

Taxonomic Diversity, Phylogeny, and Diversification of the Environmental Niche of the Genus  
*Prunus* L. with emphasis on the New World Tropics

By

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## ABSTRACT

The occurrence and diversity of *Prunus* outside of temperate North America and Eurasia has been frequently overlooked. Particularly, the Neotropics has been the region where the taxonomic knowledge of the genus was weaker with just few reports of new species and only one historical revision (Koehne, 1915). A taxonomic synopsis of all the evergreen taxa of *Prunus* currently in the Americas is presented in chapter 1 based on an exhaustive specimen revision comprising 8322 individual specimens (duplicates) corresponding to 4146 distinct botanical records housed in 94 herbaria from the Americas and Europe. A total of 246 taxa of *Prunus* (all with racemose inflorescences) comprising 227 species (plus the generally naturalized or cultivated *P. serotina*) were identified in the New World. 97 taxa with already published legitimate basionyms were accepted (out of a total 110 basionyms) and 149 taxa were identified as taxonomic novelties. After these results, the genus, traditionally considered a typical temperate taxon, now amounts its highest diversity in the tropics and particularly in the New World side. The higher number of novelties were found in the Andes, a region with a considerable environmental diversity but also with most of its ecosystems highly fragmented and adversely impacted by human activities. As part of the taxonomic studies, a full taxonomic treatment of the species of Mesoamerica was done in chapter 2 derived and complemented from a published Spanish version created during this research (Pérez-Zabala, 2015). Most of the species in Mesoamerica were previously known only by one or few specimens and since non taxonomic revision had been previously done, most specimens in herbaria (the larger portion collected in the last 40 years) remained as unidentified or misidentified. As a result, 31 species were identified and fully described for the region, including 3 cultivated and one commonly naturalized. Additionally, 11 species were recognized as novelties to science (yet to be

published), lectotypes were designated for 5 species, and 4 previously published names were categorized as synonyms. Following this study, *Prunus* was confirmed as the more diverse genus of Rosaceae (among 20 genera) in Mesoamerica.

In chapter 3, the phylogeny and evolution of the environmental niche in terms of the water regime preference was investigated across the genus considering a better representation of Neotropical species, a group that generally was absent or scarcely sampled in previous studies. *Prunus*, as an almost cosmopolitan group, exhibits a wide variety of habitat preference and many species are recognized because the tolerance to seasonality of water availability (by dryness or freeze), some with the ability to resist extreme conditions as desertic or high elevation places. In the Neotropics, even though many species are distributed in humid places, a considerable number also occupy geographic pockets of seasonally dry forest, rocky outcrops, and rain shadow patches. The best supported BEAST phylogeny suggested the split of the genus in two main clades similarly to previous studies. One comprising mostly deciduous species with solitary flower, corymbs, or racemes, plus some evergreen racemose but pubescent, leaf domatia-bearing, or with deciduous calyx. The other clade included the evergreen, glabrous and racemose species which are mostly tropical and marginally subtropical. The Neotropical species were recovered as polyphyletic with two small groups in the first clade and most of the species in a single clade within the evergreen racemose main clade. However, inconsistencies between trees inferred from nuclear and plastid regions were observed as in other studies, which suggests ancient introgressions in the racemose lineages of the first clade. Evolution of hydraulic niche (in terms of aridity index) was significantly correlated with the phylogeny and main monophyletic groups have an identifiable range of hydraulic tolerance. The current geographic wide spread of the genus seems to be favored by a retention of tolerance to water stress which even so was not identified as an evolutionary limiting

factor that impeded the adaptation to a wide variety of water regimes. Future studies about the evolution of geography, ecology and functional traits in *Prunus* should involve a greater number of tropical species considering the appreciable weight in its diversity. A better knowledge of the tropical species can effectively contribute to their conservation and additionally could contribute to improve the understanding of the response to environmental stress of economically appreciated species in cultivation.

Supplementary materials:

1. One PDF file including: 1. The best RAxML maximum likelihood tree based on the combined DNA dataset, 2. The best supported Bayesian phylogenetic tree based on the chloroplast DNA dataset, 3. The MaxEnt response curves for each species created using the variable Aridity Index, 4. The predicted maps of geographic distribution for each species modeled by MaxEnt based on predicted niche suitability, 5. The DNA alignment of 2166 bp in nexus format of the combined dataset with all the species, 6. The DNA alignment of 1871 bp in nexus format of the combined dataset with the selected species used for the comparative analyses. 7. The R script implemented for the comparative analyses of niche evolution.
2. One MS Excel files including: 1. MaxEnt niche modeling results for each species, 2. The correlation data matrices (one for all the species, and another for the Neotropical ones) of niche overlap measured with the metrics I (lower triangle) and D (upper triangle) (Species are organized following the phylogeny and data are visualized in Fig 3.4 and Fig. 3.5).

*To my father, Hector Pérez Restrepo (1933-2019).*

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## CHAPTER 1

### A TAXONOMIC SYNOPSIS OF THE EVERGREEN SPECIES (PUBLISHED AND PUTATIVELY NEW) OF *Prunus* L. IN THE NEW WORLD

#### INTRODUCTION

The economically important genus *Prunus* L. is a very distinctive member of the Angiosperm family Rosaceae Juss. characterized by a base haploid chromosome number = 8, presence of cyanogenic glycosides, foliar glands, deciduous stipules, monocarpellate solitary pistil and drupaceous fruit (Kalkman, 1965; Potter et al., 2007). The genus displays extensive morphological variation, which has been reflected in the numerous classification proposals since Tournefort times (1700), many of them segregating its members within distinct genera (see Table 1.1). Controversies about the taxonomic circumscription within *Prunus* have frequently occurred after broader taxonomic views including more extensive taxa sampling are adopted and boundaries among groups become blurred causing overlapping of morphological key characters (McVaugh, 1951b). During the last decades, many floristic studies and systematic analyses based on molecular evidence and phylogenetic approaches, have adopted as a practical reference point, the five subgenera system as proposed by Rehder (1940) (recognizing subgenera *Prunus*, *Amygdalus*, *Cerasus*, *Padus*, and *Laurocerasus* (later expanded with the inclusion by Kalkman (1965) of the genus *Pygeum*)).

<b>Author</b>	<b>Rank</b>	<b>Accepted taxa</b>
Tournefort (1700)	genus	<i>Amygdalus</i> , <i>Armeniaca</i> , <i>Cerasus</i> , <i>Laurocerasus</i> , <i>Persica</i> , and <i>Prunus</i> <i>s.s.</i>
Linné (1737)	genus	<i>Amygdalus</i> , <i>Cerasus</i> , <i>Padus</i> and <i>Prunus</i> .
(Linné & Salvius, 1753)	genus	<i>Amygdalus</i> L. and <i>Prunus</i> L.
Linné (1764)	genus	<i>Amygdalus</i> and <i>Prunus</i> (including Tournefort's <i>Padus</i> , <i>Armeniaca</i> , <i>Cerasus</i> and <i>Prunus</i> )
Miller (1768)	genus	<i>Amygdalus</i> , <i>Cerasus</i> Mill., <i>Padus</i> Mill. and <i>Prunus</i> .
Willdenow (1800)	genus	<i>Amygdalus</i> and <i>Prunus</i>
De Candolle (1825)	genus	<i>Amygdalus</i> , <i>Armeniaca</i> Scop., <i>Cerasus</i> , <i>Persica</i> Mill. and <i>Prunus</i> .
Endlicher (1836)	genus	<i>Amygdalus</i> , <i>Prunus</i> (divided in: <i>Armeniaca</i> , <i>Cerasus</i> (with <i>Cerasophora</i> and <i>Padus</i> ) and <i>Prunus</i> ) and <i>Pygeum</i> Gaertn.
Roemer (1847)	genus	<i>Amygdalopsis</i> Carr., <i>Amygdalus</i> , <i>Armeniaca</i> , <i>Cerasedos</i> Sieb. & Zucc., <i>Cerasus</i> , <i>Laurocerasus</i> Duhamel, <i>Microcerasus</i> Roem., <i>Padus</i> , <i>Persica</i> and <i>Prunus</i>
Bentham and Hooker (1865)	section	<i>Amygdalus</i> (L.) Benth. & Hook. f., <i>Amygdalopsis</i> (Carr.) Benth. & Hook. f., <i>Armeniaca</i> (Mill.) Kock, <i>Cerasoides</i> (Sieb. & Zucc.) Benth. & Hook. f., <i>Cerasus</i> (Mill.) Benth. & Hook. f., <i>Laurocerasus</i> Benth. & Hook. f. and <i>Prunus</i> .
Focke (1894)	subgenus	<i>Amygdalus</i> (L.) Focke, <i>Cerasus</i> Focke, <i>Chamaeamygdalus</i> Focke, <i>Emplectocladus</i> (Torr.) Focke, <i>Microcerasus</i> (Roem.) Focke, <i>Padus</i>

		Focke and <i>Prunophora</i> Focke. Separately, genera <i>Maddenia</i> Hook. f. & Thomson, <i>Nuttallia</i> Hook. & Arn and <i>Pygeum</i> .
Koehne (1911)	subgenus	<i>Amygdalus</i> , <i>Cerasus</i> , <i>Padus</i> , and <i>Prunophora</i> .
Rehder (1940)	subgenus	<i>Amygdalus</i> , <i>Cerasus</i> , <i>Laurocerasus</i> , <i>Padus</i> and <i>Prunophora</i> .
Hutchinson and Bentham (1964)	genus	<i>Laurocerasus</i> , <i>Padus</i> and <i>Prunus</i> .
Yu, Lu, Ku, Li, and Chen (1986)	genus	<i>Amygdalus</i> , <i>Armeniaca</i> , <i>Cerasus</i> , <i>Laurocerasus</i> , <i>Padus</i> , <i>Prunus</i> and <i>Pygeum</i> .
Shi, Li, Sun, Yu, and Zhou (2013) Phylogenetic molecular based	subgenus (and sections)	<i>Cerasus</i> , <i>Padus</i> , and <i>Prunus</i> (sections: <i>Amygdalus</i> , <i>Armeniaca</i> , <i>Emplectocladus</i> , <i>Microcerasus</i> , <i>Persicae</i> , <i>Prunocerasus</i> , <i>Prunus</i> ).

Table 1.1. Classification proposals for *Prunus* s.l.

Fuzziness of morphological evidence and lack of comparative studies evaluating homology of the main characters traditionally supporting the taxonomy (see Table 1.2) have been important causes of the classification ambiguity (McVaugh, 1951b). However, during the last three decades, several authors have tried to address the subgeneric classification supported on molecular evidence. The first attempt was an isozyme based phyletic analysis (based on cluster analysis) with 34 species representing four subgenera that corroborated some previously known taxonomic affinities within subgenera *Prunus* and *Cerasus* and showed that the rarely recognized subgenus *Lithocerasus* Ingram was not supported (Mowrey & Werner, 1990). Since the beginning of the XXI century, studies incorporated DNA data from nuclear and plastid markers, a phylogenetic perspective and better sampling, have provided novel supporting evidence for delimiting the genus

as a whole and identifying consistent groups that can be later morphologically reassessed. When consolidated, the most important insights contributed by the molecular phylogenetic studies have been: (1.) *Prunus* is a monophyletic group (Bortiri et al., 2001; Lee & Wen, 2001) including the genus *Maddenia* (Chin, Wen, Johnson, & Potter, 2010; Wen et al., 2008; Wen & Shi, 2012). (2.) Either three or four main groups have been generally recognized corresponding to the subgenera *Prunus* and *Amygdalus* seen as single group (informally called the “solitary flower” clade) (Chin, Shaw, Haberle, Wen, & Potter, 2014; Shi et al., 2013) or as separate sister clades (Hodel, Zimmer, & Wen, 2021), the subgenus *Cerasus* (informally called the “corymbose” clade) (Chin et al., 2014), and a complex non-monophyletic group (informally called the “racemose” clade) with various inconsistently nested clades that includes species traditionally placed in the subgenera *Padus*, *Laurocerasus*, the previously recognized genus *Maddenia* and some traditionally placed in the subgenus *Cerasus* (Wen et al., 2008; Zhao et al., 2016). (3.) Inconsistencies between nuclear and plastid data sets (especially about the placement of some “corymbose” and “racemose” species) that suggest ancient hybridization and allopolyploidy events (Chin et al., 2014; Hodel et al., 2021; Zhao et al., 2016; Zhao et al., 2018). And (4.) intermixing between members of *Padus* and *Laurocerasus* and segregation of the tropical species in several clades (Chin et al., 2014; Chin et al., 2010; Zhao et al., 2018). Currently, because inconsistencies among data-sets (nuclear vs chloroplast) (Zhao et al., 2018), alignment difficulties related with polyploidy (Bortiri, Oh, Gao, & Potter, 2002; Hodel et al., 2021; Zhao et al., 2016), poor informativeness of the selected markers and still very incomplete taxon sampling; a stable infrageneric classification of *Prunus* has not been achieved and consequently evolutionary informed analyses of morphology and geography are still preliminary (Bortiri, Heuvel, & Potter, 2006; Zhao et al., 2018).

<b>Plant part</b>	<b>Trait</b>	<b>Variation range</b>	<b>Taxonomic level of relevance</b>
Plant architecture	Habit	Shrub, tree	Species
	Shoot length	Short, long	Subgenus
	Shoot composition	Only leaves, only flowers, combined	Subgenus
Leaf	Leaf phenology	Evergreen, deciduous	Subgenus
	Leaf margin	Entire, toothed	Section, species
	Leaf vernation	Convolute, conduplicate	Section
Inflorescence	Inflorescence architecture	With central axis, rachis-less	Subgenus
Flower	Perianth differentiation	Conventional petals, sepaloid petals	Section
	Hypanthium shape	Campanulate, tubular	Section, species
Fruit	Fruit surface	Glabrous, pubescent	Section, species
	Pyrene surface	Pitted, smooth	Subgenus

Table 1.2 Traits more frequently used in traditional classification schemes.

In addition to the difficulties in consolidating a subgeneric classification, the species level taxonomy of *Prunus* has been characterized by excessive description and nomenclature ambiguity

(McVaugh, 1951b; Shaw & Small, 2004). *Prunus* is a relatively diverse group but with a substantial uncertainty about the number of species, with estimates varying from 150 to 400 species (Lersten & Horner, 2000; Pérez-Zabala, 2015). Intents of a broad taxonomic revision are particularly complicated considering that 1225 species scientific names have been published under *Prunus* (IPNI, 2021), with the count exceeding two thousand when names published under other previously segregated genera are considered. Moreover, an important number of names published in obscure small journals or local floristic treatments (e.g. Wight (1915)) have been circumscribed by short and vague descriptions with none or minimal taxonomic discussion and represented by single or few specimens (the oldest frequently represented by fragmentary low quality collection sets). Taxonomically, the difficulties in the species circumscriptions are related to intergradation of commonly employed species-level differentiation traits (i.e. morphometry and indument) (Rohrer, 2015; Shaw & Small, 2004), floral uniformity (Kalkman, 1965) and subtle unaccounted leaf architectural differences (Pérez-Zabala, 2015). Morphological ambiguity could be caused by frequent natural and human driven hybridization (Dickinson, Lo, & Talent, 2007; Rohrer, 2015; Shaw & Small, 2004) and underscored phenotypic plasticity (Bortiri et al., 2006).

### **The History of the Classification of the Evergreen Racemose (Mostly Tropical) New World Species of *Prunus***

The first recorded specimen of evergreen *Prunus* in New World tropics was collected by Hans Sloane (1696) in Jamaica (see Figure 1.1) and erroneously identified as a species of *Celastrus* L. species by Linnaeus (1753). However, Swartz (1800) assigned that specimen (and one collected by him in the Hispaniola) to *P. sphaerocarpa* Sw. and in addition, described a second species from

the Antilles (*P. occidentalis* Sw.). Around that time, 33 species in the genus *Prunus* (plus 6 in *Amygdalus*) were recognized (Willdenow, 1800) with four of them part of the evergreen American group (Swartz' species, *P. caroliniana* Mill and *P. serotina* Ehrh.). Schlechtendal (1839) in the first taxonomic study focused on the New World evergreen taxa (grouped under the name *Laurocerasus*) recognized 9 species (*P. occidentalis*, *P. sphaerocarpa*, *P. caroliniana*, *P. salicifolia* Kunth, *P. capuli* Cav., *Cerasus ferruginea* DC., *C. brasiliensis* Cham. & Schtdl., *P. (Cerasus) laurifolia* Schtdl. and *P. (Cerasus) samydoides* Schtdl.), widely discussed about the circumscription and distribution of the Swartz' species and identified morphological characters that today are taxonomically relevant but were ignored by many latter authors. Schlechtendal (1839) mentioned that glands placement, leaf texture and surface appearance, venation patterns, margin details, calyx persistence in fruit, presence of indumentum in some parts and stipules shape could be relevant for some species. Later, Roemer (1847) recognized 12 American evergreen species under the genus *Laurocerasus* (out of 19 in total) and proposed the first identification key based on variation of the traits: leaf relative size, shape, margin, apex, texture and lustrousness; petiole length, glands presence and placement; raceme position on the branch, grouping and posture; fruit shape and size and pyrene shape and surface.



Figure 1.1. Illustration of Sloane' collection of *P. myrtifolia* (lectotype) from Jamaica (reproduced from Sloane (1725) 2: 79, t. 193, f. 1, openly available on-line in <https://bibdigital.rjb.csic.es/>).

During the second half of the 19th century and the first years of the 20th century, 13 species published in several isolated contributions were added to the count and remarkably the Linnean name *Cerasus myrtifolia* was firstly recognized as *Prunus* (Urban, 1904) (then reducing *P.*



*sphaerocarpa* to synonymy since Swartz' circumscription of the later was partially based on the historical Sloane' first specimen). In 1915, Koehne published the only comprehensive review of the evergreen species of *Prunus* in the Americas existing up to now, distinguishing 59 taxa (47 species), 39 of them novelties (see Figure. 1.2). But Koehne himself recognized this work as provisional since most of the species were known from one or few specimens (the revision was based on just 180 specimens mainly stored in European herbaria) and decided to make practical sub-treatments by geographic units (with one or more countries), annotating that a consolidated series classification will require further work. Koehne (1915) recognized two Greges (singular, Grex: an intermediate rank between subgenus and section according to McVaugh (1951a)) in the subgenus *Padus* based on the calyx persistence in the fruit, and within them five sections based on the presence of leaves at the base of the racemes, the foliage persistence and the presence of trichomes in the primary-secondary vein junction axils (which actually are surrounding domatia). That classification was as follows:

*Prunus* subg. *Padus*

Grex *Calycopadus* (Koehne) Koehne (persistent calyx in fruits)

sect. *Neocalycinia* Koehne (evergreen, entire leaves, secondary veins basal axils with trichomes, basally leafless racemes. Tropical America.)

sect. *Calycinia* (Koehne) Koehne (deciduous, serrulate leaves, secondary veins basal axils with trichomes, basally leafless racemes. Eastern Asia.)

sect. *Iteocerasus* Presl. (deciduous (except *P. capuli* Cav. that frequently is evergreen), serrulate leaves, secondary veins base with trichomes, racemes with basal leaves. North America)

*Grex Gymnopadus* (Koehne) Koehne (non-persistent calyx in fruits)

sect. *Laurocerasus* (Schlecht.) Koehne (evergreen, entire or serrate leaves, secondary veins basal axils without trichomes, racemes without basal leaves, fruit endocarp fragile or rarely hard. Eastern Asia, Europe and tropical America)

sect. *Eupadus* Koehne (deciduous, serrulate leaves, secondary veins basal axils without trichomes, racemes with basal leaves. Eastern Asia, Europe and North America)

Most of the evergreen taxa of the Americas were placed in the sect. *Laurocerasus*, four in sect. *Neocalycinia* (all the members of that group), and one (*P. capuli*) in sect. *Iteocerasus*. For sect. *Laurocerasus* Koehne proposed subdivisions based mostly on the histological section of the leaf margin in the following way:

- Subsect 1: *Malacocraspedon* Koehne (leaf marginal cells without thickened walls; leaf apex very acute and acuminate to caudate, the surface rather dull; racemes solitary, in pairs or in groups of three; sepals frequently ciliolate; stigma unilaterally oblique or erect-oblong (rarely peltate); drupe slightly ellipsoid up to twice as long as wide. Eastern tropical and subtropical Asia).

- Subsect. 2: *Sclerocraspedon* Koehne (leaf marginal cells sclerenchyma-type, relatively compressed, with very thick walls and reduced lumen; leaves acuminate obtuse to caudate at the apex, the surface lustrous; racemes solitary; sepals rarely ciliate; stigma peltate or rather capitate; drupe globose to ellipsoid. Eastern subtropical Asia).

- Subsect. 3: *Mesocraspedon* Koehne (leaf marginal cells collenchyma-type in 2 or several layers, with thick walls and conspicuous lumen. Leaves generally obtuse and less frequently acute or acuminate at the apex, surface lustrous and less frequently dull; racemes solitary, rarely 2-4

branched; sepals not ciliate or rarely with the base barbate; stigma generally peltate; drupe various. Europe, China, Japan and America).

McVaugh (1951a) extensively discussed Koehne's classifications and found weak taxonomic support for the Greges and ambiguity in the sections circumscription due in part to over-reliance in the use of calyx persistence as key character. Later, Kalkman (1965) based on the adoption of the infrageneric grouping proposed by Rehder (1940), revised Koehne's circumscription and inner divisions of subgenus *Padus*, segregating the species of sect. *Laurocesasus* and the former genus *Pygeum* Gaertn. into the subgenus *Laurocerasus*. Also, he suggested that sect. *Neocalycinia* (restricted to America) and sect. *Calycinia* (restricted to Asia) were part of subg. *Padus*. Finally, Kalkman (1965), established that the anatomical leaf margin characters suggested by Koehne, were inconsistent within some old world species and therefore a section-level classification of *Laurocerasus* might be based on a combination of leaf margin type, leaf glands position and morphology, petal distinctiveness and fruit shape. Consequently, Kalkman proposed subdividing subg. *Laurocerasus* in the following three sections:

Sect. *Laurocerasus* Miq. (Leaves serrate or entire; glands at the base on the leaf margin, the lower side of the lamina or on the petiole; petals distinctive and (1¼-)2-8 times as long as the sepals; fruit generally ellipsoid or ovoid, sometimes globular, rarely transverse ellipsoid. Subtropical and temperate Eurasia, tropical Africa, and tropical Asia from India to New Guinea).

Sect. *Mesopygeum* (Koehne) Kalk. (Leaves entire; glands basal on the lower side of the lamina, flat to deeply depressed; petals undifferentiable or remarkably similar to sepals (up to 1½ (-2) times as long as the latter); fruit commonly transverse ellipsoid to didymous, sometimes globular, rarely ellipsoid. Tropical Asia from India to Solomon Islands and Australia).

Sect. “without name” (leaves entire, rarely serrulate or dentate (then towards the apex); glands basal on the lower side of the lamina, flat, sometimes close to the margin; petals distinctive from sepals and 1½-4 times as long as them. Fruit globular to ellipsoid, rarely transverse ellipsoid. Tropical America and some species in North America).

After Koehne (1915) taxonomic treatment and Kalkman (1965) taxonomic remarks, most of the contributions to the knowledge of the evergreen species of *Prunus* (except Pérez-Zab. (2015)) have been limited to either isolate new species descriptions or country floras compilations with minimal or neither taxonomic discussion (see Figure 1.2).

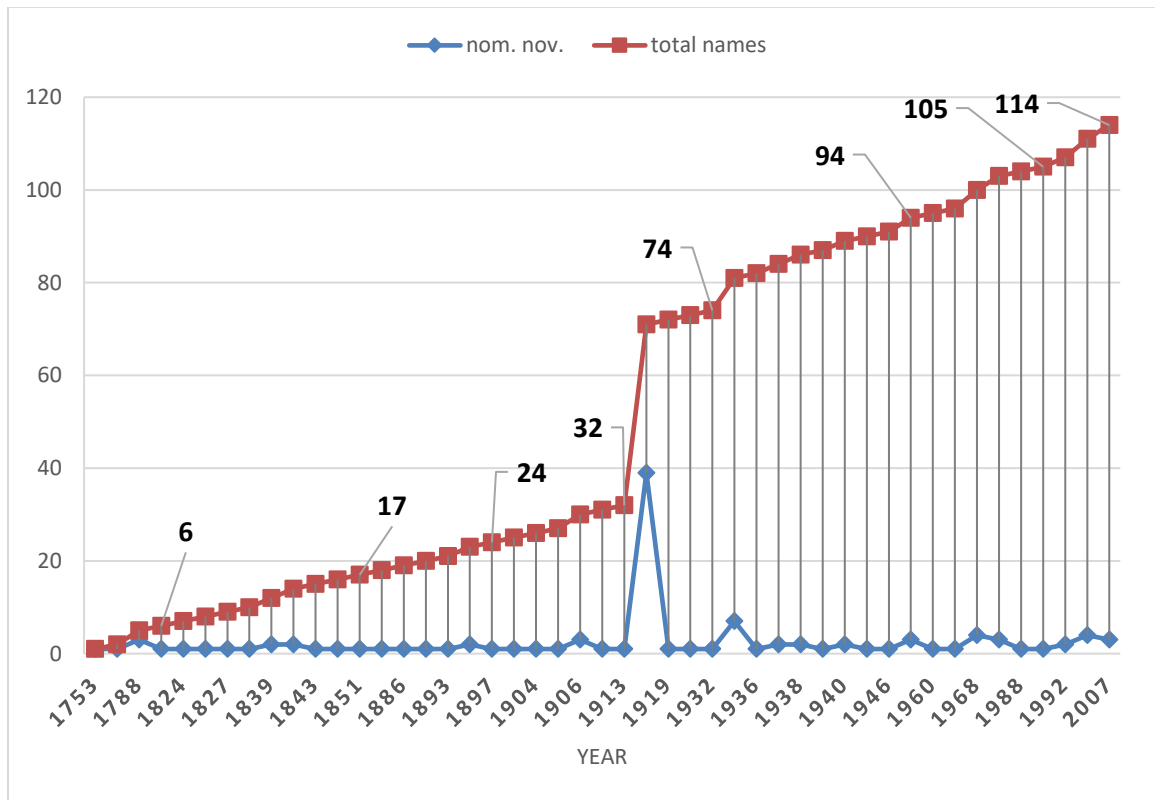


Figure 1.2. Timeline of publication of basionyms (4 illegitimate) of the evergreen taxa of *Prunus* in the Americas.

## MATERIALS AND METHODS

This synopsis is a comprehensive inventory of all potential evergreen taxa of the genus *Prunus* present in the Americas considering the exhaustive specimen revision. 8322 individual specimens (duplicates) corresponding to 4146 distinct botanical records housed in 94 herbaria from the Americas and Europe were examined for this work. Around 70% of the collections were examined physically and 30% using on-line or directly submitted high resolution images. The consulted herbaria were: A, AAU, AFP, AS, ASU, B (including B-W), BM, BR, BRH, BRIT, CAS (including DS), CAUP, COAH, COL, CR, CUVC, CUZ, CVRD, DAV, DES, DUKE, E, EAP, F, FAUC, FCQ, FMB, FURB, G, GB, GH (including ECON), GOET, HAL, HBG, HINTON, HOXA, HRCB, HSB, HUA, HUQ, INB, INPA, JAUM, K, L, LAGU, LIL, LOJA, LPB, M, MA, MCNS, MEDEL, MEXU, MHES, MICH, MO, MOL, MOLF, NY, P, PH, PMA, PORT, PSO, PY, QCA, QCNE, RB, RSA, S, SCZ, SLPM, SP, TEX (including LL), TULV, U, UC, UCR, UDBC, UEC, US, USM, USZ, VALLE, VEN, W, WAG, WFU, XAL (herbarium abbreviations following Thiers (continuously updated)). Specimens of evergreen taxa located in the continental United States (*P. caroliniana* and *P. ilicifolia* (Nutt. ex Hook. & Arn.) D.Dietr. & Arn.) were not studied in detail and hence not cited (excepting the specimens of *P. myrtifolia* from South Florida). However, as the referenced taxa have specimens collected in North Mexico or the Caribbean, they are included in the synopsis. Particularly, *P. caroliniana* is only represented by cultivated (ornamental) specimens in the study area.

The taxonomic revision was substantially supported on the possibility of compiling in DAV herbarium an important number of specimens borrowed from several US herbaria or donated for mounting. Many other specimens were studied directly when visiting 36 collections in the US

and Latin America (plus B herbarium in Germany) that allowed taking observational notes and high-resolution images of all collections. Specimen images from the rest of herbaria were gathered upon request or if available accessed online from web portals (e.g., <http://plants.jstor.org>, <http://midwestherbaria.org> or <http://reflora.jbrj.gov.br/>). and studied directly or downloaded for later examination. All the botanical records label information, specimen level curatorial notes, nomenclature and geographic data were registered and managed using the software BRAHMS (Filer, 2014 and onwards). As most of the collections missed or had incomplete or unverified geographic coordinates, manual georeferentiation was performed by interpreting each site description and assigning coordinates with the help of topographic maps, geographical-historical analyses (for older records) and online geographic databases (e.g. [geonames.org](http://geonames.org), [earth.google.com](http://earth.google.com)) following widely used guidelines (Chapman & Wieczorek, 2006). The morphological information further used for building the abbreviated descriptions, and taxonomic comments were partially handled using a java implementation of the DELTA suite of programs first developed by M. J. Dallwitz (1980) named “open-delta” which was retrieved from the Atlas of Living Australia website project (M.J. Dallwitz, Paine, & Zurcher, 2014).

Once a significative amount of collections was consolidated, databased and georeferenced, morpho-species were delimited obviating previous determinations and taxonomic proposals and inferred as perceptual hypothesis (Fitzhugh, 2005) based on a combination of shoot structure, leaf morphometric and architecture traits (venation patterns and leaf texture being especially relevant), glands morphology and placement, stipules shape, structure and placement of flowering shoots, variation in size and shape of some flower parts and fruit morphometrics (the latter two unavailable for some taxa). After an initial grouping of taxa was achieved, extensive iterative revisions were performed for solving conflicting subgroups (complex of species) to structure a stable

circumscription of the taxa. Then, previously verified type specimens were identified within the groups. At this point, abbreviate descriptions of each taxa were constructed focusing on the traits more relevant to allow differentiation from similar species. Before names were assigned to delimited taxa, all previously published names were verified checking publication validity, effectivity, and proposed combinations, and clarifying nomenclature issues. Finally, previously published descriptions were compared with the work-descriptions of corresponding taxa and consequently validated or complemented when necessary. Taxa not assigned to existing names (putative novelties) were named with dummy work names between quotation marks (reflecting affinity with a published species, a key trait, or geographic distribution), briefly described, and compared with taxa that have published names. Intraspecific taxa were recognized most of the times as geographically bounded groups of specimens in the periphery of the distribution of the leading species with morphometric and other minor consistent variation.

As not all taxa have specimen sets exhibiting all main morphological structures, others have inaccessible, incomplete, or damaged flowers and considerable number are still represented by relatively few specimens; the construction of a dichotomous taxonomic key was out of reach. In addition, the considerable number of taxa found (with a high proportion of putative novelties) and the intrinsic intergradation of characters observed among some groups of species, make too complicated to build a key at this time. In the future, a full key can be prepared in the context of a comprehensive taxonomic monograph for *Flora Neotropica* (this work is an intermediate step towards that goal) where complementary information of the morphological circumscription of many currently incomplete known taxa can be compiled, and patterns of variation of some diagnostic characters can be better understood.

As a practical decision to organize the high number of taxa here found in the absence of a sectional or serial classification of the evergreen species as a whole (integrating New World and Old World species), this manuscript was structured sorting taxa based on geographic affinities resembling partially Koehne (1915) but using natural boundaries instead of country borders. The delimitation of areas is supported on the identification of repetitive patterns in the distributions defined by a combination of latitudinal range, altitudinal thresholds, geographic barriers, climate preferences and geologic (and plate tectonic) history. Species that are present in two or more regions were assigned to the area with most of the records noticing that in all cases secondary regions have lot fewer records and frequently they are located close to the boundary with the main one. The taxa were assigned to the following regions designated from north to south:

**Central and North Mexico:** taxa distributed in the continental region west and north of the Isthmus of Tehuantepec (a lowland area dividing the Chiapas highlands from the Sierra Madre del Sur that has been considered a biogeographical boundary (Morrone, 2020)). This includes all the altitudinal gradient from lowlands to high elevation locations in the three main Mexican mountain systems (Sierra Madre del sur, Occidental and Oriental), the Central Plateau and Baja California peninsula.

**Mesoamerica and the Caribbean:** taxa distributed mainly in the Caribbean islands north of Venezuela up to southern Florida and in the Mesoamerican region as defined in the *Flora Mesoamericana* floristic project (Knapp, 2002).

**Northern Andes:** taxa mainly distributed in the Andes of Venezuela, Colombia, and Ecuador (down to the Jubones desertic basin located in the boundary between the provinces of Azuay and Loja) and predominantly over 1500 meters elevation.



**Central Andes:** taxa distributed from southern Ecuador (Loja province) to northern Bolivia (around the upper Beni (Yungas) inter-Andean valley) and approximately above 1000 m elevation.

**Southern Andes:** taxa mostly distributed in foothills and highlands from the northern Andes of Bolivia (south of the Yungas valley) down to northwest Argentina (in the province of Tucuman) and above 500 m elevation.

**Amazon, Guianas, and northern South America lowlands:** taxa distributed generally below 1000 m (or 1500 m in some places with pronounced Amazon to Andes gradients) elevation in the Amazon and Orinoco basins, the lower foothills of the Andes and the Guiana shield highlands (in the latter more frequently over 1500 m).

**Southeastern South America:** lowlands and mid-elevation places (principally the Brazilian central highlands and the Espinhaço mountains) covering central, east, and south Brazil, Paraguay, Uruguay, southeast Bolivia and northeast Argentina. Comprises the bioregions of Atlantic Forest, Cerrado, Caatinga, Pantanal and Chaco as identified by Olson et al. (2001).

In summary, for each taxon I provided (1) a full list of synonymy and type specimens for already published accepted names (2) an abbreviated commented description based on the more relevant characters and taxonomic comparisons with similar published taxa (except for the species covered extensively in the Mesoamerican treatment (chapter 2) that have just reduced descriptions); (3) an abbreviated statement about distribution referred to the specific geographic units delimiting the locations (e.g. orography, rivers, vegetation types); (4) the elevation range; (5)

local names (following information in the specimens); (6) a full citation of specimens examined and (7) distribution maps in an appendix at the end of the treatment.

## RESULTS AND DISCUSSION (TAXONOMIC TREATMENT)

A total of 246 evergreen (racemose) New World taxa of *Prunus* comprising 228 species (including *P. serotina*) were here identified. Most of the taxa are distributed in the tropical region but some can occur in the subtropics (see Corlett (2013) for a delimitation). *P. gentryi*, *P. ferruginea*, *P. ilicifolia*, *P. serotina* and *P. caroliniana* in the north (Mexico and the USA) and *P. brasiliensis*, *P. chamissoana*, *P. ligustrina*, *P. oleifolia*, *P. omissa*, *P. subcoriacea*, *P. ulei* and 5 proposed new species in the south (Brazil and Uruguay). 97 taxa with already published legitimate basionyms were accepted (out of a total 110 basionyms) and 149 taxa were identified as taxonomic novelties (see Table 1.3). Considering that the genus in the past has been mostly subject of sparse taxonomic studies with only one historical revision (Koehne, 1915), and the historical absence of group specialists curating herbaria (except the prematurely truncated intent by C.L. Li (Aymard & Li, 1997)), the high amount of new taxa identified in this revision is not unexpected. In addition, since more than 60% of the specimens have been collected after 1980 (see Figure 1.3), in part because the flourish of floristic studies in the tropics supported by main US herbaria as MO, NY and F and the growth of Latin American collections, the opportunities for discoveries have significantly increased (Bebber et al., 2010).

Area	Total taxa	Taxa nov.	Taxa exclusive to that area
Central and North Mexico	35	17	22
Mesoamérica	37	21	24
Caribbean (Antilles)	5	1	3
Northern Andes	35	22	25
Central Andes	41	32	39
Southern Andes	37	23	15

Amazon, Guianas, and northern South America	33	22	10
Southeastern South America	41	21	17
<b>TOTAL</b> (excluding shared taxa between areas)	<b>246</b>	<b>149</b>	

Table 1.3. Inventory of taxa of evergreen *Prunus* in the Americas (Mesoamerica and Caribbean shown separated).

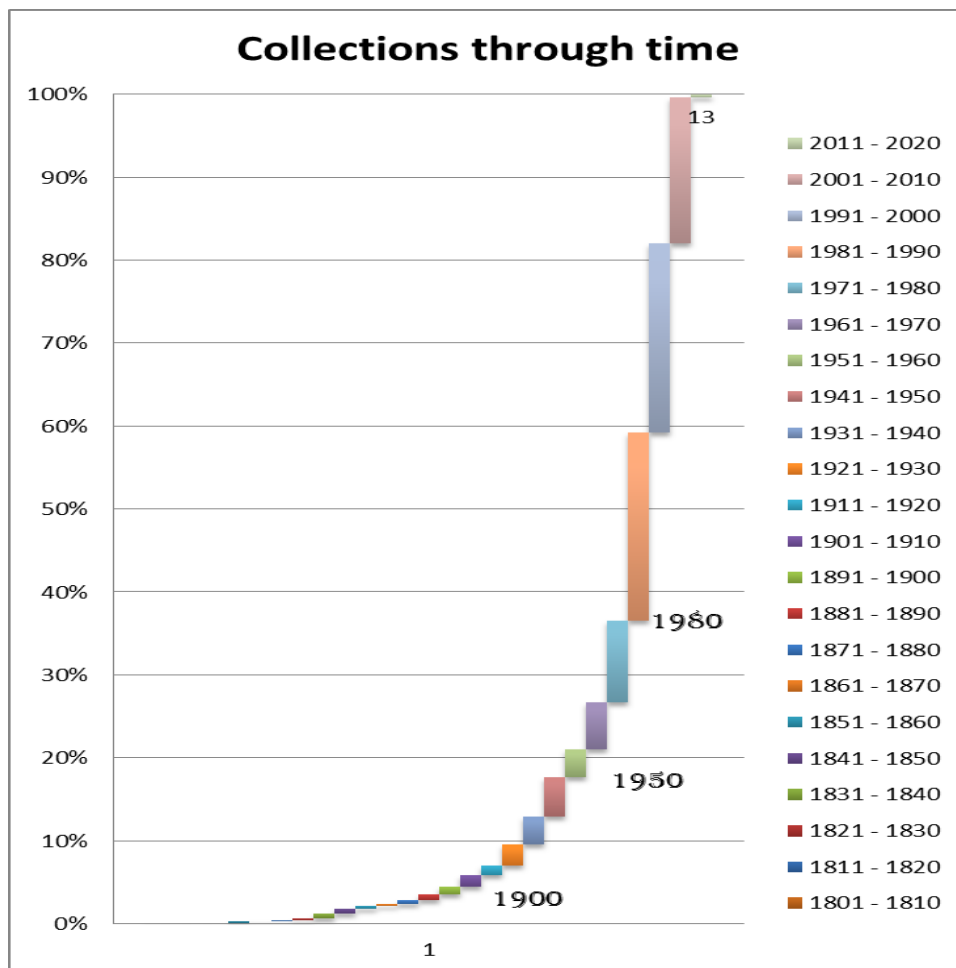


Figure 1.3 Cumulative proportion through time of specimens of *Prunus* collected in tropical and subtropical America.

## TAXONOMIC TREATMENT

### CENTRAL AND NORTH MEXICO (35 taxa in total including those reported in other areas)

1. *P. brachybotrya* Zucc., Abh. Akad. Munch. 2: 348. 1837. *Laurocerasus brachybotrys* (Zucc.) M.Roem., Fam. Nat. Syn. Monogr. 3: 91. 1847. Type: Mexico: *Karwinski sn* (sintypes M!).

*Prunus laurifolia* Schldtl., Linnaea 13: 404. 1939., not *P. laurifolia* Decne Nouv. Ann. Mus. Par. iii. 458, 1834 (illeg). (formerly described but not named by Schldtl. in Linnaea 5: 570-571 (1830)). Type. Mexico: Veracruz, Xalapa, Cuesta Grande de Chiconquiaco, Mar 1859, *Schiede 579* (lectotype HAL!).

*Prunus schiedeana* Steud., Nomencl. Bot. [Steudel], ed. 2. ii. 404. 1841, (a replacing name for *P. laurifolia* Schlcht. 1839).

*Laurocerasus mexicana* M. Roem., Synops. III. 90. 1847. (illeg) (a replacing name for *P. laurifolia* Schlcht. 1839).

Distinguished by the leaves oblong-elliptic to oblong-ovate, coriaceous, 8.5-15.5 x 3.2-5.8 cm, slightly asymmetric, the base rounded to obtuse, apex acute, petioles 13-23 mm long, venation pattern weak brochidodromous, numerous secondary veins (12-14) sinuous and relatively straight along its lower half, emerging at 50-65 degrees from the midrib, slightly prominent below and plain above by drying contrastingly compared with the background, intersecondaries short and at the same rank than tertiaries which are irregular reticulate and inconspicuous, and 2 elliptic glands located at 0-3 mm from the base and attached to the midrib. The floriferous shoots are erect to sub-erect, 2-5.5 cm long, the flowers have pedicels 2-5 mm long, hypanthium wide campanulate 2.7-3.3 mm wide and anthers 0.8-1 mm long. The fruits are globose to ovate, 8-10 x 9-10 mm.

Similar to some new species from eastern Mexico but comparisons are made under them. In herbarium collections it has been confused with *P. erythroxyton* which is distributed in the pacific side of Mexico and has chartaceous leaves with non-basal glands, shorter petioles, looser racemes and bigger ovate fruits. This name was mistakenly attributed to many Mesoamerican specimens that are now recognized as a new different species (Pérez-Zabala, 2015).

**Distribution.** Distributed mainly in mid elevation evergreen (pine and oak) forests of the state of Veracruz (Mexico).

**Elevation range.** 1200 – 2700 m.

**Local names.** capulí montés (Mexico).

**Material examined.** (42) MEXICO. Chinantla, 1200 m, May 1841, *Liebmann, F. 1724* (UC,US); Oaxaca: Distrito de Feoliltan, Camino de Huauilla, 2400 m, 23 May 1921, *Conzatti, C. 4126* (MEXU,US); Veracruz: Rafael Lucio, Rancho El Chico, 4-5 km después de Piletas, camino Xalapa-Perote, 1900 m, 14 Feb 1979, *Castillo-Campos, G. 457* (MEXU,XAL); Xico, Barranca La Funda, a un lado de Tonalaco-Oxtlapa, 2450 m, 17 Apr 1987, *Cházaro, M. 4663* (MEXU,XAL); Atlahuilco, 2 km carretera de Zihuateo a Tlaquilpa, 2100 m, 28 May 1986, *Cortés, G. 703* (XAL); MINAS, LAS, Cerro La Tolva, entrando por Casa Blanca, 2400 m, 14 Dec 1989, *Durán-Espinosa, C. 1016* (XAL); Tlacolulan, Cerro de la Magdalena, 2600 m, 7 Feb 2009, *Jimeno-Sevilla, D. 927* (MEXU,XAL); Acatlan, Rancho El Mirador de José Romero al sureste del poblado de Acatlán, 1640 m, Jul 2008, *López C., B. 203* (XAL); Acajete, Plan de Sedeño, 1900 m, 6 Feb 1976, *Marquez R., W. 505* (F,MEXU,TEX,UC,XAL); Coscomatepec, 3 km al SE de la antigua Xicola, Cima del Cerro La Masdalena,, 1700 m, 29 Apr 1987, *Martínez P.; J.L. 1303* (MEXU,MO,XAL); Calchualco, Rincón de Atotonilco, 5 km al W, 2400 m, 29 Apr 1986, *Martínez, J.L. 1207* (XAL); Veracruz, camino a Orizaba, 2200 m, 1857, *Müller, F. 623* (NY,XAL); Xico, Barranca El Caracol, 2200 m, 20 Apr 1983, *Narave F., H. 421* (XAL); Filo de La Rayuela, 1 km al SE de la Ranchería Rusia, 2700 m, 21 Apr 1983, *Narave F., H. 456* (MEXU,NY,XAL); Calchualco, 4.5 km SW of Escola on the Coscomatepec-Escola-Jacal road, 2300 m, 1 May 1983, *Nee, M. 27065* (GH,MO,NY,XAL); Huayacocotla, Viborillas, camino a Palo Bendito, 2140 m, 20 Jul 1971, *Nevling jr.; L.I. 1958* (XAL); Acultzingo, Puente del Aire, 1900 m, 12 Feb 1989, *Oliva R., H. 486* (MEXU);

Tlalnelhuayocan, Xalapa, 2 km al NW, camino a San Antonio, 1400 m, 28 Mar 1990, *Pérez-García, I. 199* (XAL); Chiconquiaco, 6 km al NE, camino a Vaquería, 2050 m, 16 Dec 1988, *Pérez-García, I. 382* (XAL); *ibidem*, 2050 m, 31 Mar 1990, *Pérez-García, I. 435* (MEXU,XAL); Tehuipango, Tzompoaleca, 1970 m, 7 Apr 2000, *Rincón G., A. 1306* (XAL); La Perla, Cumbre de la Zanja, camino Xometla-La Perla, 2230 m, Mar 1967, *Rosas R., M. 201* (CAS,GH,MEXU,XAL); Xalapa, Jun 1829, *Schiede* (BM,GH,HAL,NY); Xalapa, 1300 m, *Schlechtendal, D.F.K. ND* (XAL); Calchualco, Totosinapa 10 km. al N.W. de Calchualco, 2500 m, Apr 1983, *Tenorio L., P. 3683* (CAS,MEXU,MO,XAL); Acatlan, 1650 m, 3 Apr 1971, *Ventura A., F. 3405* (NY); Acajete, La Joya, 2100 m, 29 Apr 1971, *Ventura A., F. 3529* (DS,NY,US); Orilla de arroyo, 1880 m, 11 Jun 1971, *Ventura A., F. 3690* (ASU,BRIT,DS,UMO); Plan de Cedeña, 1750 m, 22 Mar 1974, *Ventura A., F. 9769* (MEXU,MO,XAL); Jilotepec, Vista Hermosa, 1200 m, 4 Jul 1974, *Ventura A., F. 10256* (XAL); Acajete (antes San Salvador Acajete), 1900 m, 8 Apr 1975, *Ventura A., F. 11168* (MEXU,XAL); Chiconquiaco, Rancho Nuevo, 1850 m, 28 Apr 1975, *Ventura A., F. 11246* (MEXU,MO,XAL); Acajete, Mazatepec, 1950 m, 2 Apr 1977, *Ventura A., F. 13896* (MEXU,XAL); Acatlán, 1650 m, 3 May 1977, *Ventura A., F. 13983* (MEXU,MO,XAL); Acajete, Masatepec, 2000 m, 8 Jun 1972, *Ventura A., F. 14068* (MEXU,MO,XAL); Acatlán, 1650 m, 19 Feb 1979, *Ventura A., F. 15777* (GH,MEXU,XAL); Acajete, Joya Chica. (wrong alt in orig label-1050m), 2050 m, 24 Feb 1979, *Ventura A., F. 15812* (MEXU, MO,XAL); Acatlán, 1650 m, 16 May 1980, *Ventura A., F. 17165* (CAS,MEXU,XAL); Las Vigas de Ramirez, Barranca de Loma Alta, NW de Calavernas, 2300 m, 14 Feb 1990, *Zamora C., P. 2098* (MEXU,XAL); Acajete, Plan de Sedeño, entrada, 1900 m, 30 Apr 1994, *Zamora C., P. 3880* (XAL).

2. *P. caroliniana* (Mill.) Aiton, Hort. Kew. 2: 163. 1789. *Padus caroliniana* Mill. Miller Gard. Dict. 8<sup>th</sup> ed. *Padus* no. 6. 1768. Type: unknown.

It can be recognized by the elliptic to oblanceolate leaves, 5-10 x 1.5-4 cm, lustrous above and slightly lustrous below, with base obtuse to cuneate, apex acute and mucronate at the end, margin entire to irregularly spinose serrate, petioles 4-8 mm long, venation pattern weak brochidodromous, 8-10 secondary veins progressively arcuate emerging at 50-60 degrees from the midrib, tertiaries irregular reticulate, major lateral veins generally little conspicuous, plain below and slightly impressed above and 2 glands placed

between the first and second pair of secondary veins at 8-16 mm from the base and 3-5 mm from the midrib (in some specimens can be absent). The floriferous shoots are sub-erect, 2-4.5 cm long; the flowers have pedicels 3-6 mm long, hypanthium hemispherical 2-2.5 mm wide and anthers 0.6-0.8 mm long. The fruits are ovoid apiculate 10-14 x 8-10 mm.

**Distribution.** Native to southeast United States, only known as cultivated in the Mexican city of Monterrey and the island of Cuba.

**Elevation range.** 0 - 200 m.

**Material examined.** (3) CUBA. Cienfuegos: Soledad, Harvard Tropical Garden, 6 Mar 1926, *Jack, J.G. 4201* (US); 20 Feb 1928, *Jack, J.G. 5696* (US). MEXICO. Nuevo Leon: campus of Instituto de Estudios Superiores en Medicina. 4 Aug 1970. *Williams, S. 60* (EIU)

3. *P. erythroxyton* Koehne, Bot. Jahrb. Syst. 52: 309. 1915. Type: Mexico: Colima, Mesa del Cerrero, *Kerber A. 23* (sintypes, B destr.).

It is characterized by the leaves elliptic, chartaceous, 9-12 x 3.5-5.5 cm, the lower surface drying pale brown or green, with flexuous petiole 7-10 x 0.8-1.2 mm, venation brochidodromous festooned, secondaries arcuate, tertiaries percurrent and perpendicular to the midrib connecting with numerous intersecondaries, lateral veins slightly prominent below and plain above and 2 to 4 elliptic glands (0.5-1 mm long), the lower pair located at 2-7 mm from the base and 0.5-4 mm from the midrib (sometimes submarginal) and the upper one at 10-14 mm from the base and 5-8 mm from the midrib. The floriferous shoots are suberect, 2.5-5 cm long; the flowers have pedicels 3-5 mm long, hypanthium hemispherical up to 4 mm wide and anthers 1-1.2 mm long. The fruits are ovate and apiculate, 10.5-12 x 9-10 mm.



Specimens of this taxon has been confused with *P. brachybotrya* which has bigger and more coriaceous leaves with longer petioles, basal glands, more obscure minor veins, flowers with larger petals and anthers, and smaller globose fruits.

**Distribution.** Distributed in mid-elevation forests along the pacific slopes of the western Sierra Madre of Mexico in the states of Colima, Guerrero, and Jalisco.

**Elevation range.** 1100 – 1600 m.

**Local names.** coralillo (Mexico).

**Material examined.** (3) **MEXICO. Colima:** Comala, La mesa de la Yerbabuena, volcan de fuego, 1600 m, 19 Mar 1994, *Cházaro, M.* 7282 (NY, TEX,XAL); **Guerrero:** Atoyoc de Alvarez, 15 km al NE del Paraiso, 1100 m, 19 Aug 1985, *Soto-Núñez, J.* 10112 (MEXU).

4. *P. ferruginea* (DC.) Steud., Nomencl. Bot. (ed. 2):2: 403. 1841. *Cerasus ferruginea* DC., Prod. 2: 540. 1825. Type: Mexico: Jalisco, *Sessé, M.; Mociño, J.M.* 3812bis (possible types at F!, MO!).

*Prunus zinggii* Standl., Publications of the Field Museum of Natural History, Botanical Series 11(5): 157. 1936. Type: Mexico: Chihuahua, Southern Chihuahua, *Zingg, RM A34* (holotype, F!).

This species is easily distinguishable because the leaves coriaceous, ovate-oblong to elliptic-oblong, 6-13.5 x 2.8-6 cm, hirsute ferruginous on the lower surface of the leaves mainly along the veins, also on the twigs and petioles, with petioles relatively short, 5-10 x 1.3-2 mm, base rounded to cordate and apex obtuse to truncate, venation pattern brochidodromous, secondary veins (12-13) relatively straight, the lower pair perpendicular to the midrib, the rest varying from 50-70 degrees, prominent below and impressed above, intersecondaries emerging at 70-90 degrees from the midrib, tertiaries sinuous percurrent, and 2

basal elliptic glands (1-2 mm long) attached to the midrib. The floriferous shoots are suberect, 4-6 cm long, densely arranged on previous reiterations, pedicels 3-6 mm long, hypanthium widely campanulate, 4-5 mm wide, anthers 0.6-0.8 mm long. The fruits are narrow ovate, 13-18 x 9-11 mm.

This species is similar to *P. ochoterena* which has generally larger leaves with longer petioles and less dense indumentum and longer racemes with bigger flowers. Also, it has been confused with *P. cortapico* which can have some overlapping distribution but has larger relatively glabrescent leaves with longer petioles, longer racemes and bigger fruits.

**Distribution.** Distributed in subhumid mid-elevation areas frequently in forests at the bottom of ravines of the western Sierra Madre from the state of Jalisco at the south to the state of Chihuahua at the north.

**Elevation range.** 510 – 2450 m.

**Local names.** cortapico, hachuka, huaparin, jeco, wiko, wikowa (Mexico).

**Material examined.** (46) **MEXICO.** Sine loco, 1848, *Gregg, J. 978* (MO); **Chihuahua:** Batopilas, Wimivo, between la Bufa and Batopilas, 950 m, 23 Jan 1972, *Bye, R. 3226* (GH); West of La Bufa, 950 m, 29 Oct 1973, *Bye, R. 5685* (GH,MEXU); Guazapares, La Paz region, eastern slopes of Barranca de Chinipas, 1100 m, 24 Jul 1974, *Bye, R. 6460* (GH); 900 m, Nov 1974, *Bye, R. 6803* (GH); Batopilas, W of La Bufa, 1036 m, 22 Mar 1979, *Bye, R. 9188* (ASU,P); Batopilas, Tres hermanos, Arroyo el Novillo, 1550 m, 9 May 1945, *Hewitt, W.P. 29* (GH); Almaden, 600 m, 22 Jun 1937, *LeSueur, H. 1261* (GH,MO,TEX); **Durango:** Mezquital, 2000 m, 23 Oct 1983, *Breedlove, D.E. 59260* (CAS); **Jalisco:** Tonalá, 1300 m, 14 Mar 1996, *Acevedo, R. 1542* (NY,TEX,XAL); Bolaños, Cañada 1.5 km al O de las Berenjenas, 2 a 3 km al W de las Berenjenas o 7 a 8 km al W del Crucero, 1850 m, 2 Jul 1996, *Calónico Soto, J. 2425* (GH,MEXU,MO); Arroyo EL Terrero. Creciendo en el cauce del arroyo, 1850 m, 31 May 2001, *Carrillo-Reyes, P. 1958* (MEXU); Barranquilla en mirador antes de llegar a San Cristobal de la Barranca, 1400 m, 20 Jan 1987, *Cházaro, M. 4482* (XAL); Jocotepec, San Juan Cosala a las Trojes, 2050 m, 27 May 1990, *Cházaro, M. 6241* (MEXU); Tequila, Volcan de Tequilo, 2450 m, 15 Mar 1991, *Cházaro, M. 6582* (TEX,XAL); Arroyo Milpillas, carretera

Tesistan-San Cristobal de la Barranca, 1550 m, 29 Mar 1993, *Cházaro, M. 7150* (MEXU,NY,XAL); Guadalajara, Barranca de Oblatos, 1500 m, 4 Jan 1931, *Erlanson, C.O. 19* (US); Bolaños, 1 km al SE de Las Berengenas o a 6 km al W del Crucero de Bolaños-Los Amoles 'Vanderitas', 1950 m, 3 Jul 1996, *Flores F., G. 4624* (GH,MEXU,MO); 30 km al norte de Ixtlahuacan del Rio, 1200 m, 25 Apr 1987, *Flores-M., A. 547* (MEXU); Jocotepec, En frente de San Juan de Cosalá, 1900 m, 10 May 1987, *Machuca N., J.A. 5804* (MEXU); Atengo. Sierra verde, paraje rancho verde, 2100 m, 1 Mar 1992, *Machuca N., J.A. 6811* (TEX); Guadalajara, Rio Santiago, 20-25 miles n-ne of Guadalajara, between Milpillars and Escalon, 1400 m, 12 Apr 1951, *McVaugh, R. 11971* (US); road between Ayutla and Mascota, 1850 m, 30 Apr 1951, *McVaugh, R. 12197* (NY); 4.5 miles n-ne of Talpa de Allende, north of the road summit, 1450 m, 12 Oct 1960, *McVaugh, R. 20217* (US); Talpa, mounts near Jalpa, 1500 m, 1 Mar 1897, *Nelson, E.W. 4023* (GH,US); Mascota, 1545 m, 8 Mar 1995, *Panero, J.L. 5592* (CAS,MEXU,TEX); Barranca , near to city, 1100 m, 21 May 1889, *Pringle, C.G. 3025* (GH,US); Barranca , near to city, 1300 m, 6 May 1893, *Pringle, C.G. 5485* (US); Acátic, Barranca de Agua fria, 1500 m, 13 Apr 1992, *Ramírez-Delgadillo, R. 2648* (MEXU); Tala. Bosque escuela "La Primavera". Arroyo "los Letreros", 1450 m, 19 Mar 1988, *Rodríguez C., A. 1206* (XAL); **Nayarit**: Tepic, Volcan Sanganguey, 1650 m, 4 Jan 1965, *Breedlove, D.E. 8061* (CAS); 3 km al Sw del Izote, camino al Cuarenteño, Cerro San Juan, 1200 m, 13 Apr 1990, *Flores F., G. 1915* (MEXU, MO,XAL); Jalisco, Xalisco. 4 km al NW del entronque a Cofradia de Chocolon-Xalisco, 1080 m, 17 May 1994, *Flores F., G.; Gabriel 3480* (MO); km 15-18 camino Jala-Seboruco, 1300 m, 4 Feb 1985, *Téllez V., O.; Oswaldo 8234* (MEXU); Tepic, A 9 km al NE de Camichín de Jauja, por la brecha a Potrero Grande que lleva a la base o falda del Volcán Sanganguey, 1760 m, 31 Mar 1987, *Téllez V., O.; Oswaldo 10125* (MEXU,MO); En la base del Cerro Sanganguey, a 20 km al SE de Tepic, 1400 m, 17 Jun 1987, *Téllez V., O.; Oswaldo 10384* (MO); 4 km al W de Chapalilia, 25 km S de Tepic, 1200 m, 30 May 1966, *Wilson, J.S. 11075* (TEX); **Sinaloa**: Culiacán, El Guayabito, 45 km al norte de Culiacan, 750 m, 23 Mar 1996, *Vega A. 8971* (MEXU); **Sonora**: Alamos, La Vinateria, 740 m, 26 Dec 1990, *Felger, R. 90-712* (CAS); Tepopa, Rio Mayo, Arroyo Tepopa, above old ranch site, 1080 m, 16 Mar 1993, *Fishbein, M. 1005* (UC); Arroyo el cobre, 1 km south of Choquincahui, 510 m, 17 Mar 1995, *Fishbein, M. 2186* (TEX); Upper sonoran, shady oak canyon, 850 m, 2 Jun 1936, *Gentry, H.S. 2216* (GH,MO,UC,US); Curohui, Rio Mayo, 1067 m, 4 Apr 1938, *Gentry, H.S. 3658* (F,GH,MO,UC); Alamos, In Arroyo Santa Barbara, S of Rancho Santa Barbara, 1100 m, 31 May 1993, *Jenkins, P. 93-74* (ASU,MO).

5. *P. gentryi* Standl., Field Mus. Nat. Hist., Bot. Ser. 17(2): 194. 1937. Type: Mexico: Chihuahua, Sierra Canelo, Rio Mayo, *Gentry, H.S. 2514* (isotypes, US!).

*Prunus gentryi* Standl. f. *flavipulpa* Lafer., Phytologia 65(6): 482. 1989. Type: Mexico: Chihuahua, Nabogame, 1800 m, 2 Aug 1988, *Laferrière, J.E. 1600* (holotype, ARIZ; isotypes, F!, MEXU!, MO!, UC!, US!)

This species is characterized by the ferruginous puberulent indument on the new reiterations, the leaves ovate-oblong coriaceous, 2.5-7.5 x 1.2-2.7 cm, slightly lustrous above, with petiole 8-16 x 0.5-0.8 mm, base obtuse to truncate, apex acute, venation pattern eucamptodromous-like, secondaries (8-10) emerging at 50-60 degrees, tertiaries inconspicuous, lateral veins plain on both sides, and 2 glands located marginally at 2-4 mm from the base and frequently creating an enation. The floriferous shoots are erect, 2.5-3.5 cm long, the flowers have pedicels 2-4 mm long, hypanthium rotate, 2.5-3.8 mm wide, sepals deltoid 1.2-1.8 mm long, excurved and persistent in fruits (then reflexed), petals up to 3 mm long and wide, and anthers rounded, 0.4-0.6 mm long. The fruits are ovate, 8-10 x 4-6 mm with fleshy mesocarp.

This species is close to *P. rhamnoides*, but in general it has smaller coriaceous leaves without domatia, obscure venation and shorter racemes with bigger flowers.

**Distribution.** Distributed in semiarid oak-pine type forests in the northern part of the western Sierra Madre in the states of Chihuahua and Sonora.

**Elevation range.** 1500 – 2200 m.

**Local names.** wasiki' (Mexico).

**Material examined.** (5) MEXICO. Chihuahua: Rancho Trigo, Sierra Charuco, Sierra Madre occidental, 1500 m, 26 Apr 1948, *Gentry, H.S. 8135* (DES,DS,UC,US); Guaynopa County, 1800 m, 3 Aug 1937, *LeSueur, H. 87* (MO); Sonora: 0.8 km west of El Aguajito on slopes of Mesa Chiquita, 18.1 km north-northwest of Yecora on the

Mesa Grande-Santa Rosa road; deep canyon with Cupressus and large pines, oak woodland on slopes, 1599 m, 26 May 2004, *Reina G.; Ana 2004-577* (MO).

6. *P. ilicifolia* (Nutt. ex Hook. & Arn.) D.Dietr., Synopsis Plantarum 3: 43. 1843. *Cerasus ilicifolia* Nutt. ex Hook. & Arn., The Botany of Captain Beechey's Voyage: 340. Plate 83. 1841. Type: unknown.

Characterized by leaves oblong-ovate to suborbiculate, 3–8 × 2.5–4.5 cm (measurements restricted to Mexican specimens), lustrous above and opaque below, with petiole 3–12 mm long, base usually broadly rounded to subcordate and abruptly decurrent into the canaliculated petiole, apex acute to truncate, margin spinose-dentate to spinose-serrulate, frequently undulate; venation pattern brochidodromous festooned, secondaries (9-12) emerging straight at 50-60 degrees from the midrib and sinuous, tertiaries irregular reticulate, quaternaries open dendritic, major and minor veins slightly prominent below, impressed above, and 2(-4) glands placed marginally or submarginally at 2-7 mm from the base and sometimes forming an enation. The floriferous shoots are erect to sub-erect 3-8 cm long, the flowers have pedicels 2-4 mm long, hypanthium broadly campanulate, 3-4 mm wide and the anthers are 0.7-0.9 mm long. The fruit is subglobose to ovate, apiculate and asymmetric, 12-15 x 11-13 mm.

The distribution restricted to Baja California (and California in USA) and the combination of leaves spinose dentate with intricate venation and marginal glands, make this species easily differentiable from other neo-tropical and subtropical taxa.

**Distribution.** Distributed from southern Baja California in Mexico to northern California in the USA.

**Elevation range.** 16 – 1530 m.

**Local names.** Islay (Mexico).

**Material examined.** (14) **MEXICO.** San Pedro Martin Mountains, desde Santo Tomás a San Antonio, 1500 m, 28 Jul 1905, *Goldman, E.A. 1267* (US); **Baja California:** Sierra San Luis, 26-30 miles north of Punta Prieta, 1000 m, 1 Apr 1950, *Gentry, H.S. 8917* (US); Ojos Negros Rancho, From Ensenada to Ojos Negros, 10 - 20 miles E of Ensenada, 500 m, 31 May 1905, *Goldman, E.A. 1113* (US); La Huerta, at west base of Hanson Laguna, 850 m, 2 Jun 1905, *Goldman, E.A. 1121* (US); Canyon north of the road about 2 miles inland at the northern end of Guatay Grade, 24 miles north of Ensenada, 16 m, 11 Sep 1929, *Wiggins, I.r.a. 3989* (MO); Baja California. Hillside near summit 6-8 miles west of Ojos Negros Rancho, 870 m, 14 Sep 1929, *Wiggins, I.r.a. 4066* (MO,US); **Baja California Norte:** La Rumorosa, Cantu Grande, Near Km 2871. 6 road miles east of La Rumorosa, 1100 m, 22 May 1966, *Moran, R. 13148* (UC); Sanzul, 28 May 1882, *Orcutt, C.R.* (US); **Baja California Sur:** Cerro de la Giganta, Arroyo Hondo, near base of cliffs on north side of Cerro, 700 m, 27 Nov 1947, *Carter, A. 2087* (US); Sierra de la Giganta. Cañada south of Rancho de Los Encinos, Valled de Los Encinos (S side of Cerro Giganta), 800 m, 7 Jun 1963, *Carter, A. 4562* (MO, SLPM); Arroyo Undo Ranch, Loreto, 427 m, 26 Oct 1930, *Jones, M. 27072* (MO); Sierra San Francisco, Arroyo near Rancho de la Higuera, 1000 m, 22 Feb 1964, *Moran, R. 11729* (US); Cerro la Laguna, highest peak of Sierra San Francisco, 1530 m, 24 Nov 1976, *Moran, R. 23856* (MO); Rancho la Laguna, Sierra San Francisco, 1350 m, 24 Nov 1976, *Moran, R. 23882* (MO,US).

7. *P. ochoteranae* D. Ramírez, Anales Inst. Biol. Univ. Nac. México 16: [353]. fig. 1. 1946. Type. Mexico: Morelos, Tepoztlán, Barranca del Tepzteco, bajando del Parque a Tepztlán, *Ramírez Cantú, D 65* (holotype, MEXU!).

This is a previously poorly known species of central Mexico that can be distinguished by the hirsute to pubescent ferruginous indument (albeit sometimes sparsely tomentose) on twigs, petioles and veins in the lower side of the leaves, leaves oblong-elliptic to oblong-ovate coriaceous, 11-15.5 x 3.8-5.2 cm, with base rounded and truncate in the intersection with the petiole, apex acute, venation pattern weak brochidodromous, secondary veins arcuate and emerging at 60-70 degrees from the midrib, intersecondaries rare and short, tertiaries percurrent sinuous and perpendicular to the midrib, and 2 elliptic glands positioned

basally and attached to the midrib. The floriferous shoots are suberect, 4.5-8 cm long; the flowers have pedicels 5-8 x 0.3-0.5 mm, hypanthium widely campanulate, 4-5 mm wide, petals narrowly spatulate and anthers 0.9-1.4 mm long. The fruits are prolate apiculate, 18-28 x 13-18 mm.

This species is close to *P. cortapico* and *P. ferruginea*; (and somehow to *P. occidentalis*) the former generally has larger subcoriaceous leaves with very sparse indument (only dense in buds and young leaves), smaller anthers and slightly smaller fruits; the latter has generally smaller leaves with shorter petioles, more ascending and prominent secondary veins, shorter racemes usually congested on older twigs, smaller flowers overall and smaller fruits.

**Distribution.** Distributed in humid mid to high elevation forests of the trans-Mexican volcanic belt in the states of Michoacán, Morelos, and Guerrero.

**Elevation range.** 1000 – 2300 m.

**Local names.** aguacatillo, callespalito verde, hucaz, lucaz, palo moreno, ucace, ucaz (Mexico).

**Material examined.** (29) **MEXICO. Guerrero:** Atzala, 6.6 km al SE de Chichila, 1340 m, 30 May 1998, *Calónico Soto, J. 8937* (MEXU); Iguala, Mpios. Iguala y Buenavista. Cañon de La Mano, entre Los Amates y El Naranjo, 10 km. al N. de Iguala por el ferrocarril, 1000 m, 24 Jan 1987, *Catalán H.; C. 631* (MO); Eduardo Neri, Cañada Carrizalillo, 1 km ESE Amatitlan, 1530 m, 25 Feb 1994, *Cruz Durán, R. 642* (MEXU); 10 km al SW de Carrizalillo, 1600 m, 3 Jun 1983, *Martínez S., E. 3920* (MEXU, XAL); Chilpancingo, Omiltemi, 1940 m, 13 Mar 1964, *May Nah, A. 129* (MEXU); Chilapa de Alvarez. km 72-73 carretera Chilapa-Tlapa, 2100 m, 5 Mar 1994, *Panero, J.L. 3909* (MEXU,TEX); Cerros del Gallo, 1000 m, Jan 1927, *Reko, B.P. 5066* (US); Tixtla, A 4 km al E de Tixtla, o sea, a 25 km al E de Chilpancingo, 1500 m, 6 Dec 1982, *Rico A., L. 471* (MEXU,MO,NY); Cañón de la Mano Negra, al N de Iguala, 1200 m, 15 Feb 1970, *Rzedowski, J. 27077* (MEXU,MO,XAL); Tlacotepec, Viento frio 3 km al SO de Hierbabuena, 2200 m, 23 Apr 1985, *Soto-Núñez, J. 8412* (MEXU); Cacahuamilpa, 1250 m, 3 Jan 1970, *Vázquez, J. 2368* (TEX); **Michoacán:** Tzintzuntzan, Ucasanástacua, 2100 m, 23 Apr 1979, *Caballero, J. 965* (MEXU); 2150 m, Nov 1988, *Díaz-Barriga, H. 5268* (SLPM,TEX,XAL); EL llano, 2050 m, 17 Mar 1989, *Díaz-Barriga, H. 5776* (XAL);

2050 m, 26 Nov 1989, *Díaz-Barriga, H. 6114* (XAL); 2150 m, Apr 1990, *Díaz-Barriga, H. 6125* (XAL); Tuxpan, Cañada del Puerto de la Cantera, 1780 m, 23 Apr 1990, *Díaz-Barriga, H. 6135* (XAL); Uruapan, Parque Nacional Eduardo Ruiz, 1700 m, , *Díaz-Barriga, H. 6488* (XAL); Morelia, Paso tendido, Tumbisca, 1650 m, , *Díaz-Barriga, H. 6498* (XAL); 1889, *Dugés, A. 242* (US); Zitácuaro, Guanoro, 1800 m, 7 Dec 1938, *Hinton, G.B. 13514* (GH,TEX,US); Uruapan, Between Uruapán y Jicalán, 1650 m, 14 Jan 1941, *Langman, I.R. 3256* (PH); Rocky land 2 miles south of Uruapan, 1700 m, 29 Jul 1941, *Leavenworth, W.C. 1226* (MO); Zitácuaro, Carretera Toluca-Zitacuaro km 91.5, 2000 m, 25 Aug 2002, *Soto-Núñez, J. 14123* (MEXU); Ario, 4 km al SE de la desviación a Puruarán, carr. Pátzcuaro-La Huacana, 1740 m, 29 Apr 1982, *Torres C., R. 358* (CAS, MEXU,MO); **Morelos**: Tepoztlan, Amatlán, 1650 m, 12 Apr 1987, *Cedillo T.* (XAL); Cuernavaca, al norte de la barranca el tecolote, 1800 m, 27 Nov 1987, *Estrada, L.E. 1891* (MEXU); Mexicapa, Sierra de Ocuila, 2300 m, 16 Dec 1938, *Lyonnet, E. 2887* (US); Barranca Tepotztlán, 1900 m, 12 Apr 1942, *Miranda, F. 1950* (MEXU).

8. *P. prionophylla* Standl., Contr. U.S. Natl. Herb. 20:213. 1919. Type: Mexico: Ixtaccihuntl, (Ixtaccihuatl) Along brooks, 2450 m, 1903, *Purpus, C.A. 249* (holotype, US!; isotype, UC!).

It can be distinguished by leaves narrow elliptic-oblong, subcoriaceous to coriaceous, 9-14 x 3-5.3 cm, opaque on both side and paler below when dry, with petioles 7-11 x 1-1.2 mm, base acute and shortly decurrent, apex acute, margin irregularly serrate (but sometimes just sinuate or entire), venation pattern weak brochidodromous festooned, slightly prominent below and impressed above, secondaries (14-16) arcuate and emerging at 70-80 degrees from the midrib, intersecondaries half the length of secondaries, tertiaries irregular reticulate and denser around the midrib, and 2 glands located at 3-5 mm from the base on the first pair of secondary veins. The floriferous shoots are erect, 4-5 cm long, densiflorous, lanceolate floral bracts present in young racemes, 4-6 mm long, the flowers have pedicels 1.7-2.2 x 0.6-1 mm, hypanthium campanulate 2.5-3.2 mm wide and anthers 0.7-0.8 mm long. The fruits are subglobose to elliptic prolate, 13-15 x 10-14 mm.



The combination of leaves narrow oblong coriaceous, serrate at the margin, with dense venation and sub-basal glands plus racemes densiflorous and erect is unique among the Mexican species.

**Distribution.** Distributed in high elevation humid oak-pine type forests of the trans-Mexican volcanic belt in central Mexico.

**Elevation range.** 1900 - 3500m.

**Local names.** capulincillo (Mexico).

**Material examined.** (34) **MEXICO.** Temascaltepec, Los Hornos, 2550 m, 16 Jun 1932, *Hinton, G.B.* 874 (NY,US); **Guerrero:** Chichihualco, Road from Pto de Gallo to Filo de Caballo y Chilpancingo, 3050 m, 23 Nov 1983, *Barrie, F.R.* 695 (MEXU,NY); Steep north-facing slope with Pinus Quercus and Abies East-Northeast of Puerto El Gallo, 2800 m, 11 Nov 1973, *Breedlove, D.E.* 36095 (CAS,MO); 2.7 mi south of junction road filo de Caballos to Atoyac, 2300 m, 19 May 1983, *Holmes, W.C.* 4442 (NY); Mpio. Tlacotepec. A 16 km al NE de Puerto del Gallo camino a Filo de Caballo, 2900 m, 15 Apr 1982, *Martínez S., E.* 903 (MEXU, MO); 15 km al NE de Puerto del Gallo, camino Atoyac, Filo de Caballo. Mpio. Tlacotepec, 3050 m, 23 Nov 1983, *Martínez S., E.* 5631 (CAS, MEXU,MO,NY,XAL); Cerro La Pastilla, cerca de Camotla, 2300 m, 9 Apr 1963, *Rzedowski, J.* 16454 (NY,TEX); Tlacotepec, Agua Fria, 2700 m, 11 Apr 1963, *Rzedowski, J.* 16520 (CAS); 15 km. al E. de Pto. del Gallo carr. filo de Caballo. Mpio.- Chichihualco, 3090 m, 18 Aug 1982, *Tenorio L., P.* 1426 (ASU,MO); **Jalisco:** Autlán. Sierra de Manantlan, por el Cerro de la Cumbre, 2200 m, 9 Mar 1987, *Cházaro, M.* 4520 (XAL); **Mexico:** Tlalmanalco, 3 km al E de San Rafael, 2850 m, 2 Apr 1967, *Cruz-Cisneros, R.* 1644 (CAS); ESE de San Rafael, 2950 m, 7 Apr 1984, *González L.* 68 (CAS,SLPM); Temascaltepec, Tequisquiapan, 2300 m, 21 Mar 1932, *Hinton, G.B.* 423 (HINTON); Tequesquiapan, 2450 m, 17 Mar 1935, *Hinton, G.B.* 7445 (NY,US); Tlalmanalco, 5 km al ESE de San Rafael. Arroyo Tlalmanalco, 2790 m, 11 Apr 1977, *Koch, S.D.* 7762 (MEXU); San Rafael y cercanías, 2800 m, 6 Jun 1934, *Matuda, E.* 3089 (MEXU); San Rafael. Falda W del Ixtaccihuatl, 3500 m, 16 Nov 1952, *Matuda, E.* 27595 (CAS,MEXU); Amatepec y cercanías, 1900 m, 12 Apr 1954, *Matuda, E.* 30672 (MEXU); Amecameca, Cañada de Cerro Venacho, ca. 6 km. al Este de Amecameca, 3000 m, 3 Feb 1978, *Perino, C.H.* 3117 (CAS,F,MEXU,MO,UMO); Tlalmanalco, 3 km al E de San Rafael, 2800 m, 1 Jan 1965, *Rzedowski, J.* 19327 (DS,MEXU,SLPM,TEX,US); Ocuilan, Barrancas

de Mexicapa, 2300 m, 20 Mar 1992, *Tejero, D.* 3200 (MEXU); Tlalmanalco, San Rafael, 2700 m, 20 Feb 1983, *Ventura V., E.* 557 (NY,TEX,XAL); **Michoacán**: Tancítaro, Cerro Tancitaro, al N de Zirimondiro, 2400 m, 26 Sep 1996, *García, I.* 4250 (MEXU); Zitácuaro, El Agua, Cerro el Cacique, 2840 m, 19 Dec 1978, *Ibarra C., G.* 272 (MEXU); 2 km al sur de Mirador Milcumbres. Camino a San Antonio Villalongin, 2425 m, 30 Mar 1982, *Martínez S., E.* 441 (MEXU); Senguio, Alrededores de Capilla de Ocotál, 6 km al SSW de Chincua, 2800 m, 3 Mar 1989, *Rzedowski, J.* 48328 (MEXU,MO,XAL); Queréndaro, Canada del Real, camino a San José de la Cumbre-Queréndaro, 2500 m, 23 Apr 1986, *Santos Martínez, J.* 1318 (MEXU,MO,XAL); Hidalgo, Paraje El Pino, cerca de Huajumbaro, 2300 m, 3 Jul 1986, *Santos Martínez, J.* 1447 (MEXU,MO,TEX,XAL); Zitácuaro, 22 km al NE de Zitacuaro, 2800 m, 18 Jun 1983, *Soto-Niñez, J.* 5251 (MEXU); Tlalpujahuá, Cerro Peña Blanca, Ejido San Francisco de Los Reyes, 2850 m, 21 Jun 1986, *Zamudio R.; Sergio* 3973 (CAS,MEXU,MO,XAL); Senguio, 2 km al sur de Rosa Azul, 3000 m, 4 Sep 1989, *Zamudio, S.* 7399 (MEXU,XAL); **Oaxaca**: 10 km al norte de San Andrés Chicahuastla, 2470 m, 14 May 1981, *Cedillo T.; R.* 830 (F,MEXU); San Miguel Yotao, Dto. Ixtlán, 2140 m, 28 May 1999, *Macías, B.* 670 (MEXU).

9. *P. samyoides* Schltld., *Linnaea* 13: 92 (1839); *Cerasus samyoides* (Schltld.) Walp., *Repert. Bot. Syst.* (Walpers) iv. Index, 311. 1847; *Laurocerasus samyoides* (Schltld.) M.Roem., *Syn. Rosifl.* 92. 1847. Type: Mexico: Veracruz, Xalapa (probably: Serranía de Zocoantla in conf. Jalapae majo Flor.), Aug 1829, *Schiede sn* (sintypes BR!, G!, GH!, GOET!, HAL!, HBG!, US!).

*Prunus potosina* Lundell, *Wrightia* 4: 87. 1968. Type: Mexico: San Luis Potosí, Tamazunchale, *Lundell, C.L.; Lundell, A.A.* 7151 (holotype TEX!, isotypes MO!, NY!, TEX!).

This is a remarkable species because its relatively small elliptic chartaceous to sub-coriaceous leaves (6-10 x 2.5-4.5 cm), lustrous above, with petiole 5-9 x 0.5-1 mm, base truncate to acute and shortly decurrent, apex shortly acuminate, brochidodromous venation pattern, secondaries progressively arcuate emerging at 45-60 degrees from the midrib, 8-10, plain below, intersecondaries ending in an exmedial dendritic pattern, tertiaries irregular reticulate, and 2 minute glands (0.4-0.7 mm diam.) placed between the

first and second pair of secondary veins at 7-17 mm from the base and 2-6 mm from the margin. The floriferous shoots are generally branched at the basal bracts level and appear fasciculate, flexuous, 0.5-3 cm long at the mid branch, with flowers having infundibuliform hypanthium 1.7-2.1 mm wide, flexuous pedicels 1.5-3 mm long and anthers 0.3-0.5 mm long. The fruits are globose to slightly oblate, 7-9 x 8-9 mm.

The taxon *P. potosina* Lundell is proposed here as a synonym because although it has shorter leaves, leaves less narrow elliptic and apparently unbranched racemes, that variation pattern has been observed occurring in individuals along all the range of the species. The combination of basally branched densiflorous floriferous shoots with exceedingly small flowers and relatively small fruits is not seen in any other Neotropical species.

**Distribution.** Distributed from lowlands to mid elevation moist forest of the Eastern Sierra Madre from the state of Veracruz at the South to San Luis Potosi at the North.

**Elevation range.** 30 – 1400 m.

**Local names.** copalillo, tepostente (Mexico)

**Material examined. (60) MEXICO.** Mirador, Mar 1842, *Liebmann, F. s.n.* (MO,NY); **Oaxaca:** Monte Bello, municipio de Ajitlán, 50 m, 10 Nov 1978, *Ventura A., F. 15533* (MEXU,MO); **Puebla:** Hueytamalco, Campo Experimental "Las Margaritas", Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias (INIFAP), 540 m, 15 May 2008, *Gómez Chagala, B. 562* (MEXU,MO); ibidem, 550 m, 29 May 2008, *Gómez Chagala, B. 662* (MEXU,MO); ibidem, 450 m, 8 Jul 2008, *Gómez Chagala, B. 783* (MEXU,MO); ibidem, 490 m, 10 Sep 2008, *Gómez Chagala, B. 833* (MEXU,MO); ibidem, 400 m, 16 Oct 2008, *Gómez Chagala, B. 849* (MEXU,MO); Las Margaritas, 400 m, 30 May 1986, *Ventura A., F. 22004* (MEXU,NY,UC,XAL); **Querétaro:** Landa, 10 km al SE de Agua Zarca. Joya de Leon, 600 m, 25 Apr 1990, *Rubio, H. 1619* (XAL); 2 km al sureste de San Onofre, 800 m, 23 May 1990, *Rubio, H. 1670* (CAS,F); Jalpán, La Parada, 2-3 km al O de San Isidro, 1300 m, 21 May 1991, *Servín, B. 1044* (CAS,TEX,XAL); 2-5 km E de El Saucito, 950 m, 22 Jul 1991, *Servín, B. 1195* (TEX,XAL); Molcajete, 23 km N de

Carrizal de los Duran, 700 m, 26 Sep 1991, *Servín, B. 1345* (XAL); **San Luis Potosí**: San Antonio, Lejem, 260 m, 1 May 1979, *Alcorn, J.B. 2934* (SLPM,TEX); San Antonio, Tanjasnec, 270 m, Jun 1980, *Alcorn, J.B. 3372* (SLPM,TEX); aubre Tampico de real del monte (probablemente corresponde a la serranía del Abra cerca de Tampico), 600 m, 27 May 1827, *Berlandier 236* (G,P); Tamazunchale, 250 m, 11 Jul 1937, *Lundell, C.L. 7151* (F,MO,NY,S,TEX); Tamazunchale, Orilla N del Rio, 180 m, 9 Aug 1959, *Miranda, F. 9015* (MEXU); Barrio de San Juan, Tamazunchale, 200 m, 19 Jul 1937, *Taylor Edwards, M. 605* (DS,F,MO,TEX); **Veracruz**: Orizaba, 1200 m, *Botteri, M. ND* (XAL); Cordoba, Valle de Córdoba, 800 m, 24 Apr 1866, *Bourgeau, C.M. 2295* (XAL); ACTOPAN, Almolonga, camino a Trapiche del Rosario, camino a la Concepción a Actopan, 500 m, 28 Sep 1980, *Calzada, J.I. 5941* (F,XAL); Jalcomulco, Cerro de Achichuca, entre Tuzamapan-Jalcomulco, 700 m, 29 Apr 1979, *Castillo-Campos, G. 611* (NY,XAL); Vega de la Torre, El Centenario, 20 km al NE de Santa Gertrudis, 550 m, 21 Jul 1981, *Castillo-Campos, G. 2013* (TEX,XAL); Cordillera, 1000 m, Jun 1840, *Galeotti, H. 3075* (P); Xalapa, 1000 m, Jun 1840, *Galeotti, H. 7081* (P); Tecolutla, Ejido Cuauhtemoc, camino Casitas-Gutiérrez Zamora, 30 m, 21 Jun 1970, *Gómez-Pompa, A. 1151* (MEXU,XAL); Vega de la Torre, Cumbre del Cerro Chichimaco, 650 m, 23 Jul 1981, *Guerrero C., B. 1920* (XAL); Yecuatla, Río Culebras, 400 m, 19 Sep 1989, *Gutiérrez B., C. 3645* (XAL); Chalahuite, camino a El Ojite, 300 m, 13 Nov 1989, *Gutiérrez B., C. 3741* (MEXU,XAL); Orillas Rio grande de Yecuatla, 400 m, 7 Aug 2002, *Gutiérrez B., C. 7506* (MEXU); Rio culebras, 400 m, 4 Aug 2003, *Gutiérrez B., C. 7856* (MEXU); Posa Bobo, 2 km al NE de Yecuatla, 400 m, 6 Aug 2004, *Gutiérrez B., C. 8269* (XAL); Alto Lucero, Cerro del Sombrero, Cerca de plan de las hayas. Acahual, 1000 m, 23 Jun 1972, *Hernández M., R. 1616* (CAS,US,XAL); Mirador, Mar 1841, *Liebmann, F. 1726* (NY,UC,US); Colipa, Yecuatla, camino a Colipa, 210 m, 17 Jul 1963, *Martínez Meléndez, N.; M. 16* (XAL); Misantla, Cerro del Tigre, 250 m, 26 Nov 1962, *Martínez Meléndez, N.; M. 52* (GH,MEXU,XAL); Jalapa, Thickets near Jalapa, 1300 m, 1 May 1899, *Pringle, C.G. 7838* (US,XAL); Zacuapan, 1200 m, Aug 1907, *Purpus, C.A. (DS)*; Zacuapan, 1300 m, Jun 1907, *Purpus, C.A. 4422* (F,MO,UC,US,XAL); Totutla, Zacuapan, 900 m, Jul 1915, *Purpus, C.A. 7503* (UC,XAL); Zacuapan, 1400 m, May 1917, *Purpus, C.A. 7800* (MO,NY,UC,US,XAL); El Mirador, 1000 m, Mar 1930, *Purpus, C.A. 14150* (F,TEX,XAL); Zacuapan, Rocky hillsides, 1300 m, Sep 1933, *Purpus, C.A. 14156* (US); Moist localities hillsides, 1300 m, May 1936, *Purpus, C.A. 16715* (US); Chalma, 1 km al NW, camino a Chiconamel, 180 m, 5 Oct 2000, *Rincón G., A. 1975* (MEXU,XAL); Hacienda de la Laguna, Aug 1829, *Schiede* (HAL); Xalapa, 1300 m, , *Schlechtendal, D.F.K. ND* (XAL); Alto Lucero de Gutiérrez Barri, Cerro de los Atlixtos, 650 m, 26 Jul 2002, *Vázquez T., M. 8683* (MEXU,XAL); Martínez de la

Torre, Independencia, 50 m, 9 Apr 1976, *Ventura A., F. 12645* (CAS,MO,XAL); Tlapacoyan, San Isidro, 400 m, 7 Jun 1976, *Ventura A., F. 12821* (XAL); Martínez de la Torre, Maluapan, 50 m, 4 Aug 1976, *Ventura A., F. 13143* (MEXU,XAL); Jilotepec, San Juan, 900 m, 9 Aug 1976, *Ventura A., F. 13162* (MEXU,MO,XAL); San Juan, 900 m, 30 Apr 1977, *Ventura A., F. 13975* (XAL); Totutla, Mata Obscura, 850 m, 25 Jul 1977, *Ventura A., F. 14312* (XAL); Naolinco, Naranjillo, 1250 m, 30 Apr 1980, *Ventura A., F. 17087* (MO,XAL); Tlapacoyan, El Limón, mun. de Tlapacoyan. Estado--Veracruz, 250 m, 11 Nov 1980, *Ventura A., F. 17961* (ASU,MEXU,MO,XAL); Ixtacuaco, 50 m, 11 Aug 1982, *Ventura A., F. 19669* (MEXU,XAL); Ejido de Ixtacapa Chico, El Palmar, Zongolica, 1 km south of campo experimental de Hule. El cerro de Yuhualtepetl, 230 m, 13 Aug 1944, *Vera-Santos, J. 3270* (TEX,US,XAL).

### **New species identified primarily from central and northern Mexico (13)**

#### **10. *P.* sp. nov. (“*Cochrane-Manantlan*”)**

It can be distinguished by the leaves narrow elliptic, subcoriaceous, 6-10 x 1.5-3.2 cm, lustrous above, with petioles 8-11 x 0.6-0.8 mm, base acute to obtuse and apex attenuate, venation pattern weak brochidodromous, the secondaries (11-12) relatively straight along their first half and then arcuate and bifurcate towards the margin, emerging at 40-50 degrees from the midrib, slightly prominent below and impressed above, intersecondaries parallel to secondaries and more than half their length, tertiaries sinuous percurrent and 2 glands (0.3-0.6 mm diam.) placed on the second pair of secondary veins at 3-8 mm from the base and 1-3 mm from the midrib. The floriferous shoots are subflexuous, 2-3 cm long; the flowers have pedicels 1-2 mm long and hemispheric hypanthium 2.5-3 mm wide. The fruits are ovate and apiculate, laterally asymmetric, 13-15 x 8-10 mm.

A similar species overlapping distribution, *P. erythroxyton*, has larger chartaceous leaves with less ascending lateral veins, rounded base and bigger glands and fruits with a similar shape but smaller and more widely ovate.

**Distribution.** Only known from a mid-elevation place in the Sierra of Manantlan, southern Jalisco (Mexico). This mountain ridge is an enclave of moist tropical-like vegetation in a relatively dry subtropical area and has several limestone outcrops.

**Elevation range.** 1600 – 1800 m.

**Material examined.** (1) MEXICO. Jalisco: Rincón de Manantlán, Sierra Manantlan occidental, Arroyo San Miguel, 1 km al S de Rincón de Manantlan, 1600 m, 4 Jan 1985, *Cochrane, T. 10849* (GH,MEXU,US).

11. *P.* sp. nov. (“*aff. tetradenia-Queretaro*”)

This new species can be distinguished by the leaves elliptic to elliptic-oblong, coriaceous, 10.5-18 x 5.5-9 cm, opaque on both sides, drying light brown to tin color below, with petioles 10-17 x 1-1.8 mm and drying dark brown, base obtuse to rounded and shortly decurrent, apex acute to shortly acuminate, venation pattern weak brochidodromous, secondary veins emerging at 45-60 degrees, initially straight and arching progressively, slightly prominent below and plain above, intersecondaries half the length of secondaries, tertiaries alternate percurrent and almost inconspicuous, and 2 glands placed at 7-18 mm from the base and 1-4 mm from the midrib, rarely with 2-6 extra glands over the main ones. The floriferous shoots are sub-flexuous, 4-8 cm long; the flowers have pedicels 3-7 x 0.3-0.5 mm, hypanthium campanulate 2-2.8 mm wide and anthers 0.7-0.9 mm long. The fruits are slightly oblate and apiculate, 12-15 x 13-18 mm.

The most similar species is *P. tetradenia* which has leaves sub-coriaceous with minor veins more visible, 4 glands, stipules falcate (vs. lanceolate) and longer floral pedicels.

**Distribution.** Distributed in mid-elevation pine-oak type forests of the eastern Sierra Madre in the Mexican states of Veracruz, Hidalgo, and Queretaro.

**Elevation range.** 700 – 1600 m.

**Local names.** duraznillo, naranjillo colorado, palo barranco (México).

**Material examined.** (23) **MÉXICO. Hidalgo:** Zacualtipán, 4 km al NE de Tlehuolompa, 1530 m, 19 Jan 1993, *López-García, J.L.* 539 (MEXU,SLPM,XAL); **Querétaro:** 2.5 km del rincon de piedra blanca, 1150 m, 10 Nov 2005, *Carranza, E.* 6903 (XAL); Landa, 2 km S de Neblinas, 1000 m, 25 Oct 1988, *Rubio, H.* 249 (XAL); 2 km al sur de el Naranjo, 970 m, 8 Nov 1988, *Rubio, H.* 283 (MEXU,XAL); 3 km al NO de Agua zarca, 1120 m, 24 Oct 1989, *Rubio, H.* 1260 (MEXU,XAL); 1200 m, 7 Sep 1989, *Rubio, H.* 1300 (XAL); 1.5 km al NE de La lima, 1200 m, 10 Nov 1991, *Rubio, H.* 2155 (XAL); 7 km al SE de Aguazarca, 1050 m, 27 Nov 1990, *Rubio, H.* 2185 (XAL); 1.5 km al SE de San Juan, 1100 m, 1 Feb 1991, *Rubio, H.* 2189 (XAL); Landa, Neblinas, 1100 m, 14 Sep 1988, *Rzedowski, J.* 46412 (XAL); 1100 m, 14 Mar 1989, *Rzedowski, J.* 48454 (CAS,TEX,XAL); Jalpán, 3 km norte de La Parada, 1100 m, 19 Nov 1990, *Servín, B.* 678 (MEXU,XAL); 3 km N de La Parada, 1200 m, 27 Dec 1990, *Servín, B.* 746 (MEXU,XAL); 2-3 km al oriente de la parada, municipio de Jalpan, 1300 m, 14 Nov 1991, *Servín, B.* 831 (XAL); 5 km norte de La Parada, 1300 m, 20 Jun 1991, *Servín, B.* 1144 (XAL); **San Luis Potosí:** Xilitla, Tlamaya, 700 m, 12 Apr 1960, *Rzedowski, J.* 12410 (DS); **Veracruz:** Coacoatzintla, 1 km al S, 1250 m, 18 Jul 1988, *Gutiérrez B., C.* 3193 (XAL); Tepetlan, Cerro de Villa Rica, cerca de Plan de La Flor, 1300 m, 18 Dec 1989, *Gutiérrez B., C.* 3779 (XAL); Yecuatla, Cerro de la Villa Rica, 1 km al W de Plan de la Flor, 1600 m, 25 Apr 1990, *Gutiérrez B., C.* 4006 (NY,XAL); Chiconquiaco, Las Paredes, camino a Gutiérrez Rajera, 1200 m, 19 Nov 1990, *Gutiérrez B., C.* 4095 (XAL); Jilotepec, El Esquilón, 1250 m, 15 Feb 1974, *Ventura A., F.* 9600 (US,XAL); La Concepción, 1000 m, 9 May 1980, *Ventura A., F.* 17140 (MEXU,XAL); Banderilla, La Haciendita, al N, 1300 m, 17 Feb 1990, *Zamora C., P.* 2136 (XAL).

12. *P.* sp. nov. (“*aff. brachybotrya-Queretaro*”)

This new species has leaves elliptic to elliptic-oblong, subcoriaceous, 9.5-15.5 x 3.5-7 cm, slightly lustrous on both sides, with conspicuous foliose lanceolate stipules (5-8 x 0.5-1.5 mm) late deciduous in new reiterations, petioles 8-15 x 1-1.3 mm, base rounded to truncate, apex acute to obtuse, venation pattern

brochidodromous festooned with secondaries arcuate anastomosing at 2/3 to 3/4 in the axis midrib-margin, tertiaries percurrent sinuous and little conspicuous, and 2 glands (0.5-0.8 mm) placed at 2-7 mm from the base and 1-4 mm from the midrib. The floriferous shoots are erect, 1-3.5 cm long; the flowers have pedicels 2.5-4 mm long, hypanthium infundibuliform 2.8-3.5 mm wide and anthers 0.6-0.7 mm long. The fruits are globose to subglobose, 9-11 x 9-13 mm.

This taxon is very similar to *P. brachybotrya* with which partially overlaps distribution; however, that species has leaves generally with sub-basal glands attached to the midrib, subulate minute stipules, petioles usually longer and secondary and minor veins more obscure; the racemes tend to be longer, less dense and the flowers are slightly bigger and have campanulate hypanthium.

**Distribution.** Distributed in 2 separated regions of humid pine-oak type forests of the eastern Sierra Madre mountain range, one at the north in the state of Queretaro and the other one in Oaxaca. Most of the sites are karstic or they have limestone influenced soils.

**Elevation range.** 1300 – 2850 m.

**Local names.** árbol de pajarito (México).

**Material examined.** (21) **MEXICO. Oaxaca:** Cerro San Felipe, 2100 m, 7 Mar 1898, *Conzatti, C. 672* (GH,US); Cordillera, 2330 m, Mar 1845, *Galeotti, H. 3074* (P,US); Ixtlan, Camino de Talea de Castro a Xiacui, a 26 km al S de Talea, 2850 m, 18 Apr 1982, *Lorence, D. 4101* (CAS,MO); 2400 m, 19 Jan 1965, *May Nah, A. 791* (MEXU); 6 km al S de San Juan Mixtepec, 2250 m, 9 May 1988, *Reyes, J. 217* (GH,MEXU); Centro, Cerro San Felipe del Agua. Valles Centrales, 1960 m, 26 Feb 1985, *Saynes V. 225* (CAS,MO); Teotitlán, Ca 15 miles above Teotitlán del Camno on the Huautla de Jimenez Road, 2100 m, 6 Apr 1966, *Smith Jr, C.E. 4505* (US); Teotitlan, Teotitlan mpio. Puerto La Soledad 30 km. al N.E. de Teotitlan, carr. a Huautla, 2200 m, 12 Feb 1988, *Tenorio L., P. 14390* (MEXU,MO); Santa Maria Totomaxtla. Recorrido a Cerro Zacate, 2600 m, 24 May 2002, *Torres C., R. 16365* (MEXU); **Querétaro:** Pinal de Amoles, 2-3 km norte de Puerto de Tejamanil, 2280 m, 25 Jan 1989, *Carranza, E. 1389* (MEXU); Pinal de Amoles. 1 km al este del Llano, 1680 m, 8 Mar 1989, *Carranza, E. 1523* (MEXU,XAL); Al



s de Los Pinos, 2230 m, 1 May 1990, *Carranza, E. 2478* (MEXU,XAL); 2000 m, 1 Apr 1997, *Carranza, E. 5265* (BRIT,XAL); Jalpán, Llano Las Avispas, 2300 m, 4 Apr 1991, *Díaz-Barriga, H. 6585* (MEXU,XAL); 2340 m, 14 Jan 1989, *Lugo, E. 15* (MEXU); Pinal de Amoles, 5 km carretera Pinal de Amoles-Ahuacatlan, 2400 m, 15 Feb 1995, *Orozco, J. 11098* (MEXU); Amoles, 15 km al SW de Pinal de Amoles, sobre la carretera a Vizarrón, 2250 m, 18 Mar 1987, *Rzedowski, J. 42875* (MEXU (2),MO,XAL); Cañada del Agua Fria Grande, Cerro de la Calentura, 2600 m, 19 Dec 1978, *Zamudio R.; Sergio 3629* (MEXU,MO,XAL); Pinal de Amoles, 2500 m, 7 Feb 1988, *Zamudio, S. 6126* (MEXU,XAL); Landa, Llano chiquito, 1980 m, 17 Feb 1989, *Zamudio, S. 7147* (MEXU,XAL); **San Luis Potosí:** Xilitla, 2 km al SE de Ahuacatlan, 1300 m, 27 Jun 1959, *Rzedowski, J. 10977* (SLPM).

13. *P. sp. nov. ("aff. erythroxyton-Manantlan")*

This new species can be distinguished by the leaves elliptic, coriaceous, 7.5-11 x 2.5-4.2 cm, lustrous above, frequently slightly asymmetric, with base acute to rounded and decurrent until the base forming a channeled upper side of the petiole, apex acute to attenuate, petioles 8-11 x 0.8-1 mm, venation brochidodromous festooned, secondaries straight along their first half, emerging at 50-60 degrees from the midrib, intersecondaries parallel to secondaries and 2/3 their length, tertiaries inconspicuous, and 4 glands (sometimes with an extra pair present), the lower two on the first pair of secondary veins at 1-3 mm from the base, the upper pair at 4-10 mm from the base and 2-4 mm from the midrib. Flowers are unknown. The fruiting racemes are 2.5-3.8 cm long; the fruits are ovate apiculate, 12-13 x 10-11 mm.

This species may be considered close to *P. erythroxyton* which however has bigger symmetric chartaceous leaves with more evident minor veins, and slightly wider fruits.

**Distribution.** Distributed in mid to high elevation humid forests of the Sierra of Manantlan in the southern part of the state of Jalisco, Mexico.

**Elevation range.** 1700 – 2300 m.

**Local names.** cabero (Mexico), calenturilla (Mexico).

**Material examined.** (5) MEXICO. Jalisco: Estacion biologica las Joyas, 1900 m, 9 Mar 1992, *Campos-Villanueva, A.* 4548 (MEXU,NY,TEX); Mun Toliman. 2-3 km al W del Terrero, 1850 m, 18 Apr 1991, *Cevallos E., J.* 97 (BRIT); 3 km al oeste de Manantlan, 1700 m, 13 Apr 1975, *Díaz Luna, C.* 5791 (NY,SLPM); Sierra de Manantlan, Cerro Grande. Old road from terrero to campo cuatro, 1900 m, 15 Mar 1987, *Iltis, H.H.* 29664 (GH); 2 km al NW del Terrero, 2300 m, 5 Apr 1995, *Santana M., F.J.* 7161 (BRIT).

14. *P.* sp. nov. (“*Guerrero-Cruz de Ocote*”)

This new species can be distinguished by the leaves oblong-ovate, subcoriaceous, 7.5-8.5 x 2.5-3.8 cm, with petioles 5-8 x 1.2-1.5 mm, the base truncate and the apex attenuate, the margin undulate and irregularly serrate towards the apex with sinuous teeth, venation weak brochidodromous, secondary veins (11-13), arcuate and emerging at 60-70 degrees from the midrib, intersecondaries few and little conspicuous, tertiaries reticulate, and 4 glands, the lower two basal and attached to the midrib, the upper two on the first secondary vein at 3-5 mm from the base and 2-3 mm from the midrib. The floriferous shoots are erect, 5-6 cm long, the flowers have pedicels 2.5-5 mm long, hypanthium campanulate 2-2.6 mm wide and anthers 0.5-0.6 mm long, Fruits are ovate, 12-14 x 10-11 mm.

The more similar species is *P. prionophylla* which is distributed in higher elevations, has longer petioles, marginal to submarginal glands and shorter erect racemes with bigger flowers overall.

**Distribution.** Distributed in mid-elevation oak-pine forests of the pacific slope of the southern Sierra Madre in the state of Guerrero, Mexico. This is an area with influence of limestone formations.

**Elevation range.** 1200 – 1900 m.

**Material examined.** (3) MEXICO. Guerrero: Chichihualco, 1200 m, 6 Jul 1998, *Calónico Soto, J.* 9161 (MEXU); Chichihualco, camino Filo de Caballo-Puerto del Gallo, 2 km al SE de Cruz de Ocote, 1900 m, 18 Oct 1983,

Martínez S., E. 4998 (MEXU); 33 km north of Chilpancingo to Atoyac. Roadside, 1860 m, 4 Dec 2003, Yahara, T. 2958 (MEXU).

15. *P.* sp. nov. ("*Jalisco-Jacotepec*")

This new species can be distinguished by the leaves narrow oblong-lanceolate, coriaceous, 6.5-9 x 1.8-2.5 cm, slightly lustrous above, with petiole 7-10 x 0.8-1 mm, venation pattern eucamptodromous-like, secondary vein arcuate and emerging at 50-60 degrees, tertiaries inconspicuous and 2-3 pairs of glands placed at 1-3, 5-7 and 8-10 mm from the base respectively and 0.5-2 mm from the midrib in a parallel arrangement. The floriferous shoots are erect, 4.5-5 cm long; the flowers have pedicels 3-5 mm long, hypanthium 1.8-2.3 mm wide and anthers 0.8-1 mm long.

It can resemble some specimens of *P. lundelliana*, but that taxon has thinner wider leaves with glands located closer to the margin, flexuous racemes and flowers with smaller anthers. Another similar species is *P. tartarea* which has wider leaves with less secondary veins and glands usually more distanced from the base, and relatively flexuous laxiflorous racemes.

**Distribution.** Only known from a single place at high elevation in the Cerro Viejo mountain ridge located southward of Guadalajara, Jalisco.

**Elevation range.** 2400 m.

**Material examined.** (1) MEXICO. Jalisco: Jocotepec, Cerro Viejo, ladera de exposición norte en el Carrizo, al S y enfrente de Zapotitan de Hidalgo. Cerro Viejo, 7-11 km N of Jocotepec (west end of Laguna de Chapala) or 32-35 km S of center of Guadalajara, 2400 m, 21 Nov 1987, Machuca N., J.A. 6146 (F,MO,XAL).

16. *P. sp. nov.* (“*Jalisco-big stipule*”)

This species can be distinguished by the leaves oblong, sub-coriaceous, 10-13 x 3-5 cm, lustrous above, drying green, with base rounded to truncate and apex acuminate, petioles 8-10 x 0.8-1 mm, very conspicuous foliose falcate stipules persistent on young reiterations, 6-8 x 2.5-3.5 mm, venation pattern eucamptodromous-like, secondary veins arcuate and slightly prominent below, tertiaries irregular reticulate, minor veins visible below down to 5th order, and 4 glands (0.8-1 mm diam.) located on the first and second pair of veins up to 5 mm from the midrib. The floriferous shoots are suberect, 5-8 cm long; the flowers have pedicels 3-5.5 mm long, the hypanthium is widely campanulate, 2.7-3.7 mm wide, and the anthers 0.7-0.9 mm long. Fruits are unknown.

The more similar species is *P. erythroxyton* which has shorter subulate stipules, leaves chartaceous, glands in general closer to both the base and the margin, and shorter racemes.

**Distribution.** Only known from mid-elevation oak forests near to the municipality of La Cuesta in western Jalisco, Mexico.

**Elevation range.** 1200 – 1500 m.

**Material examined.** (2) MEXICO. Jalisco: Precipitous mountainsides 5-8 miles above, north of La Cuesta, below the pass to Talpa de Allende, 1200 m, 22 Nov 1960, *McVaugh, R. 21285* (NY,US); 15 km al sur de Talpa, 1250 m, 18 Nov 1960, *Rzedowski, J. 15068* (MEXU).

17. *P. sp. nov.* (“*megastipulata-Veracruz-Hidalgo*”)

This new species can be easily distinguished by the big foliose and falcate stipules, 10-18 x 5-10 mm, persistent on new reiterations, the leaves elliptic-ovate to elliptic-obovate, 6.5-12 x 3.2-4.4 cm, slightly

asymmetric, with petioles 5-8 mm long, venation brochidodromous festooned, secondary veins relatively straight emerging at 60-70 degrees from the midrib, tertiaries irregular reticulate, lateral veins plain below and impressed to plain above, and 2 glands located on the second pair or of secondary veins or below at 4-7 mm from the base and 2-4 mm from the midrib. The floriferous shoots are erect, 1.5-5 cm long, with the flowers concentrated toward the apex, flowers with pedicels 2-3.5 mm long, hypanthium 2.6-3.2 mm wide and anthers 0.6-0.7 mm long. The fruit is prolate, 13-16 x 11-13 mm.

The most similar species is *P. lundelliana* which has smaller linguiform stipules, elliptic leaves with longer petioles and more conspicuous minor veins, the flowers have longer pedicels, and the fruits are smaller.

**Distribution.** Distributed in midelevation humid tropical forests of the states of Hidalgo, Veracruz, and Puebla with influence of limestone formations.

**Elevation range.** 650 – 2220 m.

**Material examined.** (12) **MEXICO. Hidalgo:** Barranca de Tlanchinol, 1300 m, 14 Nov 1975, *Delgado S., A. 102* (MEXU); Tenango de Doria, 20 km al NE de Metepec, por la carretera de terracería que va a Tenango de Doria, 2220 m, 24 Mar 1984, *González L.; Manuel 55* (CAS,MO,SLPM); Tenango de Doria, alrededores, 1770 m, 8 Mar 1964, *González Quintero, L. 469* (CAS); **Puebla:** Al NO de Villa Juarez, 1000 m, 8 Apr 1944, *Miranda, F. 3228* (MEXU); **Veracruz:** Chiconquiaco, Chiconquiaco, camino a Misantla, Sierra de Chiconquiaco, 1590 m, 19 Nov 1963, *Gómez-Pompa, A. 1141* (MEXU,XAL); Yecuatla, El Clarín, cuesta, E de Santa Rita, 1300 m, 12 Nov 1988, *Gutiérrez B., C. 3333* (XAL); El Clarín, al E de Santa Rita, 1300 m, 13 Nov 1989, *Gutiérrez B., C. 3752* (MEXU,XAL); Atzalan, Tatzayanala, 1400 m, 23 May 1970, *Ventura A., F. 1143* (MEXU,MO,XAL); Jalacingo, El Bravo Grande, 650 m, 20 Mar 1973, *Ventura A., F. 8039* (ASU,F,XAL); Atzalan, Ranchito El Caballo, 1000 m, 7 May 1976, *Ventura A., F. 12743* (MEXU,XAL); Jalacingo, Allende, 1750 m, 20 Mar 1981, *Ventura A., F. 18298* (GH,MO,XAL); Yecuatla, Xalapa, camino a Misantla, 20 km después de Naolinco, 1650 m, 27 Feb 1981, *Zavala Ch., F. 297* (XAL).

18. *P.* sp. nov. (“*motzorongo-Veracruz*”)

This is a big tree that has leaves elliptic-oblong to rhombic, chartaceous, 8.5-11 x 3.5-4.5 cm, slightly lustrous above, with petioles 6-10 x 1-1.2 mm, base acute to obtuse and shortly decurrent, apex shortly acuminate, venation pattern brochidodromous festooned, secondary veins progressively curved upward, emerging at 50-60 degrees from the midrib, intersecondaries with around half the length of secondaries and parallel to them, tertiaries irregular reticulate, and 4 elliptic crateriform glands, the lower pair sub-basal and placed at 1-4 mm from the base and 0-2 mm from the midrib, the upper pair placed at 10-18 mm from base and 3-5 mm from the midrib. The floriferous shoots are subflexuous, 1.5-3 cm long; the flowers have pedicels 2.5-4.5 x 0.1-0.3 mm, hypanthium hemispheric, 2.5-3.2 mm wide and anthers 0.5-0.7 mm long. The fruits are prolate and apiculate, 13-15 x 11-13 mm. The most similar species is *P. myrtifolia* which is generally a smaller tree with externally whitish bark on twigs, generally smaller leaves and longer racemes.

**Distribution.** Distributed in lower foothills of the southern and western part of the state of Veracruz and the border area with the state of Oaxaca in an ecoregion known as the Peten-Veracruz moist forests.

**Elevation range.** 530 – 570 m.

**Material examined.** (4) MEXICO. Sine loco, *Sessé, M. 2041* (F); Oaxaca: Santa Maria jacatepec, La joya del obispo, 530 m, 8 Feb 1991, *Ramos, C.H. 573* (MEXU); Tuxtepec, Santa Maria Jacatepec, predio la Joya del Obispo, aprox. 10 km al este de San Agustin, 570 m, 8 Feb 1991, *Ramos, C.H. 587* (MEXU); Veracruz: Tezonapa, Motzorongo, 5 km al W, 550 m, 9 Feb 1986, *Robles G., R. 265* (XAL).

19. *P.* sp. nov. (“*multiglandulosa-Oaxaca*”)

This new species can be recognized by the leaves elliptic-oblong subcoriaceous, 8.5-13 x 3.8-5 cm, slightly lustrous above, opaque and drying pale brown below, with base truncate to obtuse and apex shortly

acuminate, brochidodromous festooned venation, secondary veins arcuate emerging at 70-90 degrees from the midrib, intersecondaries sinuate, tertiaries irregular reticulate, and 6-12 rounded glands (0.5-0.8 mm diam.), the lower pair located at 1-3 mm from the base and 1-2 mm from the midrib, the rest placed parallel to the midrib around halfway in the midrib-margin axis and separated 12-20 mm among them along the base-apex axis. The floriferous shoots are sub-erect, 3.5-4.5 cm long, the axis and pedicels very slender and only 0.3-0.5 mm thick; the flowers have pedicels 1.5-2.5 mm long, hypanthium campanulate, 1.7-2.2 mm wide and anthers 0.3-0.5 mm long. The fruits are prolate, apiculate, slightly compressed laterally, 13-16 x 10-13 mm.

This species may be considered close to *P. erythroxyton* which however has chartaceous leaves, with only 2-4 glands, secondary veins emerging more ascendingly, bigger flowers and fruits ventrally applanate.

**Distribution.** Distributed in mid elevation wet forests on karstic formations of the northeastern part of the state of Oaxaca, Mexico.

**Elevation range.** 920 – 2250 m.

**Material examined.** (14) **MEXICO. Oaxaca:** Ixtlan, Municipio de Comaltepec: Just off Highway 175 (road from Ixtlán de Juárez to Valle Nacional), on Caribbean slope, 2250 m, 15 Oct 1991, *Boyle, B. 529* (MEXU,MO); Municipio de Comaltepec: Cerro Redondo, above town of La Esperanza (on the Oaxaca-Tuxtepec road, Highway 175). Caribbean slope, 1750 m, 26 Oct 1991, *Boyle, B. 607* (MO); Municipio de Comaltepec. Flat area below trail to Rancho Tarabundí, trail leaves Highway 175 about 1 km above Vista Hermosa. On ridge above (N of) Río La Trucha, Caribbean slope, 1255 m, 16 Nov 1991, *Boyle, B. 641* (MEXU,MO); *ibidem*, 1255 m, 18 Nov 1991, *Boyle, B. 662* (MEXU,MO); Municipio de Ixtlán. Near abandoned community of Tarabundi, south side of Río Soyolapan, access via La Luz, primary forest toward Río Langaro (local name), 1230 m, 24 Nov 1993, *Boyle, B. 2589* (MEXU,MO); Municipio de Ixtlán. 6 km to NNE of the settlement La Luz. On N slope of hill marked La Cueva de Sarmiento, Río Soyolapan watershed, 1790 m, 1 Nov 1994, *Boyle, B. 3845* (MEX); Tuxtepec, Mpio. San Felipe Usila. Cuenca del Río Perfume (ladera O). 7 km en línea recta al S de Santa Cruz Tepetotutla, 1830 m, 12 Jan 1996, *Gallardo H.; C.*

1717 (MEXU,MO); ibídem, 4.5 km en línea recta al SE de Santa Cruz Tepetotutla, 1650 m, 24 Nov 1997, *Gallardo H.*; *C. 2178* (MEXU,MO,XAL); Ixtlan, Municipio de Comaltepec: Rancho Aguacat, 1200 m, 10 Sep 1988, *López Luna, R. 365* (MO); Tuxtepec, Mpio. San Felipe Usila. Colindancia con San Antonio del Barrio. 1.3 km en línea recta al N de Santa Cruz Tepetotutla, 920 m, 25 Apr 1994, *Osorio H.*; *P. 73* (MO); San Andres Yaa, 1400 m, 19 May 1982, *Torres C., R. 493* (MEXU); Carretera Oaxaca-Tuxtepec, 24.8 km norte de Humo chico, 1800 m, 27 Sep 1982, *Torres C., R. 1448* (MEXU); Ixtlan, entrada al camino a San Isidro Yolox, 2020 m, 23 Oct 1987, *Torres C., R. 10229* (MEXU); **Veracruz**: Zongolica, 1400 m, 1856, *Botteri, M. 1023* (P).

20. *P.* sp. nov. ("*Nayarit-4glands*")

It can be distinguished by the light gray bark on the twigs, leaves obovate-elliptic, coriaceous, 9-11.5 x 2.6-3.7 cm, slightly lustrous above, with petiole 7-10 x 1-1.3 mm inserted on a protrusion of the shoot, base acute and shortly decurrent, apex shortly acuminate, the venation pattern weak brochidodromous, intersecondaries inconspicuous, tertiaries irregular reticulate, lateral veins relatively plain on both sides, and 4 glands, the lower two at 2-5 mm from the base and 0-2 mm from the midrib, the upper pair 10-24 mm from the base and 5-8 mm from the midrib. The floriferous shoots are suberect, 3.5-6 cm long, sometimes with a shorter lateral branch emerging from a cataphyll axil; the flowers have pedicels 2-3 x 0.2-0.3 mm, hypanthium campanulate 2-2.5 mm, and anthers ca. 0.6 mm long. The fruits are unknown.

The combination of coriaceous, obovate, entire leaves with four glands and basally branched racemes is singular for this taxon compared with other Mexican species. The leaf architecture resembles *P. prionophylla* which however has serrated leaves with more prominent venation and erect racemes with bigger flowers.

**Distribution.** Only known from a single collection in a mid-elevation humid place (pine and oak forest type) of the western Sierra Madre surrounded by dry forests in the state of Nayarit, Mexico.



**Elevation range.** 1420 m.

**Material examined.** (1) **MEXICO. Nayarit:** Nayar, 68 km al NE de San Pedro Ixcatán, brecha a la Mesa del Nayar, 1420 m, 3 Dec 1989, *Tenorio L., P. 16935* (MEXU, MO, XAL).

21. *P. sp. nov.* (“*roundedStipules-Oaxaca*”)

This new species can be distinguished by the leaves elliptic-oblong, subcoriaceous, 12-15 x 6-8 cm, lustrous on both sides, with petioles 7-12 x 1.2-2 mm, base rounded, apex acute, conspicuous amplexicaul stipules, persistent, reniform to circular, 16-20 mm long and 7-8 mm wide; venation pattern weak brochidodromous, secondary veins emerging at 55-60 degrees from the midrib relatively straight along their lower half, intersecondaries parallel to the secondaries and half their length, tertiaries inconspicuous, major veins slightly impressed above, and 2 glands placed at 6-8 mm from the base and 1-7 mm from the midrib. The floriferous shoots are erect, 3.5-4 mm long, the flowers have pedicels 5-7 mm, hypanthium wide campanulate, 2.5-3 mm wide, and anthers ca. 0.3 mm long.

The only other Mexican taxon with superlative stipules, *P. sp.nov.* (“*megastipulata-Veracruz-Hidalgo*”), has smaller opaque leaves, narrower not circular stipules, and shorter more compact racemes.

**Distribution.** Only known from a single locality in highlands of the central mountains of the state of Oaxaca (Sierra Juarez), in soils derived from limestone formations.

**Elevation range.** 2380 m.

**Material examined.** (1) **MEXICO. Oaxaca:** Ixtlan, Capulalpam de Mendez, 2380 m, 2 Sep 2003, *Figueroa Brito, S. 747* (MEXU).

22. *P.* sp. nov. (“*Xico-Oaxaca-Veracruz-rivuloseLeaves*”)

This new species can be distinguished by the conspicuous sulcate bark of the twigs with protruding lenticels, the leaves elliptic-oblong to oblong-lanceolate, 6.5-13 x 2.5-5.3 cm, lustrous above, base obtuse to rounded, apex narrowly acuminate, petioles 8-14 x 0.8-1.2 mm, deeply canaliculated, venation pattern brochidodromous festooned, secondary veins arcuate, emerging at 50-65 degrees from the midrib, anastomosing at 2/3 in the axis midrib-margin, intersecondaries 7-10 mm long and then bifurcated, tertiaries irregular reticulate and sinuous percurrent towards the margin, quaternaries with open endings, lateral major and minor veins slightly prominent below, impressed above with a rivulose general appearance, and generally no glands (some individual leaves of some samples can have 1 up 4 very tiny glands, the lower pair placed at 5-10 mm from the base and 1-3 mm from the midrib, the upper pair at 7-12 mm from the base and 4-7 mm from the midrib). The floriferous shoots are sub-erect, 3.5-7.5 cm long; the flowers have pedicels 2-4.5 mm long, hypanthium infundibuliform to turbinate 2.4-3.2 mm wide, and anthers 0.6-0.8 mm long. The fruits are globose to slightly ovate, 7-9 x 8-9 mm.

This species is similar to *P. tuberculata* because the conspicuous venation and the (sometimes) absence of glands; however, that taxon has coriaceous leaves, absolute absence of glands, campanulate hypanthium and smaller fruits. On the other hand, because the texture and appearance of the leaves it may be associated with *P. erythroxyton*, which however has generally larger leaves with shorter petioles and 2 sub-basal glands and bigger ovate fruits.

**Distribution.** Distributed in mid to high elevation moist places of the Oaxacan montane forest ecoregion in the states of Veracruz, Oaxaca and Puebla.

**Elevation range.** 1300 – 2700 m.

**Local names.** Capulín (Mexico).

**Material examined.** (20) **MEXICO. Oaxaca:** Eloxochitlan de Flores Magón, alrededores del primer puente que conecta a San Antonio Eloxochitlan con la brecha de San Jose Buenavista 1323 m, 28 May 2001, *Munn-Estrada, X. 1241* (XAL); Aproximadamente 400 m del Puerto de la Soledad por la carretera de Huautla a Teotitlan de Flores de Magón (MEX 182), 2320 m, 13 Feb 2002, *Munn-Estrada, X. 1943* (TEX,XAL); Totontepec Villa de Morelos, 1860 m, 24 Jan 1986, *Ramirez, E. 149* (MEXU); Mixe, Totontepec. Rio Toro a 3 km al N de Totontepec, 1860 m, 20 Dec 1987, *Ramirez, E. 694* (MEXU,MO); ibídem, 1300 m, 10 Mar 1988, *Ramirez, E. 708* (DAV,MEXU); Mun. de Totontepec, 1900 m, 21 Feb 1986, *Rivera Reyes, J. 0115* (MO); ibidem, 1900 m, Apr 1986, *Rivera Reyes, J. 0261* (MEXU,MO); ibidem, 1900 m, 1 Mar 1988, *Rivera Reyes, J. 0961* (MEXU,MO,NY); ibidem, 1900 m, 15 Dec 1989, *Rivera Reyes, J. 1311* (MEXU,MO,NY); ibídem, 1900 m, 21 May 1990, *Rivera Reyes, J. 1497* (MEXU); Totontepec Villa de Morelos, 1900 m, 23 Jun 1995, *Rivera Reyes, J. 3334* (MEXU); **Puebla:** Coyomoepán, cerro Mototepec, 4 km a NE de Coyomeapán, 2350 m, 20 May 1986, *Tenorio L., P. 11337* (MEXU); **Veracruz:** Coatepec, La Cortadura, falda E del Cofre de Perote, 2100 m, 18 Apr 2007, *Castillo-Campos, G. 22676* (XAL); Xico, 2700 m, 7 Aug 1986, *Cházaro, M. 3852* (MEXU,XAL,XAL); La Pandura, camino Ingenio El Rosario-Xico, 2100 m, , *Narave F., H. 369* (XAL); La Pandura, camino Ingenio El Rosario-Xico, 2150 m, 13 Apr 1983, *Narave F., H. 369* (XAL); Texhuacan, 1350 m, 8 Feb 1984, *Nee, M. 29463* (F,NY,XAL); Maltrata, along Mexico Hwy 150 on the way from Cordoba to Puebla. km marker 231, ca. 100 m E of borderwith Puebla, 2467 m, 18 May 2006, *Wen, J. 8755* (US); Acajete, El Tejocotal, camino a Zapotal, 1750 m, 13 Jun 1990, *Zamora C., P. 2322* (XAL); Coatepec, 1600 m, 26 Jun 1990, *Zamora C., P. 2478* (XAL).

**MESOAMERICA AND THE CARIBBEAN** (42 taxa in total including shared with other areas)

23. *P. "acutangulata"* Pérez-Zab. sp. nov. in prep.

This new species is closed to *P. cortapico*, but the leaves are consistently smaller, the apex end is mucronate and glandular, the petioles are slender; the floriferous shoot rachis and floral pedicels are significantly thinner, the petals have a basal tuft of trichomes placed ventrally and the fruits are generally larger and globose. A complete description is available in the Flora Mesoamericana revision.

**Distribution.** Distributed in low and mid elevation subhumid deciduous forests from western Chiapas to central Mexico.

**Local names.** Ucas (Mexico).

**Elevation range.** 350 – 1700 m.

**Material examined.** (10) **Mexico.** San Carlos, 900 m, 1843, *Liebmann, F. 1757* (F); **Chiapas:** Tenejapa, Ojo de Agua Yashanal, 1700 m, 10 Mar 1984, *Méndez, A. 7377* (MEXU,MO,TEX,XAL); **Guerrero:** Campo Morádo and hills above town, 1400 m, 22 May 1987, *Miller, J.S. 2895* (MEXU,MO); **México:** Temascaltepec, Pantoja, 1500 m, 4 Dec 1932, *Hinton, G.B. 2865* (GH); Temascaltepec, Acatitlan, 1150 m, 21 Jan 1933, *Hinton, G.B. 3183* (ASU,DES,F,US); Volcan, 1360 m, 12 May 1933, *Hinton, G.B. 3918* (NY,UC,US); Ixtapan, 1100 m, 22 Jun 1934, *Hinton, G.B. 6206* (US); **Michoacán:** Aquila, Barranca de Jorge, 3 km al este de Aquila, 350 m, 29 Feb 1980, *Guerrero C., B. 745* (XAL); **Oaxaca:** Miahuatlan, 36 km SW of Miahutlan along road to San Pablo Cuatlan, 1500 m, 8 Feb 1983, *Neill, D. 5422* (F,MEXU,MO); Cerro Marimba, 600 m, 14 Dec 1983, *Torres C., R. 4342* (MEXU,NY).

24. *P. acutissima* Urb., *Symb. Antill.* 5: 349. 1904. Type: Guadeloupe: inter Matelyane et Savane aux Ananas, rara, 900 m, 1897, *Duss, P. 4002* (sintypes, GH!, MO!, NY!, US!).

This species can be recognized by the leaves elliptic-lanceolate, chartaceous, 8-11 x 1.8-3.2 cm, opaque on both sides, with obtuse to rounded base and apex narrowly acuminate, petiole 10-15 x 0.8-1.2 mm, venation pattern weak-brochidodromous, secondary veins arcuate and emerging at 40-60 degrees from the midrib, appearing eucamptodromous, tertiaries irregular reticulate, and 2 rounded crateriform glands (0.7-1 mm) placed at 4-7 mm from the base and 1-2 mm from the margin. The floriferous shoots are erect, 2-3.5 cm long, the flowers have pedicels 3-4 x 0.3-0.4 mm, hypanthium shallowly campanulate, 2.5-3 mm wide and 1.5-1.8 mm high, sepals up to 1.5 mm long, petals relatively large, 3.5-4 mm long x 2.5-3 mm wide, and anthers 0.7-0.9 mm long. Fruits are unknown.

This species is close to both *P. pluradenia* and *P. dussii* which are distributed also in the Island of Guadeloupe, but they have wider subcoriaceous leaves with relatively inconspicuous minor veins below, racemes subflexuous and flowers with narrower hypanthium and smaller petals.

**Distribution.** Only known from a single collection in the northern side of the La Grande Soufriere volcano in the Guadalupe Island.

**Elevation range.** 900 m.

25. *P. "alushii"* Pérez-Zab., sp. nov. in prep.

This new species can be distinguished by the combination of twigs with dense and prominent lenticels, leaves relatively big elliptic-oblong and chartaceous, long acuminate at the apex, and stipules ovate-falcate and ventrally connate. The floriferous shoots and pedicels are relatively long, the flowers have funnellform hypanthium and very small anthers and the subglobose fruits have very thin endocarp. A complete description is available in the Flora Mesoamericana treatment.

**Distribution.** Distributed in humid lowlands and foothills of intermountain valleys in the geographic regions of the Montañas de los Choles in Chiapas and Sierra Los Cuchumatanes in Guatemala. All its range corresponds to karstic derived soils.

**Elevation range.** 500 – 1120 m.

**Material examined.** (7) **GUATEMALA. Huehuetenango:** Ixcán, Sierra de los Cuchumatanes, between Cerro Chiblac and Finca San Rafael, 500 m, 24 Jul 1942, *Steyermark, J.A. 49477* (F,US); **Quiché:** Cotzal, Finca San Francisco, 1120 m, 6 Dec 1934, *Skutch, A.F. 1860* (GH,NY,US). **MEXICO. Chiapas:** Yajalón, Río Culpitillo, 700 m, 20 Jun 1982, *Méndez, A. 4344* (CAS,MEXU,MEXU,MO,XAL); Sabanilla, Finca Morelia, 650 m, 5 Jun 1983, *Méndez, A. 6098* (MEXU,MO); Yajalón, Río y Rancho Carmen, 600 m, 25 Jun 1983, *Méndez, A. 6230* (MEXU,MO);

Sabanilla, Finca Carmen, 500 m, 15 Jul 1983, *Méndez, A. 6339* (F,MEXU,MO); Yajalón, La espalda del cerro Tz'iz Ton, 600 m, 30 Aug 1983, *Méndez, A. 6537* (MEXU).

26. *P. annularis* Koehne, Bot. Jahrb. Syst. 52:308. 1915. Type: Costa Rica: Au bord do Rio Segundo, 2000 m, 10 Jan 1890, *Tonduz, A. 1714* (sintypes BR!, W!).

It can be recognized because the ovate-oblong chartaceous to subcoriaceous leaves with 4 glands (sometimes 2), conspicuous brochidodromous venation, relatively long and flexuous petioles, stipules ovate, sub-flexuous racemes and the fruit larger than in other high elevation Costa Rican species (more than 14-16 x 12-13 mm). A full description and differences with other Mesoamerican species are summarized in the Flora Mesoamericana treatment.

**Distribution.** In mid to high elevation humid forests of Talamanca and Guanacaste Mountain ranges in Costa Rica and western Panamá.

**Elevation range.** 600 – 2500 m.

**Local names.** Mariquita, zapotillo (Costa Rica).

**Material examined.** (47) COSTA RICA. La Palma de San Ramon, 1140 m, 23 Oct 1922, *Brenes, A. 3771* (F,NY); ibidem, 1140 m, 30 May 1927, *Brenes, A. 5527* (NY); ibidem, 1140 m, 13 Mar 1929, *Brenes, A. 6744b* (NY); Tilaran, Río Negro, Atlantic slope wet forest, 1500 m, 22 Nov 1986, *Haber, W.A. 6390* (MO); Tiorels du Barba, Massif du Barba, au bore du Rio Segundo, 2000 m, 10 Jan 1890, *Tonduz, A. 1722* (US); ibídem, Atlantic, 2500 m, 15 Feb 1890, *Tonduz, A. 2025* (US); **Alajuela:** Reserva Biológica Monteverde Río Peñas Blancas. Sociedad IQPSA. Ston's, 800 m, 1 Mar 1990, *Bello, E. 1994* (CR,MO); San Ramon, La palma de San Ramon, 1140 m, 31 Dec 1927, *Brenes, A. 5932* (NY); Reserva Forestal San Ramon, premontane rain forest formations on slopes above and in the valley of the Río San Lorencito, 850 m, 12 Mar 1987, *Burger, W.C. 12140* (CAS,MO); ibidem, 1000 m, 12 Mar 1987, *Gómez-Laurito, J. 11425* (F); ibidem, 900 m, 24 Mar 1989, *Gómez-Laurito, J. 11792* (F,MO); Zarcero, Region of

Zarcelero, 1740 m, 15 Nov 1937, *Smith, A. A646* (MO); Viento Fresco, 1600 m, 13 Feb 1926, *Standley, P.C. 47868* (US); **Cartago**: Paraiso, Cañón del Río Grande de Orosí y aluvi6n, 1550 m, 23 Oct 1983, *Chac6n, A.; Isandro 1480* (MO); **Guanacaste**: Tilar6n, Cordillera de Tilar6n. Reserva Biol6gica del Colegio de Monteverde, 1600 m, 10 Jan 1992, *Bello, E. 4333* (CR); ibidem, 1600 m, 10 Jan 1992, *Bello, E. 4334* (CR,MO); Liberia, Parque Nacional Guanacaste. Cuenca del Tempisque. Estacion Maritza, Sendero a Cacao, 600 m, 12 Jun 1996, *Espinoza, R. 1537* (MO); Monteverde, 1550 m, 12 Jul 1990, *Gentry, A. 71567* (MO); Three km N Santa Elena, Atlantic exposure near continental divide on Bello farm, 1500 m, 20 Dec 1985, *Haber, W.A. 3835* (MO); Tilar6n, Cordillera de Guanacaste. Tierras Morenas. Z.P. Tenorio, 1050 m, 23 Aug 1994, *Rodriguez, G. 321* (MO); **Heredia**: Barva, Parque Nacional Braulio Carrillo, Cordillera Central, Sendero del Transecto, on ridge between second and third creek crossing below refugio at 2070 m, 2080 m, 23 Aug 1992, *Boyle, B. 3190* (CR,MO); Heredia, Along the Sarapiqu6 road, 0.5 km south of the R6o La Paz waterfall, 1400 m, 13 May 1974, *Hartshorn, G. 1493* (MO); Vara Blanca de Sarapiqu6, north slope of Central Cordillera, 1500 m, Jul 1937, *Skutch, A.F. 3302* (MO,US); **Puntarenas**: Reserva Biol6gica Monteverde, La Torre, 1600 m, 26 Jan 1989, *Bello, E. 708* (MO); Reserva Biol6gica Monteverde, R6o Guacimal, 1500 m, 31 May 1989, *Bello, E. 930* (MO); ib6dem, al lado de bosque y camino cerca de Reserva, 1520 m, 9 Feb 1977, *Dryer, V.J. 1177* (F,MO); Cordillera de Tilar6n. San Luis; Buen Amigo, camino a Veracruz Monteverde, 1100 m, 7 Mar 1994, *Fuentes, Z. 649* (CR,MO); Monteverde, reserva Forestal, 1550 m, 22 Aug 1984, *Gentry, A. 48798* (MO); ibidem, 1550 m, 9 Dec 1978, *Haber, W.A. 248* (MO); Monteverde, upper San Luis River valley below Monteverde on Pacific slope, 10°20'N, 84°50'W, 1200 m, 17 Dec 1985, *Haber, W.A. 3921* (MO); Monteverde Cloud Forest Reserve, on continental divide in area of TV towers, 1700 m, 29 Dec 1985, *Haber, W.A. 4010* (MO); Monteverde, comunidad, 1400 m, 10 Mar 1987, *Haber, W.A. 6898* (MO); ibidem, 1400 m, 1 Jan 1992, *Haber, W.A. 10970* (CR,MO); Cordillera de Tilar6n. Monteverde, road from gas station to TV towers, Pacific slope, 1600 m, 15 Mar 1992, *Haber, W.A. 11071* (CR,MO); ibidem, 1600 m, 15 Mar 1992, *Haber, W.A. 11076* (CR,MO); ibidem, 1650 m, 18 Apr 1992, *Haber, W.A. 11110* (CR,MO); Montes de oro, Zapotal, 1200 m, Apr 1961, *Jim6nez, O. s.n.* (F,NY); ib6dem, 1500 m, May 1961, *Jim6nez, O. s.n.* (F,NY,US); Monteverde area, ca 0.5 km from Reserva monteverde, on the way downtown to Monteverde, 1580 m, 22 Sep 2002, *Wen, J. 6812* (US); On the way from Santa Elena to Santa Elena Cloud forest Reserve. Ca 1.5 km from Santa Elena, 1550 m, 23 Sep 2002, *Wen, J. 6846* (US); Santa Elena cloud forest reserve, 1720 m, 23 Sep 2002, *Wen, J. 6853* (US); **San Jos6**: Acosta, Z.P. Cerros de Carraigres; Fila Bustamante. Cerro Carraigres; bosque primario en Fila El Alto, cerca de la gruta, 2100 m, 16 Apr 1994, *Morales, J.F. 2685* (CR); Tarrazu, Faja Costeña del Valle de

Parrita. Concepción de Tarrazú, bosque primario en la Fila San Isidro, camino a San Isidro, 700 m, 26 Mar 1995, *Morales, J.F.* 3756 (CR,MO). **PANAMA. Chiriquí:** Cerro Colorado; top; Bocas Road, 1500 m, 17 Feb 1977, *Folsom, J.* 1806 (MO); Comarca Ngöbe-Buglé. Distrito de Nole Duima. Corregimiento de Hato Chamí, La Nevera, aproximadamente 28 km al Norte del puente sobre Río San Félix, 1630 m, 23 Jan 2008, *Galdames, C.* 6040 (MO,SCZ); Near Cerro Colorado, c. 4.2 miles from Chami [Chame] Camp, 1500 m, 16 Apr 1986, *McPherson, G.* 8965 (MO).

26a. *P. annularis* Koehne subsp. nov. (“*Chiriqui-bigLeaves*”)

This new subspecies can be differentiated from the core collections of *P. annularis* because its larger leaves (10-17 x 4.2-7 cm), more rigid coriaceous, with thicker erect petioles, secondary veins more arcuate ascending configuring a weak brochidodromous pattern, tertiary veins little conspicuous and glands less consistently present. The racemes are frequently longer, more erect and densiflorous; and the flowers have more erect pedicels. Some specimens of this new subspecies has been attributed previously to *P. brachybotrya* from eastern Mexico because the similarity of the leaf size and shape, but that species has narrower oblong leaves, sub-basal glands attached to the midrib and erect racemes with slightly bigger flowers.

**Distribution.** Distributed in mid to high elevation moist forests of the Pacific slope of the Talamanca mountain range from central Costa Rica to western Panama.

**Elevation range.** 1100 – 2200 m.

**Material examined.** (29) **COSTA RICA. Puntarenas:** Buenos Aires, P.N. La Amistad. Cuenca Térraba-Sierpe. Fila Anguciana, 1380 m, 17 Aug 2001, *Alfaro, E.* 3695 (MO); Foothills of the Cordillera de Talamanca, lower montane forest in the area of Sitio Cotón (Cotonsito), along the road to Sitio Coto Brus, 1500 m, 3 Sep 1983, *Davidse, G.* 24601 (MO); Puesto Tres Colinas, en orilla de camino 2 km antes de llegar al puesto, 1680 m, 19 Sep 1996, *Gamboa R., B.;* *B.* 692 (INB,MO); Coto Brus, Puntarenas: Cantón de Coto Brus. Cuenca Térraba-Sierpe Estacion



Biologica Las Alturas, 1540 m, 18 Oct 1997, *Gamboa R., B.; B. 1869* (INB,MO); P.I. La Amistad; Cordillera de Talamanca. Santa María de Pittier, camino de acceso al puesto de vigilancia Pittier, 1700 m, 2 Jun 1995, *Gonzalez, J. 804* (CR,MO); Las Cruces Biological Station, San Vito, 1290 m, 2 Jul 1994, *Kress, W.J. 94 4306* (US); Z.P. Las Tablas. Cordillera de Talamanca. Estación Biología Las Alturas, 1540 m, 22 Apr 1996, *Navarro, E. 288* (MO); Between Las Alturas and Finca Río Negro, 6-10 km northeast of the town of La Union near the Costa Rican Panamanian border or about 30 km northeast of San Vito de Java, foothills and lower-most Pacific slopes of Talamancas, 1100 m, 12 May 1976, *Utley, J. 4816* (CAS,MO,US); Canton Coto Brus, near Wilson Botanical Garden, 1220 m, 6 Oct 2002, *Wen, J. 6961* (US); **San José:** Perez Zeledon, Cuenca Térraba-Sierpe, Estación Santa Elena, en potrero y orilla de río, 1210 m, 31 Aug 1996, *Alfaro, E. 662* (MO); Turrubares, Zona Protectora Cerros de Turrubares, Faldas del Cerro Bares, 1600 m, 6 Nov 1990, *Jiménez M., Q. 925* (CR,MO); Aserri, Z.P. Cerros de Carraigres, Fila Bustamante, bosque primario y tacotales en la Fila El Alto, 2000 m, 22 Jan 1995, *Morales, J.F. 3399* (CR,MO).

**PANAMA. Bocas del Toro:** Fortuna Dam region, near trail along continental divide, 1250 m, 11 Feb 1986, *McPherson, G. 8400* (MO); **Chiriquí:** Boquete, Bajo Chorro, 1829 m, 31 Jan 1938, *Davidson, M.E. 235* (GH,MO); ibidem, 1829 m, 31 Jan 1938, *Davidson, M.E. 237* (MO); Along road between Boquete and Cerro Horqueta, 1100 m, 2 Aug 1967, *Duke, J. A13719* (MO); Valley of the Río Chiriquí Viejo of Volcan City, 1585 m, 9 Dec 1966, *Duke, J. 9061* (MO); San Felix, Comarca Gnöbe Buglé. Km 10 al 16 entre Hato Chamí y Hato Ratón. ±27-37 km N de la Interamericana, 1475 m, 19 May 2001, *Galdames, C. 4629* (MO); Cerro Punta region, Alto los Guerra road W of Bambito, 1800 m, 13 Jul 1983, *Hamilton, C. 3887* (MO); Above Los Llanos, 2100 m, 3 Jun 1986, *McPherson, G. 9264* (MO); Along road from Cerro Punta village towards Boquete, near place called Bajo Grande, 2100 m, 5 Jun 1986, *McPherson, G. 9342* (MO); Santa Clara region, 27 km NW of El Hato del Volcán, on coffee finca of Rattibor Hartman called Ojo de Agua, 1524 m, 18 Jul 1975, *Mori, S. 7219* (MO); Cerro Colorado, 1600 m, 9 Aug 1984, *Schmalzel, R. 2002* (MO); Boquete, Vicinity of Boquete, Finca Collins. Oak-laurel cloud-forest, 1676 m, 24 Jul 1959, *Stern, W.L. 1133* (GH,MO,US); Cerro Punta below horse training farm, 1829 m, 26 Feb 1974, *Tyson, E. 7015* (MO); Río Chiriquí Viejo valley, between El Volcán and Cerro Punta, 1420 m, 19 Mar 1938, *White, G.14* (GH,MO,US); Edge of forested slope above Cerro Punta toward Bajo Grande in Quebrada Bajo Grande, 1981 m, 14 Jan 1970, *Wilbur, R.L. 10915* (CAS,GH,MO); East of Guadeloupe along the Río Chiriquí Viejo, about 2 miles northeast of Cerro Punta. Ridge of Cerro Respinga, 2134 m, 13 Jan 1971, *Wilbur, R.L. 13118* (CAS,GH,MO); Vicinity of Casita Alta, Volcán de Chiriquí, 1500 m, 28 Jun 1938, *Woodson Jr.; R.E. 907* (GH,MO).

27. *P. axitliana* Standl., Wash. Acad. Sci. 13:438. 1923. Type: El Salvador: La Libertad, Collected on hills near Santa Tecla, March 1923, *Calderón, S. 1519* (holotype US!, isotypes, GH!, NY!).

This species is very close to *P. lundelliana* but differs from that because the 2 (vs. 4) more conspicuous sub-basal glands next to the midrib, the vein framework conspicuously brochidodromous festooned with minor veins very visible and slightly raised below, the bigger linguiform stipules, the shorter floriferous shoots, and the fruits globose and bigger in size. A complete description is available in the Flora Mesoamericana treatment.

**Distribution.** Distributed in lowlands and low mid-elevation humid forest of the Pacific slope of the mountain ridge (Sierra Madre) ranging from El Salvador to southern Mexico in the state of Chiapas.

**Elevation range.** 380 – 1600 m.

**Local names.** Cangrejillo, pullulo negro, sapuyulo (El Salvador)

**Material examined.** (23) **EL SALVADOR. Ahuachapán:** Parque Nacional El Imposible. Finca San Benito. San Francisco Menendez, 1060 m, 31 Oct 1978, *Chinchilla, J.M. 9* (MHES,NY); Concepción de Ataco, Cantón El Arco, Finca La Esperanza, 1074 m, 8 Dec 2009, *Galán, P. 621* (LAGU); San Francisco Menéndez, El Corozo, Mariposario, zona alta. "Los Sánches", 380 m, 22 Feb 2000, *Rosales, J.M. 247* (B,LAGU,MEXU,MO); municipio San Fco. Menéndez, Hda. San Benito, al Sur de Managueta, 700 m, 8 Feb 1992, *Sandoval, E. 246* (B,LAGU,MO); Al Centro de la Quebrada Seca, 900 m, 28 Apr 1998, *Sandoval, E. 1855* (F,MO); San Benito, en el Guatalón, 1050 m, 2 Feb 1995, *Sandoval, M. 824* (MO); **Chalatenango:** Mpio. San Ignacio, quebrada boscosa ca. 1.9 km al E de El Rosario, después de la Peña de Cayaguanca, 1300 m, 1 May 2002, *Linares, J.L. 5999* (MEXU); **La Libertad:** Jardín Botánico La Laguna, 800 m, 19 Oct 1984, *Pank s.n.* (LAGU); Santa Tecla, 790 m, 10 Apr 1922, *Standley, P.C. 23011* (GH,US); Slopes volcan San Salvador, 1230 m, 22 Jan 1949, *Williams, L.O. 15239* (UC); **La Paz:** El Refugio, San Benito, 620 m, 15 Feb 1998, *Gonzalez, J.C. 518* (MO); **La Unión:** Conchagua, Loma de Cuadras, 787 m, 2 Dec 2006,

*Menjivar, J.* 795 (MHES); **San Vicente:** Volcán San Vicente, 1200 m, 7 Mar 1922, *Standley, P.C.* 21515 (GH,US); **Santa Ana:** San José Ingenio, P.N. Montecristo, la quebrada de Tomás, 1200 m, 28 Sep 2001, *Martínez, V.M.* CMC00421 (DAV,MO); ibidem, la cueva de la golondrina, 700 m, 7 Sep 2001, *Martínez, V.M.* 339 (B,BM,LAGU,MEXU,MO); ibidem, la cueva del león, 1100 m, 29 Nov 2001, *Martínez, V.M.* 390 (MO); ibidem, el infiernillo, 1600 m, 23 Feb 2002, *Martínez, V.M.* 747 (MO); **Usulután:** Laguna Alegria, Volcan Alegria, 1360 m, 22 Jun 1999, *Monro, A.* 3013 (MO). **GUATEMALA. Sacatepéquez:** Alotenango, El Astillero, 1.5 km carretera de Alotenango a Escuintla, 1350 m, 19 Nov 1994, *Castillo Mont, J.J.* 2519 (F,GH,MO,NY,US); 2.3 miles SW of Alotenango on road from Antigua to Escuintla, slopes of Volcán del Fuego, 1300 m, 26 Jul 1977, *Croat, T.* 41937 (MO). **MEXICO. Chiapas:** Mapastepec, Santa Rita, 600 m, Jan 1938, *Matuda, E.* 2016 (DS,F,GH,MEXU,NY,UC,US); Tonalá, Ejido Las Palmas, 620 m, 29 Apr 2002, *Reyes-García, A.* 4614-b (MEXU,MO).

28. *P. chiapensis* Standl. & L.O.Williams ex Ant. Molina, *Ceiba* 14(1): 1. 1968. Type: Mexico: Chiapas, in woods, Fraylesca, near Siltepec, 1600 m, 6 Mar 1945, *Matuda, E.* 5194 (holotype EAP!, isotypes LL!, MO, S).

*Prunus siltepecana* Lundell, *Wrightia* 4: 87. 1968 (illeg, based on the same type).

*P. chiapensis* can be easily differentiated from any other Neotropical species by the unique combination of leaves dentate, pubescent below mainly on the veins and the petiole, with secondary vein pattern semicraspedodromous and 2 petiolar clavate glands placed close to the base of the lamina. This species is somehow similar to *P. serotina* because the dentate margin, the petiolar glands and laminar domatia; however, the leaves are much larger, the veins are protuberant below, the lower surface is pubescent, and the floriferous shoots are basally leafless. A complete description is available in the *Flora Mesoamericana* treatment.

**Distribution.** Distributed in scattered locations of mid-elevation humid forests from El Salvador to Southern Mexico (Chiapas).

**Elevation range.** 1400 – 2000 m.

**Local names.** Carreto (Guatemala), pitarrillo (El Salvador).

**Material examined.** (5) **EL SALVADOR. Santa Ana:** Bosque Nebuloso de Montecristo, 2000 m, 23 Jun 1977, *Martinez, R. 1063* (MHES); **GUATEMALA. Huehuetenango:** Rio Blanco bridge, near to, 2000 m, 17 Sep 1971, *Molina R., A. 26573* (F,US); in deep cayon of tributary of Rio Blanco 5 km west above Aguacatán, 2000 m, 11 Jan 1974, *Molina R., A. 30226* (US); along Rio Azul, below Jacaltenango, 1400 m, 4 Sep 1942, *Steyermark, J.A. 51860* (GH).

29. *P. "chirripoensis"* Pérez-Zab., sp. nov. in prep.

It can be recognized by the leaves relatively small, rigid coriaceous, obscured veined and short petiolated, with both cataphylls and leaves with a glandular tissue at the tip, and two conspicuous sub-basal glands. The flowers of this species are bigger than other Costa Rican species with small leaves (smaller than 5.5 × 2.4 cm) and the fruits are obovate with a significant fleshy mesocarp. A full description is available in the Mesoamerican treatment.

**Distribution.** Distributed in wet cloud forests of the western slopes of the Chirripo massif (the highest peak in Costa Rica) which is part of the Talamanca mountain ridge, San José Province.

**Elevation range.** 2500m.

**Material examined.** (1) **COSTA RICA. San José:** Perez Zeledon, Cerro Chirripó, deforested area along trail known as Abra, heavily overgrown with weeds, 2500 m, 6 Apr 1969, *Davidse, G. 1650* (F,GH,MO,NY).

30. *P. compacta* L.O.Williams, Brittonia 18:266. 1966. Type: Guatemala: Huehuetenango, San Juan Ixcoy, Sierra de los Cuchumatanes, along road to Huehuetenango, 7 miles south of San Juan Ixcoy, 9750 feet, 4 Feb 1965, *Breedlove, D.E. 8500* (holotype, F!; isotypes MICH!, NY!, US!, US!).

*P. compacta* can be recognized by the leaves relatively large subcoriaceous to chartaceous, with glands basal and narrow elongate, and large linguiform stipules around 1 cm long. The floriferous shoots are relatively short (compared with other big-leafed species in Mesoamerica), the axis is noticeably thick, and the flowers are densely arranged. The fruits are ovoid to pyriform and bigger than other species in the region. The most similar species is *P. brachybotrya* which has smaller coriaceous leaves with longer petioles, more laxiflorous racemes and flowers with longer pedicels. A full description is available in the Flora Mesoamerica treatment.

**Distribution.** Only known from high elevation forests in the mountain ridge Sierra de Chuchumatanes, a karstic formation in northern Guatemala, department of Huehuetenango.

**Elevation range.** 2500 – 3100 m.

**Material examined.** (3) GUATEMALA. 2800 m, 5 Aug 1965, *Breedlove, D.E. 11476* (CI,DS,F,TEX); Ixcán, Sierra de los Cuchmatanes, trail between Tunimá and Quisil, 2500 m, 8 Jul 1942, *Steyermark, J.A. 48424* (F,US).

31. *P. cortapico* Koehne, Bot. Jahrb. Syst. 52: 307. 1915. Type. Mexico: Colima, *Kerber D 19* (sintypes, B, prob. destr.).

*Prunus skutchii* I.M.Johnst., J. Arnold Arbor. 19:117. (1938). Type. Guatemala: Suchitepequez, Finca Moca, 1150 m, 8 Jan 1935, *Skutch, A.F. 2077* (holotype, A; isotypes, MO, NY, US).

*Prunus hintonii* (C.K. Allen) Kosterm., Reinwardtia 5: 391. 1960. *Cryptocarya hintonii* C.K. Allen, Journal of the Arnold Arboretum 26(4): 423–424. 1945. Type. Mexico: Michoacán, Coalcomán, Sierra Naranjillo, 1400 m, 5 May 1939, *Hinton, G.B. 13737* (holotype, GH; isotypes, MICH, MO, NY, US).

It can be recognized by the overall big size of the adult individuals; the twigs, leaves and young floriferous shoots puberulent (but usually turning glabrous when mature); the large elliptic-oblong leaves with secondary veins prominent below and progressively arcuate near to the margin, and 2 elongate glands adnate to the midrib and fully basal or sub-basal. The flowers have relatively wide hypanthium, stamens with long filaments and anthers 1.2-2 mm long. The fruits are ellipsoid, 16-20 mm long. Differences with similar species like *P. ochoteranae* and *P. occidentalis* are detailed below those species. A complete description is available in the Flora Mesoamericana treatment.

**Distribution.** Widely distributed mostly along Pacific sided mountain ranges from El Salvador to northwest Mexico in the state of Sinaloa.

**Elevation range.** 700 – 2500 m.

**Local names.** Babelama de la Sierra, canelillo, carretero, cerezo, cortapico, ucaz (Mexico); sapuyulo (El Salvador).

**Material examined.** (36) **EL SALVADOR.** **Ahuachapán:** Sierra de Apaneca, region of Finca Colima, 900 m, 17 Jan 1922, *Standley, P.C. 20058* (US). **GUATEMALA.** **Sololá:** Volcán San Pedro, North facing slopes towards Lago de Atitlán, above villa de San Pedro, 2500 m, 7 Jun 1942, *Steyermark, J.A. 47220* (US). **MEXICO.** Temascaltepec, 1760 m, 18 Apr 1933, *Hinton, G.B. 3706* (US); Nayarit, Cerro Relix del Toro, 1200 m, 1923, *Ortega, J.G. 27* (US); **Chiapas:** Angel Albino Corzo, Along slopes of Río Cuxtepec below Finca Cuxtepec, 1080 m, 13 Dec 1980, *Breedlove, D.E. 48619* (CAS,MEXU,TEX); Above Finca Cuxtepec, 1380 m, 14 Dec 1980, *Breedlove, D.E.*

48657 (CAS,DAV,GH,MEXU,MO); Jiquipilas, A 7.83 Km al NO de Tiltepec, 1025 m, 25 Apr 2002, *Calónico Soto, J. 23010* (MO,XAL); Bella Vista, El Nuevo Pacayal, 1040 m, 17 Nov 1977, *Calzada, J.I. 3917* (XAL); Pijijiapan, Ejido El Rosario, 26 km al N del puente Margaritas que esta sobre la carretr. Pijijiapan, 750 m, 20 Apr 2006, *Martínez Meléndez, N. 1488* (MO); Escuintla, Mt. Ovando, 1300 m, 14 Nov 1945, *Matuda, E. 16246* (MEXU,MO,US); La Trinitaria, Col. Cuauhtemoc, al lado N sobre carretera de terraceria km. 17, 1450 m, 10 Jun 1984, *Méndez, A. 7654* (MEXU,MO,XAL); Oxchuc, Cascada Río Mesbiljaz, 1660 m, 15 Jun 1984, *Méndez, A. 7675* (MEXU,MO,XAL); La Trinitaria, Col. Cuauhtemoc, 1400 m, 25 Jun 1984, *Méndez, A. 7740* (F,MEXU); Oxchuc, Cascada de Coralito en la carr. San Cristóbal a Ocosinco, 2100 m, 20 Mar 1986, *Méndez, A. 8908* (MEXU,MO); Cacahoatán, Alpujarra; matorral; arbustos en ladera de cerro, 750 m, 5 Oct 1984, *Ventura V., E. 417* (MEXU,XAL); **Colima:** Edo. de Colima, 1300 m, 7 Feb 1992, *Rico A., L. 991* (MO,NY); Comala, Rancho El Jabali, 22 km (airline) NNW of colima in the SW foothills of Volcan de Colima, canyon above Lago El Jabali, 1300 m, 7 Jan 1991, *Sanders, A. 10362* (CAS,DAV,MO); Rancho El Jabali, 20 km (airline) NNW of Colima in the SW foothills of the Volcan de Colima, la Atarjea Canyon, 1.7 km SE of turnoff to Hda. San Antonio, 1275 m, 8 Jan 1991, *Sanders, A. 10428* (ASU,CAS,DAV,F,MO,NY,TEX,UC); Rancho El Jabali, 22 km (airline) NNW of colima in the Sw foothills of the Volcan de Colima; on road above (NE of ) Lago Jabali, 1325 m, 9 Jan 1991, *Sanders, A. 10433* (F,MO,TEX); **Jalisco:** Talpa, de la Cuesta a Talpa, antes Paso Hondo, 1150 m, 25 Apr 1994, *Machuca N., J.A. 7098* (TEX); Zapotitlan, Rancho El Jabali, 1100 m, 22 Mar 1991, *Sanders, A. 10868* (CAS,TEX); Mazamitla, Puerta del Zapatero, 1760 m, 18 Dec 1989, *Villa C., J. 454* (SLPM); **México:** Temascaltepec, San Lucas del Maíz, 1980 m, 2 Feb 1933, *Hinton, G.B. 3328* (GH,HINTON); Tejupilco, Tejupilco, 1300 m, 22 Dec 1934, *Hinton, G.B. 7145* (GH,HINTON,US); **Michoacan:** Coalcoman, Yerbabuena del Naranjillo, 1300 m, , *Díaz-Barriga, H. 6199* (CAS,TEX); S. Naranjillo, 1360 m, 26 Nov 1938, *Hinton, G.B. 12676* (GH,HINTON,NY,TEX,US); **Oaxaca:** Hidalgo, Region of Pluma, Mar 1943, *Leyva, C. s.n.* (US); A 28 km al W de San Jerónimo Coatlán, 1420 m, 26 Oct 1982, *Martínez S., E. 2540* (MO,XAL); Cafetal calvario, 700 m, Dec 1917, *Reko, B.P. 3643* (US); Miahuatlan, a 25.6 km al SW de San Jerónimo Coatlán camino a Piedra larga, 1530 m, 9 Feb 1983, *Torres C., R. 2242* (MO,XAL); **Sinaloa:** Capadero, 950 m, 12 Feb 1940, *Gentry, H.S. 5572* (DS,UC); Capadero, Sierra tacuichamona, 914 m, 12 Feb 1940, *Gentry, H.S. 5573* (MO,NY); **Veracruz:** Xico, ND, 1000 m, 28 Jun 1983, *Ortega O., R. 2458* (XAL).

32. *P. dussii* Krug & Urb., in Duss, Fl. Phan. Antill. Franc. 259.1897., Urban, Symb. Antill. 2: 350 (1904). Type: Martinique: des hauter du Ceron de Case Pilote, 350-680 m, 1881, *Duss, P. 1907* (sintypes, GH!, MO!, NY!, PH!, US!). Guadeloupe: in partibus inferioribus sylvarum Bainsjaunes, Gommier, Camp-Jacob; Matouba, 400-700 m, 1894, *Duss, P. 2731* (sintypes, GH!, MO!, NY!, US!).

This taxon can be identified by the dark lustrous twigs with abundant pale lenticels, the leaves ovate-oblong subcoriaceous, 7-16 x 3.5-7.5 cm, slightly lustrous on both sides, with petiole 8-13 x 1.2-1.5 mm, base rounded to truncate, concave and decurrent down to half the petiole and apex shortly acuminate, venation pattern brochidodromous festooned, secondaries (8-9) arcuate, intersecondaries parallel to secondaries and extending up to half their length, sometimes absent, tertiaries alternate percurrent and reticulate towards the apex, and 2 glands located at 1-5 mm from the base and 0-2 mm from the midrib. The floriferous shoots are erect to sub-erect, 1.5-3 cm long, the flowers have pedicels 1.5-3 mm long, hypanthium wide campanulate 1.8-2.7 mm wide and anthers 0.5-0.6 mm long. The fruits are oblate to didymous, mucronate, 13-15 x 16-20 mm.

Howard (1987) proposed the inclusion of *P. dussi* and *P. acutissima* under *P. pleuradenia*. Here, I am proposing to keep *P. acutissima* as an accepted species based on its unique lanceolate chartaceous leaves with submarginal glands and relatively big flowers overall placed on short erect racemes. On the other hand, I consider that *P. dussii* can be better understood as a taxa with close affinity to *P. pleuradenia* (or perhaps a subspecies) restricted to the Guadeloupe and Martinique Islands which can be differentiated from the later because the leaves with truncate to rounded base, less secondary veins more clearly anastomosing to each other and with a visible sub-marginal extra loop, glands closer to both the base and the midrib, the slightly bigger flowers with shorter pedicels and larger anthers, and the conspicuous bigger didymous fruits. Another similar species is the Guianan *P. accumulans* which however has less conspicuous glands not attached to the midrib, smaller flowers and smaller fruits.



**Distribution.** Distributed in mid-elevation forests of the Caribbean islands of Martinique and Guadeloupe.

**Elevation range.** 480 – 750 m.

**Local names.** amandier, bois noyau, nogan de France, noyau (Martinique).

**Material examined.** (9) **DOMINICA.** Along road between Laudat and Fresh Water lake, 700 m, 3 Feb 1966, *Chambers, K.L.* 2688 (A,US); **GADELOUPE.** St Claude - Bains Jaunes, Roadside between St Claude and Bains Jaunes, 750 m, 27 Mar 1982, *Howard, R.A.* 19787 (A,US); **MARTINIQUE.** Case Pilote-Morne Rose, 600 m, Dec 1984, *Fiard, J.P.* 40 (P); Grand Fond, Bois pres Case-Pilote, *Hahn, L.* 1364 (GH, P (3)!, US!). Foret gros mome Calvaire, 560 m, 14 Jul 1939, *Stehlé, H.* 4132 (US); Hanteurs du gros mome, Deux-choux, 480 m, 20 Jul 1939, *Stehlé, H.* 4875 (US); 620 m, 30 Nov 1944, *Stehlé, H.* 5351 (P,US).

33. *P. fortunensis* McPherson, Ann. Missouri Bot. Gard. 75: 373-375. 1988., ilustr: Ann. Missouri Bot. Gard. 75: 374. Fig 1. (1988). Type: Panama: Bocas del Toro, Fortuna Dam region, near trail along continental divide, forested slopes, 1250 m, 11 Feb 1986, *McPherson, G.* 8404 (holotype PMA!; isotypes CAS!, INB!, K!, MEXU!, MICH!, MO!, NY!, TEX!, US!).

This species may be distinguished from other species with small leaves in the geographical proximity (e.g., *P. annularis*) by the leaves with venation impressed on the upper side and prominent below, the leaf base decurrent down to half of the petiole, the two submarginal leaf glands, the ventrally fused stipules, the slender petioles, and the flowers with petals up to 2 mm long and 10-16 stamens arranged in one series. A full description is available in the flora Mesoamericana revision chapter.

**Distribution.** Mid-elevation humid forests in the Caribbean slope of the Talamanca Mountain ridge in eastern Costa Rica and western Panamá.

**Elevation range.** 1110 – 2050 m.

**Material examined.** (4) **COSTA RICA.** **Cartago:** Paraiso, Reserva Forestal Río Macho, Cuenca del Reventazón, Río Pejibaye, 1800 m, 22 Jul 1998, *Alfaro, E. 1791* (MO); Turrialba, Valle del Reventazón, Grano de Oro, Moravia de Chirripó, 1110 m, 29 Jun 1993, *Campos, P. 112* (CR,MEXU,MO); **Puntarenas:** Coto Brus, Z.P. Las Tablas. Cuenca Terraba-Sierpe. Zona Protectora Las Tablas, Sura, 7 km NO de Progreso, 2050 m, 18 Jan 1997, *Navarro, E. 587* (MO).

34. *P. guatemalensis* I.M.Johnst., J. Arnold Arbor. 19:118. 1938. Type: Guatemala: Chimaltenango, Chichavac, 8-9000 ft, Jul 29, 1933, *Skutch, A.F. 504* (holotype A !; isotypes A!, BM!, EAP!, EAP!, F!, F!, MICH!, P!, US!, US!).

It can be distinguished from the similar species, *P. cortapico* and *P. occidentalis*, by the leaves elliptic-ovate, bulliform and glabrous above, rugose and villose on the veins below, with relatively small basal crateriform glands (0.5-0.7 mm diam.), shorter floriferous shoots, puberulent when mature and the flowers with recurved pedicels and shorter anthers (around 1 mm long). The inedited herbarium name, *Prunus bullata* Lundell (annotated in the specimen *Matuda 4546*), was a superfluous posterior intent to publish this taxon. A complete description is available in the Flora Mesoamericana treatment.

**Distribution.** Only known from some scattered high elevation humid locations in the Sierra Madre of Chiapas in south-central Guatemala and south-eastern Chiapas.

**Elevation range.** 2016 – 2700 m.

**Material examined.** (4) **MEXICO.** **Chiapas:** Motozintla, Steep canyon, SW side of Cerro Mozotal, 11 km NW of the junction of the road to Motozintla along the road to El Porvenir and Siltepec, 2100 m, 27 Jun 1972,

*Breedlove, D.E. 25903* (DS,MO); Siltepec, Ventana, 2100 m, 30 Jul 1941, *Matuda, E. 4546* (F,GH,MEXU,NY,TEX,US); La Grandeza, 2016 m, 19 May 1945, *Matuda, E. 5545* (DS,F,MEXU,NY,TEX).

35. *P. "haberii"* Pérez-Zab., sp. nov. in prep.

This new taxon can be distinguished by the combination of new shoots covered by a white velamen, leaves with acute to cuneate bases, secondary veins emerging angle relatively close and venation pattern eucamptodromous-like. The floriferous shoots are noticeably short, the flowers relatively small with the remarkable presence of minute bracteoles on the pedicel, only 10 stamens arranged on only one series and filaments and pistil relatively short. The fruits are subglobose with the suture scar slightly raised. A complete description is available in the Flora Mesoamericana treatment.

**Distribution.** Endemic of Pacific slopes of the cordillera de Tilarán in the Northwest of Costa Rica. Records of this species are located within or next to some dry microclimatic pockets related to exposition to oceanic winds in an area mainly with wet montane forests.

**Elevation range.** 1200 – 1300 m.

**Material examined.** (6) COSTA RICA. **Puntarenas:** Puntarenas, Cordillera de Tilarán. Los Llanos. Río Guacimal y Río Lagarto. Finca de Emiliano Arguedas. Monteverde, 1280 m, 2 Aug 1991, *Bello, E. 2687* (CR,MO); Cordillera de Tilarán. Santa Elena, Los Llanos. Monteverde, 1300 m, 6 Jan 1992, *Bello, E. 4309* (CR); Cordillera de Tilarán. Monteverde, Los Llanos 1 km W of Santa Elena, 1200 m, 7 Jan 1992, *Haber, W.A. 10977* (CR,MO); Cordillera de Tilarán. Monteverde, Bajo Tigre Trail, Pacific slope moist forest, 1200 m, 8 Jan 1992, *Haber, W.A. 10978* (CR,F,MO); Cordillera de Tilarán. Monteverde, Los Llanos, 2 km W of Santa Elena along road to Interamerican Highway, 1200 m, 20 Jan 1992, *Haber, W.A. 10992* (CR,MO); Cordillera de Tilarán. Monteverde, headwaters of Río Amapola, 3 km SE from the village of San Luis. Pacific slope moist forest, 1200 m, 28 Jan 1993, *Haber, W.A. 11419* (CR,MO).

36. *P. lundelliana* Standl., Field Mus. Nat. Hist., Bot. Ser. 22:77. 1940. Type: Mexico: Chiapas, Siltepec, Hacienda, Jan 1938, *Matuda, E. 1906* (holotype, F!; isotypes A!, DS, EAP, MEXU!, MICH, NY! (2), US! (2)).

This species can be recognized by the fissured bark with conspicuous protuberant lenticels, the leaves subcoriaceous, ovate to lanceolate, lustrous above, with base obtuse and deeply decurrent at the end, apex attenuate, secondary veins prominent below and 4 leaf glands placed on the lower two secondary vein pairs. The flowers have relatively long pedicels, and the fruits are ovate, apiculate, and relatively small. The collection *Matuda 2016* (US) cited as paratype of *P. lundelliana* in the protologue is assigned here to *P. axitliana* because it has only 2 glands, relatively short floral pedicels and additionally its collection site is below 1000 m elevation. A complete description is available in the Flora Mesoamericana treatment.

**Distribution.** Distributed in mid-elevation humid pine-oak forests in southern and central Chiapas, Mexico.

**Elevation range.** 1275 – 2100 m.

**Material examined.** (11) MEXICO. Chiapas: Jitotol, 4 miles north, 1650 m, 12 Feb 1965, *Breedlove, D.E. 8967* (DS,F); Lago monte bello, 25 miles east of la Trinitaria, 1500 m, 13 Apr 1965, *Breedlove, D.E. 9690* (DS); Cintalapa, Ridge, SE of Cerro Baul on the border of the state of Oaxaca. 16 km NE of Rizo de Oro along a logging road to Colonia Figaroa, 1450 m, 27 Apr 1972, *Breedlove, D.E. 24852* (DS,MEXU,MO,TEX); Motozintla, Steep canyon, SW side of Cerro Mozotal, 11 km NW of the junction of the road to Motozintla along the road to El Porvenir and Siltepec, 2100 m, 21 Nov 1976, *Breedlove, D.E. 41664* (DS,MEXU); Mapastepec, Reserva El Triunfo, Poligono 1; El Tomatal-Barranca Honda, 1275 m, 1 May 1989, *Heath, M. 176* (CAS,MEXU); Mpio. Jaltenango; Reserva El Triunfo, Poligono 1; Campamento/HO Trail to F. Prusia, 1500 m, Dec 1989, *Heath, M. 255* (MEXU); Jiquipilas, Loc. "La Palmita", 5.82 Km al SO de Tiltepec, 1430 m, 24 Apr 2002, *León V.; Esther 377-a* (MEXU,MO,XAL); Pasital (in Siltepec, Sierra Mariscal), 2000 m, 30 Dec 1936, *Matuda, E. 0391* (MEXU,MO,TEX,US); Finca Prusia por camino

a Mapastepec hasta cerca Triunfo (S. Jaltenango), 1850 m, 24 Feb 1951, *Miranda, F. 7019* (MEXU,US); Jitotol, Rio Hondo, 3 mi N of Jitotol, 1650 m, 21 Jun 1970, *Thorne, R. 40156* (DS).

36a. *P. lundelliana* Standl. subsp. nov. (“*shortPetiole–coriaceousLeaves*”)

This new subspecies can be differentiated from the typical collection of *P. lundelliana* because the frequently larger and more coriaceous leaves (8-14 x 3.5-5 cm), oblong-elliptic (rather than ovate-lanceolate) with thicker petioles (1.5-2 mm), base just shortly decurrent and minor veins relatively obscure. The flowers have pedicels generally up to 5 mm long (vs. 4.5-7 mm) and petals up to 2 mm wide (vs. 2-2.5 mm). This taxon is also close to *P. tartarea* which generally occurs at higher elevations and has more coriaceous leaves with inconspicuous lateral veins and only two submarginal glands.

**Distribution.** Distributed in pine-oak mid-elevation deciduous forests the Atlantic slope of the Sierra Madre of Chiapas and its extension to Guatemala and Honduras.

**Elevation range.** 1300 – 2000 m.

**Material examined.** (19) **GUATEMALA. Alta Verapaz:** Alta Verapaz, Chelac, Carcha, 1500 m, 2 Apr 1939, *Standley, P.C. 70412* (F); San Juan Chamelco, 1350 m, 13 Apr 1941, *Standley, P.C. 92426* (F); **San Marcos:** 1500 m, 7 Mar 1940, *Steyermark, J.A. 37089* (F); Finca el Porvenir, Volcan Tajumulco, 1800 m, 14 Mar 1940, *Steyermark, J.A. 37742* (F); **HONDURAS. Morazán:** 1700 m, 26 Oct 1948, *Molina R., A. 1330* (F); 1500 m, 25 Nov 1946, *Standley, P.C. 742* (F); Cerro Uyuca, 1700 m, 2 Mar 1947, *Standley, P.C. 4855* (F); ibidem, 1700 m, 9 May 1947, *Standley, P.C. 8013* (F); La Labranza, Cerro de Uyuca, along trail to summit, 1600 m, Oct 1948, *Standley, P.C. 13590* (F,US); ibidem, 2000 m, 9 May 1947, *Williams, L.O. 12631* (F); **MEXICO. Chiapas:** Jitotol, En carretera a Pueblo Nuevo Solistahuacan, 1700 m, 29 May 1965, *Breedlove, D.E. 10141* (DS,TEX); Slope, along the Rio Hondo 6.5 km N of Jitotol along road to Pichucalco, 1700 m, 27 Jan 1973, *Breedlove, D.E. 32721* (DS,MEXU,MO,NY); 5 km SE of Jitotol along road to Bochil, 1600 m, 9 Jan 1981, *Breedlove, D.E. 49347*

(CAS,MEXU,MO,NY,SLPM,TEX); Cerca y al S de Pueblo Nuevo Solistahuacán, 1800 m, 8 Mar 1950, *Miranda, F. 6119* (MEXU); Cintalapa, Montaña, al SE de Cerro Baul, 1450 m, 4 May 1988, *Palacios E., E. 363* (MEXU); **Oaxaca:** San Miguel Chimalapa, Cabecera del cañon hierba santa. 4 km en línea recta al NO de Benito Juárez, 1600 m, 3 Jan 1986, *Maya, S. 2670* (MEXU); Santa María Chimalapa, 10 km en línea recta al NO de Benito Juárez, 1700 m, 4 May 1986, *Maya, S. 3277* (MEXU); ibidem, 1700 m, 4 May 1986, *Maya, S. 3281* (MEXU); San Miguel Chimalapa, Valle del Río Portamonedas, 38 km al norte de San Pedro Tepanatepec, 1300 m, 7 Mar 1987, *Maya, S. 4256* (MEXU).

37. *P. matudae* Lundell, *Phytologia* 1(11): 369. 1940., as "matudai". Type: Mexico: Chiapas, Mt. Tacana, 1000 m, Aug 1938, *Matuda, E. 2453* (holotype, MICH!; isotypes, GH!, LL! (2), MEXU!, MO!, NY!).

It can be distinguished among the numerous species distributed in northern Mesoamerica and southern Mexico (including the states of Oaxaca, Hidalgo and Veracruz) by the combination of leaves relatively small, chartaceous, oblong-lanceolate, with margin undulate, secondary and minor veins plain below but conspicuous, 4 glands centrally placed aside of the midrib at 2-3 mm from it, petioles weak and subflexuous, the floriferous shoots relatively short and flowers with relatively narrow hypanthium and small petals. A full description is available in the Flora Mesoamericana treatment.

**Distribution.** Distributed in mid to high elevation humid forests from eastern Guatemala to the central part of the state of Veracruz in Mexico.

**Elevation range.** 1000 – 3000 m.

**Local names.** tzajal ch'it (Mexico).

**Material examined.** (48) GUATEMALA. **El Progreso:** Joya Pacayal, Sierra de Las Minas, Between Finca Piamonte and top of Montaña Piamonte, 2500 m, 7 Feb 1942, *Steyermark, J.A. 43687* (US); **Huehuetenango:** San

Mateo Ixtatan, 4 miles east of municipality, 2600 m, Feb 1965, *Breedlove, D.E. 8773* (DS); **San Marcos:** Aldea Fraternidad, Sierra Madre Mountains, between San Rafael Pie de la Cuesta and Palo Gordo, west facing slope of Sierra Madre, 2000 m, 10 Dec 1963, *Williams, L.O. 25945* (GH,NY,US); **MEXICO. Chiapas:** Chamula, NE slope of Zontehuitz, 2820 m, 2 Dec 1964, *Breedlove, D.E. 7822* (DS); San Cristóbal las Casas, near crest of ridge on road from San Cristobal las Casas to Tenejapa. Chamula paraje of Las Ollas, 2500 m, 19 Feb 1965, *Breedlove, D.E. 9060* (DS,TEX,US); steep heavily wooded northeast slope of Zontehuitz near summit, 2800 m, 20 Jul 1965, *Breedlove, D.E. 11134* (DS,TEX,US); Unión Juárez, deep precipitous canyons on the SE side of Volcán Tacaná above Talquian, 2700 m, 12 Nov 1972, *Breedlove, D.E. 29431* (DS,MEXU,MO,NY,TEX); La Independencia, third ridge along logging road from Las Margaritas to Campo Alegre, 2300 m, 3 Jul 1981, *Breedlove, D.E. 51305* (CAS,MEXU,MO,NY); San Cristóbal de las Casas, west side of Zontehuitz, 2743 m, 17 Oct 1981, *Breedlove, D.E. 53607* (CAS); a 1 km de Tzontehuitz, 2350 m, 7 Sep 1994, *Chamé O., A. 369* (CAS); Chamula, Cerro Tzontehuitz, 2700 m, 14 Nov 1991, *González E., M.; M. 1673* (MEXU); Pueblo Nuevo Solistahuacán, Ca. 3 km SE in Selva Negra, 1750 m, 31 Mar 1952, *Harrell, B. 452* (MEXU); A 1 km del mirador el caminero hacia Tapilula, 1900 m, 28 Mar 1983, *Magaña A., M.A. 1073* (MEXU,XAL); Chamula, Shuket tón. Acahual de encino, 2410 m, 14 Jul 1995, *Martínez, M. 260* (MEXU); Tenejapa, Paraje Shohleh, 2500 m, 6 Apr 1966, *Méndez, A. 783* (CAS); Mahbenchauk, along a small river in the barrio of Tih Ha', 1100 m, 14 Feb 1967, *Méndez, A. 2084* (BRIT,DS,TEX,US); Colonia Achlum, 2400 m, 15 May 1967, *Méndez, A. 2345* (DS); Rancho Banabil, 2200 m, 26 Apr 1983, *Méndez, A. 5934* (MEXU); Chamula, Cerro Tzontehuitz, 2800 m, 1 Mar 1985, *Méndez, A. 8104* (MEXU); Mpio. Sinacantan. Muk'tawitz Cerro de Huitepec. Sinacantan, 2600 m, 15 Feb 1986, *Méndez, A. 8857* (MEXU,MO); Ruta laguna Petej a Yaal Ichin, 2150 m, 20 Jul 1993, *Ruiz-Diaz, M. 161* (XAL); Paraje Ichin ton, 2195 m, 23 May 1988, *Santis Ruiz, C. 866* (CAS,MEXU,TEX); Mak'bil Vo', 3 y medio k, 2195 m, 8 Jan 1988, *Santíz C., E. 529* (CAS,MO,NY); **Hidalgo:** Tenango de Doria, 6 km al este de Tenango de Doria, hacia Cirio, 1700 m, 19 Feb 1981, *Hernández M., R. 5455* (UC,US); **Oaxaca:** Tuxtepec, Mpio. San Felipe Usila. 6.3 km en línea recta al S (199 degree) de Santa Cruz Tepetotutla, 2600 m, 22 Nov 1993, *Gallardo H.; C. 858* (MO); Mpio. San Felipe Usila. Cuenca del Río Perfume (ladera O). 8 km en línea recta al S de Santa Cruz Tepetotutla, 2590 m, 27 Feb 1994, *Gallardo H.; C. 943* (MO); ibidem, 2440 m, 15 Jan 1996, *Gallardo H.; C. 1748* (MO); ibidem, 2480 m, 26 Feb 1994, *Rincón G., A. 307* (MO); **Puebla:** Hueytamalco, El Popual, 1550 m, 7 Mar 1970, *Ventura A., F. 1048* (DS,MO); Teziutlán, Río Frío, 1450 m, 29 Mar 1973, *Ventura A., F. 8092* (MO); San Miguel, 1400 m, 4 Aug 1973, *Ventura A., F. 8763* (MEXU,MO); **Veracruz:** Huayacocotla, Agua de la Calabaza, camino a El Salto, 1800 m,

23 Apr 1981, *Ballesteros M.*, *L. 392* (XAL); Huayacocotla, 2 km antes, 2000 m, 19 Jul 1979, *Calzada, J.I. 5441* (XAL); Banderilla, 3 km al norte de banderilla, 1600 m, 25 Aug 1971, *Dorantes L. 279* (F); Huayacocotla, 17 km al NE, entre Ocotes y Tepozánes, camino a Zilacatipan, 1800 m, 21 Apr 1981, *Juárez G.; L.G. 8* (XAL); San Andrés Tlalnahuayocan, 1 km above and NW, 1700 m, 22 Mar 1983, *Nee, M. 26167* (F,NY,XAL); Banderilla, Rancho La Mesa, 1 km al NW de Banderilla, 1600 m, 24 Feb 1990, *Pérez-García, I. 331* (XAL); Huayacocotla, entre los Ocotes y helechales, 2000 m, 21 Mar 1980, *Vargas, Y.A. 203* (CAS); Acajete, Plan de Sedeño, 1750 m, 26 Mar 1973, *Ventura A., F. 8069* (XAL); ibidem, 1750 m, 22 Mar 1974, *Ventura A., F. 9767* (XAL); Banderilla, 1500 m, 25 Jun 1974, *Ventura A., F. 10205* (XAL); Acajete, Plan de Sedeño, 1750 m, 23 Jun 1976, *Ventura A., F. 12882* (XAL); Jalacingo, Ignacio Allende, 1700 m, 22 Jul 1977, *Ventura A., F. 14293* (MEXU,XAL); Atzalan, La Florida, 1600 m, 20 Mar 1978, *Ventura A., F. 15106* (XAL); Banderilla, 1450 m, 5 Jul 1979, *Ventura A., F. 16315* (XAL); Altotonga, Texacazco, 1850 m, 13 May 1980, *Ventura A., F. 17154* (MO,XAL); Altotonga, SW, camino Perote-Teziutlán, 1550 m, 12 Apr 1986, *Zavala Ch., F. 944* (XAL).

37a. *P. matudae* Lundell var. nov. (“*hidalgo-Veracruz*”)

This new variety can be distinguished by the leaves elliptic-oblong subcoriaceous, 6-9.5 x 2-4.3 cm, slightly lustrous above, with petioles 5-8 x 0.8-1 mm, base acute to obtuse and apex acuminate, venation pattern weak-brochidodromous, secondaries initially straight, 50-60 degrees from the midrib, intersecondaries parallel to secondaries and less than half their length, tertiaries irregular reticulate, and 4 glands located at 3-5 and 7-10 mm from the base and 2-5 mm from the midrib. The floriferous shoots are sub-erect, 1-2.5 cm long; the flowers have pedicels 2-4.5 x 0.2-0.3 mm, hypanthium campanulate, 2-2.3 mm wide and anthers 0.5-0.6 mm long. The fruits are prolate, 11-12 x 8-10 mm. In contrast, the typical collections of *P. matudae* has chartaceous leaves with thinner petioles and more conspicuous minor veins below, racemes sub-flexuous and flowers with narrower hypanthium.



**Distribution.** Distributed in wet mid to high elevations of the southern part of the eastern Sierra Madre in the states of Veracruz, Hidalgo and Puebla.

**Elevation range.** 1400 – 2220 m.

**Material examined.** (12) **MEXICO. Hidalgo:** Tianguistengo, 2 kms al este de Tepeoco, hacia Tianguistengo, 2100 m, 25 Mar 1981, *Hernández M., R. 5646* (MO); Zacualtipán, 5 kms al este de Zacualtipán, 2200 m, 28 Mar 1981, *Hernández M., R. 5703* (CAS,MEXU,MO); Zacualtipan to Olotla, 1800 m, 21 Mar 1947, *Moore Jr., H.E. 2379* (GH); Zacualtipan, vicinity of river Teponapa, 2000 m, 2 Jul 1947, *Moore Jr., H.E. 3229* (GH); **Puebla:** Mpio Tlatlauquitepec, Chiucayucan, 1400 m, 2 Apr 1984, *Ventura V., E. 1985* (CAS); **Veracruz:** Huayacocotla, 3 km antes, 2220 m, 8 Sep 1976, *Calzada, J.I. 2627* (XAL); Viborillas, 2200 m, 9 Mar 1972, *Hernández M., R. 1573* (MEXU,NY); Boca del Perro, camino a Rancho Nuevo, 1700 m, 20 Jul 1973, *Hernández M., R. 1924* (CAS,XAL); Huayacocotla, 2170 m, 21 Jul 1973, *Hernández M., R. 1926* (XAL); Huayacocotla, 2 km, camino a Agua Blanca, 2100 m, 27 Jun 1984, *Ortega O., R. 2647* (XAL); Tenochtitlan, Congregación Vista Hermosa 2, 1500 m, 7 Nov 2000, *Rincón G., A. 2169* (MEXU,XAL); Huayacocotla, Palo Bendito, 3 km N y 10 km al S de Huayacocotla, 2200 m, 3 Mar 1982, *Tenorio L., P. 109* (MEXU,XAL).

38. *P. "mesoamericana"* Pérez-Zab., sp. nov. in prep.

It can be recognized by the leaves oblong coriaceous with two slightly depressed glands located on the first secondary vein and near to the margin; the flowers with relatively short pedicels, small petals, and minute anthers; and the fruits oblate and larger than 12 mm wide. Specimens of this species had been formerly identified as *P. brachybotrya* which however can be distinguished by the generally larger blade with 2 sub-basal glands attached to the midrib, longer petioles, tertiary vein fabric more conspicuous, longer floral pedicels, bigger anthers and fruits smaller and prolate. A complete description can be found in the Flora Mesoamericana treatment.

**Distribution.** Distributed in humid forests across a relatively wide elevation range in the Sierra Madre mountain range from central Chiapas to northern Nicaragua.

**Elevation range.** 950 – 3200 m.

**Local names.** cerezo, cerezo de monte (Honduras).

**Material examined.** (42) **EL SALVADOR. Santa Ana:** Cerro Monte Cristo, 2300 m, 4 Feb 1954, *Heed, W.B.* (US); San José Ingenio, P.N. Montecristo, camino al trifinio, 2000 m, 11 Jul 2002, *Monterrosa S., J.* 277 (MO); ibídem, 2100 m, 3 Sep 2002, *Monterrosa S., J.* 333 (MO); ibidem, 2000 m, 3 Sep 2002, *Monterrosa S., J.* 353 (MO). **GUATEMALA. Baja Verapaz:** Unión Barrios, east of km 162/163, 1630 m, 10 Aug 1975, *Lundell, C.L.* 19602 (CAS,MEXU,MO); Niño Perdido, on San José Road, 1950 m, 16 May 1977, *Lundell, C.L.* 20891 (CAS,MEXU,MO); **Chimaltenango:** Cerro Chichoy near Chichoy, where the departments of Chimaltenango, Quiché and Sololá join, 2800 m, 26 Jan 1949, *Williams, L.O.* 15351 (MO,US); **Huehuetenango:** San Mateo Ixtatan, La Miona, 3000 m, 16 Mar 2000, *Véliz, M.* MV2M.7992 (MEXU,MO); **San Marcos:** 1 mile above Africa, ca. 3.3 miles above Finca Armenia above San Rafael, 1600 m, 13 Jul 1977, *Croat, T.* 40932 (MO); San Marcos, between San Marcos and Patí, 1500 m, 1952, *Williams, L.O.* 18861 (F,US); **Suchitepequez:** Volcan Zunil, 1200 m, 31 Jan 1940, *Steyermark, J.A.* 35262 (F). **HONDURAS. Cortés:** (Sendero a Cerro Cantiles) A ambos lados del Sendero a Cerro Cantiles, 20 km al Oeste de San Pedro Sula. En el Parque Nacional Cusuco, 1940 m, 19 Mar 1993, *Mejía, D.* 331 (MO); **Francisco Morazán:** Tatumbula, Montaña de El Uyuca. Bosque húmedo de Valle Encantado, 1600 m, 1989, *Anonymous s.n.* 1989 (?); ibidem, 1600 m, 1989, *Anonymous 18* (MEXU,MO); ibidem, 950 m, 23 May 1998, *Araque, J.* 170 (MEXU); Distrito Central, In mountains above San Juancito, 2000 m, 22 Feb 1949, *Williams, L.O.* 15672 (GH,MO,US,US); Montaña La Tigra, San Juancito Mountains about 15 km NE of Tegucigalpa, 2000 m, 30 Dec 1962, *Williams, L.O.* 23271 (DS,GH,MEXU,NY,P,UC,US); **Intibucá:** 15 km NE of La Esperanza, 1500 m, 4 Nov 1974, *Hazlett, D.* 2216 (MO); **Lempira:** Gracias, Celaque National Park, 2010 m, 11 Nov 1991, *Hawkins, T.* 55 (MO); ibidem, 1900 m, 7 Jul 1991, *House, P.* 1024 (MEXU,MO); Parque Nacional de Celaque. Camino del Campamento Don Tomás hasta el borde, 2100 m, 12 Jul 1991, *House, P.* 1054 (EAP,HEH,MO,TEFH); Parque Nacional de Celaque. Sendero entre La Planta eléctrica y la primera casa abandonada de Don Tomás, 1500 m, 28 Jan 1992, *House, P.* 1177 (EAP,MO,TEFH); **Morazán:** San Juancito, Bosque de Nubes de Rancho Quemado, 2000 m, 19 Jun 1948, *Molina R., A.* 2810 (US);

Bosque nebuloso de Montaña La Tigra, 2000 m, 31 May 1957, *Molina R., A. 8549* (F,GH,US); ibidem, 2100 m, 31 May 1962, *Molina R., A. 10648* (GH,US); ibidem, al S.O, 2000 m, 11 Jun 1963, *Molina R., A. 12733* (NY,US); ibidem, 2000 m, 13 Jul 1964, *Molina R., A. 14492* (NY,US); Near el Rosario, Mt San Juancito, 1700 m, 27 Feb 1969, *Molina R., A. 23403* (DS); Bosque de montaña La Tigra, 2000 m, 2 Jun 1973, *Molina R., A. 27924* (US); ibidem, 2400 m, Jul 1960, *Pfeifer, H.W. 1954* (US); ibidem, 1800 m, 7 Aug 1952, *Williams, L.O. 5288* (GH,US); ibidem, 1800 m, 7 Aug 1952, *Williams, L.O. 5298* (DS,F,GH,US); near to Rancho Quemado, mountains of San Juancito, 1900 m, 24 Aug 1952, *Williams, L.O. 18580* (DS,GH,US); **Olancho**: Alrededor de El Filo, 15 km al Noroeste de Catacamas, dept. de Olancho en el Parque Nacional de Agalta, 1920 m, 1 Jun 1992, *Mejía, D. 140* (MO). **MEXICO. Chiapas**: Motozintla, Steep canyon, SW side of Cerro Mozotal, 11 km NW of the junction of the road to Motozintla along the road to El Porvenir and Siltepec, 2100 m, 27 Jun 1972, *Breedlove, D.E. 25703* (DS,MEXU,MO); Larráinzar, Near the summit of Chuchil Ton, northeast of Bochil, 1700 m, 3 Aug 1972, *Breedlove, D.E. 26824* (MO); Motozintla, SW side of Cerro Mozotal, 2100 m, 25 Nov 1981, *Breedlove, D.E. 55718* (CAS); Siltepec, Ventana, near Siltepec, 2100 m, 25 Jul 1941, *Matuda, E. 4536* (DS, GH, MEXU, MO,NY,US); El Porvenir, Mt. Male, near Porvenir,, 3000 m, 6 Jul 1941, *Matuda, E. 4667* (GH,MEXU,MO,NY); San Cristóbal de las Casas, Cerro Huitepec; al W de San Cristobal, 2500 m, 25 Sep 1984, *Méndez, A. 7978* (MEXU); Paraje de La Soledad Los Cerezos, en el Rancho El Chivero, 2400 m, 27 Oct 1994, *Ramírez-Marcial, N. 602* (MEXU). **NICARAGUA. Nueva Segovia**: San Fernando, Cerro Mogoto, Finca Las Brisas, 1600 m, 13 Jun 2011, *Coronado, I. 6222* (HULE).

39. *P. myrtifolia* (L.) Urb., Symb. Antill. 5: 93. 1904., Ilustr: Sloane, H. 1725. Voy. Jamaica 2: tab 193, fig. 1. *Celastrus myrtifolius* L., Sp. Pl. 196. 1753. Type: Jamaica: *Sloane, H.* (sintype, BM!).

*Prunus sphaerocarpa* Sw., Prodr. 80. 1788. *Cerasus sphaerocarpa* (Sw.) Loisel., Traité Arbr. Arbust. (Duhamel), nouv. éd. 5: 4. 1812. Type: Caribbean: Hispaniola, 1784, *Swartz s.n.* (sintypes, MO!, S!).

*Prunus tikalana* Lundell, Wrightia 4:88. (1968). Type: Guatemala: El Petén, Tikal, Tikal national park, in Zapotal on Remate Road, east of Aguada Tikal, 250 m, 28 Jan 1964, *Lundell, C.L. 17570* (Holotype, LL!; isotypes, CAS! (2), G! (3), K!, MEXU! (2), MICH, MO! (2), NY!, RSA, U, US!).

This species can be recognized by the canescent external bark covering of newer shoots, the leaves elliptic-oblong, sub-coriaceous, with venation appanate above and below, stipules narrowly linguiform and 4 glands. The floriferous shoots are subflexuous and relatively short (3-4.5 cm) and the stamens are up to 14 and arranged in a single series. Some collections from lowlands in La Hispaniola and Cuba currently included under this taxon that have smaller and more narrowly elliptic leaves with acute decurrent bases and apparently only two glands might be studied in the future to verify their status. A complete description of this taxon is available in the Flora Mesoamericana treatment.

**Distribution.** Distributed from lowlands to some mid elevation places in the Caribbean major islands (from Cuba to Puerto Rico), the Bahamas archipelago and southern Florida peninsula and the lowlands of Yucatan peninsula from Guatemala to southern Mexico. Found frequently on limestone derived soils.

**Elevation range.** 4 – 1300 m.

**Local names.** almendrillo (Cuba), quiebra hacha (Guatemala), red wood (Jamaica), yaya boba (Dominican Republic).

**Material examined.** (117) **BAHAMAS. Bahama Archipelago:** Eight Mile Rocks, 10 m, 5 Feb 1905, *Britton, N. 2613* (MO,US); North Andros: on edge of coppice, "Maidenhair Coppice N. 1, "about 8 miles northwest of Fresh Creek, 10 m, 8 Jan 1978, *Correll, D.S. 49362* (MO,US); **Great Abaco:** Marsh Harbour, 15 m, 10 Apr 1979, *Correll, D.S. 50526* (US). **BELIZE. Toledo:** Bladen natural Reserve, 180 m, 21 May 1999, *Brewer, S.W. 487* (DAV). **CARIBBEAN.** 1859, *Wright, C. sn* (MO). **CUBA.** La Clarita, 800 m, Apr 1889, *Eggers 5185* (P,US); In Cuba Orientali, 1859, *Wright, C. s.n.* (MO); Prope villam Monte Verde dictam, Cuba Orientali, 750 m, Jul 1859, *Wright, C. 1192* (MO); ibidem, 710 m, Jul 1859, *Wright, C. 1193* (MO,P,US); sine loco, 1865, *Wright, C. 2411* (MO,US); sine loco, 1860, *Wright, C. 2412* (MO,P); **Cienfuegos:** Buenos Aires, 800 m, 5 Dec 1928, *Jack, J.G. (DS)*; Buenos Aires, Vegas de Mataguá, 600 m, 8 Apr 1928, *Jack, J.G. 6018* (P); Trinidad hills, 800 m, 11 Mar 1930, *Jack, J.G. 7763* (P); 850 m, 20 Mar 1931, *Jack, J.G. 8221* (US); Montañas Trinidad, 850 m, 21 Feb 1956, *Morton, C.V. 10360* (US); **Habana:** Guatao, Feb 1931, *Leon, Bro. 14780* (US); **Isla de Pinos:** Campo de Coe, Ensenada de Siguaneya, 50 m, 25

Feb 1916, *Britton, N. 14870* (US); **Las Villas:** Buenos Aires, Trinidad Mountains, 800 m, 11 Nov 1941, *Morton, C.V. 4226* (F,MO,US); **Oriente:** Baracoa, in the foothills, 250 m, 2 Jan 1915, *Ekman, E.L. 4184* (MO); Sierra Maestra, 1000 m, Aug 1945, *Clemente, B.r.o. 4796* (US); Above Daiquirí, 800 m, 28 Oct 1916, *Ekman, E.L. 8071* (UC); Bayate, in forest, 400 m, 30 Nov 1917, *Ekman, E.L. 9012* (MO,US)Santiago de Cuba, Gran Piedra, 870 m, 10 Jan 1954, *Lopez-Figueiras, M. 1059* (US); Palmarito del Cauto, Monte Picote, 450 m, 29 Jan 1956, *Morton, C.V. 9740* (US); Rio Seboruco, to Mayari falls, 520 m, 26 Jan 1910, *Shafer, J.A. 3679* (US); **Pinar del Rio:** Rangel, Arroyo de la Plata, 420 m, Jan 1949, *Alain Liogier, B.r.o. 697* (US); 420 m, 23 Dec 1951, *Alain Liogier, B.r.o. 2027* (US); **Sanctus Espiritus:** Mogote Caburni, 800 m, 13 Apr 1994, *Acevedo-Rodriguez, P. 6448* (US); **Santa Clara:** Buenos Aires, Trinidad Hills, 762 m, 12 Apr 1929, *Jack, J.G. 7276* (MO), Buenos Aires, La Sabana, Trinidad Mountains, 630 m, 5 Aug 1936, *Smith, L.B. 3377* (US). **DOMINICAN REPUBLIC.** Las lavas, 600 m, 7 May 1968, *Alain Liogier, Bro. 11145* (P); Hoyo de Palempito, 800 m, 6 Nov 1969, *Alain Liogier, Bro. 16725* (P); El Rubio - Auyamas, 540 m, 7 May 1938, *Canela, M. (P,US)*; Samaná bay, Boca del Infierno, 30 m, 3 Mar 1928, *Miller, G.S. 1042* (US); **Barahona:** Santo Domingo, 350 m, , *Fuertes, P. 328* (US); **Dominican Republic:** Pedernales, Agua Negra, 900 m, 17 Feb 1969, *Alain Liogier, B.r.o. 13940* (P); El Mulito, 350 m, 18 Feb 1969, *Alain Liogier, B.r.o. 13967* (P); Bei Bahoruco, 100 m, Jun 1911, *Fuentes, M. 809* (MO); Santo Domingo, Parque Nacional Los Haitises; Prov. Monte Plata, 1km. al oeste de Pilancón, sobre farallones altos, 225 m, 30 Nov 1985, *García, R. 710* (MO); La Altagracia, Boca de Yuma: Parque Nacional del Este; aprox. 2 km al NO de la caseta de Boca de Yuma, siguiendo un sendero; 30 m, 7 Mar 1992, *García, R. 3644* (MO); Peravia, 7 km al N de Bani-Azua, Prox. al arroyo matadero, 300 m, 6 Jun 1994, *Jimenez, B. 1549* (MO); Azua, Santo Domingo, en cañada Seca, Los Manantiales, Galindo,, 400 m, 14 Mar 1980, *Mejía, M. 199* (MO); La Vega, 6 km. NW of Constanza on road to Los Corralitos, in area overlooking Arroyo Hondo, 1200 m, 28 Oct 1980, *Mejía, M. 8878* (MO); 6 km. from Pedregal de Jarabacoa (Pedregal is 4 km. S of Jarabacoa) on road to El Río (and Constanza);, 914 m, 15 Apr 1981, *Zanoni, T. 12567* (MO); Dajabon, 10 km. desde Loma de Cabrera (Pueblo) en el camino a Capotillo y Alto de La Paloma, 396 m, 11 Nov 1981, *Zanoni, T. 17938* (MO); Pedernales, Santo Domingo, Sierra de Baoruco: 2.6 km. norte desde el puerto de Cabo Rojo (de Alcoa Exploration Company) en el camino minero a Las Mercedes y Aceitillar, 610 m, 16 Feb 1982, *Zanoni, T. 19063* (MO); Sierra de Baoruco: Las Abejas, 47 km. del puerto de Cabo Rojo en la carretera de Alcoa Exploration Company a Aceitillar, Canote y Las Abejas, 1220 m, 19 May 1983, *Zanoni, T. 25915* (MO); San Cristobal, Cordillera Central: 11.7 km. al oeste-nor-oeste de Cambita Garabito en el camino a Los Cacos: en "Cajón", 620 m, 3 May 1984, *Zanoni, T. 29758* (MO); Azua, Sierra Martín García: 4

km. al oeste de Galindo en un camino, un pedregal subiendo la Sierra, 395 m, 15 Nov 1985, *Zanoni, T. 32265* (MO); Barahona, Sierra de Baoruco: en zona rural "Audon" 7km. de Los Patos (de Paraiso) en camino a Maniel, 650 m, 16 Jan 1985, *Zanoni, T. 33073* (MO); Sierra de Baoruco: en la subida a Morne La Jo (Firme La Jo en el mapa), aprox. 8km. al N de Polo por el camino, 1200 m, 27 Feb 1986, *Zanoni, T. 36287* (MO); La Vega, Cordillera Central: en el sendero desde el pueblo al Salto de Jimenoa (7.5 km sur de Jarabacoa, en el camino a El Río de Constanza) a la base del Salto de Jimenoa en el Río Jimenoa, 760 m, 26 Mar 1990, *Zanoni, T. 44274* (MO); Llanura Costera; Distrito Nacional, Ciudad de Santo Domingo, en la reserva forestal del Jardín Botánico Nacional, Av. Los Próceres esq. Av. Rep. de Colombia, 50 m, 18 Jun 1991, *Zanoni, T. 45285* (MO); **Independencia**: Angel Feliz, 3 km south of Angel Feliz, 905 m, 16 Oct 1991, *Thompson, S.A. 9774* (NY); **Puerto Plata**: El Choco, Sosua, 100 m, 6 Feb 1971, *Alain Liogier, Bro. 17847* (US); 200 m, 26 Mar 1961, *Jiménez, J.J. 4364* (US); **Santo Domingo**: Rio Nizao, Rancho Arriba, 800 m, 16 Dec 1973, *Alain Liogier, B.r.o. 20853* (US); Llano Costero, Sto Domingo city, banks of Rio Ozama, 10 m, 30 Apr 1929, *Ekman, E.L. 12333* (TEX,US); Jan 1871, *Wright, C. 173* (US). **GUATEMALA. Izabal**: El Estor, 800 m, 22 Mar 1972, *Contreras, E. 11473* (MEXU,MO,US); ibidem, 700 m, 23 Mar 1972, *Contreras, E. 11478* (MEXU,MO,P); ibidem, 700 m, 23 Mar 1972, *Contreras, E. 11479* (MEXU,MO); ibidem, 250 m, 23 Mar 1973, *Contreras, E. 11485* (P,US); Between Cienaga y ceja, along the Peten-Rio Dulce highway, 80 m, 13 Mar 1972, *Tún-Ortíz, R. 2382* (US); El chorro, along the Petén-Rio Dulce Highway, 180 m, 18 Mar 1972, *Tún-Ortíz, R. 2477* (F,US); **Petén**: Tikal, Tikal National Park, in ramonal in "H" Group of ruins, 300 m, 20 Apr 1968, *Contreras, E. 7715* (DS,MEXU,MO,TEX,US); Tikal, on Tikal road in Zapotal on km 50, 50 m, 19 Mar 1975, *Lundell, C.L. 19126* (CAS); La Cumbre, [Caserio] Sapurul. In zapotal, 250 m, 6 Apr 1977, *Lundell, C.L. 20733* (CAS,MEXU,MO,NY); Pusila, La Cumbre, 400 m, 18 Apr 1977, *Lundell, C.L. 20832* (DAV,NY,TEX). **HAITI**. Jean Rabel, led of Riv. Cote de Fer, 500 m, 31 Jan 1929, *Leonard, E.C. 12749* (UC,US); Bombardopolis, trail to Baie de Henne, 500 m, 23 Feb 1929, *Leonard, E.C. 13502* (US); Jean Rabel, South of town, 450 m, 2 Mar 1929, *Leonard, E.C. 13621* (US); **Artibonite**: Marmelade, 800 m, 20 Dec 1925, *Leonard, E.C. 8341* (US); **Haiti**: Hispaniola. Massif de la Hatte, eastern group, Acquin, secc. La Corlline, in Morne des Abricats, erupt., 400 m, 9 Nov 1926, *Ekman, E.L. 7196* (MO,TEX,US); Vicinity of St. Michel de'Atalaye, Department du Nord; 6 miles north, 550 m, 26 Dec 1925, *Leonard, E.C. 8487* (MO,US); Vicinity of Bombardopolis, 610 m, 21 Feb 1929, *Leonard, E.C. 13378* (MO,US); Massif de La Hote: Dept. Grand'AnseSud límite: 13.6 km. Norte de Camp Perrin en el camino a Beaumont y Roseaux y Jérémie: "Tombeau Cheval", roca caliza, 720 m, 13 Nov 1982, *Zanoni, T. 24265* (MO); Santo Domingo, Massif de la Hotte: Dept. Grand

Anse: (1.4 km. Norte de Duchity) 36.8 km. Sur de Roseaux en la carretera a Camp Perrin, 600 m, 11 Mar 1983, *Zanoni, T. 25644* (MO,US); Massif de La Selle: sobre Morne de L'Hopital: al sur de la ciudad de Port-au-Prince: entrada por camino a Rte. de Boutilliers en Laboule de Petionville y salida Ave. Mgr. Guilloux (cerca del hospital) en Port-au-Prince, 720 m, 29 Jan 1984, *Zanoni, T. 28889* (MO); Massif du Nord: Dept. Nord-Quest: 12.5km. al "este" de Anse-a-Foleur en la carretera a Petit Bourg de Le Borgne y Le Borgne, 570 m, 7 Jun 1986, *Zanoni, T. 34954* (MO); **Nord**: Dondon, SE of village, 450 m, 8 Jan 1926, *Leonard, E.C. 8699* (US); **Tortue Island**: West of La Vallee, 300 m, 6 Jan 1929, *Leonard, E.C. 11686* (P,US); on north side of Tortue, northeast of Basse terre, 200 m, 26 Mar 1929, *Leonard, E.C. 12464* (US); **JAMAICA**. Port Royal mountains, 780 m, 3 Feb 1898, *Harris, W.M. 660* (US); Oxford mastroy, ad Troy, 500 m, 20 Apr 1904, *Harris, W.M. 8658* (P,US); Content Gap, North side, 850 m, 20 Dec 1905, *Harris, W.M. 9121* (US); Near Troy, 650 m, 24 Apr 1906, *Harris, W.M. 9357* (GH); Kentucky Hill, Bluefields mt., 550 m, 7 Mar 1908, *Harris, W.M. 10209* (US); Lancaster, 620 m, 10 Sep 1908, *Harris, W.M. 10538* (US); John Crow Mounts, South End, 800 m, 10 Mar 1909, *Harris, W.M. 10739* (P,US); Gordon Town, 400 m, , *Hart, J. 1077* (US); Mt Diablo, 700 m, 21 Jan 1958, *Howard, R.A. 15154* (GH); St. Ann, Broom Hall Woods, 2 mi SW of Cave Valley mesic forest on limestone, 540 m, 6 Feb 1980, *Gentry, A. 28439* (MO,US); Soho, 427 m, 13 May 1915, *Harris, W.M. 12022* (MO,US); Mt. Diablo area; limestone hill about 1 mile along road towards Resource, 762 m, 11 Aug 1965, *Hespenheide, H.A. 987* (MO,UC,US); St. Catherine, Near Top Hill, southwest of Lluidas Vale, 579 m, 6 Feb 1970, *Proctor, G.R. 31222* (MO); **Clarendon Parish**: Peckham, Upper Clarendon, 610 m, 29 Dec 1917, *Harris, W.M. 12814* (MO,US); Quaco Rock near Ritchies, 919 m, 4 Jan 1974, *Morley, B.D. 958* (GH,MO); Glenwood Spring, along road between Balcarres & Sunbury, 945 m, 16 Jan 1975, *Proctor, G.R. 34703* (MO); ca 2 miles NW of Mason River Field Station and ca 5 miles NW of Kellits, border of St. Ann & Clarendon Parish, 655 m, 30 Dec 1979, *Pruski, J. 1544* (MO); **Manchester Parish**: Mandeville, 600 m, 7 Mar 1931, *Miller, G.S. 1270* (US); **St. Andrew Parish**: St. Peters, Half way St Peters and Silver Hill, 1000 m, 3 Jul 1966, *Anderson, W.R. 3017* (US); Coopers Hills, Red Hills, 650 m, 21 Mar 1954, *Proctor, G.R. 8493* (US); **Saint Elizabeth Parish**: Aberdeen, 350 m, 5 May 1977, *Correll, D.S. 48548* (US); Along the Quick Step road near milepost 1 above Aberdeen, 274 m, 5 May 1977, *Proctor, G.R. 36839* (F,MO); **Trelawny Parish**: Burnt Hill vicinity, beside road on limestone,, 518 m, 3 Jan 1974, *Proctor, G.R. 934* (MO,US); Vicinity of Burnt Hill, 518 m, 7 Jun 1976, *Thorne, R. 48077* (MO); Cockpit Contry, 500 m, 11 Aug 1954, *Webster, G.L. 5265* (DAV,GH,US). **MEXICO. Chiapas**: Ocosingo, Cordón del Chaquistero, Estación Biológica de Chajul, 400 m, 30 Jul 1996, *Ibarra Manríquez, G. 4014* (MEXU,MO). **PUERTO RICO. Puerto Rico**: Cambalache Forest,

120 m, Dec 1967, *Woodbury, R. s.n.* (MO). **USA. Florida:** Miami, Brickell Hammock, 5 m, 6 Dec 1933, *Duckett, F.* 238 (CAS,P); Dade County, 5 m, Mar 1933, *O'Neill, H.* 7616 (DS); Bay Biscayne, 5 m, 23 Nov 1886, *Sargent* (DS); Hammock near Silver Palm, 4 m, Nov 1903, *Small, J.K.* 794 (UC).

40. *P. "nonnihilum"* Pérez-Zab., sp. nov. in prep.

It may be differentiated from other Costa Rican species with small leaves (less than 8 cm long) by the new extension units emerging initially as strobile-like short shoots, the leaves with four laminar glands slightly raised from the surface, the secondary veins impressed above and flat beneath, the base extending down on the petiole as a narrow adaxial wing and the deltoid ventrally fused stipules. The flowers have a funnellform hypanthium that partially remains as a rim when the fruit matures. A complete description is available in the Flora Mesoamericana treatment.

**Distribution.** Endemic to mid elevation forests in the Pacific slope of a mountain known as Cerro de la Muerte in the central Cordillera of Talamanca, Costa Rica.

**Elevation range.** 1800 m.

**Material examined.** (1) **COSTA RICA. San José:** Dota, Copey, Area no Protegida, Providencia. Peor es nada. Camino Real entre Cerro Lira y California, Finca Medio Queso, 1800 m, 11 Dec 1994, *Herrera, G.* 7450 (F,MO,NY).

41. *P. "nubila"* Pérez-Zab., sp. nov. in prep.

This species can be distinguished by the relatively narrow leaves, with acuminate apex, secondary and tertiary veins depressed on the upper side, petioles relatively long and flexuous and elliptic glands



placed adjacent to the margin. The flowers have pedicels flexuous, sepals cucullate with petaloid appearance towards the apex and petals larger than other similar species. The fruit is longitudinally elongate and frequently obovate. A complete description is available in the Flora Mesoamericana treatment.

**Distribution.** Distributed in several isolated high elevation moist forests along the Talamanca mountain range in Panama and Costa Rica and the central volcanic massif in Costa Rica.

**Elevation range.** 2250 – 3000 m.

**Material examined.** (9) **COSTA RICA. Cartago:** Cantón Guarco, 2300 m, 14 Apr 1967, *Madriz, A.* 58 (F); **Heredia:** along road from Sacramento to Laguna del Barva, SW slope of Volcán Barva, 2650 m, 30 Apr 1986, *Grayum, M.H.* 7534 (MEXU, MO); Barva, P.N. Braulio Carrillo. Cordillera Central. Volcán Barva, 2680 m, 17 Sep 1994, *Lépez, E.* 552 (F,MO); ibidem, 2600 m, 7 Aug 1989, *Rivera, G.* 5 (MO); Parque Nac. Braulio Carrillo, estación Carrillo, costado sur, 2650 m, 5 May 1990, *Rivera, G.* 268 (MO); **Limón:** Parque Internacional La Amistad, el Valle de Silencio, Turberas #2.Z, 2400 m, 15 Feb 2012, *Monro, A.* 7247 (MO); **Puntarenas:** Coto Brus, Las Mellizas, siguiendo la línea divisoria Costa Rica-Panamá, entre Cerro Pando y Cerro Nubes, Hito Geográfico 340, camino de la Sierra, 2465 m, 15 Aug 1989, *Chacón, A.* 332 (MO); Cordillera de Talamanca, upper slopes of Cerro Echandi, 2700 m, 23 Aug 1983, *Davidse, G.* 23981 (MO). **PANAMA. Chiriquí:** Cerro Pando, 2250 m, 22 Sep 1996, *Galdames, C.* 3330 (NY).

42. *P. occidentalis* Sw., Prodr. 80. 1788. *Cerasus occidentalis* (Sw.) Loisel., Traité des arbres et arbustes [Nouvelle édition] 5: 4. 1812. Type: Jamaica: *Swartz. s.n.* (possible type, S!).

This is a big tree that can be recognized by the relatively large leaves, oblong-elliptic, sparsely puberulent below (more conspicuous while expanding) mainly around the veins or glabrescent, with relatively flat secondary veins below and 2 basal glands adnate to the midrib. The floriferous shoots are generally ramified from either the axils of the cataphylls or the axils of the most basal flowers and

puberulent. Leaf venation and flower details are definitive to differentiate this species from the closely related *P. cortapico*. It is also close to *P. subcorymbosa* (distributed from Colombia to Bolivia) which generally has more coriaceous leaves with secondary veins prominent below, floriferous shoots with longer axes and more ramifications, and flowers with wider hypanthium. A complete description is available in the Flora Mesoamericana treatment.

**Distribution.** Distributed in all the Caribbean region including the Greater and Lesser Antilles and continental land from Venezuela and Panamá at the South to the state of Veracruz in Mexico at the North.

**Elevation range.** 20 – 2420 m.

**Local names.** almendra (Venezuela), almendrillo (Puerto Rico), almendrillo (Venezuela), almendrito (Dominican Republic), almendro (Venezuela), almendro de montaña (El Salvador), calla (Dominican Republic), cuajani (Cuba), cucaracha (Dominican Republic), mamey (Panama), mamey oloroso (Panama), mují (Venezuela), ñame (Dominican Republic), pepo (Venezuela), pruan (Jamaica), prune (Jamaica).

**Material examined.** (148) **COSTA RICA. Alajuela:** Reserva Biológica Monteverde, Río Peñas Blancas, Finca Wilson Badilla, 800 m, 30 Mar 1989, *Bello, E. 782* (MO); ibídem, parcela de Alemán, 900 m, 25 Jun 1989, *Bello, E. 986* (MO); ibídem, 900 m, 22 May 1987, *Haber, W.A. 7290* (MO); ibídem, 850 m, 15 Mar 1988, *Haber, W.A. 8396* (MO); Upala, Parque Rincón de La Vieja, Puesto Santa María, del mirador por la fila hasta el sesteo de la danta, de donde se baja hasta el canal, 900 m, 4 Mar 1988, *Herrera, G. 1592* (F,GH,MEXU,MO); Tapasco, Cantón Alfaro Ruiz, 1650 m, 6 Jan 1940, *Smith, A. p 2227* (UC); **Cartago:** Santa Maria de Dota, Rio Blanco de Coper, 2420 m, 19 Sep 2002, *Wen, J. 6733* (US); ibídem, 19 Sep 2002, *Wen, J. 6772* (US); **Guanacaste:** Tilarán, Cordillera de Tilarán. Reserva Biológica del Colegio de Monteverde, 1600 m, 10 Jan 1992, *Bello, E. 4317* (CR,MO); Parque Nacional Guanacaste, Estación Mengo, Volcán Cacao, 1060 m, 29 Oct 1989, *Chacón, A.; I. 2504* (MO); Liberia, P.N. Guanacaste. Cord. de Guanacaste; Cerro Cacao. Estación Cacao, 1100 m, 11 Apr 1991, *Chávez, C. 527* (INB,MO); Parque Nacional Rincón de la Vieja, the SE slopes of Volcán Santa María, above Estación Hacienda Santa María, 900 m, 27 Jan 1983, *Davidse, G. 23434* (MO); Tilarán, Río Chiquito Zona Monteverde, Finca de Campos, vertiente

Atlántica, 1100 m, 7 Jun 1987, *Haber, W.A. 7459* (MO); Río Las Minas, Los Arenales, SW slope Volcan Cacao, 900 m, 3 Aug 1986, *Janzen, D. 12493* (MO); P. Nac. Rincón de la Vieja; Sector Los Narajos, camino a San Jorge, 760 m, 11 Jan 1991, *Rivera, G. 941* (MO); P. Nac. Rincón de la Vieja Sector Las Pailas a 600 m de la catarata, 1400 m, 14 Jan 1991, *Rivera, G. 968* (MO); Parque Nacional Guanacaste, Gongora station, near the bridge, 1135 m, 21 Sep 2002, *Wen, J. 6793* (US); **Heredia**: San Rafael, Cordillera Central. San Rafael. Bosque de la Hoja, 1650 m, 21 Feb 1993, *Morales, J.F. 1141* (CR,MO); Barva, Cuenca del Tárcoles San Jose de la Montaña. Paso Llano; a orilla de la carretera, 1900 m, 4 Feb 1997, *Rodríguez, A. 1952* (MO); **Puntarenas**: Zona Protectora Las Tablas Estación Las Alturas. Las Alturas de Coto Brus, 1400 m, 10 Dec 1991, *Aguilar, R. 723* (MO); Cantón de Osa Agua Buena, oeste, Rincón, 50 m, 17 Oct 1992, *Aguilar, R. 1380* (MO); Cantón de Perez Zeledon. Cordillera de Talamanca. Entre las confluencias de la quebrada Altamira y el Rio Blanco, 1580 m, 10 Apr 1995, *Aguilar, R. 4056* (INB,MEXU,MO); Coto Brus, Cuenca Terraba-Sierpe. Las Mellizas, Sabalito, 1400 m, 7 Jan 1997, *Alfaro, E. 1091* (MO); Cuenca Terraba-Sierpe. Las Mellizas, Cafrosa, 1200 m, 14 Jan 1999, *Alfaro, E. 1924* (MO); Puntarenas, Cordillera de Tilarán. Guacimal, Altos de Río Veracruz. Finca Brenes, 1300 m, 12 Jan 1990, *Bello, E. 1804* (CR,MO); R.B. Monteverde, Cordillera de Tilarán, Río Guacimal, Comunidad- Reserva, 1500 m, 4 Mar 1990, *Bello, E. 2111* (CR,MO); Cordillera de Tilarán. Finca Brena, cerca de la quebrada. Monteverde, 1100 m, 3 Jun 1993, *Fuentes, Z. 340* (CR,MO); Monteverde, 1400 m, 14 Jul 1990, *Gentry, A. 71651* (MO); Monteverde, forest patch in community, 1400 m, 27 Feb 1981, *Haber, W.A. 440* (MO); Forest edge in Monteverde, 1440 m, 26 Feb 1981, *Haber, W.A. 441* (MO); Monteverde community along cliff edge on Pacific slope, 1200 m, 12 Dec 1985, *Haber, W.A. 3707* (MO); ibidem, 1500 m, 12 Jan 1986, *Haber, W.A. 4265* (MO); ibidem, 1400 m, 15 May 1986, *Haber, W.A. 4953* (MO); ibidem, 1500 m, 24 Feb 1988, *Haber, W.A. 8208* (MO); Monteverde, comunidad, 1350 m, 10 Mar 1988, *Haber, W.A. 8294* (MO); Monteverde moist forest, 1350 m, 25 Jun 1988, *Haber, W.A. 8477* (MO); Cordillera de Tilarán, Monteverde, pacific slope, within community, 1400 m, 1 Jan 1992, *Haber, W.A. 10971* (CR,MO); Osa, R.F. Golfo Dulce, península de Osa, tierra del grupo de conservacionistas de Rancho Quemado, 300 m, 11 Jul 1991, *Hammel, B. 18311* (CR,MO,UC); Canto Coto Brus, Mellizas, near La lucha, 1350 m, 6 Oct 2002, *Wen, J. 6969* (US); Canton Coto Brus, near Progreso, on the way from Progreso to Las Tablas, ca. 2 km N of Progreso, 1200 m, 6 Oct 2002, *Wen, J. 6972* (US); ibidem, 1200 m, 6 Oct 2002, *Wen, J. 6973* (US); **San José**: Escazu, Cerro Pico Blanco, camino entre Pico Blanco y Cerro de la Cruz, 1700 m, 10 Mar 1984, *Cowan, C. 4519* (MEXU,TEX); Ciudad Universitaria Rodrigo Facio, San Pedro de Montes de Oca, 1400 m, *Gómez, L.D. 23065* (MO); Acosta, on road between Escuadra and Tiqueres, 1530 m, 10 Oct 2002, *Wen, J. 7042*

(US). **CUBA.** Vuelta de Abajo, 200 m, *Valenzuela, J.M.* (P); **Cienfuegos:** Trinidad Mountains. San Blas-Buenos Aires. Loma Ventana, 800 m, 15 Feb 1942, *Gonzales, A.* 572 (GH,MO,P,US); Soledad, Limones, 60 m, 9 Apr 1928, *Jack, J.G.* 6004 (GH,P,US); Buenos Aires, Montañas Trinidad, 750 m, 21 Feb 1956, *Morton, C.V.* 10376 (US); **Cuba:** Orientali, 400 m, 1856, *Wright, C.* 156 (MO,P); **Habana:** Vedado, Guatao, 70 m, Feb 1931, *Leon, Bro.* 14779 (US); **Oriente:** Mayarí, Sierra de Cristal, 450 m, 28 Dec 1955, *Alain Liogier, Bro.* 4686 (DAV,US); **Pinar del Rio:** Sierra Rosario, Reserva de Biosferd. 370 m, 29 Jun 1990, *Gentry, A.* 71339 (MO); ibidem, 200 m, 30 Jun 1990, *Gentry, A.* 71425 (MO); Rio San Miguel, Below Mal Paso, 80 m, 15 Dec 1910, *Wilson, P.* 9288 (US); **San Juan:** Isla de Pinos, 40 m, 15 Mar 1916, *Britton, N.* 15547 (US); **Sanctus Espiritus:** Mogote Caburni, Finca cuba, alrededores de Mogote Caburni, 800 m, 13 Apr 1994, *Acevedo-Rodriguez, P.* 6463 (US); **Santa Clara:** San Blas, La Sierra, 250 m, 25 Apr 1930, *Jack, J.G.* 7935 (UC). **DOMINICAN REPUBLIC.** **Barahona:** Santo Domingo, Bahoruco, 150 m, Jun 1911, *Fuertes, P.* 807 (GH,MO,US); Sierra de Bahoruco: Enriquillo N del poblado Higüero, en el lugar llamado El Maniel Viejo, 825 m, 9 Jun 1993, *García, R.* 4906 (MO); 1.5 km antes de Polo, en el camino de Cabral a Polo, Sierra de Baoruco, 930 m, 13 Oct 1981, *Mejía, M.* 17187 (MO); Río Baoruco from La Hortaliza (about 1.5 km up from mouth at town of Baoruco) to 2 km further upstream, 30 m, 13 Sep 1981, *Zanoni, T.* 16473 (MO); Sierra de Baoruco: en las orillas y el valle del Río Baoruco, aprox. 2-4 km al interior del poblado de Baoruco, 40 m, 16 Aug 1987, *Zanoni, T.* 39593 (MO); **Espailat:** Cordillera Septentrional: en La Cumbre, el paso en la carretera Moca-Jamao al Norte, en la Finca de Jacob de Lara, 800 m, 17 Feb 1987, *Zanoni, T.* 38243 (GH,MO,US); **La Vega:** Cordillera Central, Constanza; Loma Canelilla, en el nacimiento del Arroyo Canelilla, bosque latifoliado, 1520 m, 22 Jan 1986, *García, R.* 905 (MO,US); Cordillera Central: 1 km al SE del poblado de Pinalito, en la confluencia del Arroyo Madre Vieja y el Río Tireo, 1300 m, 7 Feb 1986, *García, R.* 995 (MO); Cordillera Central: Salto de Jimenoa, en la carretera hacia Constanza, 900 m, 13 Dec 1995, *García, R.* 6086 (MO,US); 6 km. NW of Constanza on road to Los Corralitos, in area overlooking Arroyo Hondo, 1200 m, 28 Oct 1980, *Mejía, M.* 8889 (GH,MO); 4 km ENE of La Cienaga, Rio Yaque del Norte, 935 m, 9 Oct 1991, *Thompson, S.A.* 9570 (US); in area of Casabito, site is 6 km W of Autopista Duarte on road to El Río and Constanza, 500 m, 14 Apr 1981, *Zanoni, T.* 12455 (MO,US); **Peravia:** 1 km S of El Pinar on road to La Toronja and San José de Ocoa, 550 m, 8 Aug 1980, *Mejía, M.* 7834 (MO,US); 7 km Noreste de San José de Ocoa en el camino al Río Abajo, en la cercanía de El Naranjal (de San José de Ocoa.), 1950 m, 24 Nov 1981, *Mejía, M.* 18264 (MO); **Samaná:** Los Cacaos, Valle de lágrimas, 250 m, 15 Mar 1969, *Alain Liogier, B.r.o.* 14420 (P); **San Juan:** vicinity of Rio Arriba del Norte, north of San Juan, 750 m, 9 Sep 1946, *Howard, R.A.* 8872 (GH,P,US); **Santiago:** Santiago, Rio

Arriba, 8 km from Santiago City, 540 m, 25 Nov 1960, *Jiménez, J.J.* 4313 (US); 8 km from Santiago city, 540 m, 25 Nov 1960, *Jiménez, J.J.* 4314 (US); **Santo Domingo**: Tabara, 350 m, 17 Mar 1922, *Schrenk, H. von* 9 (MO); **Seibo**: Jovero, Monte Redondo, east fo Jovero, 300 m, 19 Nov 1923, *Abbott, W.L.* 2791 (GH,US). **EL SALVADOR. La Libertad**: Nueva San Salvador, Jardín Botánico La Laguna, 805 m, 12 Dec 1985, *Berendsohn, W.G.* 361 (MO); **San Salvador**: Jardin Botanico, zona 29 N, 800 m, 23 Oct 1990, *Lopez, E.* RV-00516 (MO); **Santa Ana**: Bosque nebuloso de Montecristo, 2000 m, 2 Feb 1978, *Reyna, M.L.* 1138 (MHES). **GUADELOUPE. Leeward Islands**: Guadeloupe, 500 m, 1897, *Duss, P.* 3855 (GH,MO,US); **GUATEMALA. Petén**: Los Arcos-Cadenas Road, Km 143/144, west, 20 m, 17 Dec 1969, *Contreras, E.* 9378 (ASU,DS,MO,TEX). **HAITI**. Pesion ville, Massif de la Pelle, 450 m, 19 Oct 1924, *Ekman, E.L.* 2201 (US); Vicinity of St. Louis du Nord. Thicket on high mountain ridge southwest of city, 500 m, 30 Apr 1929, *Emery, C.* 14462 (MO,US); Mornes des Commissaires, 1400 m, 17 Mar 1942, *Holdridge, L.R.* 1050 (US); St Louis du Nord, High mountain ridge south west of city, 800 m, 6 Apr 1929, *Leonard, E.C.* 14462 (GH,US); Basin Bleu, upper slopes of Hant Piton, 900 m, 25 Apr 1929, *Leonard, E.C.* 15183 (UC,US); **Artibonite**: St Michel de l'Atalaye, North slope of Mt la cidre, 350 m, 30 Nov 1925, *Leonard, E.C.* 7581 (P,US); 500 m, 7 Dec 1925, *Leonard, E.C.* 7796 (US); Marmelade, along road to St. Michel, 800 m, 21 Dec 1925, *Leonard, E.C.* 8393 (US); St Michel de l'Atalaye, 6 miles n of U.W. Indies Co. plantation, 350 m, 26 Dec 1925, *Leonard, E.C.* 8492 (US); Ennery, Puilboreau Pass, 500 m, 5 Feb 1926, *Leonard, E.C.* 9572 (US); Vicinity of Ennery, slope south of Ennery (Baku's home), 600 m, 23 Feb 1926, *Leonard, E.C.* 10027 (MO,UC,US); **Tortue Island**: Basse Terre, trail west of Au Palmiste, 320 m, 28 Mar 1929, *Leonard, E.C.* 12536 (US). **HONDURAS. Morazán**: Montaña La Tigra, southwest of San Juancito, 1800 m, 2 Feb 1966, *Molina R., A.* 17024 (GH,US). **JAMAICA**. New Castle, near New Bastle, 340 m, 18 Feb 1908, *Harris, W.M.* 10109 (US); Below New Castle, 330 m, 1 Mar 1908, *Harris, W.M.* 10145 (US); Westmoreland, Copse Mountain, 1-2 km, SW of Rat Trap S of Bethel Town, 500 m, Mar 1986, *Kelly, D.L.* 1634 (MO); Gordon Town, Cinchona plantation, 350 m, , *Hart, J.* 576 (US); Hermitage Dam, South slope, 500 m, 3 Jun 1926, *Maxon, W.R.* 8792 (US); **Manchester**: Bath district along the Somerset road southeast of Johns Hall, 701 m, 8 Jan 1961, *Proctor, G.R.* 21889 (GH,MO,US); **St. James**: White Rock Hill, 1 mile south of Sweet Water. Wooded rocky limestone hillside, 640 m, 22 Dec 1974, *Proctor, G.R.* 34510 (MO); **Trelawny**: Cockpit, Quickstep to Forest Road, Cockpit Country, 600 m, 5 Feb 1999, *Kay, E.* 149 (DAV,MO); **MEXICO. Chiapas**: 20 km al NW de Raudales, 300 m, 7 Apr 1966, *González Quintero, L.* 3506 (DS); **Veracruz**: ATOYAC, Miraflores, 6 km al NW de Atoyac, 900 m, 18 May 1985, *Acevedo R., R.* 184 (XAL); Miraflores, 5 km al NW de Atoyac, 850 m, 20 Sep 1985, *Acevedo R., R.*

529 (XAL); El Mirador, 1100 m, Jun 1919, *Purpus, C.A. 8426* (MO,NY,UC,US,XAL); Totutla, El Mirador, 1000 m, May 1933, *Purpus, C.A. 15368* (GH,XAL). **NICARAGUA. Estelí:** Municipio de Estelí, asentamiento Puertas Azules, 1300 m, 17 Apr 1999, *Rueda, R.M. 10924* (MO); Municipio de Estelí, Reserva Natural Mirafior, Comarca Puertas Azules, al suroeste de la comunidad del mismo nombre, 800 m, 14 May 1999, *Rueda, R.M. 11156* (MO); Municipio de Estelí. Reserva Natural Tisey. Comunidad La Almaciguera, 1350 m, 16 Mar 2000, *Rueda, R.M. 13158* (MO); **Jinotega:** Municipio de Wiwili, Zona de Amortiguamiento de Bosawas, Macizos del Cerro Kilambé, 500 m, 9 Apr 1998, *Rueda, R.M. 8123* (MO); Municipio de Jinotega. Reserva Natural Cerro Kilambé, 950 m, 22 Apr 2000, *Rueda, R.M. 13332* (CAS,HULE,MO); Municipio de Wiwili. Reserva Cerro Kilambé, 1400 m, 7 Sep 2000, *Rueda, R.M. 14925* (HULE,MO); Km 151, old highway between Matagalpa and Jinotega, 1445 m, 22 Jan 2009, *Stevens, W.D. 27936* (HULE,MO); 5 km E of Jinotega along road through Los Papales, 1275 m, 9 Feb 2010, *Stevens, W.D. 29596* (HULE,MO); **Madriz:** Municipio de Somoto. Reserva Natural Tepesomoto. La Patasta, 1200 m, 18 May 2000, *Rueda, R.M. 13626* (MO); ibidem, 20 May 2000, *Rueda, R.M. 13731* (MO,P); **Matagalpa:** Behind La Selva Negra Hotel, slopes of Cerro Picacho, near the border with Dept. Jinotega, 1200 m, 23 May 1985, *Davidse, G. 30282* (MO); Behind La Selva Negra Hotel, slopes of Cerro Picacho, near the border with Dept. Jinotega, 1200 m, 23 May 1985, *Davidse, G. 30391* (MO); Along Canal Trail on S side of Cerro Picacho, above Selva Negra hotel, 1418 m, 16 Jun 2008, *Stevens, W.D. 27269* (HULE,MO); Near Santa María de Ostuma, Cordillera Central de Nicaragua, 1300 m, 21 Feb 1963, *Williams, L.O. 24766* (F,NY,US). **PANAMA. Chiriquí:** Rio Chiriquí viejo, Near Sawmill, 3 km of camp El Volcan. PanAmerican Highway, 1300 m, 5 Mar 1943, *Little-Jr, E.L. 6080* (MO,US); NW of Cerro Punta, at INRENARE station in Parque Amistad, 2200 m, 16 Oct 1992, *McPherson, G. 15888* (MO); El Hato, Volcán Barú, foothills of Volcan, North of El Hato, 1550 m, 5 Jun 1957, *Stern, W.L. 54 A* (DS,MO,US); 6 miles above Cerro Punta on the Boquete trail, 2286 m, 5 Mar 1974, *Tyson, E. 7106* (MO); ibidem, 2134 m, 11 Mar 1974, *Tyson, E. 7208* (MO); **Darién:** Serranía de Majé. Cerro Chucantí, 800 m, 11 Mar 2004, *Aizprúa, R. B4082* (MO,PMA); **Veraguas:** Montijo, Cerro Hoya, subiendo por el río Pedregal, 1030 m, 9 Mar 1997, *Deago, J. 454* (CAS,MO). **PUERTO RICO.** 3 miles SE of Jayuya, 800 m, 21 Aug 1954, *Little-Jr, E.L. 16445* (US); Bayamon, 330 m, Mar 1886, *Stahl, A. 389 b* (US). **TRINIDAD AND TOBAGO.** sine loco, *Sieber s.n.* (MO). **VENEZUELA.** Hacienda los Venados. Selvas del Avila, 1300 m, 22 Jul 1938, *Delgado, E. 179* (US); Parque Nacional El Avila, subida a El Vigía. Dtto. Federal, 1200 m, 29 Nov 1986, *Rojas, C. de 3563* (MO); Selvas veraneras del sur de Avila, 1000 m, Apr 1937, *Tamayo, F. 165* (US); Cotiza, en quebradas veraneras, 1050 m, Jul 1937, *Tamayo, F. 406* (US); Aragua, Guamitas, Parque Nacional, 850 m,

*Williams, L.I. 10235* (US); **Distrito Federal**: Caracas, Parque del Calvario, 950 m, 3 Apr 1972, *Morillo, G. 2180* (US); Parque del Panteon, 900 m, Jan 1918, *Pittier, H. 7712* (US); Around the city, 1000 m, 26 Jan 1922, *Pittier, H. 10098* (NY,US); **Mérida**: Sto. Domingo & Merida, La Mucuy, 1700 m, Jan 1963, *Aristeguieta, L. 4906* (MO,NY); 10 km NE de Merida near village of Tabay, 1900 m, 28 Oct 1963, *Breteler, F.J. 3219* (NY,WAG); Santa Anita-Mérida, 1700 m, 11 Jun 1966, *Marcano-Berti, L. 998* (MO); **Miranda**: Los Teques, in German plantations, Parque de los bárbaros, 1400 m, 19 Oct 1917, *Pittier, H. 7520* (US); San Diego de Los Altos, 1300 m, 11 Jul 1992, *Tillett, S.S. 927-18* (A); **Trujillo**: San Pablo de Mendoza, 1200 m, 19 Nov 1922, *Pittier, H. 10736* (US); ibídem, 1200 m, 2 Feb 1929, *Pittier, H. 13322* (MO,NY,US).

43. *P. "pankhurstii"* Pérez-Zab., sp. nov. in prep.

This new taxon can be recognized by the remarkable dichotomous architecture of the shoots in which two lateral branches emerge from the axils of the most proximal leaves of each subsequent reiteration of the main shoots, the leaves have relatively long and slender petioles enlarged at their basal edge, the apex long acuminate to caudate, two elliptic sub-marginal glands, stipules subulate and ventrally connate and flowers with anthers considerably bigger than the morphologically similar species *P. annularis*. A complete description is available in the Flora Mesoamericana treatment.

**Distribution.** Distributed in mid elevation wet forests of western Panamá surrounding a mountain known as Cerro Colorado in the central mountain ridge. Also, specimens collected in the isolated mountain Cerro Jefe (central Panamá) at a lower elevation can be attributed to this species.

**Elevation range.** 800 – 1500 m.

**Material examined.** (3) PANAMA. **Bocas del Toro**: Region of Cerro Colorado, on trails from continental divide, 7 miles from Chami [Chame] Camp, 1500 m, 12 Apr 1986, *McPherson, G. 8827* (MO); Vicinity of Cerro Colorado, on trail along creek 8.6 miles from Camp Chami [Chame], 1400 m, 14 Apr 1986, *McPherson, G. 8888*

(MO); Chiriqui-Bocas del Toro border. Vicinity of Cerro Colorado, along mining road on divide, 1300 m, 27 Jan 1989, *McPherson, G. 13642* (MO). **Panamá:** Cerro Pelon, 770 m, 31 Jan 1996, *Galdames, C. 2466* (F); Cerro Jefe, 1 km antes de la bifurcacion hacia Altos de Pacora, 800 m, 21 Mar 1997, *Galdames, C. 3755* (F).

44. *P. pleuradenia* Griseb., Fl. Brit. W. I. 231. 1860. Type: Saint Vincent/Grenadines: St. Vincent, *Guilding, L.* (sintypes K!).

This species can be distinguished by the leaves elliptic to elliptic-oblong, sub-coriaceous, 8-15 x 4-6.8 cm, with petioles 7-12 x 1-1.3 mm, base obtuse to rounded and decurrent down to half the petiole, apex acuminate, venation pattern weak brochidodromous (appearing eucamptodromous), secondary veins arcuate (9-10), emerging at 60-70 degrees from the midrib, intersecondaries parallel to secondaries and very short, tertiaries irregular reticulate, and 2 glands placed on the first pair of secondary veins at 5-7 mm from the base and 1-3 mm from the midrib. The floriferous shoots are flexuous, 3-5 cm long; the flowers have pedicels 4-6 x 0.3-0.4 mm, hypanthium infundibuliform, 2.2-2.8 mm wide, anthers 0.4-0.5 mm long. The fruit is oblate to didymous, 11-12 x 13-15 mm. It is close to *P. accumulans* which has leaves with less secondary veins, glands closer to the margin, smaller flowers subtended by shorter and thinner pedicels and smaller fruits. It is also similar to *P. dussii* with which could be combined after further studies (see discussion under *P. dussii*)

**Distribution.** Distributed in low and mid elevation forests in the Lesser Antilles from Trinidad and Tobago at the south to the American Virgin Islands at the north.

**Elevation range.** 380 – 1200 m.

**Local names.** noyan (Guadeloupe).



**Material examined.** (7) **GUADELOUPE.** Route de la Soufriere, Foret domaniale de la Basse-Terre, 1200 m, 5 Jun 1982, *Barrier, S. 3500* (P,US); Bains-Jaunes, 1050 m, 1893, *Duss, P. 362* (P). **TRINIDAD AND TOBAGO.** 500 m, 4 Feb 1980, *Adams, C.D. 14624* (NY); **Trinidad:** 400 m, *Botanic Gardens Herbarium 4501* (US); **Tobago:** Caledonia, 450 m, 23 Oct 1912, *Broadway, W.E. 4303* (GH,MO,NY,US). **VIRGIN ISLANDS:** St. John, Coral Bay Quarter; Bordeaux Mountain, 100 m from communications tower, 380 m, 9 Jan 1992, *Acevedo-Rodriguez, P. 4703* (MO,NY,US).

45. *P. rhamnoides* Koehne, Bot. Jahrb. Syst. 52: 283. 1915. Type: Guatemala: Quiché, San Miguel Uspantan, 2000 m, Apr 1892, *Heyde et Lux in Herb. Donnell Smith 3090* (lectotype, US-354940 (designated by Pérez-Zab., 2015); isoelectotypes, NY!, US!).

*Prunus barbata* Koehne, Bot. Jahrb. Syst. 52: 284.1915. Type: Guatemala: cumbre de Xiupach, Feb 1878, *Bernoulli et Cario2916* (unknown specimen location)

*Prunus cornifolia* Koehne, Bot. Jahrb. Syst. 52: 284. 1915. Type: Costa Rica: Copey, forest du Copey, 1800 m, Feb 1898, *Tonduz, A. 7355* (sintypes, BM!(2), F!, GH!, NY!(2), US!(6) ).

This species is easily distinguishable from the rest of the taxa in Mesoamerica and belongs to a separate group of species formerly identified as grex *Neocalycina* by Koehne (1915), which has domatia in the axils of secondary veins, hairy shoots and sepals persistent in the fruits. The density of the indument is variable ranging from almost glabrous to hirsute and it is especially visible on new reiterations and floriferous shoots. The domatia are generally restricted to the most basal axils and the leaf glands are marginal and frequently form an enation near to the base of the blade. The flowers have hypanthium broadly campanulate to rotate, petals conspicuous and up to 2.5 mm wide. The fruits have mesocarp moderately fleshy in contrast with the majority of the neotropical taxa. The closer species are *P. gentryi* from northern Mexico and *P. urotaenia* from the Andes in South America; the former has smaller and more coriaceous leaves with shorter

racemes and the latter has generally larger membranous leaves and bigger flowers. A potentially conflictive name (in terms of priority), *Cerasus rhamnoides* Greene, Proceedings of the Biological Society of Washington 18(8): 58. (1905), which is currently considered synonym of *P. emarginata* (Douglas ex Hook) Eaton, has never been validly combined under *Prunus*; consequently *P. rhamnoides* Koehne would retain priority in case a new combination of the former under *Prunus* were proposed. A complete description of this taxon is available in the Flora Mesoamericana treatment.

**Distribution.** Widely distributed in dry to humid mid-elevation to high elevation sub-humid and humid forests from western Panamá to northwestern Mexico. Found from highly disturbed to pristine forests or even as a residual tree in open anthropic grasslands.

**Elevation range.** 950 – 3300 m.

**Local names.** capulín (Mexico).

**Material examined.** (122) **BELIZE.** Toledo: Along divide of Maya Mountains, Bladen Nature Reserve. Medium-height, 950 m, 13 May 1996, *Holst, B. 5274* (BRH,MO); **COSTA RICA.** Prov. de Alajuela, Puntarenas y Guanacaste. Cordillera de Tilarán. Monteverde, 1500 m, 22 May 1977, *Dryer, V.J. 1368* (F,MO); Tiorels du Barba, Alto del Roble, 1800 m, May 1888, *Pittier, H. 217* (US); Salatrál de San Marcos, 1350 m, Apr 1893, *Tonduz, A. 7829* (US); **Alajuela:** San Ramon, Reserva Biológica Monteverde, Cordillera de Tilarán, Camino a la Torre, 1550 m, 27 Feb 1992, *Bello, E. 4440* (CR,MO); Reserva Forestal Grecia, Bosque del Niño, 1000 m, 16 Jan 1987, *Herrera, G. 403* (BRIT,F,MO); Zarcero, Remnant of cloud forest on mountains of Cordillera Central, about 2 km east of Zarcero, 2000 m, 15 Feb 1966, *Molina R., A. 17107* (MO,US); Region of Zarcero, 2300 m, 5 Jan 1938, *Smith, A. H1* (MO); Hills above La Brisa de Zarcero, 2100 m, 10 Mar 1938, *Smith, A. H439* (MO); ibidem, 2100 m, 10 Mar 1938, *Smith, A. pc 265* (US); Alfaro Ruiz, Palmira, 2130 m, 23 Apr 1937, *Stork, H.E. 4146* (UC); **Cartago:** El Guarco, Reserva Forestal Río Macho, Cuenca del Reventazón, La Esperanza del Guarco, 2840 m, 21 Apr 1999, *Alfaro, E. 2251* (MO); Cartago/San José province border, about 7.4 km southeast of El Empalme on the Cordillera de Talamanca, 2500 m, 15 Mar 1978, *Almeda, F. 4224* (CAS,MO); San Gerardo de Dota, Cerro de la Muerte, al margen de la carretera via Savegre, 2691 m, 8 Jun 2011, *Sanín, D. 5023* (MEDEL); **Guanacaste:** 2-3 km south of Monte verde cloud forest,

1500 m, 6 Mar 1986, *Almeda, F. 5360* (CAS); **Heredia:** Barva, Growing on slopes of Volcán Barva, 2100 m, 9 Feb 1965, *Blaisdell, R.S. 124* (MO); Heredia, Parque Nacional Braulio Carrillo, upper Volcán Barva, Atlantic slope, ca. 0.5 km below (to north of) main trail to Laguna Barva, 2750 m, 28 Apr 1992, *Boyle, B. 816* (MO); Parque Nacional Braulio Carrillo, upper Volcán Barva, Atlantic slope, ca. 0.5 km below (to north of) main trail to Laguna Barva, descending vía old "Sendero del Transecto", 2750 m, 28 Apr 1992, *Boyle, B. 823* (MO); Parque Nacional Braulio Carrillo, Vara Blanca to Regufio, 2210 m, 30 May 1992, *Boyle, B. 870* (MO); Barva, entre Porosati y Sacramento; faldas de V. Barva, 2000 m, 27 Feb 1997, *Hammel, B. 20883* (INB); San Jose de la Montana. Paso Llano. Cuenca del Tarcoles, 1900 m, 4 Feb 1997, *Rodríguez, A. 1951* (MO); Heredia, Vara Blanca de Sarapiquí, north slope of Central Cordillera, between Poás and Barba volcanoes, 1710 m, Feb 1938, *Skutch, A.F. 3502* (MO,US); Barva, Parque Nacional Braulio Carrillo, sector Volcan Barva, 2600 m, 4 Oct 2002, *Wen, J. 6942* (US); **Puntarenas:** Coto Brus, Cuenca Terraba-Sierpe. Loma Indio, 1580 m, 10 Jan 1999, *Alfaro, E. 1885* (MO); Cuenca Terraba-Sierpe. Z.P. Tablas, en las Faldas de Quijada del Diablo, 1620 m, 26 May 1999, *Alfaro, E. 2309* (MO); Zona Protectora Las Tablas, Río Cotoncito, 2000 m, 10 Dec 1983, *Chacón, A.; Isandro 1787* (MO); Foothills of the Cordillera de Talamanca, between Sitio Cotón (Cotonsito) and Mellizas, 1300 m, 11 Mar 1984, *Davidse, G. 25571* (MO); Cordillera de Tilarán. San Luis; Finca Brenes. Monteverde, 1100 m, 7 Mar 1994, *Fuentes, Z. 644* (CR,MO); Monteverde, 1400 m, 13 Oct 1978, *Haber, W.A. 211* (MO); Monteverde; lower community along cliff edge and below on Pacific slope, 1000 m, 17 Jan 1986, *Haber, W.A. 4317* (MO); R.B. Monteverde; Cordillera de Tilarán, detrás de Restaurant Monteverde, 1200 m, 9 Feb 1994, *Lépiz, E. 149* (CR,MO); Coto Brus, Z.P. Las Tablas. Cuenca Terraba-Sierpe. Zona Protectora Las Tablas, Neblina, 1440 m, 17 Jan 1997, *Navarro, E. 568* (MO); Estacion biologica Monteverde, 1580 m, 22 Sep 2002, *Wen, J. 6828* (US); Canto Coto Brus, Mellizas, near La lucha, 1350 m, 6 Oct 2002, *Wen, J. 6968* (US); ibidem, 1350 m, 6 Oct 2002, *Wen, J. 6970* (US); **San José:** Desamparados, About 2-6 km south of Higuito on the dry lower slopes of Altos Tablazo, 1356 m, 20 Feb 1978, *Almeda, F. 3746* (CAS,MO); Z. P. Cerros de Escazú. Cedral. Vereda entre Alto Hierba Buena y Poás de Aserrí, 1600 m, 28 Mar 1992, *Morales, J.F. 238* (MO); Aserri, Z.P. Cerros de Caraigres. Fila Aguabuena. Quebrada Delicias, 1500 m, 15 Feb 1996, *Morales, J.F. 5238* (MO). **GUATEMALA. Chimaltenango:** Chichavac, 2400 m, 23 Mar 1933, *Skutch, A.F. 332* (P,US); ibídem, 2400 m, 20 Apr 1933, *Skutch, A.F. 343* (US); ibídem, 2400 m, 8 Jul 1933, *Skutch, A.F. 369* (US); **Quiché:** Hedgerow along Nebaj-Aguacatan trail, 2500 m, 12 Dec 1934, *Skutch, A.F. 1915* (US); **Totonicapán:** Momostenango, San Vicente Buenabaj, cerro Tená, 3300 m, 26 Apr 2000, *Véliz, M. MV 2M.8767* (MEXU). **MEXICO. Chiapas:** San Cristóbal de las Casas, Southwest side of Zontehuitz,

2800 m, 7 Apr 1965, *Breedlove, D.E. 9583* (DS); El Porvenir, Steep slopes, 3-4 km W of El Porvenir along road from Huixtla to Siltepec, 2800 m, 17 Jan 1973, *Breedlove, D.E. 31791* (DS,F,MEXU,MO); Siltepec, Steep slope along ravines, on the ridge above Siltepec on the road to Huixtla, 2000 m, 18 Jan 1973, *Breedlove, D.E. 32007* (DS,MEXU,MO); San Cristóbal de las Casas, west side of Zontehuitz near summit, 2743 m, 17 Oct 1981, *Breedlove, D.E. 53608* (CAS); Tenejapa, Rancho Banavil, 2380 m, 4 Jul 1994, *González E., M. 2060* (MEXU); San Cristóbal de las Casas, Estación Biológica huitepec-Pronatura, 2450 m, 23 Apr 1991, *González E., M.; M. 1459* (MEXU); Chamula, steep slope with *Quercus* near the paraje of Yal'ichin on the road to Chenalo, 1829 m, 16 Apr 1966, *Laughlin, R.M. 683* (DS,MEXU); San Cristóbal de las Casas, Cerro Hueytepec, 2560 m, 22 Apr 1945, *Little-Jr, E.L. 9943* (CAS); Estación biológica Huitepec, 2450 m, 26 Jul 1995, *Martínez, M. 263* (MEXU); El Porvenir, Mt. Male, 3100 m, 6 Jul 1941, *Matuda, E. 4672* (MEXU); Motozintla, Pinabeto, 2585 m, 9 Jul 1945, *Matuda, E. 5468* (MEXU); Chamula, 600 m adelante desvío a torre Tzontehuitz, camino a Mitontic, 2720 m, 25 Apr 1995, *Mejía, H. 272* (MEXU); A 150 m al norte de la escuela de Chiviltenal, 2340 m, 10 Jul 1995, *Mejía, H. 544* (MEXU); San Cristóbal de las Casas, Cerro Huitepec, 2370 m, 5 Jun 1984, *Méndez, A. 7616* (MO); Chamula, Cerro de Tzontehuitz, al N de San Cristóbal, 2100 m, 25 Jul 1985, *Méndez, A. 8376* (MEXU,MO); San Cristóbal de las Casas, Cerro Huitepec, 2300 m, 1 Apr 1986, *Méndez, A. 8959* (MO); Finca Prusia, Arroyo del Charro (S. Jaltenango), 1450 m, 22 Feb 1951, *Miranda, F. 6962* (MEXU,US); adelante de Balun canal, camino San Cristobal-Tenejapa, 2100 m, 29 Apr 1993, *Ochoa-Gaona, S. 4067* (CAS); Siltepec, Carr. El Porvenir - Siltepec, tramo a El Rosario, 2080 m, 1 Jun 1988, *Palacios E., E. 563* (MEXU); San Cristóbal de las Casas, Estación Biológica Huitepec, 2400 m, 18 Apr 1995, *Ramírez-Marcial, N. 671* (CAS,MEXU); Mpio. Angel Albino Corzo y Mapastepec: Claro del Campamento El Triunfo en el Polígono I de la reserva de la biosfera El Triunfo, 1860 m, 8 May 1993, *Solís Galvéz, R. 63* (MEXU); San Cristóbal de las Casas, 2700 m, 21 Jun 1970, *Thorne, R. 40090* (DS); **Durango**: Collected at San Ramón, 2000 m, 21 Apr 1906, *Palmer, E. 105* (F,MO,NY,UC,US); **Guanajuato**: 2 km al norte de Mesas de Jesus, 2300 m, 21 Apr 1996, *Rzedowski, J. 53070* (CAS); Victoria, Puerto de El Aire, 10 km al Sureste de Joya Fria, 2000 m, 8 Jun 1989, *Ventura V., E. 6763* (MO); 2250 m, 5 Jul 1990, *Ventura V., E. 8233* (CAS); **Guerrero**: Mina, Aguazarca, 1100 m, 1 May 1937, *Hinton, G.B. 10403* (P,UC,US); **Hidalgo**: Tenango de Doria, 20 km al NE de Metepec, 2200 m, 18 Feb 1981, *Hernández M., R. 5437* (US); 8 kms al este de Tenango de Doria, (el Cirio), 1700 m, 19 Feb 1981, *Hernández M., R. 5480* (MO); Tianguistengo, 5 kms al oeste de Tianguistengo, 1800 m, 25 Mar 1981, *Hernández M., R. 5628* (CAS,MO); 4 kms. al oeste de Tianguistengo, 1900 m, 25 Apr 1981, *Hernández M., R. 5781* (CAS,MO); **Jalisco**: Bolaños, Arroyo del

Estafiante, 3 km al SW de las Berenjenas, 8 km al W del Crucero Tuxpan de Bolanos-Los Amoles, 1810 m, 3 Jul 1996, *Flores F., G. 4641* (MO); Salcillo, coordinates from El Saucillo, 950 m, 1 Jun 1892, *Jones, M. 129* (MO,US); Mezquitic, Monte Escobedo, 8.5 miles southeast of Mezquitic, 2000 m, 16 Apr 1951, *McVaugh, R. 12017* (NY,US); Ayutla, Wooded mountains between Aserradero Agua Blanca and San miguel de la Sierra, 25-40 miles by road southwest of Ayutla. Above La Canada, 2100 m, 14 Nov 1952, *McVaugh, R. 14150* (BRIT, US); Concepción de Buenos Aires, 30 km al E. de Cd. Guzman por la carr. a Tamazula, luego 50 km. por la brecha de Sta. Cruz a Agua de la Virgen, 1910 m, 2 Jun 1988, *Pichardo A.; V. 194* (MO); **México:** Temascaltepec, Bejucos, 1000 m, 11 Mar 1933, *Hinton, G.B. 3590* (DES,F,MEXU); Nanchititla, 1700 m, 15 May 1934, *Hinton, G.B. 6059* (P,UC,US); ibidem, 1800 m, 15 Feb 1935, *Hinton, G.B. 7374* (HINTON,US); **Michoacán:** Uruapan, Cascasa Tzeraracua, 1500 m, 4 May 1966, *Rzedowski, J. 22322* (BRIT,DS); **Nuevo León:** Cerro El Viejo, 1830 m, 26 Mar 1993, *Hinton, J. 22746* (MEXU); **Oaxaca:** Mpio. Santiago Juxtlahuaca. Puerta de Luz, hacia la torre de microondas, entrada por Santa Rosa, vía San Miguel Cuevas a El Manzanal, 2405 m, 18 Apr 1995, *Calzada, J.I. 19829* (MO); Mpio. Santiago Juxtlahuaca. 3 km de la desviación a San Juan Piñas, 2290 m, 21 Nov 1995, *Calzada, J.I. 20481* (MO); Teotitlan, [Mun. San Jerónimo Tecoaatl]. Along road between Teotitlán del Camino and Huatla de Jiménez, 35 mi E of Teotitlán, 4 mi E of San Jerónimo, 1650 m, 22 Feb 1979, *Croat, T. 48264* (MO); Tuxtepec, Mpio. San Felipe Usila. Cuenca del Río Perfume (ladera O). 8.5 km en línea recta al S de Santa Cruz Tepetotutla, 2410 m, 20 May 1994, *Gallardo H.; C. 1114* (MO); Teotitlan, Puerto de la Soledad, carr. a Huatla, 2350 m, 27 Apr 1978, *Sousa S., M. 9336* (DES, MO, UC); Villa Alta, 4.7 km al N de Maravillas y 23 km al N de Zoogocho. Camino a Talea de Castro, 1500 m, 16 May 1983, *Torres C., R. 2917* (CAS,MO); **Puebla:** Teotitlan del Camino, on the road to Huautla, 2400 m, 3 Aug 1961, *Smith Jr, C.E. 4154* (US); **San Luis Potosí:** Mex 86, 0.6 miles W. Lois Ruisas, between San Luis Potosi and Cardenas, 2286 m, 18 Jul 1965, *Kral, R. 24959* (BRIT,MO); 31 miles east of San Luis Potosí, highway to Río Verde, 2 mi below San Francisco, 6 mi below summit at RR crossing, 2000 m, 4 May 1949, *McVaugh, R. 10425* (US); **Tamaulipas:** Gomez Farias, 15 km al NO de Gómez Farías, 1100 m, 20 Apr 1988, *Estrada Castellón, A.E. 1391* (MO); **Veracruz:** Huayacocotla, Helechales, 1600 m, 22 Apr 1981, *Ballesteros M., L. 384* (XAL); Tepozanes, 1800 m, 24 Apr 1981, *Ballesteros M., L. 398* (XAL); San Andres Tuxtla, Cerro Mastagaga, ladera W, 13 km al NE de San Andrés Tuxtla, 1200 m, 11 May 1972, *Beaman, J.H. 5934* (BRIT,XAL); Volcán San Martín Tuxtla, 1420 m, 28 Apr 1973, *Calzada, J.I. 993* (P,XAL); Chiconquiaco, Planta del Pie, camino a Loma Alta, entrada por Chiconquiaco, 2100 m, 13 Jul 1982, *Calzada, J.I. 9337* (XAL); San Andres Tuxtla, Volcán San Martín Tuxtla, borde S del Cráter, 1150 m, 30 May 1984, *Calzada, J.I.*

10616 (XAL); ibídem, El Aguaje, 1150 m, 1 Jun 1984, *Calzada, J.I. 10682* (SLPM,UC,XAL); Volcán San Martín, 20 km al N de San Andrés Tuxtla, La Perla de San Martín, 1600 m, 11 Apr 1985, *Cedillo T.; R. 3205* (XAL); Acajete, Zapotal, 2400 m, 4 Apr 1977, *Cházaro, M. 611* (UC,XAL); Huayacocotla, Carretera al sur del municipio, 17 km del borde con Edo Hidalgo, 2100 m, 13 Jul 1977, *Fay, J. 862* (COL,P,SLPM,UC,US,XAL); Palo Bendito, 2 km, camino a Huayacocotla, 2150 m, 30 May 1969, *Gómez-Pompa, A. 4326* (XAL); Acajete, Mesa de la Yerba and Colexta, 2150 m, 15 May 2007, *Haeckel, I. 90* (XAL); Mesa de la Yerba and Colexta, 2150 m, 16 May 2007, *Haeckel, I. 94* (XAL); Río Colexta, camino del tubo de agua, por el rancho de Felipe Saldaña, Colexta, 2150 m, 24 Jun 2008, *Haeckel, I. 113* (XAL); Huayacocotla, Viborillas, 2200 m, 24 Apr 1971, *Hernández M., R. 1178* (XAL); Palo Bendito, 2200 m, 7 Mar 1972, *Hernández M., R. 1538* (XAL); Chiconquiaco, Planta del Pie, 2060 m, 18 Jul 1981, *Narave F., H. 35* (XAL); Chiconquiaco, 6 km al NE, camino a Vaquería, 2050 m, 16 Dec 1988, *Pérez-García, I. 383* (XAL); Chiconquiaco, 6 km al NE, camino a Vaquería, 2050 m, 30 Apr 1990, *Pérez-García, I. 429* (XAL); Huayacocotla, 1800 m, 23 Jul 1969, *Puig, H. 5053* (P); Viborillas, cerca de Huayacocotla, 2300 m, 28 Nov 1975, *Sosa O., V. 9* (XAL); Entre los Ocotes y el Agua de la Calabaza, 1900 m, 22 Mar 1980, *Vargas, Y.A. 216* (CAS); Yecuatla, La Chiviera, Bosque en ladera de cerro, 1230 m, 11 Feb 1972, *Ventura A., F. 4756* (ASU,CAS,UMO); Chiconquiaco, La Gucamaya, 1910 m, 21 Apr 1972, *Ventura A., F. 5265* (ASU,CAS,UMO); Rancho Nuevo, 1750 m, 12 Apr 1973, *Ventura A., F. 8162* (ASU,MO,XAL); **PANAMA. Chiriquí:** Bocas & Chiriqui. Cerro Colorado mine area; in elfin woods on divide road, along trail into Bocas and in woods on Pacific slope; from Chami station to ca. 9 miles along road, 1750 m, 27 Mar 1986, *Hammel, B. 14990* (MO).

46. *P. salasii* Standl., Trop. Woods 32: 14. (1932). Type: Guatemala: Sacatepéquez, Antigua, Cafetales El Pintado, 1500 m, Jan 1932, *García-Salas, J. 1437* (holotype F!).

It can be differentiated by the leaves glabrous dentate, with the teeth ending in a callous tissue (probably colleters), petioles 13-22 mm long, 2 glands placed on the marginal crests of the petiole facing up, and pocket-like structures (probably domatia) at the basal axil of secondary veins. The floriferous shoots are as long as or longer than the leaves, the flowers are relatively large, and the fruits are ellipsoid up to 18

mm long. It resembles *P. chiapensis* which has pubescent leaves and shoots, relatively rugose venation and shorter racemes. A full description is available in the Flora Mesoamerica treatment.

**Distribution.** Distributed mainly in mid elevation humid forests of the Pacific side mountain ridges extending from El Salvador to eastern Oaxaca in Mexico.

**Elevation range.** 536 – 2170 m.

**Local names.** carreto (Guatemala), cereza, cereza montes, (z)sapoyolillo (Mexico), zapotillo (El Salvador).

**Material examined.** (20) **EL SALVADOR. Ahuachapán:** El Imposible, San Benito, en la cima del Cerro Campana, 1000 m, 16 Mar 1992, *Sandoval, E. 314* (MO); **Santa Ana:** Cerro Monte Cristo, 2000 m, 2 Jan 1959, *Allen, P.H. 7132* (US); P.N. Los Volcanes, sector Los Andes, la piedra pacha, barranca el mezcal, 1800 m, 22 Jul 2005, *Monterrosa S., J. 1022* (MO); **Sonsonate:** Juayua, Cantón Los Naranjos, Cerro EL Aguila. Sector EL Rosario, 1989 m, 27 Dec 2013, *Rodriguez, D. 4740* (LAGU). **GUATEMALA. Chimaltenango:** Acatenango, 4 km de la carretera Patzicia a Actenango, 2000 m, 2 Feb 2002, *Véliz, M. MV 12245* (MEXU); **Guatemala:** Guatemala, Jardín Botánico de la USAC, 1500 m, 3 Jul 1984, *Díaz, A. 3907* (MO); Ciudad Universitaria, Zona 12, 1500 m, Jun 1993, *Véliz, M. s.n.* (MO); **Sacatepéquez:** San Miguel Dueñas, 2000 m, 10 Sep 1993, *Castillo Mont, J.J. 1923* (F,GH,NY,US); Near Antigua, 1500 m, Nov 1938, *Standley, P.C. 59958* (F,MO,NY,US); Antigua, El Panorama, 1527 m, 20 Jul 2010, *Véliz, M. 21466* (CAS); Cerro Carnaval, 2170 m, 31 Oct 2010, *Véliz, M. 22129* (CAS). **HONDURAS. Lempira:** Gracias, Parque Nacional de Celaque. Sendero entre La Planta eléctrica y la primera casa abandonada de Don Tomás, 1500 m, 28 Jan 1992, *House, P. 1179* (MO, TEFH). **MEXICO. Chiapas:** Motozintla, 45-50 km NE of Huixtla along road to Motozintla, 1900 m, 28 Dec 1972, *Breedlove, D.E. 31097* (F,MEXU,MO,NY,TEX); Cerros de Don Ventura, al NO de Tuxtla Gutiérrez, 1000 m, 30 Dec 1948, *Miranda, F. 5114* (MEXU); Cerro Brujo (Sur Ocozocuautila), 1470 m, 4 Jan 1949, *Miranda, F. 5176* (MEXU); Tuxtla-Gutiérrez, Cerca de la laguna, camino a Montecristo, unos 27 km al norte de Tuxtla, 1100 m, 17 Nov 1949, *Miranda, F. 5694* (MEXU,US); Tuxtla-Gutiérrez, 536 m, 11 Feb 1988, *Palacios E., E. 310* (MEXU,XAL); Tuxtla-Gutiérrez, Jardín Botánico, F. Miranda, 536 m, 11 Feb 1988, *Palacios E., E. 536* (MEXU); **Oaxaca:** Pochutla, Cafetal concordia, near Pochutla, 1000 m, 18 Aug 1918, *Popenoe, W. 836* (US).

47. *P. tartarea* Lundell, *Wrightia* 4 (2): 87. Type: Mexico: Chiapas, Sierra Madre, Saxchanal, 2700 m, 1 Jul 1941, *Matuda, E. 4300* (holotype, LL!; isotypes, DS!, F!, GH!, LL!, MEXU!, MO!, NY!, US!).

This species can be distinguished by the relatively thick and fissured shoots, reddish at the newest parts; the leaves coriaceous and lustrous above, generally drying in a light brown tone below, elliptic-obovate to elliptic-oblong, with lateral veins barely conspicuous and 2 laminar glands placed on the first pair of secondary veins. The floriferous shoots are sub-flexuous and have flowers with deep campanulate hypanthium. A complete description is available in the Flora Mesoamericana treatment.

**Distribution.** Distributed in some scattered locations of high elevation humid forests (pine-oak forests) in the Mexican states of Chiapas and Oaxaca.

**Elevation range.** 1800 – 2786 m.

**Material examined.** (12) **MEXICO. Chiapas:** Jaltenango, Reserva El triunfo, 1800 m, 17 May 1982, *Calzada, J.I. 9078* (XAL); Motozintla, Boqueron, 2540 m, 3 May 1945, *Matuda, E. 5377* (MEXU,TEX); Niquivil, 2786 m, 15 May 1945, *Matuda, E. 5491* (F,MEXU,TEX); **Oaxaca:** 7 km de la desviacion de San Juan Piñas. Carretera Coicoyan de las flores - Santiago Juxtlahuaca, 2125 m, 24 Nov 1994, *Calzada, J.I. 19519* (MEXU); Mpio de San Martin Peras. 1 km de la desviación del poblado de Escopeta. Km 24 carretera de San Sebastian Teconoxtlahuaca, 2750 m, 10 Nov 1994, *Calzada, J.I. 19586* (MEXU,NY); Juxtlahuaca, Mpio. San Martín Peras. 2 km de la desviación al poblado de Escopeta, km 24 carretera San Sebastián Tecomoxtlahuaca, 2600 m, 16 Feb 1995, *Calzada, J.I. 19730* (MEXU,MO); Mpio. Santiago Juxtlahuaca. 8 km del poblado San Juan Piñas, carretera a Santiago Juxtlahuaca, 2210 m, 14 Mar 1996, *Calzada, J.I. 20847* (MEXU,MO,TEX); Zimatlan, San Pedro El alto, 2540 m, 18 Sep 1998, *Guizar-Nolazco, E. 4212* (MEXU,XAL); Xianaguilla, above, 2510 m, 24 Oct 1995, *Hinton, J. 26430* (HINTON,TEX); Mpio Zimatlan. Paraje el campanario. Comunidad San Pedro del Alto, 2400 m, 23 Nov 1998, *Miranda, A.G. 700* (MEXU,XAL); 13 km al oeste de Totontepec, 2400 m, 1 Apr 1986, *Torres C., R. 8467* (MEXU).



48. *P. "terraba-sierpensis"* Pérez-Zab., sp. nov. in prep.

This new species can be recognized by the suberose bark on older shoots, the higher number of secondary veins and shorter petioles compared with other small leafed species of Costa Rica and Panamá. Additionally, it has noticeably short floriferous shoots, flowers with pedicels relatively long and sepals with lacinate margin. A complete description is available in the Flora Mesoamericana treatment.

**Distribution.** Mid to high elevation wet forest of the Terraba-Sierpe basin, located in the Pacific slope of the Cordillera de Talamanca, southwestern Costa Rica.

**Elevation range.** 1940 – 2800 m.

**Material examined.** (7) **COSTA RICA. Puntarenas:** Buenos Aires, Cuenca Térraba-Sierpe. Estación Tres Colinas, 1940 m, 9 Sep 1996, *Alfaro, E. 723* (F, MO, NY); Coto Brus, Zona Protectora Las Tablas, Cuenca Térraba-Sierpe, Sendero a Cerro Echandi, 2500 m, 14 Aug 1997, *Alfaro, E. 1368* (MO); Cordillera de Talamanca, slopes between Cerro Echandi and Cerro Burú, 2600 m, 24 Aug 1983, *Davidse, G. 24019* (MO); Z.P. Las Tablas. Cuenca Terraba-Sierpe. Sendero a Cerro Echandi, 2230 m, 19 Nov 1997, *Gamboa R., B.; B. 1962* (F,MO); Buenos Aires, P.N. La Amistad. Cuenca Térraba-Sierpe, Tres Colinas, Cerro Kutsí, 2100 m, 21 Nov 2000, *González, L. 1185* (INB,MO); **San José:** Perez Zeledon, Parque Nacional Chirripó, Cuenca Térraba-Sierpe, Llano Bonito, 2300 m, 5 May 1997, *Aguilar, R. 5077* (MO); Cuenca Térraba-Sierpe, Estación Cuericí, Sendero El Carbón, 5 km east Villa Mills, 2800 m, 1 Dec 1996, *Gamboa R., B. 932* (MO).

49. *P. tetradenia* Koehne, Bot. Jahrb. Syst. 52: 309 (1915). Type: Mexico: Veracruz, Sierra Madre zwischen Misantla und Naolinco, , 2000 m, Aug 1912, *Purpus, C.A. 6181* (lectotype UC-14997! (designated by Pérez-Zab, 2015).

Compared with most of the Mexican species, this species can be easily recognized by the leaves relatively large and obovate, with base acute or obtuse and conspicuously decurrent, 4 laminar glands, and linguiform to falcate stipules longer than 7 mm. The flowers have pedicels relatively long and slender, and the fruits are globose or transversally ellipsoid wider than 15 mm. A complete description can be found in the Flora Mesoamericana treatment.

**Distribution.** Distributed in mostly humid mid-elevation forests in the eastern Sierra Madre and Septentrional Sierra Madre of Chiapas in Mexico and oak-pine type forests of the central volcanic belt mountains and southern Sierra Madre Oriental facing the gulf in the states of Hidalgo, Oaxaca and Veracruz.

**Elevation range.** 1050 – 2400 m.

**Local names.** Capulín de ardilla, zapotillo (Mexico).

**Material examined.** (42) **MEXICO. Chiapas:** Rayón, Near Puerto del Viento, 9 miles NW of Pueblo Nuevo Solistahuacán along road to Tapiula, 1850 m, 20 Aug 1965, *Breedlove, D.E. 11976* (DS,F,NY,US); Steep slope in the Selva Negra 10 km above Rayón Mezcalapa along road to Jitotol, 1700 m, 27 Jan 1973, *Breedlove, D.E. 32663* (DS,MEXU,MO); Angel Albino Corzo, Reserva de la Biosfera El Triunfo, Sendero Palo Gordo, 1800 m, 10 Nov 2004, *Martínez Meléndez, N. 511* (MO); Siltepec, Letrero, near Siltepec, 2000 m, 6 Jul 1941, *Matuda, E. 4337* (DS,F,GH,MEXU,MO,NY); Tenejapa, La Cueva Yashanal, 1700 m, 15 Mar 1984, *Méndez, A. 7400* (ASU,MEXU); Solistahuacan, Selva Negra, al NO de Pueblo Nuevo, (aldelante de Rincón Chamula), 1800 m, 30 Dec 1959, *Miranda, F. 9186* (MEXU,US); **Hidalgo:** Along highway 105 between Pachuca and Tampico, along road to San Cristóbal which leaves main highway 100.8 miles NE of Pachuca, vicinity of turn off, 1.5 km from San Cristóbal, 10.5 miles S of San, 1550 m, 28 Feb 1987, *Croat, T. 65890* (MO); **Oaxaca:** 29 km al NE de Teotitlan del Camino, camino a Huautla, 1800 m, 18 Jul 1982, *Cedillo T.; Refugio 1639* (MO); Teotitlan, [Mun. San Jerónimo Tecoaatl]. Along road between Teotitlán del Camino and Huatla de Jiménez, 35 mi E of Teotitlán, 4 mi E of San Jerónimo, 1650 m, 22 Feb 1979, *Croat, T. 48251* (MO); Mixe, 4 km sobre la terracería Totontepec-Villa Alta, 2360 m, 18 Jan 1986, *García Mendoza, A. 2030* (MEXU,MO); Huautla de Jimenez, Aprox 1.8 km del monumento a los mártires del 3 de Junio por la vereda a Santa Cruz, 1571 m, 25 Feb 2002, *Munn-Estrada, X. 2001* (TEX); San Jeronimo Tecoaatl, Plan de Guadalupe, 2 km del plan

pro la terracería a San Martín Zoquiapan, 2204 m, 26 Feb 2002, *Munn-Estrada, X. 2032* (XAL); Teotitlan, Puerto de la Soledad, carr. a Huautla de Jiménez, 2200 m, 16 Sep 1977, *Sousa S., M. 8116* (CAS,DES,MO,UC); Mpio. Teotitlán, Los Duraznos 9 km al SO de San Jerónimo Tecuatl, carr. a Teotitlán, 2000 m, 13 Apr 1984, *Tenorio L., P. 5846* (MO); Villa Alta, Loc. a 6 km al N. del entronque Mixisistlán-Totontepec, hacia San Andrés Yaa, 2400 m, 19 May 1982, *Torres C., R. 485* (MO); Metepec, 2150 m, 8 Apr 1984, *Torres C., R. 4986* (NY); Teotitlan, Loc. 30 km al N.E. de Teotitlán del camino, carr. a Huautla de Jiménez, 2140 m, May 1984, *Torres C., R. 5014* (MO,NY); **Veracruz:** San Andrés Tuxtla, Cráter del Volcán San Martín Tuxtla, 1550 m, 15 Feb 1972, *Beaman, J.H. 5714* (BRIT,XAL); Pajapán, Volcán San Martín, Pajapan, 1600 m, 29 Sep 1971, *Calzada, J.I. 542* (GH,NY,P,XAL,XAL); Yecuatla, Ranchería Loma de Santa Rita, camino Chiconquiaco-Misantla, 1360 m, 4 Apr 1978, *Calzada, J.I. 4319* (MEXU,NY,XAL); Banderilla, Brecha de la Martinica, 1480 m, 1 Mar 1978, *Castillo C., G. 236* (MO,XAL); 1300 m, 8 Apr 1981, *Castillo C., G. 1426* (XAL); Yecuatla, Santa Rita, Sierra de Chiconquiaco, 1540 m, 26 May 1967, *Gómez-Pompa, A. 330* (GH,MEXU,UC,XAL,XAL); camino a Misantla, Sierra de Chiconquiaco, 1590 m, 3 May 1963, *Gómez-Pompa, A. 896* (GH,XAL); ibidem, 1450 m, 18 Nov 1963, *Gómez-Pompa, A. 1136* (GH,XAL); Chiconquiaco, Barranca del Maíz, 1100 m, 9 Mar 1988, *Gutiérrez B., C. 3067* (MEXU,XAL); Tepeplan, ND, 1850 m, 17 Jan 1989, *Gutiérrez B., C. 3465* (XAL); San Andrés Tuxtla, Volcán San Martín Tuxtla, 1050 m, 30 Mar 1961, *INIF 85* (XAL); Banderilla, Rancho La Mesa, 1450 m, 4 Mar 1978, *Marquez R., W. 998* (F,XAL); Cerro de Chocamán, cerca de Chocamán, 1730 m, 10 Oct 1984, *Mejía-Saulés, M.T. 1253* (XAL); Xico, Barranca El Caracol, 2200 m, 20 Apr 1983, *Narave F., H. 440* (MEXU,XAL); Coscomatepec, 1500 m, 2 Feb 1984, *Nee, M. 29356* (F,MO,NY,UC,XAL); Misantla, Sierra Madre near Misantla, 1410 m, Aug 1912, *Purpus, C.A. 6159* (GH,MO,NY,US,XAL); Mariano Escobedo, Chicola, al NW de Orizaba, 1390 m, 18 Feb 1967, *Rosas R., M. 180* (CAS,MO,P,XAL); Huiloapan, Cerro San Cristóbal, 5 km al SW de Orizaba, 1600 m, 15 Dec 1959, *Rzedowski, J. 12190* (XAL); San Andrés Tuxtla, faldas del Volcán San Martín Tuxtla, 1380 m, 20 Aug 2005, *Velasco-Sinaca, E. 766* (NY); Chocamán, 1350 m, 22 Apr 1976, *Velázquez L.; Cuahutémoc 189* (MEXU,NY,XAL); Atzalán, La Florida, 1700 m, 22 Jan 1970, *Ventura A., F. 369* (DS,US); Tlacolulan, Zaragoza, 1600 m, 17 Oct 1973, *Ventura A., F. 9140* (MO,XAL); Naolinco, 1450 m, 24 Apr 1976, *Ventura A., F. 12686* (MEXU,MO,XAL); Altotonga, Canteral, 1900 m, 1 Jun 1981, *Ventura A., F. 18531* (MO,XAL).

50. *P. tuberculata* Koehne, Bot. Jahrb. Syst. 52: 308 (1915). Type: Mexico: Oaxaca, Monte Pelado, 2450 m, Feb 1840, *Galeotti, H. 3121* (lectotype, G-356406 (designated by Pérez-Zabala (2015)); isolectotypes, G!(2), US!, P!).

It can be distinguished from similar species (e.g., *P. brachybotrya*) by the stems with very prominent lenticels, the leaves relatively rigid and coriaceous, with glands absent, base asymmetrical, venation pattern festooned brochidodromous with secondaries and lower rank veins very conspicuous below. Also, the floriferous shoots are relatively short, erect, with flowers briefly pedicellated. Remarkably, this is the only Neotropical species with total absence of leaf glands. A complete description is available in the Flora Mesoamericana treatment.

**Distribution.** Montane (high elevation) humid forests (mesophyll type and Pine-Oak type) of central Oaxaca (Mexico) on limestone derived soils.

**Elevation range.** 2240 – 3000 m.

**Material examined.** (19) **MEXICO. Chiapas:** Tenejapa, Evergreen Cloud Forest near Colonia Ach'lum, 2700 m, 10 Feb 1981, *Breedlove, D.E. 49754* (CAS,MEXU); Rancho Banabil, 2400 m, 20 Jul 1984, *Méndez, A. 7767* (MEXU); **Oaxaca:** Cerro de humo, Sierra Juarez, 3000 m, 2 Mar 1945, *Alexander, E.J. 812* (NY); Municipio de Comaltepec. Immediately to the right of Hwy. 175, just beyond first major switchback on descent from Mirador below Cerro Humo Chico, in quebrada of Río Cerro Pelón, 2740 m, 1 Nov 1993, *Boyle, B. 2516* (MEXU,MO); ibidem, 2740 m, 1 Nov 1993, *Boyle, B. 2517* (MO); Municipio de Comaltepec, gulf slope of Cerro Humo Chico. Just off of Hwy. 175, on gravel logging road running east to power lines and "Las Cascadas" waterfalls, 2430 m, 3 Nov 1993, *Boyle, B. 2520* (MEXU,MO); ibidem, 2800 m, 10 Nov 1993, *Boyle, B. 2525* (MO); Ixtlan, a 500 m. al N. de la desviación a San Pedro Yolox, 2700 m, 1 Jul 1982, *Cedillo T.; Refugio 1580* (CAS,MO); Tuxtepec, Mpio. San Felipe Usila. Parteaguas S de la cuenca del Río Perfume. 10.8 km en línea recta al S de Santa Cruz Tepetotutla, 2660 m, 12 Jul 1994, *Gallardo H.; C. 1143* (MEXU,MO); Mpio. San Felipe Usila. Parteaguas S de la cuenca del Río Perfume. 10.5 km en línea recta al S de Santa Cruz Tepetotutla, 2560 m, 23 Mar 1995, *Gallardo H.; C. 1331* (MEXU,MO); Cerro

Zempoaltepetl, Persea cloud forest at patio Arena, 5 km east of summit, 2800 m, 8 Aug 1950, *Hallberg, B. 823* (US); Ixtlan, 2500 m, 7 Apr 1981, *Lorence, D. 3234* (F); San Pablo Macuiltianguis, parte alta de la brecha 290, 2950 m, 20 Mar 1980, *Pérez-Portilla, E. B36* (MEXU,XAL); Tuxtepec, Mpio. San Felipe Usila, parteaguas S de la cuenca del Río Perfume. 10.8 km en línea recta al S de Santa Cruz Tepetotutla, 2650 m, 20 Dec 1993, *Rincón G., A. 208* (MO); Mpio. San Felipe Usila. Cuenca del Río Perfume (ladera O). 8.1 km en línea recta al S de Santa Cruz Tepetotutla, 2480 m, 26 Feb 1994, *Rincón G., A. 270* (MO); ibídem, 7.6 km en línea recta al S de Santa Cruz Tepetotutla, 2240 m, 16 May 1994, *Rincón G., A. 449* (MO); ibídem, 8 km en línea recta al S de Santa Cruz Tepetotutla, 2500 m, 14 Sep 1994, *Rincón G., A. 469* (MO); Mpio. San Felipe Usila, parteaguas S de la cuenca del Río Perfume. 10.8 km en línea recta al S (160 degree) de Santa Cruz Tepetotutla, 2660 m, 15 Sep 2004, *Rincón G., A. 3073* (MEXU,MO).

51. *P. "tuxtensis"* Pérez-Zab., sp. nov. in prep.

Compared with its most similar species, *P. myrtifolia*, this new species can be recognized by the leaves turning pale tin when dry, with relatively few secondary veins considerably ascending when arise from the midrib and minor veins obscure. The flowers have petals that have a distinctive trilobed tongue-like extension at the apex and anthers suborbicular with the connective relatively short. The fruits are relatively large and apiculate. A complete description is provided in the Flora Mesoamericana treatment.

**Distribution.** Endemic to lowlands and foothills (up to 1200 m elevation) of the southern part of the Gulf of Mexico in the states of Veracruz and Chiapas. The habitat corresponds to humid tropical forests with a short and distinct dry season during winter months.

**Elevation range.** 300 – 1200 m.

**Material examined.** (10) **MEXICO. Chiapas:** Yajalón, Rancho Carmen, 850 m, 6 Feb 1984, *Méndez, A. 7201* (MEXU,MO); Rancho Carmen, 900 m, 25 Mar 1984, *Méndez, A. 7475* (CAS,MEXU); **Veracruz:** San Andrés Tuxtla, Volcán San Martín Tuxtla, 700 m, 10 Nov 1974, *Calzada, J.I. 1660* (XAL); Hueyapan de Ocampo, Santa Rosa

Cintepec, camino Catemaco-Coatzacoalcos, 550 m, 16 Mar 1985, *Cedillo T.*; *R. 3100* (XAL); Vega de Alatorre, 950 m, Mar 1981, *Cházaro, M. 1458* (UC,XAL); San Andrés Tuxtla, Volcán San Martín, ladera S, 1200 m, 30 Mar 1956, *Miranda, F. 8367* (XAL); San Andrés Tuxtla, Lote 71. Estación de Biología Tropical Los Tuxtlas, 450 m, 12 Dec 1985, *Sinaca C., S. 358* (MEXU, MO, XAL); ibidem, 300 m, 31 Mar 1986, *Sinaca C., S. 513* (MEXU,MO,XAL); 1030 m, 15 Jun 2005, *Velasco-Sinaca, E. 685* (MEXU,NY); Teocelo, 1000 m, 15 Nov 1971, *Ventura A., F. 4498* (CAS,UMO).

52. *P. "vulcanica"* Pérez-Zab., sp. nov. in prep.

A new taxon differentiable because it has relatively thick new vegetative shoots, leaves erect and coriaceous, with fewer secondary veins compared with other species in Guatemala, leaf base cuneate to acute, margin revolute and cartilaginous, two sub-basal glands and relatively visible and persistent stipules. The floriferous shoots are erect, the anthers are larger than any other high elevation Mesoamerican species and the fruits are ovate and apiculate. A complete description can be found in the Flora Mesoamericana treatment.

**Distribution.** Distributed in high elevation humid cloud forest in the slopes of the volcanoes Acatenango and Atitlán in southern Guatemala.

**Elevation range.** 2400 – 3180 m.

**Material examined.** (4) GUATEMALA. **Chimaltenango:** Faldas del Volcan Acatenango, 2400 m, 27 Nov 1993, *Castillo Mont, J.J.*; *Juan 2071* (F,MO,NY); Acatenango, Vegetación del volcán de Acatenango, Volcán de Fuego, 3180 m, 13 Feb 1993, *Luarca, R. 93.2670* (MO); ibidem, 2700 m, 11 Sep 1993, *Véliz, M. 93.3299* (MO); **Sololá:** Volcán Atitlán, south facing slopes, 2500 m, 11 Jun 1942, *Steyermark, J.A. 47427* (F,US).

**New species identified in Mesoamerica (after the reported in Pérez-Zabala (2015)) and in the Caribbean. (9 spp.)**

53. *P.* sp. nov. (“*aff myrtifolia-Belize*”)

This new species can be distinguished by the dark bark of the twigs with dense minute whitish lenticels, the leaves elliptic to elliptic-lanceolate, sub-coriaceous, 6.5-10 x 2.8-4 cm, with petioles 5-8 x 1-1.2 mm, base acute to obtuse and shortly decurrent, apex attenuate, venation pattern brochidodromous, secondary veins 7-9, progressively ascending, emerging at 60-70 degrees, the lowermost pair frequently at 30-40 degrees, slightly prominent below and plain above, intersecondaries around half as long as secondaries and parallel to them, tertiaries sinuous percurrent but little conspicuous, and 4 to many glands with the lower pair placed at 2-5 mm from the base and 0.5-2 mm from the margin, the second pair either on or above the first pair of secondary veins at 7-15 mm from the base and 1-6 mm from the margin and frequently several extra at 2-4 mm from the margin. The floriferous shoots are subflexuous, 2.5-3 cm long; the flowers have flexuous pedicels, 3-4 mm long and 0.2-0.3 mm thick, hypanthium campanulate 2-2.5 mm wide and anthers 0.4-0.5 mm long. The fruits are slightly prolate, apiculate, 13-15 x 11-13 mm, with the ventral suture prominent.

Similar to *P. myrtifolia*, but that species has a white velamen on the bark, more sparse lenticels, leaves with rounded base and shortly acuminate apex, relatively flat secondary veins below, floral pedicels generally longer and fruit globose and much smaller.

**Distribution.** Distributed in mid elevations from Belize Maya mountains (Belize’s highest elevation) to the Isthmus of Tehuantepec in the Mexican states of Oaxaca and Veracruz.

**Elevation range.** 625 – 1200 m.

**Material examined.** (11) **BELIZE.** Cayo: Ceibo Grande to Main Divide track, towards Main Divide, 960 m, 1 Mar 2000, *Cafferty, S. 159* (BM,BRH,MEXU,MO,PMA); **Toledo:** In forest summit, Doyle's Delight, highest point in Belize. Southern Maya Mountains, 1140 m, 9 Dec 1993, *Allen, B. 15298* (MEXU,MO,US); along divide of Maya Mountains, Bladen Nature Reserve, 950 m, 13 May 1996, *Holst, B. 5285* (MO). **MEXICO. Oaxaca:** Santa Maria Guienagati, a un 1 km de Peña Blanca, 780 m, 10 Feb 2007, *Velasco-Gutierrez, K. 1756* (MEXU); **Veracruz:** Mecayapan, Volcán San Martín Pajapan, cima, S del Ejido La Valentina, 1150 m, 2 May 1985, *Calzada, J.I. 10960* (MEXU,XAL); San Andrés Tuxtla, 1035 m, 19 Feb 2011, *Campos-Villanueva, A. 7220* (MEXU); Mecayapan, Volcán San Martín Pajapan, ladera N, 625 m, 13 Jul 1994, *Castillo-Campos, G. 12586* (XAL); Volcán San Martín Pajapan, cima, S del Ejido La Valentina, 1000 m, 7 Mar 1995, *Castillo-Campos, G. 13378* (XAL); Catemaco, La Azufrera, 1000 m, 21 Feb 1974, *Ponce C., F. 158* (MEXU,XAL); Santiago Tuxtla, camino al cráter volcán Santa Marta, 1200 m, 20 Oct 1979, *Ramírez R., F. 433* (XAL).

54. *P.* sp. nov. (“*aff. lundelliana-Motozintla*”)

This new taxon can be distinguished because the leaves are elliptic-lanceolate coriaceous, 5-7.3 x 1.8-2.8 cm, lustrous above, slightly asymmetric and falcate, with petiole 5-9 x 0.7-0.9 mm, flexuous and slightly swollen at the base, base acute to cuneate and shortly decurrent, apex narrowly attenuate, venation pattern weak brochidodromous, secondaries emerging at 45-60 degrees from the midrib, relatively straight and only flexing up next to the margin, intersecondaries inconspicuous, tertiaries reticulate, and 2 glands placed on the second pair of secondary veins at 6-12 mm from the base and 1.5-4 mm from the midrib. The floriferous shoots are erect, 1.5-2 mm long; the flowers have pedicels 3.5-4 mm long, hypanthium campanulate, 1.8-2.3 mm wide, and anthers 0.7-0.8 mm long. Fruits ovate and applanate on the ventral side, 9-10 x 7-8 mm.

The more similar species is *P. lundelliana* which, however, has larger sub-coriaceous leaves with four glands, longer racemes with flowers subtended by longer pedicels and with wider hypanthium.



**Distribution.** Only known from high elevation deciduous Pine-Oak type forests in the southwestern of the municipality of Motozintla in the state of Chiapas, Mexico.

**Elevation range.** 2000 – 2100 m.

**Material examined.** (2) MEXICO. Chiapas: Motozintla, Road to El porvenir and Siltepec, 2100 m, 23 Nov 1981, *Breedlove, D.E. 55753* (CAS,NY); Terraceria a 11 km. al W. de Buenos Aires, 2000 m, 2 Apr 1983, *Méndez, A. 5779* (MEXU,MEXU,MO).

55. *P.* sp. nov. (“*aff. myrtifolia Contreras-Guatemala*”)

This new taxon can be distinguished by the leaves elliptic coriaceous, 6-9 x 2.2-3.5 cm, lustrous above, with petioles 8-16 x 0.8-1.2 mm, base acute and slightly asymmetric, apex acute to acuminate, venation pattern brochidodromous, secondary and tertiary veins plain on both sides and almost inconspicuous below, and only 2 glands placed asymmetrically at 3-10 mm from the base and 0-2 mm from the midrib. The fruiting racemes are erect, 3.5-5 cm long; the fruits are globose and 8-9 mm wide. Specimens with flowers are unknown so far.

This species can be considered close to *P. pleuradenia* which however has bigger subcoriaceous leaves with sub-basal glands, arcuate conspicuous secondary veins and oblate bigger fruits. Also, it is close to *P. myrtifolia* (especially those specimens formerly identified under *P. tikalana* which occur in the same locality), however that taxon has wider leaves, elliptic-oblong, sub-coriaceous, with base obtuse to rounded and symmetric, more conspicuous veins, 4 glands and subflexuous fruiting racemes.

**Distribution.** Only known from lowland humid forests in the southern Yucatan peninsula (eastern Guatemala) in an area with limestone derived soils.

**Elevation range.** 300 – 400 m.

**Material examined.** (3) GUATEMALA. El Petén: Pusila, 5 km from la cumbre, in high forest on top of hill, east of Pusila River, 2 km s, 350 m, 25 Aug 1969, *Contreras, E. 9023* (NY, TEX, US); La Cumbre, Pusila, 5 km from La Cumbre, E of Pusila River, 2 km south, 400 m, 25 Aug 1969, *Contreras, E. 9028* (MEXU, NY, TEX, US).

56. *P.* sp. nov. (“*aff. pleuradenia-smallLeaves*”)

This new species can be distinguished by the leaves elliptic to elliptic-oblong, subcoriaceous, 4.5-8 x 2-3.3 cm, slightly lustrous on both sides, with petioles 7-12 x 0.8-1 mm, base acute to obtuse and decurrent until the base of the petiole, apex shortly acuminate, venation pattern brochidodromous festooned but little conspicuous, intersecondaries perpendicular to the midrib, tertiaries reticulate and almost inconspicuous, and 2 glands (some leaves with 0) placed between the first and second pair of secondary veins at 3-7 mm from the base and 0.5-3 mm from the midrib. The floriferous shoots are erect, 1.5-3 cm long; the flowers have pedicels 2-4 mm long, hypanthium is turbinate, 1.8-2.5 mm wide and anthers 0.2-0.3 mm long. The fruit is globose, 9-10 mm wide.

This new species can be easily confused with *P. myrtifolia*, but that taxon has chartaceous leaves with 4 glands, more flexuous and longer racemes and flowers with longer pedicels and wider hypanthium. Another Caribbean taxon with some similarities, *P. pleuradenia* has larger leaves and flexuous longer racemes. The identification *P. myrtifolia* has been applied in general to all Caribbean specimens with leaves relatively small, elliptic, lustrous, and plain at the surface; but, as a widely distributed species in the Antilles and parts of Mesoamerica, it is morphologically diverse. The circumscription of this new insular species account for some of those deviating specimens (principally from Puerto Rico) that have been traditionally assigned to *P. myrtifolia*, coinciding with suggestions that have been around since early publications (Schlechtendal, 1839) about the taxonomic heterogeneity of the Caribbean material. Future more detailed

studies with supplementary evidence (e.g., DNA based population structure studies) of the Antillean *Prunus* species, could help to clarify the complexity seen in the herbaria.

**Distribution.** Distributed in midelevation dry shrublands and forests in the Hispaniola and Puerto Rico Islands.

**Elevation range.** 450 – 1000 m.

**Local names.** membrillo (Dominican Republic).

**Material examined.** (7) **DOMINICAN REPUBLIC.** 3 Jun 1941, *Schiffino, J.* 86 (MO); Peravia, Arroyo Parra, La Vareda, road to Los Anones, 950 m, 6 Apr 1985, *Gentry, A.* 50543 (MO, TEX); **HAITI. L'Artibonite:** Ennery, 600 m, 4 Feb 1926, *Leonard, E.C.* 9496 (UC, US); **PUERTO RICO.** Adjuntas, Bo Limani, 1000 m, 5 Feb 1998, *Acevedo-Rodriguez, P.* 10211 (US); Mun. de Sabana Grande: Reserva Forestal Maricao; along Hwy 120, 4.3-4.5 mi. S of junction with Hwy 105; 5.5 mi. S. of Maricao, 823 m, 30 Nov 1981, *Hansen, B.* 9505(MO); Maricao, 450 m, 7 Dec 1884, *Sintenis, P.* 252 (GH, US); Monte del Estado, 800 m, Jun 1960, *Woodbury, R.* (US).

57. *P.* sp. nov. ("*bocasdelToro-Panama*")

This new taxon is characterized by the leaves elliptic-ovate, chartaceous, 14-16.5 x 6.5-9 cm, slightly lustrous on both sides, with petioles 6-9 x 1-1.2 mm, base rounded and decurrent down to the middle of the petiole, apex shortly acuminate, venation pattern brochidodromous festooned, secondary veins (9-11) arcuate and emerging at 70-80 degrees from the midrib, tertiaries sinuous percurrent, lateral veins prominent below and deeply impressed above, and multiple glands, the lower two placed at 2-3 and next to the midrib, the next pair on the second pair of secondary veins at 6-8 mm from the base and 4-5 mm from the midrib and supplementary glands (up to 10 pairs) located along the outer quarter of the blade outside of

the anastomosing main secondaries and distanced 10-15 among them and at 3-7 mm from the margin. Only vegetative structures are known so far.

Some new taxa from upper elevations in Mexico, Bolivia and Colombia have multiple submarginal glands, but they have either smaller or larger leaves, with plainer venation in general and relatively opaque surfaces. Additionally, this species is remarkable, because it is distributed in lowlands near to the coast like only few species in the American tropics.

**Distribution.** Only known from a single collection in lowland moist forests of the Atlantic side of Panamá close to Chiriquí bay.

**Elevation range.** 55 m.

**Local names.** bastard cacique (Panama).

**Material examined.** (1) PANAMA. **Bocas de Toro:** Almirante, Kankintoe, 55 m, May 2013, *Proctor, G.R.* 506 (F,US).

58. *P.* sp. nov. ("*Lot-Veracruz-obscureVeins*")

This remarkable new species can be distinguished by the rugose bark of the twigs with dense whitish protuberant lenticels, leaves elliptic-oblong to elliptic-obovate, coriaceous, 7.5-13 x 3.2-5.5 cm, opaque on both sides, with petiole 8-12 x 1-1.2 mm, base acute and shortly decurrent, apex shortly acuminate, venation pattern brochidodromous, secondary veins, 7-8, emerging at 45-60 degrees from the midrib and anastomosing at 3-4 mm from the margin, intersecondaries parallel to secondaries and half to 3/4 their length, tertiaries irregular reticulate, and 2 rounded glands (ca. 1 mm diam.) placed on the first pair of secondary veins at 3-10 mm from the base and 0.5-4 mm from the midrib. The floriferous shoots are sub-

erect, 5-6 cm long, the flowers with pedicels 3.5-5 mm long, hypanthium campanulate, 2-3 mm wide and anthers 0.8-1 mm long. The fruits are subglobose, 11-13 x 11-14 mm.

The most similar species in its area of distribution is *P. pleuradenia*, which has leaves lustrous above, with weak brochidodromous venation, more secondary veins, glands generally closer to the base and more flexuous racemes with slightly smaller flowers holding smaller anthers.

**Distribution.** Distributed in lower mid elevation forests located near to coast in two disjunct places of the Caribbean basin: northern Venezuela in the isolated coastal mountain Sierra de San Luis in the state of Falcón and eastern Mexico in the eastern slope of the eastern Sierra Madre in the state of Veracruz.

**Elevation range.** 770 – 1400 m.

**Material examined.** (6) **MEXICO. Veracruz:** Alto Lucero de Gutierrez Barri, Mata Verde, camino Rancho Nuevo-Tierra Blanca, 1200 m, 9 Apr 1981, *Castillo-Campos, G. 1477* (MEXU, XAL); Saliendo de Coscomatepec Rumbo a Cordoba, 900 m, 20 Dec 1970, *Lot H., A. 1198* (F, GH, MO, XAL). **VENEZUELA. Falcón:** 2-3 km NW of town Carimagua, 1200 m, 28 Mar 1984, *Plowman, T. 13394* (F).

59. *P.* sp. nov. (“*cerro Casma-CostaRica*”)

This new taxon is part of the group of new species with small leaves from mid and high lands of Costa Rica and Panamá. It can be distinguished by the bark densely covered with pustulate lenticels amber colored, the leaves elliptic-oblong, sub-coriaceous, 5-7 x 2.5-3.6 cm, slightly lustrous above, with basally expanded and flexuous petioles 4-6 x 0.6-0.8 mm, base rounded to truncate, apex acute, venation pattern brochidodromous festooned, secondaries emerging at 65-80 degrees from the midrib, intersecondaries irregularly present, tertiaries irregular reticulate, lateral veins plain below and impressed above and 4 glands placed submarginally at 1-3 and 6-10 mm from the base respectively and 0.5-2 mm from the margin. The

fruiting racemes are flexuous, 3-6.5 cm long; the fruits are rounded, 9-10 mm wide, subtended by pedicels 4-6 mm long.

It is close to *P. fortunensis* which is usually distributed at lower elevations and has generally smaller and thinner leaves with only two glands and smaller fruits.

**Distribution.** Distributed in mid to high elevation forests of the eastern Talamanca mountain massif between Costa Rica and Panamá. One of the localities, Cerro Casma, is an open scrubland with Sphagnum, shrubs and treelets of several groups including *Prunus* (Gómez-Laurito, 1995).

**Elevation range.** 1735 – 2650 m.

**Material examined.** (3) **COSTA RICA. Limón:** Talamanca, N flank of Cerro Casma, along Ujarrás- San José Cabécar trail, Cordillera de Talamanca, 2250 m, 17 Mar 1993, *Grayum, M.H. 10325* (F, MO); Parque Internacional La Amistad, Cerros Tararias minor. Secondary peak of Cerros Tararia, 2650 m, 14 Feb 2012, *Santamaria Aguilar, D. 9193* (MO). **PANAMA. Bocas del Toro:** Caribbean slopes of Cerro Fábrega at foot of 'Falso Fábrega' in Palo Seco Reserve, second northernmost tributary (on map) of Culubre river: 'Falso Fábrega', 1735 m, 24 Mar 2005, *Monro, A. 4951* (BM, MO).

60. *P. sp. nov. ("dota-tilaran-CostaRica")*

This new species can be distinguished by the relatively small elliptic leaves, chartaceous, 5-7 x 2.5-3 cm, lustrous above with petioles 7-8 x 0.5-0.8 mm, obtuse base and narrowly acuminate apex, the margin revolute, venation pattern brochidodromous festooned, secondary veins emerging straight at 70-80 degrees from the midrib, and changing to 20-30 degrees after half its length, tertiaries irregular reticulate, lateral veins impressed above and plain below, and 4 glands placed below the second pair of veins, 4-5 and 8-9 mm from the base respectively and 1-2 mm from the margin. The floriferous shoots are flexuous, 2-3.5 cm

long, the axis 0.3-0.4 mm thick, the flowers have pedicels 2-2.8 mm, hypanthium campanulate 2-2.5 mm wide and anthers 0.5-0.6 mm long. The fruits are globose, ca 10 mm wide.

It could be considered close to *P. annularis* which however has bigger leaves with thicker petioles, racemes sub-erect longer and stouter, and flowers in general bigger. Among the new proposed taxa in Mesoamerica, the more similar species is "*P. nonnihilum*" but it has leaves with 4 bigger glands placed further up on the leaf blade, racemes with thicker axis, flowers more densely arranged and floral hypanthium with infundibuliform shape.

**Distribution.** Distributed in mid-elevation forests in the Atlantic slope of the Central mountain range of Costa Rica.

**Elevation range.** 900 - 1600m.

**Material examined.** (5) **COSTA RICA.** **Alajuela:** San Ramon, Reserva Biológica Monteverde, Cordillera de Tilarán, Valle del Río Peñas Blancas, Fila de Toro, Sendero Pipilacha y Campo Tres, 900 m, 21 Jan 1991, *Haber, W.A. 10623* (CR,MO); **Cartago:** Paraiso, Parque Nacional Tapantí, Macizo de La Muerte, cuenca del Reventazón, colecta sobre sendero a las torres, entrada en Sendero los Árboles Caídos y Las Pavas, 1350 m, 15 Mar 2000, *Acosta, L. 655* (INB,MO,NY); Parque Nacional Tapantí, Cuenca del Reventazón, Estación Tapantí, 1600 m, 10 Jan 1997, *Rodriguez, A. 1856* (INB,MO); Paraíso, P.N. Tapantí-Macizo de La Muerte. Cuenca del Reventazón, 1140 m, 5 Nov 2005, *Santamaria Aguilar, D. 3372* (MO); Parque Nacional Tapanti, 1400 m, 26 Sep 2002, *Wen, J. 6902* (US).

61. *P.* sp. nov. ("*central gland Savegre-CostaRica*")

This new species can be distinguished by the leaves obovate, subcoriaceous, 7-8.5 x 3.2-3.6 cm, opaque on both sides, with petioles 5-7 x 0.8-1 mm, secondary veins straight emerging at 65-70 degrees from the midrib, tertiaries inconspicuous, and 4-6 glands (ca. 0.5 mm diam.) placed below the third pair of

secondary veins at 0-4 mm from the midrib and distanced 3 to 20 mm from the base. Only two specimens in sterile condition are known so far.

This new species is close to *P. fortunensis* because the relatively small subcoriaceous leaves, but it has larger leaves with up to 6 glands placed around the midrib, and secondary and tertiary veins flat and less conspicuous. On the other hand, the relatively more widespread and common, *P. annularis*, has larger ovate leaves, and longer petioles. Finally, *P. "nonnihillum "*, a new proposed species found in a near area but at lower elevation, has elliptic leaves and only 2 glands around the second pair of secondary veins far from the midrib. Acevedo-Mairena (2001) reported three distinct species of *Prunus* for the Savegre river basin; the one cited as *P. fortunensis* corresponds to this new taxon.

**Distribution.** Only reported in high elevation forests of the Savegre basin on the Pacific slope of the Talamanca Mountains.

**Elevation range.** 2400 – 2419 m.

**Material examined.** (2) **COSTA RICA.** San José: Dota, Hills around Río Savegre, near Finca Zacatales, Quercus forest, 2400 m, 1 Aug 1991, *Gay, H. 1542* (MO); San Gerardo. Los Robles trail, transect Savegre, 2419 m, 19 Jun 2004, *Moran, R.C. 7086* (ASU).

**NORTHERN ANDES:** (35 taxa in total including shared with other areas)

62. *P. antioquiensis* Pérez-Zab., *Anales del Jardín Botánico de Madrid* 64(2): 178–181, f. 1, table 1. 2007. Type: Colombia: Antioquia, Medellín, Cerro del Padre Amaya, En carretera a la cumbre, 9.4 km. desde la carretera Medellín, Santa Fé de Antioquia, 2860 m, 22 May 1988, *Zarucchi, J.L.; Correa, H.; Quiroga G 6828* (holotype, HUA!; isotype, MO!).



This is an understory shrub or a small tree with linguiform falcate stipules, 2,5-3,5 x 1-1,2 mm, relatively small elliptic to rhomboid leaves (compared with most of the Andean species, but similar to some Costa Rican species), 4.5-9 x 2.5-3.7 cm, slightly bullate and opaque above, rugose below, with round base, acute apex, conspicuously revolute margin sometimes irregularly denticulate, brochidodromous festooned venation pattern, secondaries emerging at 60-80 degrees from the midrib and 4 laminar glands, the 2 lower basal and the upper pair placed on the second pair of secondary veins. The floriferous shoots are suberect, 6-8 cm long; the flowers have pedicels 2-4 x 0.3-0.4 mm, hypanthium 2.5-3 mm wide and anthers 0.5-0.6 mm long. The fruits are prolate, apiculate, 11-13 x 9-10 mm.

*P. antioquensis* could be confused with *P. stipulata* but the latter has larger oblong to obovate leaves and longer stipules. Also, with *P. falcata*, which has longer and erect floriferous shoots, larger flower and bigger fruits. Finally, another Colombian species with small leaves, *P. buxifolia*, has only two submarginal glands, deltoid stipules and relatively flat leaf surfaces.

**Distribution.** Formerly known only from the northwestern Colombian department of Antioquia, but after this extensive revision, other collections of this species were found in southwestern Colombia (Cauca department) and in the district of Huancabamba (Oxapampa, Dept. Pasco) in the central Andes of Peru.

**Elevation range.** 2000 - 3100m.

**Local names.** huesillo (Colombia).

**Material examined.** (27) COLOMBIA. **Antioquia:** Peque, Alto del Poal, Vereda Toldas. Finca de Solano Vera, 2500 m, 19 Sep 1995, *Benitez, D. 53* (COL,JAUM); Vereda Romeral, Alto de la Tumba, 2650 m, 15 Nov 1995, *Benitez, D. 383* (COL,JAUM); ibidem, 2650 m, 17 Nov 1995, *Benitez, D. 496* (COL,JAUM); Sonsón, Vereda Chaverras, Vertiente de la Quebrada "El Padre Sánchez", Ascenso al alto "La Paloma" (3200 m), colecciones en Cerro al NE de la Paloma, 2900 m, 18 Aug 1992, *Callejas, R. 10558* (HUA,MO,NY); Vertiente de la Quebrada "El Padre Sánchez", Ascenso al alto "La Paloma" (3200 m), 2470 m, 19 Aug 1992, *Callejas, R. 10667* (HUA,NY); ibidem,

Cerros al NE (2900 - 3000 m.), 2900 m, 10 Apr 1994, *Callejas, R. 11143* (HUA); Retiro, cerca al alto de San Luis, 2500 m, 21 Aug 1963, *Espinal, L.S. 1268* (COL,MEDEL); Yarumal, *Daniel, Hno.. 2480* (MEDEL). La Union, Vereda San Juan, 14 km al sudoeste del municipio de la Unión, en la carretera que conduce al municipio de Abejorral, 2600 m, 2 Sep 1999, *Penagos, J.C. 41* (MEDEL); Bello, Corregimiento de San Félix, Cerro las Baldias, 3000 m, 16 Sep 2006, *Pérez-Zabala, J.A. 2713* (MEDEL); Medellín, Cuchilla de las Baldias, Vereda San José de la Montaña, *Rodriguez, W. 492* (JAUM); Medellín, Cuchilla de las Baldias, Al lado de camino que conduce a la torre 12. Microcuenca la Iguaná, 2850 m, 29 Apr 1997, *Rodriguez, W. 605* (HUA,JAUM); Urrao, Carretera a Caicedo, 2500 m, 12 Jun 1991, *Sánchez, D. 1467* (MEDEL); La Union, Corregimiento Mesopotamia, Carretera La Unión- Sonsón, 32.5 km antes de Sonsón, 2300 m, 9 Nov 1988, *Zarucchi, J.L. 7282* (COL,HUA,MO,MO); **Cauca:** El Tambo, Parque Nacional Munchique, La Gallera, 2000 m, 15 Mar 1978, *Lobo, A. 2* (FMB); 2540 m, 13 Sep 1988, *Lozano, G. 5939* (COL); antiguo camino a Micay, Carretera a Santa Ana, km 8-9, 2975 m, 22 Jul 1993, *Lozano, G. 6651* (AFP,COL,FMB,PSO); Corregimiento La Romelia, carretera a Santana y camino de Micay, 2800 m, 30 Jan 1995, *Lozano, G. 6776* (COL); Camino al observatorio, 2500 m, 1 Feb 1995, *Lozano, G. 6798* (COL); **PERU. Pasco:** Oxapampa, Distrito Huancabamba. Parque Nacional Yanachaga-Chemillén, 3110 m, 5 Dec 2003, *Monteagudo, A. 6502* (AMAZ,DAV,HUT,MO,USM); ibidem, sector hito-San Daniel, 2500 m, 21 Aug 2005, *Monteagudo, A. 9575* (AMAZ,DAV,HUT,MO,MOL,USM); ibidem, parte alta del campamento Abra-Yanachaga, 2940 m, 2 Dec 2007, *Monteagudo, A. 16144* (AMAZ,DAV,HOXA,HUT,MO,USM); ibidem, 2910 m, 16 Feb 2004, *Vásquez, R. 29436* (AMAZ,DAV,HUT,MO,MOL,USM); ibidem, 2900 m, 20 Aug 2004, *Vásquez, R. 30439* (AMAZ,DAV,F,HUT,MO,USM).

63. *P. buxifolia* Koehne, Bot. Jahrb. Syst. 52: 312. 1915. Type: Colombia: Cordillera Oriental, Andes de Bogota, 2500 m, 1851-1857, *Triana, J.J. 4217* (sintypes, K!, MO!, NY!, P!, US!, W!).

*Prunus betancurii* R.E.Schultes & H.García-Barriga, Bot. Mus. Leaflet. Harvard Univ. 30 (2): 91. 1984. Type: Colombia: Cundinamarca, Chocontá, Represa del Sisga, 2800 m, 2 Dec 1982, *García-Barriga, H. 21366* (holotype, COL!; isotypes, COL!).

This species can be distinguished by the high density of lenticels in the terminal twigs, the relatively small oblong-elliptic coriaceous leaves (2.5-7 x 1.8-3.8 cm), lustrous above, with very short petiole (1-4 x 0.8-1.2 mm), base rounded to subcordate, venation pattern brochidodromous festooned, secondary veins (7-10) emerging relatively straight at 60-80 degrees from the midrib, slightly prominent below and impressed above, tertiary veins sinuous percurrent and perpendicular to the secondaries, relatively inconspicuous, and two glands (0.7-1.5 mm diam.) placed submarginally at 2- 3 mm from the base and 0.5-2 mm from the margin (and sometimes creating a slight marginal notch). The floriferous shoots are densiflorous, suberect and clustered towards the top of the reiterations, 4-7 cm long; the flowers have short pedicels (2-3.5 mm long), hypanthium campanulate, 2-3.2 mm wide, and anthers 0.8-1 mm long. The fruit is globose to slightly prolate, 10-14 x 10-12 mm.

Other similar species are *P. ovalis* from Peru, but it has smaller, rather orbiculate, more coriaceous and frequently denticulate leaves and shorter and more densiflorous racemes with smaller flowers. Similarly, *P. oblonga* also from Peru is a small shrub that has by far smaller oblong rigid leaves. On the other hand, the sympatric species, *P. opaca*, has bigger leaves with more conspicuous venation and two smaller basal glands. Some specimens from the surroundings of Bogota have deviating traits like glands placed on the second pair of veins midway between the margin and the midrib, ovate-lanceolate leaves, more conspicuous secondary veins and longer floral pedicels that could suggest hybridization with *P. opaca*; however, the material at hand is insufficient to be conclusive and further studies would be required.

**Distribution.** Distributed in highlands of the eastern branch of the Colombian Andes from de city of Bogota at the south to southern Santander department at the north.

**Elevation range.** 2485 – 3300 m.

**Local names.** amarillo, chucua, uche (Colombia).

**Material examined.** (36) **COLOMBIA.** Sine loco, *Mutis, J.C. 4049* (US); sine loco, *Mutis, J.C. 4054* (US); sine loco, *Mutis, J.C. 5030* (F,MA,US); **Bogotá DE:** Ciudad Universitaria, Jardines del Instituto de Ciencias Naturales, 2570 m, 7 Mar 1984, *García-Barriga, H. 21372* (COL,GH); ibidem, 3 Aug 2010, *Pérez-Zabala, J.A. COL-2010-7* (DAV); Región de Monserrate, el Granizo, 3150 m, 3 Aug 1980, *Zuluaga, S. 151* (COL); **Boyacá:** Samacá, Páramo antes de Samacá, 3200 m, 20 Sep 1954, *Alberto, Hno. 49* (MEDEL); Santa Rosa de Viterbo, Cordillera Oriental, cerros al norte de la población, hacia el páramo, 2900 m, 15 Jan 1981, *Camargo, L.A. 7808* (COL); ibidem, 2900 m, 15 Jan 1981, *Camargo, L.A. 7809* (COL); ibidem, 2900 m, 15 Jan 1981, *Camargo, L.A. 7820* (COL); Municipio de Monguít, hacia el sur este de la población, 3120 m, 28 Jul 1981, *Camargo, L.A. 8009* (COL); Belen, Vereda Teneria, 2580 m, 12 Mar 1971, *Carvajal, L. s.n.* (COL); Paipa, Vereda Cruz Murcia, 2610 m, 12 Dec 2003, *Córdoba, M.P. 3090* (COL); El Cocuy, Vereda Carrizalito, sitio Elitas, Alto la Salvia, 3000 m, 16 Oct 1996, *Cruz-A, S.P. 236* (COL); Paz del Rio, Cañón del Rio Soapaga, 2485 m, 24 Oct 1967, *Jaramillo-Mejía, R. 4059* (COL); La Uvita, Carretera entre La Uvita y Cusaguít, antes del alto, 2850 m, 24 Nov 1967, *Jaramillo-Mejía, R. 4240* (COL); Sogamoso, Vereda La Honda, 2500 m, 13 Jul 1990, *Murcia, G. s.n. 1* (UDBC); Chiscas, Vereda de Duartes, Sector Duartes arriba, parte alta de la montaña, 3300 m, 1 Oct 2003, *Rodríguez, V. 670* (COL); Monguít, junto al rio que pasa por la población, 2800 m, 11 Mar 1972, *Uribe-Urbe, L. 6647* (AFP,COL,NY,US); **Cundinamarca:** Zipaquira, Vereda Rodamontal, al N.W. de Zipaquira, 2820 m, 16 Mar 1944, *Camargo, L.A. 1153* (COL,US); Usaquén, Macizo de Bogotá, 2750 m, 20 Jan 1940, *Cuatrecasas, J. 7977* (COL,F,F,P,US); La Calera, Carretera a Choachí, 2800 m, 30 Oct 1968, *García-Barriga, H. 19409* (COL,US); Chocontá, Represa del Sisga, 2800 m, 2 Dec 1982, *García-Barriga, H. 21345* (COL); Subachoque, Vereda el Tobal, Finca El Cerro, 2900 m, 19 Mar 2003, *Hernández-Schmidt, M. 1123* (COL,MEDEL); Zipaquira, 2820 m, 16 Mar 1944, *Huertas, G. 1153* (F,US); Sibaté, Alto de San Miguel, Cordillera Oriental, 2850 m, 20 Jul 1965, *Huertas, G. 6198* (COL); Zipaquirá, entre Zipaquirá y Tocancipá, Rocas de Sevilla, 2570 m, 2 Jul 1969, *Jaramillo-Mejía, R. 4875* (COL,NY); Chía, carretera a Chia, 2600 m, 3 Mar 1969, *Lozano, G. 990* (COL); bosque nuboso de San Miguel, 2700 m, 17 Dec 1959, *Mora, L.E. 831* (COL,PSO); San Francisco, Hacienda La Laja, Finca de D. Rivera, 3030 m, 30 Jan 2005, *Parra-O, C. 661* (COL,MEDEL); Fúquene, Isla Laguna de Fúquene, 2600 m, Mar 1930, *Pérez-Arbelaez, E. 89* (COL,US); Bogota D.C., Predios Universidad Nacional, Jardín Instituto de Ciencias Naturales, 2600 m, 12 Jun 1987, *Sánchez, D. 1101* (MEDEL); **Santander:** Onzaga, Carretera del Páramo de Guantivá a Onzaga, 2700 m, 1 Dec 1967, *Jaramillo-Mejía, R. 4500* (COL).

64. *P. falcata* Cuatrec., Fieldiana, Bot. 27: 57. 1950. Type: Colombia: Valle del Cauca, Hoya del río Bugalagrande, Cordillera Central. Cuchilla de Barragán, entre las Azules y las Violetas, 3100 m, 16 Apr 1946, Cuatrecasas, J. 20816 (holotype, F!(2); isotypes, COL!, P!, US!(2)).

A high-Andean species that can be recognized by the falcate linguiform stipules reaching up to 10 mm long, the relatively small suborbicular coriaceous leaves (4-8 x 3-5 cm, but in young vegetative branches they can be twice as large) with very short petioles (3-5 x 1.5-2 mm), revolute margin, venation pattern brochidodromous festooned, tertiaries irregular reticulate, secondaries and tertiaries prominent below and slightly bullate above and 4 glands placed on the base and on the margin (or next to it) at 3-5 mm from the base respectively. The floriferous shoots are erect and can be twice as long as the leaves (5-12 cm long), the floral pedicel is relatively short, but the hypanthium and petals are wider than other small-sized species (up to 3.5 mm and 2.5 mm respectively), The fruits are globose and bigger than most of the Andean species (up to 20 mm wide).

Because the remarkable stipules, the abundant protuberant lenticels, the venation pattern and the presence of four glands it can be considered close to *P. stipulata* from Peru; however, that species has narrower oblong non cordate leaves, shorter racemes and smaller flowers and fruits.

**Distribution.** Distributed in the central and southern Andes of Colombia (along both central and eastern branches) and the neighbor northwestern mountains of Sucumbios province in Ecuador from 2500 to 3400 m elevation.

**Elevation range.** 2500 – 3380 m.

**Local names.** árbol del zapato, naranjuelo, pandalá blanco, tuno (Colombia).

**Material examined.** (17) **COLOMBIA.** **Caldas:** Manzanares, Cerro Guadalupe, 2500 m, Jul 1990, *Mahecha, G. s.n.* 2 (UDBC); **Cauca:** Inza, Vereda Rio Sucio-Los Alpes, 2975 m, 21 Nov 1998, *Rivera, O.* 887 (COL,MEDEL); **Cundinamarca:** Bogotá, Corregimiento Nazareth, Verdea los Rios, margen izquierda quebrada la Plata, 3000 m, 5 Feb 1997, *Franco, P.* 5596 (COL,MO); **Nariño:** El Encano, Laguna de la Cocha, 2900 m, 2 Mar 1963, *Espinal, L.S.* 984 (COL,MEDEL); Pasto, El Encano, Quebrada Orejuela, 2900 m, 29 Dec 1991, *Ramírez, B.R.* 4343 (PSO); **Norte de Santander:** Between Mutiscua and Pamplona, 3200 m, 23 Feb 1927, *Killip, E.P.* 19725 (GH,MO,US); **Putumayo:** Lado sur de la Laguna de la Cocha, Quebrada Santa Lucía, 2850 m, 8 Jan 1941, *Cuatrecasas, J.* 11837 (COL,US); **Quindío:** Salento, Novarco, Bosque alrededor de la estación piscicola (CRQ), 3000 m, Sep 1992, *Betancur, J.* 3630 (COL); Reserva Novarco, Camino entre el Alto de la línea y la estación piscicola, 3000 m, Sep 1992, *Betancur, J.* 3695 (COL); Reserva del Alto Quindío Acaime, 2900 m, 11 Jan 1990, *Renjifo, L.M.* 94? (COL,HUQ); Vereda Cocora, Finca la Marina, 3350 m, Aug 1992, *Vargas, W.G.* 547 (FAUC); Vereda Cocora, la Marina, 3380 m, Jun 1993, *Vargas, W.G.* 1129 (MO); **Tolima:** Santa Isabel, Cordillera central, vertiente oriental, Valle del Rio Totarito, en la margen izquierda, 3000 m, 13 Feb 1980, *Jaramillo-Mejía, R.* 6403 (COL,MO); Cajamarca, Vereda La Ceja, Montecristo, 3180 m, 13 Mar 2012, *Montoya-J, M.* 673 (MEDEL); **Valle del Cauca:** Tuluá, Corregimiento Santa Lucia, Finca Las nieves, vía a la Polonia, 3300 m, 23 Sep 1989, *Devia, W.* 1892 (MO,TULV); **ECUADOR. Napo:** Playón de San Francisco, carretera cantón Sucumbios. Sta Barbara- La Bonita, 2600 m, 28 Dec 1986, *Jaramillo, J.* 9323 (GB,US).

65. *P. littlei* Pérez-Zab., Anales del Jardín Botánico de Madrid 64(2): 181–183, f. 2, table 2. 2007.  
Type: Colombia: Huila, Acevedo, P.N.N. Cueva de Los Guácharos, Cerca al nacimiento del río Suaza, 2200 m, 18 Aug 1944, *Little-Jr, E.L.* 8499 (holotype COL!, isotypes NY!, P!, US!).

This species can be recognized by the elliptic-ovate sub-coriaceous to chartaceous leaves, 9-16 x 4.5-7 cm, opaque at both sides, usually drying in herbarium specimens with a yellowish or tin color, with plain brochidodromous venation pattern, secondary veins relatively straight along their lower half emerging at 70-80 degrees from the midrib, tertiaries perpendicular to the midrib and little conspicuous, and 2 sub-basal glands located at 2-6 mm from the base and attached to the midrib or up to 3 mm from it. The floriferous

shoots are slightly shorter than the leaves (8-12 cm), the flowers have pedicels 5-6 mm long, hypanthium 2.5-3 mm wide, and anthers rounded 0.4-0.5 mm long. The fruits are oblate and sometimes transversally didymous, 9-11 x 10-12 mm.

In Colombia and Ecuador, it has been confused with *P. opaca*, but that species have smaller and narrower oblong leaves with more ascending and raised secondary veins, less conspicuous glands and shorter subflexuous racemes. Other species from lowlands with flat venation on the lower surface usually have smaller flowers and lustrous leaves above.

**Distribution.** A widely but scattered distributed species ranging from central Colombia to central Peru in mid-elevation humid forests without any apparent biogeographic connection.

**Elevation range.** 900 – 2300 m.

**Local names.** inchoecaspi (Peru), serindo (Colombia).

**Material examined.** (19) **COLOMBIA.** **Antioquia:** Sonson, río Tasajo, 2200 m, 10 Dec 1983, *Bernal, R.* 768 (COL(2),HUA,MEDEL); Jericó, 1970 m, Dec 1940, *Daniel, Hno.* 3363 (COL,GH,MEDEL,US); **Caquetá:** San José de La Fragua, Serranía de los Churumbelos, Vereda las Palmas, 1450 m, 20 Sep 2000, *Mendoza, H.* 8885 (FMB); **Casanare:** Yopal, Carretera que conduce al morro, 900 m, 7 May 1994, *Viña, A.* 271 (FMB); **Huila:** Palestina, Cueva de los Guacharos, el pesebre, 1880 m, 28 Nov 2001, *Dávila, D.* 941 (FMB); **Quindío:** Filandia, Vereda Cruces, Finca El Brasil, 1850 m, 24 Jun 2002, *Mendoza, J.E.* 1304 (FMB); Circasia, Vereda la Cristalina, Finca Bomboná, *Vélez, M.C.* 4802 (HUQ); **Risaralda:** Santa Rosa De Cabal, Cord. Central, vertiente Occidental, Hacienda La Gaviota, 1980 m, 22 Jul 1980, *Idrobo, J.M.* 9868 (COL,MO); Pereira, Santuario Otun Quimbaya, orillas del Río Otún, 1860 m, 7 Aug 2010, *Pérez-Zabala, J.A.* COL-2010-9 (DAV); ibidem, Jul 2004, 27 Jan 1995, *Ríos, M.; Giraldo, P.* 440 (MEDEL). **ECUADOR.** **Napo:** Estribaciones occidentales de la cordillera Galeras, 1100 m, *Guevara, J.E.* 464 (QCA); **Zamora-Chinchipe:** Parque Nacional Podocarpus, trail along Río Bombuscaro SW of Guardería Bombuscaro, trail banks, 1200 m, 18 Nov 1991, *Øllgaard, B.* 99408 (AAU). **PERU.** **Cajamarca:** San Ignacio, 2020 m, 18 Nov 1999, *Flores, S.* 284 (MO,USM); San Ignacio - San Jose de Lourdes - Buenos Aires, 2140 m, 2 Mar 2001,

*Vicuña*, E. 32 (USM); **Junín**: Pichis trail, Yapas, 1350 m, 28 Jun 1929, *Killip*, E.P. 25467 (NY,US); **Oxapampa**: Huancabamba, Sector Quebrada Yanachaga-Chemillen, 2120 m, 16 Sep 2004, *Perea*, J. 1728 (DAV,MO); **San Martín**: Rioja, Puente Serranoyacu, N side of valley, 1770 m, Jul 1983, *Leo Luna*, M. 29 (MO); Puente Serranoyacu, S side of valley, 1590 m, Aug 1983, *Leo Luna*, M. 166 (MO).

66. *P. megacarpa* Pérez-Zab., Anales del Jardín Botánico de Madrid 64(2): 183–185, f. 3, table 3. 2007. Type: Colombia: Antioquia, Frontino, Corregimiento Nutibara, Cuenca alta del Río Cuevas. Finca de Luis Carlos Pereira, 1900 m, 22 Nov 1986, *Sánchez*, D.; *Orrego*, C.; *Restrepo*, D.; *Martínez*, G.; *Sylva*, S. 751 (holotype, MEDEL!; isotypes, HUA!, MEDEL!, NY!(2)).

This remarkable species can be recognized because the large linguiform-falcate stipules (up to 10 x 3.5 mm), the obovate-elliptic chartaceous to coriaceous leaves, 12-20.5 x 5.5-10 cm, slightly falcate, with petioles 8-15 x 1.4-2.7 mm, base acute and decurrent, apex acute to acuminate, venation pattern weak brochidodromous festooned, secondaries progressively arcuate and emerging at 45-55 degrees from the midrib, tertiaries sinuous percurrent and perpendicular to the midrib, lateral veins usually prominent below and impressed above, and generally 2 pairs of glands (the lower pair sub-basal and attached to the midrib and the next pair at 20-30 mm from the base on the second or third pair of veins) with sometimes supplementary miniature ones placed on the looping region of the upper secondary veins. Mature floriferous shoots and flowers are unknown. The fruiting racemes are erect, 6.5-12 cm long; the fruits are globose to oblate, basally swollen giving a pyriform appearance, 26-32 x 24-31 mm (the largest among the neotropical species) subtended by a noticeably short pedicel, 4-5 x 2-2.5 mm.

The most similar species is the Mexican *P. tetradenia* which has smaller chartaceous leaves, longer petioles and smaller fruits.



**Distribution.** This species is only known from few places of mid-elevation pluvial forests in the western slope of the western branch of the Colombian Andes (Departments of Antioquia, Cauca and Chocó).

**Elevation range.** 1700 – 2000 m.

**Material examined.** (5) **COLOMBIA. Antioquia:** Urrao, Corregimiento Encarnación, Vereda Calles, PNN Las Orquideas, Camino Calles - La Encarnación después de la confluencia del río Polo y el Río Calle y antes del Río San Pedro, sitio La Quiebra, 1750 m, 2 Feb 2011, *Pedraza-Peñalosa, P. 2099* (DAV,NY); Frontino, Corregimiento Nutibara, cuenca alta del río Cuevas, 17 mar 1984, *Sánchez, D.; et.al 94* (MEDEL). **Cauca:** El Tambo, Corregimiento La Romelia, km 75, vía la Gallera, 1700 m, 29 Jan 1995, *Ruiz, N. 363* (CAUP,COL); **Chocó:** San José Del Palmar, Cerro Torrá, Sector nororiental, arriba del helipuerto, 1920 m, 8 Jan 1984, *Silverstone-Sopkin, P. 1650* (CUVC,MO,NY).

67. *P. moritziana* Koehne, Bot. Jahrb. Syst. 52: 310. 1915. Type: Venezuela: Caracas, Colonia Tovar, in locis alpinis, *Moritz 1665* (sintypes F!, HBG!, K! M! P!(3), W!(6)).

This species can be recognized by the elliptic to elliptic-obovate coriaceous leaves, 4-10 x 3-5 cm, with canaliculated petiole 4-6 x 1-1.5 mm, secondary venation emerging at 60-70 degrees and arcuate, tertiary venation inconspicuous and two glands basal or sub-basal and generally next to the midrib. The floriferous shoots are 4-6 cm long, suberect and emerging from both last and previous reiterations; the flowers are relatively small with pedicels 2-3 mm long, hypanthium 2-2.5 mm wide and anthers 0.5-0.6 mm long. Fruits globose, 12-13 mm wide.

This species can be confused with *P. opaca* which is present in Venezuela; however, that species have oblong leaves with all major veins conspicuously raised below, two sub-basal glands 1-3 mm apart from the midrib and infundibuliform and wider hypanthium.

**Distribution.** Native to montane forests of the Sierra de Merida (an eastern branch of the Andes running along northwestern Venezuela) and Cordillera de la Costa in the northern part of that country.

**Elevation range.** 1950 – 3100 m.

**Local names.** muji, mují amarillo (Venezuela).

**Material examined.** (22) VENEZUELA. **Distrito Federal:** Fila de Agua Negra, 2000 m, Feb 1938, *Tamayo, F. 441* (US); **Lara:** Parque Nacional Dinira, Paramo de Jabón, 2900 m, 29 Dec 1999, *Riina, R. 963* (NY,US); ibidem, 29 Dec 1999, *Riina, R. 998* (US); ibidem, 29 Dec 1999, *Riina, R. 2900* (US); **Mérida:** La Carbonera, 2400 m, 1976, *Bernardi, L. 17177* (NY); praecipue in nemore montano upi *Podocarpus rospingliossi*, 2300 m, 1976, *Bernardi, L. 17198* (NY); +- 25 km W de Mérida, 2400 m, 24 Sep 1965, *Breteler, F.J. 4611* (COL,CUVC,MO,NY,US,WAG); Tabay, La Mucuy, 15 km. al este de Mérida, 2200 m, 1 Sep 1953, *Little-Jr, E.L. 15504* (COL); creca de Piñango, pendiente N de la sierra de Norte de los Andes, 2500 m, 12 Mar 1966, *Schulz, J.P. 382* (NY,US); La Carbonera, en campos desmontados, 2000 m, Jul 1956, *Tamayo, F. 4201* (US); **Portuguesa:** Dtto. Sucre. Parque Nacional Guaramacal. Sector El Alto, límite con el Estado Trujillo, camino Real Paramito - Batatal, 1950 m, 20 May 1999, *Cuello, N. 1650* (MO); **Trujillo:** Dtto. Boconó. Parque Nacional Guaramacal, 1950 m, 2 Jun 1995, *Cuello, N. 934* (MO,US); ibidem, adyacente al Puesto de Guardaparques, 1950 m, 2 Jun 1995, *Cuello, N. 945* (MO); ibidem, selvas nubladas de la vertiente norte, 2100 m, 17 Jun 1995, *Cuello, N. 983* (MO); ibidem, 2400 m, 1 Jul 1995, *Cuello, N. 1134* (MO); ibidem, 2070 m, 18 Feb 2000, *Cuello, N. 1981* (MO); ibidem, 18 Feb 2000, *Cuello, N. 1983* (MO); Parque nacional Dinira, Paramo del jabón, 3100 m, 16 Aug 1999, *Riina, R. 774* (NY); Dtto. Carache, via Paramo las Palmas, 2300 m, 21 May 1987, *Rivero, R. 1222* (MO); Distrito Boconó, Cerro Guaramacal, camino Mosquey-Guaramacal, vertiente NO, 2300 m, 23 May 1993, *Stergios, B. 15798* (PORT,US).

68. *P. moritziana* Koehne var. *robusta* Moritz ex Koehne, Bot. Jahrb. Syst. 52: 310. 1915. Type: Venezuela: Caracas, Colonia Tovar, in regione subfrigida, *Moritz 1665b* (sintypes F!, K!, P! W(7)!).

This species (here proposed to be ranked as such (“*P. robusta*”)) can be recognized by the mid-size wide ovate coriaceous leaves, 8-12 x 4.5-6.5 cm, subtended by very short petioles (3-5 x 1.5-2.5 mm), with base rounded to slightly cordate, brochidodromous arcuate festooned venation, secondary veins arcuate, 8-10, intersecondaries parallel to secondaries and little conspicuous, tertiaries alternate percurrent, and two big (ca. 2 mm wide) sub-basal glands placed on the first pair of veins next to the midrib. The twigs are angulate, and the cataphylls have conspicuous deciduous hairs along its margin. The floriferous shoots are slightly shorter than the leaves (6-10 cm); the flowers have pedicels 5-8 mm long, hypanthium 2.5-3 mm wide, and anthers 0.4-0.6 mm long. The fruits are ellipsoid and apiculate, 14-16 x 11-12 mm.

This taxon was proposed on the rank of variety by Koehne (1915), but because the multiple differences with respect to the typical variety, it should be considered as a separate species. This species can be confused with the widespread *P. integrifolia* because both have long racemes and basal glands, but the latter has longer leaves with acuminate apex and floral parts bigger in general. Another similar taxon is *P. ruiziana* from Ecuador and Peru which has smaller rigid coriaceous leaves and flowers considerably bigger arranged on shorter racemes. Finally, *P. espinozana* from the Guianas shield is very similar but it has longer petioles, thicker leaves and less arcuate secondary veins.

**Distribution.** It is found in high elevation forests of the Andes of Colombia and Venezuela. In the former, along the eastern branch from the middle of the country close its capital city to the border with Venezuela and the northern massif of Sierra Nevada de Santa Marta. In the latter, along the Merida mountain range and the coastal mountain range close to its capital city.

**Elevation range.** 1900 – 3300 m.

**Local names.** duraznillo (Colombia).

**Material examined.** (16) COLOMBIA. Boyacá: Villa De Leyva, La Antena, Vereda La Capilla, 2800 m, 11 Jul 1996, *Mendoza, H. 1365* (FMB); Arcabuco, Cañon del Rio Pomeca, 2400 m, 15 Apr 1997, *Mendoza, H. 3077*

(FMB); **Cundinamarca**: Zipacón, cabeceras del Rio Apulo, entre la hacienda Sebastopol y Dos Caminos, 1900 m, 24 Dec 1953, *Idrobo, J.M. 1555* (COL); Cabrera, Vereda Nuñez, bosque de galería alrededores quebrada la quebrada negra, 2300 m, 13 Jul 1988, *Linares, E. 2338* (COL); Junin, Inspección Chuscales, Reserva Carpanta, a lo largo del camino a la cabaña, 2500 m, 27 Apr 1988, *Luteyn, J.L. 12229* (COL,NY); Chipaque, Páramo de Chipaque, Líneas del Guavio, 3000 m, Apr 1988, *Mahecha, G. s.n. 1* (UDBC); Cabrera, Vereda Nuñez, 2400 m, 21 Aug 1985, *Morales, G. 411* (COL); San Francisco, Hacienda "la Laja", 2845 m, 15 Aug 2004, *Parra-O, C. 535* (COL,MEDEL); Supata, Vereda Santa Barbara, en meseta pequeña sobre el flanco del cañón, 2800 m, 19 Feb 1990, *Sánchez, R. 1440* (COL); La Calera, Vereda el Volcán, 2800 m, 16 Oct 1975, *Torres, J.H. 470* (COL); **Magdalena**: Santa Marta (Dist. Esp.), Alto Buritaca, 2880 m, 13 Aug 1977, *Rangel, O. 912* (COL,NY); **Santander**: Charalá, Vereda Santa Helena, Santuario Guanentá, Predio la Sierra, margen izquierdo aguas abajo del Rio la Rusia, Alto rio Fonce, 2700 m, 16 Dec 1998, *Cadena-M, J. 195* (COL); Zapatoca, Vereda Bellavista, Reserva El Páramo - La Floresta, por el bosque de La Herradura, 2500 m, 7 Jan 2015, *Díaz-Rueda, D.M. 962* (MEDEL); **VENEZUELA. Merida**: Merida, Cerro de las Flores, 2000 m, 4 Jun 1953, *Bernardi, L. 565* (F,NY,P); **Tachira**: Boca de monte - Zumbador, 3000 m, 28 Aug 1966, *Steyermark, J.A. 96844* (NY,US).

69. ***P. muris*** Cuatrec., Fieldiana, Bot. 27: 57. 1950. Type: Colombia: Valle del Cauca, Farallones de Cali, Cordillera occidental, vertiente NW, Quebrada el Ratón: Mina el diamante, 2950 m, 30 Jul 1946, *Cuatrecasas, J. 21765* (holotype F!; isotypes COL!, P!, U!, US!).

This species can be recognized by the mid-size subcoriaceous leaves, 6-11.5 x 3-6.5 cm, slightly bullate above and with prominent secondary and tertiary veins below, with petioles 5-12 mm long, base rounded and deeply decurrent on the petiole at the end, apex obtuse and shortly acuminate, margin sometimes erose and with some isolated teeth, venation pattern brochidodromous festooned with regular reticulate tertiaries, and 2 glands submarginally placed on the first pair of veins at 3-5 mm from the base. The floriferous shoots are as long as the leaves (7-11 cm long); the flowers have open campanulate

hypanthium, 2-3 mm wide and relatively long anthers (0.8-1 mm long). The fruits are globose and apiculate, 10-12 mm wide.

It can be easily confused with *P. opaca*, but that species has shorter petioles, veins relatively plain on both sides, shorter racemes and smaller flowers.

**Distribution.** Distributed in highland humid forests (2500-3200 m) from southwestern to northwestern Colombia along the western and central branch of the Andes.

**Elevation range.** 2180 – 3250 m.

**Material examined.** (13) **COLOMBIA.** *Sine loco*, *Lehmann, F. BT 854* (NY); **Antioquia:** Sonsón, Carretera Sonsón-Nariño, 10 km de la carretera Sonsón a Nariño; a la largo de de un antiguo camino español, 2600 m, 13 Nov 1988, *McPherson, G. 13065* (COL,HUA,MO); Urrao, Camino de herradura de la Finca La Clara hacia Urrao, 2180 m, 8 Dec 1984, *Orozco, C.I. 1419* (COL); Belmira, Límite entre Belmira y San Pedro, Paraje Alto de Montefrío, 2900 m, 22 Jan 1998, *Vanegas, L. BEL 93* (MEDEL); **Cauca:** Popayán, *Lehmann, F. BT 993* (NY); Corregimiento Quintana, 2950 m, 16 Feb 2003, *Navia, C.H. 79* (CAUP); El Tambo, Sector la Romelia, zona amortiguadora del parque nacional Munchique, 2640 m, 23 Oct 1992, *Ordoñez, M. 3* (AFP); Corregimiento de Quintana, Cerro Pusna, 2720 m, 8 Feb 2003, *Perdomo, L. 202* (CAUP,MEDEL); Almaguer, Vereda la Riñonada, Quebrada El Motilón, Rio Marmato, 2300 m, 28 Jul 2001, *Ramírez, B.R. 14370* (CAUP,COL); Popayán, Corregimiento Quintana, Cerro Toma Aire, El Pajonal-El Porvenir, 3200 m, 8 Feb 2003, *Ramírez, B.R. 16259* (CAUP); **Nariño:** Pasto, Bosque de Daza, 2966 m, 13 Aug 2010, *Pérez-Zabala, J.A. COL-2010-12* (DAV); **Quindío:** Salento, Estación de Navarco, 3000 m, 23 Sep 1992, *Franco, P. 3930* (COL).

70. *P. ocellata* Koehne, Bot. Jahrb. Syst. 52: 312. 1915. Type: Colombia: Santander, Socorro, *Karsten, H. s.n.* (sintype W!).

This species can be easily recognized because the relatively small chartaceous to subcoriaceous leaves (3.5-8.5 x 1.3-3.5 cm), slightly lustrous above, with weak brochidodromous festooned venation pattern, secondary veins arcuate, 8-9, numerous intersecondaries, tertiaries alternate percurrent, secondaries and tertiaries plain on both sides and 2 conspicuous macular glands (2-3 mm wide) located on the second pair of secondary veins or below at 5-15 mm from the base and 3-7 mm from the midrib. The floriferous shoots are short (up to 4.5 cm long), with flexuous slender axis, the flowers are up to 4 mm wide in total and the anthers 0.3-0.4 mm long. The fruits are globose to slightly oblate, 10-11 mm wide.

It is close to *P. guanaiensis* which has bigger coriaceous leaves, fully basal minute glands and longer racemes.

**Distribution.** Distributed from lowlands to lower montane humid forests in the western and eastern slopes of the eastern branch of the Colombian Andes, in the middle sector of the country.

**Elevation range.** 280 – 1750 m.

**Material examined.** (6) **COLOMBIA. Cundinamarca:** El Colegio, Hacienda Misiones, 1400 m, 30 Jul 1984, *Sánchez, D.* 833 A (MEDEL); **Meta:** San Martin, Vereda EL Merey, 280 m, 8 Apr 2005, *Carvajal, L.* 573 (COL,FMB); llanos orientales. Cabuyaro, 300 m, Jan 1937, *García-Barriga, H.* 5113 (COL,US); Villavicencio, km 6 via a Puerto Lopez. Hacienda Santa Ana, 390 m, 1 Jun 2000, *Ramírez, B.R.* 13261 (CAUP); **Santander:** Suaita, Sector Flandes, Finca Marbella, 1750 m, 30 Mar 2004, *Fernández-Alonso, J.L.* 21320 (COL,COL,FMB,MEDEL).

71. *P. opaca* (Benth.) Walp., Repert. bot. Syst. 5: 648. 1846. *Cerasus opaca* Benth., Pl. Hartw. 172. 1845.; *Laurocerasus opaca* (Benth.) M.Roem., Syn. Rosifl. 91. 1847. Type: Colombia: Popayán, Oct 1843, *Hartweg* 967 (lectotype K! (designated by Romoleroux (1996); isoelectotypes, E!, G!, MO!, P!(2)).

This species can be recognized by the elliptic-oblong to elliptic-obovate subcoriaceous leaves, 6-10 x 2.5-3.7 cm, opaque on both sides, with petiole 5-10 x 1.2-1.5 mm, venation pattern brochidodromous festooned, 9-10 secondary veins emerging at 60-80 degrees from the midrib, plain to slightly prominent below, intersecondaries and tertiaries intermixed in a reticulate pattern, and two basal or sub-basal glands attached or almost so to the midrib. The floriferous shoots are subflexuous, 4-7 cm long; the flowers have pedicels 2.5-4 mm long, mid-sized campanulate hypanthium 3.2-3.8 mm wide and anthers 0.6-0.8 mm long. The fruits are globose, 10-11 wide.

The more similar species sharing distribution area is *P. buxifolia* which has elliptic shorter leaves, lustrous above with base rounded to cordate, secondary veins prominent below and longer erect floriferous shoots with larger flowers. Another similar species, *P. muris* has rugose twigs with pustulate lenticels, larger leaves with protruding veins below, longer petioles, laminar glands not attached to the midrib, longer racemes and larger fruits. Finally, *P. ruiziana* has more rigid coriaceous leaves with considerable larger flowers.

**Distribution.** Distributed in humid montane forests in the northern Andes from southwestern Colombia to cordillera de Merida in Venezuela.

**Elevation range.** 1450 – 3000 m.

**Local names.** Cerezo, cresco (Colombia), muji (Venezuela), tostado (Colombia).

**Material examined.** (37) COLOMBIA. Sine loco, *Lehmann, F. BT 766* (NY); sine loco, *Mutis, J.C. 1468* (US); **Antioquia:** Urrao, Vereda Calles. Parque Nacional Natural "Las Orquídeas". Margen derecha del Río Calles, en el filo NW de la Cabaña de Calles, 1450 m, 30 Nov 1993, *Cogollo, A. 7621* (JAUM,MO); Vereda La Ana, Parcela permanente de registro La Montana, 2550 m, 18 Nov 2007, *Martínez, M. 57* (MEDEL); **Boyacá:** Villa De Leyva, Santuario de Flora y Fauna de Iguaque, Vereda Pan de Azucar, 2700 m, 10 Dec 2002, *Fernández-Alonso, J.L. 19985* (COL); Arcabuco, Santuario de Flora y Fauna Iguaque, 2800 m, 1 Aug 2010, *Pérez-Zabala, J.A. COL-2010-4* (DAV);

ibidem, 2900 m, 1 Aug 2010, *Pérez-Zabala, J.A. COL-2010-5* (DAV); ibidem, 2700 m, 1 Aug 2010, *Pérez-Zabala, J.A. COL-2010-6* (DAV); Villa De Leyva, km 19 via Villa de Leyva-Arcabuco. 1 km aguas arriba Quebrada la Colorada, 2650 m, 10 Sep 2003, *Prieto C., A. 1674* (FMB); Sáchica, Sáchica, 1990 m, Aug 1964, *Saravia, C. 4431 A* (COL); **Caldas**: Aguadas, Microcuenca Tarcará, 2600 m, 25 Jan 1994, *Doarion, K. 95* (FAUC); **Cauca**: Popayán, 2000 m, 1889, *Lehmann 9085 B* (A,NY); Purace, Volcan Purace, Candelaria, Vereda El Palmar, 2200 m, 7 Jul 1971, *Mahecha, G. 691* (UDBC); Popayán, Vereda La Rejoya, a 3.5 km de la variante, 1850 m, 15 Nov 2001, *Ramírez, B.R. 14888* (CAUP); **Cundinamarca**: Cabrera, Vereda San Isidro, 2000 m, 12 Jul 1988, *Linares, E. 2250* (COL); Bogota, Avenida de los Cerros Orientales, 2700 m, 1 Nov 1973, *Mahecha, G. 1363* (UDBC); Pacho, Vereda el hatillo, Finca de Pedro Martinez, 2100 m, 1 Sep 1974, *Mahecha, G. 1706* (UDBC); Chuscales, Chingaza, Estación biológica de Carpanta, 2500 m, 3 May 1989, *Mahecha, G. 5394 a* (UDBC); San Francisco, El Peñon, Finca "la cumbre", 2000 m, 7 Nov 1997, *Rodriguez, S. 43* (COL); Guasca, Vereda La Concepción, 3000 m, 24 Aug 1989, *Sánchez, R. 1230* (COL); Vereda Potreritos, En la ladera que desciende al rio Tunjo, 2700 m, 20 Oct 1989, *Sánchez, R. 1315* (COL); **Huila**: Reserva Merenberg. Carretera de Popayán a La Plata, 2300 m, 22 Jul 1979, *Cabrera, I. 5052* (F,GH,MO); La Plata, Finca Merenberg, 2300 m, 26 Mar 1976, *Gaulin, S.J.C. 86* (COL); 2300 m, 10 Apr 1976, *Gaulin, S.J.C. 130* (COL); Cueva de Los Guacharos, mejora de Vicente, frente a la cabaña, 1860 m, 20 Sep 1979, *Henao, J.E. 204* (COL); San Agustin, Vereda La Castellana, Reserva Natural Privada Los Yalcones, 2320 m, 9 Aug 2005, *Mendoza, H. 16525* (FMB); **Quindío**: Filandia, Vda Cruces, finca el Palacio, 1828 m, 18 Jun 2002, *Mendoza, J.E. 917* (FMB); **Santander**: Gámbita, Vereda Bucaramanguita, Límite Moscacheque corontujo, 2060 m, 25 Jun 1999, *Cárdenas, C.D. 224* (COL); Velez, Gaital, Serrania de los Agataes, sector Marilan, 2603 m, 17 Oct 2007, *Serralde, L.F. 79* (COL); **VENEZUELA**. **Mérida**: La Carbonera, 2800 m, Jul 1957, *Aristeguieta, L. 2829* (NY,US); Distrito Campo Elias, Sierra de la Culata, 18.6 km NW of las Cruces de Jaji y 7 km NW of Finca La Trinidad on Merida-La Azulita road, 2300 m, 11 Nov 1990, *Dorr, L.J. 7710* (QCA,US); aprox 25 km W de Merida, 2400 m, 14 Jan 1966, *Duerto, P. 3* (MO,NY,US,WAG); **Trujillo**: Arriba de Jajo hacia la Morita, 2200 m, Aug 1958, *Aristeguieta, L. 3414* (NY); Dtto. Boconó. Parque Nacional Guaramacal, 1950 m, 2 Jun 1995, *Cuello, N. 964* (MO); ibidem, road Boconó to Guaramacal, SE de Guaramacal, N slope mountain, 1950 m, 15 Jul 1995, *Dorr, L.J. 8143* (MO,US).



72. *P. strobilifera* Cuatrec., Fieldiana Bot. 27: 56. 1950. Type: Colombia: Valle del Cauca, Ansermanuevo, Las Brisas, Cordillera occidental. Filo de la cordillera al sur de las Brisas (Entre las Brisas y La Marina), 1750 m, 27 Oct 1946, Cuatrecasas, J. 22674 (holotype, F!; isotypes F!, COL!(2), P!, US!(2)).

This rare species can be distinguished by the coriaceous obovate-elliptic leaves, 5-10.5 x 2.6-5.2 cm, with relatively long petioles 10-14 x 1-1.3 mm, base acute and deeply decurrent, apex acute, venation pattern brochidodromous, 7-9 initially straight secondary veins emerging decurrently at 40-50 degrees from the midrib and irregularly spaced, tertiaries sinuous percurrent and perpendicular to the midrib, and 2 basal depressed glands generally attached to the midrib. The floriferous shoots are stout erect, 2-3.5 cm long x 2-3 mm thick and have conspicuous late deciduous ovate floral bracts (2-3 x 2-3 mm) giving a strobili appearance to the young racemes; the flowers have pedicels 3-6 mm long, hypanthium turbinate, 2-2.5 mm wide, small petals (1-1.5 mm wide) and anthers 0.4-0.5 mm. The fruit is subglobose, 10-13 x 10-12 mm.

The most similar species is *P. opaca*, but its leaves have brochidodromous transverse venation, shorter petioles and the racemes are longer and flexuous.

**Distribution.** Only known from two disjunct collections in the same range of elevation, one from the western branch of the Andes in Colombia and another from the northern part of Cordillera de Merida in northwestern Venezuela.

**Elevation range.** 1750 - 1880m.

**Material examined.** (2) VENEZUELA. Portuguesa: Mpio. Sucre. Alto de la Divisoria de la Concepción. Vertiente Sur del Parque Nacional Guaramacal, 1880 m, 21 Jan 2000, Cuello, N. 1882 (MO,NY,US).

73. *P. urotaenia* Koehne, Bot. Jahrb. Syst. 52: 284. 1915. Type: Venezuela: Caracas, Colonia Tovar, Karsten, H. s.n. (sintypes W!).

This very distinct species can be easily identified because the presence of domatia in the basal axils of the secondary veins, the puberulent buds and sparsely tomentose new shoots and the 2-4 marginal glands which frequently form an outgrowth as a tooth-like structure on the margin. Additionally, it has elliptic membranous to soft coriaceous leaves, 7-13 x 3-4.7 cm, petioles 6-8 x 0.8-1.5 mm, with apex mucronate, venation pattern brochidodromous double festooned, secondary veins 8-11, emerging at 50-70 degrees from the midrib and progressively arcuate, and tertiaries exmedially ramified. The floriferous shoots are flexuous to subflexuous, 4.5-6 cm long; the flowers have pedicels 3-8 mm long, open shallowly campanulate hypanthium 3.5-5 mm wide, petals relatively large (up to 3 mm long) and round anthers ca. 0.5 mm long.

The only similar taxa is the Mesoamerican *P. rhamnoides*, which is also part of a distinct group formerly recognized by Koehne (1915) as the grex *Neocalycinia*; however, that species generally has smaller both leaves and flowers and the raceme axis is puberulous.

**Distribution.** Distributed mostly in the three branches of the Andes in Colombia but with some isolated records from the Cordillera de la Costa in Venezuela and central Perú in the Oxapampa province.

**Elevation range.** 1960 – 2950 m.

**Local names.** chilcotruco (Colombia), truco (Colombia).

**Material examined.** (28) **COLOMBIA.** **Antioquia:** Peque, Alto del Poal, Vereda Toldas, 2500 m, 25 Sep 1995, *Benitez, D. 326* (COL,JAUM); Betania, Vereda Pedral Arriba, Vertiente derecha quebrada La Bramadora, 2100 m, 3 Feb 1997, *Sánchez, D. 3791* (MEDEL); **Boyacá:** Pauna, Carretera de Chiquinquirá a Pauna, Cerca del Boquerón, Los Curubitos, 2720 m, 2 Sep 1967, *Jaramillo-Mejía, R. 3269* (COL); Arcabuco, Parque Nacional Iguaque, 2849 m, 1 Aug 2010, *Pérez-Zabala, J.A. COL-2010-3* (DAV); **Cundinamarca:** Santafe De Bogota D.C., Jardín Botánico de Bogotá, 2600 m, 21 Apr 2002, *Fernández-Alonso, J.L. 19801* (COL); **Huila:** La Plata, Finca Merenberg, 2300 m, 24 Mar 1976, *Gaulin, S.J.C. 89* (COL); frontera con el Cauca, este de Leticia, 2275 m, 7 Jul 1984, *Gentry, A. 47676* (CUVC,MO); este del volcán Puracé, cerca al borde con el Cauca, 2300 m, 4 Apr 1990, *Gentry, A. 53979* (CUVC,MO); Baraya, En la orilla de Rio Negro, 25 km ESE de Baraya, 2300 m, 31 Oct 1944, *Little-Jr, E.L. 8897*

(COL,NY,P,US); La Plata, 2400 m, 7 Aug 2010, *Pérez-Zabala, J.A. COL-2010-10* (DAV); Vereda Agua Bonita, Finca Merenberg. Potrero de los Yarumos, 2480 m, 1 May 1982, *Torres, J.H. 1261* (COL); ibidem, 2200 m, 3 May 1982, *Torres, J.H. 1298* (COL); **Norte de Santander**: Villa Caro, Cabecera del Río Sardinata, 2600 m, Aug 1989, *Jimenez-Saa, H. 47* (UDBC); Herran, Vereda Honda Sur, Cabecera de la quebrada La honda, 2450 m, 2 Jun 2002, *Sánchez, R. 6564* (COL); **Quindío**: Salento, Reserva del Alto Quindío Acaime, 2850 m, 20 Jun 1990, *Renjifo, L.M. 134* (HUA,HUQ,MO); ibidem, 2840 m, 12 Apr 1992, *Vargas, W.G. 477* (MO); Genova, Camino Finca Servia-Bosque de Robledal, 2650 m, 15 Jul 1990, *Vélez, M.C. 1887* (COL,HUQ); Cordoba, Vereda Las Auras, Finca El Cedral, 2950 m, 14 Dec 1993, *Vélez, M.C. 3770* (COL,HUQ); **Risaralda**: Pereira, Parque Nacional Natural Ucumarí, Vereda el bosque. Finca la Pastora, 2460 m, 13 Oct 1989, *Agudelo, C.A. 204* (HUQ); ibidem, 2620 m, 13 Oct 1989, *Rangel, O. 5616* (COL,MO); ibidem, 2620 m, 13 Oct 1989, *Rangel, O. 5648* (COL); **Santander**: San Joaquin, Vereda San Ignacio. Camino entre Loma larga y Morro pardo, 2454 m, 23 Mar 2010, *Angel, S. 468* (COL); Piedecuesta, Vereda Cristales, estacion experimental El Rasgón, 2300 m, 19 Sep 2004, *Mendoza, H. 16202* (FMB); **Valle del Cauca**: Ansermanuevo, Cordillera occidental, filo de la cordillera sobre Las Brisas, 1970 m, 19 Oct 1946, *Cuatrecasas, J. 22300 A* (US,VALLE); Cali, Finca Zingara, Corregimiento La Divisoria, cresta de la cordillera occidental, 6 km. al norte de la carretera Cali-Buenaventura, W. de Cali, 1960 m, 24 Mar 1986, *Gentry, A. 53540* (CUVC,MO); **PERU. Pasco**: Oxapampa, Palmazú, 2300 m, 1 Oct 1984, *Smith, D.N. 8591* (MO); **VENEZUELA. Aragua**: Pico Codazzi, faldas que miran al sureste, 2100 m, 3 Dec 1977, *Steyermark, J.A. 115465* (NY).

#### **New species identified in the north Andes (22)**

##### **74. *P.* sp. nov. ("*bruijnii* Li – VEN")**

It is characterized by the oblong-lanceolate sub-coriaceous leaves, 9-15.5 x 2.8-5.5 cm, slightly falcate, lustrous above, with base acute to obtuse and decurrent until the base of the petiole, apex attenuate, petioles 4-8 x 2-2.5 mm, venation pattern weak brochidodromous, secondaries arcuate and emerging at 50-60 degrees from the midrib, prominent below and impressed above, tertiaries sinuous percurrent and perpendicular to the midrib, and 2 basal elliptic glands attached laterally to the midrib (usually

inconspicuous because their partially hidden position). The floriferous shoots are erect, 2.5-5 cm long; the flowers have pedicels 3.5-5 mm long, hypanthium infundibuliform 2.5-3.3 mm wide and anthers 0.7-0.8 mm long. The fruits are ovate and apiculate, 11-12 x 8-10 mm.

Close to *P. integrifolia* but the leaves are smaller, narrower (3 or more times longer than wide) the secondary veins are more ascending arcuate, the floriferous shoots are shorter, laxiflorous, and the flowers have wide infundibuliform hypanthium. Other species sharing partially distribution area as *P. opaca* and *P. moritziana*, both have leaves with rounded bases, venation with more perpendicular brochidromous secondary veins and glands not fully basal.

**Distribution.** In the Venezuelan Andes corresponding to the Mérida mountain ridge and the Sierra of Perijá in the northern border with Colombia between 2300 and 2600 m above the sea level.

**Elevation range.** 2300 – 2800 m.

**Local names.** cereza (Venezuela).

**Material examined.** (10) **COLOMBIA. La Guajira:** Cerro Pintado, Región del Espejo, 2300 m, 11 Nov 1985, *Cuadros, H. 2345* (COL,MEDEL,MO); **VENEZUELA. Lara:** Santo Domingo y Los Quebraditos, south of Las Sabanetas, above Humocarajo bajo, 2430 m, 8 Feb 1944, *Steyermark, J.A. 55412* (NY); **Merida:** Dto. Tovar. Carretera Santa Cruz de Mora-El Molino, 2600 m, 23 Dec 1972, *Badillo, V. 5813* (F); hills north of Canagua, disturbed montane forest fading into cloud forest, 2600 m, 23 Jan 1987, *Hahn, W.A. 3341* (MO); **Trujillo:** Distrito Carache, Between Carache and Agua de Obispo. 20-25 km NE of Carache, 2350 m, 10 May 1988, *Dorr, L.J. 5061* (CAS,NY,QCA,US); *ibidem*, 2350 m, 10 May 1988, *Dorr, L.J. 5065* (NY); *ibidem*, 2350 m, 10 May 1988, *Dorr, L.J. 5079* (US); Parque nacional Dinira, Camino del caserío de Mesa Potrera al caserío de Potreritos de Cende, en la fila, 2400 m, 19 Feb 2000, *Duno de Stefano, R. 1196* (US,VEN); carretera Carache-Agua de Obispo, 2300 m, 1 Jan 2000, *Meier, W. 6348* (US,VEN); *ibidem*, 2300 m, 1 Jan 2000, *Meier, W. 6349* (US).

75. *P.* sp. nov. (“*aff-debilis –midelevation-COL*”)

This new species is characterized by the oblong-lanceolate chartaceous to subcoriaceous leaves, 9-13.5 x 3.7-5 cm, slightly falcate, opaque on both sides when dry, with base obtuse and apex acuminate, venation pattern eucamptodromous-like, 9-10 arcuate secondary veins emerging at 50-60 degrees from the midrib, intersecondaries absent or very short, tertiaries sinuous percurrent and perpendicular to the midrib but little conspicuous, and (1-)2 glands, ca.1 mm wide, placed on the first pair of secondary veins at 12-15 mm from the base, sometimes absent. The floriferous shoots are sub-flexuous, up to 3/4 the length of the leaves (6.5-8 cm), ca. 1 mm thick, the flowers have pedicels 5-7 mm long and 0.4-0.5 mm thick, the hypanthium is turbinate, 2-2.5 mm wide, and the anthers are 0.5-0.6 mm long. The fruit is apparently prolate, 12-14 x 11-12 mm.

The leaf architecture has some resemblance with *P. debilis*, but that Amazonian lowland species has membranous-chartaceous leaves with more conspicuous brochidodromous venation, larger basal glands and shorter and more slender racemes with smaller flowers overall. Also, it can be associated with *P. lichoana* which has larger lustrous leaves with major and minor veins very visible in general.

**Distribution.** Apparently endemic to mid-elevation forests in the southern part of the Boyaca department in Colombia.

**Elevation range.** 1075 – 1400 m.

**Material examined.** (2) COLOMBIA. Boyacá: Santamaría, Carretera entre Santamaría y Juntas, Sendero ecológico de HYCA QUYE, 1075 m, 27 Mar 2001, *Betancur, J. 9108* (COL,MEDEL (2)); Paez, Cerca al municipio, 1400 m, 29 Apr 1964, *Espinal, L.S. 1697* (COL,MEDEL).

76. *P.* sp. nov. (“*aff. brittoniana midelevation ECU*”)

A new species characterized by the dense pustulate lenticels on the bark of the twigs, the elliptic to oblong-ovate chartaceous leaves, 10.5-17 x 4.2-8.3 cm, slightly bullate above and rugose below, with relatively slender and short petiole (3-6 x 1-1.2 mm), base obtuse to rounded, apex acute to acuminate, margin entire to erose, venation pattern brochidodromous festooned, secondaries emerging relatively straight at 70-80 degrees from the midrib and looping at 3-5 mm from the margin, intersecondaries less than half the length of secondaries and bifurcated at the end, tertiaries irregular reticulate, and 2 submarginal glands placed at 1-3 mm from the base and 0.5-1 mm from the midrib. The floriferous shoots are erect, 5-7 cm long, 1-1.5 mm thick, the flowers have pedicels 2-3 mm long, hypanthium campanulate 2-2.5 mm wide and anthers 0.6-0.8 mm long.

The more similar species, *P. brittoniana*, is distributed in higher elevations and have generally larger leaves, longer racemes, bigger flowers and a more robust general appearance of its terminal branches.

**Distribution.** From mid-elevation forests (1800-2400 m) in the western slope of central and north Ecuador and the neighbor Colombian department of Nariño.

**Elevation range.** 1800 – 2427 m.

**Material examined.** (8) **COLOMBIA.** Nariño: Ricaurte, Reserva la Planada, 1800 m, 1 Sep 1990, *de Benavides, O. 11420* (PSO); **ECUADOR.** Cotopaxi: Cantón Sigchos, Triunfo Grande, 35 km de Sigchos, vía Sigchos-Las Pampas, finca del Sr. Galo Roballo, 2427 m, 2 Aug 2003, *Ramos, J. 6840* (CUVC,MO,QCA,QCNE); Pujilí, Reserva Ecológica Los Ilinizas, Sector II (Sector Sur), sector Chuspitambo, al occidente de Choasillí, Cordillera Occidental, vertiente occidental, 1900 m, 5 Aug 2003, *Silverstone-Sopkin, P. 9838* (CANB, CUVC, MO, QCA, QCNE); **Pichincha:** Bosque subandino de Saloya, lado W de la cordillera W, 1800 m, 9 Sep 1943, *Acosta-Solís, M. 5850* (F); Reserva Florística-Ecológica "Río Guajalito", Km 59 de la carretera antigua Quito-Sto. Domingo de los Colorados, a 3.5 Km al NE de la carretera, estribaciones occidentales de Volcación, 2200 m, 17 Nov 1991, *Jaramillo, J. 14527* (MO,NY,QCA,QCNE); Quito, Reserva florística, Río Guajalito, 1800 m, 17 Jan 1992, *Jaramillo, J. 14552* (QCA); ibidem, Km 59 de la carretera antigua Quito-Santo Domingo, a 3.5 Km, al NE de la carretera, estribaciones

occidentales del volcán Pichincha, 2000 m, 10 Feb 1992, *Jaramillo, J. 14643* (QCA); Carretera Quito-San Juan-Chiribogac, empalme en el km 69 carretera secundaria a 3 km de la carretera a Santo Domingo de los Colorados. Sector Bellavista, 2050 m, 17 Sep 1986, *Zak, V. 1196* (GH, JAUM, MO, NY, PH, QCA, TEX, US).

77. *P.* sp. nov. (“*aff. littlei - arcuate second-veins*”)

This new species can be identified by the elliptic-oblong to elliptic-ovate chartaceous leaves, 10-17 x 4-7.5 cm, colored ferruginous in dry herbarium specimens, with petioles 5-8 x 1.3-1.7 mm, base rounded to truncate and apex shortly acuminate, venation pattern weak brochidodromous, secondary veins (8-9) arcuate, slightly prominent below and plain above, intersecondaries perpendicular to the midrib and relatively short, tertiaries alternate percurrent, and 2 crateriform glands attached to the midrib at 2-4 mm from the base. The fruiting racemes are 3-5 cm long and have fruits slightly oblate with a depressed ventral suture, 13-14 x 13-15 mm.

This species is close to *P. littlei* which has coriaceous or subcoriaceous leaves with straight secondary veins clearly anastomosing at 3-5 mm from the margin, major veins relatively plain below and longer fruiting racemes. On the other hand, *P. opaca*, has smaller coriaceous leaves and smaller fruits.

**Distribution.** From lowlands to mid elevation forest remnants in the central and southern Andes of Colombia.

**Elevation range.** 600 – 1840 m.

**Material examined.** (7) **COLOMBIA.** **Cauca:** El Tambo, Centro de Estudios ambientales Tambito, 1300 m, 12 Jul 2000, *Gonzalez, C.E. 3167* (CAUP); Santa Rosa, Corregimiento San Juan de Villalobos, Vereda La Esmeralda, 1698 m, 10 Oct 2004, *Munar, D.M. 1081* (CAUP); Cajibío, Corregimiento de La Venta, Km24, Popayán-Cali. Reserva forestal San José, 1840 m, 27 Mar 2003, *Ramírez, B.R. 16678* (CAUP); **Cundinamarca:** Cachipay, Entre Cachipay y

La Florida, 1700 m, 22 Mar 1942, *Cuatrecasas, J. 13611* (COL,F,US); Medina, Farallones de Medina, 1500 m, 25 Feb 1997, *Mendoza, H. 2426* (FMB); ibidem, 1000 m, 25 Feb 1997, *Mendoza, H. 2744* (FMB); **Putumayo**: Mocoa, Entre el rio Mocoa (Puente el aguacate) y la vereda el Zarzal, 600 m, 10 Jun 2002, *Macías, D. 2225* (CAUP,COAH).

**78. *P. sp. nov.* (“*aff. opaca-4glands*”)**

It can be distinguished by the subulate stipules measuring ca. 4 mm long, the chartaceous to subcoriaceous leaves, 11-16 x 3.5-4.5 cm with caudate apex, venation pattern brochidodromous festooned, secondary veins emerging at 60-70 degrees from the midrib, intersecondaries perpendicular to the midrib; and 2 pairs of minute glands, the first one on the pectinate basal pair of veins (1-3 mm from the base) next to the midrib and the second pair on the next secondary vein pair (5-8 mm from the base) between the midrib and the margin. Only specimens in sterile condition are known so far.

Similar to *P. muris*, but it has wider and shortly acuminate blades with rugose venation below. Also similar to *P. opaca* but that species has sub-coriaceous leaves with acute apex and just 2 glands. Finally, it can be considered close to *P. littlei*, but that species has only two glands, wider leaves and acuminate apex.

**Distribution.** Only known from lower montane forests in the central and western branches of the Andes in central Colombia.

**Elevation range.** 1949 – 2680 m.

**Material examined.** (5) **COLOMBIA.** **Quindío:** Filandia, Vereda Cruces, finca el Paraíso, 1949 m, 29 May 2002, *Mendoza, J.E. 378* (FMB); **Risaralda:** Pereira, entre Ceylan y El Cedral, 2150 m, 4 Dec 1989, *Franco, P. 2887* (COL); Vereda la Suiza SFF Otún Quimbaya, 25 Dec 2002, *Mendoza, J.E. 2284* (FMB); Pueblo Rico, Vereda Providencia a Pavero, 2620 m, 21 Aug 2004, *Prieto, A. 2330* (FMB); **Santander:** Encino, Reserva Natural Cachalú, límites con el Santuario Guanentá-Alto Fonse, 2000 m, 15 Mar 1999, *Mendoza, H. 6972* (FMB).



79. *P. sp. nov.* (“*aff. opaca Patia Cauca*”)

A new species remarkable by the elliptic-oblong to slightly obovate coriaceous leaves, 8.5-11 x 3-4.5 cm, slightly lustrous above with the lower surface minutely muricate, relatively long petioles (10-13 mm), venation pattern weak brochidodromous festooned, secondary veins arcuate ending parallel to the margin in a sinuous trajectory, emerging at 60-65 degrees from the midrib, prominent below, tertiaries sinuous percurrent but little conspicuous, and two relatively big basal glands (2-3 mm long). The floriferous shoots are 5.5-9 cm long; the flowers have pedicels 3-4.5 mm long, infundibuliform hypanthium 2.4-3 mm wide and anthers 0.8-1 mm long.

This combination of traits places it close to another new species from dry montane forests in southern Ecuador and northern Peru (*P. “aff opaca south-Ecu”*) but that taxon has glands placed upper in the lamina, shorter racemes and bigger flowers. In addition, previous determinations have associated specimens of this new taxon with *P. opaca*, but that species has shorter petioles, narrower elliptic leaves with secondary veins emerging at 70-80 degrees from the midrib, smaller crateriform glands and flexuous racemes with smaller flowers.

**Distribution.** Known from two localities at mid to high elevation forests in the upper slopes of the Patia valley, an inter-Andean dry valley in between humid regions in the southwestern part of the Colombian Andes.

**Elevation range.** 1850 – 2800 m.

**Material examined.** (2) **COLOMBIA. Cauca:** Bolivar, Corregimiento San Lorenzo, morro campana, 1850 m, 26 Dec 2005, *Zemanate, A. 7* (CAUP); **Nariño:** Pasto, Bosque de Daza, Panamericana antigua al norte, 2750 m, 8 Jun 1995, *Ramírez, B.R. 7612* (PSO).

80. *P.* sp. nov. (“*aff. antioquensis Tachira-Venezuela*”)

This is a small tree with relatively small elliptic-obovate leaves, 5-6 x 2.5-3 cm, petioles 5-7 x 0.5-0.7 mm, brochidodromous festooned venation, rugose below and impressed above, serrate margin and two submarginal glands placed on the first pair of secondary veins. The floriferous shoots are suberect and longer than the leaves, 6-7 cm long; the flowers have relatively weak pedicels (5-6 x 0.3-0.5 mm), infundibuliform hypanthium 2.5-3 mm wide, and anthers 0.8-1 mm long.

Similar to *P. antioquensis* but that species has shorter petioles, 4 conspicuous glands, shorter flexuous racemes and shorter anthers. On the other hand, the also serrate-leafed species, *P. brittoniana*, has larger leaves with basal glands, longer racemes and bigger flowers.

**Distribution.** Only known from the cerro El Duque in the state of Tachira, western Venezuela.

**Elevation range.** 2550 m.

**Material examined.** (1) VENEZUELA. Táchira: Jáuregui, 1 km 1 SE de El Cobre, 2550 m, 20 Jan 1991, *Pietrangeli, M. 1440* (NY).

81. *P.* sp. nov. (“*aff. muris ParamoUrrao-COL*”)

This new species can be recognized by the small (4.5-6.5 x 2.5-3 cm) elliptic rigid leaf blades, coarsely dentate, with transverse brochidodromous festooned venation, scabrous rugose on the lower surface and bullate on the upper side, secondary veins with straight trajectory emerging at 75-80 degrees from the midrib, tertiaries irregular reticulate and 2 glands placed on the first pair of secondary veins. The floriferous shoots are relatively short (3.5-4.5 cm) and densiflorous; the flowers have a narrow hypanthium

(1.5-1.8 mm wide), small cucullate laciniate sepals (0.7-1 mm), rhombic laciniate petals (ca. 1 mm wide), short filaments (2-4 mm) and anthers 0.5-0.6 mm long.

This species is similar to *P. antioquiensis*, however that taxon has "softer" veins, usually 4 glands and bigger flowers. On the other hand, another close taxon, *P. muris*, has bigger sizes in all vegetative and reproductive structures in general.

**Distribution.** This species is apparently endemic to highland and paramo forests in the north end of the western branch of the Colombian Andes in territory of the department of Antioquia.

**Elevation range.** 2735 – 3400 m.

**Material examined.** (6) COLOMBIA. **Antioquia:** Ituango, camino entre El Retiro y Cerro Paramillo, 3000 m, 25 Feb 1993, *Cuadros, H. 4944* (MO); Abriaqui, Parque Nacional Las Orquideas, sector cuchilla Morro Pelao (accediendo por La Mina, Rio Piedras arriba), 3400 m, 3 Feb 2012, *González, M. 797* (DAV,NY); Parque Nacional Las Orquídeas, sector cuchilla Morro Pelao (accediendo por La Mina, Rio Piedras arriba), 3400 m, 7 Feb 2012, *González, M. 913* (DAV,NY); Urrao, Paramo Frontino, 3340 m, 11 Sep 2000, *Pérez-Zabala, J.A. 1435* (MEDEL); ibidem, vertiente norte, bajando hacia la planicie, 3220 m, 5 Dec 2001, *Pérez-Zabala, J.A. 2100* (MEDEL); Bolivar, Región de Monteblanco, 2735 m, 12 Nov 1996, *Sánchez, D. 3041* (MEDEL).

82. *P.* sp. nov. ("*aff. muris Quijos-Ecu*")

This new species can be recognized by the chartaceous oblong-elliptic leaf blades, 12.5-16 x 5-6 cm, slightly falcate, with base rounded to obtuse, apex acute to acuminate, venation pattern weak brochidodromous, arcuate secondary veins anastomosing at 3-5 mm from the margin and forming successive loops, tertiaries sinuous percurrent, and 4 glands with the 2 lowermost basal and subtly attached to the lateral sides of the apex of the petiole and the upper ones around the first pair of veins, submarginal

and prominent. The floriferous shoots are sub-erect, 5-9 cm long, with flowers subtended by very thin (0.3-0.5 mm) and short pedicels (2-4 mm) and hypanthium hemispheric 1.8-2 mm wide. The fruits are globose or slightly oblate, 10-12 x 11-13 mm with raised suture edges.

Similar to *P. muris*, which occurs at higher elevations, has smaller symmetric leaves with only two sub-marginal glands and racemes generally shorter and erect.

**Distribution.** Distributed in montane humid forests of the Amazonian slope of the Andes from southwestern Colombia to central Ecuador.

**Elevation range.** 1950 – 2500 m.

**Local names.** ahuano, donsel, wilmo blanco (Ecuador).

**Material examined.** (15) **COLOMBIA.** Sine loco, 1800, *Mutis, J.C. 4059* (US); **Putumayo:** Mocoa, El Mirador, Carretera entre Sibundoy y Mocoa, 2000 m, 7 Sep 1998, *Mendoza, H. 6075* (COAH,CUVC,FMB,FMB,MEDEL). **ECUADOR. Morona-Santiago:** Morona, Parque Nacional Sangay, zona de influencia. Angostura. Río Abanico, 1950 m, 26 Jul 2002, *Suín, L. 2048* (DAV,QCNE); **Napo:** Quijos, Sierra Azul (Agrícola Industrial Río Aragón). Campamento Estero Chico, 2500 m, 17 Jun 1992, *Alvarez, A. 477* (MO,NY,QCA,QCNE); ibidem, 2500 m, 18 Jun 1992, *Alvarez, A. 485* (MO,QCA,QCNE); Reserva Ecológica Antisana, cordillera de Guacamayos, ruta del oleoducto propuesto por ARCO, 1 km al suroeste de La Virgen, 2000 m, 1 Oct 1997, *Freire, E. 2496* (QCNE); ibidem, Km 100. Camino viejo de herradura, cerca de las antenas, 2000 m, 1 Oct 1997, *Vargas, H. 1686* (MO,QCNE); ibidem, colecciones entre El Mirador y La Virgen. Oleoducto de la Compañía Arco, 2200 m, 12 Dec 1998, *Vargas, H. 3201* (DAV,MO,QCA,QCNE); ibidem, 2200 m, 17 Dec 1998, *Vargas, H. 3266* (MO,QCNE); ibidem, 17 Dec 1998, *Vargas, H. 3282* (DAV,MO,QCA,QCNE); ibidem, 17 Dec 1998, *Vargas, H. 3290* (MO,QCNE); ibidem, colecciones entre Río Vinillos y El Mirador, 2280 m, 3 Jan 1999, *Vargas, H. 3328* (DAV,MO,QCA,QCNE); **Sucumbíos:** Río Bermejo to Sur Pax. access from Bemejo oil field to Road 2. Summit of Sur Pax, South peak. Foothill of the Andes, close to Colombian border, 2275 m, 1 Aug 2001, *Aguinda, R. 1476* (F); **Tungurahua:** Baños, Zona de amortiguamiento del Parque Nacional Llanganates. Machay, Río Verde.

Colina San Agustín, 2090 m, 1 Aug 1999, Vargas, H. 3788 (MO, QCNE); ibidem, 2090 m, 1 Aug 1999, Vargas, H. 3838 (MO, QCNE).

83. *P.* sp. nov. (“*badilloiLi-VEN*”)

A rare new species that can be distinguished by the shoots with dense transverse protuberant scars along the lower half of each reiteration (similar to those seen sometimes in the Mesoamerican *P. annularis*), the elliptic-oblong sub-coriaceous leaves, 7.5-9.5 x 2.5-3.8 cm, with relatively long petioles (11-14 mm), base obtuse and apex narrowly attenuate, venation pattern brochidodromous, secondaries 12-13, emerging initially more or less straight at 70-85 degrees from the midrib and anastomosing at 2-3 mm from the margin, tertiaries reticulate, and 2 basal crateriform glands next to the midrib. The floriferous shoots are erect, 3-4 cm long; the flowers have pedicels 2-2.5 mm long and hypanthium 1.8-2.3 mm wide.

The more similar species are *P. opaca* that has shorter petioles, less secondary veins and subflexuous racemes; and on the other hand, *P. muris*, that has larger leaves with brochidodromous festooned prominent venation and longer floriferous shoots.

**Distribution.** Only known from a single locality in Venezuelan corresponding to mid-elevation sub-humid forests at the southwest of the city of Merida.

**Elevation range.** 2300 m.

**Material examined.** (1) VENEZUELA. Mérida: Entre San Isidro el Alto y El Molino, 2300 m, 23 Dec 1972, Badillo, V. 5825 (F).

84. *P.* sp. nov. (“*colombianaLi*”)

This new species has remarkable flattened twigs with longitudinal ridges, elliptic-oblong to elliptic-obovate subcoriaceous leaves, 8-11 x 3-4.3 cm, opaque on both sides, with base and apex acute, petiole 4-6 x 1-1.5 mm, brochidodromous festooned venation pattern, secondary veins (8-9) arcuate, emerging at 40-55 degrees from the midrib, intersecondaries and tertiaries sinuous percurrent and perpendicular to the midrib and 2 elliptic basal glands attached to the midrib. The floriferous shoots are short and sub-erect (2-3.5 cm long), the flowers are minute with pedicels 1.5-2 mm long and hypanthium 2 mm wide. The fruits are prolate, 9-10 x 7-8 mm.

Close to *P. strobilifera*, but that species has terete shoots, rigid coriaceous leaves with obscure tertiary venation, longer and thicker petioles (10-14 x 1-1.3 mm vs. 3-6 x 0.6-1 mm), erect floriferous shoots (vs. sub-erect) with strobiliferous appearance when young (because the long persistent bracts) and fruits with shorter pedicels (3-4 vs. 4-7 mm). Also similar to *P. opaca* but that species has rounded submarginal glands (vs. oblong and basal), longer racemes and overall larger flowers.

**Distribution.** Only known from localities close to Popayan the capital of Cauca department in Colombia corresponding to mid-elevation humid forests.

**Elevation range.** 1500 – 2000 m.

**Material examined.** (2) COLOMBIA. Cauca: Popayán, In Highlands of Popayan, 1500 m, Oct 1889, *Lehmann, F.* 9085 A (GH,NY); Cajibío, Reserva raices de vida, 1800 m, 3 Dec 2005, *Otálora, N.* 162 (CAUP).

85. *P.* sp. nov. ("**Bigleaves-La Planada-Col**")

This is a new remarkable species easy to recognize because its big oblong obovate to elliptic obovate chartaceous leaves, 22-30 cm long and 12-16 cm wide, relatively opaque on both sides, with relatively short petioles measuring 6-10 x 2-3.5 mm; the venation pattern is brochidodromous festooned, the secondary

veins (10-12) are heterogeneously spaced, intersecondaries relatively short, tertiaries sinuous percurrent, both secondary and tertiary veins are slightly raised on the lower surface and impressed above, almost perpendicular to the midrib and connecting with the precedent secondary vein; the glands are 4, with the lower two 0.8-1.5 mm wide and located below the first pair of veins at 2-5 mm from the base and almost attached to the midrib, the upper ones are 1.5-2 mm wide and located between the first and second pair of veins at 10-20 mm from the base and 2-4 mm apart from the midrib. Only known from sterile collections.

It can be considered close to *P. integrifolia* and *P. muris* but the superlative size of the leaves with chartaceous texture and 4 central glands can help to tell apart this new taxon from them.

**Distribution.** Only known from southwestern Colombia (La Planada, Nariño) and northwestern Ecuador in mid-elevation pluvial forest in the pacific slope of the Andes.

**Elevation range.** 1500 – 1840 m.

**Material examined.** (3) **COLOMBIA.** Nariño: Ricaurte, La Planada, Salazar Finca 7 km above Ricaurte, 1750 m, 29 Nov 1981, *Gentry, A. 35180* (MO); Reserva la Planada, Via al Ondón, 1840 m, 12 Mar 1999, *Ledezma, J. 53* (COL); Reserva Natural la Planada, 1500 m, 8 Mar 1995, *Mendoza, H. 777* (FMB,PSO). **ECUADOR.** **Pichincha.** Maquipucuna, 5 km E of Nanegal, 1630 m, 9 May 1990, *Gentry, A. 69940* (MO).

86. *P.* sp. nov. (“*Lasser-Trujillo-Venezuela*”)

This new species can be distinguished by the relatively small elliptic-oblong rigid coriaceous leaves (5.5-11 x 2.3-4.8 cm) with base obtuse to rounded, apex shortly acuminate, short petioles (ca. 5 mm long), weak brochidodromous venation pattern, secondary veins progressively arcuate, plain on both sides, inconspicuous minor venation, and 2 glands placed between the first and second pair of secondary veins midway between the midrib and the margin and 6-11 mm from the base. The fruiting racemes measure 2-

2.5 cm long and have globose fruits ca. 8 mm wide. It is close to the new Venezuelan species named here as "*P. pittieri*Li" which however has larger less coriaceous leaves, sub-basal to sub-marginal glands, longer racemes and larger fruits.

**Distribution.** Only known from the northwestern slopes of the Cordillera de Merida facing the lake of Maracaibo in the state of Trujillo (Venezuela) and the coastal Sierra de San Luis in the state of Falcon. This is a mid-elevation humid area with influence of seasonally dry forest vegetation of the Maracaibo basin.

**Elevation range.** 1800m.

**Material examined.** (1) VENEZUELA. **Falcón:** Sierra de San Luis, Montaña de Paraguariba. Selva siempreverde al lado de rio, 1300 m, 29 Apr 1979, *Werff, H. van der 3424* (MO). **Trujillo:** Lomas del Torro, entre Trujillo y Boconó, 1800 m, Aug 1944, *Lasser, T. 1153* (UC,US).

87. *P.* sp. nov. ("*lustrous-Lvs Tulcan-Ecu*")

This new species can be recognized by the elliptic leaves, 11.5-15 x 6-9 cm, lustrous on both sides, with obtuse base and shortly acuminate apex, 8 secondary veins emerging at 70-80 degrees from the midrib and configuring a brochidodromous festooned pattern, two conspicuous glands (ca. 1.5 mm wide) placed on the first pair of secondary veins, 6-7 mm from the base and next but not attached to the midrib. The only known specimen is in sterile condition.

The vegetative morphology is close to the Guianas taxon *P. accumulans* which has venation pattern weak brochidodromous, base rounded and smaller glands. Bonifaz and Cornejo (2004) proposed a new species of *Prunus* from cordillera Chongón Colonche in the Ecuadorian province of Guayas, that according to the brief description and overall illustration provided may represent the taxon here described.



**Distribution.** In the western (Pacific) slope of the northern Ecuadorian Andes in mid-elevation pluvial primary forests. The moist pacific slope of the Colombian and Ecuadorian Andes is unfortunately poorly represented in the herbaria collections; however, it can be the home to several more unknown species of *Prunus* as suggested by the new taxa of the region found in this revision.

**Elevation range.** 1800 m.

**Material examined.** (1) ECUADOR. Carchi: Tulcán, Parroquia Tobar Donoso. Reserva Indígena Awá. Centro El Baboso, 1800 m, 17 Aug 1992, *Tipaz, G. 1828* (MO, QCNE).

88. *P.* sp. nov. ("*macarena-Colombia*")

This rare new species is remarkable by its elliptic to elliptic-obovate sub-coriaceous leaves, 11.5-13 x 3.6-4.1 cm, generally rhombic in appearance, with base acute to cuneate, apex narrowly attenuate, margin revolute, very ascending secondary veins departing at 35-45 degrees from midrib and following an eucamptodromous pattern, intersecondaries parallel to secondaries and at least half as long as them (in a disposition with a fish spine appearance), tertiaries irregular reticulate but inconspicuous, and 2 glands placed between the first and second pair of secondary veins or on the latter at 8-15 mm from the base and 1-5 mm from the midrib. The fruiting racemes are 4-5 cm long, the fruits are slightly prolate and apiculate and measure 8-9 x 7-8 mm. Flowers are unknown.

The leaf architecture is similar to a new species from southeastern Brazil, *P.* sp. nov. "*rhombicLvs*", but that taxon has smaller leaves with basal glands and very visible major and minor veins. No other Andean species is similar to this new taxon.

**Distribution.** Apparently endemic to the Sierra de la Macarena massif in Colombia. This massif is a Precambrian formation part of the Guiana shield and placed next to the east side of the eastern branch of the Colombian Andes in the middle part of the country (Kroonenberg, 1982).

**Elevation range.** 1600 m.

**Material examined.** (1) COLOMBIA. **Meta:** Vistahermosa, cordillera de La Macarena, extremo nordeste. macizo Rengifo, cumbre y alrededores, 1600 m, 6 Jan 1951, *Idrobo, J.M. 1044* (GH,US).

89. *P.* sp. nov. (“*multiglands-Western-Colombia*”)

This new species has elliptic-oblong chartaceous leaves, 15-22 x 8-11.5 cm, opaque on both sides, with base slightly asymmetric and truncate, apex acute, secondary venation pattern brochidromous festooned with 9-10 veins departing at 70-80 degrees from the midrib, tertiary veins sinuous percurrent and five or more pair of glands (some leaves have just two), the lower two placed between the first and second pair of veins, the rest placed on the external loops or between secondary veins midway from the midrib to the margin. Only sterile material is known so far.

Close to *P. integrifolia* but that species has only 2 or 4 glands, coriaceous leaves and occurrences in general at higher elevations. On the other side, *P. megacarpa* can have more than 2 pair of glands, but it has leaves coriaceous, with base acute to cuneate and secondary veins departing from the midrib at an angle close to 45 degrees.

**Distribution.** Restricted to the western slope of the western branch of the Andes in Colombia between 1600 and 2200 m elevation.

**Elevation range.** 1650 – 2140 m.

**Material examined.** (3) **COLOMBIA.** **Antioquia:** Alto de Cuevas, 10 km W of Blanquita, 12 km W of Nutibara, 1750 m, 3 Mar 1992, *Gentry, A. 76076* (FMB,MO); **Chocó:** San Jose Del Palmar, Vereda El tabor, Finca el Tabor, 1650 m, 17 Jan 1983, *Franco, P. 1422* (COL); **Valle del Cauca:** Argelia, Vereda Las Brisas, 2140 m, 21 Jan 1983, *Franco, P. 1692* (COL).

90. *P.* sp. nov. ("*North-Santander-aff. littlei*")

This poorly known new species is characterized by the chartaceous oblong-ovate leaves, 9-12 x 3.5-5 cm, slightly lustrous above, with round to obtuse base, margin undulate, brochidodromous festooned venation, secondary veins emerging at 70-75 degrees from the midrib, relatively straight up to 2/3 from the midrib, tertiaries alternate percurrent, and 4-6 laminar glands (0.6-0.8 mm diam.) placed at 4-6 mm from the midrib between the first and fourth pair of secondary veins but not at the base. The fruiting racemes are 5-7 cm long; the fruits are globose, ca. 12 mm wide. The flowers are unknown.

The more similar species is *P. littlei* that has leaves subcoriaceous with only two sub-basal glands placed next to the midrib. In contrast with this new taxon, most of the species with 4 glands in the Andes are found in high elevation places and they have the lower pair placed around the base of the blade.

**Distribution.** Only known from a mid-elevation sub-humid place in the Catatumbo basin, a region located at the northeastern extreme of the eastern branch of the Colombian Andes.

**Elevation range.** 1570 m.

**Material examined.** (1) **COLOMBIA.** **Norte de Santander:** Bochalema, Vereda Agua Blanca, Finca El Brillante, 1570 m, 19 Feb 1998, *Quiñones, L. 3132* (COL).

91. *P.* sp. nov. ("*rugosa* (*pp*)-*Spruce*")

This species can be distinguished by the elliptic-oblong to oblong-ovate coriaceous leaves, 15-26 x 6.2-13 cm, softly bullate and slightly lustrous to opaque above, rugose by prominent secondary and tertiary veins below, with base acute to rounded and deeply decurrent, apex acute, petiole 4-10 x 2.5-4 mm, venation pattern brochidodromous festooned, secondaries emerging at 70-80 degrees from the midrib relatively straight, intersecondaries very short and perpendicular to the midrib, tertiaries sinuous and alternate percurrent; and 4 glands, 2 basal lateral to the apex of the petiole in the transition to the blade and the second pair (sometimes absent) either on the first or second pair of secondary veins at 7-18 mm from the base and 1-3 mm from the margin. The floriferous shoots are sub-erect, 7-10.5 cm long; the flowers have pedicels 2.5-4.5 x 0.5-0.7 mm, hypanthium wide campanulate, 3-4 mm wide x 2-2.5 mm high and anthers 0.6-0.8 mm long. The fruits are ovate, 12-13 x 8-10 mm.

*P. rugosa* was published by Koehne (1915) based on two collections that clearly represent different species. The first one, *Lehmann 5568*, is a sterile collection from central-south Ecuador that has serrate leaves, very prominent secondary and tertiary veins and 2 basal glands; a combination of characters among others that corresponds to *P. huantensis* (here = *P. brittoniana*) as annotated by Romoleroux (1996). The second one, *Spruce 5992*, is a collection with not specific locality in Ecuador that has big oblong entire leaves with decurrent base, four glands and long suberect racemes that fits better with another taxon close to but different from *P. integrifolia*. Here, I am proposing the assignation of a new name for *P. rugosa* (*pro parte*) in order to disambiguate its mixed original description. The widely distributed *P. integrifolia*, can be differentiated by its leaves with only two basal glands (vs. 4), with arcuate veins merging close to the margin (vs. relatively straight secondary veins arranged in a brochidodromous festooned pattern) and the erect racemes (vs. suberect to flexuous).

**Distribution.** Distributed in montane forests from northern Peru in the department of Amazonas to northern Colombia in the Sierra Nevada de Santa Marta and western Venezuela in the state of Tachira.

**Elevation range.** 1800 – 3200 m.

**Local names.** cariseco, pandala, sachafruta de monte (Colombia)

**Material examined.** (44) **COLOMBIA.** Sine loco, *Mutis, J.C. 1918* (US); sine loco, *Mutis, J.C. 4050* (US); sine loco, *Mutis, J.C. 5013* (US); sine loco, *Mutis, J.C. 5014* (US); sine loco, *Mutis, J.C. 5034* (US); **Antioquia:** Urrao, Corregimiento Encarnación, 1 hora S del Páramo de Frontino, sitio el Rio, 3000 m, 8 Apr 1989, *Callejas, R. 7857* (HUA,MO,NY); ibidem, 3040 m, 8 Jan 1984, *Londoño, R.G. 118* (COL,MEDEL); ibidem, 3100 m, 11 Sep 1984, *Londoño, R.G. 413* (COL,MEDEL); Salgar, Cerro Plateado, 2800 m, 2 Apr 2004, *Marrugo, J.C. 1129* (MEDEL); Urrao, Ascenso al Páramo de Frontino, en bosque cerca de la finca El Quince, 2900 m, 18 Nov 1988, *McPherson, G. 13105* (BRIT,HUA,MO); Paramo Frontino, vertiente norte del páramo, 3100 m, 9 Dec 2001, *Pérez-Zabala, J.A. 2172* (MEDEL); Descenso del páramo vertiente sur, Cuenca del Rio Urrao antes del Quince, 3000 m, 15 Dec 2001, *Pérez-Zabala, J.A. 2203* (MEDEL); Borde del Rio Urrao, 2540 m, 24 Jul 2006, *Pérez-Zabala, J.A. 2650* (MEDEL); Camino de descenso hacia el Quince, 3000 m, 28 Jul 2006, *Pérez-Zabala, J.A. 2696* (MEDEL); **Boyacá:** Pajarito, 2000 m, 5 Jun 1997, *Mendoza, H. 3940* (FMB); **Caquetá:** Quebrada del Rio Hacha, Cordillera oriental, vertiente Oriental. Bosques en Ruidosa, 2000 m, 26 Mar 1940, *Cuatrecasas, J. 8715* (COL,F,US); cerca del Rio Hacha, A orilla de Carretera, 2840 m, 16 Oct 1993, *Orozco, C.I. 2840* (COL); **Cundinamarca:** Tena, 5 km. al W del salto del Tequendama en la carretera a el Colegio, 0.5 km. al norte en la carretera a la planta el salto, 2125 m, 11 Jul 1972, *Barclay, A.S. 3565* (COL,FMB,US); **La Guajira:** N slopes of Cerro del Espejo Serranía de Perijá, Venezuela border, 2560 m, 28 Apr 1987, *Gentry, A. 57191* (MO); **Magdalena:** Cerro Kennedy, near top of highest peak in N massif of Sierra Nevada de Santa Marta, 2580 m, 24 Aug 1986, *Gentry, A. 55555* (MO); **Nariño:** Ipiales, Corregimiento La Victoria, bosque a orilla del rio Chingual, 2400 m, 18 Apr 1995, *Ramírez, B.R. 7302* (PSO); Pasto, bosque de Daza, Panamericana antigua al norte, 2750 m, 8 Jun 1995, *Ramírez, B.R. 7614* (PSO); **Quindio:** Salento, Alto Rio Quindio, camino a la reserva La Marina, 2600 m, 8 May 1990, *Bernal, R. 1834* (NY); La Cocora, Estación la Montaña, bosque a 500 m de la estación, 2950 m, 27 Sep 1992, *Franco, P. 3995* (COL); **Risaralda:** Reserva Ucumarí, arriba de la Pastora, 2610 m, 10 Oct 1989, *Rangel, O. 5196* (COL,MO); ibidem, 2610 m, 10 Oct 1989, *Rangel, O. 5199* (COL); ibidem, 2610 m, 10 Oct 1989, *Rangel, O. 5219* (COL); ibidem, 2610 m, 12 Oct 1989, *Rangel, O. 5593* (COL,MO); **Tolima:** Santa Isabel, Vereda Purima, Finca el prado. Cordillera Central, vertiente oriental, 2340 m, 2 Aug 1980, *Idrobo, J.M. 10482* (COL); **Valle del Cauca:** Cali, Hoya del Rio Cali, 2000 m, Jan 1941, *Bohorquez, P. 273*

(MEDEL); entre Las Brisas y Albán, Cordillera occidental, vertiente occidental: Monte la Guarida, filo de la cordillera sobre La Carbonera, 1950 m, 16 Oct 1946, *Cuatrecasas, J.* 22177 (COL,F,US,VALLE); Darién, Corregimiento Madroñal, 1800 m, 30 Jun 1988, *Devia, W.* 2227 (MO,TULV); El Cairo, Vereda Vallecitos. Finca Trinidad, 2120 m, 17 Mar 2003, *Vélez, J.G.* 5302 (FMB). **ECUADOR.** Cedropamba, 2660 m, 19 Aug 1975, *Little-Jr, E.L.* 254 (MO); Andibus Ecuadoriensis, 1857, *Spruce, R.* 5992 (BM,E,F,P); **Napo:** Coyuja, Carretera a Baeza, 2530 m, 19 Aug 1990, *Jaramillo, J.* 11946 (GB,NY,QCA); **Sucumbíos:** Carretera Pun-Aguarico km 15-18, 2800 m, 13 Aug 1949, *Acosta-Solís, M.* 13299 (F); Sucumbíos, Santa Bárbara, 2600 m, 29 Sep 1998, *Aguirre, X.* 179 (QCNE); ibidem, 2600 m, 29 Sep 1998, *Aguirre, X.* 222 (QCNE); **Zamora-Chinchipec:** Chinchipec, La Esmeralda. Cooperativa San Francisco de Numbala Alto, 2300 m, Jan 1995, *Palacios, W.* 13114 (MO,QCNE). **PERU. Amazonas:** Yambasbramba, across rio Chiriaco (data from other collections in the series), 1860 m, 2 Mar 1967, *Tillett, S.S.* 673 238 (GH,US); **Huanuco:** Tumanga, rain-forests of the Cordillera Carpish, north of the Andean village of Acomayo, 2400 m, Apr 1963, *Woytkowski, F.* 7940 (DAV,MO); ibidem, 2400 m, Apr 1963, *Woytkowski, F.* 8002 (GH,MO,UC,US). **VENEZUELA. Táchira:** Jáuregui, Cerro el Duque, 1 km al SE pueblo El Cobre, 2550 m, 29 Dec 1990, *Pietrangeli, M.* 1515 (NY).

92. *P.* sp. nov. (“*Sierra San Luis – Venezuela*”)

A new species easily distinguishable by the relatively small subcoriaceous to coriaceous elliptic leaves, 7-9 x 3-4 cm, upper surface slightly lustrous and dark, the lower one opaque and pale when dry, with acute and very decurrent base, apex acute, petioles flexuous, 4-9 x 0.7-1 mm, venation pattern eucamptodromous-like, the secondaries progressively arcuate, intersecondaries parallel to secondaries and half their length or longer, tertiaries inconspicuous, and 2 small glands placed between the first and second pair of veins at 5-10 mm from the base and 1-3 mm from the margin. The floriferous shoots are extremely short, 1.5-2 cm long, with just ca. 15 flowers; flowers with pedicels 0.5-1.5 mm long, hypanthium campanulate ca. 2 mm wide and anthers 0.2-0.3 mm long. Fruits are globose, apiculate, 10-11 mm wide.

Considering its isolated geographic distribution and the little size of all its organs, no other taxon is alike. Previous determinations assigned this species to *P. sphaerocarpa* which here is considered a synonym of *P. myrtifolia*. The latter, has larger leaves with four glands, more conspicuous venation and longer racemes.

**Distribution.** A species known just from two localities of isolated mountains next to the Caribbean coast of Venezuela: the Sierra de San Luis, located southward of the very dry peninsula of Paraguaná; and the Cerro El Humo located in the middle of the xeric dry peninsula of Paria. It is found in natural savannas and bordering forests.

**Elevation range.** 700 – 1400 m.

**Material examined.** (3) **VENEZUELA. Falcon:** Sierra de San Luis, entre La chapa y Uria, 1400 m, 19 Jul 1967, *Steyermark, J.A. 99196* (NY,P); Sierra de San Luis, montaña de Paraguariba, entre el Hotel Parador y Curimagua, 1300 m, 21 Jul 1967, *Steyermark, J.A. 99419* (NY); **Sucre:** Peninsula de Paria, vecindad de los positos, laderas que miran el norte, oeste del cerro Humo, 700 m, 10 Aug 1966, *Steyermark, J.A. 96320* (NY,US).

93. *P.* sp. nov. (“*SantaElena-Antioquia 4glands*”)

This new species can be distinguished by the bark of the twigs with sparse prominent ochre lenticels, elliptic-oblong to oblong-obovate subcoriaceous leaves, 9-11.5 x 2.4-3.6 cm, opaque on both sides, slightly asymmetric, drying dark brown to black, with petioles 4-7 x 1-1.3 mm, base acute and decurrent, apex acuminate to caudate, stipules lanceolate, 4-5 x 0.4-0.5 mm, venation pattern brochidodromous festooned, secondary veins 11-13, emerging at 60-65 degrees from the midrib and arching to 40-50 degrees after 2-6 mm, intersecondaries 5-10 mm, tertiaries alternate percurrent, lateral veins plain on both sides, and 2-4 rounded glands, slightly prominent, 0.8-1.3 mm wide, the most basal at 1-4 mm from the base and 0-2 mm from the margin, the upper pair (when present) at 8-12 mm from the base and 2-5 mm from the margin.

Floriferous shoots suberect, 4.5-7 cm long, flowers with pedicels 2.5-4 mm long, hypanthium 2.5-3.3 mm wide and anthers 0.7-0.8 mm long. The fruits are ovate apiculate, 9-11 x 8-9 mm.

This species is similar to *P. opaca* which however has leaves with round base, acute apex, less ascending secondary veins and only 2 basal glands and flowers with smaller anthers.

**Distribution.** Only known from the mountains surrounding the city of Medellín, Colombia, over 2500 m elevation.

**Elevation range.** 2500 – 2705 m.

**Material examined.** (3) COLOMBIA. Antioquia: Medellín, Santa Elena, 2600 m, 30 Jul 2010, *Pérez-Zabala, J.A. COL-2010-2* (DAV); Corregimiento Santa Elena, 1 km. delante del estadero "El silletero" vía Piedras blancas, 2500 m, 25 Jul 2004, *Pérez-Zabala, J.A. 2234* (MEDEL); Envigado, El Silencio. 1.5 km subiendo desde el potrero, 2705 m, 31 Oct 2004, *Vera-Sánchez, L.E. 977* (MEDEL).

94. *P.* sp. nov. ("*steyermarkii*Li – Venezuela")

This new species is a shrubby tree very remarkable by the rigid coriaceous wide elliptic leaves (7-9 x 4.5-6 cm), lustrous above and slightly lustrous to opaque below, with very short petioles (3-5 mm long), margin revolute, venation pattern brochidodromous festooned with secondary veins emerging initially straight at 60-65 degrees from the midrib, plain below and slightly prominent above, tertiaries inconspicuous, and four glands (the lower ones elongated and obscurely attached laterally to the midrib at the base and the upper ones rounded and relatively big (1.5-2 mm wide), placed between the first and second pair of veins in the middle of the lamina). The floriferous shoots are 5-8 cm long, subflexuous, the flowers have pedicels 5-8 mm long, hypanthium 3.5-4 mm wide and relatively big anthers 0.8-1 mm long. The fruits are prolate, pointy apiculate and measure 11-12 x 9-11 mm.



The more similar species is the lowland distributed *P. accumulans* which also has wide elliptic coriaceous leaves, but they are not rigid, the glands are only two and closer to the base and the flowers are significantly smaller.

**Distribution.** This is an apparently endemic species to the highlands of the isolated Turimiquire rocky sandstone massif located in the northeastern part of Venezuela just 40 km away from the coast of the Caribbean Sea.

**Elevation range.** 2000 – 2500 m.

**Material examined.** (6) VENEZUELA. Anzoátegui: Distrito Libertad: Ridges and tops of Montañas Negras, along the Sucre and Anzoátegui border, 20 airline km NE of Bergantín NE of Buenos Aires, Serranía de Turimiquire, 2300 m, 28 Nov 1981, *Davidse, G. 19517* (MO,NY); Distrito Freitas: Cerro Peonía, above Los Pajaritos; 31 airline km NE of Bergantín and N of Mundo Nuevo, Serranía de Turimiquire, slopes upper ridges and top of mountain, 2100 m, 2 Dec 1981, *Davidse, G. 19936* (MO,NY); ibidem, 2100 m, 2 Dec 1981, *Davidse, G. 19938* (MO); Cerro Peonia, above Santa Cruz, headwaters of Rio Manantiales, 2000 m, 20 Mar 1945, *Steyermark, J.A. 61639* (F,NY); **Sucre:** Cerro Turumuquire, rocky sandstone summit of eastern peak, 2500 m, 6 May 1945, *Steyermark, J.A. 62615* (F,NY,US); valley between Cerro del Diablo y Cerro de Neverí, along headwaters of Rio Amana, 2000 m, 11 May 1945, *Steyermark, J.A. 62733* (F,NY).

95. *P.* sp. nov. (“*tachira- Venezuela dryForest*”)

A small tree that can be distinguished by the narrow elliptic-oblong chartaceous leaves, 8-9 x 2-3 cm, some of them falcate, slightly lustrous above, opaque and superficially muricate below, drying ferruginous, with weak brochidodromous venation pattern, 11-12 secondary veins emerging at 50-60 degrees from the midrib, tertiaries obscure, and 2 sub-basal glands placed at 4-6 mm from the base midway between the

midrib and the margin. The fruiting racemes are 4-5 cm long and the fruits are globose, 7-9 mm wide. Flowers are unknown.

The drying pattern and elongate leaves are similar to some new species from northern Peru (e.g., *P. sp.nov. "jaen"* and *P. sp.nov. "cutervo"*) but those taxa have coriaceous symmetric leaves with more conspicuous glands.

**Distribution.** Only known from two places in the western side of the state of Tachira in Venezuela close to the border with Colombia and the surroundings of the city of Merida. Those are sub-humid areas with remnants of natural savannas and seasonal dry forests combined with some little pockets of humid forests.

**Elevation range.** 1500 – 2000 m.

**Material examined.** (2) **VENEZUELA. Merida:** Merida, Alrededores de Merida. Dto Libertador, 1500 m, 26 Jul 1973, *Badillo, V. 6590* (F); **Tachira:** Lobatera, La Cazadora, in 20- 25 m tall forest, with increasing humidity & elevation, finally a tall cloud forest with many palms & few tree ferns, 2000 m, Jul 1983, *Werff, H. van der 5452* (F,MO).

**CENTRAL ANDES** (42 taxa in total including shared with other areas)

96. *P. brittoniana* Rusby, Mem. Torrey Bot. Club 3: 24. 1893. *Laurocerasus brittoniana* (Rusby) C.K. Schneid., Ill. Handb. Laubholz. I. 648. 1906. Type: Bolivia: Songo, Nov 1890, *Bang, M. 821* (= *Mandon 677*, in protologue) (Holotype, NY! (Barcode-449972); isotypes, NY!(2), E!, F!, G!, GH!, K!, PH, US!(2))

*Prunus huantensis* Pilger, Bot. Jahrb. Syst. 50: 8. 1913. Type: Peru: Dept. Ayacucho, Prov. Huanta, between Tambo and the Apurimac, way of Osno, 2900-3000 m, May 1910. *Weberbauer 5583* (Holotype, B (destr.); isotypes: F!, GH!, US!).

*Prunus rigida* Koehne var. *subintegra* Koehne, Bot. Jahrb. Syst. 52: 316 (1915); Type: Bolivia: Vicinity Sorata, 2700 m, Nov 1892, *Bang, M. 1619* (Sintypes, A, F, GH!(2), MO!, NY!, US!(2)).

*Prunus rugosa* Koehne, Bot. Jahrb. Syst. 52: 311. 1915. (pro parte) Type: Ecuador: Azuay, Prov. Cañar, San Marcos. Paramo de Huairacaja, 2600-2900 m, *Lehmann 5568* (lectotype, F! (selected by Romoleroux (1996))).

This species is a relatively small tree that can be recognized by the elliptic-oblong to ovate-oblong chartaceous to sub-coriaceous leaves, 9-19 x 4.2-9 cm, with petioles 7-13 x 1.5-2.5 mm, base rounded to obtuse, apex acuminate, margin dentate with each tooth veined and sharp at the end (in some individuals entire or irregularly dentate), brochidodromous festooned venation pattern, secondaries emerging straight at 70-80 degrees from the midrib, intersecondaries always present connected to sinuous percurrent and reticulate tertiaries, major veins generally prominent below and impressed to bullate above, and 2 basal to sub-basal (and sub-marginal) glands plus frequently 2 additional marginal glands placed at 3-7 mm from the base. The floriferous shoots are erect to suberect, very variable in length measuring from 7 to 19 cm; the flowers have pedicels 3-6 mm long, hypanthium campanulate 3.5-4 mm wide and anthers 0.7-0.8 mm long.

Here, I am considering *P. huantensis* and *P. rigida* var. *subintegra* as synonyms since the initially proposed diagnostic characters to distinguish them from *P. brittoniana*, namely, the prominence of the veins on the lower surface of the blades for the former and irregularities in both the presence and frequency of teeth for the latter, were observed in specimens from near the type locality of *P. brittoniana* as well as in others across all its geographic range. The conspecific collections with the lectotype of *P. rugosa* are

considered synonyms of *P. huantensis* as previously suggested by Romoleroux (1996), and therefore are circumscribed here to *P. brittoniana*. However, the other part of the original material designated by Koehne (1915) for *P. rugosa* (*Spruce 5592*), is considered a separate species as discussed above.

**Distribution.** Distributed in high elevation humid and sub-humid forests from the central Andes in Bolivia to the central Andes in Ecuador.

**Elevation range.** 2480 – 3490 m.

**Local names.** Facte, pandala, pandala rojo (Ecuador).

**Material examined. (76) BOLIVIA. La Paz:** Franz Tamayo, Parque Nacional Madidi, Keara-Moxos, Kellutoro, 3000 m, 13 May 2008, *Araujo-Murakami, A. 4166* (DAV,LPB,MO); Piara, a 3 horas a pie de Pelechuco, bajando por el camino antiguo Pelechuco-Apolo, 2802 m, 7 Jun 2010, *Arellano, G. 2515* (DAV,LPB,MO); Nor Yungas, 25 km después de la cumbre Cerropal, 1 km hacia la mina el Salvador, 3080 m, 9 Nov 1980, *Beck, S.G. 3712* (LPB,NY); Chuspipata, 4 km hacia Unduavi, 3000 m, 31 Oct 1981, *Beck, S.G. 4897* (LPB,MO,NY); Sud Yungas, Debajo de Unduavi, subiendo a cerro Cerromarca, 3300 m, 27 Aug 1988, *Beck, S.G. 14657* (QCA); Nor Yungas, Unduani (Localidad = Unduavi), 3300 m, Nov 1910, *Buchtien, O. 4826* (US); Bautista Saavedra, Área Natural de Manejo Integrado Apolobamba, comunidad Pajan, al NE del campamento Sullaca, 2848 m, 26 May 2010, *Cachaca, E. 97* (DAV,LPB,MO); Franz Tamayo, Área Natural de Manejo Integrado Apolobamba, Hilo Hilo, Chaka, sobre senda hacia Amantala, 3189 m, 18 Aug 2009, *Cayola, L. 3472* (DAV,LPB,MO); ibidem, 3189 m, 18 Aug 2009, *Cayola, L. 3485* (DAV,LPB,MO); Área Natural de Manejo Integrado Apolobamba, Hilo, Chaka, sobre senda hacia Amantala, 3189 m, 18 Aug 2009, *Cayola, L. 3487* (DAV,LPB,MO); Bautista Saavedra, Área Natural de Manejo Integrado Apolobamba, Wayrapata, Kumamita, 2889 m, 8 May 2010, *Cayola, L. 3685* (DAV,LPB,MO); Franz Tamayo, Parque Nacional Madidi, Puina Viejo, río abajo por camino al W del río, 3100 m, 21 Jun 2005, *Fuentes, A.F. 8526* (LPB,MO); ANMI Apolobamba, Piara hacia Pelechuco, 2700 m, 17 Apr 2006, *Fuentes, A.F. 10060* (LPB,MO); Bautista Saavedra, ANMI Apolobamba, Chulina, por la carretera a Matara, 3290 m, 14 May 2006, *Fuentes, A.F. 10534* (LPB,MA,MO,USZ); Muñecas, Camata, alturas de Quiñuaña, 3,7 km al SW del pueblo, 2820 m, 15 May 2006, *Fuentes, A.F. 10616* (LPB,MO); Franz Tamayo, Parque Nacional Madidi, entre Queara viejo y Unapuyu, 3236 m, 17

Sep 2009, *Fuentes, A.F. 15131* (DAV,MO); Parque Nacional Madidi, Queara, entre río Chullu y Chaquimayu, 2918 m, 18 Sep 2009, *Fuentes, A.F. 15144* (DAV,LPB,MO); Murillo, Valle de Rio Zongo: 29.6 km N of the pass, 2600 m, 8 Jan 1988, *Grifo, F. 657* (MO); Franz Tamayo, Área Natural de Manejo Integrado Madidi, Keara viejo, Chaquimayu, 3116 m, 21 May 2008, *Gutiérrez, J. 51* (DAV,LPB,MO); Senda Pelechuco-Mojo, sector Tambo Quemado, 3490 m, 3 May 2003, *Maldonado, C. 3281* (LPB,MA,MO); Larecaja, Sorata, valley of Rio Challasuyo, in nemoribus, 2900 m, 18 Aug 1878, *Mandon, G. 699* (F,GH,K,MO,NY,P); Camino de Sorata a Consata, por el camino de abajo, San Pedro, 2480 m, 1 Nov 2001, *Navarro Sanchez, G. 1874* (BOLV,MO); Murillo, Valle del Zongo, Cuticucho, 3150 m, 27 Jan 2006, *Nee, M. 53936* (LPB,MO,NY,US); Franz Tamayo, Senda Pelechuco-Mojo, sector Tambo Quemado, 30 minutos hacia abajo del campamento siguiendo la senda Pelechuco-Mojos, 3225 m, 8 May 2003, *Paniagua, N. 5782A* (BOLV,CTES,LPB,MA,MO,USZ); ibidem, 3225 m, 8 May 2003, *Paniagua, N. 5782* (LPB,MO,QCA); Sud Yungas, 3.1 km SE of Unduavi bridge (below) on old road, 3000 m, 6 Nov 1982, *Solomon, J.C. 8674* (LPB,MO,NY,US); Nor Yungas, 0.9 km W of Chuspipata, 3100 m, 3 Mar 1983, *Solomon, J.C. 9671* (MO,NY); Sud Yungas, 2.0 km SW (above) Unduavi, 3350 m, 12 Feb 1984, *Solomon, J.C. 11543* (LPB,MO,NY); Murillo, 24.5 km N of (below) the pass at the head of the Zongo Valley, 3100 m, 16 Sep 1984, *Solomon, J.C. 12371* (LPB,MO). **ECUADOR. Azuay:** Paramo del Castillo, N and NW of the Paramo, 6-8 km N-NE de Sevilla de Oro, 2400 m, 31 Aug 1945, *Camp, W.H. 5186* (NY,US); Pichahuaycu, al oeste del Cerro señor Pungu, 2950 m, 28 May 1999, *Serrano, F. 636* (QCA); Huagarancha, 1 1/2 leagues south of El Pan, 3200 m, 8 Jul 1943, *Steyermark, J.A. 53418* (NY); **Cañar:** Bayas, 15 km NE Azogues, 3017 m, 27 Sep 1944, *Prieto, F. P-122* (NY); Parroquia Bayas, valle del rio Tabacal 15 km NE de Azogues, 3200 m, 27 Sep 1944, *Prieto, F. 122* (US); **Cotopaxi:** Cantón Sigchos, falda del Cerro Azul, lado sur del Cerro, ca. 1:30 horas de las parcelas, 3297 m, 25 Jul 2003, *Ramos, J. 6553* (CUVC,DAV,MO,QCNE); Carretera Pilaló-Zumbagua, km 12-15, desvio a Angamarca, 3370 m, 19 Feb 1991, *Romoleroux, K. 1285* (AAU,HUA,MO,NY,QCA,QCA); Road Zumbagua-San Francisco, 3370 m, 17 Apr 1993, *Romoleroux, K. 1576* (QCA,QCNE); **Imbabura:** Cotacachi, Tablachupa. Vía Otavalo-Apuela, Km 36, 3000 m, 28 Aug 1993, *Cuamacás, B. 238* (LOJA,MO,QCNE); Carretero Pimampiro-Chuga-Palma Grande, km 6-8, 2900 m, 5 Sep 1988, *Freire-Fierro, A. 1153* (HUA,MO,NY,QCA,US); Cotacachi-Puela road, W side of pass, 2950 m, 3 Dec 1988, *Jorgensen, P.M. 65580* (QCA,QCNE); Carretera Cotacachi Apuela, 2900 m, 5 Dec 1986, *Ulloa, C. 299* (QCA); **Napo:** Cerro Sumaco, 3200 m, 2 May 1979, *Madison, M.T. 6904* (F,MO,US); Quijos, Norte del Río Verde, Finca de la Asociación Agroecológica Antisana, 2690 m, 14 Jun 1998, *Vargas, H. 1823* (MO,QCNE); ibidem, 2690 m, 15 Jun 1998, *Vargas, H. 1829* (MO,QCNE); ibidem, 2690 m,

15 Jun 1998, *Vargas, H. 1840* (MO, QCNE); **Pichincha**: Reserva Ecológica Los Illinizas, finca del sr. Iván Hidalgo, detrás de Cerro Corazón, ca 1:30 horas de casa del sr. Segundo Veracucha, lugar Laureles del Pongo, 3340 m, 20 Aug 2003, *Ramos, J. 7538* (CUVC, QCA, QCNE); **Tungurahua**: Tungurahua volcano. North side along the trail from Baños to the refugee, 3300 m, 18 Nov 1983, *Korning 47227* (AAU, QCA, QCNE). **PERU**. sine loco, 1839, *Gay, M.C.* (P); Mito, 2900 m, 8 Jul 1922, *Macbride, J.F. 1701* (F, NY, US); Cani Pueblo 7 Miles N.E. of Mito, 2591 m, 16 Apr 1923, *Macbride, J.F. 3399* (GH, MO, US); **Apurímac**: Ampay, 3800 m, 22 Apr 1991, *Núñez, P. 13418* (CUZ, MO, USM); Abancay, Dtto. Tamburco. Ampay, 3200 m, 15 Feb 1986, *Tupayachi, A. 74* (CUZ, MO); Bosques Ñarchero, 3200 m, 14 Jan 1950, *Vargas, C. 8998* (CUZ, MO, US); **Cusco**: Paucartambo, 3280 m, 1 Jul 2003, *Farfán, W. 593* (DAV, MO); Kosñipata. Trocha Unión, km 3, 3280 m, 2 Jul 2003, *Farfán, W. 595* (CUZ, DAV, HUT, MO, USM, WFU); ibidem, km 3, 3280 m, 29 Jun 2003, *Farfán, W. 601* (CUZ, DAV, HUT, MO, USM, WFU); ibidem, 3280 m, 29 Jun 2003, *Farfán, W. 610* (CUZ, DAV, HUT, MO, USM, WFU); ibidem, 3280 m, 30 Jun 2003, *Farfán, W. 615* (CUZ, DAV, HUT, MO, USM, WFU); Urubamba, Dist. Machu Picchu, Wiñay Wayna, 2769 m, 23 May 2004, *Galiano, W. 6336* (AMAZ, BRIT, CUZ, HUT, MO, NY, USM); Paucartambo, Paucartambo-Pilcopato road, 8 km below Tres Cruces turnoff, 3090 m, 29 Jun 1978, *Gentry, A. 23494* (MO); Calca, Distrito Yanatile, Colca, Huaca Huiscaña, 2800 m, 5 Jun 2007, *Huamantupa, I. 9285* (CUZ, DAV, HUT, MO, USM); Distrito Yanatile, 2600 m, 6 Jun 2007, *Huamantupa, I. 9455* (AMAZ, CUZ, DAV, HUT, MO, MOL, USM); ibidem, 3000 m, 9 Jun 2007, *Huamantupa, I. 9655* (CUZ, DAV, HUT, MO, USM); ibidem, 2800 m, 11 Jun 2007, *Huamantupa, I. 9956* (CUZ, MO); Paucartambo, Kosñipata. Predio Wayquicha, 3000 m, 29 Sep 2003, *Huaraca H.; W. 154* (CUZ, MO, USM, WFU); ibidem, 3000 m, 29 Sep 2003, *Huaraca H.; W. 157* (CUZ, MO, USM, WFU); Vilcabamba, Pampacona, 3750 m, 18 Oct 2003, *Succhi, E. 1415* (DAV, MO); Calca, Dist. Lares, Choquecancha, Manto, 3161 m, 20 Feb 2005, *Valenzuela, L. 5069* (CUZ, MO); La Convención, Distrito Huayopata, sector Carrizales, 3115 m, 22 Nov 2006, *Valenzuela, L. 8052* (AMAZ, CUZ, DAV, HUT, MO, USM); **Cuzco**: Alfamayo a San Luis, 2500 m, 15 Jan 1968, *Vargas, C. 20280* (CUZ); **Huanuco**: Huanuco, Mitotambo, 3200 m, 24 Jun 1953, *Ferreyra, R.A. 9446* (US); **Puno**: Carabaya, Ollachea, above falls, 2900 m, 14 Aug 1980, *Boeke, J.D. 3021* (MO, NY).

96a. *P. brittoniana* Rusby var. nov. "*abiseo-short-petiole*"

This new proposed variety is characterized by the twigs with a zig-zag pattern, the subcoriaceous elliptic-ovate and slightly asymmetric leaves, 9-15 x 4-7 cm, sparsely and minutely serrate, with short petioles (3-6 x 1.2-1.5 mm), base obtuse and truncate at the end, apex acute, brochidodromous double festooned venation pattern; and 4 glands, the lower 2 placed sub-basal attached laterally to the midrib and the upper pair submarginal at 5-10 mm from the base. The floriferous shoots are erect, 7-14 cm long, 1.5-2 mm thick, the flowers have short pedicels (2-3 mm long), infundibuliform hypanthium, 4.5-5 mm wide and anthers 0.8-1 mm long. The fruits are slightly prolate, 12-13 x 11-12 mm and have a very thick pedicel (2-3 mm wide). The typical collections of *P. brittoniana* comparatively have straight (not zig-zag) terminal branches, symmetric leaves with longer petioles and the slimmer fruit pedicels.

**Distribution.** Apparently endemic to humid forests in the Rio Abiseo upper basin in the province of Mariscal Caceres, Department of San Martin, Amazonian slope of the central-north Andes of Peru.

**Elevation range.** 2500 – 3400 m.

**Material examined.** (7) **PERU. San Martín:** Distrito Huallaga, Valley of Rio Apisoncho, 30 km above Jucusbamba, 2800 m, 8 Jul 1965, *Hamilton, A.C. 1111* (UC); Mariscal Caceres, Río Abiseo National Park, along trail between La Playa and Pajaten camps, 2500 m, 27 Jul 1985, *Young, K. 1313* (MO,USM); ibidem, along trail between La Playa base camp and Puerta del Monte, 2800 m, 3 Aug 1985, *Young, K. 1444* (MO); ibidem, ibidem, 2800 m, 3 Aug 1985, *Young, K. 1446* (MO,USM); ibidem, Chochos, 3300 m, 12 Feb 1986, *Young, K. 2718* (MOLF); ibidem, 3400 m, 29 May 1986, *Young, K. 3529* (MOLF); ibidem, collected along trail to el mirador, 3200 m, 11 Jul 1987, *Young, K. 4452* (USM).

96b. *P. brittoniana* var. nov. “*solisii*Li”

A variant of *P. brittoniana* distinguishable from the typical collections by the smaller leaf blade (6-9 x 2.5-5 cm), with thinner petioles (1-1.5 mm), margin irregularly dentate or entire and two marginal or

submarginal glands at 1-4 mm from the base sometimes creating a short marginal enation (vs. more often round crateriform glands attached to the midrib). The floriferous shoots are erect and vary from 7 to 13 cm long, the flowers are comparatively larger and have pedicels 5-8 mm long, campanulate hypanthium 4-5.5 mm wide, petals up to 3.5 mm wide and anthers 1.2-1.4 mm long. The fruits are relatively bigger, 16-20 mm wide, globose or slightly oblate (vs. slightly prolate and apiculate). It was formerly proposed as a new species by C.L. Li.

**Distribution.** A high elevation taxon that can reach the paramo biome in central and northern Ecuador and southwestern Colombia. A disjunct collection from Paramo de las Coloradas in Merida (Venezuela), around 1000 km northeast from the northern limit of the core distribution seems to fit well the circumscription of this new taxon as well.

**Elevation range.** 2480 – 3500 m.

**Local names.** berraquillo, pandala, pilche, sachamate (Colombia) pandala (Ecuador).

**Material examined.** (32) **COLOMBIA.** **Cauca:** Totoro, Vereda aguas vivas, 2850 m, 23 Mar 2004, *Córdoba, M.P. 4186* (COL); Gabriel López, Región de Malvazá, Alrededores de la población, declive occidental de la Cordillera Central, 3000 m, 9 Oct 1954, *Fernández, A. 2831* (COL); La Hoyola, alrededores de la población, Macizo Colombiano, 2910 m, 20 Sep 1958, *Idrobo, J.M. 3563* (COL); Almaguer, Vereda Guambial, 2900 m, 2 Aug 2003, *Macías, D. 3186* (CAUP,MEDEL); **Nariño:** Cumbal, Vereda Cuetial, paramo de cumbal, 3450 m, 16 Sep 2006, *Baca, A. 547* (COL); Túquerres, 4 km de la población vía a Samaniego, 2800 m, 24 Oct 1986, *de Benavides, O. 7051* (PSO); Pupiales, Hacienda Chires, 3000 m, 1963, *Mora, L.E. 2470* (PSO); Pasto, Vereda el campanero, 3000 m, 4 May 1964, *Mora, L.E. 2984 A* (PSO); Ipiales, cerca de las Cruces, Carretera El pedregal-Ipiales, 2900 m, 26 Sep 1972, *Mora, L.E. 6052* (PSO); Pasto, Predios Universidad de Nariño, 2480 m, 14 Aug 2010, *Pérez-Zabala, J.A. COL-2010-13* (MEDEL); Rio Bobo, Vereda Casanare, 3100 m, 4 Nov 1990, *Ramírez, B.R. 2775* (PSO); Cordoba, Cerro de las tres tulpas, 3050 m, 25 May 1995, *Ramírez, B.R. 7538* (MEDEL,PSO). **ECUADOR.** **Carchi:** Montúfar, Loma Guagua, 3000 m, 4 Dec 1998, *Aguirre, X. 362* (QCNE); ibidem, 3000 m, 4 Dec 1998, *Aguirre, X. 378* (DAV,MO); Monte



Verde near San Gabriel, 2800 m, 6 Oct 1984, *Brandbyge, J.S. 42811* (AAU,QCA); Canton Huaca, Estacion Biologica Guandera. La Loma El Corazón, 11 km NE from the community San Gabriel, 3400 m, 10 Dec 1995, *Clark, J.L. 1738* (MEXU,MO,MO,NY,QCNE,US); Al este de la Colonia Huaqueña, en el sector Breñaña o Loma Corazón, 3000 m, 18 Feb 1989, *Palacios, W. 3903* (MO,QCA,QCNE); Montúfar, Loma El Corazón (Breñaña), al sureste de Huaca, al este de la Colonia Huaqueña. Río Minas, 3200 m, 4 Apr 1991, *Palacios, W. 6969* (MO,QCNE); ibidem, 3150 m, 22 Dec 1992, *Palacios, W. 10590* (F,MEXU,MO,NY); San Gabriel, desvio Monte Verde, km17, 2900 m, 27 Dec 1990, *Romoleroux, K. 1221* (AAU,MO,NY,QCA); Cantón Montúfar. Loma El Corazón (Breñaña), al sureste de Huaca, al este de la Colonia Huaqueña. Río Minas, 3200 m, 26 Mar 1989, *Tipaz, G. 17* (AAU,MO,QCNE); Espejo, Parroquia San Isidro. Sector Chulte, 3200 m, 31 Jan 1992, *Tipaz, G. 627* (MO,QCNE); **Imbabura**: 2500 m, 18 Nov 1948, *Acosta-Solís, M. 14117* (F); Cantón Otavalo. Parroquia San Luis de Quichincha. Sitio San Alberto, 3100 m, 29 Jun 1989, *Moran, J. 3* (MO,QCA,QCNE); Otavalo, Otavalo Selva Alegre, 2800 m, 23 Apr 1992, *Palacios, W. 10019* (MO,QCNE); Pimampiro, Parroquia Shanshipamba, 2800 m, 8 Dec 1991, *Rubio, D. 2225* (MO,NY,QCNE); Parroquia Chugá. San Francisco de los Palmares, al este de Pimampiro, 3100 m, 17 Jan 1992, *Tipaz, G. 612* (MO,QCNE); **Napo**: Cantón Sucumbios (El Playón de San Francisco). Parroquia Cocha seca, 3050 m, 23 May 1985, *Jaramillo, J. 7687* (MO,NY,QCA); **Pichincha**: Pasochoa ca. 30 km S of Quito E. of Uyumbicho, 3000 m, 19 Jul 1986, *Gentry, A. 54876* (MO); Pasochoa, S. of Quito. Montane forest. Transect 4, 3020 m, 1 Jan 1988, *Gentry, A. 60290* (G,MO). **VENEZUELA. Merida**: San Rafael, Páramo de las Coloradas, 2800 m, 9 Feb 1973, *Cuatrecasas, J. 28523* (US).

97. *P. integrifolia* (C. Presl) Walp., Ann. Bot. Syst. 3: 854. 1852. *Cerasus integrifolia* C. Presl, Epim. Bot. 194. [1849] 1851. Type: Perú. in montanis huanoccensibus Peruviae, *Haenke sn.* (PR)

*Prunus recurviflora* Koehne, Bot. Jahrb. Syst. 52: 311. 1915. Type: Colombia. Antioquia, Medellín, *Posada-Arango, A. 10* (B (destr.), foto F). Neotype (selected by Aymard (2004)): Colombia: Antioquia, Bello, Vereda San Félix, Vereda San Félix, 6.3 km from Medellín-San Pedro road on road to

communication towers, 2920 m, 23 May 1988, *Zarucchi, J.L.; Roldán, F.J.* 6868 (neotype, MO; isoneotypus COL!, GH!, HUA!, NY!, US!).

*Prunus villegasiana* Pilger, Notizbl. Bot. Gart. Berlin 13: 497. 1937.; Type: Colombia: Valle del Cauca, Cali, Rio Cali, Coordillera Occidental, 2000 m, Nov 1936, *Duque-Jaramillo, J.M.* 340 (B (destr), foto COL!).

This widespread Andean species can be recognized by the lanceolate-oblong, elliptic oblong or oblong coriaceous leaves, 15-28 x 6-10 cm, lustrous and relatively plain above, arranged distichously and pendulous on long patulous branches, usually with obtuse to rounded base (sometimes either cordate or asymmetric), weak brochidodromous venation pattern, secondaries arcuate, tertiaries sinuous percurrent and 2 basal oblong glands attached to the midrib. The floriferous shoots are erect, 6-12 cm x 1.5-2.5 mm, densiflorous; the flowers frequently have reflexed pedicels, the hypanthium is 2.5-3.5 mm wide, the petals are up to 3.5 x 2.5 mm and the anthers 0.7-0.9 mm long. The fruits are prolate and apiculate 12-14 x 9-13 mm.

Previously, a broader circumscription of this species had been proposed; Koehne (1915) suggested that *P. pleiantha* and *P. pearcei* could eventually be considered under its synonymy, and Macbride (1938) suggested the same for *P. brittoniana* and *P. ruiziana*. However, *P. pleianta* has chartaceous leaves with noticeably short petioles and flexuous racemes with smaller flowers; *P. pearcei* is a lowland species with multiple glands and smaller flowers and *P. rugosa* (pro parte) has leaves relatively elliptic with rugose lower leaf surface, 4 glands and stouter floriferous axis. On the other hand, *P. brittoniana* has serrate leaves with festooned venation pattern and longer racemes and *P. ruiziana* has smaller leaves, shorter racemes and bigger flowers in general.

**Distribution.** The most widely distributed species in the Andes, ranging from northern Bolivia to central Venezuela on moist forests mostly between 2000 and 3000 meters elevation.

**Elevation range.** (710?) 1900 – 3600 m.

**Local names.** botumbo, botumbon, cariseco (Colombia), inca-inca (Peru), ira (Bolivia), naranjuelo (Colombia).

**Material examined.** (145) **BOLIVIA.** Sine loco, *Bang, M. 1938* (F,GH,MO,NY,PH,US); **La Paz:** Franz Tamayo, Madidi, Pinalito, 29 km al este de Apolo por el camino a San Jose de Uchupiamonas, 2360 m, 16 Jul 2002, *Araujo-Murakami, A. 298* (LPB,MA,MO,QCA); Parque Nacional Madidi, Keara-Moxos, Kelluturo,, 3000 m, 13 May 2008, *Araujo-Murakami, A. 4167* (BOLV,DAV,HSB,LPB,MA,MO,USZ); Piara, a 3 horas a pie de Pelechuco, bajando por el camino antiguo Pelechuco-Apolo, 2821 m, 27 May 2010, *Arellano, G. 2313* (DAV,MO); ibidem, 2821 m, 27 May 2010, *Arellano, G. 2336* (DAV,DAV,MO); ibidem, 2821 m, 27 May 2010, *Arellano, G. 2365* (DAV,MO); Nor Yungas, Yolosa, 2760 m, 24 Jan 1996, *Beck, S.G. 21931* (LPB,NY); Bautista Saavedra, Área Natural de Manejo Integrado Apolobamba, Chullina, Pampa Titiriwaya, 2846 m, 21 May 2010, *Cayola, L. 3766* (DAV,MO); ibidem, 2846 m, 21 May 2010, *Cayola, L. 3782* (DAV,MO); Franz Tamayo, ANMI Apolobamba, sector arroyo Colloarani, entre Pelechuco y Apolo, 2500 m, 19 Apr 2006, *Fuentes, A.F. 10311* (BOLV,LPB,MO,USZ); ANMI Apolobamba, sector Laitiki hacia Piara, entre Pelechuco y Apolo, 2650 m, 20 Apr 2006, *Fuentes, A.F. 10410* (BOLV,CTES,F,LPB,MA,MO,USZ); Muñecas, Aylulaya, arroyo mas alla de Siete Vueltas, entre Camata y Cuibaja, 2800 m, 19 May 2006, *Fuentes, A.F. 10839* (BOLV,CTES,LPB,MO,USZ); Nor Yungas, Valley of Río Coroico, Sacramento, 10 km NE of Chuspipata on Coroico road, 2450 m, 27 Jan 1984, *Gentry, A. 44685* (MO); ibidem, 2450 m, 30 Jan 1984, *Gentry, A. 44813* (MO); Franz Tamayo, Área Natural de Manejo Integrado Madidi, Keara viejo, Chaquimayu, 2861 m, 15 May 2008, *Gutiérrez, J. 3* (DAV,LPB,MA,MO,USZ); ibidem, 3116 m, 21 May 2008, *Gutiérrez, J. 64* (DAV,LPB,MO); Inquisivi, Quebrada Jancha Kaihua, along a ravine joining the Río Ocsalla ca 3 km down river from Laguna Huara Huarani, 10 km N of Choquetanga, 3400 m, 3 Sep 1991, *Lewis, M. 39711* (AA,DAV,LPB,MA,MO,NY,Z); Bautista Saavedra, Área Natural de Manejo Integrado Apolobamba, localidad Aymara Tapuri, senda de sampoñeros, 2697 m, 18 Jun 2010, *Loza, I. 1787* (DAV,MO); ibidem, 2697 m, 18 Jun 2010, *Loza, I. 1805* (DAV,MO); ibidem, 2697 m, 18 Jun 2010, *Loza, I. 1834* (DAV,MO); Nor Jungas, carretera a Coroico desde la Paz, 2801 m, Aug 2011, *Pérez-Zabala, J.A. BOL-2011-1-A82* (DAV); Franz Tamayo, Parque Nacional Madidi, Pelechuco - río abajo, Santa Ana, 2662 m, 12 May 2009, *Quiñones, M. 19* (BOLV,DAV,HSB,LPB,MA,MO,USZ); ibidem, 2486 m, 15 May 2009, *Quiñones, M. 87* (DAV,LPB,MO); Inquisivi,

comunidad choquetanga-Wichupampa. Seranias de Lulini. 13 km al norte de Choquetanga, 2-3 km al NW del cerro Lulini, 3290 m, 17 Mar 1994, *Salinas, N. 2706* (CUZ,DAV,LPB,QCA); Comunidad Choquetanga-Aguas calientes-Calachaca, cuenca del río Calchaca-Jahura, pequeño valle 9 km de Choquetanga, 3100 m, 20 Jul 1994, *Salinas, N. 3188* (CUZ,LPB,QCA); Franz Tamayo, Área Natural de Manejo Integrado Madidi, Pelechuco, Coranara, 2766 m, 2 Oct 2008, *Sánchez, L.F. 1* (LPB); ibidem. 2766 m, 2 Oct 2008, *Sánchez, L.F. 7* (LPB); ibidem, 2766 m, 2 Oct 2008, *Sánchez, L.F. 17* (LPB); ibidem, 2766 m, 2 Oct 2008, *Sánchez, L.F. 63* (LPB); ibidem, 2766 m, 2 Oct 2008, *Sánchez, L.F. 66* (LPB); ibidem, 2766 m, 2 Oct 2008, *Sánchez, L.F. 70* (LPB); ibidem, 2766 m, 2 Oct 2008, *Sánchez, L.F. 73* (LPB); ibidem, 2766 m, 2 Oct 2008, *Sánchez, L.F. 74* (LPB); ibidem, 2766 m, 2 Oct 2008, *Sánchez, L.F. 78* (LPB); ibidem, 2766 m, 2 Oct 2008, *Sánchez, L.F. 84* (LPB); ibidem, 2766 m, 2 Oct 2008, *Sánchez, L.F. 89* (LPB); Sud Yungas, 9 km de Huancané en la carretera hacia San Isidro. Bosque pluvial de alta montaña, intervenido, 2400 m, 2 May 1989, *Smith, D.N. 13064* (MO); Murillo, Río Zongo Valley. 27 km below dam at Lago Zongo, 2600 m, 10 Oct 1982, *Solomon, J.C. 8486* (CAS,MO,NY,US); ibidem, 2500 m, 27 Nov 1982, *Solomon, J.C. 8999* (LPB,MO,NY); Valle del Río Zongo, 28.5 km al norte de la cumbre (cerca de la Escuela Cambaya), 2400 m, 29 Jul 1988, *Solomon, J.C. 18710* (BRIT,MEXU,MO); Nor Yungas, 3.9 al norte (abajo) de Chuspipata por el camino a Yolosa, 2700 m, 6 May 1990, *Solomon, J.C. 18981* (MEXU,MO); Franz Tamayo, Área Natural de Manejo Integrado Apolobamba, Pelechuco, Coranara II, ladera frente a las ruinas de la ex Aduana de Coranara, 2570 m, 15 Oct 2008, *Villalobos, M. 14A* (LPB,MA,MO,USZ); ibidem, 2570 m, 15 Oct 2008, *Villalobos, M. 50* (BOLV,DAV,LPB,MO); ibidem, 2570 m, 15 Oct 2008, *Villalobos, M. 52* (DAV,HSB,LPB,MO). **COLOMBIA.** sine loco, *André, E. s.n.* (MO); **Antioquia:** Santa Rosa De Osos, Cerro San José, ca. 10 km al NE de Santa Rosa de Osos, 2600 m, 8 Jan 1985, *Bernal, R. 851* (COL); Medellín, Piedras Blancas (vereda), En cercanía del antiguo hotel el Cabuyo. Corredor MetroCable, 17 Dec 2007, *Botero, D. 1061* (MEDEL); Rionegro, Vereda Yarumales, 20-30 km SE de Medellín en la vía a Rionegro, 2140 m, 12 Nov 1990, *Callejas, R. 9631* (HUA,MO,NY); Envigado, Entre Caldas y Envigado, 2400 m, 16 Apr 1996, *Correa, M. 305* (HUA,JAUM,MO); ibidem, 2350 m, 16 Apr 1996, *Correa, M. 323* (BRIT,HUA,JAUM); Ituango, Antioquia, Ituango, El Retiro, 2570 m, 24 Feb 1993, *Cuadros, H. 4904* (CAS,MO); Urrao, Finca el Chuscal, Entre Urrao y Caicedo, Margen derecho del Río Urrao, 2770 m, 26 Jun 1994, *Edwards, K.S. 742* (TULV); La Ceja, 2400 m, Mar 1962, *Espinal, L.S. 405* (MEDEL); Medellín, Corregimiento Santa Elena, Vereda el Placer, al lado de la carretera, cerca al nacimiento 2 y 3 de la quebrada Santa Barbara, 2500 m, 28 Mar 1996, *Giraldo, L.F. 722* (HUA,JAUM); Santa Elena, 2440 m, 31 Jul 2010, *Pérez-Zabala, J.A. COL-2010-1* (DAV); Bello, Corregimiento de

San Félix, Vía del corregimiento a las torres repetidoras del cerro Baldios, 2500 m, 11 Jul 1997, *Pérez-Zabala, J.A. 161* (MEDEL); Corregimiento Santa Elena, a 1 km al norte de la estación forestal de Piedras Blancas, 2500 m, 25 Jul 2004, *Pérez-Zabala, J.A. 2236* (MEDEL); Rionegro, El tablazo, 2500 m, 24 Jan 1993, *Vargas, W.G. 788* (FAUC,HUA); Envigado, El Escobero (vereda), Finca La Morena, 2570 m, 31 Aug 2007, *Vélez-Puerta, J.M. 2407* (MEDEL); Alto de Campanas, Junto a la Cascada, 2300 m, 16 Nov 2004, *Vera-Sánchez, L.E. 1007* (MEDEL); Vereda San Félix, 6.3 km from Medellín-San Pedro road on road to communication towers, 2920 m, 11 Nov 1988, *Zarucchi, J.L. 7303* (COL,HUA,MO,NY,US); **Cauca**: Cabeceras del Rio Palo, Quebrada de Santo Domingo, vertiente derecha, 2640 m, 15 Dec 1944, *Cuatrecasas, J. 19359* (COL,GH,P,US,VALLE); **Cesar**: Manaure, Bosque antes de llegar al páramo. Cordillera oriental, 2000 m, 7 Mar 1959, *Romero-Castañeda, R. 7486* (COL); **Cundinamarca**: Entre Sebastopol y Alto de las Escaleras, Cordillera Oriental, vertiente occidental, 2300 m, 21 Mar 1942, *Cuatrecasas, J. 13569* (COL,COL,F,MEDEL,MEDEL,US,US); *ibidem*, 2300 m, 21 Mar 1942, *Cuatrecasas, J. 13569 A* (COL,F,MEDEL,US); San Francisco, Vereda la mina, 2450 m, 9 Apr 1988, *Franco, P. 2467* (COL,NY); Pacho, 2000 m, 1965, *Mahecha, G. 16* (UDBC); Granada, Vereda planadas, 2800 m, 16 May 1987, *Morales, G. 931* (COL); San Francisco, Vereda Sabaneta, 2600 m, 20 Feb 1990, *Sánchez, R. 1453* (COL); **Meta**: El Calvario, Cordillera oriental. Unos 7 Km. antes de llegar a San Francisco, a orilla de carretera, 2400 m, 4 Mar 1981, *Camargo, L.A. 7880* (COL); **Norte de Santander**: Valle Pica pica, above Tapatá, north of Toledo, 2100 m, 1 Mar 1927, *Killip, E.P. 20203* (GH,NY,US); **Quindío**: Salento, Vereda los Andes, Finca la Betulia, 2200 m, 13 Jun 1998, *Agudelo, C.A. 4020* (HUQ); *ibidem*, Finca la montaña, 2800 m, 13 Sep 2000, *Castaño, F. 117* (HUQ); Alto Navarco, cerca al bosque de roble, 2850 m, 21 Nov 1990, *Franco, P. 3171* (COL,HUQ); Novarco, cerca a la Finca, 2900 m, 20 Nov 1990, *Galeano, G. 2139 b* (COL); Cocora, Estación la Picota. Hacia el monte del Loro. antes de la primera quebrada, 2650 m, 10 May 1990, *Orozco, C.I. 2140* (COL,HUQ); Reserva del Alto Quindío Acaime, 2900 m, 11 Jan 1990, *Renjifo, L.M. 94* (HUQ); 2850 m, Oct 1992, *Vargas, W.G. 692* (FAUC,HUA); Vereda Llanitos, 1900 m, 11 Dec 1997, *Vargas, W.G. 4295* (HUA); Genova, Vereda Rio Gris Alto, Finca La Granja, 2000 m, 14 Feb 1994, *Vélez, M.C. 3818* (HUQ); Cordoba, Rio verde alto, 1400 m, 7 Aug 1995, *Vélez, M.C. 5650* (COL,HUQ); **Risaralda**: Pereira, Parque Nacional Natural Ucumarí, Vereda el Bosque, 2450 m, 9 Oct 1989, *Agudelo, C.A. 16* (HUQ); Vereda el bosque. Finca la pastura, 2460 m, 19 Oct 1989, *Agudelo, C.A. 66* (HUQ); Santuario, P.N.N. Tatama, Planes de San Rafael, Vereda la cumbre, 2200 m, 26 Sep 2000, *Devia, W. 7191* (TULV); Reserva Ucumarí, La Pastora, pendiente sobre salto de agua, 2620 m, 13 Oct 1989, *Rangel, O. 5691* (COL,MO); Vereda las Colonias, 200 m arriba del campamento, 2740 m, 1 Feb 1983,

*Torres, J.H. 1396* (COL); **Tolima:** Ibaguè, Corregimiento Toche, Finca Gallegito, 2780 m, 27 Jun 1996, *Agudelo, C.A. 3313* (HUQ); ibidem, 2780 m, 1996, *Agudelo, C.A. 3666* (HUQ); Finca la Leona, 2550 m, 7 Apr 1998, *Agudelo, C.A. 3977* (HUQ); ibidem, 2600 m, 25 May 1998, *Agudelo, C.A. 4001* (HUQ); Corregimiento Alto Toche, Finca cruces, 2780 m, 15 Jun 1996, *Agudelo, C.A. 4062* (HUQ); ibidem, 2650 m, 15 Jul 1998, *Agudelo, C.A. 4096* (HUQ); ibidem, 2700 m, 15 Sep 1998, *Agudelo, C.A. 4140* (HUQ); Roncesvalles, Tarapacá, Camino hacia el páramo de Yerbabuena. Vecindad de la población. Cordillera Central, 2600 m, 9 Nov 1980, *Camargo, L.A. 7523* (COL); Ibaguè, Vereda Toche, Finca Las Cruces, 2600 m, 15 Apr 1998, *Macías, D. 789* (HUQ); ibidem, 2600 m, 17 Nov 1998, *Macías, D. 1008* (HUQ); ibidem, 2600 m, 15 Oct 1998, *Macías, D. 1135* (HUQ); ibidem, 2600 m, 17 Nov 1998, *Macías, D. 1205* (HUQ); Anzoategui, Camino de la Argentina a la Hoyada, 3150 m, 17 Aug 1985, *Sánchez, H. 458* (FMB); **Valle del Cauca:** Cali, El Silencio, Rio Cali, 2000 m, , *Duque-Jaramillo, J.M. s.n. 1* (COL); Peñas blancas, Hoya del rio Cali, climas frios, 1800 m, 5 Jan 1937, *Duque-Jaramillo, J.M. 140* (VALLE); Rio Cali, El Recuerdo, 2000 m, 15 Oct 1947, *Duque-Jaramillo, J.M. 4445 A* (COL,FAUC); Bosque de San Antonio, W de Cali, cerca a la torre de televisión, 1950 m, 15 Jul 1984, *Gentry, A. 48106* (COL,CUVC,JAUM,MO,NY); Finca Zíngara, km 18 de la carretera Cali-Buenaventura, km 4 vía a Dapa, corregimiento de La Elvira, cordillera occidental, 1900 m, 13 Nov 1994, *Giraldo, J. 546* (CUVC,MO); El Darién, Región del Alto Calima, Faldas del Cerro Sinaí, 2200 m, 17 Jul 1970, *Mahecha, G. 369* (UDBC); Riofrio, Corregimiento de Fenicia, 1800 m, 26 Mar 1999, *Vargas, W.G. 5956* (HUA).

**ECUADOR. Imbabura:** Along road Otavalo-Apuela, collected at various altitudes, collected very close to Apuela, 2000 m, 3 Jul 1991, *Werff, H. van der 12181* (MO,NY,QCNE); **Pichincha:** Quito, Loma Murillo 1 Km al este del Río Alambí, arriba de Guarumos, por la carretera vieja Nono-Tandayapa, 2300 m, 13 Mar 2000, *Rojas, W. 438* (DAV,MO,QCNE); **Sucumbíos:** Playon de Santa Barbara, 2903 m, 12 Jul 2009, *Jaramillo, J. 29367* (QCA). **PERU.** Imainca, (habitat in Macora?). Pillao?. Habitat in silvis juxta aguas (viae cocheao) floret mende julii, 1785, *Ruiz, H. s.n.* (MA (5)); **Cajamarca:** Jaén, Transect 3. District Pomahuaca, Caserio Amilán, La Rinconada, 2350 m, 25 Jun 1993, *Shonle, I. 176* (MO); **Cusco:** Paucartambo, Parque Nacional Manu, Acjanaco, Cerro macho cruz, 3000 m, 12 Jul 1991, *Cano, A. 5061* (F,USM); Kosñipata, Trocha Unión, km 5, 2750 m, 18 Jul 2003, *Farfán, W. 889* (CUZ,DAV,HUT,MO,USM,WFU); ibidem, km 4, 3000 m, 4 Oct 2003, *Farfán, W. 1191* (CUZ,MO,USM,WFU); ibidem, 3000 m, 6 Oct 2003, *Farfán, W. 1200* (CUZ,MO,USM,WFU); Kosñipata. Predio Wayquicha, 3000 m, 28 Sep 2003, *Huaraca H.; W. 144* (CUZ,DAV,HUT,MO,USM,WFU); La Convención, Dist. Echarati. E. Rio Apurimac, NE Puerto Libre, 2445 m, 3 Aug 1998, *Núñez, P. 23208* (USM); Distrito Quellouno, Punta Lacco, 2470 m, 20 Aug 2007,

*Valenzuela, L. 10075* (CUZ,HUT,MO,MO,USM); Calca, Road Quebrada-Alto Lacco, 2800 m, 30 Apr 2006, *Werff, H. van der 21161* (MO); **Huánuco**: Cochero?, 2000 m, *Dombey 815* (P); **Junín**: Satipo. upper river Poyeni watershed, 2050 m, 1 Jul 1997, *Boyle, B. 4957* (USM); Carpapata, above Huacapistana, 2700 m, 7 Jun 1929, *Killip, E.P. 24453* (F,NY,US); **Madre de Dios**: Salvación, Provincia Manu, 710 m?, 27 Sep 1966, *Vargas, C. 17765* (US); **Pasco**: Oxapampa, Dist. Huancabamba. Sector Milpo. Zona de amortiguamiento del P.N. Yanachaga-Chemillen, 2850 m, 25 Sep 2004, *Monteagudo, A. 7363* (AMAZ,HUT,MO,MOL,USM); *ibidem*, 2850 m, 25 Sep 2004, *Monteagudo, A. 7385* (HUT,MO,USM); *ibidem*, Sector Oso-Playa, 2410 m, 24 Sep 2007, *Monteagudo, A. 15286* (AMAZ,DAV,HUT,MO,MOL,USM); *ibidem*, 2410 m, 24 Sep 2007, *Monteagudo, A. 15288* (AMAZ,DAV,HUT,MO,USM); *ibidem*, 2410 m, 24 Sep 2007, *Monteagudo, A. 15300* (AMAZ,DAV,HUT,MO,MOL,USM); *ibidem*, 2200 m, 11 Jun 2008, *Monteagudo, A. 16367* (AMAZ,DAV,HOXA,HUT,MO,USM); Huancabamba, Localidad de Lanturachi, sector Santa Barbara, camino a Cueva Blanca, 2813 m, 18 Oct 2004, *Perea, J. 746* (DAV,MO); Palmazú, 1900 m, 5 Oct 1984, *Smith, D.N. 8714* (MO); Oxapampa to Chacos Antenna, 2100 m, 27 Nov 2005, *Wen, J. 8620* (USM); border Oxapampa and Pasco, 2700 m, 7 Mar 1986, *Werff, H. van der 8598* (MO,USM); **VENEZUELA. Mérida**: La Carbonera, 26 km al W de Mérida, 2300 m, 23 Feb 1964, *Breteler, F.J. 3609* (COL,MO,NY,P,US); Ca. 57 km W. of Merida. La Carbonera, San Eusebio, 2300 m, 17 Nov 1966, *Bruijn, J. de 1297* (F,MO,NY,P,UC,US); Sucre, road from Las González to San José, 2300 m, 1 Dec 1990, *Dorr, L.J. 7917* (QCA,US); Bosque Eusibio, 2500 m, 17 Feb 1972, *Wolfe, F.H. 1283* (US); **Táchira**: Carretera Andina entre La Grita y Los Mirtos, 2400 m, 23 Nov 1948, *García-Barriga, H. 13289* (COL,NY,US).

98. *P. oblonga* Macbride, *Candollea* 5: 364. 1934. Type: Peru: Pasco, Saria en el valle del Rio Pozuzo (Huanuco since Weberbauer), 3300 m, 2 Jul 1913, *Weberbauer, A. 6732* (holotype F!; isotypes, MOL!, GH!).

This shrubby species is a one of the smallest in its overall size in the Neotropics with some individuals being adults with less than 1 m tall. It also has the smallest recorded leaves (1.8-4 x 0.8-2.3 cm) which are elliptic-oblong to oblong and rigid coriaceous, with base obtuse and apex truncate ending apiculate (as a midrib extension), margin entire to unevenly serrate, brochidodromous venation with 10-11 secondary

veins, tertiary veins inconspicuous and 2 glands located at the base and sub-marginally. The floriferous shoots are sub-erect, distributed towards the tips of the branches, 2.5-4.5 cm long; the flowers have pedicels 1-1.5 mm long, hypanthium campanulate 2.5-3.2 mm wide and anthers 0.8-1 mm long.

It is similar to another small-leaved species in Perú, *P. ovalis*, which however, has wider and longer elliptic-oblong leaves with more prominent lateral veins below.

**Distribution.** This species is distributed in mid to high elevation forests, dwarf forests and shrublands in the Oxapampa province, central Andes of Peru.

**Elevation range.** 2360 – 3300 m.

**Material examined.** (20) PERU. Sine loco, 1836, *Rivero, M.* (P); **Pasco:** Oxapampa, Cordillera Yanachaga: Cerro Pajonal "chacos", 12 km SE of Oxapampa, 2700 m, 7 Oct 1982, *Foster, R.* 9022 (DAV,MO,USM); Huancabamba, Misericordia trail, Lanturachi-Sta barbara, 3000 m, 3 Jul 1985, *Foster, R.* 10513 (F); Parque Nacional Yanachaga, to summit from road head at the Paraiso-San Francisco area, 3200 m, 25 Jun 1988, *Foster, R.* 12246 (F); Huancabamba, entre el Río cueva blanca y Milpo, 2720 m, 20 Sep 2004, *Monteagudo, A.* 7123 (AMAZ,HUT,MO,USM); ibidem, 2720 m, 20 Sep 2004, *Monteagudo, A.* 7139 (AMAZ,HUT,MO,USM); ibidem, 2720 m, 20 Sep 2004, *Monteagudo, A.* 7169 (AMAZ,HUT,MO,MOL,USM); Huancabamba. Zona de amortiguamiento del P.N. Yanachaga-Chemillén, sector Milpo, 2750 m, 22 Sep 2004, *Monteagudo, A.* 7225 (AMAZ,HUT,MO,MOL,USM); ibidem, 2750 m, 22 Sep 2004, *Monteagudo, A.* 7247 (MO,USM); Dist. Oxapampa, Parque Nacional Yanachaga-Chemillén, a 40 minutos del Refugio Abra Esperanza, 2910 m, 12 Oct 2006, *Monteagudo, A.* 12786 (MO,USM); Dist. Oxapampa. Camino hacia la antena de Chacos-Zona de Amortiguamiento, Parque Nacional Yanachaga-Chemillén, 2360 m, 27 Sep 2005, *Ortiz V., E.* 1010 (BRIT,MO,USM); Sector Santa Barbara, alrededor de campamento en Milpo, 2862 m, 20 Oct 2003, *Perea, J.* 808 (DAV,MO); Sector Chacos Antena, 2750 m, 12 Jan 2004, *Vásquez, R.* 28540 (DAV,MO); ibidem, 2750 m, 12 Jan 2004, *Vásquez, R.* 28628 (DAV,MO); Dist. Oxapampa. Chacos. Bosque esclerófilo, 2600 m, 4 Mar 2005, *Vásquez, R.* 30750 (AMAZ,DAV,HUT,MO,MOL,USM); Dist. Oxapampa. Parque Nacional Yanachaga-Chemillén, Zona de Amortiguamiento, carretera hacia Chacos y trocha al este de la Antena de Chacos, 2500 m, 27 Nov 2005, *Vilca C.* 591



(MO,USM); Dist. Oxapampa. Abra Villa Rica - Zona de Amortiguamiento, Parque Nacional Yanachaga-Chemillén, 2360 m, 28 Nov 2005, *Vilca C. 600* (MO,USM); Dist. Oxapampa, just below the antenna on its SE side and above a small lake, 2793 m, 27 Nov 2005, *Wen, J. 8625* (HOXA,US,USM); Dist. Villa Rica. Abra Villa Rica, 2360 m, 28 Nov 2005, *Wen, J. 8646* (US,USM).

99. *P. ovalis* Ruiz ex Koehne, Bot. Jahrb. Syst. 52: 315. 1915. Type: Peru: In Pillao, 1787, *Pavón s.n.* (sintypes, K!, MO!, P!).

This species can be distinguished by the foliage relatively clustered towards the tip the branches, the rigid-coriaceous elliptic to oblong-elliptic leaves, 2.5-4 x 1.5-3 cm, with petioles measuring 2-4 x 1-1.5 mm, base rounded to truncate, apex rounded to truncate and mucronate, margin entire to sparsely serrate mainly along the lower half of the blade, secondary vein pattern brochidodromous festooned, plain or seldom obscure below and impressed above, tertiary veins inconspicuous on both sides, and two submarginal glands (0.8-1 mm across) located at 1-2 mm from the base. The floriferous shoots are erect and placed mainly next to the tip of the branches, 2.5-4.2 cm long, the axis is 1-1.5 mm thick (when fruiting it can swell up to 3 mm thick), the flowers have pedicels 1.5-2 mm long, hypanthium campanulate 2-3 mm wide, and anthers rounded 0.6-0.7 mm long. The fruits are prolate apiculate and oblique, 13-15 x 8-10 mm.

The more similar known species is *P. oblonga* from central Peru which is a smaller shrub with smaller oblong leaves that have more secondary veins and shorter racemes with less flowers.

**Distribution.** Distributed in highland moist montane forest of the northern Peruvian and southern Ecuadorian Andes.

**Elevation range.** 2800 – 3134 m.

**Material examined.** (7) **ECUADOR. Azuay:** Hacienda Tarqui, Carretera Cuenca-Pasaje, km 22 desde Patacocha, 2800 m, 8 Aug 1986, *Jaramillo, J.* 8936 (NY,QCA,QCA,US). **PERU. Amazonas:** Luya, Distrito Camporredondo: Anexo: Tullanya. Cerro Wicsocunga, 3075 m, 7 Dec 1996, *Campos, J.* 3124 (DAV,MO,MOL); Camporredondo, saliendo de Tullanga, camino hacia Cerro Huicsocunga o Condor-puna, entre Paseana "La Palma" y la base del Cerro, 2900 m, 6 Sep 1989, *Díaz, C.* 3743 (DAV,MO); Camporeddondo, Tullanya, Base del Cerro Huicsocunga, 3075 m, 7 Dec 1996, *Díaz, C.* 8858 (DAV,MO,USM); 3075 m, 7 Dec 1996, *Díaz, C.* 8863 (DAV,MO); Chachapoyas, Distrito Leymebamba, Quintecocha. Vicinity of guard cabin at Quintecocha, 3134 m, 10 Jul 2008, *Townesmith, A.* 1234 (MO).

99a. *P. ovalis* Ruiz ex Koehne var. *nummularia* Koehne, Bot. Jahrb. Syst. 52: 315. 1915. Type: Peru: Prov. of Chachapoyas, 24 April 1914, *Matheus s.n.* (sintypes K! (2), MO!, P!, W!).

This is a rare shrubby taxon that can be distinguished by the sulcate rugose bark of the twigs, the coriaceous wide elliptic (almost orbicular) leaves, 2.5-4.5 x 2-3.5 cm, with very short petioles (2-3 mm long), base rounded to truncate, apex rounded to obcordate, brochidodromous festooned venation pattern, flat below but with the midrib very prominent and impressed above, margin entire or with some upward pointy teeth at the central region of the blade and two minute glands (0.5-0.6 mm across) located submarginally at 1-2 mm from the base. The floriferous shoots are sub-erect, 4-6.5 cm long, the axis 0.8-1 mm wide; the flowers have pedicels 1.5-2.5 mm long, open campanulate hypanthium 3.5-4.2 mm wide, and anthers 0.6-0.7 mm long.

Clearly different from the type variety because the less congested arrangement of the leaves presenting smaller glands. The racemes are laxer with slimmer rachis and larger open campanulate flowers.

**Distribution.** Only known from rocky scarps in the Chachapoyas province (in the route of the city of Chachapoyas to Molinopampa) in northern Peru.

**Elevation range.** 2300 – 2450 m.

**Material examined.** (2) **PERU. Amazonas:** Chachapoyas, ruta Chachapoyas - Mendoza, 2450 m, 4 Jul 1978, López, A. 8544 (NY).

100. *P. pleiantha* Pilger, Bot. Jahrb. Syst. 37: 538. 1906. Type: Peru: Huanuco, Valle de Monzón, Prov de Huamalies, 1800 m, Aug 1903, *Weberbauer*, A. 3507 (sintypes G!, MO!, MOL!(2)).

This species can be recognized by the big elliptic-oblong to ovate-oblong leaves (15-23 x 6.5-8.5 cm), slightly asymmetrical and falcate, with short and relatively thick petioles (3-5 mm long), base obtuse, apex acute, arcuate prominent secondary veins (8-10) weakly anastomosing near to the margin, intersecondaries perpendicular to the midrib, tertiaries irregular reticulate and two basal to sub-basal crateriform glands attached to the midrib. The racemes are flexuous and relatively long (8-12 cm long x 1.2-1.5 mm thick), the flowers are relatively small, with pedicels of 2-4.5 x 0.4-0.5 mm, hypanthium 2-2.5 mm wide and anthers 0.6-0.7 mm long.

Close to *P. integrifolia* but that taxon has thicker leaves with more secondary veins, racemes erect and bigger flowers with longer anthers. Other similar Peruvian species from the Amazonian slope (e.g., *P. amplifolia* and some similar new identified species), usually have plain veins, shorter floriferous shoots and smaller flowers.

**Distribution.** Only known from few mid-elevation localities in the amazonian slope of the northern and central Peruvian Andes.

**Elevation range.** 1800 – 2600 m.

**Material examined.** (4) **PERU.** Villcabamba, Rio Chinchao, Hacienda on Rio, 1800 m, 17 Jul 1923, *Macbride, J.F. 5187* (F,NY,US); **Amazonas:** Near the border with Dept. San Martin, 2000 m, 3 Apr 2001, *Werff, H. van der 16672* (MO,MOLF); **Huánuco:** Ambo, over the pass at La Carpish, 2600 m, 4 Aug 1978, *Aronson, J. 616* (MO).

101. *P. rigida* Koehne, Bot. Jahrb. Syst. 52: 316 (1915). Type: Peru. Cajamarca, San Miguel, Prov. Hualgayoc Encima de San Miguel, 2800-3000 m, *Weberbauer, A. 3945* (sintype MOL!).

This species can be distinguished by the ovate-oblong sub-coriaceous leaves, 6.5-9.5 x 2.8-5.8 cm, cordate to truncate at the base, acute at the apex, with petioles 5-7 cm long, margin either entire or sparsely serrate, brochidodromous festooned venation pattern, secondaries arcuate, 10-12, emerging at 70-80 degrees from the midrib, slightly prominent below and plain above, tertiaries alternate percurrent, and two glands located at the margin or next to it, 0-2 mm from the base on the sinus of the cordate base. The floriferous shoots are erect to suberect, 6-14 cm long; the flowers have pedicels 2-4 mm long, hypanthium 3.5-4 mm wide and anthers 0.7-0.8 mm long. The fruits are ovate and apiculate, applanate ventrally, 10-12 x 7-8 mm.

The other dentate species in the central Peruvian Andes, *P. brittoniana*, has larger oblong leaves, with more protruding venation, base generally rounded, usually longer racemes and larger flowers overall.

**Distribution.** In humid to sub-humid high elevation forests around a matrix of dry areas from central to northwestern Peru.

**Elevation range.** 2400 – 3100 m.

**Local names.** duraznillo, lucmash (Peru).

**Material examined.** (17) **PERU. Amazonas:** Chachapoyas, Cerros Calla Calla, W side, 45 km above Balsas, midway on the road to Leimebamba, 3100 m, 19 Jun 1964, *Hutchison, P.C. 5743* (UC,USM); **Ancash:** Recuay, Bosque de Noqno, 2850 m, 26 May 1988, *Cano, A. 1782* (USM); Dto Marca, 2800 m, 1 Nov 1998, *Gamarra-Gómez, P. 819* (USM); Huaraz, 10 km by road from Cachabamba, 2870 m, 6 Jun 1985, *Smith, D.N. 10926* (MO,NY); Recuay, Vertiente Occidental De Los Andes. Bosque de Pararin, 2800 m, 24 May 1988, *Valencia, N. 2207* (MO); **Cajamarca:** Contumaza, Ca. 12 km from Contumazá on route to Cascas, 2590 m, 15 Apr 1986, *Dillon, M. 4572* (F,MO,NY,QCA,TEX,US); Alrededores del Túnel (Contumazá), 2400 m, 4 Oct 1993, *Mostacero, J. 3339* (MO); Contumazá, Contumazá-Cascas, 2600 m, 22 Apr 1967, *Sagástegui, A. 6505* (F,US); Contumaza, desvio a bosque de Cachil-Contumazá ladera pedregosa, 2600 m, 30 May 1990, *Sagástegui, A. 14286* (F,MO,USM); Lledén-San Martin ladera, 2600 m, 2 Jun 1990, *Sagástegui, A. 14366* (F,MO,USM); Quebrada, entrada al Bosque de Cachil, 2500 m, 29 Jul 1993, *Sagástegui, A. 14994* (F,MO,NY); Contumazá, Alrededores del tunel, 2500 m, 26 Apr 2002, *Sagástegui, A. 16886* (F); **Lima:** Huarochirí, San Bartolomé, arriba de la población, entre Lima y Matucana. Monte Zarate, 2900 m, 6 Nov 1954, *Ferreyra, R.A. 10425* (MO,US); Huarochiri, Zarate, forest above San Bartolomé. Canyon of Rio Rimac, 2900 m, 3 Nov 1964, *Hutchison, P.C. 7085* (UC,USM); Huarochirí, Margen derecha, cuenca del Rio Seco, 2850 m, 19 Apr 2000, *Mavila, M. 8* (MOLF); Canta, San José, 3000 m, 7 Dec 1975, *Sánchez, S. 103* (MO,USM).

102. *P. ruiziana* Koehne, Bot. Jahrb. Syst. 52: 316. 1915. Type: Peru: *Ruiz, H. s.n.* (sintypes, F!, MA! (2), US!).

This species can be recognized by the rigid coriaceous elliptic-oblong to obovate-oblong leaves, 4-8.5 x 3-5.2 with canaliculated petiole 3-6 x 1.5-2 mm, base obtuse to rounded and sometimes truncate, apex obtuse to acute, venation pattern weak brochidodromous festooned, secondary veins (8-10) departing at 50-60 degrees from the midrib, intersecondaries infrequent and 10-15 mm long, tertiaries irregular reticulate and little conspicuous, and 2 rounded glands (1.5-2 mm diam) placed next to the base or up to 4 mm from it and 2 mm from the margin. The stipules are falcate, linguliform, slightly auriculate at the base and undulate on the margin, 5-8 mm long. The floriferous shoots are sub-erect, 5-8 cm long, the flowers have

pedicels 3-10 (20) mm long, hypanthium open campanulate, 4.5-5.5 mm wide, stamens 0.8-1 mm long and anthers ap to 1 mm long. The fruits are prolate apiculate, 12-15 x 11-13 mm.

This species is close to *P. moritziana* (from northeastern Colombia and northern Venezuela) but that taxon has more regular elliptic leaves with secondary veins anastomosing near to the margin and more slender racemes with smaller flowers.

**Distribution.** Distributed in high montane humid forests of southern Ecuador and northern Peru.

**Elevation range.** 2400 – 3390 m.

**Local names.** capulí de montaña (Ecuador), cerrag negro (Ecuador).

**Material examined.** (18) **ECUADOR. Loja:** Parque nacional Podocarpus, Cajanuma entrance, 2880 m, 10 Feb 2008, *Cumbicus*, N. 220 (DAV,GOET); Loja, Parque Nacional Podocarpus, 2880 m, 11 Feb 2008, *Cumbicus*, N. 221 (DAV); ibidem, Cajanuma entrance, 2920 m, 19 Dec 2008, *Cumbicus*, N. 348 (DAV,GOET); ibidem, 2920 m, 19 Dec 2008, *Cumbicus*, N. 349 (DAV,GOET); ibidem, 2920 m, 19 Dec 2008, *Cumbicus*, N. 472 (DAV,GOET); ibidem, 2850 m, 22 Nov 2009, *Cumbicus*, N. 1743 (DAV); Loja-Zamora 12 km from Loja, on the finca of Dr. David Espinosa, 2400 m, 17 Nov 1988, *Ellemann*, L. 75383 (AAU,LOJA,QCA,QCNE); Loma de Oro, 2800 m, 4 Aug 1986, *Jaramillo*, J. 8807 (COL,F,F,GB,MO,NY,QCA,US); Saraguro-Loja, Km 12.4, turnoff towards Fierro Urco, Km 3.8-7.1, 3120 m, 7 Dec 1994, *Jørgensen*, P.M. 1288 (LOJA,MO,NY,QCA); Parque Nacional Podocarpus, E of Nudo de Cajanuma, just N of Centro de Información, 2750 m, 16 Sep 1989, *Madsen*, J.E. 86159 (AAU,LOJA,QCA,QCNE); Urituzinga, La Y de la Palma, 2550 m, 5 Feb 1995, *Merino*, B. 4404 (LOJA); Laguna de Chinchilla, 3000 m, 11 Nov 2008, *Salgado*, S. 106 (LOJA); between Tambo Cachiyacu, La Entrada and Nudo de Sabanillas, 3000 m, 7 Oct 1943, *Steyermark*, J.A. 54467 (F,F,NY); Montañas de Santiago, 2700 m, Dec 1988, *Vivar*, F. 3332 (LOJA); Parque Nacional Podocarpus. E of Nudo de Cajanuma, 2900 m, 18 Jun 1984, *Øllgaard*, B. 74891 (AAU,QCA); **Morona-Santiago:** Main trail to San Miguel de los Cuyes via the Cordillera Morire (The I will die Ridge), 2700 m, 7 Jan 2001, *Clark*, J.L. 5839 (QCNE,US).

103. *P. stipulata* Macbride, Candollea 5: 363-364. 1934. Type: Peru: Cusco, Paucartambo, Encima de Cosñipata, entre los Tambos, Tres Cruces y Tambomayo, 2600-2700 m, 25 Apr 1914, *Weberbauer, A. 6930* (holotype, F!; isotypes, MOL! (3)).

This species can be distinguished by the rugose sulcate twigs with dense protuberant lenticels, the big falcate to round stipules (up to 8 mm long), the elliptic-ovate to elliptic-obovate subcoriaceous leaves, 6.5-11 x 2.5-4.5 cm, sometimes slightly oblique, opaque on both sides, with petioles 4-7 x 1-1.5 mm, venation pattern brochidodromous festooned, secondary veins arcuate, 11-13, emerging at 65-80 degrees from the midrib, raised below and slightly depressed above, tertiaries sinuous percurrent, and 2-6 glands, crateriform, with lower four ones (sometimes only two) sub-basal at 0-2 from the midrib and 1-5 mm from the base, the upper ones (sometimes absent) on the second pair of secondary veins at 7-13 mm from the base and near to the margin. The floriferous shoots are densiflorous, erect, 4-7 cm long, the floral pedicels are 1.5-3 mm long, the hypanthium is open campanulate 2.5-3 mm wide and the anthers measure 0.5-0.7 mm long. The fruits are globose and slightly apiculate, 10-11 mm high.

The most similar species is *P. antioquiensis* which is a shrub that has smaller linguiform stipules, shorter leaves and slender racemes. Other similar species are the central Andean *P. ruiziana* which has thicker leaves, smaller stipules and bigger flowers; and the northern Andean *P. opaca* that has narrower and shorter stipules, larger leaves with 2 glands and flexuous racemes.

**Distribution.** Distributed from southern Ecuador to northern Bolivia along the humid Amazonian slope of the Andes.

**Elevation range.** 1400 – 2801 m.

**Material examined.** (64) **BOLIVIA. Cochabamba:** Carrasco, Sehuencas, 2100 m, 18 Feb 2005, *Altamirano, S. 3042* (MO); Chapare, Road to Corani Pampa; ca. 5 km from the highway to the Chapare, 2550 m, 24 Jun 1995, *Ritter, N. 2321* (CAS,GH,MO); **La Paz:** Franz Tamayo, Parque Nacional Madidi, Moxos, Fuertecillo, 2000 m, 25

Apr 2007, *Araujo-Murakami, A. 3243* (LPB,MA,MO); Parque Nacional Madidi, Keara, Tocoaque II, 2400 m, 8 Nov 2007, *Araujo-Murakami, A. 3608* (LPB,MA,MO,USZ); ibidem, 2550 m, 14 Nov 2007, *Araujo-Murakami, A. 3743* (LPB,MA,MO); Santa Ana, bajando desde Pelechuco por el camino antiguo de Pelechuco a Apolo, 2139 m, 17 Jul 2009, *Arellano, G. 350* (DAV,MO); ibidem, 2223 m, 29 Aug 2009, *Arellano, G. 529* (DAV,MO); Larecaja, Cocapunco, cerca de la línea de bosque, bajando por el camino antiguo Ingenio-Mapiri, 2801 m, 4 Jul 2010, *Arellano, G. 2735* (DAV,MO); ibidem, 2801 m, 4 Jul 2010, *Arellano, G. 2741* (DAV,MO); ibidem, 2801 m, 4 Jul 2010, *Arellano, G. 2749* (DAV,MO); Franz Tamayo, Parque Nacional Madidi, quebrada Jatun Chiriuno, 31 km en línea recta al este de Apolo por el camino a San Jose de Uchupiamonas, 1850 m, 25 Jun 2002, *Bascopé, F. 79* (LPB); Parque Nacional Madidi, Piñalito, 30 km en línea recta al este de Apolo por el camino a San Jose de Uchupiamonas, 1900 m, 14 Jul 2002, *Bascopé, F. 352* (LPB,MO); Nor Yungas, Arriba del final del camino al Chairo, 2400 m, 21 Jun 1997, *Beck, S.G. 23045* (LPB,QCA); Franz Tamayo, Madidi, Pelechuco, Tanhuara, 1804 m, 15 Jul 2009, *Cayola, L. 3259* (DAV,LPB,MO); ibidem, 1804 m, 15 Jul 2009, *Cayola, L. 3277* (DAV,LPB,MO); Región Madidi, Santo Domingo, arroyo Tintaya, 1437 m, 12 Sep 2012, *Cayola, L. 4152 B* (LPB); ibidem, 1456 m, 19 Sep 2012, *Cayola, L. 4556* (LPB); ibidem, 1400 m, 13 Oct 2006, *Chapi, N. 65* (DAV,LPB,MEDEL,MO); ibidem, 1468 m, 25 Oct 2006, *Chapi, N. 259* (LPB,MA,MO); ibidem, 1459 m, 10 Oct 2006, *Cornejo, M. 76* (LPB,MA,MO); Región Madidi, Santo Domingo, Lechemayu, a 984 m N campamento Lechemayu, primera palca, 1522 m, 16 Aug 2010, *Cornejo, M. 1375* (DAV,MO); ibidem, 1522 m, 16 Aug 2010, *Cornejo, M. 1400* (DAV,MO); Parque Nacional Madidi, Lagunillas, entre Tokoake y Carjata, 2097 m, 28 Jun 2005, *Fuentes, A.F. 8979* (LPB,MO); Parque Nacional Madidi, Mojos, sector Fuertecillo, por el camino a Queara, 1930 m, 24 Apr 2007, *Fuentes, A.F. 11392* (LPB,MA,MO); Parque Nacional Madidi, Mojos, sector Lagunillas, por el camino a Queara, 2015 m, 28 Apr 2007, *Fuentes, A.F. 11552* (LPB); Parque Nacional Madidi. Unión de los ríos Tanhuara y Pelechuco, 1820 m, 17 Jun 2009, *Fuentes, A.F. 14395* (LPB,MO); Región Madidi, Santo Domingo, río Turiapo, más arriba de Rumi Rumioj, por el sendero a Amantala, 1427 m, 16 Aug 2010, *Fuentes, A.F. 16959* (DAV,MO); Región Madidi, Santo Domingo, río Siripita, 1515 m, 30 Aug 2010, *Fuentes, A.F. 17224* (DAV,MO); Región Madidi, Santo Domingo, río Turiapo, subiendo de la unión con el río Siripita, ladera baja al W del río, 1469 m, 3 Sep 2010, *Fuentes, A.F. 17331* (DAV,MO); Inquisivi, "Tableria", crossing the river and climbing the lower part of this ridge is the area locally known as Tableria. 15 km N. of Choquetanga, 2400 m, 2 Dec 1991, *Lewis, M. 40784* (MO); Franz Tamayo, Madidi, Apolobamba, Pelechuco - Rio Abajo, Tanhuara, 1850 m, 9 Jul 2009, *Loza, I. 1120* (DAV,LPB,MO); Nor Yungas, Cotapata, Estacion biologica de Tunquini, 1710 m, 26 Sep 2001,



*Maldonado, C. 153* (LPB,NY); Franz Tamayo, Senda Apolo-San José de Uchupiamonas, a 15 minutos antes de llegar al arroyo Cuchiwani, 1990 m, 4 Dec 2002, *Miranda, T. 515* (LPB,MO,QCA); Parque Nacional Madidi, Pelechuco - río abajo, Santa Ana, 2502 m, 17 May 2009, *Quiñones, M. 141* (DAV,LPB,MO); Área Natural de Manejo Integrado Apolobamba, Pelechuco, Coranara II, ladera frente a las ruinas de la ex Aduana de Coranara, 2698 m, 19 Oct 2008, *Villalobos, M. 81* (DAV,LPB,MO). **ECUADOR. Napo-Pastaza:** 6 km al SE de Cosanga. Cordillera de Guacamayos, 2050 m, 10 Apr 2012, *Homeier, J. 4990* (DAV,GOET); **Zamora-Chinchipec:** Yantzaza, Cordillera del Cóndor. Carretera desde Los Encuentros hacia el Cerro Machinaza. Sendero a Las Peñas, 1630 m, 21 Jul 2005, *Quizhpe, W. 1654* (DAV,LOJA,MO,QCNE). **PERU. Amazonas:** Luya, Distrito Camporedo, Tullanya, Pascana, La Palma, 2710 m, 9 Dec 1996, *Vásquez, R. 22020* (DAV,MO,USM); Mariscal Benavides, Izcuchaca, 1800 m, 30 Aug 1998, *Vásquez, R. 25363* (DAV,MO,MOLF); Izcuchaca, 1880 m, 11 Apr 2001, *Werff, H. van der 16951* (DAV,MO,MOLF); Mendoza, 1600 m, 17 Aug 1963, *Woytkowski, F. 8318* (GH,MO); **Cajamarca:** Chorro Blanco, Cutervo National Park, cloud forest, ca. 15 km N of San Andres, 2430 m, 14 Sep 1991, *Gentry, A. 74816* (MO); San Ignacio, Distrito Huarango. Cordillera Huarango (prolongación al sur de la Cordillera del Cóndor). Sector El Romerillo. Arriba de Quebrada Yahuara y La Ventolara (Rey del Oriente), 2180 m, 29 Apr 2006, *Rodríguez, E. 3048* (DAV,HUT,LOJA,MO,QCNE,USM); **Cusco:** La Convención, Dist. Kimbiri. Flanco occidental de la cordillera Vilcabamba, margen derecha Rio Apurimac. Llactahuaman, 1720 m, 16 Jul 1998, *Baldeón, S. 2980* (USM); Dist Santa Ana, Tunquimayo, 2675 m, 22 Sep 2004, *Calatayud, G. 2842* (DAV,MO); Paucartambo, Kosñipata. Trocha Unión, km 11, 2000 m, 19 Sep 2003, *Farfán, W. 1178* (CUZ,DAV,HUT,MO,USM,WFU); La Convencion, up mountain of Anchiuay and Bellavista, South Cordillera Vilcabamba, 2445 m, 3 Aug 1998, *Núñez, P. 23682* (USM); La Convención, Echarati, trocha Paititi, 2179 m, 11 May 2004, *Salinas, M. 7263* (DAV,USM); Santa Ana, Tunquimayo, 2800 m, 16 Jun 2003, *Suclli, E. 1034* (DAV,MO); Calca, Dist. Yanatile, Estrella, 1567 m, 19 Oct 2005, *Suclli, E. 2433* (CUZ,HUT,MO,USM); ibidem, 1567 m, 21 Oct 2005, *Suclli, E. 2643* (AMAZ,CUZ,HUT,MO,MOL,USM); La Convención, Dist. Santa Ana, Tunquimayo, 2099 m, 21 Nov 2005, *Suclli, E. 2809* (AMAZ,CUZ,DAV,HUT,MO,MOL,USM); ibidem, 2500 m, 22 Oct 2002, *Valenzuela, L. 825* (CUZ,MO,USM); Dist, Maranura, Mesa Pelada, 2547 m, 20 Apr 2005, *Valenzuela, L. 5527* (CUZ,DAV,MO,USM); Dist. Quellouno, carretera Yavero Quellouno, 2219 m, 29 Sep 2006, *Valenzuela, L. 7851* (AMAZ,CUZ,DAV,HUT,MO,MOL,USM); ibidem, above Quellouno, 2300 m, 29 Apr 2006, *Werff, H. van der 21129* (DAV,MO); **Junín:** Satipo, northern Cordillera de Vilcabamba, eastern slope. Upper River Poyeni watershed, 2050 m, 23 Jun 1997, *Boyle, B. 4143* (USM); Northern

Cordillera Vicabamba. Upper Rio Poyeni watershed, 2050 m, 23 Jun 1997, *Boyle, B. 4480* (F,USM); **Pasco:** Oxapampa, Dist. Huancabamba. Parque Nacional Yanachaga-Chemillén. Sector-San Daniel, cerca al hito, 2200 m, 17 Aug 2005, *Monteagudo, A. 9521* (AMAZ,DAV,HUT,MO,MOL,USM); ibidem, la Colmena, 2238 m, 27 Aug 2008, *Valenzuela, L. 11775* (DAV,MO); ibidem, 2700 m, 28 Feb 2008, *Vásquez, R. 33771* (DAV,MO); La Suiza Nueva, 2240 m, 21 Jun 2003, *Werff, H. van der 17583* (DAV,MO); La Suiza Vieja, 2300 m, 28 Oct 2009, *Werff, H. van der 22879* (MO).

103a. *P. stipulata* Macbride var. nov. “**acha-highElevation-Bolivia**”

This new high elevation variety can be distinguished from the typical collections because the shrubby habit, the smaller and more coriaceous leaves (4.5-7 x 1.8-2.8 cm), the glands placed closer to the midrib, the smaller oblong-lanceolate stipules and the shorter and more erect racemes.

**Distribution.** Restricted to high elevation very humid shrubland and grasslands (ceja de monte and paramo Yungueño) in the Apolobamba mountain ridge in northern Bolivia.

**Elevation range.** 2900 – 3555 m.

**Material examined.** (12) **BOLIVIA. La Paz:** Bautista Saavedra, Área Natural de Manejo Integrado Apolobamba. Sector campamento Chaka, por el antiguo camino Hilo-Hilo - Apolo, 3555 m, 3 Apr 2009, *Achá, S. 273* (BOLV,DAV,LPB,MO,USZ); ibidem, 3555 m, 3 Apr 2009, *Achá, S. 290* (LPB,MO); Bautista Saavedra, Area Natural de Manejo Integrado Apolobamba, Chiata, a 20 m del río, 3400 m, 21 Mar 2009, *Achá, S. 291* (DAV,LPB,MO); Franz Tamayo, Parque Nacional Madidi, Keara, Ichucorpa, 3500 m, 25 Oct 2007, *Araujo-Murakami, A. 3848* (DAV,LPB,MEDEL,MO); Área Natural de Manejo Integrado Apolobamba, Chaka, 300 m al NE del campamento minero, 3200 m, 23 Aug 2009, *Cornejo, M. 895* (LPB,MO); Parque Nacional Madidi, entre Queara y Mojos, sector Kara Pascay, 3169 m, 26 Feb 2008, *Fuentes, A.F. 12038* (LPB,MEDEL,MO); Bautista Saavedra, Área Natural de Manejo Integrado Apolobamba, sector Waranwayayoj, más allá de Chaka por el antiguo camino Hilo-Hilo-Apolo, 3040 m, 9 Apr 2009, *Fuentes, A.F. 13950* (LPB,MO); Franz Tamayo, Parque Nacional Madidi, bajando de Ichucorpa,

entre Keara y Mojos, 3250 m, 20 Sep 2009, *Fuentes, A.F. 15179* (LPB,MO); ibídem, a 15 minutos del campamento Chuncani, 2952 m, 7 Nov 2001, *Orellana, M.R. 1830* (LPB); ibídem, 2952 m, 7 Nov 2001, *Orellana, M.R. 1845* (LPB); ibídem, 2952 m, 7 Nov 2001, *Orellana, M.R. 1847* (LPB); ibídem, 2900 m, 8 Nov 2001, *Orellana, M.R. 1886* (LPB); Nor Yungas, Cotapata ca. 11 km NE of Unduavi, 3100 m, 22 Dec 1983, *Solomon, J.C. 11418* (LPB,MO,NY).

104. *P. subcorymbosa* Ruiz ex Koehne, Bot. Jahrb. Syst. 52: 315. 1915. Type: Peru: 1778, *Ruiz, H. s.n.* (lectotype, MA! (selected by Romoleroux (1996)); isolectotypes F!(2), G!, MA! (2),P!).

*Prunus carolinae* H.García-Barriga, Mutissia 56: 1. 1983. Type: Colombia: Cundinamarca, Fusagasuga, Vereda Bochica, Finca cafetera Lolandia, 1780 m, 6 Nov 1980, *García-Barriga, H. 21240* (holotype, COL!; isotypes COL! (4), US! (3)).

This is a easily distinguishable species because the big size of its individuals (up to 30 m), the puberulent to sericeous buds, stipules, new twigs and lower surface of the leaves mainly along the midrib and secondary veins, the relatively big sub-coriaceous elliptic-ovate leaves, 10-20 x 6-9 cm, with rather straight secondary veins anastomosing near to the margin, emerging at 60-80 degrees from the midrib, prominent below and impressed above, intersecondaries around half as long as secondaries, tertiaries alternate percurrent and exmedially ramified near to the midrib, and 2 glands located at the base and frequently attached to the midrib. The floriferous shoots are branched at the axils of most basal flowers of the main axis, tomentulose to sericeous, 5-9 cm long (up to 5 cm at the branches); the flowers have pedicels 2-4 mm long, open campanulate hypanthium up to 4 mm wide, stamens with filaments that can reach 3.5 mm long and elongated anthers up to 1.2 mm long. The fruits are prolate, relatively big (15-22 x 11-15 cm) with mesocarp considerably fleshy.

The closest species is the caribbean *P. occidentalis*, which has more chartaceous and narrow leaves, shorter floriferous shoots with more branches and smaller flowers.

**Distribution.** Mostly in humid mid-elevation places and sometimes in hilly lowland localities from northwestern Colombia to northern Bolivia with sparse records and frequently associated to secondary forests, highly transformed habitats and coffee plantations.

**Elevation range.** 360 – 2100 m.

**Local names.** almendro (Ecuador), botumbo, botundo, cerezo, duraznillo (Colombia), mamecillo (Ecuador), quinde, trapiche, truco (Colombia)

**Material examined.** (71) **BOLIVIA. La Paz:** Franz Tamayo, Parque Nacional Madidi, Azariamas, arroyo San Roque, 660 m, 11 Oct 2005, *Cayola, L. 2016* (K,LPB,MO,USZ); Parque Nacional Madidi, NW de Apolo, senda Azariamas-San Fermin, 1326 m, 27 May 2006, *Loza, I. 42* (LPB,MO); ibidem, 1408 m, 1 Jun 2006, *Loza, I. 216* (LPB,MO); ibidem, 1124 m, Jun 2006, *Loza, I. 457* (DAV,GH,LPB,MA,MO); Senda Apolo-San José de Uchupiamonas, a 5 minutos antes de llegar a río 3 de Mayo, 1735 m, 1 Dec 2002, *Miranda, T. 345* (K,LPB,MO); ibidem, 1735 m, 1 Dec 2002, *Miranda, T. 350* (K,LPB,MO); ibidem, 1735 m, 1 Dec 2002, *Miranda, T. 354* (LPB,MA,MO); Senda Apolo-San Jose de Uchupiamonas, ladera exposición SSE sobre rio Machariapo, 1650 m, 7 Dec 2002, *Miranda, T. 621* (LPB,MA,MO); ibidem, 1650 m, 7 Dec 2002, *Miranda, T. 654* (K,LPB,MO); Parque Nacional Madidi, Sumpulo, 8 km al NW de la comunidad Virgen del Rosario, 1297 m, 21 Jul 2008, *Quisbert, J. 1240* (DAV,LPB,MO,USZ); Parque Nacional Madidi, senda Azariamas-San Fermín sector Cumbre, 1400 m, 7 Jun 2006, *Ticona, E. 277* (LPB,MEDEL,MO). **COLOMBIA. Antioquia:** Frontino, Corregimiento La Blanquita, Via Nutibara-La Blanquita, 14.5 km al W de Nutibara, 10 - 18 km del alto de Cuevas a la Blanquita, 870 m, 12 Jul 1988, *Callejas, R. 6638* (HUA,MO); **Cauca:** Silvia, El Tambo, cerca a la aldea, 1700 m, 29 Oct 1939, *Sneidern, K.V. 2347* (A,NY,TEX,US); **Cundinamarca:** Viotá, Vereda Magambo, 1050 m, Nov 1981, *Acero, E. s.n. 1* (UDBC); Vereda alto Palmar, Laguna indi, 1860 m, Aug 1983, *Acosta, R.H. 36* (UDBC); Tibacuy, Cerro de Quinini, 1900 m, 17 Aug 2003, *Ariza, W. 379* (FMB); San Francisco, El tablazo, entre Subachoque y San Francisco. Cordillera Oriental, 1900 m, 26 Jan 1944, *García-Barriga, H. 11040* (COL,US); Fusagasuga, Vereda Bochica, Finca cafetera Lolandia, 1780 m, 10 Nov 1979, *García-Barriga, H. 21177* (COL,US); ibidem, 1780 m, 10 May 1980, *García-Barriga, H. 21200* (COL,US); ibidem, 1780 m, 10 May 1980, *García-Barriga, H. 21209* (COL,MO,US); ibidem, 1780 m, 6 Nov 1980, *García-Barriga, H. 21241* (COL (3),CUVC(2)); Pacho, Vereda la Esmeralda, Finca Guatancuy, 1900 m, 16 Nov

1969, *Mahecha, G. 227* (UDBC); Medina, Líneas del Guavio, 800 m, Apr 1988, *Mahecha, G. 5185* (UDBC); El Colegio, Mesitas del Colegio, 1600 m, 1990, *Mancipe, J. 15* (UDBC); Medina, Farallones de Medina, 1800 m, 25 Feb 1997, *Mendoza, H. 2470* (FMB); **Huila**: San Agustín, Parque arqueológico, 1751 m, 10 Aug 2010, *Pérez-Zabala, J.A. COL-2010-11* (DAV); Palestina, Vereda Santa Barbara, Finca La Esperanza, 1550 m, 25 Oct 2005, *Rico, V.M. 261* (FMB); Vereda Santa barbara, Finca Vegagrande, 1500 m, 29 Oct 2005, *Silva, G.A. 495* (FMB); **Quindío**: Salento, Vereda Cocora, Finca el Cairo, 1925 m, 14 Jun 1997, *Agudelo, C.A. 3800* (COL,HUQ); ibidem, 1925 m, 14 Jun 1997, *Agudelo, C.A. 3854* (HUQ); Genova, Vereda el dorado, 1310 m, 6 Oct 1988, *Arbelaez-S, G. 2762* (COL,HUQ,MO); Calarca, Bosque La Viuda, Jardín Botánico, 1600 m, 1 Mar 1990, *Cuadros, H. 4691* (HUQ); ibidem, 1600 m, 1 Mar 1990, *Cuadros, H. 4692* (HUQ); Salento, Vereda La playa, Finca el Cairo, 1950 m, 2 Apr 1995, *Macías, D. 180* (HUQ); ibidem, 1950 m, 2 Apr 1995, *Macías, D. 255* (COL,HUQ); Calarca, Vereda La Virginia, 1500 m, 29 Nov 2000, *Macías, D. 1717* (HUQ); Salento, Bosque frente al Molino, 1900 m, 9 May 1997, *Vargas, W.G. 3826* (HUQ); Armenia, Finca de los Rios, 1500 m, 13 Oct 1997, *Vargas, W.G. 4083* (COL); Genova, Carretera Génova al Pedregal alto, 1500 m, 9 Mar 1990, *Vélez, M.C. 1135* (HUQ); Calarca, Bosque la Viuda, Jardín botánico del Quindio, 1450 m, 10 Aug 1990, *Vélez, M.C. 2519* (HUQ); Buenavista, Vereda los balsos, 1560 m, 25 Sep 1990, *Vélez, M.C. 2580* (COL,HUQ); **Valle del Cauca**: Buga, Reserva forestal Yotoco, 1200 m, 20 Nov 1997, *Escobar, E. 126* (VALLE); 1200 m, 20 Nov 1997, *Escobar, E. 154* (VALLE); Tulua, Corregimiento Monteloro, 2000 m, 9 Nov 1972, *Jimenez-Saa, H. 1846* (NY); Versalles, La Balastrea, Carretera La Unión-Versalles, 1600 m, *Mahecha, G. 1021* (UDBC); Yotoco, Reserva forestal CVC, 1600 m, 9 Apr 1991, *Zuluaga, S. 4538* (FMB). **ECUADOR. Bolívar**: via Calumaguaranda, aproximadamente 45 km de Guaranda, 1000 m, 10 Dec 1987, *Palacios, W. 2152* (AAU,MO,QCA,QCNE); **Loja**: Sector Labushco. Jatumpamba-Jorupe, 1600 m, Mar 2000, *Cabrera, O. 687* (LOJA); Olmedo, 3 km along road to Chaguarpamba, 1275 m, 5 Feb 1995, *Jiggins, C. 160* (QCA); Canton Chaguarpamba. Via a Yaguachi, 1100 m, Oct 2004, *Sanchez, O.A. 171* (LOJA); Ciano Viejo, 1500 m, Nov 2004, *Sanchez, O.A. 230* (LOJA); **Manabí**: Machalilla National Park, zona de San Sebastian, ridgetop, 550 m, 21 Jan 1991, *Gentry, A. 72523* (AAU,F,MO,QCNE); ibidem, 520 m, 11 Jan 1993, *Josse, C. 914* (MO,QCA,QCNE); P.N. Machalilla, Cerro el Pechiche, 360 m, 20 Nov 1993, *Josse, C. 949* (QCA); **Morona-Santiago**: Parroquia El Copal. San José Grande, cuenca del río Paute entre el río Cardenillo Grande y Cardenillo Chico, 1100 m, 13 Apr 1991, *Cerón, C. 14088* (MO,QCNE); Morona, Cordillera del Cutucú. Asociación Shuar Sevilla. Comunidad Angel Ruby. Tras el Cerro Iñiak naint, 1213 m, 11 May 2002, *Suin, L. 1793* (DAV,MO,QCNE). **PERU. Junin**: Chanchamayo, Hacienda La Genoa, Finca Italia, 1160 m, 4 Mar 1991, *Gentry, A.*

73345 (MO); **Pasco**: Oxapampa, Dist. Pozuzo. Parque Nacional Yanachaga-Chemillén, cercanía del Puesto de Control Huampal, 1100 m, 23 Jul 2006, *Monteagudo, A. 12496* (AMAZ,DAV,HUT,MO,MOL,USM); ibidem, 1180 m, 25 Jul 2006, *Monteagudo, A. 12586* (AMAZ,DAV,HUT,MO,MOL,USM); Distrito Oxapampa. Zona de Amortiguamiento del Parque Nacional Yanachaga-Chemillén, borde de carretera Oxapampa-Huancabamba, 2100 m, 20 Sep 2007, *Monteagudo, A. 15121* (AMAZ,DAV,HUT,MO,MOL,USM); ibidem, 2100 m, 20 Sep 2007, *Monteagudo, A. 15123* (AMAZ,DAV,F,HUT,MO,MOL,USM); **Tumbes**: Zarumilla, Matapalo. Campo verde, 620 m, 27 Oct 1967, *Cunales, I. 5* (MO); ibidem, 720 m, 29 Oct 1992, *Díaz, C. 5318* (MO,USM); ibidem, 720 m, 29 Oct 1992, *Díaz, C. 5338* (BRIT,MO); ibidem, 720 m, 2 Nov 1992, *Díaz, C. 5500* (BRIT,CAS,MO,MOLF,USM); ibidem, 720 m, 3 Nov 1992, *Díaz, C. 5575* (MO); ibidem, 720 m, 5 Nov 1992, *Díaz, C. 5640* (MO,P); ibidem, 500 m, 18 Feb 1993, *Díaz, C. 6644* (MO,USM).

#### **New identified species from central Andes (30)**

##### 105. *P. sp. nov.* (“*4glands-Knapp-Peru*”)

This new species have elliptic-oblong sub-coriaceous leaves, 9-10.5 x 5-5.5 cm, with base round to truncate, apex obtuse, venation pattern brochidodromous festooned, secondary veins straight at the end, emerging at 65-75 degrees from the midrib, impressed above and prominent below, intersecondaries around half as long as secondaries, tertiaries sinuous percurrent and perpendicular to the midrib, and 4 glands (sometimes only two visible) with the lower pair basal and attached to the midrib and the upper pair located between the first and second pair of secondary veins at 12-15 mm from the base and 6-10 mm from the midrib. The fruiting racemes are 8-12 cm long, fruit pedicels measure 8-10 mm long and the fruits are ovate apiculate 13-14 x 9-10 mm. Material with flowers is unknown so far.

The more similar taxon is *P. ruiziana* which has very similar leaf shape but generally smaller, coriaceous leaves with only two sub-basal glands, and shorter fruiting racemes.

**Distribution.** Only known from two localities of humid montane forests in the Cutervo National Park in Cajamarca, Peru.

**Elevation range.** 2150 - 2400m.

**Material examined.** (2) **PERU. Amazonas:** Bongara, 4 km N of Pomacochas on road to Rioja, trail down gorge to W of road, 2150 m, 2 Jun 1986, *Knapp, S. 7505* (F,MO,NY); **Cajamarca:** Cutervo, San Andrés, Gruta Salomón, 2400 m, 2 Jul 1967, *López, A. 6633* (US).

106. *P.* sp. nov. (“*aff-guanaiensis-LOJA*”)

This new species can be recognized by its elliptic coriaceous leaves, 7-11 x 3-4 cm, lustrous above and opaque below, drying color ochre, with petioles 5-9 x 1-1.5 mm, acuminate apex and acute base, revolute margin, relatively inconspicuous arcuate secondary veins configuring a eucamptodromous-like pattern, plain on both surfaces, tertiaries irregular reticulate and two basal elliptic glands (1.5 mm long). The floriferous shoots are suberect, 6-8 cm long; the flowers have infundibuliform hypanthium, 3-3.5 mm wide and anthers 0.5-0.6 mm long. The fruits are subglobose, apiculate, 9-10 mm long.

This species is very similar to *P. guanaiensis*, but that taxon has less coriaceous leaves, longer and weaker petioles, relatively smooth (vs. sulcate and densely lenticelated) petioles, smaller and more hidden glands, flexuous racemes, smaller flowers and oblate fruits.

**Distribution.** Only known from mid to high elevation forests in the San Francisco Biological Station and surroundings of the city of Loja in the provinces of Zamora-Chinchipec and Loja, southern Ecuador.

**Elevation range.** 1970 – 2500 m.

**Local names.** sacha capulí (Ecuador).

**Material examined.** (20) **ECUADOR. Loja:** Santiago, 2500 m, Jan 1987, *Vivar, F. 2935* (DAV,LOJA); **Zamora Chinchipe:** Bosque montano de la Estación Científica San Francisco, Km 30 de la vía Loja-Zamora, en la Quebrada El Milagro, 2100 m, 4 Aug 2001, *Chimbo, C. 79* (LOJA,MO,QCNE); Reserva San Francisco, 2080 m, 12 Nov 2008, *Cumbicus, N. 502* (DAV,GOET); ibídem, 2080 m, 12 Nov 2008, *Cumbicus, N. 506* (DAV,GOET); ibídem, 2080 m, 12 Nov 2008, *Cumbicus, N. 788* (DAV); ibídem, 2080 m, 12 Nov 2008, *Cumbicus, N. 794* (DAV); ibídem, 2080 m, 12 Nov 2008, *Cumbicus, N. 980* (DAV,GOET); ibídem, 2080 m, 16 May 2009, *Cumbicus, N. 1345* (DAV); ibídem, 2080 m, 16 May 2009, *Cumbicus, N. 1346* (DAV); ibídem, 2000 m, 5 Feb 2010, *Cumbicus, N. 1755* (DAV); ibídem, 2000 m, 5 Feb 2010, *Cumbicus, N. 1766* (DAV); ibídem, 2000 m, 5 Feb 2010, *Cumbicus, N. 1778* (DAV); Reserva San Francisco, road Loja-Zamora, ca. 35 km from Loja, 2150 m, 18 Mar 2000, *Homeier, J. 341* (MO,QCNE); ibidem, 2200 m, 11 Oct 2001, *Homeier, J. 1010* (BIEL,DAV,MO,QCNE); ibidem, 2000 m, 21 Mar 2002, *Homeier, J. 1067* (BIEL,DAV,MO,QCNE); ibidem, 2130 m, 21 Mar 2002, *Homeier, J. 1068* (MO); Sabanilla, road Loja-Zamora, ca. 38 km from Loja, 2000 m, 25 Sep 2006, *Homeier, J. 2362* (DAV,GOET,LOJA,MO,QCNE); ibidem, 1970 m, 11 Sep 2010, *Homeier, J. 4446* (DAV,GOET); Parque Nacional Podocarpus. New rd. Loja - Zamora, E. of the pass, 2500 m, 26 Sep 1989, *Madsen, J.E. 86195* (AAU,LOJA,QCA,QCNE); Estación San Francisco, 2105 m, 30 Jul 2011, *Pérez-Zabala, J.A. ECU-2011-1-A72* (DAV).

107. *P.* sp. nov. (“*aff. littlei-Oxapampa*”)

This new species can be recognized by the zig-zag shoots with whitish bark decorated with minute protruding lenticels, ovate-elliptic subcoriaceous leaves, 11-13 x 4-5.2 cm, drying in an opaque light ochre tone, with base acute to obtuse and concave at the end, apex acute, 10-11 secondary veins forming a brochidodromous festooned pattern, tertiary veins barely visible and connected perpendicularly to some intersecondaries, secondaries and tertiaries flat below and almost inconspicuous above, and two round (0.7-0.8 mm diam.) sub-basal glands placed at 2-3 mm from the base and next to the midrib. The floriferous shoots are sub-flexuous, 6-7.5 cm long, the flowers with pedicel 1.5-2.2 mm long, hypanthium 2.6-3 mm wide and anthers 0.6-0.7 mm long.



This species is similar to *P. guanaiensis* which has more coriaceous leaves, lustrous above, rounded at the base, with bigger elongated glands attached laterally to the midrib and longer racemes. It also can be confused with *P. littlei*, but that taxon has shoots with darker bark without protruding lenticels, larger oblong leaves with secondary veins anastomosing at 3-5 mm from the margin without a conspicuous festooned pattern, glands placed at 2-4 mm from the base and larger flowers.

**Distribution.** Only known from a single collection located in the eastern (Amazonian) moist slopes of the Yanachaga mountain range (District of Oxapampa, department of Pasco, central Andes of Peru).

**Elevation range.** 2500 m.

**Material examined.** (1) PERU. Pasco: Oxapampa, Chacos. Cloud forest with much bamboo, 2500 m, 22 Jun 2003, Werff, H. van der 17651 (DAV,MO).

108. *P.* sp. nov. ("*aff.opaca-SouthEcuador*")

This new species can be recognized by angulate stems, the coriaceous elliptic-oblong to elliptic-obovate leaves, 6-11 x 2.3-4.5 cm, slightly lustrous above, opaque below, with base obtuse, apex acute to acuminate, petioles 6-10 mm long, brochidodromous festooned venation, 8-9 pairs of secondary veins emerging at 60-70 degrees from the midrib, arching more strongly after half length, tertiaries irregular reticulate and little conspicuous, and two glands placed on the second pair of secondary veins at 2-7 mm from the base and 1-3 (-7) mm from the midrib. The floriferous shoots are relatively short (3-4.5 cm), pauciflorous; the flowers have floral bracts late deciduous, pedicles 2-3 mm long, and campanulate hypanthium 2.5-3.5 cm wide.

The most similar species is *P. opaca*, but it has brochidodromous festooned conspicuous veins, shorter petioles and smaller flowers. Another similar species with partially coincident distribution is *P. ruiziana*

which however has elliptic leaves with rounded to truncate leaves, more ascending secondary veins and bigger flowers.

**Distribution.** Distributed in high elevation humid to sub-humid forests in southern Ecuador and northern Peru.

**Elevation range.** 2200 – 3060 m.

**Local names.** sacha capulí (Ecuador).

**Material examined.** (13) **ECUADOR. Loja:** Parque Nacional Podocarpus, Yangana km 16 desde Yangana Zumba, 2500 m, 8 Sep 1997, *Cerón, C. 34940* (LOJA); Carretera Loja-La Toma: Cerro Villonaco a 20 km al oeste de Loja, colecciones en la cordillera, 2200 m, 14 Aug 1983, *Jaramillo, J. 5683* (AAU,MO,NY,QCA); Carretera Sopotepamba-Celica, Guachanama, 2600 m, 26 Feb 1988, *Jaramillo, J. 10267* (GB,QCA); Celica-Guachanama, 2400 m, 25 Feb 1988, *Jorgensen, P.M. 65118* (QCA); Cerro de Villonaco. Loja-La Toma, Km 13, turnoff towards Chuquiribamba, Km 2. Hcda. La Huangora, 2640 m, 18 Apr 1994, *Jørgensen, P.M. 402* (LOJA,QCA); Cerro Santa Bárbara. 4.4 km NE, Chuquiribamba, at Aguarongo, 3060 m, 2 Dec 1994, *Jørgensen, P.M. 1149* (LOJA,MO,QCA,QCNE); Zamora-Huaico, 2366 m, 7 Sep 2007, *Rivas, V.M. 15* (LOJA); Loja, Cordillera Nor-occidental, sitio Carigan, 2646 m, 30 Jun 2008, *Villa, N. 39* (LOJA); **Zamora-Chinchi:** Yacuambi, Parroquia La Paz. Centro Shuar Kiim. Reserva Tiwi Nunka, 2860 m, 11 Jun 2006, *Kajekai, C. 529* (DAV,LOJA,MO,QCNE). **PERU. Cajamarca:** Cutervo, San Andrés de Cutervo. Parque Nacional de Cutervo, arriba de Saucedal pasando por Chorro Blanco, 2250 m, 3 Aug 1988, *Díaz, C. 2941* (F,MEXU,MO,NY); ibidem, entrando por "Chorro Blanco" sobre invernadas del Sr. Nicolás Navarro, 2550 m, 11 Jan 1990, *Díaz, C. 3932* (MO); ibidem, ca. 15 km N of San Andres, 2410 m, 14 Sep 1991, *Gentry, A. 74811* (MO,USM); **Piura:** Morropon, Chalaco, carretera hacia Las Pircas, 2200 m, 17 Oct 1988, *Díaz, C. 3001* (MO,NY,USM).

109. *P. sp. nov.* (“*aff.ruiziana Loja-Ecu*”)

This new species can be distinguished by its shrubby habit, the elliptic-oblong sub-coriaceous leaves, 8.5-13 x 3.5-5.5 cm, slightly lustrous above, with brochidodromous double festooned venation pattern, secondaries emerging straight at 60-70 degrees from the midrib, tertiaries sinuous percurrent, secondary and tertiary veins plain below and above, tertiaries barely visible, and 2 glands (frequently leaves without glands) placed on the first pair of secondary veins, 5-7 mm from the base and 0-2 from the margin. The floriferous shoots are 7-10.5 cm long, erect, the flowers have infundibuliform hypanthium 3.5-4.2 mm wide, pedicels 3-4 mm long, filaments ca. 2 mm long and anthers 0.7-0.8 mm long. The fruits are prolate apiculate, 13-15 x 11-12 mm with the ventral suture slightly depressed.

The more similar species is *P. ruiziana* which has rigid coriaceous leaves with shorter petioles, more ascending brochidodromous secondary veins, shorter sub-erect racemes and bigger flowers with larger anthers.

**Distribution.** Distributed in high elevation forests of southern Ecuador and northwestern Peru.

**Elevation range.** 2100 – 3000 m.

**Material examined.** (9) **ECUADOR. Loja:** Parque Nacional Podocarpus, E of Nudo de Cajanuma, just N of Centro de Información, 2900 m, 2 Jan 1989, *Eriksen, B.j.* 91296 (AAU); ibidem, Cajanuma entrance, 2730 m, 1 Sep 2010, *Homeier, J.* 4430 (DAV,GOET); Cerro Uritusinga. Loja-La Palma, Km 18.4, 3000 m, 28 Nov 1994, *Jørgensen, P.M.* 1006 (MO); Loja-Zamora, km 11.7 past police control, 2675 m, 14 Mar 1997, *Lewis, G.P.* 3095 (LOJA,MO,QCA); Bosque Universitario, 2470 m, 1 Aug 2011, *Pérez-Zabala, J.A.* ECU-2011-5-A76 (DAV); Parque nacional Podocarpus. Nudo de Cajanuma, 2900 m, 30 Mar 1993, *Romoleroux, K.* 1552 (QCA); Old road Loja - Zamora, E of pass, 2600 m, 31 Mar 1993, *Romoleroux, K.* 1560 (QCA); Parque Nacional Podocarpus. The pass on road Yangana Valladolid, (Nudo de Sabanilla), 2750 m, 28 Feb 1985, *Øllgaard, B.* 58405 (AAU); **PERU. Amazonas:** Chachapoyas, Leimebamba. Forest, 2100 m, Dec 1962, *Woytkowski, F.* 7672 (GH,MO,UC,US).

110. *P.* sp. nov. (“*aff. pearcei-Oxapampa Chartaceous-lvs*”)

This new species can be distinguished by the brown twigs with pale prominent and dense lenticels, the chartaceous elliptic-ovate leaves, 11-21 x 3.5-8.5 cm, with petiole flexuous at the base, 7-11 x 1-1.2 mm, obtuse to acute base, shortly acuminate apex, impressed secondary arcuate veins forming a weak brochidodromous venation pattern, tertiary veins irregularly reticulate and little conspicuous, and 4 glands (some leaves could have supplementary glands sub-marginally along the first secondary vein or alternatively only the two basal are present), the lower pair oblong and placed on the base attached to the midrib and the upper pair smaller round shaped and placed on the first pair of secondary veins 7-20 mm from base and 2-3 mm from the margin. The floriferous shoots are flexuous, 6-9 cm long, the flowers are relatively small with hypanthium campanulate (1.8-2.5 mm wide) slender pedicel ( 3-5 mm long and 0.2-0.3 mm wide) and anthers very minute (0.2-0.3 mm long). The fruits are slightly prolate and apiculate, 11-12 x 9-10 mm, and have thin walled endocarp.

This species is similar to *P. pearcei* which however is distributed at lower elevations, has subcoriaceous leaves with 5 or more pair of submarginal glands, racemes more flexuous and flowers with shorter and thicker pedicels.

**Distribution.** Distributed in humid montane forests of the Amazonian side of the central and southern-central Andes of Peru.

**Elevation range.** 1835 – 2560 m.

**Material examined.** (13) **PERU.**; **Cusco:** Paucartambo, Cosñipata, Trocha Unión, km 8, 2500 m, 3 Aug 2003, *Farfán, W. 973* (CUZ,DAV,HUT,MO,USM,WFU); Urubamba, South Mackhupichu "cloud forest"; Río Aobamba remnant forests, 2200 m, 22 Nov 1995, *Núñez, P. 14195* (DAV,MO); Quillabamba, Santa Teresa, on a hillside called Mandornilloc, .5 km. west of La Playa, 2560 m, 9 Sep 1982, *Peyton, B. 1248* (MO); **Junín:** Satipo. Northern cordillera de Vilcabamba, eastern slope, 2090 m, 26 Jun 1997, *Boyle, B. 4734* (USM); **Pasco:** Oxapampa,

Huancabamba, Cordillera Yanachaga, western slope at base of highest peaks, 2000 m, 18 Sep 1984, *Foster, R. 11208* (DAV,F); Distrito Oxapampa. Parte media de la quebrada San Alberto (zona de amortiguamiento), 2135 m, 8 May 2007, *Monteagudo, A. 13961* (DAV,HUT,MO,USM); Localidad Grapanazu, sector San Daniel, 2094 m, 14 Jul 2004, *Perea, J. 1630* (DAV,MO); ibidem, 2240 m, 22 Sep 2004, *Pérea, J. 1813* (DAV,MO); Dist. Huancabamba, P.N. Yanachaga-Chemillén, Quebrada Yanachaga-Chemillén, 2240 m, 22 Sep 2004, *Pérea, J. 1817* (DAV,MO); Oxapampa, Palmazu, 2550 m, 1 Oct 1984, *Smith, D.N. 8587* (USM). ibidem, 2250 m, 14 Jun 2003, *Vásquez, R. 28265* (AMAZ, DAV, HUT, MO, MOL, USM); ibidem, 2250 m, 14 Jun 2003, *Vásquez, R. 28271* (AMAZ,DAV,HUT,MO,MOL,USM); ibidem, 2265 m, 22 Aug 2004, *Vásquez, R. 30514* (AMAZ,DAV,HUT,MO,MOL,USM).

111. *P. sp. nov.* (“*archidona-midelevation-Ecu*”)

This new species can be recognized by the subcoriaceous ovate-elliptic leaves, 11-16 x 4.5-6.8 cm , slightly lustrous on both sides, with petioles 8-11 x 1.2-1.3 mm, terete and longitudinally sulcate, base obtuse and extending down adaxially on the petiole up to 2/3 its longitude as a narrow ledge, apex acute, venation pattern eucamptodromous-like, secondary veins (7-8) arcuate, emerging at 50-60 degrees from the midrib and parallel to the margin at the end, tertiaries percurrent sinuous and almost perpendicular to the midrib, and two impressed glands placed 2-5 mm from the base, 1-3 mm from the midrib and with a halo surrounding them. Only one sterile is known so far.

The more similar species is *P. debilis*, but it has membranous-chartaceous leaves, more transverse secondary veins and it is distributed in lowland under 500 m elevation.

**Distribution.** Only known from a single locality in premontane forests in the Amazonian foothills of the central Ecuadorian Andes.

**Elevation range.** 1050 m.

**Material examined.** (1) **ECUADOR. Napo:** private reserve of the Hakuna Matata lodge, ca. 5km NW of Archidona, 1050 m, 6 Oct 2007, *Homeier, J. 2717* (GOET,MO,QCA,QCNE).

112. *P.* sp. nov. ("*bagua-stipulata*")

This new species could be distinguished by the rugose stem with dense protruding and very small lenticels, the oblong-elliptic to oblong-ovate chartaceous leaves, with a rusty finish in the herborized material, 10-13 x 3.5-5.8 cm, both surfaces opaque, apex narrowly acuminate, short petiole (4-6 x 1.2-1.5 mm), numerous (12-14) arcuate secondary veins creating an eucamptodromous-like pattern, tertiary veins sinuous percurrent and alternate percurrent when connecting with intersecondaries, and 2 sub-basal glands placed on the first pair of secondary veins next to the midrib or up to 2 mm apart from it. The floriferous shoots are erect and noticeably short, 1-3 cm long; the flowers have pedicels 1-2 mm long, campanulate hypanthium 1.5-1.8 mm wide, and anthers 0.4-0.5 mm long. The fruits are prolate apiculate up to 15 x 12 mm.

Considering the leaf shape, the venation architecture and the flower size, the most similar species is *P. stipulata*, but that taxon has smaller leaves with less secondary veins, four glands and longer racemes. Additionally, that taxon is generally distributed at higher elevations.

**Distribution.** Distributed in mid-elevation sub-humid to humid forests in the Amazonian slope from southern Ecuador to northern Peru plus one isolated record from central Peru (Oxapampa region).

**Elevation range.** 1020 – 1960 m.

**Material examined.** (7) **ECUADOR. Azuay:** Molleturo. Via Santa Cruz - la Conferencia, 1400 m, 11 Jan 1990, *Ortiz, L. 120* (QCA,QCNE); **Loja:** Loja, Parque Nacional Podocarpus, Bombuscaro entrance, 1020 m, 17 Jun 2008, *Cumbicus, N. 1291* (DAV,GOET); **Napo:** Parque Nacional Sumaco-Galeras, Rio Hollin watershed, wet lower

montane forest, 1490 m, 27 Mar 2008, *Homeier, J. 3518* (DAV,GOET,MO,QCA,QCNE); **Zamora-Chinchipe:** Reserva San Francisco, road Loja Zamora, ca. 30 km from Loja, 1960 m, 6 Sep 2008, *Cumbicus, N. 611* (DAV); ibidem, 1870 m, 7 Oct 2000, *Homeier, J. 525* (BIEL,DAV,LOJA,MO,MO,QCNE). **PERU. Amazonas:** Bagua, Ca. 17 trail km E of La Peca in Serranía de Bagua. Elfin forest in rocky saddle between two peaks, 1850 m, 14 Jun 1978, *Gentry, A. 22992* (MO,NY,USM); **Pasco:** Oxapampa, Distrito Bermudez. Bosque de Protección San Matías-San Carlos, Sector Unión-Shimaki, 1382 m, 13 Feb 2003, *Vásquez, R. 27953* (DAV,HUT,MO,USM).

113. *P. sp.nov.* (“*bagua-Imaza-PERU*”)

This new species is distinguishable by a characteristic ochre-ferruginous tone on herbarium specimens, the oblong elliptic chartaceous leaves, 8-11 x 3.5-4.5 cm, with very short petioles (2-3 x 1.5-2 mm), base truncate to cordate, apex acute, venation pattern weak brochidodromous with secondary veins (12-13) departing straight at 70-80 degrees and arching upward after the middle of their length, intersecondaries parallel to secondaries and bifurcating after 10-15 mm, tertiaries irregular reticulate, and 2 sub-basal glands placed on the first pair of veins and either next or attached to the midrib. The fruiting racemes are 4-7.5 cm long, immature fruits are ovate, 7-9 x 5-6 mm. It is similar to *P. stipulata*, but that species has 4 glands, longer petioles, less secondary veins, more obscure minor veins and altitudinal distribution higher in the Andes.

**Distribution.** Only known from a single sample collected in a rocky tableau outcrop namely Cerros Chimin which is part of the Marañon dry forests biogeographic province and part of the Amazonian slope of the northern Peruvian Andes (Bagua district). From that area, during the last years numerous reports of new species and even new genera have been published, some of which are also distributed in the near Cordillera del Condor (e.g. Michelangeli, Ulloa Ulloa, and Sosa (2014).

**Elevation range.** 800 – 850 m.

**Material examined.** (1) **PERU. Amazonas:** Bagua, Dtto. Imaza, comunidad Aguaruna de Wanás (Km 92 Carretera Bagua-Imacita), cerros Chinim, bordes Quebrada rocosa en ambas márgenes, 800 m, 31 Aug 1996, *Díaz, C.* 8094 (MO).

114. *P.* sp. nov. (“*Calca-highlevation-Peru*”)

This new species can be distinguished by the dense lenticellated terminal stems, the coriaceous oblong-elliptic leaves, 11-12 x 3.5-4 cm, with weak brochidodromous venation, secondary veins arcuate and prominent below, emerging at 55-65 degrees from the midrib, tertiaries sinuous percurrent, perpendicular to the midrib and little conspicuous, and two relatively inconspicuous basal elliptic glands attached laterally to the midrib. The floriferous shoots are flexuous, 4-5 cm long and the very minute flowers have pedicels 0.5-2 mm long and hypanthium ca. 1.5 mm wide.

The more similar species is *P. “micradenia”* from central Bolivia, but that taxon has leaves with several pairs of submarginal glands and bigger flowers with longer pedicels.

**Distribution.** Only known from a single humid locality in the upper part of the Rio Yanatilli valley which is located in the southern Peruvian yungas in the region of Calca.

**Elevation range.** 2579 m.

**Material examined.** (1) **PERU. Cusco:** Calca, Dist. Lares, Manto, 2579 m, 20 Feb 2004, *Valenzuela, L.* 2741 (AMAZ,CUZ,DAV,HUT,MO,MOL,USM).

115. *P.* sp. nov. (“*celica-LOJA-Ecu*”)



This new species is characterized by the elliptic to elliptic-ovate coriaceous leaves, 6-8 x 3-4 cm, lustrous above, with petioles 8-11 mm long, veins down to tertiaries prominent on the lower surface and plain on the upper one, secondary veins arcuate configuring a weak brochidodromous main pattern, intersecondaries parallel to secondaries and branched, tertiaries openly reticulate and two marginal to sub-marginal minute glands (0.3-0.5 mm wide) located 4-7 mm from the base and frequently creating a marginal enation. The floriferous shoots are sub-erect, 3-4 cm long, the flowers shortly pedicelated (1-3 mm) and with a wide open campanulate hypanthium 3.5-4 mm wide. The fruits are globose and measure 12-13 mm wide.

Similar to *P. ruiziana* which, however, has shorter petioles, close brochidodromous venation pattern, basal to sub-basal glands not attached to the margin and bigger flowers.

**Distribution.** Only known from few sub-humid Andean cloud forests surrounded by a very dry matrix in the province of Loja, Ecuador.

**Elevation range.** 2100 – 2600 m.

**Local names.** sachá capuli (Ecuador).

**Material examined.** (7) **ECUADOR. Loja:** Haico-pamba, 55 km S de Loja, 2500 m, 8 Feb 1948, *Espinosa, R.* 2336 (LOJA); Cerro de Celica. Celica-Guachanamá, 6-7.5 km, 2400 m, 12 Apr 1994, *Jørgensen, P.M.* 104 (MO,NY,QCA,QCNE); Catamayo-Catacocha, Km 25, turnoff at Las Chinchas towards Piñas, Km 2.3, 2250 m, 13 Dec 1994, *Jørgensen, P.M.* 1462 (MO,NY,QCA,QCNE); Montaña de Tarapo, Catacocha, 2100 m, 18 Mar 1995, *Merino, B.* 4464 (LOJA); Las Chinchas, via a Zambí, 2600 m, 7 Jul 1995, *Merino, B.* 4589 (LOJA); Catamayo, Las Chinchas, 300 despues de desvío a Portovelo, 2290 m, 31 Jul 2011, *Pérez-Zabala, J.A.* ECU-2011-4-A75 (DAV); Las Chinchas, 2330 m, 2 Mar 1988, *Vivar, F.* 3172 (LOJA,QCNE).

116. *P. sp.nov.*(“*chachapoyas-Peru-vdWerff*”)

This new species can be distinguished by the elliptic-oblong subcoriaceous leaves, 16-20 x 5.7-8 cm, with base obtuse, apex attenuate, petioles 8-12 mm long, brochidodromous festooned venation, the secondaries slightly raised or plain below, tertiaries relatively inconspicuous and two glands placed sub-basally at 2-4 mm from the base and attached to the midrib. The floriferous shoots are relatively long, 9-12 cm long (up to 15 cm when fruiting), the flowers have pedicels 3-4 mm long, widely campanulate hypanthium 4.5-5 mm wide and anthers 0.5-0.6 mm long. The fruits are ovate and apiculate, ventrally applanate, 15-18 x 13-16 mm.

Species similar to *P. integrifolia* which, however, has coriaceous leaves, more dense arcuate secondary veins raised below, erect shorter racemes and occurrences generally at higher elevations.

**Distribution.** Distributed in the wet montane forests of the Amazonian slope of the central and southern Ecuadorian Andes and the northern Peruvian Andes.

**Elevation range.** 1500 – 2550 m.

**Material examined.** (6) **ECUADOR. Loja:** Vicinity of Mercadillo, at El Retiro, 1500 m, 13 Aug 2000, *Madsen, J.E. 7087* (AAU,LOJA,QCNE); Rd. Celica -Pindal, km 8-9, 1900 m, 9 Feb 2000, *Madsen, J.E. 7179* (AAU,LOJA); **Napo:** Cordillera de Guacamayos, ca. 6 km SE of Cosanga, 1990 m, 1 Apr 2006, *Homeier, J. 2231* (DAV,GOET,QCA,QCNE); ibidem, 1940 m, 23 Oct 2007, *Homeier, J. 3111* (DAV,GOET,MO,QCA,QCNE). **PERU. Amazonas:** Road Chachapoyas-Mendoza, a little past Molinopampa, 2400 m, 15 Mar 1998, *Werff, H. van der 15064* (DAV,MO,USM); Laguna de Pomacochas, 2550 m, 27 Mar 1998, *Werff, H. van der 15828* (DAV,MO,MOLF,USM).

117. *P. sp. nov.* (“*choquequirao-PERU*”)

This new species can be recognized by the light gray stem with dense white pustulate lenticels, elliptic-oblong coriaceous rigid leaves, 11-15 x 3.5-6 cm, slightly falcate and asymmetric, drying light ochre, with base obtuse and apex acute, margin irregular with some enations close to the base, petioles 6-10 mm long, drying black, secondary veins arcuate very ascending, eucamptodromous to weak brochidodromous in appearance, emerging at 50-60 degrees from the midrib, tertiaries irregular reticulate, and four glands, the lower two basal and the upper ones marginal located at 6-8 mm from the base. The floriferous shoots are 5-7 cm long, subflexuous; the flowers have short pedicels (2-3 mm long), campanulate hemispherical hypanthium 2.5-3.5 wide and exceedingly small anthers measuring 0.2-0.3 mm long. The fruits are globose, 12 mm wide.

This species resemble *P. micradenia* from Bolivia, but that taxon has smaller elliptic symmetric leaves, more than four not marginal glands, stems with few lenticels and smaller fruits.

**Distribution.** Apparently endemic to the Choquequirao mountain, a relatively dry highland area occupied in the past by an Inca city in the southern Andes of Peru.

**Elevation range.** 2791 – 3329 m.

**Material examined.** (5) PERU. Cusco: La Convención, Dist. Santa Teresa. Choquequiraw, San Ignacio. Matorral, 3250 m, 7 Mar 2005, *Suelli, E. 2237* (CUZ,DAV,HUT,MO,USM); ibidem, 2826 m, 19 May 2004, *Valenzuela, L. 3574* (CUZ,HUT,MO,USM); ibidem, 2826 m, 19 May 2004, *Valenzuela, L. 3599* (CUZ,DAV,MO); ibidem, 2791 m, 21 May 2004, *Valenzuela, L. 3641* (CUZ,DAV,MO,USM); ibidem, 3314 m, 23 May 2004, *Valenzuela, L. 3719* (AMAZ,CUZ,DAV,HUT,MO,MOL,USM).

118. *P. sp. nov.* (“*cordillera-Condor-highlevation*”)

This new species can be distinguished by the coriaceous elliptic-oblong to obovate-elliptic leaves, 6.5-9.5 x 4-4.8 cm, sometimes slightly asymmetric, with obtuse base, obtuse to rounded apex, revolute margin, very short petioles (2-5 x 1.5-2 mm), brochidodromous festooned venation, secondary veins emerging at 60-65 degrees from the midrib and slightly raised below, tertiary veins irregular reticulate and conspicuous on both sides and 2 glands sub-basal, 0-2 mm from the midrib. The floriferous shoots are suberect, 5-7 cm long, 1-1.2 mm thick, the flowers have pedicels 2-3 mm long, hypanthium 2-2.5 mm wide and anthers ca. 0.5 mm long.

This species is similar to *P. littlei* which has bigger leaves, longer petioles and the flowers in general bigger in size. Also, it can be associated with *P. ruiziana* which has leaves elliptic and symmetric, longer petioles, base rounded to slightly cordate, racemes stouter and bigger flowers in general.

**Distribution.** This species is apparently endemic to the upper montane forest of the isolated sandstone Amazonian-Andean mountain range of Cordillera del Condor located in the border between southern Ecuador and northern Peru.

**Elevation range.** 1800 – 2150 m.

**Material examined.** (4) **ECUADOR. Morona-Santiago:** Gualaquiza, Campamento Achupalla, Cordillera del Cónдор, 15 km east of Gualaquiza, 2100 m, 22 Jul 1993, *Gentry, A. 80349* (MO); **Zamora-Chinchipe:** El Pangui, Cordillera del Cónдор, 1 km south of Cónдор Mirador military post, on Ecuador-Peru border, 1970 m, 7 Sep 2003, *Neill, D. 14444* (DAV,MO,QCNE); Yantzaza, Cordillera del Cónдор. Carretera desde Los Encuentros hacia el Cerro Machinaza, Cima del Cerro Machinaza, 2100 m, 24 Jul 2005, *Quizhpe, W. 1701* (DAV,LOJA,MO,QCNE); In the vicinity of the mining camp at the Río Tundaime. Along trail from military base El Condor to the look-out point, 1800 m, 28 Oct 2004, *Werff, H. van der 18950* (MO).

119. *P. sp. nov.* (“*crrAhuaca-pyrogenic-Ecu*”)

This new species can be distinguished by the ovate subcoriaceous leaves, 6.5-8 x 3-4.2 cm, lustrous above and slightly lustrous below, with base obtuse, apex acuminate, conspicuous cartilaginous margin, slender petioles (6-7 x 0.5-0.7 mm), lanceolate falcate stipules measuring 3-4 x 1-2 mm, brochidodromous festooned venation, secondaries emerging relatively straight at 65-75 degrees from the midrib, irregular reticulate tertiary fabric, lateral veins plain on both sides, and 2 minute glands (0.3-0.4 mm wide) located on the first pair of veins at 5-8 mm from the base and 2-3 mm from the margin. The only known specimen is in sterile condition.

The most similar species is *P. sp. nov.* "*aff. reflexa BOL*" which has leaves with longer petioles, basal glands and more ascending secondary veins.

**Distribution.** Known from a single collection in the cerro El Ahuaca, a rocky granite inselberg with montane dry dwarf forest and pyrogenic grasslands in southern Ecuador (Werner, Ledesma, & Hidalgo B., 2006).

**Elevation range.** 2200 – 2260 m.

**Material examined.** (1) ECUADOR. Loja: Calvas, Cerro El Ahuaca, close to the town of Cariamanga, west slope, 2200 m, 23 Jul 2005, *Werner, F.A. 1702 (LOJA,MO)*.

120. *P. sp. nov.* ("*cutervoPERU-HighElev-Gentry*")

This new species is a tree with chartaceous elliptic-oblong leaves, 11-13 x 5-5.5 cm, drying generally in a light ochre tone below, with relatively slender petioles (4-8 x 0.8-1 mm), base rounded to truncate and becoming decurrent at the end, apex shortly acuminate, margin erose, brochidodromous festooned venation pattern, secondary veins slightly prominent below and emerging at 70-80 degrees from the midrib, tertiaries alternate percurrent, and 2 glands placed on the first pair of secondary veins at 3-7 mm from the base, 2-7

mm from the midrib and 1-3 mm from the margin. The floriferous shoots are 5.5-6.5 cm long, flexuous; the flowers have pedicels 2-3 mm long, hypanthium infundibuliform 2.5-3 mm wide, and anthers 0.7-0.8 mm long.

Pérez-Zabala (2007) identified some specimens of this taxon as *P. littlei*, however that species has more coriaceous leaves, with entire margin, glands generally attached to the midrib and thicker petiole. Also, its floriferous shoots are longer, the flowers have wider hypanthium and smaller anthers.

**Distribution.** Known only from few humid forest localities of the Amazonian slope in northern Peru and southern Ecuador.

**Elevation range.** 1700 – 2650 m.

**Local names.** canelón (Ecuador).

**Material examined.** (7) **ECUADOR. Zamora-Chinchi:** Romerillos Alto, vertiente izquierda Quebrada la avioneta, 1840 m, 3 Mar 1998, *Cabrera, O. sn* (LOJA); Yacuambi, Parroquia La Paz. Centro Shuar Kiim. Reserva Tiwi Nunka, por el sendero entre la comunidad y la cumbre de la Cordillera Chiichim Naint, 2400 m, 15 Jun 2006, *Wisum, A. 586* (DAV,LOJA,MO,QCNE). **PERU. Amazonas:** Luya, Distrito Camporendondo, Tullanya. Quebrada San Francisco, borde de quebrada, 1700 m, 29 Nov 1996, *Vásquez, R. 21886* (DAV,MO,MOLF,QCNE); **Cajamarca:** San Ignacio, Chirinos. Localidad de Pacasmayo, 1700 m, 23 Oct 1997, *Campos, J. 4514* (DAV,MO,USM); Cutervo National Park, Chorro Blanco area, 15 km N of San Andrés de Cutervo, 2400 m, 13 Sep 1991, *Gentry, A. 74723* (DAV,F,MO,USM); Cutervo National Park, 12 km NE of San Andrés at Cutervo, 2200 m, 16 Sep 1991, *Gentry, A. 74863* (MO,USM); **San Martín:** Rioja, Pedro Ruíz-Moyobamba road, Km 390, Venceremos, 1770 m, 5 Aug 1983, *Smith, D.N. 4619* (MO,NY).

121. *P.* sp. nov. (“*ferreyranaLi-Peru*”)

This new species can be distinguished by the shrubby habit, the sclerotic elliptic-oblong to ovate leaves, 6-10 x 2.4-4 cm, with petioles 7-10 mm long, base obtuse or rounded and decurrent down to the base of the petiole, apex attenuate, margin irregularly serrate, venation pattern brochidodromous festooned, secondary veins arcuate emerging at 60-70 degrees from the midrib and anastomosing at 1/3 to 1/4 the distance midrib-margin, tertiaries irregular reticulate, major and minor veins impressed above and prominent below, and 2-4 glands, the lower pair placed in the petiole on the decurrent margin or in the intersection of the petiole and the blade and the upper pair marginal at 1-5 mm from the base and creating an enation. The floriferous shoots are erect 3.5-5 cm long, the flowers have short pedicels (2-2.5 mm long), hemispherical hypanthium (3.5-4 mm wide) and anthers 0.5-0.6 mm long. The fruits are slightly prolate, 11-12 x 9-10 mm, apiculate and laterally asymmetric.

This species is close to *P. rigida* which has leaves more ovate in shape with truncate to cordate base, sub-marginal glands not placed on a tooth and wider hypanthium.

**Distribution.** Species distributed in high altitude scrublands (up to 3700 m!) from northern to central Andes in Peru corresponding to subhumid and frequently rocky areas.

**Elevation range.** 2775 – 3700 m.

**Material examined.** (4) **PERU. Ancash:** Road from Sihuas to Pomabamba, after Sicsibamba before Palo Secco, 3700 m, 11 Mar 2001, *Weigend, M. 5092* (NY); **Cajamarca:** Celendín, Entre Celendín y Jalca Cumullca, 3000 m, 23 Jun 1963, *Ferreya, R.A. 15072* (UC,US); Cajamarca, Distrito de Namora. en la quebrada del río Llallumayo, 2775 m, 23 Jun 1984, *Sanchez Vega, I. 3621* (F,MO); **La Libertad:** Hill north of Huamachuco, 3300 m, 5 Feb 1997, *Weigend, M. 97-279* (USM).

122. *P. sp. nov.* (“*integrifolia-aff-Huamantupa-Peru*”)

This new species can be distinguished by the dark brown twigs with dense prominent beige elliptic lenticels, the elliptic ovate coriaceous leaves, 12-16 x 5-8 cm, sometimes slightly falcate, with petioles 6-10 mm long, base rounded to obtuse, apex acute to attenuate, arcuate ascending secondary veins, venation pattern weakly brochidodromous, secondaries progressively arcuate emerging at 60-70 degrees from the midrib, intersecondaries very short (ending at less than 10 mm from the midrib), tertiary veins sinuous percurrent and perpendicular to the midrib, and 2 glands, sub-basal and attached to the midrib. The floriferous shoots are sub-erect, 7-11 mm long, with minute flowers that have pedicels 1-2.5 mm long, 0.3-0.4 mm thick, campanulate hypanthium 2-2.5 mm wide and anthers 0.4-0.5 mm long. The fruits are prolate-apiculate, 12-13 x 9-11 mm, with pedicels measuring 4.5-5 x 0.5-0.7 mm.

The most similar species is *P. integrifolia* which generally has larger leaves and erect racemes with bigger flowers. Also similar, is *P. pleiantha*, which however has chartaceous ovate to obovate leaves with noticeably short and thick petioles and longer racemes with slightly wider flowers.

**Distribution.** Distributed mainly in primary forests of the upper part of the Urubamba basin in the central-southern Andes of Peru.

**Elevation range.** 2000 – 2900 m.

**Material examined.** (9) PERU. Cusco: Dist. Vilcabamba, frente a Yupancca, 2560 m, 3 Jun 2002, *Galiano*, W. 4294 (CUZ,MO); La Convención, Dist. Santa Teresa, Yerbabuenayoc, 2000 m, 17 Mar 2004, *Huamantupa*, I. 4157 (AMAZ,CUZ,HUT,MO,MOL,USM); ibidem, 2000 m, 17 Mar 2004, *Huamantupa*, I. 4162 (CUZ,DAV,HUT,MO,USM); ibidem, 2300 m, 18 Mar 2004, *Huamantupa*, I. 4185 (AMAZ,CUZ,DAV,HUT,MO,MOL,USM); ibidem, 2420 m, 16 Sep 2005, *Huamantupa*, I. 6601 (CUZ); ibidem, 2500 m, 17 Apr 2005, *Valenzuela*, L. 5426 (AMAZ,CUZ,DAV,HUT,MO,MOL,USM); Distrito Vilcabamba, Oyara, Cedropata, 2560 m, 20 Feb 2007, *Valenzuela*, L. 8819 (AMAZ,CUZ,DAV,HUT,MO,MOL,USM); Distrito Vilcabamba, Oyara, Bazul, 2900 m, 21 Feb 2007, *Valenzuela*, L. 8880 (CUZ,DAV,MO,USM).



123. *P.* sp. nov. (“*aff rigida Huancabamba-PER*”)

This new species can be distinguished by the relatively long ensiform-falcate stipules (6-7 x 1-1.5 mm) only persistent in early expanding reiterations, the oblong-ovate leaves, 7-13.5 x 3.2-5.5 cm, with round base, shortly acuminate apex with protruding midrib, evenly serrate margin with veins ending in the teeth, brochidodromous double festooned venation pattern impressed above and prominent below, tertiaries irregular reticulate, and two laminar glands placed 3-6 mm from the base on the first pair of veins at 2-4 mm from midrib. The floriferous shoots are erect, 2-4 cm long; the flowers have pedicels 2-3 mm long, hypanthium 3-3.5 mm wide, and anthers 0.8-0.9 mm long. The fruits are slightly prolate, 10-11 x 9-10 mm.

This species is similar to *P. rigida*, but that taxon has basal marginal glands placed on the cordate base, sparse teeth, brochidodromous relatively inconspicuous veins and longer racemes measuring 6-14 cm long.

**Distribution.** Distributed in montane cloud forest enclaves in the arid western slope of the northwestern Andes in Peru.

**Elevation range.** 2000 – 3000 m.

**Local names.** laicate (Peru).

**Material examined.** (7) **PERU. Cajamarca:** San Miguel, Bosque natural de Quellahorco, al Nor Este de la localidad de Tongod, 2700 m, 14 Sep 1991, *Sanchez Vega, I. 5786* (F,MO,NY); Jaén, Transect 3. District Pomahuaca, Caserio Amilán, La Rinconada, 2350 m, 25 Jun 1993, *Shonle, I. 160* (MO); Cajabamba, 2000 m, 16 Nov 1950, *Velarde-Nuñez, O. 3021* (US); **La Libertad:** Santiago de Chuco, Huacás (Cachicadán), 2800 m, 15 Jun 1984, *Sagástegui, A. 11908* (F,MO,NY); **Lambayeque:** Ferrenafe, Vertiente Occidental De Los Andes. Bosque de Chiñama, 2500 m, 15 Aug 1988, *Cano, A. 2066 a* (MO); **Piura:** Ayabaca, Vertiente Occidental de Los Andes Piura: Bosque de

Huamba, 2850 m, 15 Oct 1988, *Cano, A. 1591* (MO,TEX); Huancabamba, Al NO de Salala, 3000 m, 1 May 1990, *Sanchez Vega, I. 5209* (F).

124. *P.* sp. nov. (“*jaen-PERU*”)

This new species can be easily recognized because the relatively small elliptic-ovate coriaceous leaves, 6-8 x 2.5-3 cm, opaque on both sides, with long and relatively slim petioles (12-18 x 0.8-1 mm), brochidodromous festooned venation pattern, secondary veins emerging relatively straight at 50-60 degrees from the midrib, intersecondaries 7-8 mm long bifurcated at the distal end, tertiaries inconspicuous, lateral veins flat on both sides, and 2 marginal to sub-marginal maculate glands (1-1.5 mm wide) placed 7-13 mm from the base. The fruiting racemes are erect, 3.5-4.5 cm long with fruits prolate apiculate and applanate at the ventral face, 12-14 x 11-12 mm. Flowers are unknown so far.

The relatively small leaves with long petioles and submarginal glands can fit the appearance of *P. urotaenia*, however that taxon has laminar domatia, more visible minor veins, sparse trichomes on expanding shoots and ovate fleshy fruits. Other Andean taxa with small leaves have quite different leaf architecture.

**Distribution.** Only known from a single collection in the Sallique district of the Jaen Province located in the northern department of Cajamarca in Peru. This is sub-humid upper montane forest located in the western slope of the Andes with the influence of the desert Peruvian coast but with humidity supply from the fog condensation. This is part of the Amotape-Huancabamba zone, an area with a particularly high richness and high endemism of several Andean floristic elements (Weigend, 2002).

**Elevation range.** 2495 – 2600 m.

**Material examined.** (1) **PERU. Cajamarca:** Sallique. Localidad Lanchal a Tambillo. Bosque secundario con relictos de bosque primario, 2495 m, 1 Jul 1998, *Campos, J. 5172* (DAV,MO).

125. *P. sp. nov.* (“*MachuPichu-shortInfl*”)

This new species can be distinguished by the subcoriaceous ovate-elliptic leaves, 8-11.5 x 3.5-5 cm, with petiole 5-8 mm long, base acute and decurrent, apex acute, secondary veins arcuate and emerging at 45-60 degrees from the midrib and forming a eucamptodromous-like pattern, tertiaries alternate percurrent more or less perpendicular to the midrib, and 2 elliptic basal crateriform glands (1 mm diam.) laterally attached to the midrib plus 1-2 additional minute round glands (0.3-0.5 mm wide) sometimes present on the first pair of secondary veins at 3-5 mm from the base. The floriferous shoots are erect and relatively short (2.5-4 cm long); the flowers have pedicels 1.5-2 mm long, infundibuliform hypanthium 2.8-3.2 mm wide and anthers 0.5-0.6 mm long.

Closely allied to *P. sana* which is found at lower elevations, has longer leaves with less arcuate secondary veins, bigger glands and flexuous racemes with smaller flowers.

**Distribution.** Only known from the southern Andes of Peru, on humid montane forests of the Amazonian slopes northward of the city of Cusco.

**Elevation range.** 2150 – 2483 m.

**Material examined.** (2) **PERU. Cusco:** Paucartambo, km 135 de la carretera Paucartambo-Pilcopata, 2150 m, 17 Feb 1990, *Cano, A. 3030* (F); Urubamba, Dist. Machu Picchu, Pampacahua, 2483 m, 25 Jan 2005, *Valenzuela, L. 4805* (AMAZ,CUZ,DAV,HUT,MO,USM).

126. *P. sp.nov.* (“*morona-ECU-bigfruit*”)

This new species can be recognized by the ovate-elliptic coriaceous leaves, 12-18 x 5-6.5 cm, reddish to ochre in dry herbarium specimens, with base obtuse to rounded, apex acute, petiole deeply canaliculated until the base by an extension of the base of the blade, 10-14 mm long, brochidodromous venation pattern with 8-9 arcuate secondary veins prominent below, tertiary veins straight percurrent and little conspicuous, and 2 oblong sub-basal glands attached to the midrib measuring 2-2.5 mm long. The fruiting racemes are relatively thick (2-2.5 mm), and the fruits are oblate, 10-11 x 13-15 mm. The flowers are unknown so far.

It can be confused with *P. integrifolia* which has generally larger lanceolate oblong leaves, weak brochidodromous venation, bigger basal glands and fruits ovate and apiculate. Another similar taxon is *P. littlei*, which generally has smaller leaves, relatively plain secondary veins, fruiting racemes suberect and slimmer and smaller fruits (though also oblate and didymous).

**Distribution.** Distributed in midelevation forests of the Amazonian slope of the Andes and the western side of Cordillera del Condor in southern Ecuador and northern Peru.

**Elevation range.** 1150 – 2040 m.

**Material examined.** (6) **ECUADOR. Morona-Santiago:** Limón Indanza, Cordillera del Cóndor. Centro Shuar Yunkumas, Asociación Nunkui. Cerro Chuank Naint, 1150 m, 19 Dec 2005, *Morales, C. 1534* (DAV,LOJA,MO,QCNE); **Zamora Chinchipe:** Reserva San Francisco, Road Loja Zamora, 2040 m, 22 May 2009, *Cumbicus, N. 1316* (DAV,GOET); Reserva San Francisco, road Loja-Zamora, ca. 35 km from Loja, 2000 m, 15 Oct 2004, *Homeier, J. 1404* (BIEL,DAV,LOJA,QCNE); Finca Reynoso Numpatakaima Nangaritza, 1530 m, 27 Jun 2000, *Merino, B. 5292* (LOJA); Area of the Estación Científica San Francisco, road Loja-Zamora, ca. 35 km from Loja, 1980 m, 12 Jun 2005, *Werner, F.A. 1542* (MO); **PERU. Cajamarca:** San Ignacio, Huarango, Nuevo mundo, Pisagua, 1550 m, 10 Aug 2001, *Vicuña, E. 518* (USM).

127. *P. sp.nov.* (“*nuneziiLi-Peru*”)

This new species can be recognized by the shrubby habit, the ovate-oblong coriaceous leaves, 11-16 x 4.5-6.5, opaque on both sides, with petioles 8-13 mm long, base obtuse to truncated and shortly decurrent at the end, apex acuminate, margin serrate with evenly distributed upward curved teeth, venation pattern brochidodromous double festooned, secondaries emerging straight at 55-60 degrees from the midrib, anastomosing at around 1/3 from the margin, tertiaries irregular reticulate, and 2 glands (sometimes just one or none) placed between the first and the second pair of secondary veins (or submarginal), 5-18 mm from the base. The floriferous shoots are erect, 6-9.5 cm long; the flowers have a pedicel 2.5-3.2 mm long, hypanthium open campanulate 3.5-4 mm wide and anthers 0.7-0.8 mm long. The fruits are prolate apiculate.

The most similar species are *P. huantensis* and *P. rigida*, the former has longer flexuous racemes and basal glands; the latter has smaller leaves with marginal-basal glands, more obscure veins and subflexuous racemes.

**Distribution.** Distributed in humid upper montane forests surrounding the middle basin of the Marañón River in northern Peru.

**Elevation range.** 2660 – 3400 m.

**Local names.** pipe (Peru).

**Material examined.** (6) **PERU. Amazonas:** Utcubamba, Uchumarca, Chuquibamba, cloud forest around Cochabamba, 2660 m, 19 Nov 2013, *Bussmann, R. 18600* (MO); **Cajamarca:** Celendín, Guañambra entre Celedin y Agua Colorada, 2890 m, 11 Dec 1990, *Sanchez Vega, I. 5397* (F); Celendin, Celendín-Cajamarca road, 10-15 km from Celendín, 3200 m, 25 Feb 1984, *Smith, D.N. 6226* (BRIT,MEXU,MO,USM); ibidem, 3200 m, 25 Feb 1984, *Smith, D.N. 6230* (MO,USM); **La Libertad:** Huamachuco, Sanagorán, 2750 m, 24 Oct 2002, *Cano, A. 12445* (USM); Pataz, S side of Cerro Potosi, above Pampa Rosas, 3000 m, 3 Mar 1986, *Young, K. 3089* (F, MO, MOLF, USM).

128. *P.* sp. nov. (“*peruensis*Li”)

This new species can be distinguished by the elliptic-ovate to oblong-ovate subcoriaceous leaves, 9.5-12.5 x 3.0-4.2 cm with base obtuse to rounded and decurrent into the petiole forming a conspicuous lateral ledge, apex acute, weak-brochidodromous venation pattern, midrib very prominent and colored red, secondary veins arcuate emerging at 50-65 degrees from the midrib, slightly prominent below and plain above, intersecondaries half the length of secondaries, tertiaries irregularly reticulate, and 2 small elliptic basal glands located either laterally on the midrib or next to it. The floriferous shoots are erect, 7-11 cm long; the flowers have open campanulate hypanthium, 4-4.5 mm wide, the pedicels are 4-5 mm long and the anthers ca. 0.5 mm long.

This species is similar to the Colombian *P. opaca*; however, such species has transverse brochidodromous venation, flexuous racemes and smaller flowers. Although *P. pleiantha* is distributed in the geographic proximity of this new species (but at slightly lower elevation); its leaves are considerably larger, the petiole is short and thick, and the flowers are considerably smaller.

**Distribution.** Only known from two localities of humid montane forests in the central Andes of Peru.

**Elevation range.** 2400 – 2800 m.

**Material examined.** (2) PERU. Pano, 2800 m, 10 May 1923, *Macbride, J.F. 3629* (US); Huanuco: Tumanga, rain-forests of the Cordillera Carpish, north of the Andean village of Acomayo, 2400 m, 19 Apr 1963, *Woytkowski, F. 7993* (MO,UMO).

129. *P.* sp. nov. (“*piper-like Urubamba-Peru*”)

This rare new species has a remarkable branching architecture with zig-zag distichous twigs (terminal reiterations) swelled at the base and attached to an older zig-zag shaped branch resembling some shrubs of the genus *Piper* (Piperaceae). Also, at first glance it can resemble the genus *Picramnia* (Picramniaceae) because all leaves from a previous season get lateral branches of similar length that appear compound leaves with basal pulvinus and alternate leaflets. The leaves are elliptic-oblong to elliptic-obovate, slightly asymmetric, 6-9 x 2.2-3 cm, with a relatively weak petiole (4-6 x 0.7-1 mm), obtuse base, acuminate apex, very ascending (45-50 degrees) secondary veins, conspicuous percurrent sinuous tertiary veins and two sub-basal glands located at various levels around the first pair of secondary veins next to the midrib. The fruiting shoots are 4-4.5 cm long and the fruits are globose to slightly oblate, minutely apiculate and measure 9-10 x 9-11 mm. The flowers are unknown.

The combination of characters observed in this species is not shared with any other already described species.

**Distribution.** Only known from a single place in a humid montane location namely Pampacahua in the Urubamba Province, Department of Cuzco.

**Elevation range.** 2300 m.

**Material examined.** (1) PERU. Cusco: Urubamba, Pampacahua, a 95 km de Cusco, entre el Km 95 y 107 del ferrocarril Cusco-Quillabamba, 2300 m, 6 Nov 1987, Núñez, P. 8564 (CUZ,GH,MEXU,MO).

130. *P.* sp. nov. ("*Quizhpe-cordillera Condor*")

This new taxon can be distinguished by the bark of the twigs covered by a whitish layer and pustulate amber lenticels, the elliptic-oblong subcoriaceous leaves, 17-19 x 6.5-7.5 cm, slightly lustrous above, with base rounded and decurrent at the end, apex acute, venation pattern weak brochidodromous, secondary

veins (10-12) emerging at 55-60 degrees from the midrib, relatively straight along their first half and then curved upward, tertiaries alternate percurrent, and 2 glands, ca. 2 mm across, placed at 2-4 mm from the leaf base and 1-2 mm from the midrib. The floriferous shoots are subflexuous, 10-15 cm long; the flowers have pedicels 4.5-5.5 x 0.5-1 mm, hypanthium infundibuliform, 3-3.8 mm wide with very narrow deltoid sepals at the top (less than 1 mm wide and separated from each other), petals 3-3.2 x 1.5 - 2.2 mm, and anthers 0.5-0.6 mm long.

It is closely allied to *P. williamsi* which has generally larger and wider leaves with secondary veins closer to eucamptodromous and slightly prominent below, bigger glands located next to the base and longer racemes with smaller flowers subtended by slender and longer pedicels.

**Distribution.** Only known from a single collection in mid elevation humid forests of the sandstone massif Cordillera del Condor which is located in the southeastern border of Ecuador with northern Peru.

**Elevation range.** 1600 m.

**Material examined.** (1) **ECUADOR. Zamora-Chinchi:** Yantzaza, Cordillera del C6ndor. Carretera desde Los Encuentros hacia el Cerro Machinaza. Sector San Antonio - Rio Blanco, 1600 m, 27 Jul 2005, *Quizhpe, W. 1772* (DAV,LOJA,MO,QCNE).

131. *P.* sp. nov. ("*short raceme- SanFrancisco-Ecu*")

This new species has oblong lanceolate to elliptic-lanceolate subcoriaceous leaves, 13-18 x 5.5-8 cm, with petioles 9-13 x 2-2.5 mm, base and apex acute, arcuate secondary veins, prominent below and impressed above, arranged in a brochidodromous pattern, tertiaries irregular reticulate, secondaries and tertiaries slightly prominent below and impressed above, and 2 big glands (2-2.5 mm long) attached to the midrib and below the first pair of veins. The floriferous shoots are apparently (based on only one collection



with partially mature flowers, *Neill 14919*) erect, noticeably short and thick (1-2.5 cm x 2 mm at the base); the flowers have pedicels 1-2 mm long and infundibuliform hypanthium 2-2.5 mm wide. When fruiting, the racemes elongate up to 10 cm long, the fruits are oblate 12-13 x 14-15 mm.

The leaf architecture is similar to *P. integrifolia*, but the combination of leaves with two big basal glands, dwarf racemes and oblate fruits, is not found in that species.

**Distribution.** Only known from moist places in the transition between mid-elevation to high-elevation forests in the Podocarpus Natural Park and the San Francisco Biological Station in southern Ecuador.

**Elevation range.** 1040 – 2030 m.

**Material examined.** (8) **ECUADOR. Loja:** Loja, Parque Nacional Podocarpus, Bombuscaro entrance, 1040 m, 30 May 2008, *Cumbicus*, *N. 145* (DAV,GOET); **Zamora Chinchipe:** Reserva San Francisco, 2030 m, 4 Oct 2008, *Cumbicus*, *N. 1003* (DAV,GOET); Punta de Guanza- Guayzimi, 1500 m, 18 Dec 1999, *Merino*, *B. 5138* (LOJA); Zamora, Estación Científica San Francisco; 30 km east of Loja, on road to Zamora, on eastern Andean slopes, 1900 m, 22 Nov 2005, *Neill*, *D. 14919* (DAV,LOJA,MO,QCNE); ibidem, 2000 m, 30 Jul 2011, *Pérez-Zabala*, *J.A. ECU-2011-2-A73* (DAV); Parque Nacional Podocarpus, 5-6 km al S de Zamora, 1100 m, 10 Jul 1992, *Romoleroux*, *K. 1456* (QCA); Numbala, a 15 km SE de Yangana, 1800 m, 25 Aug 1975, *Samaniego*, *A. 103* (COL,LOJA,US); Area of Estación Científica San Francisco, road Loja-Zamora, ca. 35 km from Loja, 1930 m, 14 Jun 2005, *Werner*, *F.A. 1573* (MO).

132. *P.* sp. nov. (“*short Petiole SanFrancisco-Ecu*”)

This apparently new species has elliptic to elliptic-ovate thick coriaceous leaves, 11-13 x 5-6 cm, lustrous above and opaque below, with very short and stout petiole (2-3.5 x 2-2.5 mm), round base and shortly acuminate apex, margin recurved, venation pattern weak brochidodromous, secondary veins

relatively straight along their first half (at 60-65 degrees from the midrib), raised below and slightly to very depressed above, and two elliptic basal glands (1-2 mm diam.) attached laterally to the midrib. The fruiting racemes are 10-11 cm long and have prolate apiculate fruits measuring 12-14 x 11-12 mm.

The most similar already described species is *P. guanaiensis* but that has sub-coriaceous leaves with relatively flat and obscure secondary veins, longer and slimmer petioles and round to oblate fruits. The previously treated species (*P. "short raceme- SanFrancisco-Ecu"*), which also occurs in the reserve "San Francisco" and have both leaves and fruiting racemes of comparable size, differs because its more oblong and thinner leaves, just slightly lustrous and relatively plain above, with longer petioles, not recurved margin and sub-basal glands visible on the lamina and not hidden laterally at the base.

**Distribution.** So far only known from mid-elevation humid forests in the San Francisco biological reserve area which is located in the Amazonian slope of the Andes in the upper basin of the Zamora River, southern Ecuador.

**Elevation range.** 1900 – 2300 m.

**Material examined.** (5) ECUADOR. Zamora Chinchipe: Area of the Estación Científica San Francisco, road Loja-Zamora, ca. 30 km from Loja, 2300 m, 5 Jan 1999, *Homeier, J. 89* (LOJA,MO,QCNE); Reserva San Francisco, road Loja-Zamora, ca. 35 km from Loja, 2150 m, 18 Mar 2000, *Homeier, J. 336* (MO,QCNE); ibidem, 2150 m, 18 Mar 2000, *Homeier, J. 342* (MO,QCNE); ibidem, 2150 m, 18 Mar 2000, *Homeier, J. 343* (DAV,GOET); ibidem, 1900 m, 30 Jul 2011, *Pérez-Zabala, J.A. ECU-2011-6-A77* (DAV).

133. *P. sp. nov. ("Socota-Peru")*

This is a remarkable new species characterized by the small elliptic-oblong coriaceous leaves, 5-6 x 1.8-2.2 cm, with both surfaces opaque and scabridulous, petiole relatively slim (5-6 x 0.5-0.6 mm), base

acute to cuneate and slightly asymmetric, apex attenuate, venation pattern weak brochidodromous, secondary veins ca. 7, emerging straight at 50-60 degrees from the midrib, tertiaries not evident and 4 (sometimes 2) glands located on the first and second pair of lateral veins, 2-3 and 6-8 mm from the base respectively and 1-2 mm from the midrib. The floriferous shoots are 4-7 cm long, suberect; the relatively small flowers have pedicels 1.5-2 mm long, hypanthium campanulate 2.5-2.8 mm wide, filaments 1-1.5 mm long and anthers rounded 0.5-0.7 mm long.

No other Neotropical species have the combination of character observed in this taxon.

**Distribution.** Apparently endemic to a relatively dry mid-elevation place northward of the town of Socota in the Cutervo region of the department of Cajamarca, Peru.

**Elevation range.** 2300m.

**Material examined.** (1) **PERU. Cajamarca:** Cutervo, Arriba de Socota, siguiendo la ruta a San Andres, 2300 m, 2 Nov 1991, *Sanchez Vega, I. 5904* (F,MO,QCA).

134. *P. sp.nov.* (“*sumaco-galeras-Ecuador*”)

This poorly known new species is characterized by the elliptic-ovate subcoriaceous leaves, 9-11 x 2.5-4 cm, slightly asymmetric, rather lustrous on both sides, with petiole 8-12 x 1 mm, base acute to cuneate, apex acute, 7-8 very ascending secondary veins configuring a weak brochidodromous festooned venation pattern, emerging at 55-65 degrees from the midrib, intersecondaries absent and tertiaries arranged in a reticular regular pattern, and 2 macular glands placed on the lamina at 5-12 mm from the base between the first and second pair of secondary veins. Flowers and fruits are unknown so far.

**Distribution.** Apparently endemic to the high lands of the Galleras mountain range (Sumaco-Galeras national park) in the province of Napo, Ecuador. This is an Amazonian isolated system from the Andes reaching up to 1700 m elevation and with limestone derived soils.

**Elevation range.** 1560 – 1600 m.

**Material examined.** (3) **ECUADOR. Napo:** Parque Nacional Sumaco-Galeras, Cordillera Galleras, 1570 m, 14 Apr 2006, *Homeier, J.* 2297 (DAV,GOET,MO,QCA,QCNE); ibidem, 1600 m, 1 Apr 2008, *Homeier, J.* 3587 (DAV, GOET, MO, QCA, QCNE); ibidem, 1560 m, 2 Apr 2008, *Homeier, J.* 3629 (DAV, GOET, MO, QCA, QCNE).

**SOUTHERN ANDES** (29 taxa in total including shared with other areas)

135. *P. guanaiensis* Rusby, Mem. Torrey Bot. Club 6: 31.1896. *Laurocerasus guanaiensis* (Rusby) C.K. Schneid., Ill. Handb. Laubholz. I. 650. 1906. Type: Bolivia: Guanai-Tipuani, Apr. 1892, *Bang, M.* 1432 (holotype, NY!; isotypes F!, GH!, K!, NY! (2), PH!, US! (3), W!).

*Prunus ernestii* H.García-Barriga, Mutisia 56: 4. 1984. Type: Colombia: Cundinamarca, Fusagasuga, Vereda Bochica, Finca cafetera Lolandia, 1750 m, 25 Apr 1982, *García-Barriga, H.* 21337 (holotype, COL!; isotypes COL!, US!).

This species can be easily distinguished by the dark twigs with sparse minute lenticels, the elliptic to elliptic-oblong coriaceous to sub-coriaceous leaves, 11-13.5 x 4.5-6, lustrous above and opaque below, with obtuse to rounded base and acute apex, margin revolute, secondary veins arcuate and concolour with the background but slightly prominent, intersecondaries around half as long as secondaries, tertiaries reticulate and inconspicuous, and 2 elliptic glands (0.8-1.5 mm long) located at the base or at 1-2 mm from it and attached to the midrib. The floriferous shoots are flexuous, 4-6 cm long and 0.6-0.8 mm thick, the flowers

have flexuous pedicel, 3-5 mm long and 0.2-0.3 mm thick, hypanthium 2-2.5 mm wide, anthers 0.4-0.5 mm long. The fruits are globose to oblate 9-10 x 11-14 mm.

The most similar species is *P. sellowii* from eastern Brazil, but it has more narrow elliptic leaves, with longer petioles and more decurrent base, secondary veins relatively straight and departing from a closer angle (45-55 degrees) and shorter sub-erect racemes.

**Distribution.** Characterized by a disjunct distribution in mid-elevation humid forest and the transition to lowlands in the northern Yungas of Bolivia, the central Peruvian Yungas and the inter-Andean Magdalena Valley in Colombia.

**Elevation range.** 500 – 1800 m.

**Local names.** mondey, totumo (Colombia)

**Material examined.** (16) **BOLIVIA.** Bopi River Valley, 914 m, 1 Sep 1921, *Rusby, H.H. 657* (MO,NY); **La Paz:** Nor Yungas, 4 km NE (above) Incahuara, 13.5 km above San Pedro, trail to 12 de Octubre, 1500 m, 23 Jan 1984, *Gentry, A. 44545* (MO); Sud Yungas, San Bartolome, 750 m, 22 Jul 1939, *Krukoff, B.A. 10012* (A,F,LPB,MO,NY,UC,US); San Bartolome (near Calisaya). Basin of Rio Bopi, 750 m, 22 Jul 1939, *Krukoff, B.A. 10152* (A,F,GH,MO,NY,UC,US); Asunta (near Evenay). Basin of Rio Bopi, 690 m, 31 Jul 1939, *Krukoff, B.A. 10561* (A,GH,LPB,MO,NY,UC,US); **COLOMBIA. Antioquia:** San Luis, corregimiento "El Prodigio", ca 25 km por la carretera hacia el corregimiento desde la autopista Medellín-Bogotá, 500 m, 23 May 1990, *Cogollo, A. 4569* (JAUM,MO); **Caldas:** Norcasia, Vereda Moscovita, Sector el Horno, 660 m, Sep 2005, *David, H. 1173* (HUA); **Cundinamarca:** Fusagasuga, Vereda Bochica, Finca cafetera Lolandia, 1750 m, 10 May 1978, *García-Barriga, H. 21125* (COL,MEDEL,NY); ibidem, 1750 m, 12 Jun 1979, *García-Barriga, H. 21131* (COL); ibidem, 1780 m, 27 Feb 1981, *García-Barriga, H. 21255* (COL,MEDEL); ibidem, 1700 m, 25 Apr 1982, *García-Barriga, H. 21341* (COL,HUQ,TULV); Tibacuy, Corregimiento de Cumaca, Vereda los Ocobos, camino al macizo de Quinini, 1700 m, 17 Aug 2003, *Giraldo-Cañas, D. 3581* (COL); **PERU. Pasco:** Cachorro, Villa Rica, 1530 m, 25 Nov 1998, *Daza, A. 16499* (MOLF).

136. ("*P. micradenia*") *P. guanaiensis* Rusby var. "*micradenia*" Koehne, Bot. Jahrb. Syst. 52: 318. 1915. Type: Bolivia: Yungas, Coripati, 1800 m, 29 Apr 1894, *Bang, M. 2170* (sintypes, COL!, F!, G!, GH!, K!, NY!, PH!, UC!, US!).

This is a small tree with elliptic-oblong to obovate-oblong coriaceous leaves, 10-12.5 x 3-4.3 cm, opaque on both sides, with base obtuse and apex acuminate, venation pattern brochidodromous with secondary veins arcuate-sinuuous and emerging at 45-55 degrees from the midrib, slightly prominent below and flat and inconspicuous above, intersecondaries relatively short, tertiary veins sinuous percurrent and perpendicular to the midrib, and 4-8 glands, the lower two sub-basal attached to the midrib, the second pair located on or below the second pair of secondary veins between the middle and the outer quarter of each lateral side of the blade, the third and fourth pairs placed submarginally at 20-25 and 30-35 mm from the base respectively, 2 or more extra pairs are sometimes present in some leaves. The floriferous shoots are erect, 6-7 cm long; the flowers have pedicels 2-3 mm long, hypanthium campanulate 1.8-2.5 mm wide, petals 1-1.3 mm long. The fruits are slightly oblate, 9-10 x 9-11 mm.

Based on the presence of multiple glands, the more similar species is *P. pearcei*, however that taxon has larger leaves and longer flexuous racemes. The combination of leaves coriaceous, oblong, with multiple glands, and relatively short erect racemes make this taxon different enough from *P. guanaiensis* to be considered as a separated species.

**Distribution.** Distributed in sub-humid mid-elevation cliffs of the northern and nor-central Bolivian Yungas

**Elevation range.** 1735 – 1900 m.

**Material examined.** (4) **BOLIVIA. La Paz:** Muñecas, Carpa, al lado de carretera y río Charazani, 1900 m, 5 May 2005, *Fuentes, A.F.* 7976 (LPB,MO,NY); Franz Tamayo, Senda Apolo-San José de Uchupiamonas, a 5 minutos antes de llegar a río 3 de Mayo, 1735 m, 30 Nov 2002, *Miranda, T.* 300 (LPB,MO); *ibidem*, 1735 m, 1 Dec 2002, *Miranda, T.* 338 (LPB,MA,MO).

136a. *P. micradenia* var. nov. “*pelechuco*”

This new taxon can be distinguished by the elliptic-oblong to oblong-ovate and slightly falcate sub-coriaceous leaves, 12-20 x 4.5-6 cm, with upper surface slightly lustrous when dry, petioles dark brown to black when dry, 10-12 x 0.8-1.2 mm, the secondary veins (8-9) are arcuate and emerge at 60-75 degrees from the midrib, tertiary and quaternary venation plain and very visible below forming a polygonal pattern, and 4 glands, two main ones crateriform and elliptic placed adjacent to the midrib on the intersection of the first pair of secondary veins and the midrib, the upper pair at 10-30 mm from the base on the second secondary vein and at 1-4 mm from the margin (sometimes 1 or 2 pairs of minute submarginal glands are present towards the middle of the blade). Only sterile material is known so far.

This new proposed variety of *P. micradenia* can be differentiated from the main species because its bigger sub-coriaceous leaves with slimmer petioles, flat venation on the lower side of the blade and generally only two pair of glands.

**Distribution.** Distributed in mid-elevation humid forests of the northern Bolivian Yungas close to a region known locally as Pelechuco.

**Elevation range.** 1469 – 2400 m.

**Material examined.** (4) **BOLIVIA. La Paz:** Culi, en Parque Nacional Madidi, cercanías del río Pelechuco, bajando desde Pelechuco por el camino antiguo Pelechuco-Apolo, 1496 m, 30 Sep 2009, *Arellano, G.* 861

(DAV,LPB); ibidem, 1469 m, 14 Oct 2009, *Arellano, G. 1260* (LPB); Franz Tamayo, Parque Nacional Madidi, Tokoake, por la senda hacia el incienso Linter, 2400 m, 26 Jun 2005, *Fuentes, A.F. 8793* (LPB,MO); Bautista Saavedra, Wayrapata II, 1800 m, 24 Jul 2002, *Zenteno, F. 1181* (LPB).

137. (“*P. bangii*”) *P. oleifolia* Koehne var. “*bangii*” Koehne, Bot. Jahrb. Syst. 52: 318. 1915. Type: Bolivia: 1800 m, *Bang, M. 2170a* (sintypes, COL!, F!, G!, GH!, K!, NY!(2), PH, US!(2))

This species can be distinguished by the coriaceous narrow elliptic-lanceolate leaves, 7-11 x 2-3 cm, with base acute, apex acute to shortly acuminate, petiole 7-10 x 1 mm, brochidodromous festooned venation pattern, secondary veins arcuate and slightly prominent below, tertiaries irregularly reticulate and little conspicuous and 2 basal crateriform glands attached to the midrib, 0.6-1 mm diam. The floriferous shoots are sub-erect, 2.5-4.5 cm long; the flowers have pedicels 1-2 mm long, hypanthium infundibuliform 1.5-2 mm wide, petals 1.2-1.5 mm wide and anthers 0.2-0.3 mm long on inserted stamens.

This species is similar to *P. oleifolia* (initially proposed as doubtful variety by Koehne (1915)); however, that taxon has chartaceous leaves with barely visible venation and more flexuous racemes with bigger flowers subtended by longer pedicels. Considering the contrasting geographic distribution (Andes vs. lowlands of Paraguay and Brazil) and leaf architecture (prominent and brochidodromous festooned vs. plain and weak brochidodromous), here this taxon is treated as a separate entity in the rank of species.

**Distribution.** Distributed in sub-humid montane forests of the central Andes of Bolivia in the province of Inquisivi.

**Elevation range.** 1200 – 2400 m.

**Local names.** huayra pata (Bolivia), Ira (Bolivia)



**Material examined.** (6) **BOLIVIA.** No data, *Bang, M. s.n.* (MO); Between Plazuela and Irupana, Departamento de La Paz, prov sud Yungas, 1200 m, Nov 1958, *Cárdenas, M. 6059* (US); **La Paz:** Inquisivi, Entre Rios, From Poque Loque to Alta Polea (pass), 2400 m, 28 Dec 1989, *Dorr, L.J. 6892* (LPB,QCA,US); Huayra Pata - - Major ruin discovery of large fortalezas, irrigation canals and mysterious foundations cover this ridge which is 2 km NE of the mouth of the Río Aguilani mouth at Lakachaka, and 2 km S. of the junction of the Río Mikhailpurhua and Río Aguada. 22 km N of Choquetanga, 2300 m, 18 Nov 1991, *Lewis, M. 40588* (DAV,LPB,MO,TEX,US); Río Churu to Cuchi Kiada - - Along the trail between Aguilani and the ruins of Choquecamiri, to a wierd shaped Quebrada known as the Pig's Fang 17 km N. of Choquetanga, 1900 m, 30 Nov 1991, *Lewis, M. 40748* (DAV,LPB,MO).

138. *P. pearcei* Rusby, Mem. Torrey Bot. Club 6: 30. 1896. Type: Bolivia: Guanai-Tipuani, Apr. 1892, *Bang, M. 1465* (holotype, NY!, isotypes A! (2), K!, MO!, NY !, PH!, S!, US!(2)).

This species can be distinguished by the elliptic-oblong to ovate-oblong coriaceous leaves, 14-19 x 5-7.3 cm, opaque below and slightly lustrous above, with base rounded, apex acute, margin irregular and revolute, eucamptodromous-like venation pattern, arcuate secondary veins emerging at 60-75 degrees from the midrib, tertiaries obscure, and multiple glands with the main pair elongated in shape, 2-2.5 mm long, placed at the base of the blade and attached to the midrib, complemented by 7-10 pairs of supplementary glands distributed along the sub-margin, 1-3 mm from the margin. The floriferous shoots are flexuous, 8-11 cm long; the flowers have pedicels 1-1.5 mm long, hypanthium 2.8-3.2 mm wide, petals 1.5-1.8 mm wide and anthers 0.4-0.5 mm long. The fruits are prolate, apiculate, 11-12 x 9-10 mm.

Superficially similar to *P. integrifolia*, but the presence of multiple glands and small flowers on a flexuous rachis make this species easily differentiable.

**Distribution.** Distirbuted in the transition between lowland and mid-elevation humid forests in the central and northern Andean Yungas of Bolivia and in southern Peru near to the border with Bolivia.

**Elevation range.** 600 – 1835 m.

**Material examined.** (9) **BOLIVIA.** **La Paz:** Sud Yungas, Huancane, 7.5 km al sur por el camino nuevo altitud como 2410 (puede ser error, correcta debe ser 1410 de acuerdo a localidad), 1410 m, 9 Mar 1980, *Beck, S.G. 3088* (MO); Subida a Serranía de Marimonos, 4 km arriba de Palos blancos, 1100 m, 13 Aug 1991, *García, E. 2012* (QCA); Asunta, Basin of Rio Bopi, near Evenay, 690 m, 27 Jul 1939, *Krukoff, B.A. 10621* (A,F,NY,US); Chailla, 1000 m, , *Pearce s.n. (?)*; **Mapiri:** Chimate, 600 m, 10 Jan 1927, *Buchtien, O. 1632* (US); San Carlos, 850 m, 8 Apr 1927, *Buchtien, O. 1732* (US); **PERU.** **Cusco:** Paucartambo, Cosñipata, Trocha Unión, km 13, 1835 m, 15 Aug 2003, *Farfán, W. 1037* (USM); **Puno:** Carabaya, Cabeceras del Río Candamo, 1000 m, 6 Jun 1997, *Cornejo V.; Fernando 3115* (MO).

139. *P. tucumanensis* Lillo, Contrib.Conoc. Arb. Argent. 86 No 282. 1910. Type: Argentina: Tucumán, Alto de las Salinas, 9 Sept 1901, *Lillo, M. 2557* (sintypes, CAS!, GH! (2), MO!, US!).

This is a relatively widespread species characterized by the chartaceous to subcoriaceous elliptic-oblong to elliptic-ovate leaves, 7.5-12 x 3-5 cm, lustrous above, opaque below, with flexuous petiole, 6-10 mm long, base rounded to obtuse and apex shortly acuminate, margin generally irregularly serrate, sometimes almost entire but then erose with some sparse teeth, main venation pattern weak brochidodromous, secondary veins arcuate and numerous (12-15), sinuous towards the margin, plain and little conspicuous below, impressed above, tertiaries irregularly reticulate or exmedially ramified and 2 rounded glands (0.6-1 mm wide) placed either on the first secondary pair of veins or submarginal at 1-4 mm from the base and 0.5-2 mm from the margin. The floriferous shoots are sub-erect, 2-4 cm long, generally with flowers generally present only at the distal half of the rachis, pedicels 1-1.8 mm, hypanthium open campanulate 2.7-4 mm wide, and anthers 0.7-0.9 mm long. The fruits are ovate apiculate and flattened at the ventral face, 10-14 x 7-9 mm.

Some specimens can be similar to *P. rigida* from Peru which, however, has more coriaceous leaves with more sparsely distributed teeth, base emarginate (or cordate), prominent venation below and smaller flowers placed on longer racemes.

**Distribution.** Distributed in semi-deciduous Tucuman-Bolivian forests from central Bolivia to northwestern Argentina mostly at mid elevations, but with some records located at lower (in the south of the range) and upper (in the north of the range) montane places.

**Elevation range.** 550 – 3330 m.

**Local names.** durasnillo, laurel rojo (Bolivia), duraznillo, palo luz (Argentina)

**Material examined.** (65) **ARGENTINA.** El Saladillo, 1800 m, Dec 1891, *Jørgensen, P. 12* (GH,US); **Catamarca:** Andalgalá, Esquina Grande, 1600 m, 2 Dec 1916, *Jørgensen, P. 1544* (GH,UC,US); **Jujuy:** Ledesma, Camino a Valle Grande, Abre de Canos, 1500 m, 13 Sep 1976, *Cabrera, A.L. 27829* (MO,NY); Valle Grande, De Abra de Cañas a Valle Grande, cerca Rio Jordán, 1550 m, 14 Sep 1976, *Cabrera, A.L. 27852* (GH,MO); Ledesma, Parque Nacional Calilegua, 1400 m, 25 Aug 1998, *Cocucci, A.A. 1064* (CORD); Capital, Camino de Huella de Alto Lozano a Tiraxi, 1600 m, 3 Nov 1974, *Correa, M. 6122* (MO); Rio de Reyes, 20 km north of Jujuy; gravelly bed of stream, 1500 m, 27 Sep 1938, *Eyerdam, W.J. 22243* (GH,MO,UC); Ledesma, Pque. Nac. Calilegua, paralelo al río San Lorenzo, 750 m, 14 Sep 1991, *Guaglianone, E.R. 2642* (MO,NY); **Salta:** ANTA: Parque Nacional El Rey, 950 m, 22 Sep 1985, *Gentry, A. 51744* (MO,NY); Orán, finca Yakulica 26 km de A Blancas, 550 m, 11 Sep 1971, *Legname 8453 C* (GH); Santa Victoria, Camino de los Toldos al Lipeo a 10 km del primero, 1750 m, 5 Oct 1973, *Legname 9588 c* (US); Rosario de Lerma, Río Blanco, 2-3 km aguas arriba del puente ferroviario sobre el río homónimo, 1700 m, 14 Sep 1997, *Novara, L.J. 914* (CORD,MCNS); Santa Victoria, Camino de los Toldos a Lipeo, 15 km de los Toldos, 1700 m, 8 Nov 1975, *Schiavone, M.M. 11684* (NY); 3 km de los Toldos a Lipeo, 1600 m, 9 Nov 1975, *Schiavone, M.M. 11702* (BRIT,CAS); Rosario de Lerma, Río Blanco, 2-3 km aguas arriba del presente ferroviario sobre el río homónimo, 1700 m, 14 Sep 1997, *Tolaba, J. 914* (CORD,MCNS); 1200 m, 15 Oct 1930, *Venturi, S. 10522* (MO); **Tucumán:** Burruyacú, Camino al Alto de Medina, km 12, 1500 m, 9 Oct 1966, *Boelcke, O. 5410* (MO); ibidem, 1500 m, 9 Oct 1966, *Burkart, A. 26532* (US); Tafí, Taficillo, Quebrada la Toma, 1500 m, 16 Aug 1953, *Grassi, M.*

(US); Tafi del Valle, La Angostura, 2000 m, 19 Nov 1950, *Legname 72* (NY,P,TEX); Tranquitas, 1500 m, 26 Feb 1900, *Lillo, M. 2389* (GH); Tranquitas, 900 m, 9 Sep 1901, *Lillo, M. 2557 bis* (US); Famaillá, Villa Nougues, 1200 m, 8 Sep 1909, *Lillo, M. 9731* (GH); ibidem, 1500 m, 20 Sep 1949, *Meyer, T. 15205* (MO,P); Tafí, Desde Anta Muerta a Villa Nougues, 1100 m, 14 Oct 1948, *Schulz, A.G. 7281* (F,MO); Altos de Medina, 1550 m, 4 Oct 1966, *Schulz, A.G. 9541* (F); Quebrada de Lules, 700 m, 10 Oct 1922, *Venturi, S. 884 A* (CAS); Famaillá, 1000 m, 4 Sep 1922, *Venturi, S. 1884* (F,GH,MO,UC,US); Burruyacú, Alto de Medina, 1000 m, 10 Oct 1923, *Venturi, S. 1884 c* (GH,US); Famaillá, 900 m, 11 Sep 1927, *Venturi, S. 5248* (CAS,GH,MO,UC,US); Tafí, Cerro de Taficillo, 1200 m, 16 Aug 1929, *Venturi, S. 9419* (CAS,GH,MO,NY,US). **BOLIVIA. Chuquisaca:** Oropeza, Comunidad Cajamarca, aproximadamente a 27 km de la ciudad de Sucre, 3330 m, 28 Apr 2001, *Gutiérrez, J. 172* (MO); Azurduy, Primera seccion Villa Azurduy. Comunidad de La Angostura. Ladera de exposcion Nor Oeste, con 20° de pendiente, 2641 m, 11 Nov 2007, *Jimenez, M. 629* (HSB,MEDEL,MO); 2 km al SW de Tarvita, 2750 m, 25 Sep 1991, *Kessler, M. 3234* (LPB); Sud Cinti, Puca Pampa. Cercanias de una quebrada con agua que desemboca al rio Alborniyoj, 1690 m, 10 Oct 2004, *Lliully, A. 75* (MO,NY); Belisario Boeto, Municipio de Villa Serrano, Comunidad de Ovejeros, 2489 m, 18 Dec 2008, *Portal, E. 644* (DAV,MO); Comunidad Ovejeros, a 5 km al NE de la localidad de Villa Serrano, 2255 m, 27 Feb 1994, *Serrano, M. 692* (F); ibidem, 2340 m, 17 Nov 1994, *Serrano, M. 1100* (LPB); Municipio Villa Serrano. Comunidad Nuevo Mundo. Quebrada Potrerillos, 2235 m, 17 Aug 2005, *Villalobos, J. 53* (MO); Oropeza, Rio Mamahuasi, below Punilla, 2900 m, 27 Jul 1997, *Wood, J.R. 12507* (NY); **Cochabamba:** Incallajta, quebrada humeda, 2800 m, 27 Oct 1991, *Ibisch, P. 271o12* (LPB); Carrasco, Incallajta ruins, 3000 m, 15 Aug 1991, *Kessler, M. 2979* (LPB); Mizque, A 8 km sobre la carretera Mizque-Cbba, 2400 m, 10 Dec 1992, *Saravia, E. 450* (MO); Campero, Bosque de pino de monte a 37 km de Pasorapa sobre el camino a Quinori, 2420 m, 31 Jan 1993, *Saravia, E. 717* (MO); **Santa Cruz:** Vallegrande, Camino de Vallegrande, 12 a 15 km antes de la comunidad de Loma Larga, 2363 m, 24 Aug 2008, *Arroyo, L. 4003* (MEDEL,MO,USZ); ibidem, 2363 m, 24 Aug 2008, *Arroyo, L. 4019* (MO,USZ); Florida, Huasacañada, 2050 m, 20 Jan 2006, *Nee, M. 53882* (MO,NY,USZ); Vallegrande, Sahuintal sobre quebrada, 2378 m, 11 Apr 2011, *Parada, G. 3328* (MO); Pojos, 2200 m, 1 Nov 1928, *Steinbach, J. 8601* (A,F,GH,GH,MO,NY,PH,UC,US); Huasacañada, 5 km al S de la ciudad de Vallegrande, 2050 m, 10 Sep 1989, *Vargas, I. 315* (LPB,MO,NY,USZ); ibidem, 2050 m, 3 Nov 1990, *Vargas, I. 811* (LPB,MO,NY,USZ); Comunidad El Palmar; 10 km al E de la ciudad de Vallegrande, siguiendo el camino Vallegrande - Tierras Nuevas, 2400 m, 5 Nov 1993, *Vargas, I. 3033* (LPB,NY,TEX,USZ); **Tarija:** Arce, Bermejo 70 km via a Tarija, 700 m, 19 Oct 1983, *Beck, S.G. 9580* (LPB); O'Connor, 2100 m, 12 Oct 2005, *Beck, S.G.*

31465 (LPB); Arce, Mun. Padcaya. Canton Emborozú. Reserva Natural Alarachi. Cima del Cerro Los Tejerinas, 2180 m, 16 Sep 2004, *Serrano, M.* 4834 (MO,USZ); Mun. Padcaya. Reserva Nacional de Flora y Fauna Tariquia, alrededores del campamento Potreros, 2396 m, 12 Nov 2004, *Serrano, M.* 5079 (MO,NY); Municipio Padcaya. Reserva Nacional de Flora y Fauna Tariquía Pampa Grande hacia Cambarí, Cañon Largo, 1057 m, 22 Nov 2004, *Serrano, M.* 5316 (MO); O'Connor, 21.1 km on road to Entre Rios, 2050 m, 1 Oct 1983, *Solomon, J.C.* 10921 (MO,NY); ibidem, 27.4 km E of Junacas on road to Entre Rios, 2170 m, 1 Oct 1983, *Solomon, J.C.* 10937 (LPB,MO,NY); ibidem, 1.5 km E of (below) Narvaez on road to Entre Rios, 1700 m, 2 Oct 1983, *Solomon, J.C.* 10978 (LPB,MO,NY); Arce, Upper Río Cambarí, ca. 5 km from the first pass, on trail from Sidras to Tariquia, 1200 m, 13 Oct 1983, *Solomon, J.C.* 11159 (MO,NY); Valley of the Río Chillaguatas, below Rancho Nogalar on trail between Sidras and Tariquia, 1100 m, 14 Oct 1983, *Solomon, J.C.* 11252 (LPB,MO,NY); sine loco, Jul 1846, *Weddell, M.H.A.* 4065 (P).

139a. *P. tucumanensis* Lillo var. nov. "**steinbachii- BOL**"

This new variety can be distinguished by the rigid coriaceous elliptic-oblong leaves, 7-8.5 x 2-3.3 cm, lustrous above and opaque below, with base acute and apex narrow acuminate, margin subentire irregularly serrate mainly along the lower half, cartilaginous towards the base and with some basal teeth apparently ending in colleters, venation pattern from weak brochidodromous to eucamptodromous-like, secondary veins arcuate and sinuous, slightly prominent below, tertiaries random reticulate and flat below, secondaries up to quaternaries are conspicuously impressed above creating a cancellate surface and 2 sub-basal glands placed submarginally at 1-5 mm from the base. The floriferous shoots are erect to suberect, 1-2.5 cm long, the flowers have noticeably short pedicels (0.2-3 mm long), hypanthium campanulate 3.5-4 mm wide and anthers 0.6-0.7 mm long. The fruits are ovate apiculate, 12-13 x 10-11 mm.

This new variety can be differentiated from the more typical material of *P. tucumanensis* because its rigid coriaceous smaller leaves with acute base, strongly cancellate upper surface, minor veins less conspicuous below and sub-basal glands. Also, because the noticeably short racemes and larger fruits.

**Distribution.** Distributed in upper montane dry forests and shrublands of the eastern part of the Andes in central Bolivia.

**Elevation range.** 2300 – 3500 m.

**Local names.** jauri (Bolivia).

**Material examined.** (8) **BOLIVIA.** **Chuquisaca:** Punilla (Guerraloma), 3500 m, Feb 1949, *Cárdenas, M. 4105* (US); Belisario Boeto, 2.8 km above Nuevo Mundo on road to Villa Serrano, 2300 m, 19 Jul 2004, *Nee, M. 52773* (LPB,MO,NY,USZ); **Cochabamba:** Mizque, A 12 km de Mizque hacia Arani, bajando la quebrada, hacia el bordedel río Curi, 2400 m, 10 Dec 1992, *Atahuachi B.; M. 207* (LPB,MO); **Potosí:** Prov Chayanta, Sucre hacia Ravelo 7 km antes de Ilegas, 3300 m, 26 Sep 1992, *Beck, S.G. 21182* (LPB,NY,US); **Santa Cruz:** Vallegrande, Camino del Cruce hacia Alto Seco, 2717 m, 8 Jul 2011, *Parada, G. 3740* (MO); Camino entre Chañara y Moro Moro, 2494 m, 14 Aug 2012, *Parada, G. 4607* (MO); Ruta del Che, comunidad Salsipuedes Grande, 2722 m, 25 Aug 2012, *Parada, G. 4975* (MO); Bergschlucht (barranco) von Comarapa, 2800 m, 26 Oct 1928, *Steinbach, J. 8550* (F,GH,MO,NY).

#### **New species identified in the south Andes (20 spp.)**

140. *P. sp. nov.* (“*aff-chamisoana-midElev-Bolivia*”)

This new species can be identified by the elliptic-ovate chartaceous leaves, 9-13 x 3-4.5 cm, with petioles 12-16 x 0.7-1 mm, base obtuse and apex acuminate, venation pattern eucamptodromous-like, secondary veins arcuate and flat below, intersecondaries parallel to secondaries and with wavy trajectories, tertiaries dendritic and barely visible, and 2 glands placed between the first and second secondary veins at

6-13 mm from the base and 2-4 mm from the midrib. The floriferous shoots are sub-erect and 4-6 cm long, the flowers have pedicels 4-5 mm long and 0.2-0.4 mm thick, the hypanthium is campanulate, 2-2.5 mm wide and the anthers 0.6-0.8 mm long. The fruits are ovate apiculate and oblique, 11-12 x 8-10 mm.

It is close to *P. chamissoana*, but it has relatively smaller leaves with less conspicuous tertiary dendritic veins (vs. reticulate), only two glands (vs. 4 or more) and bigger anthers (vs. 0.4-0.5 mm long).

**Distribution.** Distributed in mid-elevation areas with semi-deciduous “tucuman-bolivian” type forest in the eastern slopes of the central Andes of Bolivia.

**Elevation range.** 1200 – 1600 m.

**Local names.** duraznillo (Bolivia).

**Material examined.** (9) **BOLIVIA. Santa Cruz:** Florida, Comunidad de Bella Vista, Sendero Quebrada el Fraile cerca del Chorro el Fraile, 1200 m, 5 Nov 2005, *Arroyo, L. 2961* (USZ); Within the "Flora de la Region del Parque Nacional Amboro", but above the 700 m contour, 1450 m, 25 Sep 1990, *Nee, M. 38921* (GH,LPB,MO,NY); Vic. Cerro Herradura, along road to antennas and along oil pipeline, old road from Bermejo to Río Salado, 4.7 km by road from the Santa Cruz-Samaipata highway. Between La Portada and Cerro Herradura, 1400 m, 17 Jan 2006, *Nee, M. 53810* (MO,NY,US); Along dirt road to Bella Vista, 2.2 km S of turnoff at Cuevas from the Santa Cruz-Samaipata highway, 1340 m, 18 Jan 2006, *Nee, M. 53820* (LPB,MO,NY,US,USZ); 1600 m, 4 Nov 1995, *Saldías, M. 4127* (NY); El Sillar, aprox 10 km al sur de Bermejo, 1420 m, 2 Aug 1996, *Saldías, M. 4689* (TEX); Sendero Ecológico en Cañadón, 1421 m, 12 Sep 2007, *Vargas, M.a. 408* (MEDEL,MO,USZ); Localidad de Bella Vista, Sendero Ecologico el Cañadón, fondo de valle, 1487 m, 9 Aug 2005, *Villaruel, D. 105* (MO,MO,USZ); 6 km al este del pampas del Tigre, 1568 m, 24 Mar 2004, *Wood, J.R. 20548* (LPB).

141. *P. sp. nov.* (“*aff-oleifolia-caudata-Bolivia*”)

This new species can be distinguished by the chartaceous oblong-lanceolate leaves, 7-13.5 x 2-3.7 cm, slightly lustrous above, slightly asymmetric at the base with flexuous petioles 10-14 x 1 mm, base acute to obtuse and decurrent down to the base of the petiole, apex sharply acuminate, secondary veins relatively sinuous along their lower half and then arching upwards, emerging at 50-60 degrees from the midrib, intersecondaries short averaging 2-3 between secondaries, tertiaries exmedially ramified and little conspicuous, and two very small glands (0.3-0.4 mm wide) placed asymmetrically at 5-18 mm from the base, midway from midrib to margin under the second pair of secondary veins (sometimes one or both absent). The floriferous shoots are sub-erect, 1.5-5 cm long; the flowers have pedicels 1.5-2.5 mm long, hypanthium campanulate 2.7-3 mm wide, sepals ovate with rounded apex 0.8-1.2 mm long, petals 1.5-1.8 mm wide and anthers 0.6-0.7 mm long. The fruits are globose to ovate apiculate, 8-10 x 8-9 mm.

This species is similar to *P. oleifolia* which however has narrower leaves with sub-basal and sub-marginal glands and longer racemes with larger flowers.

**Distribution.** Distributed in upper mid-elevation areas of the sub-humid "Tucumano-Boliviano" forest type in central to southern Bolivia.

**Elevation range.** 1200 – 2280 m.

**Local names.** duraznillo (Bolivia).

**Material examined.** (17) **BOLIVIA.** **Santa Cruz:** Florida, Bermejos, El Sillar, 1200 m, 2 Aug 1996, *Balcazar, J. 937* (NY,TEX); Samaipata. Achira, estrada para Paredones, 1700 m, 7 Dec 2002, *Mello-Silva, R. 2034* (F); Vallegrande, Aguadita, road to Los Siltanos. 8 km south of Khasa Monte, 2350 m, 26 Dec 1989, *Nee, M. 38441* (MO,NY); Within the "Flora de la Region del Parque Nacional Amboro", 7 km NE of Mairana, 2100 m, 22 Jul 1994, *Nee, M. 45320* (LPB,MO,NY,QCA,TEX); Florida, 14.2 km (by steep windy road) NE of Achira Camping resort on road to Banegas and Barrientos, 1800 m, 17 Jan 1998, *Nee, M. 48046* (MO,NY,TEX); Along dirt road to Bella Vista, 10.8 km S of turnoff at Cuevas from the Santa Cruz-Samaipata highway, 1520 m, 18 Jan 2006, *Nee, M. 53831*



(CAS,MO,NY,US,USZ); ibidem, 1520 m, 18 Jan 2006, *Nee, M. 53836* (LPB,MO,NY,US,USZ); 2.7 km N of Campamento La Yunga of Parque Nacional Amboró, 2130 m, 19 Jan 2006, *Nee, M. 53855* (CAS,MO,NY,US,USZ); Vallegrande, Aguaditas, 2280 m, 28 Dec 1989, *Vargas, I. 361* (LPB,MO,NY,USZ); Florida, Parque Nacional Amoro. Río San Rafael, 10 Km al NE de Mairana; pasando La Yunga, 1500 m, 3 Mar 1993, *Vargas, I. 2094* (LPB,NY,USZ); Bermejo, 5 km al E subiendo hacia el sillar - Tres Cruces. Camino del gaseoducto y zona de la antena, 1500 m, 3 Aug 2000, *Vargas, I. 5054* (NY,USZ); Vallegrande, Pucarillo 65 km S de Vallegrande 7 km entrando de Loma larga, pastisales del tajibo 2 km abajo del Rancho al NE, 1600 m, 2 Dec 2003, *Vargas, I. 6760* (USZ); Florida, La Yunga de Mairana 3 km de la Yunga, 2150 m, 3 Jun 2005, *Vargas, I. 7265* (DAV,MO,NY,QCA,USZ); Bella Vista, sendero al Cañadón, 1525 m, 12 Nov 2007, *Villarroel, D. 1493* (MO,USZ); Bella Vista, 1555 m, 12 Dec 2007, *Villarroel, D. 1626* (MO,USZ); **Tarija**: O'Connor, 20 km SSE (by air) of Entre Rios on road from comunidad El Puesto to Chiquiaca. slope and top of ridge, 1700 m, 26 Jun 1998, *Nee, M. 49893* (CAS,DAV,MO,NY); 20 km SSE (by air) of Entre Rios. Road comunidad El Puesto to Chiquiacá, 1700 m, 26 Jun 1998, *Nee, M. 49901* (MO,NY,TEX).

142. *P. sp. nov.* (“*aff. reflexa Bolivia*”)

This new species can be distinguished by the ovate-elliptic subcoriaceous leaves, 8-11 x 3-5 cm, with relatively long and flexuous petioles, 12-24 x 0.5-0.8 mm, base obtuse turning concave and ending decurrent until half of the petiole, apex acuminate to caudate, venation pattern weak brochidromous or apparently eucamptodromous in some specimens, 7-8 secondary veins arcuate and emerging at 45-60 degrees from the midrib, intersecondaries less than half as long as secondaries, tertiaries irregularly reticulate and frequently with open ends, lateral veins flat and conspicuous below and impressed above, and 2 glands placed submarginally and around the first pair of secondary veins at 2-7 mm from the base. The floriferous shoots are subflexuous and 3-5.5 cm long, the flowers have pedicels 1.5-3.5 mm long, hypanthium campanulate, 2.3-3 mm wide and anthers 0.7-0.8 mm long. The fruits are ovate elongate, 12-14 x 6-8 mm.

The most similar species is *P. reflexa* from eastern Brazil which however has bigger ocellate glands placed upward in the lamina, more secondary veins, smaller anthers and wider more globose fruits.

**Distribution.** Distributed over 2000 m elevation in seasonally wet montane forests and high elevation dwarf forest (montane Yungas) of central Bolivia in the Department of Santa Cruz. Other common species in the area belong to the genera, *Podocarpus*, *Prumnopitys*, *Myrcianthes*, *Blepharocalyx*, *Dicksonia*, *Crinodendron*, *Oreopanax*, *Alnus* and *Weinmannia*.

**Elevation range.** 2000 – 2850 m.

**Material examined.** (28) **BOLIVIA. Santa Cruz:** Manuel Maria Caballero, entre el Empalme y el campamento a unos 5 km de la misma, 2185 m, 10 Apr 2004, *Carrasco, A. J. 251* (AAU,MA,MO,NY,QCA,USZ); Astillero, 2500 m, 18 Aug 2003, *Fernandez, E. 2148* (BOLV); Localidad Enpalme, exposicion NE, 2600 m, 6 Feb 2004, *Fernandez, E. 2574* (BOLV,LPB,MO); P.N. Amoro Cerro Bravo, cerca Comarapa, 2600 m, 20 Jun 1995, *Jardim, A. 2045* (MO,USZ); ibidem, 2600 m, 20 Jun 1995, *Jardim, A. 2047* (MO,USZ); Parque Nacional Amboró. Filo del Racete, 2400 m, 2 Apr 1996, *Jardim, A. 2638* (USZ); ibidem. San Juan del Potrero al norte 25 km, 2400 m, 8 Apr 1996, *Jardim, A. 2787* (NY,TEX,USZ); ibidem, 30 km al norte de San Juan del Potrero, 2630 m, 10 Apr 1996, *Jardim, A. 2901* (NY,USZ); ibidem, entre 15 y 25 km al norte de San Juan de Potrero hacía, Cerro Bravo, 2400 m, 6 Jun 1992, *Killeen, T.J. 4078* (AAU,DAV,MA,MO,NY,TEX,USZ,Z); Florida, within the "Flora de la Region del Parque Nacional Amoro", but above the 700 m contour. 7 km NE of Mairana through la Yunga, 2200 m, 21 Jul 1994, *Nee, M. 45293* (COL,MO,NY,TEX,US); ibidem, 5.5 km north of campamento la Yunga, 2270 m, 6 Jun 1998, *Nee, M. 49661* (MO,NY); ibidem, 2270 m, 6 Jun 1998, *Nee, M. 49662* (MO,NY,TEX); ibidem, 2300 m, 29 Mar 2002, *Nee, M. 52012* (MO,NY); ibidem, 4.8 km N of campamento La Yunga, 2265 m, 19 Jan 2006, *Nee, M. 53868* (MO,NY,US); Manuel Maria Caballero, 2.7 km on road to Khara Huasi, down from El Empalme (on Comarapa-Cochabamba highway), 2420 m, 21 Jan 2006, *Nee, M. 53891* (MO,NY,US,USZ); Amboró National Park, Cerro Bravo area; ca. 10 map Km. N of Comarapa, 2500 m, 21 Jun 1995, *Richard Abbott, J. 17125* (MO,USZ); Parque Nacional Amboró; southwest region of park, north of Comarapa, 2500 m, 24 Jun 1995, *Skinner, N. 26* (LPB,MEDEL,MO); ibidem, 2500 m, 24 Jun 1995, *Skinner, N. 33* (MEDEL,MO,USZ); 50 km al norte del Mataral (en la carretera Santa Cruz-Comarapa) pasando por San Juan del Potrero y bajando a la cuenca del alto Río Ichilo, 2300 m, 28 May 1989,

*Smith, D.N. 13459* (BRIT,LPB,MO); Entre el Empalme y Locotal, 2100 m, 8 Apr 2004, *Soto, D. 117* (LPB,MO,NY,USZ); Parque Nacional Amboró. San Juan del Potrero; entre Yunguillas y cabeceras del río Zapallar, 2300 m, 12 May 1992, *Vargas, I. 1357* (F,LPB,MO,NY,USZ); ibidem, Cerro Bravo, juntas del Río Alizar y Amparo, 2000 m, 7 Jun 1992, *Vargas, I. 1503* (USZ); ibidem, proximidades del Cerro Bravo a 10 km al N de Comarapa, 2400 m, *Vargas, I. 2958* (USZ); ibidem, 2400 m, 18 Oct 1993, *Vargas, I. 2981* (LPB,USZ); ibidem, 2400 m, 7 Apr 1994, *Vargas, I. 3114* (NY,TEX,US,USZ); Caballero, 3 km along road to San Mateo from old Cochabamba-Santa Cruz highway, 2300 m, 18 Apr 1996, *Wood, J.R. 11035* (LPB,NY); Comarapa, cerro Bravo, 5.5 km de Laguna verde hacia abra del cerro, 2623 m, 19 Feb 2003, *Wood, J.R. 19108* (LPB).

143. *P. sp. nov.* (“*aff.integrifolia-Urubamba-Peru*”)

This new species can be distinguished by the elliptic-ovate coriaceous leaves, 12-19 x 4.2-6.5 cm, slightly lustrous above, pale green when dry in herbarium specimens, with acuminate apex, rounded base, secondary veins (11-12), arcuate and configuring an eucamptodromous-like venation pattern, slightly raised below and plain above, intersecondaries up to 4 between secondaries and shortly arcuate and connecting down with the precedent secondary, tertiaries sinuous percurrent and perpendicular to the midrib but little conspicuous, and two relatively inconspicuous sub-basal glands attached laterally to the midrib and placed on the first pair of secondary veins. The floriferous shoots are sub-erect, 10-12 cm long; the flowers have short, reflexed pedicels (3-4 mm long), broadly campanulate hypanthium, 3.5-4 mm wide and anthers 0.5-0.6 mm long. The fruits are prolate apiculate with the ventral face applanate, 11-12 x 9-10 mm.

It is morphologically close to both *P. integrifolia* and *P. pearcei*, but the former has more rigid leaves with conspicuous tertiary venation, erect racemes with bigger flowers and is generally distributed at higher elevation. The latter has leaves with multiple glands and smaller flowers.

**Distribution.** Distributed in mid-elevation humid forests in the southern Peruvian and northern Bolivian Andes.

**Elevation range.** 1450 – 2000 m.

**Material examined.** (6) **BOLIVIA. La Paz:** Sud Yungas, entrando hacia Apa Apa, 1800 m, 20 Mar 2000, *Beck, S.G. 24779* (LPB,LPB,QCA); Coroico. Estación biológica Tunquini. Entre Chairó y Tunquini, 1450 m, 24 Jun 2000, *Beck, S.G. 25539* (LPB,QCA); Franz Tamayo, Región Madidi, Santo Domingo, sector arroyo Tintaya, 1468 m, 25 Oct 2006, *Chapi, N. 269* (LPB); Nor Yungas, 16.5 km al noreste (debajo) de Chuspipata por el camino a Coroico (Yolosa), 1900 m, 28 May 1988, *Solomon, J.C. 18492* (LPB,MO); **PERU.** San Miguel, Urubamba Valley, 1800 m, 9 Jun 1915, *Cook, O.F. 1143* (US); 1800 m, 9 Jun 1915, *Cook, O.F. 1151* (US); **Cusco:** Urubamba, Santuario Histórico de Machu Pichu, 2000 m, 4 Jul 1990, *Núñez, P. 12407* (CUZ,MO).

144. *P.* sp. nov. (“*aff. williamsii-BigLeaves-Bolivia*”)

This new species can be recognized by the light grey large sulcated bark of the twigs, with sparse lenticels, the elliptic-oblong sub-coriaceous leaves, 18-24 x 8.5-11.5 cm, opaque on both sides, slightly asymmetric at the base, with base obtuse and apex acute, venation pattern weak brochidodromous, secondary veins arcuate, tertiaries percurrent and obtuse respect to the midrib, intersecondaries short and curved downward, and 2 sub-basal glands located 1-5 mm from the base and attached to the midrib. The floriferous shoots are sub-erect, measure ca. 3 cm long (although rather immature, in contrast the fruiting racemes measure 10 cm long) and the minute immature flowers have pedicels ca. 1 mm long and urceolate hypanthium, 1-1.3 mm wide. The fruits are globose to slightly oblate, 12-14 mm diam., with the ventral suture prominent.

It is close to *P. williamsii* from northern Peru, but that species has smaller leaves with thinner texture and more obscure tertiary veins and bigger flowers.

**Distribution.** Distributed in moist lower mid-elevation forests of the northern Bolivian Yungas inside the Madidi National Park.

**Elevation range.** 1070 – 1496 m.

**Material examined.** (13) **BOLIVIA.** 1496 m, 6 Oct 2009, *Arellano, G. s.n.* (LPB); **La Paz:** Bautista Saavedra, Área Natural de Manejo Integrado Apolobamba, Wayrapata, 1 Km NE del caserío, 1294 m, 21 May 2004, *Antezana, A. 567* (LPB,MA); ibidem, 1294 m, 21 May 2004, *Antezana, A. 591* (LPB,MA,MO); Área Natural de Manejo Integrado Apolobamba, Pauje Yuyo, a 3,5 Km E de la Comunidad, 1070 m, 27 May 2004, *Antezana, A. 628* (LPB,MA,MO); Culi, en Parque Nacional Madidi, cercanías del río Pelechuco, bajando desde Pelechuco por el camino antiguo Pelechuco-Apolo, 1167 m, 24 Sep 2009, *Arellano, G. 605* (DAV,LPB); ibidem, 1167 m, 24 Sep 2009, *Arellano, G. 621* (DAV,MO); ibidem, 1239 m, 27 Sep 2009, *Arellano, G. 681* (DAV,LPB); ibidem, 1496 m, 30 Sep 2009, *Arellano, G. 793* (DAV,MO); ibidem, 1447 m, 6 Oct 2009, *Arellano, G. 1043* (DAV,LPB); Parque Nacional Madidi, Santa Rosa-Amantala, Charopampa, 1232 m, 31 Jul 2010, *Cayola, L. 4209* (DAV,LPB,MO); Senda Santa Rosa-río Amantala, cerca al encuentro entre Río Pelechuco y Amantala, frente al sector conocido como Charopampa, 1451 m, 4 Aug 2010, *Cayola, L. 4259* (LPB); Bautista Saavedra, Área Natural de Manejo Integrado Apolobamba, Thola Pampa, sector loma Kallawayaya, 1 Km al NE del Caserío, 1242 m, 30 Sep 2009, *Escalante, A. 300* (LPB,MO); Nor Yungas, Río Yalisa - - Along the Río Yalisa up river from where it crosses the Suapi turn off. 4 km N. of Coroico, 1350 m, 5 Nov 1990, *Lewis, M. 37907* (DAV,LPB,MO).

145. *P. sp. nov.* (“*aff. williamsii-lateral-glands*”)

This taxon can be distinguished by the densely lenticelated twigs, the sub-coriaceous to chartaceous elliptic to elliptic-obovate leaves, 12-15 x 5-6.2 cm, with base acute and deeply decurrent on the petiole, apex acute, petioles 8-11 x 1-1.3 mm, secondary veins arcuate and configuring a eucamptodromous-like pattern, intersecondaries numerous and connected to tertiaries in an irregular reticulate pattern, and 2 elongated elliptic glands, 1-1.5 mm long and laterally attached to the midrib at the decurrent region of the blade (as a consequence almost inconspicuous). The floriferous shoots are erect, 6-7 mm long, the flowers have sub-flexuous pedicels 4-5 mm long, the hypanthium is infundibuliform 2-2.5 mm wide and the anthers are rounded 0.7-0.8 mm wide.

The most similar species is the Peruvian *P. sana* which has more coriaceous leaves, bigger sub-basal glands and smaller flowers on more densiflorous racemes.

**Distribution.** Distributed in mid-elevation humid forests of the northern Bolivian Yungas next to the border with Peru into territory of the Madidi National Park.

**Elevation range.** 1250 – 1470 m.

**Material examined.** (3) **BOLIVIA. La Paz:** Franz Tamayo, Parque Nacional Madidi, NW de Apolo, senda Azariamas-San Fermin, 1326 m, 27 May 2006, *Loza, I. 47* (LPB,MEDEL,MO); ibidem, sector Mutún, 1250 m, 4 Jun 2006, *Ticona, E. 160* (DAV,LPB,MO); **Santa Cruz:** Florida, Santa Rosa de Lima, Quebrada el Creston, 5 al E de Santa Rosa 1470 m, 3 Jul 1996, *Saldías, M. 4349* (NY).

146. *P. sp.nov.* (“*aff. williamsii-doubleFlower*”)

This new taxon is remarkable because its big oblong-ovate subcoriaceous leaves, 18-22 x 8-10 cm, slightly lustrous on both sides with base rounded and concave when merging from the petiole, apex apparently acute (all leaves with apex damaged), petiole 10-11 x ca. 1 mm, secondary veins arcuate and initially decurrent on the midrib, then running at 50-60 degrees and finally ascending parallel to the margin to configure an eucamptodromous-like venation pattern and two sub-basal crateriform oblong glands, 2.5 x 1 mm, attached to the midrib. The floriferous shoots are sub-flexuous, 8-10 cm long; the flowers have flexuous pedicels up to 5 mm long and are frequently arranged in pairs with apparently a non-functional flower placed at the abaxial side of a normal functional flower (usually the underdeveloped flowers wither prematurely), the hypanthium is infundibuliform 2-2.7 mm wide and the anthers are 0.4-0.5 mm long.

It is similar to *P. williamsii* which has shorter chartaceous leaves with less conspicuous tertiary veins, flowers with longer pedicels and not arranged in pairs. *P. amplifolia* is also a similar species, but it has shorter and thicker petioles, shorter racemes and flowers with shorter pedicels.

**Distribution.** Only known from a single locality in mid-elevation humid forests of the province Larecaja. The place is situated in an eastern branch of the Andes known as Cordillera Larecaja which is part of the northern Bolivian Yungas.

**Elevation range.** 1489 m.

**Material examined.** (1) **BOLIVIA. La Paz:** Larecaja, Desde la comunidad de Quilapituni, subiendo por el camino antiguo Ingenio-Mapiri, hasta un lugar llamado Victopampa. Campamento a unas 3 horas a pie bajando hacia el río Chiñijo, 1489 m, 17 Apr 2010, *Arellano, G. 1590* (DAV,LPB,MO).

147. *P.* sp. nov. (“*caballero-Bolivia*”)

This new species can be distinguished by the dark sulcate twigs with dense prominent lenticels, the elliptic-ovate sub-coriaceous leaves, 12-15 x 4.5-5.7 cm with base obtuse and apex acuminate, petioles 9-11 x 1-1.3 mm, drying dark brown, muriculate below, slightly lustrous above, secondary vein pattern brochidromous festooned, midrib and secondaries relatively flat below, tertiaries percurrent sinuous and 2 basal prominent glands (ca. 0.5 mm wide) attached to the midrib and barely visible. The floriferous shoots are sub-flexuous, 4-7 cm long, the flowers have recurved pedicels 1-1.5 mm long and hypanthium hemispherical 2-2.5 mm wide x 1.5-2 mm high.

This species is similar to *P. chamisoana* because the relatively big leaves and small recurved flowers, however this new species has only two glands and the lower leaf surface is conspicuously muricate.

**Distribution.** Apparently endemic to a region known as Siberia in the Andes of central Bolivia which corresponds to a cloud forests in the transition between montane dry forests and the eastern humid Yungas.

**Elevation range.** 1850 – 2700 m.

**Material examined.** (4) **BOLIVIA. Santa Cruz:** Manuel Maria Caballero, 4.9 km on road to Khara Huasi, down from El Empalme (on Comarapa-Cochabamba highway.), 2310 m, 21 Jan 2006, *Nee, M. 53893* (MO,NY,US,USZ); A 26 km de Comarapa camino hacia el Empalme, en bosque nublado, 2700 m, 18 Apr 2003, *Soto, D. 50* (MA,MO,QCA,USZ); Parque Nacional Amboró. Siberia-El Empalme, 5 km entrando hacia Khara Huasi, carretera entre Comarapa-Cochabamba, 2300 m, 8 May 1992, *Vargas, I. 1283* (F,MO,MO,NY,USZ); bajando 2 km al E de Khara Huasi, pasando El Encuentro de los Ríos Khara Huasi y Chua Khocha (camino hacia Tunas Pampa), 1850 m, 23 Jul 2000, *Vargas, I. 4864* (NY,TEX,USZ).

148. *P. sp. nov.* (“*centralgland-Bolivia*”)

This new species can be recognized by the subcoriaceous ovate leaves, 11-15 x 5-7.5 cm, with relatively long petioles (12-15 mm), brochidodromous festooned venation pattern, secondaries arcuate and anastomosing at 3/4 in the midrib-margin axis, tertiary veins plain and apparently exmedially ramified connecting with numerous intersecondaries, and 2 glands placed next to the midrib at slightly distinct levels and 5-10 mm from the base. Only sterile material is known so far.

The more similar species is *P. chamissoana* which however has 4 or more glands positioned basally and near to the margin and irregular reticulate tertiary veins.

**Distribution.** Distributed in sub-humid interandean lowland to mid-elevation forests in the Amazonian slope of the northern Andes of Bolivia.

**Elevation range.** 820 – 1217 m.



**Material examined.** (3) **BOLIVIA. La Paz:** Franz Tamayo, Parque Nacional y Area Natural de Manejo Integrado Madidi. NW de Apolo, 1217 m, 18 Mar 2005, *Choque, D. 197* (LPB,MA,MO); ibidem, 1175 m, 19 Mar 2005, *Choque, D. 214B* (DAV,LPB); Abel Iturralde, Parque Nacional Madidi, región de Tumupasa, 820 m, 24 Jun 2001, *Macia, M. 4885* (LPB,MA).

149. *P. sp. nov.* (“*Choquetanga-Bolivia*”)

This new species can be distinguished by the elliptic-ovate to ovate-lanceolate coriaceous leaves, 8-11.5 x 3.2-4.7 cm, opaque on both sides, generally with serrate margin but some individual leaves can be entire, brochidodromous festooned venation relatively inconspicuous, tertiary veins irregularly reticulate and 2-3 pair of glands placed as follows: the lower one basal to sub-basal attached to the midrib or 1-2 mm apart from it, the second pair at 5-7 mm from the base next to the margin, the third one on the margin or sub-marginal at 10-15 mm from the base and frequently forming a notch in the margin. The erect floriferous shoots are 3-4 cm long; the flowers have pedicels 2-2.5 mm long, open campanulate hypanthium, 3.5-4 mm wide and anthers 0.5-0.6 mm long. The fruits are ovate apiculate, 12-13 x 9-10 mm.

It can be confused with *P. brittoniana*, but that species generally has larger leaves, conspicuous minor veins, only two basal glands and longer racemes with larger flowers.

**Distribution.** Distributed in highland areas in the transition between dry forests and the Bolivian yungas in the central-northern Andes of Bolivia.

**Elevation range.** 2700 – 3800 m.

**Local names.** chachacomani (Bolivia), ira (Bolivia).

**Material examined.** (11) **BOLIVIA. Cochabamba:** Ayopaya, Sailapata, 2700 m, Jan 1935, *Cárdenas, M. 3050* (A,F,GH,P,US); Sailapata, 2800 m, Dec 1935, *Cárdenas, M. 3335* (F,P); Pajchanti, 7 km NO de la capital de

provincia, 3800 m, 6 Nov 1987, *Mérida, G. 58* (LPB); Independencia, Pajchanti, arriba de independencia, 3120 m, 19 Dec 2002, *Wood, J.R. 18753* (LPB); **La Paz**: Inquisivi, 5 km arriba de Quime, hacia la Paz, 3350 m, 23 Aug 1997, *Beck, S.G. 22899* (LPB); Huañahawira - on the N. side of the Río Khatu between Quime and Pongo. 1-4 km SW of Quime, 3300 m, 20 Dec 1990, *Lewis, M. 38054* (DAV,LPB,MO,TEX); ibidem, 3200 m, 20 Dec 1990, *Lewis, M. 38061* (DAV,LPB,MO); Chachacomani - slope SW of the Río Ocsalla, a few hundred m above the river and 3 km SE of its mouth 12 km NE of Choquetanga, 3300 m, 18 Apr 1991, *Lewis, M. 38825* (MO); comunidad Choquetanga-Cuchiwasi, bajando Pabellonani, a 7 km al NE de Choquetanga, 3300 m, 19 Jan 1994, *Salinas, N. 2150* (CUZ,LPB); comunidad Choquetanga-Wichupampa, Serranias de Lulini, 13 km al N de Choquetanga, 2-3 km al NW del cerro Lulini, 3290 m, 17 Mar 1994, *Salinas, N. 2707* (CUZ,LPB,QCA); Comunidad Choquetanga-Aguas calientes-Calachaca, cuenca del Rio Calachaca-Lahura, 3400 m, 20 Jul 1994, *Salinas, N. 3176* (CUZ,LPB,QCA).

150. *P. sp. nov.* (“*high-elevation-Sorata-Bolivia*”)

It can be recognized by the rugose bark with dense protuberant lenticels, the oblong-lanceolate coriaceous leaves, 11-14 x 3-4.5 cm, opaque on both sides, pale colored when dry, with obtuse asymmetric base, apex attenuate, brochidodromous venation pattern, secondary veins relatively open (arising at 70-80 degrees from the midrib) and running straight along their lower half, tertiaries irregularly reticulate and little conspicuous, and two basal glands located marginally on the decurrent portion of the leaf base adjacent to the midrib. The fruiting shoots are 10-11 cm long with fruits ventrally applanate, 11-13 x 8-11 mm.

Based on the leaf shape and drying pattern, this new species can be considered similar to *P. micradenia*” which however has smaller leaves with more visible venation below, multiple pairs of glands and smaller globose fruits. Another similar species is *P. integrifolia*, but it has larger leaves with basal glands, more conspicuous veins and longer fruiting shoots.

**Distribution.** Only known from the transition between the puna and high elevation dry scrublands in the province of Larecaja, northern Andes of Bolivia.

**Elevation range.** 3250 m.

**Material examined.** (1) **BOLIVIA. La Paz:** Larecaja, Sorata 10 Km hacia Consata por el camino de arriba, 3250 m, 27 May 1991, *Beck, S.G. 19875* (LPB,QCA).

151. *P. sp. nov.* (“*Macia-SouthMadidi-Bolivia*”)

This new taxon can be distinguished by the elliptic to elliptic-ovate chartaceous leaves, 13-15 x 7-8 cm, arranged distichously on zig-zag twigs, with linguiform stipules 4-5 mm long and 2 mm wide, base obtuse and decurrent at the end, apex shortly acuminate, venation pattern brochidodromous, secondary veins arcuate, just 6-7, emerging at 50-60 degrees from the midrib after a short decurrent portion, lateral veins slightly prominent below and plain above, tertiaries percurrent sinuous, and 2 rounded glands located at 8-10 from the base and 1-3 mm from the midrib. Only specimens in sterile condition are known so far.

The more similar species is *P. sana* which has narrower elliptic leaves with more secondary veins in a close to eucamptodromous pattern and basal elongated glands. In addition, it could be confused with *P. debilis*, but that taxon has generally smaller leaves with more secondary veins and plain secondary veins below.

**Distribution.** Distributed in the wet eastern Bolivian Yungas foothills in the southern part of the Madidi National Park, Department of La Paz, Bolivia.

**Elevation range.** 550 – 740 m.

**Material examined.** (2) **BOLIVIA. La Paz:** Abel Iturralde, Parque Nacional Madidi, próximo al río Tequeje, 550 m, 29 Oct 2001, *Macia, M. 5837* (LPB,MA); Alto Beni, Serrania de Marimonos, Colonia Tupiza, 740 m, 7 Apr 1993, *Seidel, R. 7190* (LPB).

152. *P. sp.nov.* (“*aff.pearcei-Madidi-Bolivia*”)

This new species can be distinguished by the dense lenticellate twigs, the elliptic-ovate chartaceous to subcoriaceous leaves, 15-24 x 6-10 cm, with base obtuse, apex narrowly acuminate, petioles 7-11 x 1.5-2 mm, when dry with a pale tin color above, weak brochidromous venation pattern, arcuate secondary veins (ca. 11), percurrent tertiary veins perpendicular to the midrib and four glands, the lower two basal to sub-basal elongated and attached to the midrib, the second pair (sometimes absent) rounded and placed around the first secondary veins at 6-16 mm from the base. The floriferous shoots are sub-erect, 5-7.5 cm long; with minute flowers (mature buds are 1-1.5 mm wide and have pedicels 1-1.5 mm long). The fruits are elliptic-prolate, 13-14 x 11-13 mm, with the ventral face applanate, the endocarp relatively thick and a robust pedicel of 1-4 x 1.5-2 mm.

This species is similar to *P. pearcei*, but that taxon has coriaceous leaves with rounded base, several glands, less conspicuous tertiary veins and longer racemes. *P. pleiantha* from northern Peru has also relatively large leaves but with shorter petioles, more prominent veins below and only two basal glands and bigger flowers with longer pedicels. On the other hand, it is also similar to a new species from southern Peru and northern Bolivia (*P. “aff. integrifolia-Urubamba”*) which however has smaller and more coriaceous leaves with only two basal glands, longer racemes, slightly larger flowers and more robust fruits with shorter pedicels.

**Distribution.** Distributed in mid-elevation montane wet forests of the northern Yungas of Bolivia, mainly into the Madidi National Park area, department of La Paz.

**Elevation range.** 1459 – 2400 m.

**Material examined.** (30) **BOLIVIA. La Paz:** Franz Tamayo, Madidi, Pinalito, 30 km al este de Apolo por el camino a San Jose de Uchupiamonas, 1936 m, 11 Jul 2002, *Araujo-Murakami, A. 240* (BOLV,LPB,MA,MO,QCA,USZ); Parque Nacional Madidi, Moxos, Fuertecillo, 2000 m, 25 Apr 2007, *Araujo-Murakami, A. 3242A* (LPB,MA,MO); ibidem, 2000 m, 25 Apr 2007, *Araujo-Murakami, A. 3253* (LPB,MA,MO); ibidem, 2000 m, 25 Apr 2007, *Araujo-Murakami, A. 3312* (LPB,MA,MO); ibidem, 1900 m, 3 May 2007, *Araujo-Murakami, A. 3422* (LPB,MA,MO); Parque Nacional Madidi, quebrada Jatun Chiriuno, 31 km en linea recta al este de Apolo por el camino a San Jose de Uchupiamonas, 1850 m, 25 Jun 2002, *Bascopé, F. 49* (LPB,MA,MO); ibidem, trayecto de 1.2 km hacia el oeste, 1925 m, 28 Jun 2002, *Bascopé, F. 140* (LPB,MA,MO,NY); Parque Nacional Madidi, Piñalito, 30 km en linea recta al este de Apolo por el camino a San José de Uchupiamonas, 1800 m, 9 Jul 2002, *Bascopé, F. 276* (LPB,MA,MO); ibidem, 1800 m, 9 Jul 2002, *Bascopé, F. 278* (LPB,MA,MO); Nor Yungas, Cerro Uchumachi, sector Carmen Pampa, 2250 m, 30 May 2005, *Bohorquez, J. 14* (LPB); Franz Tamayo, Region Madidi, Santo Domingo, Lechemayu, segunda Palca a 492 m al noroeste del campamento, 1538 m, 28 Aug 2010, *Calvi, P. 112* (DAV,LPB,MO); ibidem, 1538 m, 28 Aug 2010, *Calvi, P. 124* (DAV,MO); Parque Nacional Madidi, Mojos, campamento Fuertecillo, sobre la senda a Queara, 1839 m, 3 May 2007, *Cayola, L. 2828* (DAV,LPB,MO); Santo Domingo, sector Tintaya, 1459 m, 10 Oct 2006, *Cornejo, M. 110* (DAV,LPB,MO,USZ); Parque Nacional Madidi, Balcon Alto, al SE de Mojos, 2008 m, 2 Jul 2005, *Fuentes, A.F. 9223* (LPB,MO); Parque Nacional Madidi, Mojos, sector Fuertecillo, por el camino a Queara, 1930 m, 24 Apr 2007, *Fuentes, A.F. 11377* (LPB,MA,MO); ibidem, 1930 m, 24 Apr 2007, *Fuentes, A.F. 11440* (F,LPB,MO); ibidem, 1900 m, 2 Mar 2008, *Fuentes, A.F. 12222* (BOLV,CTES,LPB,MA,MEDEL,MO,USZ); Región Madidi, Santo domingo, sector Siripita , 1491 m, 29 Aug 2010, *Fuentes, A.F. 17195* (DAV,LPB); Parque Nacional Madidi, sector Chiriuno, por el camino Apolo-San José de Uchupiamonas, 1890 m, 23 Jul 2012, *Fuentes, A.F. 17582* (MO); Nor Yungas, Sacramento, between Chuspipata and Yolosa, 2380 m, 4 Oct 1985, *Gentry, A. 52043* (MO); Abel Iturralde, Parque Nacional Madidi, comunidad Mamacona, sobre camino de Apolo a San José de Uchupiamonas, a 1 km subiendo el río Mamacona, 1578 m, 1 Aug 2002, *Maldonado, C. 2418* (LPB,MO); ibidem, 1578 m, 1 Aug 2002, *Maldonado, C. 2437* (BOLV,LPB,MO,USZ); ibidem, 1578 m, 1 Aug 2002, *Maldonado, C. 2445* (LPB,MA,MO); ibidem, 1626 m, 5 Aug 2002, *Maldonado, C. 2572* (LPB,MO); ibidem, 1626 m, 7 Aug 2002, *Maldonado, C. 2635* (LPB,MA,MO); ibidem, 1626 m, 9 Aug 2002, *Maldonado, C. 2695* (LPB,MA,MO); ibidem, 1598 m, 10 Aug 2002, *Maldonado, C. 2737* (LPB,MA,MO); ibidem,

1532 m, 11 Aug 2002, *Maldonado, C. 2777* (LPB,MA,MO); Bautista Saavedra, Wayrapata II, 1800 m, 24 Jul 2002, *Zenteno, F. 1174* (LPB).

153. *P.* sp. nov. (“*micro-flowers-Uchupiamonas-Bol*”)

This new species is a shrub until 3 m tall with ovate-lanceolate sub-coriaceous leaves, 10-11.5 x 3.5-4 cm, slightly lustrous on both sides, with obtuse base and acuminate apex, brochidromous venation pattern, secondaries emerging relatively straight at 45-55 degrees from the midrib, slightly prominent below, tertiaries irregularly reticulate and slightly prominent below, venation impressed above and 2 crateriform submarginal glands located next to the midrib. The floriferous shoots are sub-erect, 3-5 cm long and the flowers are relatively small with noticeably short pedicels 0.8-1.2 mm long, infundibuliform hypanthium, 2-2.3 mm wide x 1.5-1.7 mm high, petals ca. 1.5 mm wide and anthers 0.2-0.3 mm long. The fruits are ovate apiculate, immatures measure up to 8 x 6 mm and have pedicels 1-1.5 x 0.8-1 mm.

This species is similar to *P.* “*micradenia*” which has more opaque leaves with multiple glands, longer racemes and flowers with longer pedicels.

**Distribution.** Only known from a single locality in mid-elevation forest of the northern Bolivian yungas and close to the border with Peru.

**Elevation range.** 1958 m.

**Material examined.** (1) **BOLIVIA. La Paz:** Franz Tamayo, Senda Apolo-San José de Uchupiamonas, último arroyo antes de río Huacataya, 1958 m, 8 Oct 2002, *Maldonado, C. 3154* (BOLV,CTES,LPB,MO,USZ);

154. *P.* sp. nov. (“*multigandulosa-pectinateVeins-Bolivia*”)

This new species is remarkable because the sulcate gray bark of the twigs with few lenticels, the relatively large oblong-lanceolate to oblong-elliptic coriaceous leaves, 15-21 x 5-8 cm, opaque on both sides, with base obtuse to acute, apex acute, flexuous petioles, 8-12 cm long, weak brochidodromous festooned venation pattern, the most basal pair of secondaries acute pectinate, tertiaries irregular reticulate, major veins plain and drying dark below, barely visible above, and 2 sub-basal glands elongated (2.5-3 x 0.5-0.7 mm) attached to midrib, plus multiple supplementary glands (up to 10 pairs) located along the blade at 3-5 mm from the margin on the outer loops of the secondary venation framework. The floriferous shoots are 4-5 cm long, subflexuous, the flowers are minute with pedicel 1-1.5 mm long, hypanthium turbinate 2-2.7 mm wide, petals 1.8-2 mm wide and anthers 0.3-0.4 mm long. The fruits are globose apiculate and measure 10-11 x 9-10 mm.

This species is similar to *P. pearcei* (because the multiple glands and oblong leaves) which however has less conspicuous tertiary veins, smaller basal glands, longer flexuous racemes and campanulate hypanthium.

**Distribution.** Distributed in a relatively small area corresponding to mid-elevation humid forests in the northwestern Bolivian Yungas.

**Elevation range.** 1054 – 2303 m.

**Material examined.** (21) **BOLIVIA. La Paz:** Bautista Saavedra, Área Natural de Manejo Integrado Apolobamba, Wayrapata, 1 Km NE del caserío, 1470 m, 13 May 2004, *Antezana, A. 165* (LPB,MA,MO); Larecaja, Desde la comunidad de Quilapituni, subiendo por el camino antiguo Ingenio-Mapiri, hasta un lugar llamado Victopampa. Campamento a unas 3 horas a pie bajando hacia el río Chiñiño, 1493 m, 19 Apr 2010, *Arellano, G. 1685* (LPB); ibidem, 1224 m, 25 Apr 2010, *Arellano, G. 1851* (DAV,LPB); ibidem, 1386 m, 2 May 2010, *Arellano, G. 2052 A* (DAV,LPB,MO); ibidem, 1386 m, 2 May 2010, *Arellano, G. 2068* (DAV,LPB); ibidem, 1386 m, 2 May 2010, *Arellano, G. 2091* (DAV,LPB); ibidem, 1386 m, 2 May 2010, *Arellano, G. 2102* (LPB); ibidem, 1386 m, 2 May 2010, *Arellano, G. 2106* (DAV,LPB); ibidem, 1371 m, 4 May 2010, *Arellano, G. 2124* (DAV,LPB,MO); ibidem, 1371 m,

4 May 2010, *Arellano, G. 2126* (DAV,LPB,MO); Enfrente de comunidad Lambramani, 2303 m, 12 Oct 2010, *Arellano, G. 3141* (LPB); Franz Tamayo, Apolo 57 Km hacia Charasani pasando Correo, campamento Calabatea, 1550 m, 6 Jul 1990, *Beck, S.G. 18555* (LPB,QCA); Parque Nacional Madidi, Mojos, Carjata, sobre la senda a Queara, 1656 m, 7 May 2007, *Cayola, L. 2921* (LPB,MA,MO); Santo Domingo, sector Tintaya, 1463 m, 17 Oct 2006, *Cornejo, M. 291* (BOLV,DAV,HSB,LPB,MA,MO); *ibidem*, 1527 m, 25 Oct 2006, *Cornejo, M. 373* (BOLV,LPB,MA,MO,USZ); Bautista Saavedra, Área Natural de Manejo Integrado Apolobamba, Thola Pampa, sector loma San Lorenzo, 2,5 Km al NE del Caserío, 1054 m, 17 Sep 2009, *Escalante, A. 107* (LPB,MO); *ibidem*, 1054 m, 17 Sep 2009, *Escalante, A. 186* (DAV,LPB,MO); Franz Tamayo, Calabatea, entrando al N de la carretera Apolo Charazani, 1500 m, 30 Apr 2005, *Fuentes, A.F. 7655A* (LPB,MO); Parque Nacional Madidi, Mojos, Charopampa, 1245 m, 6 Jul 2005, *Fuentes, A.F. 9459* (LPB,MO); Parque Nacional Madidi, Mojos, sector Toma (de agua), 3.5 km al SW del pueblo, 1790 m, 7 May 2007, *Fuentes, A.F. 11744* (DAV,LPB,MO); Bautista Saavedra, Área Natural de Manejo Integrado Apolobamba, Paujeyuyo, sector Tunquini Mayu, 1068 m, 13 Apr 2010, *Fuentes, A.F. 15960* (DAV,MO).

**155. *P. sp.nov.*(“*multiglandulosa-ApoloBolivia*”)**

This new species can be distinguished by the elliptic chartaceous leaves, 12-19 x 5-7.5 cm, with acuminate apex, obtuse decurrent base, margin undulate and minutely irregular, brochidromous festooned venation, secondary veins (8-10) relatively straight at their first half and then arcuate upwards, tertiary veins irregularly reticulate and little conspicuous and two main basal elongated glands (1-1.5 mm long) attached to the midrib accompanied by 3-7 pair of supplementary minute rounded glands (0.3-0.5 mm wide) along the outer loops of venation at 1-3 mm from the margin. Only sterile material is available so far.

Close to *P. pearcei* but the leaves are chartaceous, with brochidromous festooned venation pattern and the glands are more unevenly distributed. On the other hand, the previously described species with multiple glands has bigger coriaceous leaves with conspicuous pectinate basal veins and base frequently acute.



**Distribution.** With a narrow distribution in a mid-elevation humid forest with influence of limestone soils in the Madidi National Park (Apolo sector), northwestern Yungas of Bolivia.

**Elevation range.** 1351 – 1935 m.

**Material examined.** (7) **BOLIVIA. La Paz:** Franz Tamayo, Parque Nacional Madidi, Mojos, campamento Fuertecillo, sobre la senda a Queara, 1935 m, 5 May 2007, *Cayola, L. 2863* (DAV,LPB,MA,MO); Parque Nacional Madidi, NW de Apolo, senda Azariamas-San Fermin, 1351 m, 5 Jun 2006, *Loza, I. 388* (DAV,LPB,MO); ibidem, 1392 m, 12 Jun 2006, *Loza, I. 482* (DAV,LPB,MA,MO); Abel Iturralde, Parque Nacional Madidi, comunidad Mamacona, sobre camino de Apolo a San José de Uchupiamonas, cerca de cima de cerro frente a Mamacona, 1580 m, 14 Aug 2002, *Maldonado, C. 2825* (LPB,MA,MO); Franz Tamayo, Senda Apolo-San Jose, 5 min antes de llegar al Naranjal, 1786 m, 2 Oct 2002, *Maldonado, C. 2951* (LPB,MA,MO); Parque Nacional-ANMI Madidi, Senda Apolo-San Jose de Uchupiamonas, cerca de Naranjal, entrando una quebrada, 1716 m, 20 Apr 2003, *Miranda, T. 785* (LPB,MA,MO); Parque Nacional Madidi, senda Azariamas-San Fermin sector Cumbre, 1400 m, 7 Jun 2006, *Ticona, E. 310* (LPB,MA,MO).

156. *P. sp. nov.* (“*aff. oleifolia- obscureGlands-Bolivia*”)

This new species can be distinguished by the twigs densely covered by elliptic whitish lenticels, the elliptic-lanceolate to elliptic-oblong coriaceous leaves, 9-16 x 2-5.5 cm, slightly asymmetric, lustrous above, with base acute and deeply decurrent, apex attenuate to narrowly acuminate, secondary veins arcuate and slightly prominent below configuring an eucamptodromous-like pattern, intersecondaries numerous and sinuous, tertiaries percurrent perpendicular to the midrib, secondary and tertiary veins paler than the background, and 0-2 (frequently just one) crateriform glands (0.5-1 mm wide) placed at 5-15 mm from the base and in the middle of the midrib-margin axis or closer to the latter. The floriferous shoots are sub-erect and relatively short (2-5.5 cm long); the flowers have pedicels 1-2 mm long, hypanthium campanulate 1.8-2.3 mm wide and anthers 0.2-0.3 mm long. The fruits are ovate-apiculate, 10-11 x 8-9 mm.

This species is similar to *P. oleifolia*, which however has less coriaceous leaves with sub-basal glands placed next to the margin and bigger flowers subtended by longer pedicels.

**Distribution.** Distributed in mid-elevation areas with Tucuman-Bolivian type forests rich in Lauraceae, Juglandaceae, Fabaceae and Pteridophytes in central and southern Bolivia.

**Elevation range.** 1560 – 2250 m.

**Material examined.** (13) **BOLIVIA.** **Chuquisaca:** Sud Cinti, Puca Pampa. Aproximadamente a 5 km de Puesto ganadero, a 600 m del río Albornioy, orientación SW, 1964 m, 11 Feb 2004, *Gutiérrez, J. 545* (MO,NY); Tomina, Aprox. 800 m, antes de llegar a Llantoj, de La Florida subiendo hacia el E de la Serranía de Kaska Orcko, 1750 m, 15 Dec 2004, *Gutiérrez, J. 1084* (HSB,MO,QCA); Hernando Siles, Municipio Monteagudo primera sección del Cantón Fernades, comunidad San Lorenzo, Loma de Monu Mayu, 1560 m, 28 Dec 2007, *Ortiz, C. 48* (BOLV,HSB,MEDEL,MO); **Santa Cruz:** Vallegrande, 10 km SSE of Vallegrande (by air). On road from Guadalupe to Piraimiri, 2200 m, 31 Jan 1987, *Nee, M. 33905* (LPB,MO,NY,US); 7 km E of Guadalupe (by air), 1875 m, 5 Feb 1988, *Nee, M. 36214* (GH,MO,NY); ibídem, 2234 m, 1 Jun 2010, *Parada, G. 2683* (DAV,FCQ,MO); ibídem, 2168 m, 29 Jul 2011, *Parada, G. 3539* (MO); Abra las Islas, a 22 km de Vallegrande camino hacia racete, 1914 m, 20 Aug 2012, *Parada, G. 4848* (MO); Ruta del Che, camino entre Guadalupe y Pucará, 2183 m, 22 Jan 2013, *Parada, G. 5010* (MO); Valle Grande, Cantón Pucara, Sección Municipal Alto Seco, Comunidad Alto Seco, 1964 m, 9 May 2008, *Peñaranda, J. 699* (HSB,MO); Vallegrande, Monte Paulo, 4-5 km SE de Piraymirí sobre la carretera a Masicurí, 2160 m, 27 Dec 1998, *Vargas, I. 3698* (LPB,MO,NY,TEX,USZ); Florida, Parque Nal. Amboró, La Yunga de Mairana, luego 5 km al N por el camino carretero a San Rafael, 2250 m, 17 Mar 2000, *Vargas, I. 4378* (USZ); Camino Mairana - Postervalle, ca 51 km del cruce de la carretera central Samaipata - Mairana, 2100 m, 29 Mar 2004, *Wood, J.R. 20367* (DAV,LPB,MO).

157. *P.* sp. nov. (“*rhytidomeBark-Madidi-Bol*”)

This new species can be easily differentiated by the abundant rhytidome on the bark and the protruding lenticels, the chartaceous elliptic-ovate leaves, 16-21 x 7-9.5 cm, with weak brochidodromous venation pattern, arcuate secondary veins, short intersecondaries arcuate downward and connecting with their underneath secondary vein, tertiaries sinuous percurrent and perpendicular to the midrib, lower surface with both major and tertiary veins very prominent, upper surface slightly bullate, and 6 glands, two basal attached to the midrib, two more on the second pair of secondary veins at 3-5 mm from the base and the upper two at 12-18 mm from the base and 1-3 mm from the margin. The floriferous shoots are erect to sub-erect, 7-11 mm long, with rachis 1-1.5 mm thick; the flowers have reflexed pedicels 1.5-3 mm long, hypanthium 2.5-3 mm wide, filaments ca. 1.5 mm long and anthers 0.5-0.6 mm long.

The most similar species is *P. brittoniana* which has serrated margin, only two basal glands and bigger flowers with longer pedicels.

**Distribution.** Apparently endemic to a single mountain ridge (montane pluvial forest) originated from the Apolobamba massif in the northern Andes of Bolivia close to the border with Peru.

**Elevation range.** 2400 m.

**Material examined.** (2) **BOLIVIA. La Paz:** Franz Tamayo, Parque Nacional Madidi, Keara, Tocoaque II, 2400 m, 8 Nov 2007, *Araujo-Murakami, A. 3580* (LPB,MEDEL,MO); Parque Nacional Madidi, Tokoake, por la senda hacia el inciensal Linter, 2400 m, 26 Jun 2005, *Fuentes, A.F. 8816A* (DAV,LPB,MA,MO,QCA).

158. *P. sp. nov. ("BigLeaves-2glands-SouthBolivia")*

This new species can be distinguished by the relatively big oblong-ovate chartaceous leaves, 12-18 x 4-7.2 cm, opaque on both sides, with flexuous petioles, 10-14 x 0.8-1 mm, base obtuse and deeply decurrent, apex acute, weak brochidodromous venation pattern, secondary veins arcuate emerging at 60-70 degrees

from the midrib, slightly raised below and flat above, intersecondaries emerging at variable angles and hardly differentiable from the tertiaries, tertiaries irregularly reticulate to sinuous percurrent and 2 glands placed between the first and second pair of veins at 5-12 mm from the base and 2-5 mm from the midrib. The floriferous shoots are flexuous, 4-8.5 cm long; the flowers have pedicels 3-6 x 0.2-0.3 mm, hypanthium open campanulate, 2.8-3 mm wide x 1.5-2 mm high and anthers 0.8-1 mm long. The fruits are globose, 8-10 mm wide with the ventral suture slightly depressed.

This species has similar venation architecture and geographic distribution with *P. tucumanensis*, which however, generally has dentate smaller leaves, shorter more erect racemes with larger flowers and narrow ovate fruits.

**Distribution.** Distributed in low to mid-elevation semi-deciduous Tucuman-Bolivian forests from central Bolivia to northwestern Argentina.

**Elevation range.** 550 – 1900 m.

**Material examined.** (5) **ARGENTINA. Salta:** Orán, El Angosto del Pescado, Finca Yakulica, 550 m, 23 Sep 1974, *Meneses, E. 30* (BRIT,CAS,TEX,US); **BOLIVIA. Chuquisaca:** Luis Calvo, Parque Nacional y Área de Manejo Integrado "Serranía del Iñaño." Comunidad Ticucha, pendiente media de la Serranía del Iñaño. Pasando por la chacra de Jochis. Arriba de las juntas de los rios Jarca Mayu Chico y Grande, 1479 m, 14 Mar 2003, *Serrano, M. 4089* (MO); ibidem, pendiente superior de la serranía del Iñaño. Margen izquierdo del Río Jarca Mayu Grande, 1730 m, 16 Mar 2003, *Serrano, M. 4109* (MO); **Santa Cruz:** Valle Grande, Camino de Loma Larga a Cerro Bocón, 1900 m, 7 Apr 2011, *Parada, G. 3186* (MO); **Tarija:** Jul 1846, *Weddell, M.H.A. 4046* (P).

159. *P.* sp. nov. (“*zentino-TarijaBolivia*”)

This species is characterized by the chartaceous to membranous oblong-lanceolate leaves, 8.5-14 x 3-4.7 cm, with flexuous petioles, 11-17 x 0.7-1.2 mm, base obtuse and decurrent on the petiole, apex shortly acuminate, brochidodromous festooned venation pattern, secondary and lower veins plain on the lower surface and inconspicuous on the upper surface, secondary veins (12-14) progressively ascending, intersecondaries up to 4 between secondaries and branched midway, tertiaries percurrent towards the base and densely reticulate on the upper two thirds of the blade, and 2 very small glands (0.3-0.4 mm wide) located at 10-25 mm from the base and between the midrib and the middle of the midrib-margin axis. The floriferous shoots are sub-flexuous, 1.5-3 cm long; they contain minute flowers (the smallest known so far in the Neotropics) with pedicels 1-1.5 mm long, hypanthium 1.2-1.8 mm wide and anthers ca. 0.2 mm long. The fruits are prolate-ovate and apiculate, 10-11 x 7-9 mm.

The most similar species is *P. oleifolia* which however has lustrous leaves with more basal glands and longer racemes with much bigger flowers.

**Distribution.** Distributed in low mid-elevation Tucumano Boliviano-type forests in the southern Andes of Bolivia (departments of Chiquisaca and Tarija).

**Elevation range.** 600 – 1575 m.

**Material examined.** (9) **BOLIVIA. Chuquisaca:** Sud Cinti, Cañon chapirenda, quebrenda ladera de rio. Ca. 5 km al NW de la Comunidad de Las Abras. Camino a Candado Grande, sector La Abra, 1372 m, 26 Jan 2006, *Lozano, R. 1930* (DAV,HSB,MO,QCA); Hernando Siles, Serranía Los Milagros. Trayecto Cañon Largo-Pendiente media, serranía con sendero turístico, 1575 m, 22 Dec 2005, *Serrano, M. 6824* (DAV,HSB,MA,MO); **Tarija:** Arce, Municipio Padcaya. Reserva Nacional de Flora y Fauna Tariquía, comunidad Cambarí a orillas del río Naranjal, El Mezon-Cambarí, 1071 m, 16 Jan 2005, *Serrano, M. 5595* (MO); O'Connor, Municipio Entre Ríos. Reserva Nacional de Flora y Fauna Tariquía, comunidad Salinas, 1215 m, 24 Jan 2006, *Serrano, M. 7263* (DAV,HSB,MO,QCA); Arce, 29.2 km S of Emborozú-Sidras road on road to Bermejo, (12.7 km S of Naranjo Agrio), 600 m, 21 Apr 1983, *Solomon, J.C. 9935* (MO); O'Connor, Camino a Soledad, 1300 m, 28 Feb 2006, *Zenteno, F. 4181* (LPB); ibidem, 1300 m, 28

Feb 2006, *Zenteno, F. 4194* (LPB,US); Salinas, El Meson, 1280 m, 8 Jul 2006, *Zenteno, F. 5498* (LPB); Prov. Aniceto Arce, Conchas, 1000 m, 14 Jul 2006, *Zenteno, F. 5598* (LPB).

**AMAZON GUIANAS AND NORTHERN SOUTH AMERICA LOWLANDS** (36 taxa including shared with other areas):

160. *P. accumulans* (Koehne) C.L. Li & G.Aymard, *BioLlania* 6(Ed. Esp.): 449. 1997. *P. myrtifolia* (L.) Urb. var. *accumulans* Koehne, *Bot. Jahrb. Syst.* 52: 320. 1915. Type: Guyana: Lower Demerara, May 1888, *Jenman, G.S. 4361* (sintypes, K!(2), NY!, US!).

This species can be recognized by the elliptic to elliptic-ovate subcoriaceous leaves, 8.5-13.5 x 4.8-8 cm, lustrous above, with base obtuse to rounded, apex obtuse to acute, venation pattern brochidodromous, secondary veins 6-8, initially emerging straight at 55-65 degrees from the midrib and changing to 20-30 degrees on the outer third of the midrib-margin axis, intersecondaries around half as long as secondaries, tertiaries reticulate and almost inconspicuous, and two relatively small glands (0.6-0.8 mm across) placed on the first pair of secondary veins submarginally at 3-6 mm from the base. The floriferous shoots are subflexuous, 3-4.5 cm long, sometimes congested at the base of new reiterations (as displayed in the type collection); the flowers have pedicels 2-4 mm long, hypanthium campanulate 1.8-2.2 mm wide and anthers 0.4-0.5 mm long. The fruit is slightly oblate and apiculate, 11-13 x 12-14 mm.

It is similar to *P. rotunda* but differs because the generally smaller size of the leaves, the secondary veins more distanced among them and the relatively small glands placed submarginally on the first pair of veins. Another similar species, *P. pleuradenia* has more elongated leaves with acuminate apex, an obscure brochidodromous venation pattern, more secondary arcuate veins, and glands next to the midrib.

**Distribution.** Distributed in lowlands located at the edges of the Amazonian basin and sometimes near to the Atlantic coast from southern Venezuela to French Guiana.

**Elevation range.** 20 – 1220 m.

**Local names.** amandelhout (Suriname), manga yek (Venezuela), menta Berti (Venezuela), noyeau (Guyana).

**Material examined.** (13) **FRENCH GUIANA.** Charvein, 20 m, 16 Feb 1914, *Benoist, R. 254* (P). **GUYANA.** Sandhills, Demara river, 50 m, 22 May 1945, *Fanshawe, D.B. 5173* (NY); 50 m, , *Forest Department of Brit Guyana 5846* (GH); Wallaba forest, Bartica-Potaro road, 50 m, 2 Jul 1949, *Forest Department of Brit Guyana 5847* (GH,NY,P). **SURINAME.** Walimiaballi. Zanderij I, Sep 1944, *Anonymous 229* (MO); Mapane creek, 20 m, 13 Jun 1964, *Elburg, J. 9862* (F); Brownsberg, 250 m, 14 Aug 1924, *Kleinhoonte 6599* (NY). **VENEZUELA. Amazonas:** Nonflooded forest on low hills over clay soils, ca. 10.5 km west of Yavita, along Yavita-Maroa road, 110 m, 28 May 1996, *Aymard, G. 11129* (MO); **Bolivar:** Cercanias de los campamentos EL Paraiso y La Yagua. Aprox 24-48 km NE del caserío Los Rosos, este último aprox 17 km de Upata (sobre la carretera Upata a San Felix), 500 m, 1 Aug 1965, *Blanco, C. 206* (MO); ibidem, 500 m, Apr 1966, *Blanco, C. 439* (MO,NY,US); La Gran Sabana, Carretera de Santa Elena de Uairen, camino selvatico del centro minero hasta la comunidad indígena Pemon Apoipo, 900 m, 3 Apr 1988, *Sastre, C. 8449* (MO,P); Ptari tepui. Lower south facing slopes, 1220 m, 28 Nov 1944, *Steyermark, J.A. 60687* (F,NY).

161. *P. amplifolia* Pilger, Bot. Jahrb. Syst. 37: 538 . 1906. Type: Peru: Sandia, cerca a Chunchusmayo, 900 m, Jul 1902, *Weberbauer, A. 1265* (clonotypus F!).

This species can be recognized by the profusely lenticellated twigs, the large ovate-oblong to elliptic-oblong chartaceous leaves, 18-26 x 8-11.2 cm, with base obtuse and slightly asymmetric, apex acute, secondary veins prominent below and plain above, departing at 50-60 degrees from the midrib and progressively anastomosing towards the margin, intersecondaries around half as long as secondaries,

tertiaries alternate percurrent and 2 sub-basal oblong glands, laterally truncated, attached to the midrib and distanced 2-3 mm from the base. The floriferous shoots are flexuous and relatively short (4-5 cm long), the flowers have pedicels 2-2.5 mm long, hypanthium ca. 2 mm wide and anthers 0.2-0.3 mm long.

This species can be confused with others with leaves over 20 cm long like *P. integrifolia* and *P. pleiantha*, but those species occur at higher elevation forests, have coriaceous leaves and longer racemes with bigger flowers. The taxonomic circumscription of *P. amplifolia* has been historically confusing due that it was initially only briefly described based on a single specimen that later apparently got lost in Berlin during the Second World War. Today, only specimen fragments and a photograph of the original type (both deposited in F) are the remnant material linked to the type.

**Distribution.** Distributed in moist mid-elevation forests of the Amazonian slope of the central and southern Peruvian Andes.

**Elevation range.** 800 – 1500 m.

**Material examined.** (5) **PERU.** **Cusco:** Paucartambo, Kosñipata, San Isidro, 1213 m, 13 Jul 2005, *Farfán, W. 2186* (USM); **Pasco:** Oxapampa, Distrito Palcazú. Camino desde alto Lagarto hacia alto Comuñiz, 800 m, 30 Aug 2007, *Rojas, R. 4617* (MO,USM); Dist. Pozuzo. Camino Alto Lagarto a Pozuzo Alto Victoria, 1500 m, 29 Jun 2008, *Rojas, R. 5769* (DAV,HOXA,MO,USM); **Puno:** Río Candamo, fila at mouth of Río Guacamayo, ridge top forest with cloud forest aspects, 870 m, 28 May 1992, *Gentry, A. 77306* (MO).

162. *P. debilis* Koehne, Bot. Jahrb. Syst. 52: 317. 1915. Type: Peru: Loreto, Maynas, Maynas. In sylvis adis ad Yurimaguas, Jul 1831, *Poeppig, E. s.n.* (sintype, W!; fragment, F!).

This species can be recognized by the ovate-elliptic to lanceolate membranous to chartaceous leaves, 10-16 x 4-6.7 cm, opaque on both sides, sometimes slightly falcate, with slender petioles 6-10 x 0.7-1.2



mm, venation pattern weak brochidodromous festooned, secondary veins (8-11) emerging at 50-60 degrees from the midrib and progressively ascending towards the margin, plain on both sides, intersecondaries almost perpendicular to the midrib and arching downward to connect with the precedent secondaries, tertiaries percurrent sinuous and 2 glands basal to sub-basal, on or just above the first pair of secondary veins, frequently attached to the midrib. The floriferous shoots are flexuous, delicate in appearance, up to 7 cm long and less than 0.8 mm thick, the flowers have pedicels 3-4 mm long, hypanthium 1.5-2.2 mm wide and anthers 0.2-0.3 mm long. The fruits are oblate measuring 12-15 x 10-11 mm.

Several collections from the foothills of the Andes are similar to *P. debilis* but differences in leaf architecture, glands and flowering shoots have been considered to separate them in several new taxa here briefly described below.

**Distribution.** This is one of the most widely distributed species of the genus in South America and restricted to lowlands of the Amazon basin and some other adjacent areas (usually below 500 m elevation) in zones generally exempt of seasonal flooding regime.

**Elevation range.** 150 – 600 m.

**Local names.** huaripatua (Bolivia), mutuupach (Ecuador), ojo de pollo (Bolivia), sakúmchak, sindi caspi yura, sindi numi, sindi yura, sindimuyu, sindipanga, somkuumjak (Ecuador), sungkímiak , terperentina moena, waisnum (Peru).

**Material examined.** (63) **BOLIVIA. Cochabamba:** Carrasco, Estación Valle del Sajita UMSS.DAP 23 cm, 240 m, 30 Oct 1991, *Galarza, M.I. 567* (MO); Valle de Sacta, a 240 km carretera principal Cochabamba-Santa Cruz, a 4,5 km entrando a la comunidad Pukara. Estación de valle Sacta, 390 m, 1 Feb 2008, *Zárate, M. 2995* (BOLV,MO); **La Paz:** Abel Iturralde, Madidi. Arroyo Rudidi, sobre el Rio Tuichi, 154 m, 26 Sep 2002, *Araujo-Murakami, A. 323* (BOLV,LPB,MO,USZ); Comunidad de Buena Vista. Senda a 3 km al NE de Buena Vista hacia la parcela permanente, 180 m, 22 Apr 1995, *DeWalt, S. 274* (MO); ibidem, 180 m, 12 May 1995, *DeWalt, S. 432* (MO); Franz Tamayo,

Parque Nacional Madidi, río Hondo, arroyo Negro, 340 m, 27 Mar 2002, *Maldonado, C. 1968* (DAV,LPB,MA,MO); ibidem, 300 m, 24 Mar 2002, *Seidel, R. 8917* (DAV,LPB,MA,MO); ibidem, 340 m, 27 Mar 2002, *Seidel, R. 8972* (LPB,MA,MO,NY); **Santa Cruz:** Velasco, Parque Nacional Noel Kempff Mercado, campamento La Torre, 200 m, 28 Nov 1993, *Arroyo, L. 412* (MO,USZ); Ichilo, S side of Río Moile, 1.9 km SE of Puente El Cóndor, 280 m, 20 Feb 2006, *Nee, M. 54187* (MO,NY,USZ); Sarah, Bosque del Fraile, Buenavista, 450 m, 2 Jan 1926, *Steinbach, J. 7398* (A,GH,MO,PH); Buena Vista, senderos ecológicos de las cabañas de Robin Clark, 393 m, 20 Feb 2006, *Villarroel, D. 380* (MEDEL,MO,USZ); Velasco, Parque Nacional Noel Kempff Mercado, Lago Caimán, planicie, 230 m, 19 Mar 1997, *Wallace, R. 124* (WCS); ibidem, 230 m, 17 Apr 1997, *Wallace, R. 139* (DAV,MO,NY,USZ). **BRAZIL. Acre:** Río Branco, 150 m, 8 Aug 1980, *Coelho, L. 1784* (NY). **ECUADOR. Río san Miguel o Sucumbios, entre el Río Putumayo y la Quebrada Teteyé, along river's edge, 260 m, 29 Mar 1942, Schultes, R.E. 3463** (COL,GH); **Napo:** 300 m, *Alarcón, R. 73* (QCA); Río Shiripuno, Quehueiri-ono, 300 m, 6 Oct 1992, *Miller, J. 216* (MO,QCA,QCNE); Tena, construcción de Carretera Campococha-Chontapunta, variante Selva Viva-Bosque Protector, 300 m, 23 Aug 1997, *Núñez, T. 687* (MO,QCNE); District Isle of San Rafa; In front of village of Ahuano, 310 m, 16 May 1991, *Rios, M. 349* (NY,QCA); **Orellana:** La Joya de los Sachas, Comunidad de Pompeya, lado sur del Río Napo. Campamento de Maxus. Río Indillama, carretera de Maxus, Km 5-7, 220 m, 23 Nov 1992, *Grijalva, A. 283* (MO,NY,QCNE); **Pastaza:** Pastaza, Villano. Pandanuque, 1 km al sur de Pozo petrolero Villano 2 de ARCO, 450 m, 29 Jul 1997, *Alvarez, A. 2352* (QCNE); Río Curaray, flood plain forest and riverside forest about 10 km upstream from the military camp, 200 m, 31 May 1980, *Brandbyge, J.S. 31446* (AAU,MO); Arajuno, bosque protector Pablo López del Oglán Alto y Estación Científica de la Universidad Central del Ecuador, orilla del río Oglán, aguas abajo de la Estación, 600 m, 5 Mar 2006, *Cerón, C. 56676* (MO); Nuevo Corrientes, upstream on the Shiona river, 275 m, 4 Sep 2000, *Díxon, S. 343* (QCA); Kapawí (Amuntai), río Pastaza, 235 m, 25 Jul 1989, *Lewis, W.H. 13997* (MO); ibidem, 235 m, 25 Jul 1989, *Lewis, W.H. 14075* (MO,QCNE); ibidem, 235 m, 25 Jul 1989, *Lewis, W.H. 14081* (MO,QCNE); Río Pastaza. River banks between the outlets of Río Bobonaza and Río Ishpingo, 275 m, 22 Jul 1980, *Øllgaard, B. 34992* (AAU,MO,US); ibidem, 275 m, 22 Jul 1980, *Øllgaard, B. 35009* (AAU,MO,TEX,US); **Sucumbíos:** Shushufindi, Parroquia Pañacocha, sector Pucapeña, pozo exploratorio Tongoy 2 petrolera Occidental, 200 m, 4 Dec 1997, *Freire, E. 2627* (MO,QCNE); ibidem, 200 m, 8 Dec 1997, *Freire, E. 2701* (MO,QCNE). **PERU. Amazonas:** Condorcanqui, monte virgen, 1 km. atrás de la comunidad de Caterpiza, trocha de metayar, banda este de la Quebrada Caterpiza, Río Santiago, 180 m, 7 Nov 1979, *Huashikat, V. 1195* (DAV,MO); Valle del Río Santiago, approx 65 km N de Pinglo.

Quebrada Caterpiza, 2-3 km atrás de la comunidad de Caterpiza, 200 m, 30 Jan 1980, *Huashikat*, V. 1873 (MO,P); Rio Santiago, más abajo de la comunidad de Caterpiza, cerca de la boca, 10 vueltas a la quebrada, 180 m, 20 Nov 1979, *Tunqui*, S. 112 (MO); Valle del Rio Santiago. Quebrada Caterpiza, 2-3 km atrás de la comunidad de Caterpiza, 200 m, 4 Dec 1979, *Tunqui*, S. 229 (MO); ibidem, 180 m, 12 Dec 1979, *Tunqui*, S. 292 (MO); ibidem, 180 m, 27 Mar 1980, *Tunqui*, S. 1119 (MO); **Cusco**: La Convención, Echarate, Armihuari Well Site, 535 m, , *Núñez*, P. 19922 (CUZ); **Cuzco**: La Convencion, 370 m, 25 Feb 1996, *Shepard*, R.S. 625 (USM); **Huanuco**: Puerto Inca, Dantas, selva central, 270 m, 16 Jul 1990, *Tello 109* (MOLF); **Loreto**: Maynas, Río Gueppi, tributary of Río Putumayo, northern most tip of Peru on border with Ecuador, riverside between mouth and Puerto Peru, border post 8 km upriver, 200 m, 13 May 1978, *Gentry*, A. 21773 (F,MO,USM); Loreto, Nueva Jerusalem and vicinity, Río Macusari, 220 m, 29 Dec 1985, *Lewis*, W.H. 10456 (MO,USM); ibidem, 250 m, 30 Dec 1985, *Lewis*, W.H. 10527 (MO); ibidem, 250 m, 10 Jun 1986, *Lewis*, W.H. 11051 (MO,USM); Puranchim, Río Sinchiyacu, 200 m, 21 Nov 1986, *Lewis*, W.H. 12050 (MO); Nuevo Andoas, Río Pastaza, 220 m, 5 Dec 1986, *Lewis*, W.H. 12593 (MO); **Madre de Dios**: Tambopata, Comunidad Nativa Infierno. Hermosa Chica, 260 m, 7 Apr 1989, *Alexiades*, M. 594 (MO,NY,USM); Manu, Los Amigos Conservation Concession, centro de monitoreo 1 (CM1), trocha tigres, 240 m, 28 Apr 2007, *Balarezo*, A. 534 (BRIT); Manu, parque nacional Manu, Cocha Cashu, 350 m, 7 Sep 1989, *Foster*, R. 13115 (USM); 8 km N of Salvación on road to Shintuya, 500 m, 30 Jun 1978, *Gentry*, A. 23630 (DAV,MO); Cocha Cashu Biological Station. Manu National Park, 400 m, 10 Aug 1983, *Gentry*, A. 43510 (F,MO,USM); Puerto Maldonado. Los amigos biological station, Madre de Dios River, 270 m, 10 May 2001, *Janovec*, J. 1988 (BRIT); ibidem, 280 m, 13 Nov 2010, *Maceda*, A.P. 2170 (BRIT); Tambopata, Dist. Tambopata. río Madre de Dios, Reserva Ecológica Inkaterpa, 190 m, 30 Aug 2006, *Monteagudo*, A. 12758 (MO,USM); Cusco Amazónico. Lodge camp site 1, 200 m, 14 Jun 1989, *Núñez*, P. 10726 (F,MO); Puerto Arturo, R las Piedras, 200 m, 9 Jun 1999, *Núñez*, P. 25940 (CUZ); Campamento Explorers Inn, 270 m, 21 Sep 1998, *Vásquez*, R. 25591 (MO,USM); Campamento Turístico "Cusco Amazónico", 200 m, 5 Oct 1998, *Vásquez*, R. 25772 (MO); **San Martín**: Chazuta, Rio Huallaga, 260 m, Apr 1935, *Klug*, G. 4122 (GH,MO,NY,UC,US); ibidem, 260 m, Apr 1935, *Klug*, G. 4124 (F,GH,MO,NY,UC,US); **Ucayali**: Carretera Pucallpa - Lima "Federico Basadre" Departamentos de Loreto y Huánuco, 250 m, 5 May 1975, *Hartshorn*, G. 1655 (DAV,MO).

162a. *P. debilis* var. nov. "*Ecuador500m-streams*"

This new proposed variety can be differentiated from the typical variety because the generally larger elliptic-oblong to ovate-oblong leaves (11.5-18 x 4-7.5 cm), chartaceous to subcoriaceous, with secondary veins slightly prominent (vs. flat), 2 sub-basal glands generally bigger in size (1.7-2 mm vs 1-1.2 mm across), the floriferous shoots suberect with thicker both rachis (1.2-1.5 mm vs. 0.5-0.7 mm) and floral pedicels (0.3-0.4 mm vs. 0.1-0.2 mm) and bigger flowers overall.

**Distribution.** Foothills and lowlands of the Amazon basin in central-eastern Ecuador and northern Peru, usually next to watercourses.

**Elevation range.** 230 – 1000 m.

**Local names.** Bakashap (Peru), huecayape, sindi'si (Ecuador)

**Material examined.** (10) **ECUADOR. Napo:** Napo-Pastaza: between Tena and Archidona, rivershore, 540 m, 19 Oct 1939, *Asplund, E. 9459* (LL,MO,QCA); Puerto Napo, 700 m, *Harling, G. 3499* (S); Unio Rio Eno-Aguarico, 260 m, 3 Jul 1980, *Jaramillo, J. 2763* (AAU,MO,QCA,QCNE); Tena, Jatun Sacha Biological Station, south bank of Río Napo, 8 km east of Misahuallí, 400 m, 25 Aug 1996, *Neill, D. 10696* (MO,QCNE); ibidem, 400 m, 15 Jul 2002, *Neill, D. 14003* (QCNE); Vicinity of Puyo, (Eastern foot-hills of the Andes), 750 m, Sep 1939, *Skutch, A.F. 4493* (A,F,GH,MO,NY,US); **Pastaza:** Curaray, Valle de la Muerte, 240 m, 22 Mar 1980, *Holm-Nielsen, L.B. 22533* (AAU); Río Papayacu at Río Curaray, 230 m, 23 Mar 1980, *Holm-Nielsen, L.B. 22549* (AAU). **PERU. Amazonas:** Bagua, Yamayakat, Bosque de Rivera, 320 m, 15 Mar 1996, *Jaramillo, N. 1407* (MO,USM); Condorcanchi, Nieva, Cachiaco, Namaka Jintaji, 600 m, 13 Apr 2004, *Jernigan, K. 93* (USM).

163. *P. espinozana* C.L. Li, Biollania, Ed. Espec. 6: 450 1997. Type: Venezuela: Bolivar, Meseta de Jaua, Cerro Jaua, Cumbre. Porción Sur Oeste, este del campamento, Este del tributario del Rio Marajano, 1810 m, 28 feb 1974, *Steyermark, J.A.; Carreño-Espinoza, V.; Brewer-Carias, C. 109651* (holotype, VEN; isotypes, NY!, US!).

A very rare species that can be recognized by the ovate to obovate-oblong rigid coriaceous leaves, 9-12 x 5.5-7 cm, with petiole 5-10 x 2-2.5 mm, base obtuse to acute and deeply decurrent, apex acute, venation pattern weak brochidodromous, secondaries arcuate (7-8) emerging at 50-60 degrees from the midrib, intersecondaries 2-3 between secondaries, sinuous and less than half their length, tertiaries alternate percurrent, and 2 elliptic basal to sub-basal glands, 1.5-2 mm long placed at 0-2 mm from the midrib. The racemes are erect, 4-5 cm long and elongating up to 12 cm when fruiting; the flowers have pedicels 3-5 mm long, hypanthium campanulate ca. 2 mm wide and anthers 0.4 mm long.

The most similar species is *P. ruiziana* from southern Ecuador and northern Peru that has smaller elliptic leaves and bigger flowers.

**Distribution.** Endemic to the summit of the Jaua massif in the central part of the Venezuelan Guianas region.

**Elevation range.** 1810 – 1880 m.

**Material examined.** (2) VENEZUELA. Bolivar: Cerro Jaua, Este del tributario del rio Marajano, Cumbre, 1810 m, 28 Feb 1974, *Steyermark, J.A. 109828* (F,US).

164. *P. herthae* Diels, Notizbl. Bot. Gart. Berlin 15: 374. 1941. Type: Ecuador: Pastaza, Río Negro, primärer Sumpfwaldstreifen unter dem Steilufer des Pastaza, 1200 m, 3 Jul 1938, *Schultze-Rhonhof, H. 2584* (holotype B, destr.).

A species similar to *P. williamsii* considering their partially coincident geographic distribution and the overall size of the leaves (up to 22 x 10 cm) and floriferous shoots (9-11 cm). However, it differs from that taxon because it has more narrow oblong leaves, slightly falcate, coriaceous in texture, with higher number

(10-11) and density of secondary veins and secondaries conspicuously raised below and relatively straight along their lower half trajectories. The racemes are thicker and tend to be erect.

Its type collection was destroyed in Berlin during the Second World War and not duplicates have been found so far.

**Distribution.** Endemic to a small mid elevation area in the middle of Ecuador corresponding to the Amazonian slope of the Andes along the mid-course of the Pastaza River.

**Elevation range.** 1130 – 1200 m.

**Material examined.** (3) **ECUADOR. Pastaza:** Mera, 1130 m, 25 Jun 1968, *Harling, G.* 9929 (GB,MO,NY,QCA); 5 km northeast of Mera, carretera al Río Ansu, 1200 m, 2 Mar 1985, *Neill, D.* 5882 (MO,NY,QCA,QCNE,QCNE,US); ibidem, 1200 m, 13 Mar 1985, *Palacios, W.* 121 (MO, NY, QAME, QCA, QCNE, US).

165. *P. lichoana* G.Aymard, *BioLlania* 6: 451. 1997. Type: VENEZUELA. Amazonas: Atabapo. Forested slope of Marahuaca. 1 to 2 km north of Sima Camp, 1100 m, 8 Mar 1985, *Liesner, R.* 18457 (holotype, VEN; isotype, MO)

It can be recognized because the elliptic-oblong chartaceous leaves, 14.5-18.5 x 5.5-7.5 cm, lustrous on both sides, with petioles 8-10 cm long, base rounded to obtuse, apex acuminate, venation pattern weak brochidodromous, secondary veins (9-10) arcuate emerging at 60-70 degrees from the midrib and parallel to the margin along their last quarter, intersecondaries around half as long as secondaries, tertiaries irregular reticulate, lateral veins slightly prominent below and impressed above, minor veins reticulate and conspicuous below and 2 glands located on the first pair of secondary veins at 6-8 mm from the base and

3-4 mm from the midrib. The fruiting racemes are 8.5-11 cm long, the fruits are slightly oblate, 10-12 x 13-15 mm.

The collection *Steyermark 130578* cited as paratype corresponds to another species (here "*P. sp. nov. gran-sabana*") easily separable because its lower number of secondary veins (7-8), the venation pattern more conspicuously brochidodromous, the more obscure minor veins and the more separated glands from the base. It can be confused with *P. integrifolia* because the size and shape of the leaves but in that taxon they are coriaceous, the glands are generally next to the midrib, the secondary veins generally emerge in a closer angle and are more prominent below and the fruits are ovate.

**Distribution.** Currently known only from the type specimen collected in a mid-elevation place part of the Guianas Shield highlands named Cerro Duida in southern Venezuela.

**Elevation range.** 1100 m.

166. *P. rotunda* Macbride, *Candollea* 5: 363-365. 1934. Type: Peru: Loreto, Mishuyacu, near Iquitos, 100 m, Jan 1930, *Klug, G. 797* (holotype F!; isotypes NY!, US!).

*Prunus detrita* Macbride, *Candollea* 5: 363-365. 1934. Type: Peru: Loreto, Mishuyacu, near Iquitos, 100 m, Feb 1930, *Klug, G. 1094* (holotype, F; isotype US!).

This species can be distinguished because its relatively big elliptic subcoriaceous leaves, 11.5-20 x 6-12 cm, lustrous above, and slightly lustrous below, with flexuous petioles 7-12 x 1.2-2 mm, base rounded and apex shortly acuminate, venation pattern weak brochidodromous, secondaries progressively arcuate emerging at 65-75 degrees from the midrib, 9-11, intersecondaries around half the length of secondaries, tertiaries sinuous percurrent and almost perpendicular to the midrib, and two sub-basal rounded to elliptic glands, 1-2 mm wide, placed at 2-6 mm from the base and 0-3 mm from the midrib. The floriferous shoots

are slender (0.7-1 mm thick), 4-5 cm long, the flowers are small, with pedicel 2.5-4 mm long, hypanthium ca. 2.5 mm wide and anthers 0.3-0.4 mm long. The fruits are oblate apiculate up to 11-13 x 12-14 mm.

The most similar species is *P. accumulans* which has smaller more coriaceous leaves with minute glands placed on the first pair of lateral veins and floriferous shoots sub-flexuous and usually clustered at the base of the last reiteration. The other widespread lowland species, *P. debilis*, differs because the thinner relatively dull chartaceous leaves, generally smaller, with less conspicuous major veins, smaller basal glands and slightly smaller fruits. Finally, *P. vana* has more elliptic elongated leaves, opaque below, and very short but thicker racemes.

**Distribution.** It is found in Amazonian lowlands from southern Colombia to northeastern Bolivia, mainly at the margins of white sand rivers or on lateritic soils.

**Elevation range.** 50 – 350 m.

**Local names.** jihui Xoco, jihuirononopa (Bolivia), tuogui-s+ge (Colombia), yoro forma caspi (Peru).

**Material examined.** (53) **BOLIVIA. Beni:** Alto Ivon, Chibolo, 200 m, Aug 1992, *Bergeron, S. 154* (LPB); Vaca Diez, Alto Ivon, 200 m, Aug 1992, *Bergeron, S. 628* (LPB); ibidem, 200 m, Feb 1993, *Bergeron, S. 854* (DAV,LPB); ibidem, 230 m, , *Boom, B.M. 1185* (LPB,MO,NY); ibidem, 200 m, 15 Apr 1984, *Boom, B.M. 5038* (F,GH,MO,NY,US). **BRAZIL. Amazonas:** Reserva Florestal Ducke, Manaus-Itacoatiara, km 26. Na entrada da reserva. Árvore, 80 m, 25 Jan 1995, *Assuncao, P.A. 166* (MO); Manaus, Estrada da Raiz, 50 m, 13 Feb 1945, *Ducke, A. 1690* (GH,NY,US); Manaus, 100 m, 19 Apr 1948, *Ducke, A. 2121* (COL,GH,NY); Sao Paulo de Olivenca, Rio Solimoes, 100 m, 16 Aug 1973, *Lleras, E. p 17353* (A,MO,NY,US); Reserva Florestal Ducke, Manaus-Itacoatiara, km 26, 80 m, 19 Apr 1996, *Lohmann, L.G. 73* (INPA,MO,US); Basin of Rio Negro. Road Camanaus-Uaupés near Camanaus, 100 m, 1 Nov 1971, *Prance, G.T. 15982* (MO,NY,US); Manaus sede do INPA, junto ao prédio da Fitoquimica, 100 m, 4 Apr 1975, *Rodrigues, W. 9596* (MO); Manaus, Campus do INPA, Aleixo proximo do Aquario do Peixe Boi, 100 m, 25 Mar 1993, *Rodriguez, W. 11073* (US); Manaus, 50 m, 11 Apr 1972, *Schultes, R.E. 26131A* (GH); Reserva Florestal Ducke, Manaus-Itacoatiara, km 26, 80 m, 27 Mar 1995, *Sothers, C.A. 370* (MO); Inpa,



Esterada de Aleixo, km. 3 , Manaus, near tracking station, 100 m, 26 Dec 1973, *Steward, W.C. 20109* (MO,NY,US).

**COLOMBIA. Amazonas:** La Pedrera, Isla Mariñame, margen izquierda Río Caquetá, 1 km arriba de la punta extrema occidental, 200 m, 15 Jun 1988, *Sánchez, M. 807* (COAH); **Caquetá:** Solano, Margen de río Mesay, a 2 km de la bocana de Yavilla (aguas abajo), 200 m, 17 Nov 1995, *Cárdenas, D. 8694* (COAH); ibidem, 200 m, 17 Nov 1995, *Cárdenas, D. 8698* (COAH); Chiribiquete, cuenca media del rio Cuñare, 200 m, 15 Nov 2000, *Mendoza, H. 10892* (FMB); PNN Chiribiquete, Cuenca alta del Rio Mesay, 350 m, 20 Jan 2000, *Mendoza, H. 14035* (FMB). **PERU.**

**Loreto:** Rio Nanay 6 km arriba de la comunidad de Pucaurco, 150 m, 10 Jul 2003, *Fine, P. 1031* (F); Maynas, near mouth of Río Gueppi, tributary of Río Putumayo, northern most tip of Peru on border with Ecuador, 200 m, 18 May 1978, *Gentry, A. 22084* (A,MO,USM); Mishana. Rio Nanay halfway between Iquitos and Santa Maria de Nanay, 140 m, 10 Jan 1983, *Gentry, A. 39322* (MO); ibidem, 140 m, 10 Jan 1983, *Gentry, A. 39337* (F,MO); Yanamono. Explorama Tourist Camp, Río Amazonas halfway between Indiana and mouth of Río Napo, 130 m, 1 Jul 1983, *Gentry, A. 42491* (F,MO); Requena, Dist. Jenaro Herrera, 150 m, 14 Mar 2005, *Huamantupa, I. 5921* (CUZ,MO); Near Iquitos, 100 m, Jan 1930, *Klug, G. 823* (NY,US); Maynas, Dtto. Iquitos. Carretera Quisto Cocha, from Quisto Cocha to Pena Negra, 100 m, 9 Jul 1974, *McDaniel, S. 19051* (MO); Dtto Iquitos. Carretera Iquitos-Nauta, cerca Varillal, km. 8-9, 120 m, 21 Aug 1987, *McDaniel, S. 29553* (MO,US); Dtto. Iquitos. Carretera de Peña Negra, 150 m, 18 Apr 1977, *Rimachi, M. 2950* (MO); Dtto. Iquitos. Carretera de Zungaro Cocha, trocha de una purma, cerca a la quebrada de Shushuna, 160 m, 16 Feb 1983, *Rimachi, M. 6573* (MO,TEX,US); Dtto. Iquitos. Carretera del Varillal, trocha del puesto "El Viroso", cerca al vivero forestal, 140 m, 1 Aug 1983, *Rimachi, M. 6835* (IBE,MO,US); Dtto. Iquitos. Carretera de Iquitos-Nauta, km 1.5, en monte abierto, 130 m, 24 Nov 1987, *Rimachi, M. 8432* (IBE,MO,USM); 2 km south of the village of Mishana at Rio nanay, 120 m, 13 Nov 1991, *Roukolainen, K. 2912* (USM); Mishana, 120 m, 13 Nov 1991, *Roukolainen, K. 2954* (USM); ibídem, 120 m, 13 Nov 1991, *Roukolainen, K. 2965* (USM); Varillal (carretera a Nauta), 130 m, 8 Jan 1981, *Vásquez, R. 1184* (DAV,MO,USM); Alpahuayo, (Km 25, carretera Dtto. Iquitos-Nauta). Estación IIAP, 150 m, 19 Oct 1984, *Vásquez, R. 5763* (MO,USM); ibidem, 150 m, 12 Nov 1984, *Vásquez, R. 5890* (BRIT,MEXU,MO,USM,USM); Dtto. Iquitos. Peña Negra, carretera Iquitos-Nauta, Km 20, 130 m, 26 Feb 1987, *Vásquez, R. 8842* (MO,NY); Dtto. Iquitos, varillal; carretera Iquitos- Nauta, 130 m, 13 Apr 1988, *Vásquez, R. 10553* (MO,MOLF,USM); ibidem, 130 m, 23 May 1990, *Vásquez, R. 13743* (BRIT,MEXU,MO); Dtto. Iquitos, Allpahuayo. Estación Experimental del Instituto de Investigaciones de la Amazonía Peruana - IIAP, 150 m, Nov 1990, *Vásquez, R. 14958* (DAV,MO); ibidem, 150 m, Dec 1990, *Vásquez, R. 15367* (MO); ibidem, 150 m, Dec

1990, *Vásquez, R. 15397* (DAV,MO); ibidem, 150 m, Dec 1990, *Vásquez, R. 15446* (MO); ibidem, 150 m, Dec 1990, *Vásquez, R. 15451* (MO); ibidem, 150 m, 23 Mar 1992, *Vásquez, R. 18015* (MO); **Madre de Dios**: Tambopata, Rio Bajo Madre de Dios - Northern margin of river several kilometers upriver of confluence of Rio Heath, 180 m, 20 Jul 2009, *Balarezo, A. 2628* (BRIT); Rio Bajo Madre de Dios - Northern margin of river several kilometers upriver of confluence of Rio Heath, Aguajal Bolivia, 200 m, 20 Jul 2009, *Balarezo, A. 2635* (BRIT). **VENEZUELA. Amazonas**: Neblina Base Camp, Rio Mawarinuma. Terra firme forest, 150 m, 1 Feb 1985, *Boom, B.M. 5495* (MO).

166a. *P. rotunda* var. nov. “*cucui-Brazil*”

A new variety of *P. rotunda* with longer petioles (15-20 mm long), acute to cuneate leaf bases, more coriaceous leaves and fruits globose rather than oblate and overall smaller (up to 11 mm across) compared with the typical material.

**Distribution.** Only known from a single collection in the lowlands of the eastern Guiana shield in the border among Brazil, Colombia and Venezuela.

**Elevation range.** 130 m.

**Material examined.** (1) **BRAZIL. Amazonas**: Rio Negro, road from Sao Gabriel da Cachoeira to Cucuí at km 153 from convent in Sao Gabriel da Cachoeira. West side of road below Sierra do Padre, 130 m, 28 Nov 1987, *Stevenson, W.D. 1091* (F,MO,NY,US).

166b. *P. rotunda* Macbride var. nov. “*igapo-Amazon*”

This new proposed variety of *P. rotunda* (compared with the typical specimens) has leaves generally smaller and narrower (9-11.3 x 4-5.3 cm), with two glands placed above the first pair of secondary veins at

5-11 mm from the base and 2-5 mm from the midrib (vs. basal to sub-basal and next to the midrib), venation pattern eucamptodromous-like, secondary veins more arcuate ascending and starting at a more acute initial angle (50-60 degrees), and fruiting racemes shorter ( 2-3.2 cm) with slightly bigger oblate fruits (12-13 x 9-11 mm).

**Distribution.** Central amazon region (Brazil) in black water flooded forests known collectively as Igapó.

**Elevation range.** 80 – 130 m.

**Local names.** uaru (Brazil).

**Material examined.** (3) **BRAZIL. Amazonas:** Reserva Florestal Ducke, Manaus-Itacoatiara, km 26, 100 m, 18 May 1988, *Coêlho, D.F. 58-D* (MO,NY); ibidem, 80 m, 15 Apr 1996, *Lohmann, L.G. 66* (COL,F); **Para:** missao Cururú, 130 m, 11 May 1977, *Rosa, R.A. 1900* (MO,NY,NY,US).

167. *P. sana* Macbride, *Candollea* 5: 363-363. (1934). Type: Peru: Cuzco, Paucartambo, Casñipata, 700 m, 5 May 1914, *Weberbauer, A. 6958* (holotype F!; isotypes US!, GH!, MOL!, S!, US!).

It can be recognized by the elliptic-oblong to slightly obovate coriaceous leaves, 11-19 x 4-7 cm, slightly lustrous above, with petioles 5-10 x 1.5-2.5 mm, base acute and slightly decurrent, apex acuminate, venation pattern weak brochidodromous and marginally festooned but appearing eucamptodromous, with 9-13 progressive arcuate secondary veins emerging at 50-60 degrees from the midrib, impressed above, prominent below, intersecondaries parallel to secondaries and half or more as long as them, tertiaries sinuous percurrent and little conspicuous, stipules linguiform, glands two, elliptic laterally truncate and crateriform, 2-3 mm long, basal or placed at 1-3 mm from the base. The floriferous shoots are 4-7 cm long, densiflorous, sub-erect; the flowers are relatively small, with pedicels 1.5-2.5 mm long, hypanthium

infundibuliform 1.5-2 mm wide, petals rotund of ca. 1.5 mm wide and anthers 0.3-0.4 mm long. Fruits subglobose, 12-14 x 12-15 mm with the ventral suture conspicuously depressed.

This species is similar to some other new species proposed here and discussed below; however, the combination of venation architecture (up to 13 secondary veins, eucamptodromous-like and relatively ascending) and gland details (basal elliptic, relatively big and laterally truncate) are diagnostic for this taxon.

**Distribution.** Distributed in Amazonian foothill forests from central and southern Peru.

**Elevation range.** 500 – 1050 m.

**Material examined.** (4) **PERU. Cusco:** Quispicanchis, Quincemil. Flora de Camanti-Marcapata, 750 m, 26 Apr 2008, *Chambi, B.R. 1058* (BRIT); Quispicanchis, District of Camanti. Tunquimayo River, 720 m, 7 Jan 2011, *Wells, J.D. 1237* (BRIT). **Pasco:** Oxapampa, Dist. Pozuzo. Zona de amortiguamiento del Parque Nacional Yanachaga-Chemillén, Sector Yulitunqui, 1050 m, 19 Jul 2006, *Monteagudo, A. 12408* (AMAZ,DAV,HUT,MO,MOL,USM); Dist. Palcazú. Reserva Comunal Yanasha, 500 m, 25 Jul 2008, *Rojas, R. 5918* (DAV,HOXA,HUT,MO,USM).

168. *P. schultzeae* Pilger, Notizblatt des Botanischen Gartens und Museums zu Berlin-Dahlem 14: 332. 1939. Type: Ecuador: Pastaza, Oriente, Canelos, 350 m, 1936, *Schultze-Rhonhof, H 2160* (sintype, B, destr.).

This species can be recognized by the elliptic-oblong chartaceous leaves, 10-18 x 3.8-7 cm, slightly asymmetrical, with petiole 9-12 mm long, base obtuse to acute and shortly decurrent, apex narrowly acuminate with mucronate midrib at the tip, venation pattern eucamptodromous-like, secondary veins progressively arcuate, 8-9, impressed on both sides, the intersecondaries short and perpendicular to the midrib, tertiaries sinuous percurrent and perpendicular to the midrib, and 2 elliptic-oblique glands up to 2

mm long sub-basal and next to the midrib (sometimes attached to it). The floriferous shoots are sub-flexuous to sub-erect, 4-8 cm long, the flowers have pedicels 2-4 mm long, hypanthium infundibuliform 2-2.7 mm wide and anthers 0.2-0.3 mm long. The fruits are oblate apiculate, 7-9 x 10-12 mm.

It can be easily confused with *P. debilis* (because the thin leaves, basal glands, slender racemes and lowland Amazonian distribution) but, *P. schultzeae* has narrower long acuminate leaves, with more conspicuous basal glands, longer and more erect floriferous shoots (up to 8 cm long), less flexuous floral pedicels, and smaller fruits. A collection from the Amazonian foothills in central-east Bolivia (*Nee 44939*), assigned to this species, is morphologically coincident except for the longer racemes. Future studies with additional collections of that area would confirm the identity of this odd record.

**Distribution.** This is a lowland species from the central-eastern foothills of the Andes in Ecuador growing mainly in the banks of the Napo River and its main tributaries.

**Elevation range.** 200 – 900 m.

**Local names.** capulí de monte, sindi panga, sindi yura, sindy, sunkipnum, yacu sindi muyu yura, yacu sindi yura (Ecuador).

**Material examined.** (47) **BOLIVIA. Santa Cruz:** Ichilo, 4 km WSW of El Hondo, "Potrerillo". Tropical semi-evergreen forest along Quebrada La Concha, 400 m, 14 Feb 1994, *Nee, M. 44939* (MO,NY). **ECUADOR. Morona Santiago:** Shiramentza, 412 km S Taisha, 300 m, 19 Jan 1977, *Ortega, A. 264* (US); **Napo:** Misahualli, along River Misahualli, 400 m, 12 Aug 1990, *Bennett, B. 4506* (QCNE); Río Coca, 3-4 km from the mouth, rastrojos, 250 m, 11 Feb 1974, *Harling, G. 11888* (GB,MO,QCA); Mishuallí. Rain forest in the surroundings of the junction Río Mishuallí - Río Napo, 500 m, 13 Aug 1979, *Holm-Nielsen, L.B. 19105* (AAU,MO); San Jose Paymino, 40 km W of Coca, 300 m, 10 Nov 1983, *Irvine, D. 306* (F,MO,NY,QCA,QCNE); ibidem, 320 m, 21 Apr 1984, *Irvine, D. 808* (F,QCA,QCNE); Entre Coca - Añangu aguas abajo, 220 m, 23 Feb 1989, *Jaramillo, J. 11247* (NY,QCA); Cotococha; about 1km west of Venecia and 25km east of Tena; on the south side of the Napo River, 450 m, 20 Jun 2003, *Landrum, L. 10738* (ASU,BRIT,MO); Ahuano at Río Napo, ca 25 km east of Puerto Napo, 375 m, 25 Mar 1969, *Lugo S., H.*

895 (GB,MO); Misahuallí at Río Napo, ca 12 km east of Puerto Napo, 430 m, 28 Mar 1969, *Lugo S., H. 912* (GB,MO); Ciudadela San José, in the vicinity of Tena, 600 m, 1 Apr 1969, *Lugo S., H. 966* (GB,MO); Puerto Napo, 420 m, 12 May 1972, *Lugo S., H. 2235* (GB,MO); Misahuallí at Río Napo, ca 12 km east of Puerto Napo, 450 m, 14 May 1972, *Lugo S., H. 2253* (MO); Río Pano, 6-7 km NW of Puerto Napo, 550 m, 20 May 1972, *Lugo S., H. 2377* (MO); Zatzayacu, 500 m, 22 Mar 1935, *Mexia, Y. 7060* (UC,US); ibídem, 500 m, 22 Mar 1935, *Mexia, Y. 7085* (F,MO,NY,UC,US); ibídem, 400 m, 22 Mar 1935, *Mexia, Y. 7123* (MO,NY,UC,US); Tena, alrededores del río Tena, 400 m, 2 Apr 1935, *Mexia, Y. 7199* (MO,NY,UC,US); Orellana, Yasuní National Park. Río Indillama, a small southern tributary of the Río Napo, at Comuna Pompeya, 260 m, 26 Aug 1992, *Neill, D. 10110* (MO,QCNE); Vía Coca - Loreto. 8 km. antes de Loreto, 440 m, 8 Jun 1987, *Palacios, W. 1630* (MO,QCA,QCNE); ibídem, 200 m, 23 Oct 1995, *Romoleroux, K. 1884* (F,QCA,QCNE); Tena, Márgenes del Río Pano, 500 m, 24 May 1995, *Tafur, V. 123* (MO); **Orellana:** la Joya de los Sachas Canton, Pompeya. Río Indillama, entre la desembocadura al Napo y el cruce de la carretera de MAXUS, 250 m, 13 Dec 1992, *Gudiño, E. 2119* (COL, DAV, LOJA, MO, NY, QCA, QCNE); **Pastaza:** Mera, Puyo-El Porvenir-Puyopungo road. Collections before Cotocachi, close to the river Puyo, 900 m, 3 Jun 1997, *Freire-Fierro, A. 2809* (MO); up Bobonaza, 600 m, 2 Sep 1951, *Fuller 71* (MO,NY); Veracruz (Indillama) - Cabeceras at Río Bobonaza, 700 m, 20 Jan 1971, *Lugo S., H. 1330* (GB,MO); ibídem, ca 12 km east of Puyo, 680 m, 22 Jan 1971, *Lugo S., H. 1344* (GB,MO); Cabeceras - Chiquita, at Río Bobonaza, south east of Cabeceras, 600 m, 25 Jan 1971, *Lugo S., H. 1363* (MO); Chiquita at Río Bobonaza, between Cabeceras and Canelos, 550 m, 27 Jan 1971, *Lugo S., H. 1375* (GB,MO); Puchu at Río Bobonaza, between Cabeceras and Canelos, 520 m, 2 Feb 1971, *Lugo S., H. 1395* (GB,MO); Puchu - Tolín, at Río Bobonaza, between Cabeceras and Canelos, 480 m, 4 Feb 1971, *Lugo S., H. 1407* (GB,MO); Tolín at Río Bobonaza, between Cabeceras and Canelos, 470 m, 6 Feb 1971, *Lugo S., H. 1418* (MO); Cuansha - Nalpi, at Río Bobonaza, between Cabeceras and Canelos, 470 m, 9 Feb 1971, *Lugo S., H. 1428* (MO); Ca 4 km east of Pacayacu on the Río Bobonaza, 420 m, 31 Oct 1974, *Lugo S., H. 4424* (GB,MO); Between Pacayacu on the Río Bobonaza and Canelos, 430 m, 3 Nov 1974, *Lugo S., H. 4430* (GB,MO,QCNE); Parayacu (Pacayacu), ca 10 km east of Canelos, 400 m, 8 Nov 1974, *Lugo S., H. 4508* (GB,MO,QCNE); Sarayacu on the Río Bobonaza, 370 m, 14 Aug 1979, *Lugo S., H. 5418* (MO,NY,QCNE); Sarayaquillo, c. 5 km N of Sarayacu, 450 m, 16 Aug 1979, *Lugo S., H. 5453* (MO,NY,QCNE); Palta Playa, 15 km N of Sarayacu, 490 m, 23 Aug 1979, *Lugo S., H. 5626* (GB,MO,QCNE); Teresa Mama on the Río Bobonaza, c. 35 km SE of Sarayacu, 380 m, 26 Aug 1979, *Lugo S., H. 5668* (MO,QCNE); 6 km S of Arajuno, 620 m, 6 Sep 1979, *Lugo S., H. 5797* (GB,MO,QCNE); 12 km N of Arajuno,

470 m, 9 Sep 1979, *Lugo S., H. 5805* (MO, QCNE); Llanchama, 230 m, 16 Oct 1996, *Ushigua 96-10-07* (QCA); Río Bobonaza, around houses between Huagracachi and Cachitama, below Montalvo, 300 m, 18 Jul 1980, *Øllgaard, B. 34605* (AAU, MO, TEX, US); Río Bobonaza, between Cachitama and the outlet of Río Bufeó, 300 m, 19 Jul 1980, *Øllgaard, B. 34681* (AAU, MO, TEX, US); **Sucumbíos**: Río Aguarico, 240 m, 6 Aug 1975, *Little-Jr, E.L. 72* (MO).

169. *P. vana* Macbride, *Candollea* 5: 362. 1934. Type: Peru: Junín, La Merced, wooded valley, 700 m, 29 May 1929, *Killip, E.P. 23772* (holotype, F!; isotypes, NY!, US!).

It can be recognized by the dark bark of the twigs with sparse minute lenticels, the elliptic subcoriaceous leaves, 9-15.5 x 4-6.7 cm, slightly lustrous above, with base obtuse to rounded and cuneate decurrent at the intersection with the petiole, apex acute to shortly acuminate, petioles relatively short, 4-7 mm long, margin revolute, venation pattern eucamptodromous-like, secondary veins ascending arcuate and emerging at 40-50 degrees from the midrib, slightly prominent below and plain above, pectinate basal veins present, minor veins relatively inconspicuous, and two sub-basal crateriform glands, ca. 1 mm diam., placed at 2-10 mm from the base and 0.5-3 mm from the midrib. The floriferous shoots are short, 2-3 cm long, in bud covered by conspicuous ochre bracts (cataphylls) of 2.5-3 mm length that have an abaxially raised midrib and an adaxial line of hairs that emerges at the apex as a mucron; the flowers have pedicels 2-4 mm long, hypanthium 1.5-2.3 mm wide and anthers 0.4-0.5 mm long. The fruits are oblate, slightly didymous, 10-11 x 12-14 mm with slightly fleshy mesocarp.

Romoleroux (1996) and Achá (2014) proposed this taxon as synonym of *P. debilis*. However, that species is distributed generally at lower elevation, it has membranous to chartaceous leaves with maculiform sub-basal glands, more conspicuous minor veins and longer flexuous racemes with smaller flowers.

**Distribution.** Distributed in the Andean Amazonian foothills from central Peru to northern Bolivia below 1000 m elevation.

**Elevation range.** 150 – 950 m.

**Material examined.** (5) **BOLIVIA. Beni:** Gral. Ballivian, Cumbre de la Serranía del Pilón Lajas, carretera Caranavi-San Borja, 25 km de Yucumo, 950 m, Jul 1990, *Smith, D.N. 14409* (MO). **PERU. Cusco:** La Convención, Dist. Echarate, carretera Kiteni Cumpiroshato, 600 m, 24 Aug 2006, *Valenzuela, L. 7657* (CUZ,DAV,HUT,MO,USM); Distrito Echarate, Kepashiato, Puguientimari-Pomoreni, 853 m, 23 Mar 2007, *Valenzuela, L. 9390* (AMAZ,CUZ,DAV,HUT,MO,MOL,USM); **Madre de Dios:** Tambopata, Distrito Las Piedras, Reserva Amazónica, Trocha D, Aguajal, 150 m, 13 Jul 2007, *Valenzuela, L. 9845* (CUZ,DAV,HUT,MO,USM).

170. *P. williamsii* Macbride, *Candollea* 5: 364. 1934. Type: Peru: San Martín, San Roque, 1350 m, 14 Jan 1930, *Williams, L.l. 7396* (holotype F!, isotypes G!, US!).

This is a big size tree (up to 28 m high) that can be distinguished by the wide chartaceous elliptic oblong leaves, 15-23 x 7-10 cm, slightly lustrous above, with petioles 8-15 mm long, base obtuse to rounded and shortly decurrent at the end, apex shortly acuminate, venation pattern weak brochidodromous anastomosing submarginally by transverse straight percurrent veins (4-7 mm long), secondaries arcuate, 8-10, tertiaries alternate percurrent, and 2 basal or sub-basal glands placed up to 2 mm from the base and attached to the midrib. The floriferous shoots are up to 10.5 cm long, relatively flexuous; the flowers have long and slender pedicels, 7-10 x 0.5-0.7 mm, hypanthium 2-2.5 mm wide and anthers 0.4 mm long. The fruits are sub-globose 11-13 mm wide.

It is similar to *P. herthae* which, however, has denser and more protruding secondary veins and more rigid floriferous shoots. It also has been confused in herbarium determinations with *P. amplifolia* which is



distributed at lower elevation in the Bolivian yungas and has wider leaves with shorter petioles, more intricate minor venation and shorter racemes with smaller flowers overall.

**Distribution.** Mid-elevation humid forests in the Amazonian slope of the northern Andes (between southwestern Colombia and northern Perú).

**Elevation range.** 1000 – 1750 m.

**Local names.** aputinkimi, sake, urcusindy (Ecuador).

**Material examined.** (29) **COLOMBIA. Caquetá:** San Vicente Del Caguan, Cuenca del Rio Pato, 1500 m, 15 Nov 1997, *Mendoza, H. 4503* (FMB); ibidem, 1300 m, 15 Nov 1997, *Mendoza, H. 4909* (FMB); **Putumayo:** Puerto Asís, Cuenca alta de los rios Rumiayaco-Ranchería, 1000 m, 7 Sep 1998, *Mendoza, H. 6666* (COAH,FMB); **ECUADOR. Morona-Santiago:** Cordillera del Cóndor, valle del Río Coangos, Río Tsurim entre los centros Shuar de Numpatkaint y Banderas, 1100 m, 21 Oct 1999, *Fuentes, P. 1116* (MO,QCNE); ibidem, 1100 m, 21 Oct 1999, *Fuentes, P. 1176* (MO,QCNE); **Napo:** Cantón Archidona. Faldas al sur del Volcán Sumaco, carretera Hollín-Loreto, km 31, comuna Challua Yacu, 1200 m, 15 Nov 1988, *Alvarado, A. 70* (MO,QCNE); Huamani Centro Calluhua Yacu, 31 km E of Tena-Baeza Road, on new road to Coca, 1150 m, 24 Dec 1988, *Gentry, A. 64093* (MO,NY); Parque Nacional Sumaco-Galeras, southern slope of Sumaco volcano, 1750 m, 17 Oct 2005, *Homeier, J. 1909* (DAV,QCNE); ibidem, 1500 m, 19 Mar 2008, *Homeier, J. 3357* (DAV,GOET,MO,QCA,QCNE); Parque Nacional Sumaco-Galeras, Rio Hollin watershed, 1490 m, 27 Mar 2008, *Homeier, J. 3492* (GOET,MO,QCA,QCNE); area of the Narupa reserve, Rio Hollín watershed, 1190 m, 14 Apr 2008, *Homeier, J. 4000* (DAV,GOET,MO,QCA,QCNE); 3 km este del Caserío de Huamaní, al norte de la carretera Hollín- Loreto, por una trocha, 1200 m, 17 Sep 1988, *Hurtado, F. 254* (F,MO,NY,QCNE); ibidem, 1200 m, 17 Sep 1988, *Hurtado, F. 315* (MEXU,MO,QCNE,TEX,US); Carretera Hollín-Loreto, km 40-50, alrededores de la comunidad Huamaní y del Río Pucuno, 1200 m, 10 Oct 1988, *Hurtado, F. 723* (BRIT,JAUM,MO,QCNE); Carretera Hollín-Loreto, km 25. Centro Challuayacu, en trocha hacia la zona del Guagua Sumaco, 1230 m, 10 Nov 1988, *Hurtado, F. 904* (MO,QCNE); ibidem, 1230 m, 10 Nov 1988, *Hurtado, F. 916* (MO,QCNE); ibidem, 1230 m, 10 Nov 1988, *Hurtado, F. 964* (GH,MO,QCNE); Cantón Archidona. Challuayacu. Carretera Hollín-Loreto, km 25-Km 31, 1230 m, 15 Dec 1988, *Hurtado, F. 1155* (MO,QCNE); Cantón Archidona,

faldas al sur del Volcán Sumaco. Carretera Hollín-Loreto, Km 31, Comuna Challua Yacu, 1200 m, 22 Apr 1989, *Hurtado, F. 1831* (MO); ibidem, 1200 m, 22 Apr 1989, *Hurtado, F. 1921* (MO); ibidem, 1200 m, 14 Sep 1989, *Hurtado, F. 2463* (MO); ibidem, 1200 m, 14 Sep 1989, *Hurtado, F. 2490* (MO); Vía Hollín-Loreto, a 3 km después del Río Hollín, 1200 m, 16 Jan 1989, *Palacios, W. 3839* (MO, QCNE); Cantón Archidona, faldas al sur del Volcán Sumaco. Carretera Hollín-Loreto, km 31, Comuna Challua Yacu, 1200 m, 4 Oct 1989, *Palacios, W. 4551* (MO, QCNE); El Chaco, Tres Cruces, entre los Ríos Santa Rosa y El Salado, Quebrada Osayacu, afluente del Río Salado, 1600 m, 14 Oct 1990, *Palacios, W. 6255* (MO, QCNE); **Sucumbíos**: Lumbaqui, 1000 m, 15 Aug 1975, *Little-Jr, E.L. 203* (QCNE). **PERU. Amazonas**: Dtto. Vista Alegre, entre Vista Alegre y La Ventana a Naciento del Río Negro, 1500 m, 2 Jul 1998, *Sanchez Vega, I. 9607* (F, MO); **Cajamarca**: San Ignacio, Dist. Huarango. Caserío Selva Andina, trocha del conducto de agua, 1616 m, 19 Aug 2006, *Perea, J. 2762* (AMAZ, DAV, HUT, MO, MOL, QCNE, USM).

170a. *P. williamsii* Macbride var. nov. “*condoriense*”

This new proposed variety differs from the typical collections of *P. williamsii* because the more coriaceous and slightly smaller leaves (11.5-18.5 x 4.5-7.8 cm) with more prominent secondary and tertiary veins, the latter more densely arranged in a percurrent way. The floriferous shoots are slightly shorter (8-10 cm long), erect and more densiflorous, with the flowers smaller overall and the pedicels no longer than 5 mm.

**Distribution.** Known from mid-elevation forests in the Cordillera del Condor, the Narupa reserve in the province of Napo and Moyobamaba in San Martin (Peru).

**Elevation range.** 1090 – 2000 m.

**Material examined.** (5) **ECUADOR. Morona-Santiago**: Gualaquiza, Cordillera del Cóndor. Valle del Río Quimi, orillas del Río Quimi, 1090 m, 13 Dec 2000, *Cuascota, M. 292* (DAV, MO, QCNE); Cordillera del Cóndor.

Valley of Río Quimi, 1300 m, 10 Dec 2000, *Neill, D.* 12945 (DAV,MO,QCNE); **Napo**: area of the Narupa reserve, Rio Hollín watershed, 1180 m, 13 Apr 2008, *Homeier, J.* 3985 (DAV,GOET,MO,QCA,QCNE); **Zamora-Chinchi**: Cresta de la Cordillera del Cóndor en la frontera Ecuador - Perú, 1 Km al sur del destacamento militar Cóndor Mirador, 2000 m, 15 Dec 2000, *Ramírez H.; Wagner 35* (MO). **PERU. San Martín**: Moyobamba, Zepelacio, near Moyobamba, 1200 m, Mar 1934, *Klug, G.* 3613 (A,F,GH,MO,US).

171. *P. wurdackii* C.L. Li, Biollania, Ed. Espec. 6: 451. 1997. Type: Venezuela: Bolivar, Torono Tepui, Chimantá Massif, north facing slopes on summit above valley of Caño Mojado, 2030-2150 m, 21 Feb 1955, *Steyermark, J.A. & Wurdack, J.J.* 1016 (holotype, NY!; isotypes US!, VEN!).

This species can be recognized because the relatively big elliptic-oblong thick-coriaceous leaves, 11-20 x 5-9 cm, pale below when dry, with petiole 8-14 x 1.5-2.5 mm, base rounded to truncate turning decurrent down to half the petiole, apex obtuse, weak brochidromous venation pattern, secondary veins arcuate, 10-11, emerging at 60-70 degrees from the midrib, slightly prominent below and plain above, minor veins little conspicuous, and two big glands, 1.2-2 mm diam., located on the first secondary vein pair at 7-20 mm from the base (but in some leaves only one or absent). The floriferous shoots are subflexuous, 4-6 cm long; the flowers have very short pedicels, 2-3 mm long, hypanthium 2-3 mm wide and anthers ca. 0.5 mm long.

Aymard and Li (1997), found this species related to *P. espinozana*; however, that taxon has rigid coriaceous smaller leaves with close to basal glands and longer rigid fruiting racemes. From the Amazon lowlands, *P. rotunda* can have similar leaf size, but it has thinner leaf texture, 2 sub-basal glands, and shorter flexuous racemes with small flowers.

**Distribution.** Only known from the summit and slopes of the Chimantá massif, a sandstone rocky outcrop located in the northwestern edge of the Gran Sabana region of the Venezuelan Guiana shield.

**Elevation range.** 1500 – 2150 m.

**Material examined.** (3) **VENEZUELA. Bolivar:** Bolivar, Torono Tepui, Chimantá Massif, summit, along caño mojado, between base of upper falls and drop to escarpment, *Steyermark, J.A. 1068* (F, NY, US, VEN).  
Venezuela: Bolívar, ptari tepuí, southwest slope, *Maguire, B. 33898* (US, VEN).

### **New identified species from Amazonian and northern South America lowlands (18)**

172. *P.* sp. nov. (“*aff-amplifolia-Yasuni-ECU*”)

A new species characterized by the oblong-ovate to oblong-elliptic subcoriaceous large sized leaves, 17-22 x 6-10 cm, slightly falcate, relatively opaque on both sides, with petioles deeply sulcate, 10-13 mm long, base acute to cuneate, apex acute to attenuate, venation pattern eucamptodromous-like, secondaries progressively arcuate, tertiaries sinuous percurrent and little conspicuous, and two slightly raised glands (ca. 2.5 x 1 mm diam.) placed laterally on the midrib at the junction with the petiole. The flowers are unknown so far. The fruiting shoots are 6-7 cm long, relatively erect and the fruits are oblate, 13-14 x 11-12 mm, with thin endocarp and the suture groove relatively raised at the edges.

It can be confused with *P. williamsii*, but that species has thinner leaves with more conspicuous veins below. Its big leaves can resemble *P. amplifolia*, but that species is distributed further south in Peru, it has shorter petioles, thinner leaves with more prominent secondaries and tertiaries and smaller fruits. On the other hand, *P. rotunda* has generally smaller ovate-elliptic leaves, less coriaceous, with base rounded, more visible major and minor veins below and two smaller circular glands located sub-basal and frequently unattached to the midrib.

**Distribution.** Distributed in humid lowlands of the Amazonian basin in central Ecuador in a region mostly included in the National Natural Park of Yasuni and rich in oil deposits (Bass et al., 2010).

**Elevation range.** 230 – 365 m.

**Local names.** bere deyo guemo, coemuhue, cohuenmonhue, cuemu (Ecuador).

**Material examined.** (17) **ECUADOR. Napo:** Orellana, Parque Nacional Yasuní. Carretera y oleoducto de Maxus en construcción, Km 54-58, 250 m, 26 Sep 1993, *Aulestia, M. 680* (MO, QCNE); ibidem, Km. 47-48, 250 m, 22 Nov 1993, *Aulestia, M. 1252* (MO, NY, QCA, QCNE); ibidem, Km 54, 250 m, 18 Sep 1993, *Dik, A. 545* (AAU, MO, NY, QCA, QCNE); ibidem, km 8, 250 m, 18 Oct 1993, *Grijalva, A. 673* (MO, MO, QCNE); Yasuni National Park. Kms 14-15 of the Maxus/YPF pipeline road. E of Juan Tapuy's finca, 250 m, Oct 1997, *Pitman, N. 1572* (MO, QCA, QCNE); **Orellana:** Aguarico, Reserva Etnica Huaorani. Carretera y oleoducto de Maxus en construcción, Km 61. Al sur del río Tivacuno, 250 m, 26 Oct 1993, *Aulestia, M. 1110* (MO, QCNE); La Joya de los Sachas, (Orellana) Parque Nacional Yasuní. Carretera y oleoducto de Maxus en construcción, km 45, 230 m, 8 Aug 1993, *Dik, A. 149* (MO, QCA, QCNE); ibidem, 230 m, 8 Aug 1993, *Dik, A. 180* (MO, QCA, QCNE); Aguarico, Reserva Etnica Huaorani. Carretera y oleoducto de Maxus en construcción, Km 1-3, vía pozo Iro, 249 m, 1 Oct 1994, *Dik, A. 1595* (MO, QCA, QCNE); Parque Nacional Yasuní. Carretera Pompeya Sur - Iro Km 114,1, en territorio de la comunidad Huaorani de Dicaro, 250 m, 10 Mar 1998, *Macía, M.J. 2755* (QCNE); Plano inundable km 32.4 carretera pompeya Iro, 250 m, 15 Mar 1998, *Macía, M.J. 2816* (QCA); km 41 carretera Pompeya-Iro, 250 m, 6 Jun 1997, *Yáñez, A.P. 2086* (QCA); **Pastaza:** Pastaza, Pozo petrolero "Corrientes" de UNOCAL. 35 km al suroriente de Curaray, 320 m, 1 Sep 1990, *Espinoza, S. 319* (MO, QCNE); Pozo petrolero "Namoyacu" de UNOCAL. 30 km al sur del pueblo de Curaray, 290 m, 13 Nov 1990, *Espinoza, S. 570* (AAU, CR, MEXU, MO, NY, QCNE); Via Auca, 115 km south of Coca, near Río Tiguino, 320 m, 13 Feb 1989, *Neill, D. 8905* (MO, QCNE); Pozo petrolero "Danta 2" de UNOCAL. 50 km al sursureste de Curaray, 365 m, 1 Oct 1990, *Rubio, D. 765* (AAU, MO, QCA, QCNE); Pozo petrolero "Garza" de TENNECO. 35 km (aprox.) al noreste de Montalvo, 260 m, 2 Jul 1989, *Zak, V. 4529* (MO, QCNE).

173. *P. sp. nov.* (“*aff.debilis-OrinocoBasin-Venezuela*”)

This new taxon has elliptic chartaceous leaves, 9-15 x 4.2-7.3 cm, lustrous above, with petioles 7-10 x 0.8-1.1 mm, base obtuse to acute and shortly decurrent, apex acute, venation pattern weak brochidodromous, secondary veins (7-8) arcuate and emerging at 50-60 degrees, intersecondaries half to 3/4 as long as secondaries, tertiaries sinuous percurrent and almost perpendicular to the midrib, and 2 glands placed on the first pair of secondary veins 12-20 mm from the base and 1-4 mm from the margin (sometimes absent or just 1 present). The flowering shoots are sub-erect, 5-6.5 cm long; the flowers have pedicels 1.5-3.5 mm long, hypanthium campanulate 2-2.8 mm wide and anthers 0.4-0.6 mm long. The fruits are globose, ca. 10 mm wide.

It is close to *P. ocellata*, but that species has smaller leaves and flexuous racemes. Also, could be confused with *P. debilis* which however have leaves with less arcuate secondary veins, glands next to both the base and the midrib and racemes flexuous with minute smaller flowers.

**Distribution.** Distributed in lowland and low mid-elevation forests of the foothills of the Andes surrounding the Orinoco River basin in eastern Colombia and western Venezuela.

**Elevation range.** 200 – 1200 m.

**Local names.** durazno (Colombia).

**Material examined.** (10) **COLOMBIA.** **Boyacá:** Pajarito, 1200 m, 5 Jun 1997, *Mendoza, H. 3486* (FMB); **Meta:** Reserva Nacional de La Macarena, Margen izquierda del río Guayabero, al pie de las mesetas del sur, frente a la confluencia del caño Losada, 300 m, 5 Mar 1959, *Jaramillo-Mejía, R. 2133* (COL); Restrepo, 600 m, 1981, *Mahecha, G. 15* (UDBC); Puerto Lopez, Finca El Naranjal, 230 m, Apr 1997, *Quiceno, M.P. 158* (COAH); Villavicencio, Villavicencio, Predios de UNILLANOS, 450 m, 26 Apr 1995, *Rincón, R. 450* (COL). **VENEZUELA.** **Barinas:** La Soledad. Carretera Santo Domingo-Barinitas, 800 m, 2 May 1980, *Marcano-Berti, L. 74-980* (MO,NY); Orillas del río Zulia, carretera rural Santa Barbara - Los Diques. Santa Barbara de Barinas, 200 m, 1 Jun 1989, *Valverde, L. 1158* (MO,NY); **Miranda:** San Antonio de los Altos, 1200 m, Dec 1940, *Tamayo, F. 1504* (F,US);

**Tachira:** 10 km E of La Fundación (13-23 km by road), around Represa Dorada, 750 m, 10 Mar 1981, *Liesner, R.* 10266 (MO,NY); Rubio, 1100 m, 7 Dec 1979, *Marcano-Berti, L.* 545-979 (NY).

174. *P.* sp. nov. (“*aff.debilis-sucumbios-Ecuador*”)

This new taxon can be distinguished by the elliptic-lanceolate chartaceous leaves, 13-14 x 4-5 cm, slightly falcate, drying with a light reddish tone, with petioles 8-11 x 1.2-1.5 mm, base acute to obtuse and apex acuminate, venation pattern eucamptodromous-like, secondary veins emerging at 55-70 degrees from the midrib, intersecondaries almost perpendicular to the midrib, tertiaries sinuous percurrent, and 2 glands located at 2-4 mm from the base on the first pair of secondary veins. The floriferous shoots are suberect, 2-2.5 cm long x 0.6-0.8 mm thick; the flowers have pedicels 3-3.5 mm long, hypanthium 1.8-2.5 mm wide and anthers 0.3-0.4 mm long. The fruits are oblate, 10-12 x 12-14 mm.

Morphologically similar to *P. debilis*, a lowland Amazonian species with overlapping geographic distribution; but in this new species the leaves are thicker, more narrowly acuminate at the apex, with secondary veins more numerous and arranged in an eucamptodromous-like pattern, and longer sub-erect racemes with thicker axes and bigger flowers.

**Distribution.** Distributed in lowland non-inundated Amazonian forests of eastern Ecuador and northern Peru.

**Elevation range.** 200 – 275 m.

**Local names.** sindi panga (Ecuador), sunkímia (Peru).

**Material examined.** (5) **ECUADOR. Pastaza:** Rio curaray, Río Curaray; boca del Río Namoyacu, 275 m, 14 Aug 1985, *Neill, D.* 6655 (AAU,MO,NY,QCA,QCNE,US); **Sucumbíos:** Rio Way si ayá, 5 km upstream from Río Aguarico, 260 m, 10 Aug 1981, *Brandbyge, J.S.* 33398 (AAU,MO,US); Reserva de Produccion Faunistica Cuyabeno,

1 km north of Laguna Grande, 265 m, 4 Jan 1988, *Valencia, R. 67540* (AAU,QCA). **PERU. Loreto:** Maynas, Río Gueppi, tributary of Río Putumayo, northern most tip of Peru on border with Ecuador, 200 m, 14 May 1978, *Gentry, A. 21832* (F,MO,USM); Loreto, Nueva Jerusalem and vicinity, Río Macusari, 250 m, 10 Jun 1986, *Lewis, W.H. 10983* (MO,USM).

175. *P.* sp. nov. (“*aff.lichohana-granSabana-Venezuela*”)

This species can be distinguished by the coriaceous oblong leaves, 11-17 x 4-5.8 cm, slightly asymmetric, very lustrous above and slightly lustrous below, with base obtuse to acute and shortly decurrent, apex acute to attenuate, venation pattern brochidodromous, secondary veins, 8-9, irregularly spaced, arcuate and emerging at 60-70 degrees from the midrib, slightly prominent below, tertiaries alternate percurrent and little conspicuous, and 2 glands placed at 4-12 mm from the base and 1-6 mm from the midrib. The floriferous shoots are 4-5.5 cm long; the flowers have pedicels 3.5-5 cm long, hypanthium 2.2-2.5 mm wide and anthers 0.3-0.4 mm long. The fruits are globose, 9-10 mm wide.

Close to *P. accumulans* but that taxon has leaves more elliptic, the secondary veins are less ascending, the petioles are shorter, and the flowering shoots are generally aggregated on older reiterations. On the other hand, *P. lichohana* has larger sub-coriaceous leaves with more secondary veins and conspicuous intersecondaries. This species includes material designated originally as paratypes of *P. lichohana*.

**Distribution.** Sparsely distributed in riparian forests, sandstone savannas of central and eastern Venezuela and the northern part of the state of Bahia in Brazil.

**Elevation range.** 300 – 1140 m.

**Local names.** waeripu dau (Venezuela).



**Material examined.** (6) **BRAZIL. Bahia:** Senhor do Bonhim: Varzinha, estrada para a cidade, 743 m, 30 Oct 2005, *Conceição, S.F.* 293 (MO). **VENEZUELA. Amazonas:** Upper reaches of poñoto (caño Lapita), left bank tributary of upper Cua river, 300 m, 14 Jul 1986, *Zent, S.* 0786-34 (MO); **Bolívar:** Carretera El Dorado - Santa Elena de Urien, 14 km de la piedra de la virgen, 900 m, 26 Jan 1981, *Marcano-Berti, L.* 49-981 (NY); Distrito Cedeño: Planicie aluvial, piedemonte y altiplanicie entre el margen derecho del Río Orinoco medio y el borde NW de la Serrania de Los Pijiguaos (Bajo Río Suapure), 600 m, May 1987, *Ramírez, J.* 33 (MO); ibidem, 600 m, May 1987, *Ramírez, J.* 79 (MO).

176. *P.* sp. nov. (“*aff.sana-quispicanchis-Peru*”)

This new species can be distinguished by the twigs bark colored when dry either light brown or cream, the elliptic-oblong coriaceous leaves, 17-20 x 6.5-8 cm, with stipules linguiform 4-5 x ca 3 mm, petioles 7-10 mm long, venation pattern weak brochidodromous, 9 secondary veins arcuate, intersecondary veins less than half the length of secondaries and emerging almost perpendicular to the midrib, tertiary conspicuous and relatively percurrent reticulate, and 2 half elliptic (limited by the midrib) basal to sub-basal glands up to 3 mm long and bordering the midrib. The fruiting shoots are up to 7 cm long, the fruits are obovate apiculate, 12-14 x 13-16 mm, with the ventral suture depressed.

It is similar to *P. sana*, but it can be differentiated from that because the larger leaves, the longer petioles, the secondary veins more conspicuously brochidodromous and the longer fruiting shoots.

**Distribution.** Only known from two collections in lowland humid forests of the Amazonian foothills of the central Andes of Peru (Province of Quispicanchis, Department of Cusco).

**Elevation range.** 450 – 643 m.

**Material examined.** (2) **PERU.Cusco:** Quispicanchis, Hills around Río Araza between Pande Azucar and Quince Mil Airport. Forests 292 km from Cusco, 643 m, 10 Aug 1991, *Núñez, P. 13989* (DAV,MO); Dist. Camanti, Quincemil, 450 m, 17 Dec 2007, *Valenzuela, L. 10665* (DAV,MO).

177. *P.* sp. nov. ("*aff.sana-Smith1600m*")

This new species has ovate-elliptic coriaceous leaves, 14-16 x 5.5-6.5 cm, with petioles 6-9 x 1.5-2 mm, venation pattern weak brochidodromous, secondaries progressively ascending and emerging at 50-60 degrees from the midrib, tertiary veins percurrent, lateral veins slightly prominent below, and 2 inconspicuous elliptic crateriform glands basal or sub-basal and attached to (and truncate by) the midrib. The floriferous shoots are suberect, 3.5-4 cm long; the flowers have pedicels 1.5-2 mm long and hypanthium campanulate, 1.7-2.2 mm wide. The fruits are oblate to didymous, apiculate, 11-14 x 12-15 mm.

It is close to *P. sana*, but this new species is distributed at higher elevations, its leaves are elliptic-ovate with less secondary veins (7-8 vs. 9-10) that emerge in a more open angle, the glands are smaller and crateriform (1.5-2 mm long) not configuring a gland field at the base of the blade, the racemes are suberect, less densiflorous and the flowers are slightly bigger.

**Distribution.** Narrowly distributed in some mid-elevation moist forests of the province of Oxapampa (Department of Pasco) in the Amazonian slope of the central Andes of Peru.

**Elevation range.** 1200 – 1600 m.

**Material examined.** (6) **PERU. Pasco:** Oxapampa, Distrito Palcazu. Bosque de proteccion San Matias-San Carlos. Bosque Secundario Sector Union-Shimakii, 1350 m, 3 Jul 2003, *Monteagudo, A. 5688* (AMAZ,DAV,HUT,MO,MOL,USM); Distrito Villa Rica. Cerro el ascensor. Bosque de Proteccion San Matias-San Carlos. Bosque secundario, 1355 m, 3 Jul 2003, *Perea, J. 0121* (AMAZ,DAV,HUT,MO,MOL,USM); Distrito Villa

Rica. Localidad Centro Bocaz, camino y trocha a Purus, 1590 m, 19 Sep 2003, *Perea, J. 364* (DAV,MO); Villa Rica-Yesú road, 1600 m, 28 Dec 1983, *Smith, D.N. 5429* (GH,MEXU,MO,MOLF,NY).

178. *P. sp. nov.* (“*brevistylina*Li-Peru”)

This new taxon is characterized by the dark bark on the twigs sparsely covered with minute lenticels, the elliptic-lanceolate chartaceous leaves, 11-13.5 x 4.5-6.4 cm, with base rounded to obtuse and deeply decurrent at the end, apex acuminate, venation pattern weak brochidodromous and festooned, secondaries arcuate, 7-8, with the inner loop anastomosing at 8-10 mm from the margin, intersecondaries very faint and 1/3 or less as long as the secondaries, tertiaries sinuous percurrent, branching excurrently and perpendicular to the midrib, and 2 very tiny crateriform glands placed at the very base of the leaves laterally on the petiole (ca. 0.5 mm) plus 1 or 2 pairs of supplementary laminar glands placed either on or between the secondary veins on the outer quarter of the blade. The floriferous shoots are frequently agglomerated at the base of the last reiteration, 3-5 cm long, the flowers are up to 4 mm across with hypanthium deeply campanulate 2-2.5 mm wide, pedicels 3 mm long and anthers 0.3-0.4 mm.

Similar to *P. guanaiensis* and *P. pearcei* because the presence of basal glands and relatively inconspicuous lateral veins, but in *P. "brevistylina"* the secondary venation anastomoses distanced from the margin, the tertiary veins are percurrent, the racemes are shorter, and the flowers are much smaller. Also, superficially similar to *P. wurdackii* from the Venezuelan Guiana, which however has more coriaceous leaves with 2 not basal glands and longer racemes with larger flowers.

**Distribution.** Only known from two collections in the Rio Pozuzo region in Peru in the transition between lowland and mid-elevation forests.

**Elevation range.** 1000 – 1100 m.

**Material examined.** (2) **PERU.** Sine loco, 1862, *Matheus 1201* (MO); Pozuzo, Rio Pozuzo, entre Cueva blanca y la Colonia Alemana, 1000 m, 4 Jul 1913, *Weberbauer, A. 6747* (A,F,GH,MOL,PH,US).

179. *P.* sp. nov. (“*cedeño-aff.ocellata-Venezuela*”)

This new species is characterized by the elliptic chartaceous to subcoriaceous leaves, 9.5-11.8 x 4.2-5.5 cm, slightly lustrous above, with petiole 7-10 x 0.8-1 mm, brochidodromous festooned venation pattern, secondary veins arcuate, prominent below and plain above, tertiaries alternate percurrent, and 2 minute glands (0.4-0.7 mm across) placed on the second pair of secondary veins at 7-14 mm from the base. The floriferous shoots are suberect, 1.5-3 cm long; the flowers have pedicels 1.5-2.5 mm long, hypanthium turbinate 1.5-2 mm wide and anthers 0.5-0.6 mm long. The fruit is subglobose, apiculate, 10-12 mm wide.

This taxon is similar to *P. ocellata* which has smaller leaves with larger glands (ca. 2 mm across) placed upper in the blade, lateral veins prominent below, and additionally, flexuous racemes.

**Distribution.** Distributed in sandstone outcrops of the Guianas Shield from central Venezuela (state of Bolivar) to French Guiana.

**Elevation range.** 250 – 1610 m.

**Material examined.** (7) **FRENCH GUIANA.** Saul, Layon vers la crique Limonade, 250 m, 21 Dec 1972, *de Granville, J.J. B 4646* (NY,P); **L’Inini:** Mount Atachi Bacca, Nord du plateau sommital, 11 km au SE de Gobaya Soula, Environs du camp 3, 750 m, 18 Jan 1989, *de Granville, J.J. 10765* (NY,US). **GUYANA. Cuyuni-Mazaruni:** Mt. Maringma, plateau below summit escarpment, 1610 m, 19 Jun 2004, *Clarke, H.D. 11844* (NY,U,US). **VENEZUELA. Bolivar:** Distrito Cedeño. Along Rio Mawela, tributary of the Erebató, 300 m, 20 Mar 1992, *Boom, B.M. 10638* (MO); Municipio: Cedeño. Cerro Impacto, 1250 m, Jun 1988, *Elcoro, S. 350* (MO,NY,US); Alrededores

del salto Danto, 1100 m, 26 Feb 1981, *Marcano-Berti, L. 67-981* (NY); **Guayana:** Caroni, Selvas de Ikabarú, 450 m, Nov 1947, *Cardona, F. 2381* (US).

180. *P. sp. nov. (“debilis.aff-Madidi-Bolivia”)*

This new species can be distinguished by the elliptic-oblong sub-coriaceous leaves, 10-14 x 4.5-6 cm, slightly falcate, relatively opaque on both sides, with petioles 7-10 x 1.2-1.5 mm, base obtuse and decurrent at the end, apex shortly acuminate, venation pattern weak brochidodromous, secondaries emerging at 40-55 degrees from the midrib, intersecondaries less than 10 mm long, tertiaries alternate percurrent, lateral veins in general slightly prominent below and plain above, and 2 sub-basal glands, 1.2-2 mm across, located at 2-5 mm from the base. The fruiting racemes are 4-5 cm long; the fruits are oblate, 10-12 x 13-15 mm.

The similar species, *P. debilis*, has chartaceous relatively symmetrical leaves, with slender petioles, secondary veins relatively flat below, smaller glands usually not fully attached to the midrib and smaller fruits.

**Distribution.** Distributed in Amazonian foothills of northern Bolivia and southern Peru in riparian habitats or floodplains.

**Elevation range.** 175 – 450 m.

**Material examined.** (19) **BOLIVIA. Beni:** Moxos, Bosque de Producción Permanente Chimanes, Concesión de Bolivian Mohogany, 27 km de San Borja en carretera a Trinidad, 19 km de aquella carretera en carretera de extracción, 260 m, 28 Aug 1990, *Smith, D.N. 14251* (MO); **La Paz:** Franz Tamayo, Madidi, Rio Tuichi, Laguna Chalalan, 400 m, 17 Jul 2003, *Araujo-Murakami, A. 499* (LPB,MO); ibidem, 400 m, 18 Jul 2003, *Araujo-Murakami, A. 550* (LPB,MO); Abel Iturralde, Madidi, Rio Heath, 190 m, 12 Sep 2004, *Araujo-Murakami, A. 989* (BOLV,CTES,LPB,MO,USZ); Franz Tamayo, Parque Nacional Madidi, laguna Chalalan, 293 m, 23 Sep 2006,

*Araujo-Murakami, A. 3038* (BOLV,CTES,DAV,LPB,MEDEL,MO,USZ); Parque Nacional Madidi, río Hondo, arroyo Negro, pica hacia la serranía de Toregua, 340 m, 25 Mar 2002, *Fuentes, A.F. 4095* (LPB,MA,MO,QCA); Parque Nacional Madidi, río Hondo, trayecto de aproximadamente 4 km por la senda turística hacia el Tuichi, 220 m, 10 Apr 2002, *Miranda, T. 150* (DAV,LPB,MA,MO); Abel Iturralde, Parque Nacional y Area Natural de Manejo Integrado Madidi. Laguna Chalalán, entrando 45 min sobre orilla izquierda de río Tuichi, 450 m, 24 Apr 1997, *Paniagua, N. 1179* (LPB); Franz Tamayo, ca. 5 km S del Cruce del Rios Beni y Tuichi, 400 m, 6 Sep 1992, *Perry, A. 1206* (DAV,K,LPB,MA,MO,NY,Z); Abel Iturralde, Parque Nacional Madidi, Río Heath, 175 m, 30 Aug 2004, *Poma, A. 74* (BOLV,LPB,MO,USZ); Franz Tamayo, Parque Madidi, orilla derecha de Río Quendeque, detrás del campamento Retamas, 310 m, 28 Jan 2002, *Seidel, R. 8576* (LPB); Abel Iturralde, Siuruna, 400 m, 17 Aug 2005, *Zenteno, F. 2891* (LPB); ibídem, 345 m, 18 Aug 2005, *Zenteno, F. 2931* (LPB). **PERU. Huanuco:** Puerto Inca, Dantas, 270 m, 1 Jun 1989, *Kroll 451* (MOLF,NY); **Madre de Dios:** Tambopata, Parque Nacional "Bahuaja-Sonere." Ex Santuario Nacional "Pampa de Heath" Puesto Guarda parques "San Antonio, 180 m, 13 Jun 1997, *Díaz, C. 9025* (DAV,MO); Manu, Los Amigos Biological Station, Madre de Dios River, ca. 7.0 km upriver from mouth of Río Los Amigos. Trocha Cocha Lobo 1570 m, al final de la trocha, a 2 m a la derecha, 250 m, 14 Apr 2003, *Maceda, A.P. 567* (BRIT); Los Amigos Biological Station, Madre de Dios River, ca. 7.0 km upriver from mouth of Río Los Amigos. Trocha Cocha Lobo 1570 m, a 3 m a la derecha, 250 m, 24 Jul 2003, *Maceda, A.P. 788* (BRIT); **Ucayali:** Coronel Portillo, Bosque Nacional Alexander von Humboldt; km 86 Pucallpa-Tinga Maria road, 270 m, 5 May 1980, *Begazo, N. 145* (MO); Bosque Nacional Alexander von Humboldt; km 86 Pucallpa-Tinga Maria road; Tropical Moist Forest. Carretera a extraccion, 270 m, 21 May 1980, *Begazo, N. 151* (MO).

181. *P. sp. nov.* ("**huanchaca-SantaCruz-Bolivia**")

This new species can be distinguished by the whitish bark on the twigs, the elliptic subcoriaceous leaves, 10.5-14 x 4.5-6.5 cm, slightly lustrous above, drying tin tone above and light brown below, with petioles 7-9 x 1-1.5 mm, base obtuse to acute and decurrent down to half the petiole, apex acute, stipules linguiform with undulate margin, venation pattern weak brochidodromous, secondary veins (6-7) arcuate, emerging at 50-60 degrees from the midrib and becoming vertical along the most marginal quarter in the

midrib-margin axis, slightly prominent below, intersecondaries parallel to the secondaries, tertiaries sinuous percurrent and little conspicuous, and 2 submarginal glands located at 12-15 mm from the base and 1-2 mm from the margin. The floriferous shoots are sub-erect, 4-4.5 mm long, the flowers have pedicels 2-3 x 0.3-0.4 mm, hypanthium campanulate 1.8-2.3 mm wide, and anthers 0.4-0.6 mm long. The fruits are globose and mucronate, ca. 11 mm wide.

The most similar species is *P. debilis*, which however, has membranous to chartaceous leaves, sub-basal glands placed at less than 5 mm from the base, more conspicuous minor veins and flexuous racemes with smaller flowers overall. Also close to *P. pleuradenia*, but the taxon has slightly falcate leaves with less secondary veins, sub-basal glands and longer flexuous racemes.

**Distribution.** A species native to humid forest of eastern Bolivia next to border with Brazil (Rondonia) in the Huanchaca tableau mountains, The Huanchaca hills are part of a pre-Cambrian sandstone formation (Mayle, Langstroth, Fisher, & Meir, 2007) which particular edaphic and geological history can explain the endemic distribution.

**Elevation range.** 170 – 500 m.

**Material examined.** (5) **BOLIVIA. Santa Cruz:** Velasco, Parque Nacional Noel Kempff Mercado; campamento Huanchaca I, 500 m, 26 May 1994, *Gonzales, H. 46* (MO,USZ); ibidem, 500 m, 3 Jun 1994, *Gonzales, H. 312* (AAU,DAV,MO,US,USZ); Parque Nac. Noel Kempff M; Los Fierros, la senda hacia la meseta, 200 m, 4 Jul 1996, *Jardim, A. 3024* (DAV,MO,USZ); 30 km al norte del aserradero Moira yendo al Choré, 170 m, 11 Aug 1996, *Jardim, A. 3299* (DAV,MO,USZ); Parque Nacional Noel Kempff Mercado. Los Fierros, area permanente de Estudio "Los Fierros", 0,5 km N del puente "Los Cepes" sobre el camino a la meseta, 200 m, 10 Apr 1994, *Saldías, M. 3165* (USZ).

182. *P.* sp. nov. ("*longiracemos**Li Peru*")

Easily distinguishable because the densely arranged pustulate lenticels on the bark of the twigs, the elliptic-oblong subcoriaceous leaves, 11-13 x 6-7 cm, lustrous above, with very short curved petiole of 3-5 mm long x 2.-2.5 mm thick, irregular margin, base rounded and cordate to truncate at the end, apex shortly acuminate, venation pattern weak brochidodromous and festooned, secondary veins (8-9) emerging straight at 70-80 degrees from the midrib, tertiaries irregular reticulate, and four glands with the lower pair 2-3 mm wide at the base next to the petiole and the upper two smaller (and not always present) submarginal at 15-25 mm from the base. The floriferous shoots are relatively long, 10-13 cm; the flowers are less than 4 mm across in total, with pedicels 3-4.5 mm long, hypanthium infundibuliform, 1.5-2 mm wide and anthers 0.5-0.6 mm long.

This species is close to *P. rotunda*, but its shorter petiole, longer floriferous shoots and the mid-elevation geographic distribution help to easily tell apart both taxa.

**Distribution.** Only known from a single mid-elevation location in a relatively isolated eastern branch of the Peruvian Andes between the towns of Balsapuerto and Moyobamba in the western edge of the department of Loreto.

**Elevation range.** 850 – 1200 m.

**Material examined.** (1) PERU. Loreto: Pumayacu, between Balsapuerto and Moyobamba, 850 m, Sep 1933, Klug, G. 3136 (A,F,GH,MO,US).

183. *P.* sp. nov. (“*Paucartambo-Nuñez*”)

This new species can be recognized by the elliptic chartaceous leaves, 9-16 x 3.8-5.8 cm, opaque at both sides when dry, with petioles 4-8 x 1-1.3 mm, base acute to slightly obtuse and apex acute, secondary veins in a weak brochidodromous to eucamptodromous pattern, 7-8, emerging at 30-45 degrees from the



midrib, progressively arcuate, flat and little conspicuous above, flat or very slightly raised below, intersecondaries bifurcating at 1/3 to 1/2 the length of secondaries, tertiaries alternate percurrent; stipules linguiform, slightly undulate at the margin; glands 2, elliptic, 1-1.5 x 0.5-1 mm, 1 mm from the base and adjacent to the midrib (but not fully attached). Flowering shoots 3.5-6.2 cm long, 0.5 -1.2 mm thick, developing from the axils of last reiteration leaves or basal cataphylls, subflexuose, flower hypanthium 1.5-1.8 high x 1.5-2.5 mm wide.

It is morphologically similar to *P. vana*, but that species has thicker leaves (subcoriaceous), revolute at the margin, secondary and tertiary veins less conspicuous and shorter sub-erect floriferous shoots. Also, could be confused with *P. sp. nov* (“brevistilina Li-Peru”) but that species has brochidodromous festooned venation, one basal pair of crateriform rounded glands plus one or two pairs of tiny laminar glands and shorter flowering shoots.

**Distribution.** Only known from two collections from the first foothill mountains raising after the lowland Amazonian plain in southern Peru.

**Elevation range.** 1200 – 1800 m.

**Material examined.** (2) **PERU. Cusco:** Paucartambo, Kosñipata Valley, Km 150, San Pedro, Río Unión and Río Kosñipata junction, 1800 m, 20 Mar 1990, *Núñez, P. 11954* (CUZ,DAV,MO); **Pasco:** Oxapampa, Gran Pajonal, trail to Shumahuani from Chequitavo, 1200 m, 24 Sep 1983, *Smith, D.N. 5204* (DAV,MO,USM).

184. *P. sp. nov.* (“*rojas-palcazu-Peru*”)

This new species is a small tree that has elliptic-ovate subcoriaceous leaves, (6-)11-14 x (2.3-)4.5-7 cm, with petioles 5-9 x 1.2-1.5 mm, base obtuse and concave finishing decurrent on the petiole, apex shortly acuminate, venation pattern weak brochidodromous with secondaries straight at the beginning and

progressively arcuate towards the margin, tertiaries alternate percurrent, and 2 crateriform glands narrowly elliptic, ca. 1.5 x .7 mm, placed between the base of the first and second pair of secondary veins at 2-4 mm from the base and laterally adjacent to the midrib. The fruiting racemes are erect, 3-4 cm long, the fruits are oblate apiculate, 12-13 x 13-15 mm.

Close to *P. sana* but with leaves longer and wider, crateriform rounded glands smaller and unattached to the midrib and secondary veins emerging in a more open angle (70-80 vs 50-60 degrees), forming a more clearly brochidodromous pattern.

**Distribution.** Found in primary and secondary lowland to mid-elevation forests of the Amazonian foothills in central Peru (La Convención and Oxapampa provinces).

**Elevation range.** 500 – 1500 m.

**Material examined.** (5) **PERU.** **Cusco:** La Convención, Dist. Vilcabamba, Chuanquiri camino a Riobamba, 1009 m, 23 Oct 2006, *Farfán, J. 1273* (CUZ,MO); *ibidem*, 1009 m, 23 Oct 2006, *Farfán, J. 1275* (CUZ,MO); **Pasco:** Oxapampa, Distrito Palcazú. Comunidad Nativa Alto Lagarto, 700 m, 31 Jul 2007, *Rojas, R. 4472* (MO,USM); Dist. Pozuzo. Camino Alto Lagarto a Pozuzo Alto Victoria, 1500 m, 29 Jun 2008, *Rojas, R. 5804* (DAV,HOXA,MO,USM); Dist. Palcazú. Comunidad Nativa Alto Lagarto-Reserva Comunal Yanasha, 500 m, 6 Aug 2008, *Rojas, R. 6011* (DAV,HOXA,MO,USM).

185. *P. sp. nov.* (“*rotunda aff. paleDrying-Lowlands*”)

This new species can be distinguished by the elliptic to elliptic-oblong chartaceous to subcoriaceous leaves, 12-18 x 5.5-8 cm, slightly lustrous on both sides, pale brown to tin colored when dry, with flexuous petiole, 7-11 x 1-1.2 mm, base obtuse to rounded and shortly decurrent, apex acuminate, venation pattern weak brochidodromous festooned, secondary veins (7-8) arcuate and anastomosing among them by

transverse straight faint veins, prominent below and plain above, tertiaries sinuous percurrent, and 2 rounded glands, 1.5-2.5 mm wide, usually placed up to 12 mm from the base y 2-3 mm from the midrib. The fruiting shoots are sub-erect, 3-5 cm long, fruits rounded to oblate and apiculate, 10-12 x 11-13 mm, with ventral suture conspicuously prominent.

Close to *P. accumulans* which has coriaceous smaller leaves with smaller glands located closer to the base and more plain lateral veins. *P. rotunda* is also similar but has coriaceous leaves, relatively wider lamina, more conspicuous minor veins and drying finish brown to dark brown.

**Distribution.** Western amazonian lowlands from Bolivia, Peru and Brazil and French Guiana.

**Elevation range.** 10 – 900 m.

**Local names.** almendro (Venezuela), courawalou-ou, kunawalu (French Guiana).

**Material examined.** (11) **BOLIVIA. Beni:** Moxos, Parcela permante de U. de Princeton y Prog. Chimanes, 130km S San Ignacio, 130 m, 7 Sep 1991, *Del Aguila, M. 49* (MO); Vaca Diez, 3 km E of Riberalta on road to Guayaramerín, then 2 km SE on side road, 230 m, 7 Jun 1982, *Solomon, J.C. 7974* (MO,NY); **Pando:** Centro gomero Ingavi, 150 m, 9 Jul 1996, *Vargas, L. 750* (F,QCA). **BRAZIL. Acre:** Territory of Acre: near mouth of Rio Macauhan (tributary of Rio Yaco) on terra firma, 180 m, 17 Aug 1933, *Krukoff, B.A. 5562* (F,MO,NY,US); **Amazonas:** Madeira, 100 m, 15 Nov 1933, *Krukoff, B.A. 5840* (NY); R. Jarí, Monte Dourado, Planalto B, entre Pilão e Repartimento; mata de terra firme, 100 m, 1 Nov 1968, *Silva, N.T. 1350* (MO,NY,TEX). **FRENCH GUIANA.** Oyapock, 2 km from Camopi, 120 m, 16 Dec 1967, *Oldeman 2731* (NY,P); Village Wayampi Trois-Sauts, Basin du haut-Oyapock, 150 m, 15 Aug 1989, *Prévost, M.F. 2799* (US); Crique Passoura-Région littorale. Forêt primaire, 10 m, 9 May 1992, *Sabatier, D. 4000* (BRIT,MO,NY,US). **PERU. Loreto:** Maynas, Distrito Iquitos, Allpahuayo-IIAP, 140 m, 23 Apr 1997, *Vásquez, R. 23468* (DAV,MO,USM). **VENEZUELA.** Vargas, Puerto Cruz, mountain side, 900 m, 9 Sep 1917, *Whitford, H.N. 458* (F).

186. *P.* sp. nov. (“*pittierii*Li-Venezuela”)

This new species can be distinguished by the dark brown bark of the twigs with minute white protuberant lenticels, the elliptic-oblong to ovate-oblong sub-coriaceous leaves, 8.5-14 x 3.8-5.5 cm, slightly falcate, lustrous and drying dark brown above, opaque and drying yellowish ochre below, with petioles 7-12 x 0.8-1.2 mm, base rounded and concave to finish decurrent down to half the petiole, apex acute, venation pattern weak brochidodromous, secondaries emerging relatively straight at 50-60 degrees from the midrib and arching upwards to become vertical on the outer quarter of the midrib-margin axis, intersecondaries little conspicuous and up to 12 mm long, tertiaries sinuous percurrent and frequently inconspicuous, lateral veins plain on both sides, and 2 rounded to elliptic glands (1-2 mm diam.) placed at 5-15 mm from the base and 1-4 mm from the margin (sometimes sub-basal). The floriferous shoots are relatively short, sub-erect, 2.5-5 cm long; the flowers have pedicels 1.5-2.5 x 0.2-0.3 mm, hypanthium campanulate 2-2.7 mm wide and anthers 0.4-0.5 mm long. The fruits are oblate to didymous, 12-13 x 14-15 mm.

It is close to *P. accumulans*, which has leaves generally wider, with numerous intersecondaries and smaller glands, more flexuous racemes and smaller fruits. Also, it can be considered close to *P. ocellata*, which has smaller chartaceous leaves with lateral veins conspicuous, macular bigger glands and smaller flowers. Finally, the Peruvian species *P. vana*, which has a similar drying tone and also short erect racemes, has more coriaceous leaves with secondaries arcuate, smaller sub-basal crateriform glands and smaller flowers.

**Distribution.** Distributed in mid elevation humid forests of the coastal mountain range in north Venezuela and close to its capital city, Caracas.

**Elevation range.** 700 - 1480m.

**Local names.** yema de huevo (Venezuela)

**Material examined.** (8) **VENEZUELA. Aragua:** Parque Nacional Pittier, south facing moist virgin forested slopes between Las Delicias (above maracay) and summit of pass to Choroni, 1400 m, 3 Nov 1962, *Steyermark, J.A. 91424* (NY,US); Maracay, 700 m, 15 Feb 1969, *Trujillo, B. 9175* (NY); Guamitas, Parque Nacional, 750 m, 26 Mar 1938, *Williams, L.I. 9989* (A,F,US); In low forest or thickets; Guamitas, Nat Park, 760 m, 7 Jul 1938, *Williams, L.I. 10249* (A,F,MO); **Distrito Federal:** Valle de Puerto La Cruz, Hacienda el Limon y alrededores, 850 m, 14 Feb 1921, *Pittier, H. 9225* (GH,NY,US); **Monagas:** vicinity of La Cuchilla, between Guanagua ad Guácharo, 1200 m, 21 Apr 1945, *Steyermark, J.A. 62254* (NY,US); **Yaracuy:** Carretera Nirgua-La Chapa, Municipio Autónomo Nirgua, 1150 m, 14 May 1994, *Benítez de Rojas, C. 5099* (MO); Dto. Bolivar. Cerca de la Finca El Jaguar, 800 m, 3 Apr 1987, *Smith, R. V10001* (MO).

187. *P. sp. nov.* (“*plainveins-Pozuzo-Peru*”)

This new species can be recognized by its twigs with pustulate lenticels, the ovate-elliptic chartaceous leaves, 12-14.5 x 4.5-6 cm, opaque on both sides, with petioles 5-7 x 1.2-1.5 mm, venation pattern brochidodromous festooned, secondary veins (10-11) relatively straight along their first half and emerging at 60-75 degrees from the midrib, tertiary veins irregular reticulate, lateral veins plain on both sides, and two sub-basal crateriform glands, 0.8-1 mm across, placed at 2-3 mm from the base and next to the midrib but not attached to it. The fruiting racemes are 3-4.5 cm long and the fruits are globose to slightly oblate, apiculate, 11-12 x 11-13 mm.

This species is distinguishable from others in the Amazonian slope of the central Peruvian Andes like *P. vana*, *P. amplifolia* and *P. sana*, because the venation pattern conspicuously open brochidodromous festooned with all veins impressed beneath and the small rounded sub-basal crateriform glands. In addition, it is similar to *P. "brevistilinaLi"*, a new proposed species from a nearby location that has a remarkably similar venation pattern, but, it has 4 or more glands, the floriferous shoots are arranged in clusters and the flowers are minute.

**Distribution.** Only known from a single riverbank place in the Pozuzo region of the department of Pasco in the transition between mid-elevation and lowland humid forests.

**Elevation range.** 1100 m.

**Material examined.** (1) PERU. Pasco: Oxapampa, Dist. Pozuzo. Parque Nacional Yanachaga-Chemillén, cercanía del Puesto de Control Huampal, 1100 m, 23 Jul 2006, *Monteagudo, A. 12494* (AMAZ, DAV, HUT, MO, MOL, USM).

188. *P.* sp. nov. (“*rotunda-aff.-JatunSacha*”)

This new species has noticeably big elliptic-oblong coriaceous leaves, 15-25 x 7-12.5 cm, lustrous above, opaque below, with petioles 10-15 x 1.5-2.5 mm, secondary vein pattern eucamptodromous-like, secondaries emerging at 50-60 degrees from the midrib and running in a progressively arcuate trajectory, tertiaries sinuous percurrent and little conspicuous and 2 basal elliptic and laterally attached to the midrib glands. The floriferous shoots are subflexuous, 5-7.5 cm long, up to 10 cm when fruiting; the flowers with pedicels 2-3.5 x 0.2-0.3 mm, hypanthium campanulate 1.5-2 mm wide, and anthers 0.3-0.4 mm long. The fruits are globose to oblate and apiculate, with the ventral suture slightly depressed, 12-15 x 13-16 mm wide.

The most similar species is *P. rotunda*, but it has smaller less coriaceous leaves (subcoriaceous) with relatively conspicuous minor venation, shorter floriferous shoots and smaller fruits.

**Distribution.** Distributed in Amazonian foothills of the Andes in southern Ecuador and northern and central Peru.

**Elevation range.** 200 – 589 m.

**Local names.** sindi yura (Ecuador).

**Material examined.** (12) **ECUADOR. Napo:** Tena, 2 km al sur de la Reserva Biológica Jatun-Sacha, 400 m, 11 Jun 1992, *Cerón, C. 19072* (DAV,MO,QCNE); Reserva Biologica Jatun Sacha, 8 km. de Puerto Misahualli, margen derecha del Río Napo, 450 m, 14 Aug 1987, *Palacios, W. 1862* (MO,QCNE); ibidem, 400 m, 26 Jun 1991, *Palacios, W. 7513* (MO,QCNE); ibidem, 400 m, 28 Jun 1994, *Tirado, M. 985* (MO,QCNE); **Orellana:** Sendero Peru, Parque Nacional Yasuni, 200 m, 21 Aug 2009, *Pérez, A.J. 4271* (QCA). **PERU. Huanuco:** Bosque de Aucayacu, 589 m, 6 Sep 1965, *Schunke V., J. 813* (COL,US); Fundo San Jose (Aucayacu) in tall forest., 589 m, 17 Aug 1964, *Schunke V., J. 6574* (MO,US,USM); **Pasco:** Oxapampa, Dist. Palcazú. Comunidad Nativa Loma Linda-Laguna, sector Nueva Aldea, bosque de la Asociación Forestal Yanasha Concoll-Toroñ (AFYCT), 400 m, 16 Oct 2008, *Huamán, M. 340* (DAV,HOXA,HUT,MO,MOL,USM); Distrito Iscozacín. Trees of the Palcazú Valley, 300 m, 1986, *Pariona, W. 403* (DAV,MO); Distrito Palcazú. Parque Nacional Yanachaga Chemillén - Sector Pampa de Pescado, 365 m, 20 Sep 2014, *Vásquez, R. 39109* (MO); **San Martín:** Provincia Mariscal Caceres, Distrito Campanilla. Fundo San Eliseo, del Sr. Oscar Maldonado, sur de Mashuyacu, margen izquierda del rio Huallaga, 395 m, 17 Aug 1970, *Schunke V., J. 4269* (COL,F,GH,MO,NY,US,USM); **Ucayali:** Coronel Portillo, Bosque Nacional Alexander von Humboldt; km 86 Pucallpa- Tingo Maria road. Camino al Rodal Semillero Km. 116 Arbol, 270 m, 22 May 1980, *Begazo, N. 154* (MO,NY).

189. *P. sp. nov.* (“*vana-aff.-small-leaves-Peru*”)

A new species characterized by the elliptic subcoriaceous leaves, 10-12 x 3.8-5.2 cm, slightly lustrous above, with petiole 6-11 x 1-1.2 mm, base acute and shortly decurrent, apex shortly acuminate, venation pattern eucamptodromous-like, secondaries progressively arcuate and emerging at 40-50 degrees from the midrib, tertiaries alternate percurrent and little visible, and 2 glands located on the first pair of secondary veins separated 3-12 mm from the base and 1-4 from the midrib. The floriferous shoots are flexuous, 1-2.2 cm long, with basal bracts persistent and forming an ochre bud 4-5 mm long, with flowers that have pedicels

0.8-1.5 x 0.2-0.3 mm, hypanthium wide infundibuliform, 1.8-2.5 mm wide and anthers 0.3-0.4 mm long. The fruits are oblate and didymous, 11-13 x 13-14 mm.

It can be considered close to *P. vana*, but that taxon has leaves coriaceous, generally bigger, and slightly falcate with thicker petioles and secondary veins more prominent below. Even though in both species the racemes are subtended by the persistent bud of basal bracts, in *P. vana* the racemes are longer and more erect. Another similar species, *P. debilis*, has usually chartaceous leaves with brochidromous venation, more conspicuous minor veins below and longer racemes without persistent basal bracts and smaller flowers.

**Distribution.** Reported in the margins of big rivers and seasonally flooded habitats (Varzea) in lowlands of the Amazon basin in Peru and Bolivia.

**Elevation range.** 160 – 400 m.

**Local names.** sunkímiak (Peru)

**Material examined.** (10) **BOLIVIA.** **Santa Cruz:** Ichilo, 8 km by road S of central square in Buena Vista, on road to Huaytú, secondary woods at bank above Río Surutú, where former section of road being washed away, 340 m, 19 Feb 2006, *Nee, M.* 54171 (MO,NY,US,USZ). **PERU.** Pucallpa. R. Semillero Km 98, 200 m, 15 Sep 1980, *Oliveira, R.* 035 (MO); **Huanuco:** Pachitea, Dtto. Honoria. Bosque Nacional de Iparia: Región de bosque seco tropical (sensu Tosi, 1960) a lo largo del Río Pachitea cerca del campamento Miel de Abeja (1 km. arriba del pueblo de Tournavista o unos 20 km. arriba de la confluencia con el Río Ucayali), 200 m, 5 Apr 1967, *Schunke V., J.* 1819 (COL,GH,MO,MOLF,NY,P,US); **Loreto:** Loreto, Pampa Hermosa, río Corrientes, 160 m, May 1986, *Carijano, M.* 40 (MO); **Madre de Dios:** Manu, Cocha Cashu Station, Parque Nac. Manu, 350 m, 24 Jul 1984, *Foster, R.* 9672 (BRIT,F,QCA,US,USM); ibidem, 350 m, 31 Aug 1989, *Foster, R.* 13035 (F,MO,USM); Tambopata, on alluvial soil along Río Tambopata, 280 m, 19 Feb 1984, *Gentry, A.* 45763 (MO); Manu, Cocha Cashu Biological Station, Manú National Park, 400 m, 30 Aug 1991, *Núñez, P.* 12507 (DAV,MO); Manu National Park; Río Manu; Cocha Salvador



floodplain forest plot, 350 m, 6 Oct 1991, Núñez, *P. 14338* (MO,USM); Altos de Maizal, Río Manu, 400 m, 30 Aug 1990, Núñez, *P. 17620* (MO).

## **SOUTHEASTERN SOUTH AMERICA** (41 taxa in total including shared with other areas)

190. *P. brasiliensis* (Cham. & Schltdl.) Steud., Nomencl. Bot. 2: 402. 1841, *Cerasus brasiliensis* Cham. & Schltdl., Linnaea II. 542. 1827. *P. brasiliensis* (Cham. & Schltdl.) D. Dietr. Syn. III. (1843) 43, emend., non *P. brasiliensis* Schott ex Spreng. Syst. Veg. [Sprengel] 4(2, Cur. Post): 406. 1827, (nom. nud.). *Laurocerasus brasiliensis* (Cham. & Schltdl.) M. Roem., Fam. Nat. Syn. Monogr. 3: 91. 1847. Type: Brazil: Minas Gerais, Sellow, *F. 1361* (possible typus, HAL!).

This species can be recognized because it is a poorly ramified small tree with gray bark on the twigs and few small lenticels, the elliptic oblong to oblong obovate chartaceous leaves, 6-12 x 2.5-5.5 cm, slightly lustrous above and opaque below, with petiole 7-12 x 0.7-1.2 mm, base acute and deeply decurrent and apex acuminate, margin undulate, venation pattern brochidodromous festooned with secondary veins relatively straight arising at 50-60 degrees from the midrib, slightly raised below and impressed above, tertiaries irregular reticulate and little conspicuous, glands 2, relatively big (1-)1.5-3 mm diam., located basal or sub-basal on the first pair of secondary veins at 3-4 mm from the base. The floriferous shoots are sub-erect, laxiflorous, 2-3 cm long; the flowers have a flexuous pedicel 2.5-3.5 x 0.1-0.2 mm, hypanthium campanulate ca. 2 mm wide, anthers 0.4-0.6 mm long. The fruits are globose and with thin endocarp, 8-9 mm wide.

Several new taxa that can be confused with this species are discussed below under their respective descriptions. *P. brasiliensis* has been a name indiscriminately assigned to determinations of Brazilian

material due to the previous lack of knowledge and misunderstanding of the diversity of the genus *Prunus* in the Mata Atlantica region, the missing or obscure type material, the morphological similarities and traditional associations between Caribbean and Brazilian species and the mixing of material found in some old exsiccates.

**Distribution.** Distributed along the eastern side of Brazil in mid-elevation humid places close to the Atlantic coast.

**Elevation range.** 680 – 950 m.

**Local names.** coração negro (Brazil).

**Material examined.** (12) **BRAZIL.** Catalogus Geographicus Plantarum Brasiliae Tropicae, *Burchell, W.J. A 53 A* (GH); **Bahia:** Mun. Santa Terezinha, Vila da Pedra Branca, Serra da Jiboia, estrada para torre de TV, 850 m, 11 Jun 2000, *Alves, M. 1988* (NY); Camacã: RPPN Serra Bonita, 9,7 km W de Camacã na estrada para Jacareci, ramal para a RPPN, ca. 6 km da entrada, 850 m, 18 Mar 2005, *Fiaschi, P. 2882* (BRIT,MO,NY); Município de Lencóis. Rod. Br. 242, trecho Itaberaba/Seabra, Km 224. Afloramento de rochas a 7 km al oeste do entroncamento para Lencóis. Próx. ao rio Mucugezinho na parte mais alta do vale do rio, 780 m, 13 Jan 1983, *Mattos Silva, L.A. 1622* (MO); **Espírito Santo:** Alfredo Chaves, Vila Sao Bento de Uranio, 950 m, 8 May 1985, *Martinelli, G. 10904* (NY); **Minas Gerais:** sine loco, Aug 1840, *Claussen, P.* (GH,P); Tombos, Capoeira, Pedra dourada, 700 m, 4 Jun 1941, *Oliveira, J.E. 505* (US); **São Paulo:** Biritiba-Mirim, Estação Biológica de Boraceia, 850 m, 3 Feb 1984, *Custodio Filho, A. 2246* (NY); Mogi Mirim, 680 m, 21 May 1927, *Hoehne, F.C.* (NY); Sao Paulo, Jardim Botânico, Living plant 230, , *Hoehne, F.C. 28792* (US).

191. (“*P. gardneri*”). *P. brasiliensis* (Cham. & Schltdl.) Steud. var. “*gardneri*” Koehne, Bot. Jahrb. Syst. 52: 323. 1915. Type: Brazil: Minas Gerais, *Glaziou, A. 14679* (sintypes, P!, US!). Brazil: Goiás, Santa

Luzia, 800 m, 20 Apr 1898, *Glaziou, A. 21118* (sintype, P). Brazil: Goiás, Piauhy, 1846, *Gardner 3709* (sintypes F!, G! (4), NY!, P! (4), RB!).

This taxon here proposed as a new combination in the rank of species is a shrub or small tree, with dark fissured bark covered with few small lenticels; coriaceous elliptic to obovate leaves, 9-15 x 3.8-6 cm with petiole 5-12 x 1-1.5 mm, base rounded to acute and decurrent down to the base of the petiole forming an adaxial channel, apex acute to obtuse, margin revolute, venation pattern brochidodromous, 9-10 secondary veins impressed above and relatively flat below, tertiaries conspicuous below, irregular reticulate with some exmedial open veins, and 2 rounded glands, sub-basal (up to 4 mm from base), 1.5-2 mm wide, and frequently attached to the midrib or totally basal in specimens with large leaves. The floriferous shoots are flexuous 2.5-8 cm long, flowers with pedicels 2-4 mm long, hypanthium campanulate 2.5-3.5 mm wide and anthers 0.5-0.6 mm long. The fruit is globose to oblate and apiculate, 7-8 x 8-10 mm with the middle scar conspicuously raised.

I consider this species as an independent taxon not subordinated from *P. brasiliensis*, which indeed has thinner leaves with more flexuous petioles and shorter racemes with smaller flowers.

**Distribution.** Distributed in Cerrado mid-elevation forests in central and northeastern Brazil.

**Elevation range.** 625 – 1330 m.

**Material examined.** (36) **BRAZIL.** In silvis caa-apoauí, , *Martius, C. s.n.* (M); 1839, *Pohl 2586?* (M,NY); **Alagoas:** Quebrangulo, Reserva Biológica de Pedra Talhada, 750 m, 26 Apr 1994, *Cervi, A.C. 7426* (G); **Distrito Federal:** Brasília, Reserva ecológica do IBGE, 1120 m, 22 May 1989, *Alvarenga, D. 266* (US); Reserva Ecológica do IBGE. Mata ciliar do córrego escondido inundada, 1150 m, 5 Jul 1989, *Azevedo, M.L.M. 226* (MO); Rio São Bartolomeu, barragem do Paranoa, 920 m, 26 Jun 1979, *Heringer, E.P. 1625* (DAV,US); Abaixo do barragem do Paranoa, 980 m, 26 Jun 1979, *Heringer, E.P. 1627* (DAV,NY); Bacia do Rio São Bartolomeu, 1100 m, 3 Jul 1979, *Heringer, E.P. 1714* (DAV,MO,US); ibidem, 1200 m, 5 Nov 1980, *Heringer, E.P. 3719* (MO,US); Taguatinga, mata

cerca estadio Serejao, 1200 m, , *Heringer, E.P. 4821* (US); Bacia do Rio São Bartolomeu, 1100 m, 7 Jul 1980, *Heringer, E.P. 5182* (MO); ibidem, 1100 m, 27 Nov 1981, *Heringer, E.P. 5793* (MO,US); córrego da Laje, 900 m, 22 Apr 1981, *Heringer, E.P. 6852* (NY,US); córrego Papuda, 950 m, 13 May 1981, *Heringer, E.P. 6946* (NY,US); Rio Sao Bartolomeu, 1100 m, 7 Jul 1981, *Heringer, E.P. 7114* (NY,US); Margin of gallery forest adjacent to cerrado, ca. 30 km S. of Brasília on road to Belo Horizonte, 700 m, 26 Aug 1964, *Irwin, H.S. 5618* (F,MO,US); Gallery forest, Fazenda Vargem Bonita, ca. 10 km S of Brasília, D.F., on road to Belo Horizonte, 1000 m, 18 Jul 1966, *Irwin, H.S. 18256* (CAS,MO,QCA,TEX); ibidem, 1000 m, 19 Jul 1966, *Irwin, H.S. 18277* (CAS,MO,QCA,TEX); Fazenda Palestina, 810 m, 6 Jul 1995, *Mecenas, V.V. 69* (MO,TEX,US); **Goiás**: 1816, *de Saint-Hilaire, A. 861* (P); Pirenopolis, mata ciliar, 1112 m, 19 Jul 2007, *Forzza, R.C. 4537* (NY); Luziania, 920 m, 12 Nov 1981, *Heringer, E.P. 18304* (MO,US); Cerrado, Fazenda J. Teles, ca. 10 km NW of Formosa, Goiás, near source of Rio Paraná, 850 m, 29 Apr 1966, *Irwin, H.S. 15480* (CAS,MO,QCA,TEX); Chapada dos Veadeiros, 5-10 km N of Veadeiros, 1330 m, 19 Jul 1964, *Prance, G.T. 58249* (NY,US); Uberana, (Uberba??) Minas Gerais, 800 m, Aug 1834, *Riedel, L. 2425* (US); **Minas Gerais**: Uberlandia, estacao ecologica do Panga, 810 m, 12 Mar 1999, *Arantes, A.A. 1093* (DAV,HRCB); Mun de Grao Mogol. atras de cidade. Trilha do Barao, 900 m, 2 Aug 1998, *de Carvalho, A.M. 6529* (NY); Gallery forest at Fazenda Vargem Bonita, ca. 10 km. south of Brasilia, 900 m, 19 Jul 1966, *Hunt, D. 6680* (MO,US); Gallery and cut-over cerrado, ca. 5 km E of Parada das Batistas, MG-1, 625 m, 11 Mar 1970, *Irwin, H.S. 27394* (CAS,MO,QCA,TEX); **Paraná**: Tamanduá, 700 m, 24 Nov 1910, *Dusén, P. 10807 a* (US); **Santa Catarina**: Joinvile, Palácio Episcopal, (cultivated), 25 Aug 1957, *Reitz, P.R. 4724* (UC,US); **São Paulo**: Botucatu, Sorroundigs, 900 m, 30 Oct 1974, *Gottsberger, I. 13-301074* (US); Araraquara, 700 m, 29 Sep 1888, *Loefgren, A. CGG 951* (SP).

192. *P. chamissoana* Koehne, Bot. Jahrb. Syst. 52: 325. 1915. Type: Brazil: sine loco, *Schüch, G. 514* (sintype, W!). Brazil: sine loco, *Sello, H.L. 2039* (sintype, P!). Brazil: Minas Geraes, Stranch in Capao beim Cemiterio, *Ule, E. 177-2882* (sintypes HBG!).

This relatively frequent species can be recognized by the dark twigs with abundant pale protuberant lenticels, the chartaceous to sub-coriaceous elliptic to elliptic-ovate leaves, 9-15 x 3.5-6 cm, opaque on both sides, slightly asymmetric at the base, with relatively slender petioles, 6-12 x 0.8-1 mm, base obtuse and

apex acuminate to attenuate, venation pattern brochidodromous, secondaries sinuous and slightly prominent below, plain above, intersecondaries short and numerous, tertiaries irregular reticulate and almost inconspicuous and four glands, the lower two basal and attached to the midrib, the upper pair around the second pair of secondary veins at 5-15 mm from the base and 2-4 mm from the margin (sometimes minute supplementary sub-marginal glands are present). The floriferous shoots are subflexuous, 4-6 cm long; the flowers have flexuous pedicels 2-6 x 0.3-0.4 mm, hypanthium campanulate 2-2.8 mm wide and anthers 0.5-0.6 mm long. The fruits are ovate-globose, apiculate, 10-11 x 8-9 mm and applanate on the ventral side.

Several similar new species found near to its main distribution range are described and compared below in this revision.

**Distribution.** A wide distributed species from lowlands and mid elevation humid and sub humid forests in eastern Bolivia, central and southeastern Brazil and northern Argentina.

**Elevation range.** 120 – 1420 m.

**Local names.** duraznillo (Bolivia), perceguiera (Brazil).

**Material examined.** (21) **ARGENTINA. Misiones:** Iguazú, Parque Nacional Iguazú, 190 m, Sep 1948, *Biloni, A. 59-m (?)*; Aristobulo del Valle, Salto Encantado, 450 m, 31 Jul 1987, *Vanni, R.O. 930 (F,GH,UC)*. **BOLIVIA. Santa Cruz:** Vallegrande, Musicurí a 88 km al sur de Vallegrande, 780 m, 7 Feb 2006, *Hurtado, R. 627 (LPB)*; Andres Ibanez, Municipio de Porongo, localidad del Monumento Natural Espejillos. Extremo inicial del Codo de los Andes. Primer riachuelo del área portegida, sobre el riachuelo dirección NO, 500 m, 8 Jan 2008, *Linneo, I. 1222 (MEDEL,MO,USZ)*. **BRAZIL. Distrito Federal:** Gallery forest, Planaltina, 1000 m, 20 Jul 1966, *Irwin, H.S. 18299 (CAS,MO,QCA,TEX)*; **Goiás:** Chapada dos Veadeiros, 15 km north of Veadeiros, valley of Rio Parana, Riverine forest, 1420 m, 20 Jul 1964, *Prance, G.T. 58253 (NY,P,US)*; 66 km. north of Jatai. Dry forest, 800 m, 21 Oct 1964, *Prance, G.T. 59543 (F,GH,MO,US)*; **Mato Grosso:** Rio Tucana. km 330 BR174, 350 m, 11 Jun 1979, *Silva, M.G. 4869 (NY)*; **Minas Geraes:** Coronel Pacheco, 600 m, 6 Sep 1943, *Heringer, E.P. 1286 (P)*; Viçosa, State agricultural school, 720 m, 2 Dec 1958, *Irwin, H.S. 2193 (DS,TEX,UC,US)*; Vicoso. Fazenda da Cresiuma; beyond last tenant's

house, in cut-over woods in valley, 690 m, 30 Sep 1930, *Mexia*, Y. 5126 (CAS,GH,MO,NY,PH,UC,US); Stranch in Capao beim Cemiterio, 900 m, Jul 1892, *Ule*, E. 177-2882 (HBG,MO); **Parana**: Contenda, Turvo, 950 m, 25 Aug 1960, *Hatschbach*, G. 7169 (US); **Rio de Janeiro**: Nova Friburgo, 1000 m, Aug 1946, *Leite*, J.E. 4123 (US); **Rio Grande do Sul**: Marcelino Ramos, Estreito Rio Uruguay, 550 m, 28 Sep 1993, *Butzke*, A. 10930 (US); Vale Veneto, 120 m, 22 Aug 1954, *Daniel*, F.r. (DAV,HRCB); Augusto Pestana, 500 m, 26 Aug 1953, *Pivetta*, P.J. 854 (DAV,HRCB); **São Paulo**: Santa Genebra Forest Reserve, Barão Geraldo near Campinas, disturbed semideciduous forest. Transect 5 (wrong orig coordinates), 550 m, 31 Aug 1987, *Gentry*, A. 58775 (MO); Teite, Mata, 550 m, 10 Aug 1887, *Loefgren*, A. 36 (SP).

192a. *P. chamissoana* Koehne var. nov. “*nobasalGlands-Iguazu-Argentina*”

This new proposed variety can be distinguished from the typical specimens of *P. chamissoana* because it has leaves generally with closer acute base (vs. obtuse), secondary veins relatively straight along their lower half (vs. arcuate), more numerous and shorter intersecondaries, 4 glands with the lower pair placed at 2-5 mm from the base and 1-3 mm from the midrib (vs. fully basal) and flowers with slightly longer pedicels.

**Distribution.** Distributed in lowlands and low mid-elevation seasonally deciduous forests in the Chaco and Alto Paraná Atlantic forests ecoregions from central Bolivia to northern Argentina. Marginally overlapped with the geographic distribution of the typical collections.

**Elevation range.** 80 – 1200 m.

**Material examined.** (8) **ARGENTINA.** **Misiones:** Leandro N. Alem, Lote 106 - 7 Km E de Leandro N. Alem, 80 m, 4 Aug 1990, *Maruñak*, V. 668 (ASU,CTES,GH,MO); San Pedro, Ruta Nac. 14, 32 Km de Bernardo de Irigoyen camino a Tobuna, 750 m, 17 Oct 1996, *Morrone*, O. 1514 (MO,US); Caingúas, Ruta Prov. 220, 3.5 Km de Salto Encantado camino a Garuhapé, 365 m, 19 Oct 1996, *Morrone*, O. 1589 (MEXU,MO,SI); Iguazú, Parque

Nacional Iguazú. Isla San Martín, 160 m, 15 Oct 1993, *Tressens, S.G. 4557* (ASU,GH,MO); Aristobulo del Valle, 400 m, 30 Jul 1987, *Vanni, R.O. 885* (GH). **BOLIVIA. Santa Cruz:** Florida, Camino entre la escuela y el Sendero Cola de Mono, 1200 m, 8 Nov 2005, *Arroyo, L. 3034* (MEDEL,MO,NY,UC,USZ); Andres Ibanez, 5 km. WNW of bridge over Rio Pirai (of highway from Santa Cruz to Samaipata), Rio El Salado, along old mule trail and current pipeline from Santa Cruz to Bermejo and Samaipata, 700 m, 9 Dec 1989, *Nee, M. 38038* (GH,MO,NY,US); Monumento Natural Espejillos entre 500 hasta 1100 msnm con bosque hidrofítico chiquitano,, 500 m, 25 Jul 2007, *Parada, G. 202* (MEDEL,MO,USZ).

193. *P. ligustrina* Koehne, Bot. Jahrb. Syst. 52: 327. 1915. Type: Argentina: Gran Chaco, *Hagenbeck, C.F.* (sintype, B, destr?, photo F!, US!). Paraguay: Kolonie San Bernardino, *Endlich 33334* (sintype, ?)

This is a shrub or small tree that can be distinguished by the relatively thin twigs (1.5-2 mm wide), the elliptic chartaceous to sub-coriaceous leaves, 4-7 x 1.7-3 cm, with slender petiole 4-7 x 0.5-0.7 mm, venation pattern weak brochidodromous, secondaries emerging at 40-45 degrees from the midrib, relatively straight along its lower half, intersecondaries parallel to secondaries, tertiaries irregular reticulate, veins plain on both sides, and 2 sub-basal glands (0.5-1 mm diam.), placed at 2-7 mm from the base and 1-3 mm from the midrib. The floriferous shoots are sub-erect, 1-2.5 cm long; the flowers have pedicels 1-2 x 0.2-0.3 mm, the hypanthium is campanulate, 2-2.5 mm wide, and the anthers 0.3-0.4 mm long. The fruits are globose and apiculate, 7-8 mm wide.

This is the species with the smallest leaves and more slender petioles in lowlands and mid-elevation places of central and southern South America.

**Distribution.** Distributed in lowland alto Paraná semi evergreen forests, the humid Chaco and cerrado type vegetation in southern Paraguay and Brazil and northwestern Argentina.

**Elevation range.** 130 – 900 m.

**Material examined.** (7) **BRAZIL. Rio Grande do Sul:** Caxias do Sul, Criúva, 900 m, 3 Oct 2004, *Rossato, M. 241* (GH). **PARAGUAY. Caazapá:** Tavaí, Bosque cercano al hospital, 200 m, 28 Oct 1988, *Soria, N. 2363* (MO); **Cordillera:** Serranía Tobatí, Meseta Ybytú Silla. On bog, 250 m, 23 Oct 1988, *Zardini, E. 7588* (FCQ,MEXU,MO); **Itapúa:** Pirapó. CEDEFO, 130 m, 4 Aug 1984, *Hahn, W.A. 2727* (MO,PY); **Paraguarí:** Near Parque Nacional Ybycui, 250 m, 1 Oct 1985, *Gentry, A. 51947* (BRIT,MEXU,MO,NY,TEX); Parque Nacional Ybycui. Limite N del parque, campo abierto, en las cercanías de arroyo Corrientes, 280 m, 6 Oct 1984, *Pérez de Molas, L. 400* (MO).

194. ("P. biritiba") *P. myrtifolia* (L.) Urb. var. "*brasiliensis*" Koehne, Bot. Jahrb. Syst. 52: 320. 1915. *Prunus brasiliensis* Schott ex Spreng., Syst. Veg. (ed. 16) [Sprengel] 4(2, appendix): 406. 1827., Illeg., nom. nud. Type: Brazil: *Claussen, P. 2098* (sintypes, MO!).

This taxon was formerly proposed by Koehne (1915) as a variety of the caribbean *P. myrtifolia*; however, considering the presence of only 2 glands and the disjunctive distribution, here I consider it as a distinct species. It can be distinguished by the chartaceous to subcoriaceous elliptic-oblong leaves, 6.5-12.5 x 3-5.2 cm, pale colored below, with petiole 10-15 x 0.8-1 mm, acute to obtuse slightly decurrent base, shortly acuminate apex, venation pattern brochidodromous festooned, secondary veins (9-10) arcuate, intersecondaries numerous extending for more than half the distance midrib-margin, tertiaries alternate percurrent, veins plain on both sides, and 2 glands (1-1.2 mm wide) placed between the first and second pair of secondary veins at 12-25 mm from the base and 4-7 from the margin. The floriferous shoots are flexuous, 2.5-4.5 cm long; the flowers have flexuous pedicels 3-4 mm long, hypanthium infundibuliform 2-2.5 mm wide, petals ca. 1.5 mm wide, anthers 0.4-0.5 mm long. The fruits are globose and apiculate, 10-11 mm wide.

This species is similar to *P. reflexa*, but that taxon has longer petioles and more secondary veins. *P. brasiliensis* Schott ex Spreng. is considered here an Illegitimate (*nomen nudum*) synonym because Sprengel just mentioned the name and did not provide any description or cite any specimen.



**Distribution.** Distributed in mid-elevation Atlantic forests from the state of Sao Paulo to Rio de Janeiro.

**Elevation range.** 890 – 950 m.

**Material examined.** (5) **BRAZIL. Minas Geraes:** Aug 1842, *Claussen, P. 162* (P); **Rio de Janeiro:** Jul 1878, *Miers, J.* (P); **São Paulo:** Biritiba-Mirim, Estação Biológica de Boraceia, 900 m, 29 Mar 1984, *Custodio Filho, A. 2321* (COL,NY); ibidem, 890 m, 11 May 1984, *Custodio Filho, A. 2425* (MO); Estacao Boraceira, 900 m, 7 Jul 1983, *Guerra, T.P. 56* (NY).

195. (“*P. glaziovii*”) *P. myrtifolia* (L.) Urb. var. "*glaziovii*" Koehne, Bot. Jahrb. Syst. 52: 320. 1915. Type: Brazil: Rio de Janeiro, Serra de Estrella, 900 m, 13 May 1874, *Glaziou, A. 7604* (sintypes, K!, NY!, P!). Brazil: Minas Gerais, 1878, *Glaziou, A. 10709* (sintypes K!, P!).

As the previous taxon, it is not close related to *P. myrtifolia*, therefore, it should be considered as a separate species. This species can be recognized by the sub-coriaceous elliptic-oblong leaves, 6-10 x 2.7-4.2 cm, relatively opaque on both sides, slightly falcate, with flexuous petiole 10-14 x 1-1.2 mm, base acute and decurrent, apex acuminate, venation pattern brochidodromous festooned, secondary veins arcuate and plain below, intersecondaries irregularly present, tertiaries irregular reticulate, and 2 glands placed 5-8 mm from the base and 1-3 mm from the midrib. The floriferous shoots are sub-erect, 3-5.5 cm long; the flowers have pedicels 3-4 mm long, hypanthium infundibuliform, 2.5-3 mm wide and the anthers 0.4-0.6 mm long.

It is similar to *P. reflexa*, but that taxon has elliptic-ovate leaves with longer petioles, eucamptodromous-like venation, glands more distant from the base, reflexed racemes and slightly larger flowers with shortly campanulate hypanthium.

**Distribution.** Distributed in mid-elevation Atlantic forests near to the coast in the states of Sao Paulo, Rio de Janeiro and Minas Gerais.

**Elevation range.** 900 – 1400 m.

**Material examined.** (4) BRAZIL. Sao Paulo: Cunha, Reserva Forestal, 1200 m, 10 Jul 1980, *Custodio Filho*, A. 292 (NY,P); Fazenda Fim da Picada, Nucleo Cunha, 1400 m, 29 Jan 2002, *de Assis, M.A. 1533* (DAV,HRCB).

196. *P. oleifolia* Koehne, Bot. Jahrb. Syst. 52: 327. 1915. Type: Paraguay: Alto Paraná, In regione fluminis Alto Parana, 1909, *Fiebrig, K. 5844* (sintypes, US!, GH!). Paraguay: Alto Paraná, In regione fluminis Alto Parana, 1909, *Fiebrig, K. 5927* (sintypes, US!, GH!).

This species can be distinguished by the elliptic-oblong to lanceolate-oblong sub-coriaceous leaves, 6.5-10 x 2.2-3.4 cm, slightly lustrous above, with slender flexuous petiole, 10-14 x 0.5-1 mm, base acute to obtuse and decurrent at the end, apex long acuminate, venation pattern eucamptodromous-like to weak brochidodromous, secondaries arcuate and parallel to the margin the upper third of the trajectory, intersecondaries parallel to secondaries and barely visible, tertiaries inconspicuous, veins in general plain above and below, and 2 sub-basal glands placed at 1-3 mm from the base and generally near to the margin. The floriferous shoots are sub-erect, 3-5.5 cm long; the flowers have erect pedicels 3.5-5 mm long, hypanthium 2.5-3.2 mm wide and anthers 0.5-0.6 mm long. The fruits are globose or slightly oblate, 8-10 mm wide.

The most similar previously published species is *P. oxyphylla*, which has smaller coriaceous leaves with proportionally longer petioles and shorter racemes with smaller flowers. It is also similar to some new species proposed here from Bolivia to Brazil, under whose respective descriptions differences are established.

**Distribution.** Distributed in upper Paraná Atlantic type forests in central and eastern Paraguay, northeastern Argentina and southwestern Brazil.

**Elevation range.** 120 – 1150 m.

**Local names.** ybaró, yva'ro (Paraguay).

**Material examined.** (33) **ARGENTINA. Misiones:** San Pedro, Alegria, 680 m, 28 Mar 1945, *Bertoni 994* (NY); Puerto Aguirre, 120 m, 8 Jul 1914, *Curran, H.M. 675* (NY,US); San Pedro, Parque Provincial Piñalito, 660 m, 4 Mar 2000, *Deginani, N.B. 1652* (MO,SI); Leandro N. Alem, Lote 106, 12 Km E de L. N. Alem, 250 m, 19 Aug 1972, *Maruñak, V. 381* (MO,NY); ibidem, 250 m, 23 Sep 1972, *Maruñak, V. 390* (MO,NY,P); Guaraní, Predio Guarani, 400 m, 29 Nov 1994, *Tressens, S.G. 5094* (TEX); San Pedro, Ruta 20 y arroyo Piray Guazú, 300 m, 21 Mar 1997, *Tressens, S.G. 5718* (CTES,GH,MO); Guaraní, De El Soberbio a Parque Prov. Moconá, 45 km de El Soberbio, 300 m, 13 Apr 1996, *Zuloaga, F. 5435* (MO,SI); Ruta Prov. 21, 30 km de Paraíso, camino a 2 km al W de la ruta, 450 m, 23 Feb 1999, *Zuloaga, F. 6822* (MO,SI). **BRAZIL. Parana:** Irati, 900 m, 26 Jan 1909, *Dusén, P. 7809* (GH,MO,UC); Roca Nova, 1000 m, 19 May 1909, *Dusén, P. 8145* (GH,MO); Vila Velha, rio Quenra-Perna y BR - 376, 800 m, 10 Jan 1987, *Krapovickas, A. 40739* (GH,MO,UC); Curitiba, Alto da Serra S. Luiz do Puruna, 1150 m, , *Moreira Filho, H. 202* (US); **Rio Grande do Sul:** Caxias do Sul - Sao Roque, Fazenda Souza, 780 m, 26 Jan 1999, *Kegler, A. 139* (US). **PARAGUAY. Guarapi** (Yaguaron), 200 m, Oct 1882, *Balansa, B. 4374* (P); **Alto Paraná:** Puerto Flores, 220 m, 30 May 1945, *Bertoni 1408* (NY); Estancia Río Bonito. Forest I (along the entrance), 240 m, 29 Aug 1994, *Zardini, E. 40665* (MO,PY); ibidem, 240 m, 26 May 1995, *Zardini, E. 42605* (MO,PY); **Caaguazú:** Guayaki. Ruta 2, km 158, 200 m, 22 May 1987, *Zardini, E. 2462* (BRIT,FCQ,MO,NY,TEX); Guayaquí, between Coronel Oviedo and Caaguazú; Route 2, km 158-159, 230 m, 26 Aug 1993, *Zardini, E. 37053* (FCQ,MO); ibidem, 230 m, 26 Aug 1993, *Zardini, E. 37054* (FCQ,MO); **Paraguarí:** Ybicuí, Parque Cesar Barrientos, 200 m, 19 Oct 1978, *Bernardi, L. 18131* (NY,P); Parque Nacional Ybycui, 300 m, 22 Jul 1984, *Hahn, W.A. 2624* (MO,PY,US); ibidem, 200 m, 18 Mar 1980, *Hartshorn, G.S. 2481* (MO,NY,US); ibidem, 300 m, 20 Jan 1984, *Little-Jr, E.L. 40026* (NY); ibidem, 1 km around administration area, 150 m, 23 Jun 1988, *Zardini, E. 5000* (MO,PY); Cerro Palacios, 250 m, 8 Sep 1988, *Zardini, E. 7139* (BRIT,FCQ,MO,NY); Parque Nacional Ybycu'í, administración-Arroyo Corrientes-La Rosada, 150 m, 4 Jun 1989, *Zardini, E. 12459* (MO,PY); National Park Ybycu'í, 6 km S of northwestern corner of park along

tributary of Arroyo Mina, 220 m, 20 Aug 1991, *Zardini, E. 28372* (MO,PY); **San Pedro**: Colonia 8 de diciembre, 12 kms al SE de Choré, 200 m, 30 Sep 1987, *Zardini, E. 3192* (MO,PY); Yaguareté forest, northern boundary, 180 m, 23 Aug 1995, *Zardini, E. 43443* (MO,PY).

197. *P. omissa* Koehne, Bot. Jahrb. Syst. 52: 325. 1915. Type: Brazil: São Paulo, *Sellow, F sn* (sintypes F! (fragment)).

This species can be distinguished by the ovate-oblong to elliptic-oblong subcoriaceous leaves, 5-10.5 x 2.1-3.8 cm, opaque on both sides, with petioles relatively straight, 8-13 x 0.7-1.2 mm, base rounded to obtuse and decurrent until half the length of the petiole, apex attenuate to acuminate, venation pattern weak brochidodromous and festooned, secondary veins arcuate, intersecondaries parallel to secondaries, tertiaries irregular reticulate, lateral veins plain on both sides, little conspicuous in dry specimens, and 2 sub-basal glands (0.7-0.9 mm wide), placed at 2-7 mm from the base and 0.5-3 mm from the margin. The floriferous shoots are sub-erect, 2.5-5 cm long; the flowers have flexuous pedicel 2-4 x 0.3-0.4 mm, infundibuliform hypanthium 2.5-2.8 mm wide and anthers 0.5-0.6 mm long. The fruits are globose to slightly oblate, apiculate, 8-10 x 9-11 mm, with the edges of the suture slightly prominent.

It is similar to *P. oleifolia*, which however has generally narrower leaf blades, longer flexuous petioles, eucamptodromous-like venation and flexuous racemes.

**Distribution.** Distributed in mid to high elevation Atlantic moist forests (Araucaria moist forests) of southeastern Brazil in the states of Sao Paulo, Santa Catarina and Paraná.

**Elevation range.** (300-) 800 – 1800 m.

**Local names.** marmeleiro, pecegueiro brabo (Brazil).

**Material examined.** (19) **BRAZIL. Paraná:** Quatro Barras, Rio Taquari, 815 m, 21 Jan 1975, *Hatschbach, G.* 35781 (WAG); Uniano da Vitoria, Colonia Correntes, 800 m, 26 Feb 1968, *Koczicki, C.* (UC); Tijucas do Sul, Represa de Vassorooca, 900 m, 26 Jan 1975, *Kummrow, R.* 856 (UC); Campo Largo, serra do San Luiz de Puruna, 1200 m, 23 Feb 1960, *Pereira, E.* 5407 (NY); **Rio de Janeiro:** Nova Friburgo, Reserva de Macae de cima. Sitio Sophronites, 1100 m, 16 Jul 1987, *Pessoa, S.V.A.* 207 (NY); **Santa Catarina:** Blumenau, Morro Spitzkopf, 850 m, 23 Apr 1953, *Reitz, P.R.* 564 (BRIT,NY,UC,US); Campo dos Padres, 1800 m, 18 Dec 1948, *Reitz, P.R.* 2516 (US); Campo Alegre, Morro de Iquererim, 900 m, 5 Sep 1957, *Reitz, P.R.* 4806 (US); S. Bento, Rio Negrinho, 800 m, 24 Jan 1953, *Reitz, P.R.* 5190 (UC,US); Sao José, Serra da Boa Vista, 1800 m, 2 Feb 1953, *Reitz, P.R.* 5445 (UC,US); Urussanga, Pinhal da Companhia Lauro Muller, 300 m, 21 Feb 1959, *Reitz, P.R.* 8505 (US); Sao José, Serra da Boa Vista, 800 m, 27 Dec 1960, *Reitz, P.R.* 10628 (US); Sao Francisco do Sul, Morro do Campo Alegre, 1200 m, 20 Jan 1961, *Reitz, P.R.* 10675 (US); Sao José, Serra da Boa Vista, 1000 m, 21 Jan 1961, *Reitz, P.R.* 10769 (US); Campo Alegre, Morro de Iquererim, 1200 m, 8 Nov 1956, *Smith, L.B.* 7371 (GH,US); Porto União, 950 m, 5 Feb 1957, *Smith, L.B.* 10812 (US); **São Paulo:** Jundiai, 900 m, 23 Sep 1998, *Digiampietri, E.A.* (DAV,HRCB); ibídem, 800 m, 1984, *Gandolfi, S.* 10602 (NY); Parque municipal da Serra do Japi, 983 m, 19 Oct 2004, *Junqueira, A.B.* 209 (NY).

197a. *P. omissa* Koehne var. nov. “*itajai-coastal*”

This new proposed variety of *P. omissa* can be differentiated from the main form by the placement of the glands closer to the midrib (vs. generally submarginal), the shorter sub-erect racemes (1.5-3 vs 2.5-4.5 cm) and the smaller flowers (hypanthium 2-2.3 mm vs. 2.5-2.8 wide and anthers 0.3-0.4 vs 0.5-0.6 mm).

**Distribution.** Distributed in lowlands of the hills next to the coast of the state of Santa Catarina (Brazil) generally at lower elevations than *P. omissa*.

**Elevation range.** 50 – 780 m.

**Local names.** alma de serra, arma de serra, pecegueiro Brabo (Brazil).

**Material examined.** (13) **BRAZIL. Rio Grande do Sul:** Caxias do Sul, Bairro 1o de maio, 780 m, 28 Dec 1999, *Kegler, A. 478* (US); **Santa Catarina:** Brusque, Mata do Hoffmann, 50 m, 21 Jun 1951, *Klein, R. 101* (US); ibidem, 50 m, 21 Jun 1951, *Klein, R. 221* (UC,US); Itajaí, Morro de Fazenda, 320 m, 9 Sep 1955, *Klein, R. 1562* (NY); Blumenau, Bom Retiro, Lote Hering, 250 m, 10 Mar 1960, *Klein, R. 2402* (NY); Orleaes, 150 m, 16 Dec 1946, *Reitz, P.R. C 1722* (NY,UC,US); Itajaí, Braco Joaquim, 400 m, 18 Jul 1954, *Reitz, P.R. 1969* (NY); Lauro Muller-Urussanga, 300 m, 17 Jul 1958, *Reitz, P.R. 5792* (NY); Lauro Muller, Pinhal da Companhia. Lauro Muller Urassanga, 300 m, 20 Sep 1958, *Reitz, P.R. 7195* (UC); Rio de meio, Lauro Muller, 350 m, 15 Jan 1958, *Reitz, P.R. 8226* (F,NY); Pinhal da Companhia, 300 m, 25 Apr 1955, *Reitz, P.R. 8807* (UC); Vargem Grande, 350 m, 11 Jun 1959, *Reitz, P.R. 8855* (US); **São Paulo:** Iporanga, Parque Estadual Alto Ribeira, Camino acceso nucleo Santana, 370 m, 16 May 1996, *Franco, G.A. 1423* (UEC).

198. *P. oxyphylla* Koehne, Bot. Jahrb. Syst. 52: 328. 1915. Type: Paraguay: Caaguazú, *Balansa, B. 2380a* (sintypes, P!(3)).

*Prunus douglasii* Basualdo & Zardini, Candollea 47: 252, fig. 2. 1992. Type: Paraguay. Amambay: Sierra de Amambay, in altiplanicie et declivibus, 570 m, Mar 1907, *Rojas in Herbarium Hassler, T. 10194 a* (holotype, G; isotypes, GH!, K!, NY!, P!, US!)

This species can be distinguished by the elliptic-oblong to lanceolate-oblong coriaceous leaves, 3-7.5 x 1.2-2.5 cm, slightly falcate and asymmetric, opaque on both sides, with relatively flexuous petiole 7-11 x 0.7-1 mm, base acute and shortly decurrent, apex attenuate and mucronulate, venation pattern brochidodromous festooned, secondary veins relatively straight and emerging at 30-40 degrees from the midrib, plains below and slightly prominent above, intersecondaries sinuous and parallel to secondaries, tertiaries irregular reticulate and 2 glands (0.6-1 mm across) placed submarginally at 2-4 mm from the base. The floriferous shoots are erect, 0.5-2 cm long, the flowers have pedicels 2-3 mm long, the hypanthium

infundibuliform, 2.5-3 mm wide, and anthers 0.2-0.3 mm long. The fruits are prolate, apiculate, 7-8 x 6-7 mm.

The most similar species is *P. subcoriacea* which has larger elliptic leaves with relatively shorter petioles and smaller flowers on longer more flexuous racemes. On the other hand, *P. douglasii*, a rather obscure name very briefly described without a discussion, was published based on 2 specimens formerly assigned to *P. oleifolia* by Koehne (1915), but that differs considerably from that entity considering its smaller more coriaceous leaves, with bigger glands and shorter racemes with flowers shortly pedicelated. However, the specimen named as type (Hassler 10194a) can be associated more precisely with the type and other material here assigned to *P. oxyphylla* based on its narrow elliptic coriaceous leaves with sub-basal glands, flexuous petioles and short racemes. On the other hand, the only paratype designated for *P. douglasii* (Hassler 11056), which has bigger leaves, longer subflexuous racemes and bigger flowers; is here considered to belong to a different taxon, namely a new variety of *P. subcoriacea*.

**Distribution.** Distributed in lowlands in the transition between upper Paraná Atlantic forests and humid Chaco in southern Paraguay.

**Elevation range.** 160 - 300m.

**Material examined.** (2) **Caaguazú:** 300 m, 10 Apr 1876, *Balansa, B. 2380 a* (P,US); **Caazapá:** Abai, 160 m, May 1932, *Rojas, T. 5945* (AS,MO).

199. *P. ravenii* Basualdo & Zardini, *Candollea* 47: 252, fig. 1. 1992. Type: Paraguay: Caaguazú, 2 km N of Arroyo Guaranungua. Cerrado scrub. 250 m, 5 Jan 1991, *Zardini, E.; Velázquez, U. 25660* (holotype, AS; isotype, MO!).

This species is distinguishable because the elliptic-oblong to elliptic-obovate chartaceous leaves, 6-8.5 x 2.2-3 cm, opaque on both sides, pale colored below, with petioles 5-7 x 0.6-1 mm, base acute, apex acute to shortly acuminate, margin revolute, secondary veins arising at 40-50 degrees from the midrib and forming a brochidodromous pattern, intersecondaries connecting to the middle of the immediately subjacent lateral vein, tertiaries alternate percurrent and almost inconspicuous, lateral veins slightly prominent below and plain above, and 2 elliptic glands (0.6-1 mm across) placed at 0-7 mm from the base and 0-3 mm from the midrib. The floriferous shoots are erect to suberect, 1-1.8 cm long, the flowers have pedicels 0.5-1.5 mm long, hypanthium campanulate 2-2.3 mm wide and anthers 0.2-0.3 mm long. The fruits are globose to slightly prolate, apiculate, 6-7 x 5-7 mm.

This species is close to *P. subcoriacea* but differs by the chartaceous and smaller pale drying leaves and the short racemes with smaller flowers in general.

**Distribution.** Distributed in lowlands of central and southern Paraguay with forests and cerrado shrublands.

**Elevation range.** 135 – 280 m.

**Local names.** ivaro (Paraguay).

**Material examined.** (10) PARAGUAY. **Alto Paraná:** 23 km N of Hernandarias, 275 m, 15 Dec 1982, *Hahn, W.A. 901* (MO, PY); Reserva Biol. Itabo, 35 km W rio Parana, 280 m, 10 Oct 1990, *Schinini, A. 27093* (CTES,GH,MO); **Amambay:** National Park Cerro Corá, around Río Aquidabán, 250 m, 13 Nov 1999, *Zardini, E. 52669* (FCQ,MO); **Caazapá:** Tavai, 250 m, 1 Nov 1988, *Soria, N. 2548* (MO); Estancia Tapytá of Shell Forestry Ltd, 220 m, 15 Dec 1999, *Zardini, E. 53070* (FCQ,MO); **Cordillera:** Near Altos, 135 m, 24 Jul 1969, *McDaniel, S. 12015* (MO); **Paraguarí:** Rt. 1, between Quindy and Caapucu, near km 246, ca. 0.5 km N of road to Lago Ypoa, 250 m, 12 Aug 1995, *Landrum, L. 8653* (ASU,MO); **San Pedro:** Colonia 8 de diciembre. Borde Arroyo Mboi, 200 m, 1 Oct 1987, *Zardini, E. 3264* (MO,PY); Yaguarete Forest (Sustainable Forest Systems site): Trail to Confluencia, 190 m, 30 Jul 1996, *Zardini, E. 45251* (FCQ,MO).



200. *P. reflexa* (Gardner) Walp., Rep. 2: 910. (1843). *Cerasus reflexa* Gardner, Hook. Lond. Journ. Bot. II.: 342. 1843.; *Laurocerasus reflexa* (Gardner) M.Roem., Synops. III. 91. 1847.; *Prunus myrtifolia* (L.) Urb. var. *reflexa* (Gardner) Koehne, Bot. Jahrb. Syst. 52: 321. 1915. Type: Brazil: Rio de Janeiro, Serra dos Orgaos, 1838, *Gardner 371* (sintypes G! (2), K! (2), P! (2), US! (2)).

This species can be recognized by the elliptic-oblong to ovate-elliptic chartaceous to sub-coriaceous leaves, 7.5-10 x 2.8-4.2 cm, opaque on both sides, with petiole 11-20 x 0.7-1 mm, base acute and decurrent, apex shortly acuminate, venation pattern weak brochidodromous, secondary veins arcuate, intersecondaries half to 3/4 as long as the secondaries, tertiaries irregular reticulate and conspicuous below, lateral veins plain below, impressed above, and 2 rounded to elliptic glands (sometimes absent), 1.2-2 mm wide, located at 5-12 mm from the base and 1-3 mm from the margin. The floriferous shoots are sub-erect, 3.5-6 cm long; the flowers have pedicels 3-5 mm long, hypanthium campanulate 2.7-3.3 mm wide and anthers 0.3-0.4 mm long. The fruits are globose, 7-9 mm wide.

Comparison with some similar new taxa proposed here, are provided under their respective descriptions.

**Distribution.** Distributed in mid-elevation Atlantic forests near to the coast from the state of Santa Catarina to Rio de Janeiro.

**Elevation range.** 150 – 1200 m.

**Local names.** pecegueiro bravo (Brazil).

**Material examined.** (13) **BRAZIL.** sine loco, 1842, *Claussen, P.* (P); Corcovado, Rio de Janeiro, 700 m, Jan 1833, *Riedel, L. s.n.* (NY,US); Pr. F. Domingo, Aug 1822, *Riedel, L. s.n.* (MO,NY); **Rio de Janeiro:** Serra de Teresópolis, 1150 m, 8 Apr 1959, *Duarte, A. 4718* (NY); Estado Guanabara. Sumare, 720 m, 16 Mar 1962, *Duarte,*

A. 6278 (COL,MO,NY,US); Vista Chinesa, 500 m, 30 Jun 1950, *Duarte, A. 7022* (NY); Gavea, 700 m, 11 Jul 1867, *Glaziou, A. 1441* (P); Morro Sumare, 600 m, 28 Mar 1960, *Pereira, E. 5643* (NY); In umbr aquil montaos et la Estrella et S dos Orgaos, 700 m, Mar 1833, *Riedel, L. 1272* (MO,NY,US); **Santa Catarina**: Itajaí, Morro da Fazenda, 150 m, 4 Mar 1954, *Reitz, P.R. 1709* (NY,UC,US); **São Paulo**: Cananeia Ilha do Cardoso, Moro do trapiche, 600 m, 11 Jul 1985, *de Barros, F. 1155* (F).

201. *P. sellowii* Koehne, Bot. Jahrb. Syst. 52: 321. 1915. Type: Brazil: Sao Paulo, Campos da Bocaina (Rio de Janeiro), Sept 1876, *Glaziou, A. 8400* (sintype, K!). Brazil: sine loco, 1841, *Martius, C. 75* (sintypes, G! (4), GH!, K! (2), MO!, NY!). Brazil: Minas Gerais, 23 Jan 1846, *Widgren, J.F. s.n.* (sintypes, M!, P!).

This species can be recognized by the elliptic to elliptic-lanceolate leaves, 7-11 x 2.2-3.8 cm, slightly lustrous above, with petioles 8-15 x 1-1.3 mm, base acute and shortly decurrent, apex shortly acuminate, venation pattern brochidromous, secondary veins arcuate, slightly prominent below, intersecondaries running parallel to secondaries up to half their length, tertiaries percurrent and perpendicular to the midrib but inconspicuous, and 2 elliptic glands (0.8-1.2 mm diam), crateriform, placed at the base on the decurrent region attached to the midrib and as a consequence almost inconspicuous. The floriferous shoots are flexuous, 2.5-6 cm long, the flowers have pedicels 1.5-4.5 mm long, with early deciduous bracteoles, the hypanthium is campanulate, 2-2.7 mm wide and the anthers are 0.3-0.4 mm wide. The fruits are slightly oblate, 8-10 x 9-12 mm.

This species has been commonly confused with *P. brasiliensis*, which however has less coriaceous leaves with sub-basal macular glands, more conspicuous lateral veins and flowers without bracteoles. The collection *Martius 74* cited as original material for this species, correspond to a new taxa referenced below.

**Distribution.** Distributed in mid-elevation Atlantic forests of south-eastern Brazil in the states of Paraná, Sao Paulo and Minas Gerais.

**Elevation range.** 750 – 1800 m.

**Local names.** pessegueiro bravo (Brazil).

**Material examined.** (15) **BRAZIL. Minas Geraes:** Pocos de Caldas, 1350 m, 9 Jan 1919, *Cruz, H.O. 2750* (GH); Lima Duarte, Parque estadual de Ibitipoca, 750 m, 21 Nov 2006, *Forzza, R.C. 4328* (NY); **Minas Gerais:** Caldas, Pedra Branca, 1800 m, 24 Jan 1980, *Krapovickas, A. 35473* (MO,NY); sine loco, Feb 1839, *Riedel, L. 58* (GH,P); Pocos de Caldas, Santa Rosalia, 1400 m, 26 Oct 1981, *Tamashiro, J.Y. 1260* (UEC); **Paraná:** Anhangava, 900 m, 5 Mar 1996, *Portes, M.C. 188* (MEXU); Serra da Baitaca, 1000 m, 20 Jul 1993, *Tiepolo, G. 54* (MEXU); **São Paulo:** Estrada do Cunha, 1000 m, 11 Jul 1980, *A.C.F. 12360* (NY); Itarare, Estancia Vale do Paraiso, 950 m, 9 Feb 2000, *de Barros, F. 3008* (NY); Monte Alegre dos Sul, 900 m, 27 Aug 1949, *Kuhlmann, M. 1905* (MO); Campos de Bocaina, 1550 m, 7 Apr 1894, *Loefgren, A. 2372* (SP).

202. (“*P. longifolia*”) *P. sellowii* Koehne var. "*longifolia*" Koehne, Bot. Jahrb. Syst. 52: 322 (1915).

Type: Brazil: Minas Gerais, Ouro Preto, *Sena, J.C.* (sintype, HBG!). Brazil: Minas Geraes, Barbacena, 1 Jau 1887, *Glaziou, A. 15945* (sintype, P!).

This species can be recognized by the elliptic-oblong sub-coriaceous leaves, 10-15 x 3-4.8 cm, slightly lustrous above, with petioles 9-18 x 1.2-1.6 mm, base acute and shortly decurrent at the end, apex attenuate, venation pattern brochidodromous festooned, secondary veins shortly arcuate anastomosing at 1/4 from the margin and emerging at 60-70 degrees from the midrib, intersecondaries 2-3 between secondaries and half to 3/4 as long as them, tertiaries irregular reticulate but little conspicuous and 2 basal elliptic glands attached to the midrib. The floriferous shoots are sub-erect, 4-8 cm long; the flowers have pedicels 1.5-3.5 mm long, hypanthium campanulate, 2.5-2.8 mm wide and anthers 0.4-0.5 mm long.

This taxon was proposed by Koehne (1915) as a variety of *P. sellowii*; however, I suggest it should be considered a separated species because the considerably larger leaves with longer petioles and the longer sub-erect racemes.

**Distribution.** Distributed in mid-elevation rocky outcrops of the southern part of the state of Minas Gerais, Brazil.

**Elevation range.** 850 – 1750 m.

**Material examined.** (6) **BRAZIL. Minas Gerais:** Serra de Espinhaço, Eastern slopes of pico do Itambe, 1310 m, 13 Feb 1972, *Anderson, W.R. 35907* (US); Rocky slopes with shrubs and low trees, ca. 17 km NE of Diamantina, road to Mendanha, 1250 m, 29 Jan 1969, *Irwin, H.S. 22856* (CAS,IBE,MO,TEX); Cerrado on middle slopes of Pico de Itacolomí, ca. 3 km S of Ouro Preto, 1750 m, 31 Jan 1971, *Irwin, H.S. 29472* (BRIT,MO,TEX); Patrocínio, Fazenda Chalé, 850 m, 1 Mar 1989, *Mendonça, R.C. 1256* (US).

203. *P. sellowii* Koehne var. "*longifolia*" Koehne fo. *petiolaris* Koehne, Bot. Jahrb. Syst. 52: 322 (1915). Type: Brazil: Minas Geraes, Serra do Itatiaia, *Ule, E. 135-3328* (sintype, HBG!).

This taxon can be distinguished by the elliptic-oblong coriaceous leaves, 9-12 x 2.7-4.5 cm, lustrous above, with obtuse to acute base, concave at the end and conspicuously decurrent into the petiole, apex acuminate, the petioles are relatively long and flexuous, 12-23 x 0.8-1.2 mm, the secondary veins are brochidodromous festooned, tertiaries alternate percurrent, lateral veins plain below and above, and 2 sub-basal rounded glands attached to the midrib placed at 2-3 mm from the base. The floriferous shoots are sub-flexuous, 3.5-6 mm long; the flowers have pedicels 1-3.5 mm long, hypanthium wide campanulate, 3-3.5 mm wide, and anthers 0.3-0.4 mm long. The fruits are globose, 10-12 mm wide.

This taxon could be better considered as variety of *P. sellowii* instead of being a form of the variety *longifolia*. The actual status of this taxon should be studied in the future.

**Distribution.** Distributed mainly in mid-elevation forests of the Serra da Mantiqueira, a mountain range close to the coast in the states of Rio de Janeiro, Minas Gerais and São Paulo.

**Elevation range.** 550 – 1800 m.

**Material examined.** (10) **BRAZIL. Minas Gerais:** sine loco, 1816, *de Saint-Hilaire, A. 169* (P); Lima Duarte, Parque Estadual do Ibitipoca, ao lado da guarita de entrada seguindo o aceiro, 1400 m, 23 Jan 2007, *Forzza, R.C. 4393* (NY); **Rio de Janeiro:** Mts Orgaos, Below the waterfall, 600 m, Jun 1878, *Miers, J. 4482* (NY,P); Itaoca, Parque Nacional do Itatiaia, 850 m, 17 Aug 1969, *Sucre, D. 5803* (COL,MO,NY,RB,US); Mun. Nova Friburgo, Reserva Ecológica Municipal de Macaé de Cima, Rua Garlippi, 550 m, 6 Apr 1989, *Vieira, C.M. 27* (MO); **São Paulo:** 12 km norte de Lavrinhas, 1300 m, 6 Apr 1995, *Koch, I. 228* (UEC); Campos de Jordao, 1700 m, Jan 1946, *Leite, J.E. 3915* (GH); Campos de Cunha, estrada Campos de Cunha-Silveiras, 943 m, 18 Jan 2006, *Lombardi, J.A. 6270* (DAV,HRCB); Município de Águas da Prata. Estrada de Águas da Prata-São Roque da Fartura, a km de Águas da Prata, 1460 m, 11 Jan 1994, *Souza, V.C. 5016* (MO,NY).

204. *P. subcoriacea* Chod. et Hassl. ex Koehne, Bot. Jahrb. Syst. 52: 324. 1915. *Prunus sphaerocarpa* Sw. fo. *subcoriacea* Chod. et Hassl., Bulletin de l'Herbier Boissier, sér. 2, 3: 799. 1903. Type: Paraguay: In regione fluminis Curiguaty, Sierra de Maracayu, 1898, *Hassler, E. 4595* (sintypes F!, GH!, P! (2), UC!, W!).

This is a morphological variable species that can be recognized by the elliptic-oblong to obovate-oblong sub-coriaceous (and sometimes coriaceous leaves), 6-10.5 x 2-4.5 cm, opaque on both sides or slightly lustrous above, pale green below, with petioles 4-10 x 1-1.5 mm, base rounded to obtuse and less frequently acute, apex acute to obtuse (sometimes rounded), venation pattern brochidodromous festooned,

secondary veins relatively straight along their first half, emerging at 40-70 degrees and anastomosing each other into the outer 1/5 to 1/4 of the midrib-margin axis, intersecondaries parallel to secondaries and extending for around half its length, tertiaries irregular reticulate, secondaries and tertiaries in general plain and very conspicuous below and either plain or impressed above, and 2 glands (1-1.8 mm wide) placed around the first pair of secondary veins at 2-8 mm from the base and 0-5 mm from the midrib. The floriferous shoots are sub-erect, 2.5-5 cm long; the flowers have pedicels 1.5-4 mm long, hypanthium campanulate 2-2.5 mm wide and anthers 0.3-0.5 mm long. The fruits are globose to slightly oblate, apiculate, 6-8 x 7-8 mm.

In general; the combination of relatively small leaves, short petioles, sub-basal laminar glands, tertiary and quaternary venation conspicuous below and small fruits can help to distinguish this species from other similar taxa in the region. Koehne (1915) clarified the ambiguous idea of *P. sphaerocarpa* briefly presented by Chodat and Hassler by separating the South American material from the typical forms of the Caribbean widespread *P. myrtifolia*, although considering differences at the level of variety. The form *subcoriacea* of *P. sphaerocarpa* was originally a name not validly published since not specimen was explicitly cited in the original publication (as referred in the Art. 40.3 (note 2) of the International Code of Nomenclature).

**Distribution.** Widely distributed in Cerrado type vegetation and riparian forest from central Paraguay to Uruguay and southeastern Brazil.

**Elevation range.** 20 – 1050 m.

**Local names.** faruman sin espinas (Uruguay), persiguerillo, persiquero (Argentina), pessegueiro bravo (Brazil).

**Material examined.** (172) ARGENTINA. **Corrientes:** Santo Tomé, Galarza, próximo al puesto de guardaparques, 80 m, 25 Nov 1999, *Arbo, M.M.* 8505 (CTES,MO); Ituzaingó, 45 km E de Posadas, por ruta 12, 150 m, 12 Sep 1986, *Davina, J.* 46 (GH,MO,UC); 20 km E de Ituzaingo. en barrances del rio Paraná, 100 m, 14 Sep 1970,

*Krapovickas, A. 16030* (MO,P,TEX,UC); Santo Tomé, Establecimiento las Marias, 160 m, 2 Dec 1970, *Krapovickas, A. 16892* (GH); Ituzaingó, Isla Apipé Grande, Puerto San Antonio, 75 m, 10 Dec 1973, *Krapovickas, A. 24088* (MO); Santo Tomé, Ayo. Chimiray, 100 m, 23 Sep 1974, *Krapovickas, A. 26252* (UC); Ituzaingó, Puerto Valle, 90 m, 20 Oct 1954, *Myndel Pedersen, T. 2949* (P,US); Estancia Puerto valle, 100 m, 24 Oct 1954, *Pedersen, T.M. 2949* (GH); Garapé, 90 m, 9 Dec 1984, *Tressens, S.G. 2622* (GH); Sub Prefectura Dest. Garapé, 5 km NE de Ayo. Garapé y Rio Paraná, 100 m, 21 Sep 1986, *Tressens, S.G. 3779* (ASU,MO,TEX); Santo Tomé, Ea. San Benito, 22 Km NW de Santo Tomé. Monte Mberity, 80 m, 9 Apr 1992, *Tressens, S.G. 4059* (CTES); Ea La Gabina, 120 m, 5 Nov 1996, *Vanni, R.O. 3754* (ASU); **Misiones:** Apóstoles, 5 km NE de Azara, camino a Concepcion de la Sierra, 130 m, 6 Sep 1993, *Arbo, M.M. 5877* (ASU,GH,MO); Cainguás, Predio UNLP: valle del arroyo Cuña Pirú, picada cerca del puente sobre el arroyo Cuña Pirú, 200 m, 23 Sep 1998, *Biganzoli, F. 320* (MO,NY,SI); Dep. Concepcion de la Sierra: entre C. de la Sierra y Azara, 150 m, 24 Aug 1978, *Cabrera, A.L. 29437* (MO); Iguazú, Parque Nacional Iguazú, sendero Spur, 180 m, 24 Oct 1991, *Hunziker, J.H. 11901* (MO,SI); ibidem, Cataratas, 190 m, 24 Oct 1991, *Hunziker, J.H. 11914* (MO); Apóstoles, 120 m, 22 Sep 1969, *Krapovickas, A. 15480* (MO,SI,TEX,UC); ibidem, 120 m, 22 Sep 1969, *Krapovickas, A. 15483* (SI,UC); Puerto Rico, 130 m, 28 Oct 1948, *Montes, J.E. 3357* (P); Frontera-Barrancon, Pepiri Guazu, 450 m, 4 Nov 1949, *Montes, J.E. 7083* (P); Candelaria, Loreto, 220 m, 6 Dec 1955, *Montes, J.E. 14638* (MO,US); San Ignacio, camino desde la casa de Horacio Quiroga hacia Prefectura de San Ignacio, 150 m, 21 Sep 2000, *Mulgura de Romero, M.E. 2202* (SI); San Pedro, ruta Nacional 14, desde la ruta provincial 17 hacia Tobuna, 750 m, 11 Mar 2002, *Mulgura de Romero, M.E. 3226* (SI); Candelaria, Santa Ana, 150 m, 18 Nov 1909, *Rodríguez, F.M. 117* (SI); Capital, Santa Inés, 125 m, 21 Aug 1987, *Rodríguez, M. 54* (SI); 15 km S de Posadas por Ruta 105, 140 m, 21 Aug 1987, *Schinini, A. 25444* (CTES,GH,MO,SI,UC); Guaraní, Predio Guarani. Picada al Ayo. Paraiso, 500 m, 8 Sep 1994, *Schinini, A. 28729* (MO); Predio Guarani, picada al ayo. Paraiso, 500 m, 9 Sep 1994, *Schinini, A. 28762* (GH,MO); Camino a predio Guarani, 475 m, 27 Sep 2007, *Schinini, A. 36880* (ASU); San Ignacio, Santo Pipó, 160 m, 5 Jun 1947, *Schwarz, G.J. 5118* (MO); Gobernador Roca, 200 m, 7 Oct 1948, *Schwarz, G.J. 6316* (CAS,MO); Colonia Corpus, 140 m, 20 Oct 1948, *Schwarz, G.J. 6446* (CAS,LIL,MO); Cainguás, Puerto Rico, 110 m, 23 Dec 1947, *Schwindt, E. 560* (DS,MO); Capiovy, 160 m, 4 Oct 1948, *Schwindt, E. 809* (MO); Apóstoles, Camino de Cerro Azul a Apóstoles, 140 m, 19 Oct 1975, *Zardini, E. 1035* (MO); Oberá, Ruta Prov. 103, de San Martín a Martires, 200 m, 26 Sep 1997, *Zuloaga, F. 6514* (MO,SI). **BRAZIL.** Rio Grande de Sul, Gloria p. Alegre, 100 m, 20 Sep 1949, *Rambo, B. 43478* (MO,TEX); Sao Carlos, es Ytúa, 800 m, Feb 1834, *Riedel, L. s.n.* (US); Localidade: RS - Mun. de

Jaquirana-Barra do Arroio Novilhos, 830 m, 17 Dec 1999, *Wasum, R. 366* (MO); **Paraná:** Curitiba, Barigui, 920 m, Oct 1960, *Braga, R. 1031* (US); Barigui de Portao, 930 m, 6 Sep 1960, *Braga, R. 1715* (US); Serrinha, in silvule, 1000 m, 8 Dec 1908, *Dusén, P. s.n.* (MO); Curityba, in silvula subuliginosa, 1000 m, 8 Sep 1908, *Dusén, P. 6679* (GH,MO,P,US); Terrinha, Serrinha, 700 m, 14 Oct 1909, *Dusén, P. 8544* (US); Tamanduá, in silaula, 890 m, 24 Nov 1910, *Dusén, P. 10807* (MO); Serrinha ad marginem sivuvale, 840 m, 8 Oct 1914, *Dusén, P. 15563* (GH,MO,UC); Ponta Grossa, Parque de Vila Velha, 850 m, 29 Sep 1965, *Hatschbach, G. 12834* (US,WAG); Campo Mourao, 580 m, 13 Oct 1965, *Hatschbach, G. 12964* (US); Chapadão S. Antonio (Arapoti), 620 m, 10 Oct 1968, *Hatschbach, G. 19957* (MO); Lapa. col. Wietmarsum, 1050 m, 8 Oct 1972, *Hatschbach, G. 30529* (GH,MO,TEX,UC); Sao José des Pinhais, Aeroporto Afonso Penna, 900 m, Sep 1955, *Moreira Filho, H. 21* (UC,US); Curitiba, Barigui de Santa Felicidade, 900 m, Jan 1956, *Moreira Filho, H. 101* (US); Araucaria, Estrada de rodagem para Contenda, 910 m, Sep 1965, *Moreira Filho, H. 330* (US); Sao José des Pinhais, Aeroporto Afonso Penna, 900 m, 28 Aug 1961, *Moreira Filho, H. 377* (US); Castro, Carambeí, 950 m, 17 Dec 1965, *Reitz, P.R. 17856* (US); Campina Grande do Sul, Araçatuba, 950 m, 3 Oct 1966, *Stellfeld, C. 1622* (US); **Rio Grande do Sul:** Caxias do Sul, Parque Getulio Vargas, 760 m, 3 Oct 2004, *Brunetto, A. 105 e* (US); Erechim, 705 m, *Butzke, A. 7440* (US); Estação, 750 m, *Butzke, A. 7682* (US); Áurea, 580 m, *Butzke, A. 7706* (US); estrada Erechim, para Aurea, 780 m, 29 Oct 1993, *Butzke, A. 10803* (US); Canela, 800 m, 1 Oct 1998, *Diesel, S. 1631* (US); sine loco, *Herbier Imperial du Bresil 1626* (P); ill São Leopoldo, 80 m, Sep 1927, *Herter, W.G. s.n.* (MO); ibidem, 20 m, 27 Sep 1935, *Herter, W.G. 965* (GH); Guaritas, Caçapava do Sul, 300 m, 25 Sep 1984, *Irgang, B. ICN 92598* (MO); Caxias do Sul, Ana Rech, 850 m, 20 Oct 2001, *Kegler, A. 1141* (US); Porte Alegre, 200 m, 24 Aug 1892, *Malme, G.A. 102* (K, MO); Campus Universitario, 780 m, 23 Oct 2000, *Marchetto, C. 3* (US); Bairro Reolon, 780 m, 9 Oct 2004, *Marchetto, C. 5* (US); Montenegro, 80 m, 10 Sep 1945, *Rambo, B. 29658* (GH); Vila Oliva, S. FR. de Paula, 770 m, Jan 1947, *Rambo, B. 31137* (MO); Portao, Sao Leopoldo, 80 m, 20 Jul 1949, *Rambo, B. 42665* (P); ibidem, 100 m, 23 Sep 1949, *Rambo, B. 43537* (US); ibídem, 60 m, 25 Oct 1950, *Rambo, B. 49034* (US); Passo do Socorro, 930 m, 26 Dec 1951, *Rambo, B. 51461* (US); Belem Velho-Gloria, 230 m, 12 Sep 1897, *Reineck, M. 15* (P); Herval, Arroio Jaguarao, 120 m, 8 Jan 1980, *Sehnem, A. 16762* (NY); Sao Francisco de Paula, 850 m, 2 Oct 1999, *Wasum, R. 154* (US); Jaquirana, Arroio dos Novilhos, 830 m, 17 Dec 1999, *Wasum, R. 361* (US); Vacaria, 900 m, 6 Oct 2000, *Wasum, R. 681* (US); RS-Mun. de São Francisco de Paula RS-235, 830 m, 8 Oct 2000, *Wasum, R. 684* (MO); Caxias do Sul - Ana Rech - Faxinal, 700 m, 22 Oct 1988, *Wasum, R. 4708* (MO,US); ibidem, 700 m, Dec 1988, *Wasum, R. 4741* (BRIT,MO,US); Flores da Cunha - Otavio Rocha, 700 m, 21



Oct 1989, *Wasum, R. 6252* (MO,US); **Santa Catarina:** Campo Novo, Mafra, 800 m, 7 Sep 1957, *Reitz, P.R. 4916* (UC,US); Campo Alegre, Morro de Iquererim, lower slopes of Pinheiral, 1000 m, 8 Nov 1956, *Smith, L.B. 7383* (UC,US); Lajes, estrada de Rodagem Federal, 900 m, 3 Dec 1956, *Smith, L.B. 8144* (US); Chapecó, fazenda Campo Sao VICENTE, 900 m, 26 Dec 1956, *Smith, L.B. 9499* (US). **PARAGUAY.** Campo Grande, 300 m, 5 Dec 1875, *Balansa, B. 2381 a* (P); Plan de Capitindu, este cordillera Villa Rica, 400 m, 22 Sep 1874, *Balansa, B. 2381 b* (P); Caacupé, Barrerito, 180 m, 21 Oct 1951, *Burkart, A. 18876* (US); Alto Paraná, In regione fluminis, 1909, *Fiebrig, K. 6338* (GH,US); Fort Lopez, In silva, 130 m, 1885, *Hassler, E. 588* (P); In silvis prope Caballero, 650 m, 1885, *Hassler, E. 704* (P); San Bernardino, 200 m, Aug 1885, *Hassler, E. 852* (P); Cordillera de Altos, 200 m, , *Hassler, E. 3230* (P); Rio Paraguay, Sep 1892, *Kuntze, O. s.n.* (NY,US); San Lorenzo del Campo Grande, 100 m, Jul 1948, *Rojas, T. 14201* (US); sine loco, Aug 1987, *Schmeda, G. 934* (US); **Alto Paraguay:** 35 km N of Caapucu. Arroyo Apichapa, 130 m, 4 Aug 1984, *Hahn, W.A. 2706* (MO,PY); **Alto Paraná:** Reserva Biológica Limoy de Itaipu Binacional, 230 m, 18 Apr 1986, *Brunner, D. 1888* (MO,PY); Reserva Biológica LIMoy Sendero vyperé, 250 m, 27 Aug 1989, *Keel, S. 2019* (MO); 26 Km E de Itaquyry, 250 m, 9 Oct 1995, *Schinini, A. 29962* (CTES,MO); Reserva Biológica Limoy, cerca del río Limoy y Embalse de la Represa Itaipú en el río Paraná, 250 m, 15 Oct 1996, *Schinini, A. 31415* (ASU,CTES); Centre Forestier du Haut Parana, 12 km al oeste de Ciudad del Este, 260 m, *Stutz, L.C. 1212* (G); Estancia Río Bonito. Forest IV (Río Bonito), 200 m, 30 Aug 1994, *Zardini, E. 40832* (MO,PY); ibidem, 200 m, 30 Aug 1994, *Zardini, E. 40836* (MO,PY); ibidem, Forest VI, south of forest III (Río Bonito on western side of swamp), 230 m, 28 Nov 1995, *Zardini, E. 43998* (MO,PY); **Amambay:** Parque Nacional Cerro Cora, camino a Colonia Aceite, 280 m, 31 Oct 1997, *Basualdo, I. 6297* (MO); In nemore parvo inter savannam trans rivulum Akidaban, Cerro Cora, 270 m, 10 Dec 1978, *Bernardi, L. 19108* (US); Parque Nacional Cerro Cora. Alrededores de la administración y lugar de "camping", 270 m, 16 Nov 1985, *Brunner, D. 1435* (MO,PY); ibidem, Selva marginal del Rio Aquidaban Nigui, 230 m, 14 Dec 1999, *Ferrucci, M.S. 1403* (ASU,GH); ibidem, 270 m, 1 Nov 1983, *Hahn, W.A. 1755* (MO,PY,TEX,US); Colonia Indigena Ndyvaa, 580 m, Sep 1994, *Soria, N. 6594* (MO); Parque Nacional Cerro Cora, 240 m, Sep 1994, *Soria, N. 6618* (MO); ibidem, 240 m, 23 Aug 1994, *Soria, N. 6634* (MO); ibidem. Margen del Río Aquidabán, 260 m, 8 Jan 1988, *Zardini, E. 4212* (FCQ,MO); **Asunción:** Areguá, 140 m, 22 Jul 1893, *Malme, A.M. 8563* (US); **Caaguazú:** Guayaquí. Between Coronel Oviedo and Caaguazú; Route 2, km 158-159, 230 m, 26 Aug 1993, *Zardini, E. 37041* (AS,MO); **Caazapá:** Tavai. Prop. de la Flia Bogado, 320 m, 1 Nov 1988, *Basualdo, I. 1777* (MO); Ruta Caazapa-Yuty, desvío a Tres de Mayo a 1 km de Capitindy, 120 m, 11 Sep 1987, *Zardini, E. 3066* (BRIT,FCQ,MO,NY,TEX); Tavai. Gallery forest 1

km N of Hospital, 230 m, 28 Oct 1988, *Zardini, E. 7685* (FCQ,MO,TEX); *ibidem*, 200 m, 28 Oct 1988, *Zardini, E. 7702* (BRIT,FCQ,MO,NY); Estancia Tapytá of Shell Forestry Ltd, 250 m, 13 Dec 1999, *Zardini, E. 52813* (FCQ,MO); *ibidem*, 220 m, 15 Dec 1999, *Zardini, E. 53110* (FCQ,MO); **Canindeyú**: 3 km N of Itãmbú, 320 m, 17 Dec 1984, *Hahn, W.A. 986* (MO,PY); Jejuí-mi, camino pastizal sur, 190 m, 19 Aug 1996, *Jimenez, B. 1396* (MO); Aguara Ñu, 180 m, 17 Sep 1996, *Jimenez, B. 1546* (MO); **Central**: Estero del Ypoá, 15 km SW of Nueva Italia, coast in front Isla Guazú, 120 m, 7 Dec 1990, *Zardini, E. 24835* (FCQ,MO); **Cordillera**: Cerro Tobatí, 220 m, 28 Oct 1987, *Degen, R. 413* (MO); Cerro Zanja Jhú, 1 km East of road from Route 1 to Atyra, 3 km before Atyra, 230 m, 30 Jul 1988, *Zardini, E. 6230* (MO,PY,US); Serranía Tobatí. Meseta Ybitú Silla, 297 m, 25 Aug 1988, *Zardini, E. 6763* (BRIT,FCQ,MO); 1 km NE of Nueva Colombia, on arroyo Mbaéy, 140 m, 17 Jun 1992, *Zardini, E. 32222* (FCQ,MO); **Guairá**: sine loco, 180 m, Dec 1874, *Balansa, B. 2381* (P); Villa Rica, 140 m, 9 Nov 1929, *Jørgensen, P. 3859* (GH,US); Iturbe, 100 m, 19 Aug 1952, *Montes, J.E. 15978* (MO); Cordillera de Ybytyruzú. Road to Polilla. Cerro Acatí, 650 m, 23 Jul 1989, *Zardini, E. 13657* (FCQ,MO,NY); **Itapúa**: Trinidad, alrededor de las ruinas, 180 m, 6 Oct 1993, *Krapovickas, A. 44420* (CTES,MO,NY); Capitán Miranda, 4.2 Km N del Hotel Tirol, detrás del Barrio CONAVI, 130 m, 7 Oct 1993, *Krapovickas, A. 44468* (CTES); **Misiones**: San Ignacio-Estancia Brusquetti, 140 m, 12 Oct 1984, *Basualdo, I. 2500* (MO); **Paraguarí**: Cordillera de los Altos, 300 m, 9 Sep 1902, *Fiebrig, K. 98* (GH); Parque Nacional Ybycuí, 250 m, 5 Sep 1984, *Hahn, W.A. 2776* (GH,MO,PY,US); Parque Nacional Ybycuí. Road to César Barrientos, 150 m, 15 Sep 1988, *Zardini, E. 7240* (MO,PY); National Park Ybycu'i, 5 km N of administration, 300 m, 25 Nov 1991, *Zardini, E. 28994* (MO,PY); Arroyo Mbopicua, 110 m, 28 Jul 1994, *Zardini, E. 40165* (FCQ,MO); **San Pedro**: Lima, Estancia Carumbe, 110 m, 8 Oct 1967, *Myndel Pedersen, T. 8577* (P); Ruta a Cap. Bado. Rancho ZS, 300 m, 22 Aug 1994, *Soria, N. 6669* (MO); *ibidem*, 300 m, 22 Aug 1994, *Soria, N. 6678* (MO); *ibidem*, 300 m, 22 Aug 1994, *Soria, N. 6688* (MO); Desvío a Cap. Bado Estancia Nelly Isabel, 250 m, 30 Aug 1994, *Soria, N. 6742* (MO); *ibidem*, 250 m, 30 Aug 1994, *Soria, N. 6744* (MO); Colonia Primavera, 110 m, 31 Aug 1956, *Woolston, A. 718* (UC); Yaguareté forest, 230 m, 20 Jun 1995, *Zardini, E. 42866* (MO,PY); *ibidem*, 230 m, 24 Aug 1995, *Zardini, E. 43683* (MO,PY); *ibidem*, Arroyo Mboy, 210 m, 19 Jan 1996, *Zardini, E. 44530* (AS,MO); *ibidem*, trail to Confluencia, 190 m, 30 Jul 1996, *Zardini, E. 45245* (FCQ,MO); *ibidem*, 240 m, 31 Jul 1996, *Zardini, E. 45430* (FCQ,MO); *ibidem*, trail to Victoria, 230 m, 31 Jul 1996, *Zardini, E. 45438* (FCQ,MO); *ibidem*, trail to Victoria, 230 m, 31 Jul 1996, *Zardini, E. 45441* (FCQ,MO); *ibidem*, Río Verde, 150 m, 1 Aug 1996, *Zardini, E. 45462* (AS,MO); *ibidem*, 220 m, 31 Oct 1996, *Zardini, E. 45771* (AS,MO); *ibidem*: Northern boundary, 210 m, 27 May 1997, *Zardini, E. 46779* (FCQ,MO).

**URUGUAY.** Campo largo, Isla Zapata, 120 m, 24 Jan 1877, *Arechavaleta, J.* (P); **Artigas:** Chiflero, 100 m, 24 Jul 1934, *Herter, W.G. 1366* (MO); **Cerro Largo:** Sierra de Rios, 150 m, 24 Jul 1934, *Herter, W.G. 1366 b* (US); **Rivera:** Bajada de Pena, 350 m, 26 Jan 1995, *Myndel Pedersen, T. 16253* (F); **Tacuarembó:** Tacuarembó, 150 m, Oct 1896, *Aricharaleta, F. 283* (GH); **Treinta y Tres:** Ao. Caraja del Olimar a 2 leguas de Sta Clara, 250 m, 10 Oct 1945, *Rosengurt 4861* (GH,MO,US).

204a. *P. subcoriacea* Koehne var. nov. “*cunneateLvs*”

This new variety can be distinguished by the elliptic-oblong to elliptic-obovate sub-coriaceous leaves, 6.5-8 x 1.7-2.8 cm, opaque on both sides, with petioles 5-8 x 0.6-1 mm, base cuneate and apex acute, venation pattern brochidodromous, secondary veins sinuous and progressively arcuate arising at 50-60 degrees from the midrib, intersecondaries parallel to secondaries but relatively inconspicuous, tertiaries irregular reticulate, and 2 glands (1-1.5 mm wide) placed at 1-6 mm from the base and 0-3 mm from the midrib. The floriferous shoots are suberect, 3-4 cm long; the flowers have pedicels 2-4 mm long, hypanthium wide campanulate, 2.5-3 mm wide and anthers 0.3-0.4 mm long. The fruits are globose, 6-8 mm wide.

The combination of cuneate leaves with relatively narrow blade, small laminar glands, and less conspicuous venation and the relatively shorter racemes, differentiate this new variety from the typical collections of *P. subcoriacea*.

**Distribution.** Distributed in lowland and less frequently in mid-elevation moist forests from southern Bolivia to southern Brazil.

**Elevation range.** 90 – 1400 m.

**Material examined.** (14) **ARGENTINA.** **Corrientes:** 10 km w de San Carlos, 150 m, 9 Sep 1978, *Cristóbal, C.L. 1730* (MEXU,MO,UC); Santo Tomé, Ruta 14, a unos 2 km arroyo Chirimay, 120 m, 18 Dec 1997, *Mulgura de Romero, M.E. 1971* (MO,SI); **Misiones:** Apóstoles, Arroyo Chirimay, 90 m, 18 Sep 2000, *Mulgura de Romero, M.E. 2009* (SI). **BOLIVIA.** **Tarija:** Gran Chaco, Municipio de Carapari, P.N. y Area de Manejo Integrado de la Serranía de Aguaraque. Aprox. a 3 km al SE de la comunidad de Nazaren, subiendo por la antigua senda hacia el puesto Sanadita, 1400 m, 24 Sep 2007, *Llully, A. 956* (DAV,HSB,MO). **BRAZIL.** **Rio Grande do Sul:** Caxias do Sul - Ana Rech - Faxinal, 700 m, 7 Dec 1988, *Wasum, R. 4953* (MO,US); Tupanciretã-Jari-Passo das Vassouras próximo à margem de afluyente Rio Santana, 415 m, 11 Nov 1991, *Wasum, R. 7996* (MO,NY,US); Cambará do sul - Fortaleza, 1000 m, 27 Sep 1992, *Wasum, R. 8660* (MO,US); Mun. Jaguari/Mata, 100 m, 4 Dec 1986, *Webster, G.L. 25922* (DAV,MO); **Santa Catarina:** Mun. Xanxeré: Pinheiral and ruderal 17 km north of Abelardo Luz, 900 m, 25 Dec 1956, *Smith, L.B. 9218* (MO,P,US). **PARAGUAY.** **Amambay:** In regione calcarea cursus superioris fluminis Apa, 200 m, Mar 1912, *Hassler, E. 11056* (F,G,GH,K,UC,US); **Caazapá:** National Park Caaguazú., 300 m, 24 Nov 1997, *Zardini, E. 47443* (FCQ,MO); **Central:** Estero del Ypoá. Isla Guavira, 140 m, 12 Aug 1992, *Zardini, E. 32934* (FCQ,MO); Estero del Ypoá. Isla Guavira, 140 m, 12 Aug 1992, *Zardini, E. 32957* (FCQ,MO); **Cordillera:** Cerro Tobati, en roquedales, 200 m, 4 Dec 1987, *Zardini, E. 3865* (FCQ,MO).

205. *P. ulei* Koehne, Bot. Jahrb. Syst. 52: 323 (1915). Type: Brazil: Santa Catarina, Stranch in campo bei laguna, Sept 1890, *Ule, E. 1687* (sintypes, HBG!).

This species is characterized by the small shrubby habit, the lustrous dark twigs, the oblong-obovate to obovate coriaceous leaves, 3.5-7 x 1.7-3.2 cm, relatively opaque on both sides or slightly lustrous above, with petioles 4-7 x 1.3-1.8 mm, slightly swollen at the base, base acute and decurrent down to half petiole and apex obtuse to truncate, margin revolute, venation pattern brochidodromous festooned, secondary veins relatively straight and curving upwards after merging the previous lower vein, slightly prominent below, intersecondaries inconspicuous, tertiaries irregular reticulate, lateral and minor veins sometimes inconspicuous, and 2 basal or sub-basal elliptic glands (1-2 mm long) attached to the midrib. The floriferous

shoots are sub-erect, 3-5.5 cm long; the flowers have pedicels 1.5-4 x 0.2-0.4 mm, hypanthium wide campanulate 2-2.8 mm wide, and anthers 0.4-0.5 mm long. The fruits are globose, 6-7 mm diam.

This species is similar to *P. subcoriacea*, but that taxon has in general thinner oblong leaves, petioles not swollen at the base and glands separated from the midrib.

**Distribution.** Distributed in coastal lowlands of southeastern Brazil (from Sao Paulo to Santa Catarina) corresponding to a ecoregion known as “restinga” which has dry, acidic and nutrient-poor soils (Pimentel et al., 2007).

**Elevation range.** 5 – 15 m.

**Local names.** pessegueiro brabo, pessegueiro do mato (Brazil).

**Material examined.** (12) **BRAZIL. Paraná:** Praia do Mendanha, 10 m, 28 Jul 1966, *Hatschbach, G. 14550* (P,UC,US); Guaratuba, Rio Sao Joao, 5 m, 23 Jul 1967, *Hatschbach, G. 16734* (UC); Caiobá, 10 m, Feb 1945, *Hertel, R.* (GH); **Santa Catarina:** Itapoá, Reserva Volta Velha, 10 m, 23 Aug 1992, *Negrelle, R. A 319* (GH,NY); Sombrio, 15 m, 10 Aug 1945, *Reitz, P.R. 1156* (BRIT,GH); Ararangua, Sombrio, 15 m, 10 Aug 1945, *Reitz, P.R. C 1160* (GH,US); ibidem, 15 m, 20 Aug 1945, *Reitz, P.R. 1184* (GH); ibidem, 15 m, 20 Aug 1945, *Reitz, P.R. 1779* (UC); Araquarí, Inferninho, 10 m, 6 Oct 1957, *Reitz, P.R. 5049* (US); **Sao Paulo:** Cananéia, Ilha Comprimida. Estrada entre a balsa e a Praia da Ilha Comprimida, 10 m, 8 Sep 1994, *Hoffmann, J.R.R. 38* (NY); Ilha do Cardoso, 10 m, 31 Aug 1977, *Yano, O. 823* (P).

### **New species identified in southeastern South America (22 spp.)**

206. *P.* sp. nov. (“*bahia-lowelevation-BRA*”)

This new species has subcoriaceous ovate leaves, 9-10 x 4-4.3 cm, with petiole 8-10 x 0.5-0.8 mm, apex acuminate, base obtuse to rounded and decurrent at the end, margin revolute, venation pattern brochidodromous festooned, secondary veins (9-10) slightly raised, inter-secondary parallel to secondaries, and 2 glands impressed, located on the first pair of secondary veins, 3-5 mm from the base and 1-4 mm from the midrib. The floriferous shoots are up to 4 cm long, subflexuous, the flowers have pedicels 2-3.5 mm long, hypanthium campanulate, 2-2.5 mm wide, anthers 0.4-0.5 mm long.

Similar to *P. "myrtifolia var. brasiliensis"* but in that taxon the glands are submarginal far from the base, the secondary veins are plain and little conspicuous below, the base is more narrow decurrent, the racemes are shorter and more flexuous and the flowers smaller.

**Distribution.** Distributed in lowlands next to the coast from Rio de Janeiro to southern Bahia.

**Elevation range.** 32 – 600 m.

**Local names.** cruzeiro bravo (Brazil).

**Material examined.** (5) **BRAZIL. Bahia:** Porto seguro, Itabela, BR 101 para Eunapolis, 170 m, 18 May 1971, *dos Santos, T.S. 1665* (TEX); Urucuca-ilha, 100 m, 24 Jul 1971, *Pinheiro, R.S. 1507* (TEX); **Espírito Santo:** Linhares, reserva forestal, 32 m, 11 Aug 1996, *Folli, D.A. 2766* (CVRD); **Minas Gerais:** sine loco, 1845, *Widgren, J.F.* (GH,MO,US); **Rio de Janeiro:** Chemin du Corcovado, 600 m, 26 Oct 1869, *Glaziou, A. 3946* (P,US).

207. *P.* sp. nov. ("*NarrowLeaves- JundaiJapi-BRA*")

This new species can be distinguished by the narrow elliptic coriaceous leaves, 6-8.5 x 1.8-2.5 cm, with petiole 10-12 x 0.8-1 mm, base acute and deeply decurrent, apex acute to attenuate, margin recurved, venation pattern brochidodromous, secondary veins arcuate and departing at 30-40 degrees from the midrib,

intersecondaries not evident, tertiaries irregular reticulate almost inconspicuous, and 2 glands placed at 4-8 mm from the base and 1-3 mm from the midrib. The floriferous shoots are sub-erect, 2-5.5 cm long, the axis 0.6-0.8 mm thick, the flowers have pedicels 3-4.5 mm long, hypanthium campanulate 2.2-3 mm wide and anthers 0.3-0.4 mm long.

The most similar species is *P. oleifolia* which has sub-coriaceous leaves with wider blades, acuminate apex, basal to sub-basal glands, flexuous petiole and racemes with thinner axis.

**Distribution.** Distributed in mid-elevations of the Atlantic forest close to the Atlantic coast in the states of Sao Paulo and Paraná.

**Elevation range.** 580 – 1300 m.

**Material examined.** (5) **BRAZIL. Paraná:** Piraquara, Campininha, 930 m, 18 Jan 1947, *Hatschbach, G. 586* (NY); **Sao Paulo:** Jundiaí, 1150 m, 11 Aug 1976, *Leitao-Filho 2533* (NY,UEC); Sorocaba, 580 m, 1844, *Prates, M.T.* (P); Sao Paulo, Cultivada parque do Estado Jardim Botânico de Sao Paulo, 14 Apr 1971, *Rodrigues, L. 32* (GH); Jundiaí, Serra do Japi, 1300 m, 6 May 1977, *Semir, J. 4906* (MO,NY).

208. *P. sp. nov.* (“*aff-reflexa-submarginalGlands-BRA*”)

This new species can be recognized by the elliptic-oblong coriaceous leaves, 8-12.5 x 3.5-4.5 cm, slightly falcate, slightly lustrous above, with petioles 10-23 x 0.8-1 mm, base concave and deeply decurrent, apex attenuate to acuminate, venation pattern brochidodromous, emerging at ca. 60 degrees from the midrib, tertiaries sinuous percurrent and little conspicuous, lateral veins plain on both sides, and 2 glands placed either submarginally or touching the margin at 6-12 mm from the base. The fruiting racemes are 5-7 cm long with fruits globose or slightly oblate, 11-12 mm wide.

The most similar species, *P. reflexa*, has smaller subcoriaceous (or chartaceous) opaque leaves with macular glands placed 2-4 mm from the margin and more conspicuous minor veins.

**Distribution.** Distributed in midelevation Atlantic forests in the states of Rio de Janeiro and Bahia.

**Elevation range.** 850 m.

**Material examined.** (2) **BRAZIL. Bahia:** Camacá, parque serra Bonita, trilha do mirante ate a torre, 850 m, 6 Jun 2006, *Lopes, M.M.M.* 818 (NY); **Rio de Janeiro:** Ingeneiro Passos, a entrada para Agulhas negras, 850 m, 29 May 1969, *Plowman, T.* 2901 (GH,US).

209. *P.* sp. nov. ("*aff. brasiliensis-slimPetiole*")

This new species can be recognized by the relatively dense lenticellated twigs, the sub-coriaceous elliptic-oblong to lanceolate-oblong leaves, 6.5-12 x 2.3-5.3 cm, slightly lustrous on both sides, with petiole basally flexuous, 10-14 x 0.6-0.8 mm, base acute to obtuse and shortly decurrent, apex acute to shortly acuminate, margin undulate, venation pattern weak brochidodromous, very inclined secondary veins (10-11) emerging at 40-45 degrees, with 2 or 3 intersecondaries between secondaries, tertiaries irregular reticulate and little conspicuous, lateral veins flat below and slightly impressed above and two glands (0.6-1.2 mm wide) placed sub-basally on the first pair of secondary veins at 2-9 mm from the base and 0-3 mm from the midrib. The floriferous shoots are flexuous, 3.5-8 cm long, with floral pedicels flexuous, 1.5-6 x 0.2-0.4 mm, hypanthium campanulate, 1.8-2.5 mm wide and anthers 0.4-0.5 mm long. Mature fruits are unknown.

This species is close to *P. brasiliensis* which however has more wide elliptic leaves with very decurrent base, bigger glands and more conspicuous veins below and racemes in general shorter and more erect.



**Distribution.** Distributed in the Atlantic forest of southeastern Brazil and northern Argentina from the upper Paraná region around the Iguazú falls to the southern Minas Gerais state.

**Elevation range.** 250 – 1120 m.

**Material examined.** (10) **ARGENTINA.** Misiones: Iguazú, Salto Iguazú, 250 m, 27 Aug 1910, *Rodríguez, F.M. 385* (GH,SI,US); Salto Iguazú, 250 m, 27 Aug 1910, *Rodríguez, N. 385* (GH,US); **BRAZIL.** Sine loco, 1839, *Pohl* (NY); Lagoa Santa, 850 m, 5 Jul 1864, *Warming, J.E.B. s.n.* (MO,NY); **Minas Gerais:** sine loco, 1838, *Claussen, P. 259* (GH,P); Caldas, 1100 m, , *Regnell, A.F. 121* (P); **São Paulo:** Capital, Parque estadual dos fotes de ipiranga Area26 planta 151a, 800 m, 5 Jan 1978, *Goes, M. sn* (NY); São Paulo, nativa no Jardim Botânico, 850 m, 28 Jan 1932, *Hoehne, F.C. 230* (COL,F,GH,MO,NY); ibidem, 28 Jan 1932, *Hoehne, F.C. 230 b* (NY); Jundiai: Serra do Japi. Trilha do Mirante, 1120 m, 18 Jul 1995, *Mello-Silva, R. 1056* (DAV,HRCB,MO,UEC).

210. *P. sp. nov.* (“*aff.chamissoana-Chaco-Bolivia*”)

This new species can be recognized by the elliptic-ovate coriaceous leaves, 10-12 x 4.5-5.5 cm, lustrous above, light green in dry specimens, with petioles 11-13 x 1.2-1.5 mm, weak brochidodromous venation pattern, secondary veins arcuate, running sinuous and emerging at 50-60 degrees from the midrib, tertiaries percurrent and perpendicular to the midrib, secondaries and minor veins slightly prominent below but barely visible and 2 rounded glands placed on the lamina between the first and second lateral veins at 4-15 mm from the base and 1-4 mm from the midrib. The floriferous shoots are sub-erect, 3-4 cm long; the flowers have pedicels 1-2 mm long and 0.5-0.6 mm thick, hypanthium campanulate, 2-2.5 mm wide and anthers 0.6-0.7 mm long.

This species is similar to *P. chamissoana* which has generally thinner leaves with 4 or more glands (the lower ones basal and attached to the midrib), tertiary conspicuous veins and longer flexuous racemes with longer and thinner floral pedicels.

**Distribution.** Distributed in southern Bolivia next to the border with Argentina in an eastern Andean isolated mountain range known as Serrania of Carapari in the province of Gran Chaco, Department of Tarija.

**Elevation range.** 800 - 1230m.

**Material examined.** (1) **BOLIVIA.** Tarija: Gran Chaco, Yacuiba, 800 m, 24 Sep 1985, Beck, S.G. 11542 (QCA).

211. *P.* sp. nov. (“*aff.oleifolia-submarginalGlands*”)

This new species can be recognized by the elliptic-oblong to lanceolate sub-coriaceous leaves, 6.5-9.5 x 2-3.3 cm, slightly lustrous above, with flexuous petioles, 15-17 x 0.6-0.8 mm, base acute to cuneate and shortly decurrent, apex narrowly acuminate, venation pattern weak brochidodromous, secondary veins arcuate, initially emerging from the midrib at 50-60 degrees and promptly changing to 30-35 degrees, intersecondaries parallel to secondaries and half its length, tertiaries irregular reticulate and almost inconspicuous, and 2 glands (0.5-0.8 mm wide) placed submarginally (0-2.5 mm from the margin) at 3-9 mm from the base. The floriferous shoots are sub-erect, 2.5-4 cm long; the flowers have pedicels 1.5-2.5 mm long, hypanthium wide campanulate, 2.5-3 mm wide and anthers 0.3-0.4 mm long. The fruits are globose and apiculate, 10-11 mm wide.

The most similar species is *P. oleifolia* which has wider leaves with less conspicuous venation, glands placed near to the base, longer pedicels and flowers in general slightly bigger.

**Distribution.** Distributed mainly in lowlands of the upper Paraná Atlantic forests from southeastern Paraguay to neighbours southern Brazil and the Province of Misiones in Argentina.

**Elevation range.** 150 – 900 m.

**Local names.** yva'ro (Paraguay).

**Material examined.** (28) **ARGENTINA.** **Corrientes:** Santo Tomé, Ea. Vuelta del Ombu, 3 km SW de Gobernador Virasoro, 150 m, 21 Jul 1982, *Tressens, S.G. 2113* (UC); **Misiones:** Eldorado, Ruta Nac. 12, 3 km de Victoria camino a Esperanza, Ayo. Pareha, 210 m, 19 Feb 1996, *Morrone, O. 980* (MO,SI); San Pedro, Parque Prov. Cruce Caballero, 750 m, 26 Apr 1997, *Morrone, O. 2120* (MO,SI); 35 Km del desvio Ruta Nac. 14 a Colonia Esmeralda, 550 m, 27 Apr 1997, *Morrone, O. 2149* (MO). **BRAZIL.** **Goiás:** sine loco, 1816, *de Saint-Hilaire, A. 1423* (P); **Paraná:** Palmeira, 900 m, 21 Jan 1941, *Ceccatto, N.* (NY); Jaguariahya, 750 m, 5 Feb 1910, *Dusén, P. 9246* (US); Coppice, Fazenda Mururé, Rio Ivai, ca 30 km E of Cianorte, 300 m, 24 Mar 1966, *Lindeman, J.C. 730* (US); 15 km S of Cava Funda, 350 m, 20 May 1967, *Lindeman, J.C. 5368* (TEX); Parque nacional Iguacu, 200 m, 19 Feb 1996, *Pereira, E. 5362* (NY); **Rio Grande do Sul:** Erechim, 780 m, 19 Apr 1994, *Butzke, A. 7403* (US); Villa Oliva, S.Fr. de Paula, in silva primaeva, 750 m, 2 Feb 1946, *Rambo, B. 31364* (CAS,MO); Sao Francisco de Paula, José Velho, 830 m, 24 Jan 2000, *Wasum, R. 437* (US); in beira de estrada to Taquara, 830 m, 19 Feb 2000, *Wasum, R. 456* (L,MO,US); ibidem, 830 m, 26 Mar 2000, *Wasum, R. 577* (US); **Santa Catarina:** Rio do Sul, Alto Matador, 800 m, 26 Jan 1959, *Reitz, P.R. 8316* (NY,UC,US); Bela Vista, Canoinhas, 750 m, 4 Jan 1962, *Reitz, P.R. 11530* (US); Xanxeré-Joaçaba, 11 km east of Faxinal dos Guedes, 800 m, 26 Feb 1957, *Smith, L.B. 11855* (US); **São Paulo:** Anita Garibaldi, 503 m, 26 Jan 2009, *Verdi, M. 1433* (FURB). **PARAGUAY.** **Alto Parana:** Pto Presidente Stroessner, 150 m, 3 Feb 1984, *Little-Jr, E.L. 40127* (GH,MO,NY); Estancia Río Bonito. Forest I (along entrance), 240 m, 26 May 1995, *Zardini, E. 42614* (MO,PY); ibidem, Forest III, 230 m, 26 May 1995, *Zardini, E. 42633* (MO,PY); ibidem, 230 m, 28 Feb 1996, *Zardini, E. 44686* (FCQ,MO); ibidem, 230 m, 28 Feb 1996, *Zardini, E. 44702* (FCQ,MO); **Amambay:** Pedro Juan Caballero. circa tres Palos ad septentr, 580 m, 20 Dec 1978, *Bernardi, L. 19322* (NY); Sierra de Amambay, in altiplanicie et declivus, 400 m, Mar 1907, *Rojas in Herbarium Hassler, T. 10194* (GH,K,NY,P); **Paraguarí:** Ybicuí, Parque nacional Ybicui, 200 m, 12 Sep 1980, *Fernández-Casas, J. 3528* (NY); **San Pedro:** Yaguareté Forest (Sustainable Forest Systems Site), 210 m, 19 Jan 1996, *Zardini, E. 44509* (FCQ,MO).

212. *P. sp. nov.* (“*aff. glaziovii-erectShortRaceme*”)

This new species is characterized by the coriaceous elliptic-ovate leaves, 8-11 x 3.5-5 cm, lustrous above, with flexuous petioles 15-20 x 0.8-1 mm, venation pattern weak brochidodromous, secondary veins arcuate, tertiaries alternate percurrent, one or two intersecondaries present between almost all the secondaries, veins plain on both sides, and 2 glands placed at 6-7 mm from the base and 1-4 from the midrib. The floriferous shoots are noticeably short and erect, 0.5-2.5 cm long, the axis 1-1.2 mm thick, the flowers have pedicels 1-2.5 mm long, hypanthium turbinate to infundibuliform 2.5-3 mm wide, petals 2-2.3 mm wide and anthers 0.5-0.6 mm long.

Similar to “*P. glaziovii*” but that species has smaller subcoriaceous leaves with glands more distanced from the base and longer flexuous racemes with smaller flowers subtended by longer pedicels. Also, vegetatively like *P. “aff-reflexa-submarginalGlands-BRA”* which occurs at lower elevations in the same area and has leaves with shorter petioles, glands submarginal and longer racemes.

**Distribution.** Distributed in high elevation rocky places close to the coast and part of the Atlantic forests of the Brazilian state of Sao Paulo.

**Elevation range.** 1800 m.

**Material examined.** (1) BRAZIL. Sao Paulo: Cunha, estrada para Pedra da Macela, área de Furnas, 1800 m, 22 Mar 1996, Kirizawa, M. 3282 (MO,P).

213. *P. sp. nov.* (“*aff. oleifolia-RioClaro-SP-BRA*”)

This new species can be distinguished by the elliptic to elliptic-oblong sub-coriaceous leaves, 8-13.5 x 2.8-4.5 cm, slightly lustrous above, with erect petioles, 8-13 x 1-1.8 mm, base acute and shortly decurrent,

apex acute, venation pattern brochidodromous, secondary veins relatively straight along their proximal half, emerging at 45-60 degrees from the midrib, intersecondaries very short or absent, tertiaries irregular reticulate, lateral veins flat below and impressed above, and 2 glands (1-1.5 mm diam.) placed at 1-7 mm from the base and at 0-3 mm the midrib. The floriferous shoots are erect or sub-erect, 2.5-3.5 cm long, the flowers have pedicels 2-3.5 mm long, hypanthium narrow campanulate, 2-2.5 mm wide, the sepals are narrowly ligulate (ca. 0.5 mm wide and high) giving a coroniform appearance to the calyx, and the anthers are 0.5-0.6 mm long. The fruits are globose and apiculate, 9-11 mm wide.

The most similar species is *P. subcoriacea* which has in general smaller leaves with shorter petioles, smaller flowers on denser racemes and smaller fruits.

**Distribution.** Distributed in mid-altitude vegetation of Cerrado and transition to Atlantic forests in eastern and southern Brazil.

**Elevation range.** (60?) 550 – 1250 m.

**Local names.** coração de negro (Brazil).

**Material examined.** (37) **BRAZIL. Minas Gerais:** Sao Tomaz de Aquino, Fazenda Fortaleza, 1000 m, 19 Apr 1945, *Brade, A.C. Bs 199* (GH); sine loco, 1838, *Claussen, P. 260* (P); sine loco, 1816, *de Saint-Hilaire, A. 410* (P); Viçosa, Road East from Chacha valley, about 5 km, 700 m, 26 Apr 1930, *Mexia, Y. 4642* (UC); Vicoso, Fazenda da Cresiuma, 800 m, 14 May 1930, *Mexia, Y. 4697* (GH,MEDEL,MO,P,UC,US); Caldas, 1250 m, 15 Dec 1873, *Regnell, A.F. 1266* (P); **Parana:** Jaguariaiva, in silvula, 880 m, 15 May 1914, *Jonsson, S. 359 a* (PH); **Rio de Janeiro:** Province Sebastianopolit. Silvis primaveris supra Serra do Mar, 600 m, *Martius, C. s.n.* (M); **Rio Grande do Sul:** Amaral Ribeiro. Prope Taquara, 60 m?, 5 Jul 1949, *Rambo, B. 42374* (MO); **São Paulo:** Itirapina, 850 m, 24 Feb 1983, *Cesar, O.* (DAV,HRCB); ibídem, 850 m, 21 Feb 1984, *Cesar, O. 164* (DAV,HRCB); Reserva Instituto Florestal, 720 m, 12 Feb 1981, *de Barros, F. 629* (P); Itirapina, área de Pedregulho, 720 m, 2 Feb 1993, *de Barros, F. 2530* (MO); Itararé, rodovia SP 258, km 5, 800 m, 8 Feb 2000, *de Barros, F. 2964* (COL); 1816, *de Saint-Hilaire, A. 995 ter* (P); Fazenda Citricola M. de Jaú, 550 m, 20 Apr 1961, *Duarte, A. 5597* (US); Municipio de São Carlos: several

km north of São Carlos, base of northmost escarpment along new road to Ribeirão Preto, 750 m, 12 Jul 1961, *Eiten, G.* 3292 (MO,US); Moji Guaçu, Padua Sales, Fazenda Campininha, 600 m, 24 Sep 1980, *Forero, E.* 8442 (COL); Ytirapyna, 800 m, 28 Feb 1920, *Gehrt, G.* 5727 (P); Carlos Botelho State Park, Ribeirão Branco, Km 55, ca. 23 km S of Park Headquarters, 560 m, 3 Sep 1987, *Gentry, A.* 58934 (MO); Carlos Botelho, ca. 20 km S of Park Headquarters, 550 m, 3 Sep 1987, *Gentry, A.* 58994 (MO); Carlos Botelho State Park, Ribeirão Branco, Km 55, ca. 23 km S of Park Headquarters, 560 m, 4 Sep 1987, *Gentry, A.* 59016 (MO); Mogi Das Cruzes, Estrada de Taiacupeba, 900 m, 7 Sep 1991, *Gomes da Silva, S.J.* 222 (P); Botucatu, Near ex rail station treze de maio, 550 m, 9 Feb 1975, *Gottsberger, I.* 11-9275 (NY); ibidem, 550 m, 23 Feb 1979, *Gottsberger, I.* 14-23279 (NY); Mogi Guaçu. Nativa na Estação Experimental e Biológica de Mogi Guaçu, Fazenda Campininha, 750 m, 31 Aug 1972, *Kuhn, E. s.n.* (MO); Sao Carlos, Perto do Rio Mogi-Guaçu, 540 m, 28 Mar 1962, *Labouriau, M.* 50 (NY,P,US); Rodovia Casa Branca - Porto Ferreira, 700 m, 20 Mar 1977, *Leitao-Filho* 4630 (F,UEC); Capoeira, 800 m, 18 Jul 1888, *Loefgren, A.* 743 (P,SP); Mogi-Guaçu, Capoeira da Capela, 650 m, 7 Jul 1889, *Loefgren, A.* 1254 (SP); Ytu, campis tubuleiro, 600 m, *Martius, C.* 599 (M); Loreto, 630 m, Sep 1917, *Moraes, J.* 397 (GH,US); Rio Claro, Arrededores do campus INESP, 580 m, 16 Jun 1983, *Paoli, A.A.S.* 2 (DAV,HRCB); St. Carlos et Ytu, Jan 1834, *Riedel, L. s.n.* (MO,NY, US, US); Aguas da Prata, 860 m, 30 Apr 1941, *Viégas, A.P.* 6250 (UC); Ibiuna, Bairro Sorocabucu ca 8 km da SP 250 no km 63, 900 m, 30 Apr 1984, *Yano, T.* 56 (F).

214. *P.* sp. nov. (“*petioleGlands-camposJordao-SP*”)

This new species can be distinguished by the shrubby habit, the rugose bark with sparse transversal cracks, the elliptic-oblong to lanceolate-oblong leaves, 6-9 x 2-3 cm, lustrous above and opaque below, with long flexuous pedicels 10-16 x 0.5-0.7 mm, base acute and decurrent at the end, apex acute, 10-11 secondary arcuate veins configuring a eucamptodromous like pattern, intersecondaries 2-3 between secondaries, tertiaries reticulate and inconspicuous and 2 glands located marginally on the apex of the petiole (consequently almost indistinguishable). The floriferous shoots are flexuous and noticeably short,

2-3 cm long; the floral pedicels are 1-1.5 mm long, the hypanthium 2-2.5 mm wide and the anthers 0.3-0.4 mm long.

The most similar species is *P. sellowii* which is a tree that has larger coriaceous leaves with basal glands, thicker petioles and less conspicuous secondary venation.

**Distribution.** High elevation rocky outcrops of the Serra da Mantiqueira mountains in the Campos do Jordao area located above 1600 m.

**Elevation range.** 1600 - 1830m.

**Material examined.** (3) **BRAZIL. São Paulo:** Campos do Jordao. Parque Estadual, 1830 m, 8 Mar 1984, Kubitzki, K. 84-45 (NY); Campos de Jordao, 1700 m, Jan 1945, Leite, J.E. 3914 (GH); Silveiro, Serra da Becaina, 1600 m, 1951, Segadas-Vianna 2421 (US).

215. *P.* sp. nov. (“*duseni-Parana-BRA*”)

This new species can be distinguished because its elliptic-oblong to ovate-oblong sub-coriaceous leaves, 8-11 x 3-5.5 cm, slightly falcate, slightly lustrous above, drying frequently pale green, with rounded base concave at the end and shortly decurrent on the petiole, apex shortly acuminate, petiole 8-10 x 0.6-0.8 mm, secondary veins arcuate, plain below and slightly prominent above, eucamptodromous-like venation pattern, intersecondaries numerous, tertiaries inconspicuous and two laminar elliptic glands (1.5-2 mm long) placed at 5-8 mm from the base and 2-3 mm from the margin. The floriferous shoots are subflexuous, 3-5.5 cm long; the flowers have sub-erect pedicel, 3-4 mm long, turbinate hypanthium, 3-3.5 mm wide and anthers 0.4-0.5 mm long. Fruits unknown.

This species is similar to *P. oleifolia* which however has narrower elliptic chartaceous leaves with slimmer flexuous petioles and basal to submarginal glands, and slightly smaller flowers.

**Distribution.** Distributed in lowlands of the alto Paraná Atlantic forests region in southwestern Brazil, eastern Paraguay and northern Argentina.

**Elevation range.** 130 – 630 m.

**Material examined.** (9) **ARGENTINA. Misiones:** Guaraní, Ruta Prov. 21, camino de Paraiso a Moconá, 33 km de la Ruta Nac. 14, 450 m, 28 Apr 1997, *Morrone, O. 2188* (MO,SI). **BRAZIL. Paraná:** Serra do Mar, Volta Grande a meryinem silvae primaevse, 400 m, 9 Jul 1914, *Dusén, P. 647a* (GH,MO,NY,US); Jacarehy in silva paludosa, 250 m, 25 Mar 1911, *Dusén, P. 11401* (GH,MO,NY,UC,US); Floresta, 400 m, 25 Jan 1962, *Reitz, P.R. 12029* (US); Xambre, Altônia, 350 m, 27 Jan 1962, *Reitz, P.R. 12099* (US); **Rio Grande do Sul:** Tupandi, Montenegro, 300 m, 15 Nov 1945, *Rambo, B. 32837* (MO,NY); **São Paulo:** Rio Claro, cultivada na UNESP, 630 m, 30 Aug 1984, *Furlan, A. 191* (DAV,HRCB). **PARAGUAY. Alto Paraná:** Centro forestal alto Paraná, 12 km O Puerto Pte Stroessner, 250 m, 2 Feb 1984, *Little-Jr, E.L. 40122* (NY,PY); **Caazapá:** Distr. Yuty. Capitindy, arroyo Tacuara, 22 km E de San Miguel, 130 m, 11 Sep 1987, *Arbo, M.M. 2867* (MO).

216. *P. sp. nov.* (“*macularGlands-EspirituSanto-BRA*”)

This new species can be recognized by the chartaceous elliptic leaves, 8-10.5 x 3.7-5 cm, opaque on both sides, pale colored below, with base obtuse and concave at the end, apex briefly acuminate, petioles 8-10 x 0.5-0.8 mm, secondary vein pattern brochidodromous, intersecondaries perpendicular to the midrib, tertiaries alternate percurrent, and 2 relatively large glands (1.5-2 mm wide), located at 10-17 mm from the base and 3-8 mm from the midrib between the second and third pair of secondary veins. The floriferous shoots are noticeably short and erect, 1.2-2 cm long; the flowers have pedicels 1-1.4 mm long, campanulate hypanthium, 1.5-2 mm wide and anthers ca. 0.5 mm long.



It is somewhat similar to *P. "myrtifolia var. brasiliensis"*, but it has longer petioles, leaf base more decurrent, glands more separated from the midrib and flexuous longer racemes.

**Distribution.** Only known from mid-elevations in a mountain range next to the Atlantic coast in the Espirito Santo state at eastern Brazil.

**Elevation range.** 700 – 750 m.

**Material examined.** (2) **BRAZIL. Espirito Santo:** Santa Teresa, Estacao biologica Santa Lucia, 750 m, 23 Mar 1995, *Thomaz, L.D. 1673* (DAV,HRCB); ibidem, 700 m, 5 May 1994, *Thomaz, L.D. 1676* (DAV,HRCB).

217. *P.* sp. nov. (“*glaziovii-aff-oblongLeaves-BRA*”)

Characterized by the mid-size elliptic-oblong sub-coriaceous leaves, 9-11.5 x 3-3.6 cm, with relatively straight petioles 12-16 mm long, venation pattern weak brochidodromous, the secondaries relatively straight along 2/3 its length, tertiaries irregular reticulate and 2 glands (1-1.5 mm wide) placed at 7-12 mm from the base halfway between the midrib and the margin. The floriferous shoot are subflexuous, 4-5 cm long, the flowers have erect pedicels 3-4 x 0.3-0.4 mm long with the hypanthium narrow campanulate, 2-2.3 mm wide.

This species is similar to “*P. glaziovii*” but has larger not falciform leaves, longer straight petioles, more obscure anastomosing secondaries, glands more separated from the midrib and smaller flowers.

**Distribution.** Only known from the mid-elevation places in the Rio de Janeiro area.

**Elevation range.** 400 – 1000 m.

**Material examined.** (3) **BRAZIL. Rio de Janeiro:** Petropolis, 1000 m, 16 Apr 1868, *Glaziou, A. 2563* (K,P); Estrada de Vista Chinesa, 400 m, 22 May 1969, *Plowman, T. 2748* (GH); **Sao Paulo:** Sao Luis do Piraitinga, Parque esdual da Serra do Mar, Nucleo Virginia, tilha Pirapitinga, 960 m, 20 Oct 2003, *Ressel, K. 198* (DAV,HRCB).

218. *P.* sp. nov. (“*guillemmin43-aff.glaziovii*”)

This new species is a shrub or small tree that has ovate-oblong to elliptic-oblong sub-coriaceous leaves, 9-11.5 x 4-5.3 cm, slightly lustrous above, with petiole 8-15 x 1-1.2 mm, base obtuse to rounded and shortly decurrent, apex acute, venation pattern weak brochidodromous, secondaries arcuate and emerging at 50-60 degrees from the midrib, slightly prominent below, intersecondaries sinuous and relatively inconspicuous, tertiaries irregular reticulate, and 2 glands placed at 5-9 mm from the base and 1-3 mm from the midrib. The floriferous shoots are sub-erect, 3.5-5.5 cm; the flowers have pedicels 2.5-4.5 x 0.5 mm, hypanthium wide campanulate, 2.3-3 mm wide and anthers 0.2-0.3 mm long. Fruits unknown.

Very similar to “*P. glaziovii*” but that species has smaller elliptic falcate leaves with more coriaceous texture, shortly decurrent blades, longer flexuous petioles and flowers with smaller anthers. Also, close to *P. “myrtifolia var. brasiliensis”* which is a tree with chartaceous leaves, pale colored below, with 2 glands placed far away from the base and longer racemes.

**Distribution.** Distributed in Atlantic forests near to coast in the states of Rio de Janeiro and Sao Paulo.

**Elevation range.** 180 – 850 m.

**Material examined.** (5) **BRAZIL. Rio de Janeiro:** Nova Friburgo, Rio Bonito de Lumiar, estrada do Sertão, 824 m, 1 Mar 2004, *Forzza, R.C. 2801* (NY); Montanas de Tijuca, 700 m, 1839, *Guillemmin, M. 43* (P); **São Paulo:** Biritiba-Mirim, Estação Biológica de Boraceia, 850 m, 10 Feb 1984, *Custodio Filho, A. 2250* (NY); Sao miguel

Arcanjo, P.E.C. Botelho, 700 m, 13 Jan 1991, *de Moraes, P.L.R. 402* (DAV,HRCB); Ubatuba, rodovia BR 101, entre Ubatuba-Picinguaba, 180 m, 22 Apr 1991, *Kirizawa, M. 2455* (MO).

219. *P.* sp. nov. (“*grandifolia*”- *aff.subcoriacea*”)

*Prunus sphaerocarpa* Sw. fo. *grandifolia* Chod. et Hassl., Bulletin de l'Herbier Boissier, sér. 23: 799. 1903.

This new species is a shrub or small tree that have narrow elliptic to wide obovate rigid coriaceous leaves, 4-10 x 3-4.5 cm., lustrous above, relatively congested towards the end of the branches, with petioles of variable length, 5-14 x 1.2-2 mm, base rounded to acute, apex acute to obtuse, venation pattern brochidodromous festooned, secondary veins 8-9, plain or slightly prominent below and plain to impressed above, intersecondaries parallel to secondaries and extended until half the length midrib-margin, tertiaries irregular reticulate, and 2 very conspicuous elliptic glands, 1.5-3 mm long, attached to the midrib and at 3-5 mm from base. The floriferous shoots are sub-erect, 5-7 cm long, frequently as long as the leaves; the flowers have flexuous pedicels 2.5-4.5 mm long, the hypanthium is campanulate, 2.5-3.3 mm wide and the anthers 0.6-0.7 mm long. The fruits are slightly oblate, apiculate, 6-7 x 8-9 mm, with the edges of the ventral suture raised.

Similar to “*P. gardnerii*” but that taxon has larger and less rigid leaves, more secondary veins plain above, smaller glands, and racemes considerably shorter than the length of the leaves. This new taxon includes the specimen *Hassler 5542* that was cited as type of *P. sphaerocarpa* fo. *grandifolia* Chodat & Hassler. Koehne (1915) however, assigned this specimen (also *Hassler 10130*, *10130a* and *10130b*) with doubts (cf.) either to *P. brasiliensis* or *P. brasiliensis* var. *gardneri*. But considering the presence of more coriaceous and wider leaves and longer racemes with bigger flowers in *Hassler 5542*, it does not fit any of those determinations. It is also different from *P. subcoriacea* because its larger leaves, with large maculate

glands attached to the midrib and the larger size of both racemes and flowers. Although the epithet *grandifolia* was previously used in *P. grandifolia* Salisb. Prodr. Stirp. Chap. Allerton 356.(1796), this is a superfluous illegitimate name under Art. 52.1 of the code, hence the epithet “*grandifolia*” could be used under Art.58.1.

**Distribution.** Distributed from eastern Paraguay to the central part of the state of Bahia in cerrado habitats and rocky outcrops.

**Elevation range.** 300 – 1500 m.

**Material examined.** (20) **BRAZIL. Bahia:** Rio de Contas, Pico das Almas, 1500 m, 21 Dec 1988, *Harley, R.M. 27321* (NY); **Distrito Federal:** Brasilia, Reserva ecologica do IBGE, 1000 m, 26 Oct 1989, *Azevedo, M.L.M. 385* (US); Margin of gallery forest, bordering on cerrado, ca. 15 km E. of Brasilia, 1000 m, 30 Aug 1964, *Irwin, H.S. 5737* (GH,MO,US); Gallery forest, ca. 10 km NW of Planaltina, D.F, 950 m, 27 Feb 1966, *Irwin, H.S. 13204* (CAS,F,MEXU,MO,TEX); Gallery forest, Rio Torto, ca. 10 km NE of Brasília, 1000 m, 6 May 1966, *Irwin, H.S. 15662* (CAS,MEXU,MO,QCA,TEX); In the area of the Corrego Cabeça de Veado c 9.5 km SSE of Brasilia TV Tower, 1100 m, 15 Jun 1976, *Ratter, J.A. 3168* (CAS,MO); **Goiás:** Chapada dos Veadeiros, 7 km W of Veadeiros, 1100 m, 15 Feb 1966, *Irwin, H.S. 12887* (US); **Mato Grosso:** In gallery forest, 6 km east of Rondonopolis, en route to Cuiaba, Mata Grosso. Brasilia-Acre Highway, 350 m, 27 Aug 1963, *Maguire, B. 56371* (COL,MO); Ribeirão Cascalheira, Xavantina-Sao Felix road, 300 m, 21 Jun 1968, *Ratter, J.A. 1883* (NY,P,UC); **Mato Grosso do Sul:** Brasilandia, Rio Taquarussu, 300 m, 20 Jun 1998, *Salvador, J.L.G. 99* (NY); **Minas Gerais:** Gouveia, 1100 m, 3 Jun 1985, *de Barros, F. 1076* (NY), ca. 15 km E of Diamantina, 1100 m, 20 Mar 1970, *Irwin, H.S. 27970* (CAS,MEXU,MO,QCA,TEX); ca. 3 km N of São João da, Chapada, 1200 m, 24 Mar 1970, *Irwin, H.S. 28285* (BRIT,MEXU,MO,QCA,TEX); Ituiutaba, 500 m, 27 Aug 1944, *Marcel 502* (MO); Grao Mogol, Rib. dos Bois, 890 m, 2 Sep 1986, *Mello-Silva, R. 10006* (MO); sine loco, 4 Dec 1844, *Regnell, A.F. 1 122* (US). **PARAGUAY. Amambay:** Sierra de Amambay, in altiplanicie et declivibus, 600 m, Jan 1907, *Rojas in Herbarium Hassler, T. 10130 a* (GH,P); ibidem, 600 m, Jan 1907, *Rojas in Herbarium Hassler, T. 10130* (GH,P); ibidem, 600 m, Jan 1907, *Rojas in Herbarium Hassler, T. 10130 b* (GH); **Canindeyú:** In regione vicini Igatimi, 300 m, Nov 1900, *Hassler, E. 5542* (GH,P,UC).

220. *P.* sp. nov. (“*highlev-mucronulateLeaves-BR*”)

This new species is a shrub, 3-4 m. tall. with dark grey bark, elliptic-lanceolate coriaceous leaves, 7-8.5 x 2.3-3 cm, lustrous above, with base cuneate, apex acute and conspicuously mucronulate, margin revolute, petiole reddish, 7-8 mm long, venation pattern brochidodromous, secondary veins (ca. 10) arcuate and anastomosing at one third from the margin, and 2 sub-basal glands (ca. 1 mm diam.), 3-5 mm from the base and 0-2 mm from midrib. The floriferous shoots are short (2-3 cm) and have 15-20 flowers with short pedicels (1-2 mm long), infundibuliform hypanthium, 2-2.8 mm wide and anthers 0.3-0.4 mm long.

The most similar species is *P. "serra do piedad"* which however has wider ovate leaves with shorter petioles, glands totally basal, racemes densiflorous and bigger flowers with thicker pedicels.

**Distribution.** Distributed in the summit of rocky outcrops in the states of Bahia and Minas Gerais.

**Elevation range.** 1400 – 2000 m.

**Material examined.** (3) **BRAZIL.** **Bahia:** Mun. Abaíra: Tijuquinho, 1740 m, 10 Feb 1992, *Nic Lughadha, E.M. H 51077* (MO,NY); **Minas Gerais:** Caeté, Serra da Piedade, km 1-5 on road to top of Serra, 1400 m, 2 Feb 1982, *Landrum, L. 4255* (DAV,MO); **São Paulo:** Campos de Jordao. Itapeva, 2000 m, Jan 1946, *Leite, J.E. 3860* (GH).

221. *P.* sp. nov. (“*Iguape-Coastal-BRA*”)

This new species is a small tree that has elliptic-oblong chartaceous leaves, 8-10 x 3-4.5 cm, with petioles 8-12 x 0.5-1 mm, base obtuse and concave-decurrent at the end, apex shortly acuminate, main venation brochidodromous, secondaries arcuate sinuous and slightly prominent below, anastomosing at 3-4 mm from the margin, tertiaries inconspicuous, and 2 minute elliptic glands (0.5-0.8 mm long) placed

either on or around the first pair of secondary veins at 6-10 mm from the base and 2-4 mm from the margin. The floriferous shoots are erect, 2-2.5 cm long; the flowers have pedicels 3-4.5 x 0.2-0.3 mm, hypanthium broadly campanulate, 2.5-3 mm wide, and anthers 0.5-0.6 mm long. The fruits are globose and apiculate, 10-12 mm wide.

The combination of minute glands, chartaceous leaves and short erect racemes with slender pedicelated flowers are diagnostic in comparison with other similar taxa as *P. reflexa* and *P. "myrtifolia var. brasiliensis"*.

**Distribution.** Distributed in lowland Atlantic forests next to the coast in the states of Sao Paulo and Santa Catarina.

**Elevation range.** 10 – 350 m.

**Material examined.** (3) **BRAZIL. Santa Catarina:** Itajaí, Morro da Ressacada, 10 m, 6 May 1955, *Klein, R. 1343* (NY); ibidem, 350 m, 14 Oct 1955, *Klein, R. 1692* (NY); **São Paulo:** Iguape, Peropava, Fazenda Boa Vista, 10 m, 12 Jun 1990, *de Moraes, P.L.R. 142* (DAV,HRCB).

222. *P.* sp. nov. ("*martius555-BRA*")

This new species is remarkable because its elliptic to elliptic-oblong coriaceous leaves, 6.5-9 x 2.8-3.8 cm, very lustrous above, with flexuous petioles, 7-10 x 1 mm, base acute and shortly decurrent, apex acute to attenuate, venation pattern weak brochidodromous, secondary veins slightly arcuate and emerging at 50-60 degrees from the midrib, intersecondaries as long as half to 3/4 the distance midrib-margin, tertiaries irregular reticulate and almost inconspicuous, and 2 glands placed on the first pair of secondary veins at 5-7 mm from the base and 1-3 mm from the margin. The floriferous shoots are flexuous, 3-4.5 cm long, the

flowers have pedicels 0.5-1 mm long, infundibuliform hypanthium 2.3-3 mm wide and anthers 0.3-0.4 mm long. Immature fruits are globose apiculate, 6-7 mm wide.

This taxon is similar to *P. brasiliensis* which differs because the sub-coriaceous opaque leaves with decurrent petiole, the more conspicuous venation below, the sub-basal glands and the flowers with flexuous pedicels.

**Distribution.** Known from the surroundings of the city of Itu, state of Sao Paulo. In that area, limestone derived soils are frequent.

**Elevation range.** 700 m.

**Material examined.** (2) BRAZIL. Sao Paulo: 700 m, Sep 1839, *Guillemin, M. 653* (P); São Paulo: Ytu, 700 m, *Martius, C. 555* (M).

223. *P.* sp. nov. (“*obovate-leaves- SCatarina-BR*”)

This new species can be distinguished by the subcoriaceous elliptic to slightly obovate leaves, 6-10 x 2-3 cm, slightly lustrous above, with petioles 8-12 x 0.6-1 mm, base acute to cuneate, apex acute to acuminate, venation pattern eucamptodromous-like, secondary veins arcuate and running approximately parallel to the margin at the end, emerging at 40-50 degrees from the midrib, intersecondaries extending up to half the length of secondaries, tertiaries alternate percurrent, and 2 sub-basal glands, located at 2-6 mm from the base and 0.5-2 mm from the margin. The floriferous shoots are suberect, 2-5.5 cm long; the flowers have pedicels 2-3.5 mm long, campanulate hypanthium 2-2.5 mm wide and anthers 0.4-0.5 mm long. Mature fruits are unknown.

This species is similar to *P. subcoriacea* which generally has more oblong leaves with shorter petioles, secondary veins starting at more open angle and configured in a clear brochidodromous pattern.

**Distribution.** Distributed in riverbanks and Araucaria forests in mid-elevation places of the state of Santa Catarina.

**Elevation range.** 900 – 1200 m.

**Material examined.** (5) **BRAZIL. Santa Catarina:** Bom Retiro, Capao do campo, 950 m, 25 Oct 1957, *Reitz, P.R. 5459* (NY,US); Campo Alegre, Morro de Iquererim, 900 m, 4 Feb 1958, *Reitz, P.R. 6393* (US); Bom Retiro, Riozinho, 1000 m, 25 Nov 1956, *Smith, L.B. 7954* (US); ibidem, 1000 m, 22 Jan 1957, *Smith, L.B. 10281* (US); Agua Doce, 1100 m, 4 Dec 1964, *Smith, L.B. 13622* (NY,P,US).

224. *P.* sp. nov. (*SantaCatarina- SerradoMar-BRA*)

This new species is a shrub with relatively lustrous dark twigs, leaves coriaceous elliptic to elliptic-obovate (sometimes close to rhombic), 5-7.5 x 1.8-2.8 cm, with petioles 2-4 x 1-1.5 mm, base acute to cuneate and apex obtuse, venation pattern brochidodromous, secondary veins relatively straight before anastomosing and emerging at 50-55 degrees from the midrib, tertiaries inconspicuous, and 2 glands placed at 1.5-2.5 mm from the base submarginally on the first pair of secondary veins. The floriferous shoots are erect, 3-5 cm long; the flowers have pedicels 2-4 mm long, the hypanthium is campanulate 2.5-3 mm wide, and anthers 0.5-0.6 mm long. The fruits are unknown.

This taxon can be confused with the coastal lowland species *P. ulei* which however has leaves with apex rounded to truncate and muriculate at the end, more conspicuous lateral veins, slightly longer petioles with a basal pulvinulus and smaller flowers overall. It also can be confused with the previously referenced species (*"P. obovate-leaves- SCatarina-BR"*) but it has subcoriaceous leaves, with longer and slender



petioles, more conspicuous lateral and minor veins and apex acuminate and more flexuous racemes with slightly smaller flowers.

**Distribution.** Distributed in mid-elevation forests of the Serra do Mar in the southern Brazilian states of Santa Catarina and Rio Grande do Sul. Reported in Araucaria forests.

**Elevation range.** 450 – 1400 m.

**Material examined.** (5) **BRAZIL. Rio Grande do Sul:** Aratinga, 1000 m, 1984, *Sobral, M. 3207* (TEX); **Santa Catarina:** Piloes, Palhoca, 450 m, 25 Oct 1956, *Reitz, P.R. 3965* (NY); Campo Alegre, Morro de Iquererim, Morro Quiriri (actualmente), 1300 m, 5 Sep 1957, *Reitz, P.R. 4760* (GH,P,US); Camp, Camp Alegre, 850 m, 5 Sep 1957, *Reitz, P.R. 4843* (MO,US); Sao Joaquim, Serra do Oratorio, Bom Jardim, 1400 m, 21 Aug 1958, *Reitz, P.R. 6994* (US).

225. *P.* sp. nov. (*serra-Sao luiz-Curitiba-BRA*)

This new species can be recognized by the elliptic-oblong to slightly obovate coriaceous leaves, 4.5-6 x 1.8-2.3 cm, slightly lustrous above, with petioles 2-4 x 0.8-1 mm, base rounded to obtuse and apex obtuse and notched at the tip, venation pattern brochidodromous festooned, secondaries arcuate, intersecondaries parallel to secondaries up to 3/4 their length, tertiaries alternate percurrent and inconspicuous, and 2 rounded glands placed at 2-4 mm from the base and 0.5-2 mm from the midrib. The floriferous shoots are suberect, 3-3.5 cm long; the flowers have pedicels 1-2.5 mm long, hypanthium campanulate to turbinate 1.5-2.2 mm wide and anthers 0.5-0.6 mm long. The fruits are globose, 6-7 mm wide.

This is close to *P. subcoriacea* which generally has larger and less coriaceous leaves, tertiary veins conspicuous below, longer petioles and longer racemes with bigger flowers subtended by longer pedicels.

**Distribution.** Only known from rocky places in midelevation scrublands of the Serra do Sao Luiz in the eastern of the state of Paraná.

**Elevation range.** 900 – 1070 m.

**Material examined.** (3) BRAZIL. Paraná: Tibagi. Parque Estadual do Guartela, 1000 m, 25 Oct 1998, *Cervi*, A.C. 6520 (P); Curitiba, Serra de Sao Luiz, 1070 m, 5 Aug 1960, *Duarte*, A. 5348 (NY); ibidem, 900 m, 27 Aug 1939, *Kuhlmann*, M. s.n. (MO).

226. *P.* sp. nov. (“*serra da Piedade-BRA*”)

This new species can be distinguished by the shrubby habit, the gray to brown fissured bark, the vegetative buds profusely covered by deltoid cataphylls, the ovate to elliptic rigid coriaceous leaves, 3.5-6 x 1.7-3.5 cm, with petiole 3-7 cm long, base obtuse to rounded, apex acute to rounded and emarginate at the end, brochidodromous festooned venation pattern, 6-7 secondary veins progressively arcuate and anastomosing at 1/3 to 1/4 from the margin, intersecondaries sinuate and parallel to the secondaries, lateral veins slightly prominent below and plain to impressed above, and 2 elliptic basal glands up to 2 mm wide and attached to the midrib. The floriferous shoots are erect, densiflorous, 2-3.5 cm long; the flowers have pedicels 1-2.5 mm long, campanulate hypanthium 1.7-2.5 mm wide, and anthers 0.4-0.5 mm long. The fruits are oblate and apiculate, 6-7 x 7-8 mm.

Differs from the similar *P. brasiliensis* by the shorter petiole, the thicker leaves, the shorter and more rigid racemes, and the flowers smaller with shorter pedicels.

**Distribution.** Distributed in rocky places with shrubby vegetation in the Serra da Piedade and Serra Lenheiro massifs located in central and southern Minas Gerais state, Brazil.

**Elevation range.** 950 – 1740 m.

**Material examined.** (5) **BRAZIL. Minas Gerais:** Caete, Serra da Piedade, 1550 m, 14 May 1990, *Arbo, M.M. 4084* (MO); ibidem, 1600 m, 1843, *Claussen, P. 235* (P); ibidem, 1740 m, 3 Nov 1988, *Harley, R.M. 25495* (NY); ibidem, km 1-5 on road to top of Serra, 1600 m, 2 Feb 1982, *Landrum, L. 4270* (MO); Serra Lenheiro o Carassa, 950 m, Jun 1824, *Riedel, L. 525-304* (NY,US).

227. *P. sp. nov.* (“*ultralongPetiole-2macularGlands*”)

This new species is remarkable because the elliptic-lanceolate leaves, 11-13 x 3.5-4.5 cm, with exceptionally long slim petioles (20-25 x 0.6-0.8 mm), base acute deeply decurrent, apex narrow attenuate, arcuate plain secondary veins on a brochidodromous festooned pattern with polygonal reticulate tertiary veins, and 2 maculate glands located on the second pair of veins at 0-3 mm from the midrib and 7-15 mm from the base. The floriferous shoots are relatively short (2-5 cm long), the flowers have slim pedicels (0.2-0.4 mm thick), and the hypanthium is infundibuliform up to 4 mm wide.

The most similar species is *P. reflexa*, but its petioles are generally shorter, the leaf venation is not conspicuously festooned, and the glands are more separated from the midrib.

**Distribution.** Only known from midelevation areas in the Serra dos Órgãos massif in the Brazilian state of Rio de Janeiro

**Elevation range.** 1600 m.

**Material examined.** (1) **BRAZIL. Rio de Janeiro:** Teresópolis, Parque nacional da Serra dos Orgaos, Trilha para Pedra do Sino, 1600 m, 12 Apr 2011, *Lombardi, J.A. 8397* (DAV,HRCB).

***P. serotina* group:** commonly represented by either naturalized or cultivated plants in most of the Neotropics but apparently wild native plants have been recorded in some parts of Mexico and Guatemala

228. ***P. serotina*** Ehrh. Gartenkalender 3: 285. 1783. Type. United States: Pennsylvania, Westmoreland, 5.4 km W of Pa, Rte. 837 on Pa. Rte. 136, 29 May 1979, Wood, E. W. et al. 4207 (epitype (conserved type) proposed by Gandhi, Reveal, and Brouillet (2009))

A full description of this taxon can be found in the chapter of the Flora Mesoamerica treatment.

Key for the subspecies of *P. serotina* in the neotropics

1. Leaves elliptic-obovate or elliptic or ovate, generally more than 2.5 times longer than wide with the apex narrowly acuminate to caudate; floriferous shoots flexuous generally subtended by 3-4 leaves; flowers with pedicels 2.5-5 mm long and anthers more than 0.8 mm long.

**17a. *P. serotina* subsp. *capuli***

1. Leaves lanceolate-oblong, generally 2-2.5 times longer than wide with the apex acute or widely acuminate; floriferous shoots subflexuous or erect, generally subtended by 2-3 leaves; flowers with pedicels 4-10 mm long and anthers less than 0.7 mm long.

**17b. *P. serotina* subsp. *serotina***

228 a. ssp. ***serotina***

*P. novoleontis* Standl., Publications of the Field Museum of Natural History, Botanical Series 17(2): 194. 1937. 1937. Type: Mexico. Nuevo Leon; Santiago, Common along the various arroyos. Potrero Redondo to west to Puerto a Laguna Sanchez & beyond, 5 Jul 1935, Mueller, C.H. 2118 (holotype, F!; isotypes, GH!, MO!, PH!, UC!).

**Distribution.** Widely distributed as a native, naturalized or cultivated tree from central Guatemala to northeastern Mexico (and extending northward until northeastern USA).

**Elevation range.** 1000 – 3300 m.

**Local names.** capulin (Mexico).

**Material examined.** (30) **GUATEMALA.** **Chimaltenango:** 7.6 km. E. of Patzún. Collection from pine-oak woodland along a small creek, 2000 m, 21 Jun 1970, *Harmon, W. 2608A* (MO); **Huehuetenango:** Along road 13 km west of Huehuetenango, near Puente de Xinaxo, 1800 m, 30 Dec 1940, *Standley, P.C. 81535* (F,US); **Sacatepéquez:** Entre San Lucas Sacatepéquez y Antigua Guatemala, 3 May 1990, *Castillo Mont, J.J.; Juan 1055* (MO,US); **Sololá:** Volcán San Pedro, North facing slopes towards Lago de Atitlan, above village of San Pedro, 1800 m, 7 Jun 1942, *Steyermark, J.A. 47171* (US); near nahuala, Sierra Madre mountains, 2500 m, 17 Dec 1962, *Williams, L.O. 23202* (US); **MEXICO.** Socorro Islands. East slope of island, 5 May 1925, *Mason, H. 1635* (MO); **Chiapas:** San Cristóbal de las Casas, along the streets or in the sitios of San Cristóbal Las Casas, 2200 m, 10 Jan 1972, *Breedlove, D.E. 23633* (MEXU,MO); Ixtapa, along road from Zinacantan center to Ixtapa between Burrero and Ixtapa, 1100 m, 18 Aug 1976, *Breedlove, D.E. 39654* (MEXU,MO); **Durango:** San Ramon, 6 Jul 1941, *Palmer, E. 97* (MEXU,MO); **Jalisco:** Volcano of Colima, middle elevations, 14 Jul 1892, *Jones, M. 131* (MO); **México:** Temascaltepec, Timbres, 1900 m, 5 Aug 1932, *Hinton, G.B. 1248* (ASU,MEXU); **Michoacán:** Morelia, Cerro Azul, Sauca largo, 2200 m, 9 Mar 1912, *Arsène, G. 8600* (MO); Tancítaro, 1890 m, 27 Jul 1940, *Leavenworth, W.C. 366* (MO); **Morelos:** Loma Quiahuistepec, Tepoztlan, 1900 m, 1 Nov 1980, *Martínez A. 51* (MO); **Nuevo León:** Tamaulipas, 1690 m, 16 Jul 1948, Meyer, F. 2796 (MO); end of road in Chipinque Park, Monterrey, 1300 m, 14 May 1991, *Seigler, D. 13400* (MO); **Oaxaca:** Juxtlahuaca, Coicoyan. Yuvi Ka'nu, al SW de Coicoyan, 2050 m, 12 Aug 1989, *Avila, A. de 656* (MO); Dtro. de Ixtlán, Mpio. de Ixtlán de Juárez, 3.3 mi S of Ruta Nacional 175 from a point a few km N of turoff to San Juan Evangelista Analco, on timber road to San Juan Tepanzacoalco and Ixtlán de Juarey, 2840 m, 27 Apr 1986, *Gereau, R.E. 2014* (MO); Miahuatlan, Mpio. San Juan Mixtepec, near town, 2000 m, 11 Jun 1997, *Hunn, E. OAX-777* (MEXU,MO,WTU); Ixtlan, Yolox, from Highway 175 to Yolox, 1800 m, 22 Feb 1981, *Martin, G.J. 333* (MO); Comaltepec: along the path that leads from Cerro Machin to Comaltepec, 2000 m, 20 Mar 1983, *Martin, G.J. 666* (MO); Mixe, Totontepec, 1900 m, 1 Apr 1986, *Rivera Reyes, J. 0198* (MO); Along route 175, near Cienaga, 2385 m, 13 May 2006, *Wen, J. 8685* (US); **San Luis Potosí:** Mountains about 10 miles northeast of Ciudad del Maiz, 1400 m, 7 May 1949, *McVaugh, R. 10450* (MO); **Tamaulipas:** Oak forests on Jaumave road about 13 miles southwest of Ciudad Victoria, 1000 m, 13 May 1949, *McVaugh, R. 10505* (MO); **Veracruz:** Misantla, Chiconquiaco, camino a

Misantla, Sierra de Chiconquiaco, 1610 m, 3 May 1963, *Gómez-Pompa, A. 897* (XAL); Acajete, Plan de Sedeño, 1800 m, 28 Feb 1979, *Ortega O., R. 1275* (F,XAL).

228 b. ***P. serotina*** Ehrh. ssp. ***capuli*** (Cav. ex Spreng.) McVaugh, *Brittonia* 7: 308-311. 1951. *Prunus capuli* Cav., *Anales Hist. Nat.* 2: 110. 1800. Type: Ecuador: Tunguragua, *Née, L. sn* (lectotype MA!).

*Prunus salicifolia* Kunth, *Nov. Gen. Sp.* 6: 241-242, t. 563. 1824. Type: Colombia: Amerique equatoriale (Colombia? Ecuador?), *Humb; Bonpland 1766* (sintype, P!).

*Prunus capollin* Zucc. var. *prophyllosa* Donn.Sm., *Bot. Gaz.* 42(4): 293. 1906. Type: Guatemala: San Rafael, between Mixco and Antigua, *Maxon, W.R.; Hay, R. 3666* (holotype, US!).

**Distribution.** Distributed from northwestern Mexico to northwestern Argentina in dry to very humid climates. Naturalized or sparsely cultivated across most of its range. Apparently only grows as a native plant from western Guatemala to central Mexico (McVaugh, 1951b). Wide spreading could be due to Amerindian trade and carrying.

**Elevation range.** 1200 – 4000 m.

**Local names.** cerezo criollo, cerezo, capulí (Colombia), capulí (Ecuador; Perú), cerezo de Castilla (El Salvador), capulin (Honduras), guinda (Peru).

**Material examined.** (163) **ARGENTINA.** **Salta:** Santa Victoria, Acoite, 22 Jan 1983, *Zardini, E. 1737* (MO). **BOLIVIA. La Paz:** On road to Obrajes, 3500 m, 12 Oct 1921, *Buchtien, O. 242* (CAS,GH); Canyon of Rio La Paz. 1-2 km, below La Paz, 3200 m, 6 Sep 1947, *Fosberg, F.R. 28579* (MO,US); Obrajes, Jul 1859, *Mandon, G. 676bis* (GH,P); Murillo, in the suburb of Calacoto on the far SE side of La Paz, 3400 m, 7 Nov 1984, *Nee, M. 30344* (MO,NY); La Paz, 3505 m, 10 Oct 1920, *Shepard, R.S. 200* (GH); Calacoto (La Paz), 3300 m, 10 Sep 1982, *Solomon, J.C. 8206* (MO); ibidem, 3300 m, 16 Nov 1984, *Solomon, J.C. 12760* (LPB,MO); La Paz, ornamental plants from the Jardín Botánico Municipal, 3600 m, 6 Sep 1986, *Solomon, J.C. 15570* (MO); **Tarija:** Cuesta de Sama, Rocailles, 3800 m, 5 Nov 1993, *Billiet, F. 6108* (MO); Rincón de la Victoria, 2000 m, 7 Nov 1974, *Türpe, L. 5128* (MO).

**COLOMBIA. Antioquia:** Belmira, Paramo Santa Ines, camino de ascenso al páramo, 2500 m, 27 Mar 2004, *Pérez-Zabala, J.A. 2231* (MEDEL); Fredonia, 1700 m, 30 Jun 1928, *Toro, R.A. 1033* (MEDEL); **Boyacá:** Aquitania, Laguna de Tota, along roadside, near of Laguna, 3050 m, 28 Aug 1953, *Langenheim 3612* (COL,UC); Tota, 2824 m, 8 Sep 1951, *Yepes-Agredo, S. 3193* (COL); **Cundinamarca:** Soacha, Alicachin, Nw side of Rio Bogotá, 2500 m, 12 Jul 1972, *Barclay, A.S. 3573* (COL); Tausa, Represa del Neusa, 2600 m, 24 Jun 1957, *Barclay, H.G. 4230* (COL,MO); Bogotá, Quebrada del Chicó, 2650 m, 1 Jun 1939, *Cuatrecasas, J. 5236* (COL); Bogota, 2620 m, 20 Mar 1946, *Duque-Jaramillo, J.M. 2973* (COL); San Miguel a Aguabonita, 2200 m, 20 Apr 1946, *Duque-Jaramillo, J.M. 3324* (COL); Suba, Hacienda las Mercedes, 2600 m, 16 May 1964, *Forero, E. 34* (COL); Valle de Sopa, Hacienda Santa Isabel, 6 Mar 1974, *Gillett, J. 16532* (MO); Bogota, Cañón en la margen este de Chapinero, 2600 m, 6 Jun 1945, *Little-Jr, E.L. 9212* (MEDEL,US); Bogotá, 2600 m, 6 Jun 1973, *Idrobo, J.M. 6532* (COL); ibidem, 2600 m, 5 Aug 2010, *Pérez-Zabala, J.A. COL-2010-8* (DAV); Boquerón - Rio San Francisco, Cañon mouth, above Bogotá, 2700 m, 27 Sep 1917, *Pennell, F.W. 2217* (US); Bogotá, Sabana de Bogotá, 2600 m, Jun 1930, *Pérez-Arbelaez, E. 297* (COL); Subachoque, Carretera al Páramo Tablazo; 1 km al W de Subachoque, 2500 m, 6 Jul 1990, *Pipoly, J. 12050* (COL,MO); Bogotá, Suba, 2600 m, 13 Mar 1945, *Schiefer, H. 548* (COL); Macizo de Bogotá, El Retiro, Entre el Cerro La Cita y Guasca, 2600 m, 10 Apr 1946, *Schultes, R.E. 7015* (COL); ibidem, 2600 m, Apr 1946, *Schultes, R.E. 7265* (COL,US); Usme, Above the village, 2700 m, 15 Aug 1963, *Soejarto, D. 425* (COL); **Huila:** Baraya, 25 km. al ESE de Baraya, 2300 m, 2 Nov 1944, *Little-Jr, E.L. 8920* (COL,UC); **Nariño:** Pasto, Convento de los Padres Capuchinos, 2594 m, 8 Oct 1966, *Guarín, R. 417* (PSO); Ipiales, 3400 m, 16 Jan 1952, *Instituto de Parcelaciones 55* (COL); Cumbal, 3500 m, 11 Feb 1941, *Sneidern, K.V. A 324* (NY,US). **ECUADOR.** Cordillera of Riobamba, 2800 m, 1929, *Rimbach, A. 77* (MO); **Azuay:** Sigsig, Parroquia Sigsig, 2498 m, 2 Mar 1991, *Cerón, C. 13563* (MO,QCNE); Cuenca, Parroquia Sayausi, 1500 m, 4 Jul 1991, *Cerón, C. 15596* (MO); Chullambaba, 11 km N of Cuenca in the Cuenca valley near the river, 2350 m, 7 Oct 1981, *Dodson, C. 11614* (MO,SEL); Baños, south west of Cuenca, cultivated ground, 2700 m, 1912, *Harling, G. 14551* (MO); **Bolívar:** Entre Guaranda y Vinchoa, 2700 m, 29 Sep 1943, *Acosta-Solís, M. 5923* (F); Guaranda, Parroquia Julio B. Moreno, 3800 m, 23 Jun 1991, *Cerón, C. 15409* (QCA); **Cañar:** Ingapirca Parish. Ingapirca, 3200 m, Nov 1991, *Kohn, E. 1427* (MO); **Chimborazo:** Chunchi, Parroquie Llagos, 2600 m, 5 May 1991, *Cerón, C. 14565* (?); Penipe, Parroquia El Altar, 2425 m, 18 Jul 1991, *Cerón, C. 15715* (MO); Parroquia San Antonio de Bayushig, 2760 m, 3 Aug 1991, *Cerón, C. 15836* (MO); Riobamba, Parroquia Lizarsaburo, 3000 m, 12 Nov 1991, *Cerón, C. 17482* (MO); **Imbabura:** Cotacachi, Apula near Morocho, 3000 m, 24 Jul 1974, *Plowman, T. 3860* (P);

**Loja:** Saraguro, At Saraguro, 2500 m, 22 May 1971, *Macbryde, B. 336* (MO,NY,QCA,US); **Pichincha:** Quito, Ciudad de Quito, entre el Parque Italia y el Barrio Las Casas, 3800 m, 28 Nov 1990, *Cerón, C. 12395* (MO); Instalaciones del Jardín Botánico de Quito, 2800 m, 29 Jan 2001, *Montenegro, W. 82* (MO,QCNE); Parque La Alameda, Quito, 2812 m, 16 Feb 1991, *Padilla, I. 2050* (MO); Quito; along Avenida Reina Victoria a few blocks north of "El Ejido" park, 2800 m, 7 Dec 1994, *Richard Abbott, J. 15729* (BEREA,MO,QCNE); **Tungurahua:** Ambato, Parroquia San Fernando, 3000 m, 23 Jun 1990, *Cerón, C. 10391* (MO); Parroquia Pilaguin, 3100 m, 24 Jun 1990, *Cerón, C. 10421* (MO); Parroquia Picayhua, 2600 m, 26 Jun 1990, *Cerón, C. 10469* (MO); San Pedro de Pelileo, Comunidad Salasaca, 2500 m, 5 Apr 1996, *Molliner, N. 35* (MO,QCNE); Ambato, 2700 m, 1924, *Tate, G.H.H. 545* (US). **EL SALVADOR.** **Chalatenango:** Mpio. de San Ignacio. Entre El Cerro El Pital y Las Pilas. Veg. de Pinar, 29 Apr 2001, *Linares, J.L. 5200* (MEXU); **Santa Ana:** Metapan, Parque Nacional Montecristo, la quebradona del portesuelo, 1900 m, 23 Feb 2002, *Martínez, V.M. s.n. (e)* (MEXU). **GUATEMALA. Chimaltenango:** 7.6 km. E. of Patzún, 2000 m, 21 Jun 1970, *Harmon, W. 2608* (MO,MO,UMO); **Quetzaltenango:** San Mateo, San Mateo, 2300 m, 2 Apr 1978, *Germán, M.T. 723* (MEXU,MO); Quetzaltenango, north slope of Cerro de Baul, 2499 m, 21 Jan 1945, *Sharp, A.J. 4519* (MEXU,MO); San Juan Ostuncalco, Canton La Esperanza, about 6 km from San Juan Ostuncalco, 3200 m, 12 Jan 1966, *Molina R., A. 16636* (US); **Quiché:** Nebaj, on Cotzal Road, about 500 m NE, 6 Jun 1964, *Contreras, E. 4889* (US); 2 km S of Chichicastenango, 5 Apr 1970, *Harmon, W. 2237* (MO,UMO); Between Chajul and Nebaj, 1981 m, 7 Feb 1946, *Sharp, A.J. 4688* (MEXU); **Sacatepéquez:** Volcán de Acatenango, Concepción Calderas, 2100 m, 11 Mar 1999, *Véliz, M. MV 99.6960* (MEXU). **HONDURAS. Morazán:** La Labranza, Cerro de Uyuca, 1800 m, 3 Apr 1957, *Molina R., A. 7870* (US). **MEXICO.** East of Lerma, 27 Apr 1849, *Gregg, J. 702* (MO); La Cuna, Mt. Ajusco, 18 Apr 1900, *Trelease, W. 55* (MO); **Chiapas:** Huistán, Ejido Chilil, 2350 m, 26 Feb 1989, *González E., M.; M. 651* (MEXU); San Cristóbal de las Casas, Estación Biológica Huitepec-PRONATURA, 2400 m, 13 Jun 1989, *González E., M.; M. 666* (MEXU); Cerro San Cristóbal, 2225 m, 16 Feb 1966, *Laughlin, R.M. 67* (CAS,MEXU); Mt. Male, near Porvenir, 3200 m, 21 Apr 1906, *Matuda, E. 4689* (MEXU,MO); Siltepec, Cascada, 1600 m, 1 Mar 1945, *Matuda, E. 5179* (MEXU); Tenejapa, En el paraje "Kotoltez", 1650 m, 10 Apr 1982, *Méndez, A. 4195* (MEXU); Alrededores de S. Andrés Chamula, 18 Apr 1943, *Miranda, F. 2651* (MEXU); Chamula, Yaal Ichin, 2110 m, 25 May 1993, *Ruiz Díaz, J. de 53* (MEXU); **Distrito Federal:** La Magdalena Contreras, Eslava, Valley of Mexico. [Ex-hacienda de Eslava], 2286 m, 30 Jan 1899, *Pringle, C.G. 8052* (MO,PH); Milpa Alta, Santa Ana, 2750 m, 3 Jan 1976, *Ventura A., F. 756* (MO,UMO); **Hidalgo:** Metepec, 7 kms al Este de Metepec, La Victoria, 2450 m, 24 Mar 1980, *Hernández M., R.*



4108m (ASU,MO); Acaxochitlán, San Francisco, 1725 m, 29 Jan 1985, *Villa Kamel, A.* 92 (MO); **Jalisco**: Ciudad Guzman, ca. 30 km W of Ciudad Guzman on the road to Venustina Carranza, 2040 m, 8 Oct 1985, *Bartholomew, B.* 2800 (MO); Bolaños, Cañada 1.5 km al O de las Berenjenas, 2 a 3 km al W de las Berenjenas o 7 a 8 km al W del Crucero, 1850 m, 2 Jul 1996, *Calónico Soto, J.* 2446 (MO); Tapalpa, 300-400 despues de la desviación de Ferreria, 2200 m, 5 May 1991, *Huerta M.* 71 (MO); **México**: Polotitlán, 0-2 miles W of Encinillas, along Highway 57, ca. 70 miles NW of Mexico City, 2500 m, 26 Aug 1977, *Croat, T.* 44156 (MO); Atlacomulco, 40 km N of Atlacomulco, 2318 m, 1 Mar 1962, *Detling, L.* 8923 (ASU,UMO); Texcoco, Atlapulco, 13 Km. al SE de Tequesquinahuac por la brecha al cerro Tláloc, 2990 m, 25 Jan 1986, *Koch, S.D.* 862 (UMO); **Michoacán**: Morelia, Lado E del Cerro El Águila, 2590 m, 17 Feb 2009, *Cornejo Tenorio, G.* 3572 (MEXU,MO); Pátzcuaro, Cerro El Toro, cerca de Ihuatzio, 2100 m, 7 Aug 1986, *Escobedo, J.* 1095 (MO); Erongarícuaro, 3/4 km al NW de la Hacienda Charahuén, 2160 m, 28 Oct 1986, *Espinosa G.; J.* 2354 (MO); NW shore of Lake Patzcuaro, Michoacan, between San Jeronimo & San Andres Tzirondaro, 2040 m, 3 Apr 1982, *Perrott, F.A.* 12 (MO); Acuitzio, Neovolcanic Axis: About 10 km S of Acuitzio del Canje, along Hwy 9 on the way to Villa Madero, 2300 m, 8 Mar 2006, *Provance, M.* 10026 (MO,UCR); **Nayarit**: Tepic, 11 km al SW de la carr. el Izote - V. Carranza, camino al Cuarenteno, Canada la Capilla. 21.28.609N 105.00.084 W, 1325 m, 20 Jan 1994, *Calzada, J.I.* 19097 (MO); A 6 km al NE de Camichin de Jauja, por la brecha a Potrero Grande que lleva a las faldas del Volcan Sanganguey, 1760 m, 31 Mar 1987, *Téllez V., O.; Oswaldo* 10143 (MO); Km 5, camino de terraceria al Cuarenteno, que empieza 500 m al W de El Izote, carr. Tepic-Miramar, 1400 m, 2 Feb 1989, *Téllez V., O.; Oswaldo* 11714 (MO); Jalisco, Km 12 del camino de terraceria de Xalisco al Malinal, 1500 m, 30 Jan 1990, *Téllez V., O.; Oswaldo* 12610 (MO); **Oaxaca**: Miahuatlan, 4 km al N del Campamento Rio Molino, entre San Jose del Pacifico y Sochixtepec, 2600 m, 13 Jun 1985, *García Mendoza, A.* 1622 (MO); Along Route 175. 2.5 km SE of San Jose del Pacifico, 2481 m, 13 May 2006, *Wen, J.* 8688 (US); **Puebla**: San Martín Texmelucan, 2300 m, 25 Feb 1973, *Wolfgang Boege, L.* 2727 (MO); **Veracruz**: Rafael Lucio, San Miguel del Soldado, camino a Xalapa, 1950 m, 3 Jun 1938, *Balls, E.K.* 4716 (XAL); Orizaba, Orizaba, 1200 m, , *Botteri, M.* 964 (XAL); Orizaba, 1200 m, , *Botteri, M.* 1107 (US,XAL); Tlacolulan, San José de arriba, camino de terracería El Rodeo-San José, 5 km de la carretera federal Xalapa-México, Casa de María, 15 Apr 2004, *Martínez Cruz, N.* 6 (XAL); Acajete, Piletas, 1700 m, 23 Jan 1976, *Ortega O., R.* 139 (MO,XAL); Tonayán, Tonayan, 1830 m, 10 Nov 1976, *Ortega O., R.* 141 (MEXU,MO,XAL); Soledad Atzompa, 6 Mar 1984, *Robledo M.; J.D.* 109 (XAL); Magdalena, 1450 m, 27 Mar 1976, *Vázquez T., M.* 356 (XAL); Chiconquiaco, El Huérfano, 2000 m, 10 Jul 1973, *Ventura A., F.* 8586 (XAL); Acajete, Plan de Sedeño, 1750

m, 22 Mar 1974, *Ventura A., F. 9770 (XAL)*; Tlalnelhuayocan, San Antonio, camino a Rancho Viejo, 1500 m, 14 Feb 1991, *Zamora C., P. 2887 (XAL)*. **PANAMA. Chiriquí:** Parque Nacional Volcán Barú. Boquete, camino hacia el Volcán, 2300 m, 6 Nov 2002, *Aizprúa, R. B3562 (MO)*. **PERU. Ancash:** Recuay, San Nicolas (Huaraz-Recuay), 3500 m, 28 Sep 1986, *Cadillo Moreno, E. 012 (MO)*; Yungay, Entre Yungay y Llanganuco Ladera, 2800 m, 9 Aug 1986, *Mostacero, J. 1375 (MO)*; Huaraz, 2850 m, 27 Sep 1975, *Saunders, S.G.E. 1276 (MO)*; Yungay, Huascarán National Park. Llanganuco sector, María Josefa Trail, 3580 m, 29 Dec 1984, *Smith, D.N. 8833 (MO)*; **Apurímac:** 5 km above Andahuaylas, on trail to Abancay, 3200 m, 5 Nov 1935, *West, J. 3746 (MO,UC)*; **Cajamarca:** Cajamarca, Plantas en la ciudad, 2700 m, 4 Mar 1983, *Beck, S.G. 7889 (MO)*; Km. 2.3 on road from Cajamarca to Chota, 3000 m, 3 Jan 1983, *Krukoff, B.A. 22000 (MO)*; Cajamarca. El Gavilán, Cajamarca, 2500 m, 3 Jul 1993, *Llatas Quiroz, S. 3292 (MO)*; **Cusco:** Anta, Cillapuyu, El Chaccan, 3611 m, 28 Dec 1972, *Brunel, G.R. 209 (MO)*; Santa Ana, El Chaccan, 3498 m, 23 Feb 1973, *Brunel, G.R. 547 (MO)*; Cillapuyu, El Chaccab, 3610 m, 5 Mar 1973, *Brunel, G.R. 603 (MO)*; Calca, Dist. Arin. North of Cusco, road Cusco-Urubamba, 2897 m, 18 Jul 1992, *Chavez, F. 800 (MO)*; Paucartambo, along Río Paucartambo, S of Paucartambo, 3000 m, 3 Oct 1995, *Croat, T. 78145 (MO)*; Urubamba, Chincheros. South of center of Chinchero along road to Cachimayo, at shallow lake called Pongolay, 3800 m, 19 Jan 1982, *Davis, E.W. 1637 (MO)*; Tankarpata, above Cusco airport, 3500 m, 23 Jul 1983, *Gentry, A. 43212 (MO)*; Amaparaes. Center of the town, around the bridge, SW from Cusco and S of town, 13 Dec 1986, *Núñez, P. 6710 (CUZ,MO)*; Chumbivilcas, Velille, Tuntuma. ca. a 5 km de velille por la carretera Velille-Colquemarca y hacia Tuntuma, y sus cerros vecinos, 3750 m, 17 Apr 1987, *Núñez, P. 7952 (MO)*; Ca. 2km S of San Jeranimo (ca. 10 km SE of Cusco). NE facing hillside, 3200 m, 20 May 1977, *Solomon, J.C. 3006 (MO)*; **Junin:** Huancayo, 3317 m, Feb 1948, *Soukup, J. 3539 (MO)*; **La Libertad:** Otuzco, Fundo El Tunja de Faustino Sánchez. borde de carretera cerca de casa, 3200 m, 3 Jun 1992, *Leiva, S. 465 (MO)*; Santiago de Chuco, Santiago de Chuco - Cachicadán, 2700 m, 14 Jun 1984, *Sagástegui, A. 11838 (MO,UMO)*; Otuzco, Trujillo-Huamachuco road, 5 km before Shorey, 3800 m, 13 Feb 1983, *Smith, D.N. 3300 (MO)*; **Piura:** Huancabamba, valley of Rio Huancabamba, 2 km east of Huancabamba, 1850 m, 8 Jun 1947, *Fosberg, F.R. 27716 (US)*; Sapalache (Distrito), 2350 m, 3 Sep 1976, *Sagástegui, A. 8590 (MO)*. **VENEZUELA. Merida:** In cultivated ground, Monocoque, 20 Jan 1929, *Pittier, H. 13235 (MO, PH)*.

List of specimens revised and corresponding identification

- A.C.F. 12360 (201).
- Abbott, W.L. 2791 (42).
- Acero, E. s.n. 1 (104).
- Acevedo R., R. 184, 529 (42).
- Acevedo, R. 1542 (4).
- Acevedo-Rodriguez, P. 4703 (44); 6448 (39); 6463 (42); 10211 (56).
- Achá, S. 273, 290 (103a); 291 (62).
- Acosta, L. 655 (60).
- Acosta, R.H. 36 (104).
- Acosta-Solís, M. 5850 (76); 13299 (91); 14117 (96b).
- Adams, C.D. 14624 (44).
- Agudelo, C.A. 16, 66 (97); 204 (73); 3313, 3666 (97); 3800, 3854 (104); 3977, 4001, 4020, 4062, 4096, 4140 (97).
- Aguilar, R. 723, 1380, 4056 (42); 5077 (48).
- Aguinda, R. 1476 (82).
- Aguirre, X. 179, 222 (91); 362, 378 (96b).
- Aizprúa, R. B4082 (42).
- Alain Liogier, B.r.o. 697, 2027 (39); 4686 (42); 11145, 13940, 13967 (39); 14420 (42); 16725, 17847, 20853 (39).
- Alarcón, R. 73 (162).
- Alberto, H.n.o. 49 (63).
- Alcorn, J.B. 2934, 3372 (9).
- Alexander, E.J. 812 (50).
- Alexiades, M. 594 (162).
- Alfaro, E. 662 (26a); 723 (48); 1091 (42); 1368 (48); 1791 (33); 1885 (45); 1924 (42); 2251, 2309 (45); 3695 (26a).
- Allen, B. 15298 (53).
- Allen, P.H. 7132 (46).
- Almeda, F. 3746, 4224, 5360 (45).
- Altamirano, S. 3042 (103).
- Alvarado, A. 70 (170).
- Alvarenga, D. 266 (191).
- Alvarez, A. 477, 485 (82); 2352 (162).
- Alves, M. 1988 (190).
- Anderson, W.R. 3017 (39); 35907 (202).
- André, E. s.n. (97).
- Angel, S. 468 (73).
- Anonymous s.n. 1989, 18 (38); 229 (160).
- Antezana, A. 165 (154); 567, 591, 628 (144).
- Arantes, A.A. 1093 (191).
- Araque, J. 170 (38).
- Araujo-Murakami, A. 240 (152); 298 (97); 323 (162); 499, 550, 989, 3038 (180); 3242A (152); 3243 (103); 3253, 3312, 3422 (152); 3580 (157); 3608, 3743 (103); 3848 (103a); 4166 (96); 4167 (97).
- Arbelaez-S, G. 2762 (104).
- Arbo, M.M. 2867 (215); 4084 (226); 5877, 8505 (204).

Arechavaleta, J. (204).

Arellano, G. s.n. (144); 350, 529 (103); 605, 621, 681, 793 (144); 861 (136a); 1043 (144); 1260 (136a); 1590 (146); 1685, 1851, 2052A, 2068, 2091, 2102, 2106, 2124, 2126 (154); 2313, 2336, 2365 (97); 2515 (96); 2735, 2741, 2749 (103); 3141 (154).

Aricharaleta, F. 283 (204).

Aristeguieta, L. 2829, 3414 (71); 4906 (42).

Ariza, W. 379 (104).

Aronson, J. 616 (100).

Arroyo, L. 412 (162); 2961 (140); 3034 (192a); 4003, 4019 (139).

Asplund, E. 9459 (162a).

Assuncao, P.A. 166 (166).

Atahuachi B.; M. 207 (139a).

Aulestia, M. 680, 1110, 1252 (172).

Aymard, G. 9804 (166); 11129 (160).

Azevedo, M.L.M. 226 (191); 385 (219).

Baca, A. 547 (96b).

Badillo, V. 5813 (74); 5825 (83); 6590 (95).

Balansa, B. 2380a (198); 2381, 2381a, 2381b (204); 4374 (196).

Balarezo, A. 534 (162); 2628, 2635 (166).

Balcazar, J. 937 (141).

Baldeón, S. 2980 (103).

Ballesteros M., L. 384 (45); 392 (37); 398 (45).

Bang, M. s.n. (137); 821 (96); 1432 (135); 1465 (138); 1619 (96); 1938 (97); 2170 (136); 2170a (137).

Barclay, A.S. 3565 (91).

Barrie, F.R. 695 (8).

Barrier, S. 3500 (44).

Bascopé, F. 49 (152); 79 (103); 140, 276, 278 (152); 352 (103).

Basualdo, I. 1777, 2500, 6297 (204).

Beaman, J.H. 5714 (49); 5934 (45).

Beck, S.G. 3088 (138); 3712, 4897 (96); 9580 (139); 11542 (210); 14657 (96); 18555 (154); 19875 (150); 21182 (139a); 21931 (97); 22899 (149); 23045 (103); 24779, 25539 (143); 31465 (139).

Begazo, N. 145, 151 (180); 154 (188).

Bello, E. 708 (26); 782 (42); 930 (26); 986, 1804 (42); 1994 (26); 2111 (42); 2687, 4309 (35); 4317 (42); 4333, 4334 (26); 4440 (45).

Benítez de Rojas, C. 5099 (186).

Benitez, D. 53 (62); 326 (73); 383, 496, 1285 (62).

Bennett, B. 4506 (168).

Benoist, R. 254 (160).

Berendsohn, W.G. 361 (42).

Bergeron, S. 154, 628, 854 (166).

Berlandier 236 (9).

Bernal, R. 768 (65); 851 (97); 1834 (91).

Bernardi, L. 565 (68); 17177, 17198 (67); 18131 (196); 19108 (204); 19322 (211).

Bernoulli 2916 ().

Bertoni 994, 1408 (196).

Betancur, J. 3630, 3695 (64); 9108 (75).

Biganzoli, F. 320 (204).

Biloni, A. 59-m (192).

Blaisdell, R.S. 124 (45).

Blanco, C. 206, 439 (160).

Boeke, J.D. 3021 (96).

Boelcke, O. 5410 (139).

Bohorquez, J. 14 (152).

Bohorquez, P. 273 (91).

Boom, B.M. 1185, 5038, 5495 (166); 10638 (179).

Botanic Gardens Herbarium 4501 (44).

Botero, D. 1061 (97).

Botteri, M. ND (9); 1023 (19).

Bourgeau, C.M. 2295 (9).

Boyle, B. 529, 607, 641, 662 (19); 816, 823, 870 (45); 2516, 2517, 2520, 2525 (50); 2589 (19); 3190 (26); 3845 (19); 4143, 4480 (103); 4734 (122); 4957 (97).

Brade, A.C. Bs199 (213).

Braga, R. 1031, 1715 (204).

Brandbyge, J.S. 31446 (162); 33398 (174); 42811 (96b).

Breedlove, D.E. 7822 (37); 8061 (4); 8500 (30); 8773 (37); 8967 (36); 9060 (37); 9583 (45); 9690 (36); 10141 (36a); 11134 (37); 11476 (30); 11976 (49); 24852 (36); 25703 (38); 25903 (34); 26824 (38); 29431 (37); 31097 (46); 31791, 32007 (45); 32663 (49); 32721 (36a); 36095 (8); 41664 (36); 48619, 48657 (31); 49347 (36a); 49754 (50); 51305, 53607 (37); 53608 (45); 55718 (38); 55753 (54); 59260 (4).

Brenes, A. 3771, 5527, 5932, 6744b (26).

Breteler, F.J. 3219 (42); 3609 (97); 4611 (67).

Brewer, S.W. 487 (39).

Britton, N. 2613, 14870 (39); 15547 (42).

Broadway, W.E. 4303 (44).

Bruijn, J. de 1297 (97).

Brunetto, A. 105e (204).

Brunner, D. 1435, 1888 (204).

Buchtien, O. 1632, 1732 (138); 4826 (96).

Burchell, W.J. A53A (190).

Burger, W.C. 12140 (26).

Burkart, A. 18876 (204); 26532 (139).

Bussmann, R. 18600 (127).

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Samaniego, A. 103 (131).

Sanchez Vega, I. 3621 (121); 5209 (123); 5397 (127); 5786 (123); 5904 (133); 9607 (170).

Sánchez, D. 94, 751 (66); 757 (97); 833A (70); 1101 (63); 1467 (62); 3041 (81); 3791 (73).

Sánchez, H. 458 (97).

Sánchez, L.F. 1, 7, 17, 63, 66, 70, 73, 74, 78, 84, 89 (97).

Sánchez, M. 807 (166).

Sanchez, O.A. 171, 230 (104).

Sánchez, R. 1230, 1315 (71); 1440 (68); 1453 (97); 6564 (73).

Sánchez, S. 103 (101).

Sanders, A. 10362, 10428, 10433, 10868 (31).

Sandoval, E. 246 (27); 314 (46); 1855 (27).

Sandoval, M. 824 (27).

Sanín, D. 5023 (45).

Santamaria Aguilar, D. 3372 (60); 9193 (59).

Santana M., F.J. 7161 (13).

Santis Ruiz, C. 866 (37).

Santíz C., E. 529 (37).

Santos Martínez, J. 1318, 1447 (8).

Saravia, C. 4431A (71).

Saravia, E. 450, 717 (139).

Sargent (39).

Sastre, C. 8449 (160).

Saynes V. 225 (12).

Schiavone, M.M. 11684, 11702 (139).

Schiede (9); (1); (9); 579 (1).

Schiffino, J. 86 (56).

Schinini, A. 25444 (204); 27093 (199); 28729, 28762, 29962, 31415, 36880 (204).

Schlechtendal, D.F.K. ND (1); ND (9).

Schmalzel, R. 2002 (26a).

Schmeda, G. 934 (204).

Schrenk, H. von 9 (42).

Schüch, G. 514 (192).

Schultes, R.E. 3463 (162); 26131A (166).

Schultze-Rhonhof, H. 2160 (168); 2584 (164).

Schulz, A.G. 7281, 9541 (139).

Schulz, J.P. 382 (67).

Schunke V., J. 813 (188); 1819 (189); 4269, 6574 (188).

Schwarz, G.J. 5118, 6316, 6446 (204).

Schwindt, E. 560, 809 (204).

Segadas-Vianna 2421 (214).

Sehnm, A. 16762 (204).

Seidel, R. 7190 (151); 8576 (180); 8917, 8972 (162).

Sello, H.L. 1361 (190); 2039 (192).

Sellow, F. ? (190); sn (197).

Semir, J. 4906 (207).

Sena, J.C. (202).

Serralde, L.F. 79 (71).

Serrano, F. 636 (96).

Serrano, M. 692, 1100 (139); 4089, 4109 (158); 4834, 5079, 5316 (139); 5595, 6824, 7263 (159).

Servín, B. 678, 746, 831 (11); 1044 (9); 1144 (11); 1195, 1345 (9).

Sessé, M. 2041 (18); 3812bis (4).

Shafer, J.A. 3679 (39).

Shepard, R.S. 625 (162).

Shonle, I. 160 (123); 176 (97).

Sieber s.n. (42).

Silva, G.A. 495 (104).

Silva, M.G. 4869 (192).

Silva, N.T. 1350 (185).

Silverstone-Sopkin, P. 1650 (66); 9838 (76).

Sinaca C., S. 358, 513 (51).

Sintenis, P. 252 (56).

Skinner, N. 26, 33 (142).

Skutch, A.F. 332, 343, 369 (45); 504 (34); 1860 (25); 1915 (45); 2077 (31); 3302 (26); 3502 (45); 4493 (162a).

Sloane, H. (39).

Small, J.K. 794 (39).

Smith Jr, C.E. 4154 (45); 4505 (12).

Smith, A. H1 (45); A646 (26); H439, pc265 (45); p2227 (42).

Smith, A.C. 10281 (223).

Smith, D.N. 4619 (120); 5204 (183), 5429 (177); 6226, 6230 (127); 8587 (122); 8591 (73); 8714 (97);



10926 (101); 13064 (97); 13459 (142); 14251 (180);  
14409 (169).

Smith, L.B. 3377 (39); 7371 (197); 7383 (204); 7954  
(223); 8144 (204); 9218 (204a); 9499 (204); 10812  
(197); 11855 (211); 13622 (223).

Smith, R. V10001 (186).

Sneidern, K.V. 2347 (104).

Sobral, M. 3207 (224).

Solís Galvéz, R. 63 (45).

Solomon, J.C. 7974 (185); 8486 (97); 8674 (96);  
8999 (97); 9671 (96); 9935 (159); 10921, 10937,  
10978, 11159, 11252 (139); 11418 (103a); 11543,  
12371 (96); 18492 (143); 18710, 18981 (97).

Soria, N. 2363 (193); 2548 (199); 6594, 6618, 6634,  
6669, 6678, 6688, 6742, 6744 (204).

Sosa O., V. 9 (45).

Sothers, C.A. 370 (166).

Soto, D. 50 (147); 117 (142).

Soto-Núñez, J. 5251 (8); 8412 (7); 10112 (3); 14123  
(7).

Sousa S., M. 8116 (49); 9336 (45).

Souza, V.C. 5016 (203).

Spruce, R. 5992 (91).

Stahl, A. 389b (42).

Standley, P.C. 742, 4855, 8013, 13590 (36a); 20058  
(31); 21515, 23011 (27); 47868 (26); 59958 (46);  
70412, 92426 (36a).

Stehlé, H. 4132, 4875, 5351 (32).

Steinbach, J. 7398 (162); 8550 (139a); 8601 (139).

Stellfeld, C. 1622 (204).

Stergios, B. 15798 (67).

Stern, W.L. 54A (42); 1133 (26a).

Stevens, W.D. 27269, 27936, 29596 (42).

Stevenson, W.D. 1091 (166a).

Steward, W.C. 20109 (166).

Steyermark, J.A. 1016, 1068 (171); 35262 (38);  
37089, 37742 (36a); 43687 (37); 47220 (31); 47427  
(52); 48424 (30); 49477 (25); 51860 (28); 53418  
(96); 54467 (102); 55412 (74); 60687 (160); 61639  
(94); 62254 (186); 62615, 62733 (94); 91424 (186);  
96320 (92); 96844 (68); 99196, 99419 (92); 109651,  
109828 (163); 115465 (73); 130578 (175).

Stork, H.E. 4146 (45).

Stutz, L.C. 1212 (204).

Suelli, E. 1034 (103); 1415 (96); 2237 (117); 2433,  
2643, 2809 (103).

Sucre, D. 5803 (203).

Suin, L. 1793 (104); 2048 (82).

Swartz s.n. (39); s.n. (42).

Tafur, V. 123 (168).

Tamashiro, J.Y. 1260 (201).

Tamayo, F. 165, 406 (42); 441 (67); 1504 (173);  
4201 (67).

Taylor Edwards, M. 605 (9).

Tejero, D. 3200 (8).

Téllez V., O.; Oswaldo 8234, 10125, 10384 (4).

Tello 109 (162).

Tenorio L., P. 109 (37a); 1426 (8); 3683 (1); 5846 (49); 11337 (22); 14390 (12); 16935 (20).

Thomaz, L.D. 1673, 1676 (216).

Thompson, S.A. 9570 (42); 9774 (39).

Thorne, R. 40090 (45); 40156 (36); 48077 (39).

Ticona, E. 160 (145); 277 (104); 310 (155).

Tiepolo, G. 54 (201).

Tillett, S.S. 673238 (91); 927-18 (42).

Tipaz, G. 17, 612, 627 (96b); 1828 (87).

Tirado, M. 985 (188).

Tolaba, J. 914 (139).

Tonduz, A. 1714, 1722, 2025 (26); 7355, 7829 (45).

Torres C., R. 358 (7); 485 (49); 493, 1448 (19); 2242 (31); 2917 (45); 4342 (23); 4986, 5014 (49); 8467 (47); 10229 (19); 16365 (12).

Torres, J.H. 470 (68); 1261, 1298 (73); 1396 (97).

Townesmith, A. 1234 (99).

Tressens, S.G. 2113 (211); 2622, 3779, 4059 (204); 4557 (192a); 5094, 5718 (196).

Triana, J.J. , 4217 (63).

Trujillo, B. 9175 (186).

Tún-Ortíz, R. 2382, 2477 (39).

Tunqui, S. 112, 229, 292, 1119 (162).

Tupayachi, A. 74 (96).

Tyson, E. 7015 (26a); 7106, 7208 (42).

Ule, E. 135-3328 (203); 177-2882 (192); 1687 (205).

Ulloa, C. 299 (96).

Uribe-Uribe, L. 6647 (63).

Ushigua 96-10-07 (168).

Utley, J. 4816 (26a).

Valencia, N. 2207 (101).

Valencia, R. 67540 (174).

Valenzuela, J.M. (42).

Valenzuela, L. 825 (103); 2741 (114); 3574, 3599, 3641, 3719 (117); 4805 (125); 5069 (96); 5426 (122); 5527 (103); 7657 (169); 7851 (103); 8052 (96); 8819, 8880 (122); 9390, 9845 (169); 10075 (97); 10665 (176); 11775 (103).

Valverde, L. 1158 (173).

Vanegas, L. BEL93 (69).

Vanni, R.O. 885 (192a); 930 (192); 3754 (204).

Vargas, C. 8998 (96); 17765 (97); 20280 (96).

Vargas, H. 1686 (82); 1823, 1829, 1840 (96); 3201, 3266, 3282, 3290, 3328, 3788, 3838 (82).

Vargas, I. 315 (139); 361 (141); 811 (139); 1283 (147); 1357, 1503 (142); 2094 (141); 2958, 2981 (142); 3033 (139); 3114 (142); 3698, 4378 (156); 4864 (147); 5054, 6760, 7265 (141).

Vargas, L. 750 (185).

Vargas, M.a. 408 (140).

Vargas, W.G. 477 (73); 547 (64); 692, 788 (97); 1129 (64); 3826, 4083 (104); 4295, 5956 (97).

Vargas, Y.A. 203 (37); 216 (45).

Vásquez, R. 1184, 5763, 5890, 8842, 10553, 13743, 14958, 15367, 15397, 15446, 15451, 18015 (166); 21886 (120); 22020 (103); 23468 (185); 25363 (103);

25591, 25772 (162); 27953 (112); 28265, 28271 (110); 28540, 28628 (98); 29436, 30439 (62); 30514 (110); 30750 (98); 33771 (103); 39109 (188).

Vázquez T., M. 8683 (9).

Vázquez, J. 2368 (7).

Vega A. 8971 (4).

Velarde-Nuñez, O. 3021 (123).

Velasco-Gutierrez, K. 1756 (53).

Velasco-Sinaca, E. 685 (51); 766 (49).

Velázquez L.; Cuahutémoc 189 (49).

Vélez, J.G. 5302 (91).

Vélez, M.C. 1135 (104); 1887 (73); 2519, 2580 (104); 3770 (73); 3818 (97); 4802 (65); 5650 (97).

Vélez-Puerta, J.M. 2407 (97).

Véliz, M. MV 12245, s.n. (46); MV 2M.7992 (38); MV 2M.8767 (45); 93.3299 (52); 21466, 22129 (46).

Ventura A., F. 369 (49); 1048 (37); 1143 (17); 3405, 3529, 3690 (1); 4498 (51); 4756, 5265 (45); 8039 (17); 8069, 8092 (37); 8162 (45); 8763 (37); 9140 (49); 9600 (11); 9767 (37); 9769 (1); 10205 (37); 10256, 11168, 11246 (1); 12645 (9); 12686 (49); 12743 (17); 12821 (9); 12882 (37); 13143, 13162 (9); 13896 (1); 13975 (9); 13983, 14068 (1); 14293 (37); 14312 (9); 15106 (37); 15533 (9); 15777, 15812 (1); 16315 (37); 17087 (9); 17140 (11); 17154 (37); 17165 (1); 17961 (9); 18298 (17); 18531 (49); 19669, 22004 (9).

Ventura V., E. 417 (31); 557 (8); 1985 (37a); 6763, 8233 (45).

Venturi, S. 884A, 1884, 1884c, 5248, 9419, 10522 (139).

Vera-Sánchez, L.E. 977 (93); 1007 (97).

Vera-Santos, J. 3270 (9).

Verdi, M. 1433 (211).

Vicuña, E. 32 (65); 518 (126).

Viégas, A.P. 6250 (213).

Vieira, C.M. 27 (203).

Vilca C. 591, 600 (98).

Villa C., J. 454 (31).

Villa, N. 39 (108).

Villalobos, J. 53 (139).

Villalobos, M. 14A, 50, 52 (97); 81 (103).

Villarroel, D. 105 (140); 380 (162); 1493, 1626 (141).

Viña, A. 271 (65).

Vivar, F. 2935 (106); 3172 (115); 3332 (102).

Wallace, R. 124, 139 (162).

Warming, J.E.B. s.n. (209).

Wasum, R. 154, 361, 366 (204); 437, 456, 577 (211); 681, 684, 4708, 4741 (204); 4953 (204a); 6252 (204); 7996, 8660 (204a).

Weberbauer, A. 1265 (161); 3507 (100); 3945 (101); 5583 (96); 6732 (98); 6747 (178); 6930 (103); 6958 (167).

Webster, G.L. 5265 (39); 25922 (204a).

Weddell, M.H.A. 4046 (158); 4065 (139).

Weigend, M. 97-279, 5092 (121).

Wells, J.D. 1237 (167).

Wen, J. 6733, 6772, 6793 (42); 6812 (26); 6828 (45); 6846, 6853 (26); 6902 (60); 6942 (45); 6961 (26a); 6968 (45); 6969 (42); 6970 (45); 6972, 6973, 7042 (42); 8620 (97); 8625, 8646 (98); 8755 (22).

Werff, H. van der 3424 (58); 5452 (95); 8598, 12181 (97); 15064, 15828 (116); 16672 (100); 16951, 17583 (103); 17651 (107); 18950 (118); 21129 (103); 21161 (97); 22879 (103).

Werner, F.A. 1542 (126); 1573 (131); 1702 (119).

White, G.e.n.e. 14 (26a).

Whitford, H.N. 458 (185).

Widgren, J.F. (206); s.n. (201).

Wiggins, I.r.a. 3989, 4066 (6).

Wilbur, R.L. 10915, 13118 (26a).

Williams, L.I. 7396 (170); 9989 (186); 10235 (42); 10249 (186).

Williams, L.O. 5288, 5298 (38); 12631 (36a); 15239 (27); 15351, 15672, 18580, 18861, 23271 (38); 24766 (42); 25945 (37).

Williams, S. 60 (2)

Wilson, J.S. 11075 (4).

Wilson, P. 9288 (42).

Wisum, A. 586 (120).

Wolfe, F.H. 1283 (97).

Wood, J.R. 11035 (142); 12507 (139); 18753 (149); 19108 (142); 20367 (156); 20548 (140).

Woodbury, R. (56); s.n. (39).

Woodson Jr.; R.E. 907 (26a).

Woolston, A. 718 (204).

Woytkowski, F. 7672 (109); 7940 (91); 7993 (128); 8002 (91); 8318 (103).

Wright, C. s.n., s.n. (39); 156 (42); 173, 1192, 1193, 2411, 2412 (39).

Yahara, T. 2958 (14).

Yáñez, A.P. 2086 (172).

Yano, O. 823 (205).

Yano, T. 56 (213).

Young, K. 1313, 1444, 1446, 2718 (96a); 3089 (127); 3529, 4452 (96a).

Zak, V. 1196 (76); 4529 (172).

Zamora C., P. 2098 (1); 2136 (11); 2322, 2478 (22); 3880 (1).

Zamudio R.; Sergio 3629 (12); 3973 (8).

Zamudio, S. 6126, 7147 (12); 7399 (8).

Zanoni, T. 12455 (42); 12567 (39); 16473 (42); 17938, 19063, 24265, 25644, 25915, 28889, 29758, 32265, 33073, 34954, 36287 (39); 38243, 39593 (42); 44274, 45285 (39).

Zárate, M. 2995 (162).

Zardini, E. 1035 (204); 2462 (196); 3066 (204); 3192 (196); 3264 (199); 3865 (204a); 3966 (229); 4212 (204); 5000 (196); 6230, 6763 (204); 7139 (196); 7240 (204); 7588 (193); 7685, 7702 (204); 12459 (196); 13657, 24835 (204); 25660 (199); 27804 (229); 28372 (196); 28478, 28532 (229); 28994 (204); 32058 (229); 32222 (204); 32818 (229); 32934, 32957 (204a); 33334, 36832, 36965 (229);

37041 (204); 37053, 37054 (196); 40165 (204);  
40168 (229); 40665 (196); 40832, 40836 (204);  
42605 (196); 42614, 42633 (211); 42785 (229);  
42866 (204); 43229, 43233, 43235, 43236, 43260,  
43310 (229); 43443 (196); 43492 (229); 43683,  
43998 (204); 44509 (211); 44530 (204); 44686,  
44702 (211); 45199, 45219, 45226, 45229 (229);  
45245 (204); 45251 (199); 45430, 45438, 45441,  
45462, 45771, 46779 (204); 47355, 47409 (229);  
47443 (204a); 47558, 47618, 48482, 49287 (229);  
52669 (199); 52724 (229); 52813 (204); 53070 (199);  
53110 (204); 54952, 54973, 55045, 56866, 60211  
(229).

Zarucchi, J.L. 6828 (62); 6868 (97); 7282 (62); 7303  
(97).

Zavala Ch., F. 297 (17); 944 (37).

Zemanate, A. 7 (79).

Zent, S. 0786-34 (175).

Zenteno, F. 1174 (152); 1181 (136a); 2891, 2931  
(180); 4181, 4194, 5498, 5598 (159).

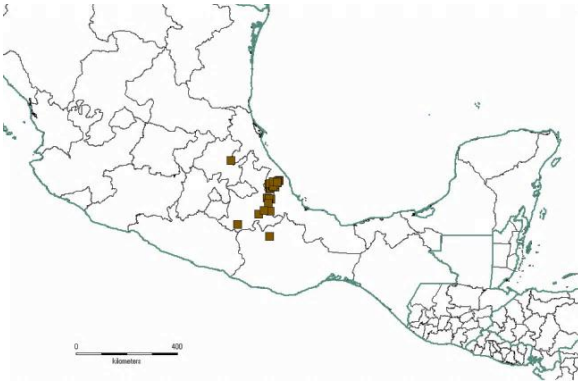
Zingg, R.M. A34 (4).

Zuloaga, F. 5435 (196); 6514 (204); 6822 (196).

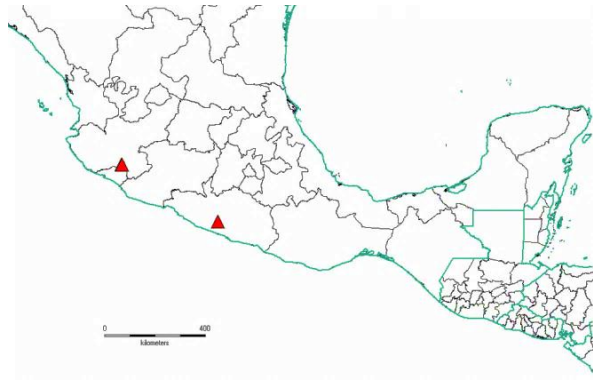
Zuluaga, S. 151 (63); 4538 (104).

Appendix 1. Maps of distribution (order and numbers corresponding to those in the synopsis)

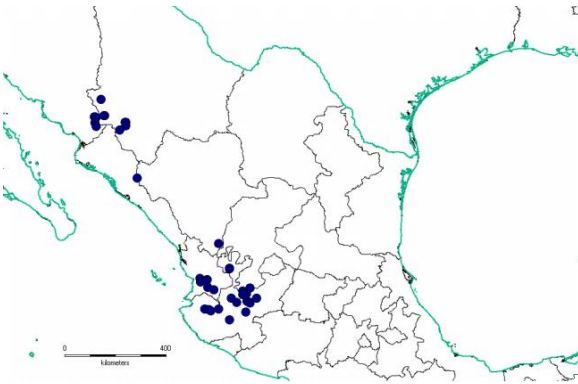
**CENTRAL AND NORTH MEXICO**



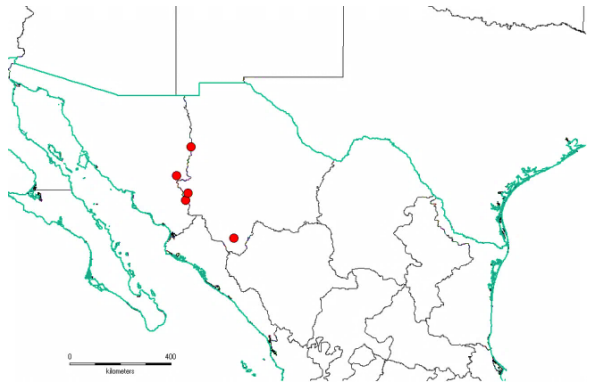
**1.** *P. brachybotrya*



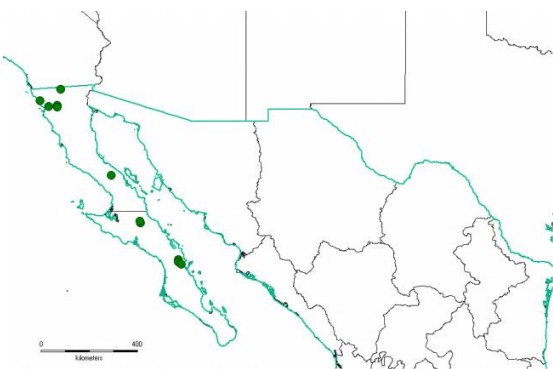
**3.** *P. erythroxyton*



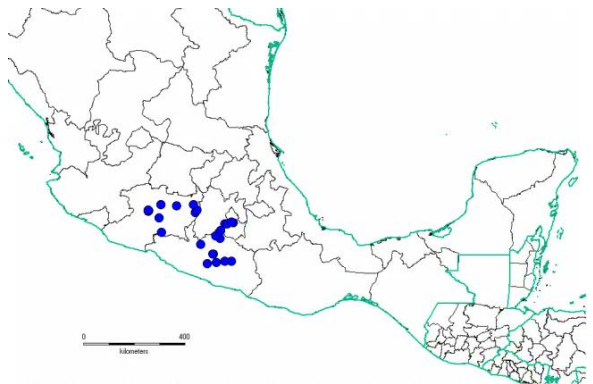
**4.** *P. ferruginea*



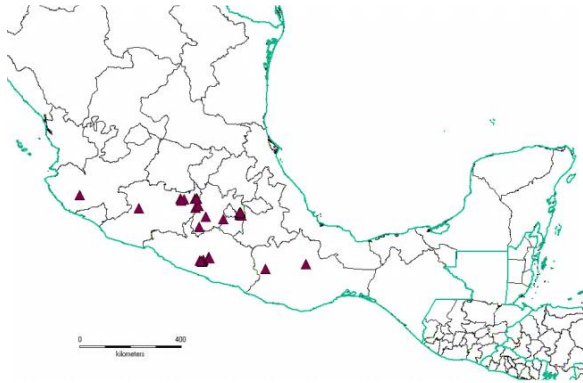
**5.** *P. gentryi*



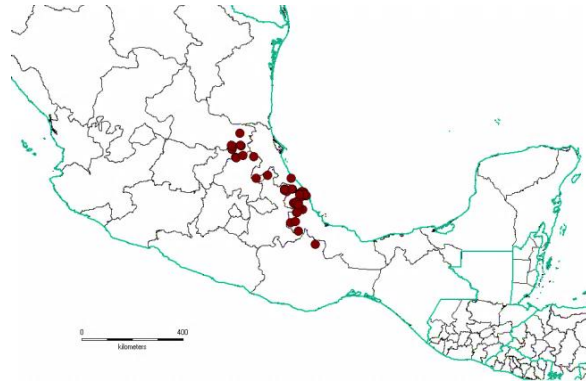
**6.** *P. ilicifolia*



**7.** *P. ochoterena*



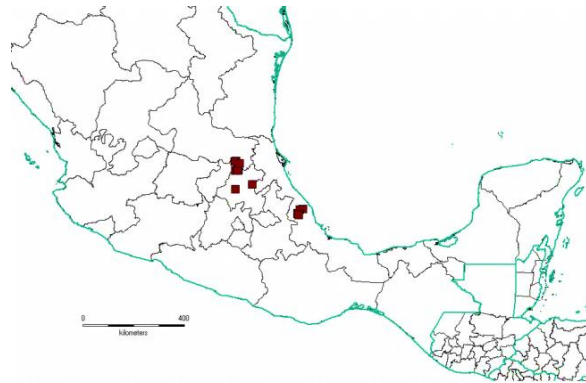
**8.** *P. prionophylla*



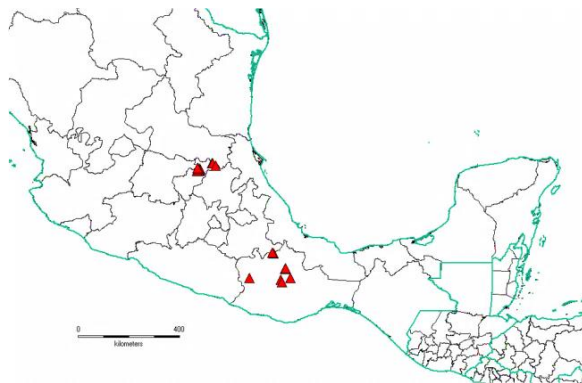
**9.** *P. samyoides*



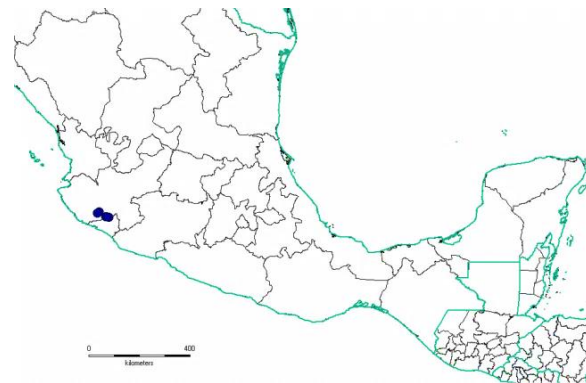
**10.** *P. sp. nov.* ("Cochrane-Manantlan")



**11.** *P. sp. nov.* ("aff. tetradenia-Queretaro")



**12.** *P. sp. nov.* ("aff. brachybotrya-Queretaro")



**13.** *P. sp. nov.* ("aff. erythroxyton-Manantlan")



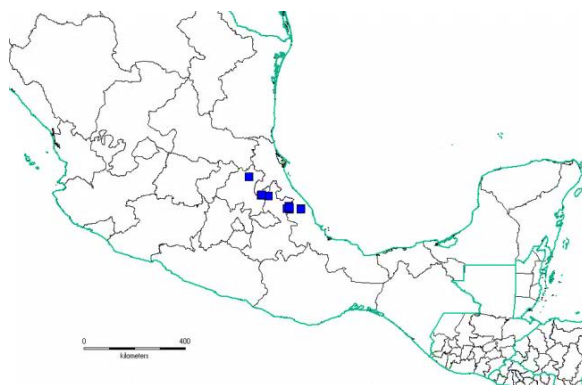
14. *P. sp. nov.* (“Guerrero-Cruz de Ocote”)



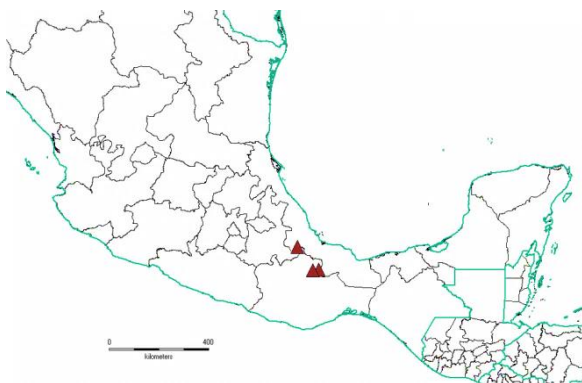
15. *P. sp. nov.* (“Jalisco-Jacotepec”)



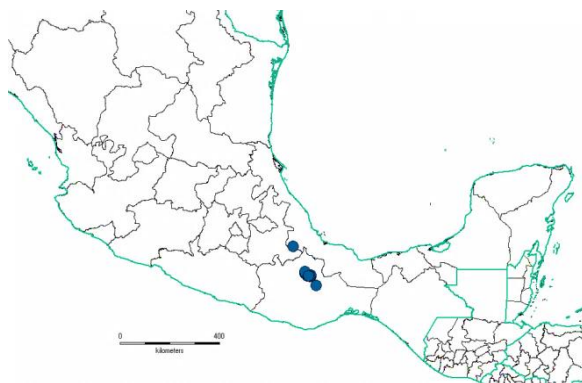
16. *P. sp. nov.* (“Jalisco-big stipule”)



17. *P. sp. nov.* (“megastipulata-Veracruz-Hidalgo”)

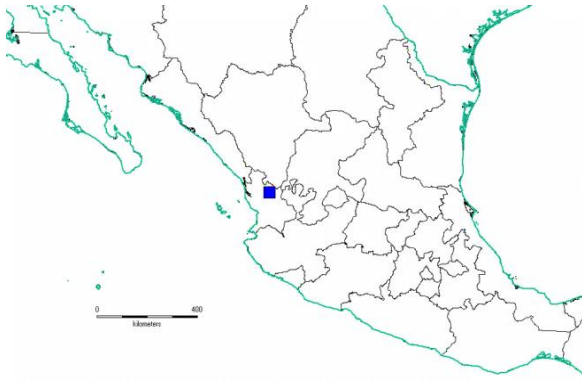


18. *P. sp. nov.* (“motzorongo-Veracruz”)

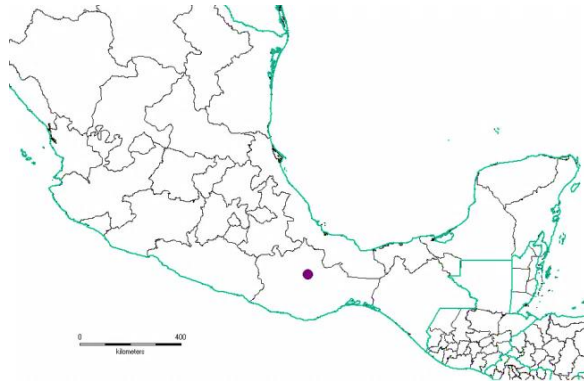


19. *P. sp. nov.* (“multiglandulosa-Oaxaca”)



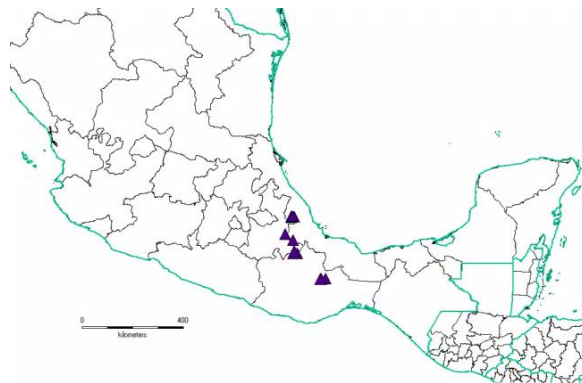


**20.** *P. sp. nov.* ("Nayarit-4glands")

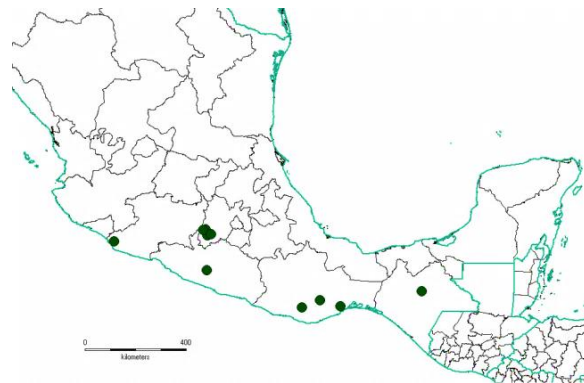


**21.** *P. sp. nov.* ("roundedStipules-Oaxaca")

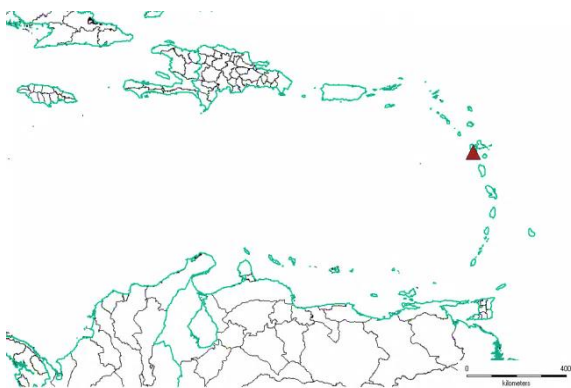
**MESOAMERICA AND CARIBBEAN**



**22.** *P. sp. nov.* ("Xico-Oaxaca-Veracruz-rivuloseLeaves")



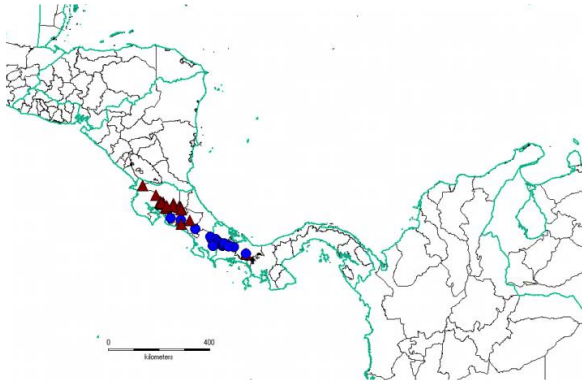
**23.** *P. acutangulata* (meso)



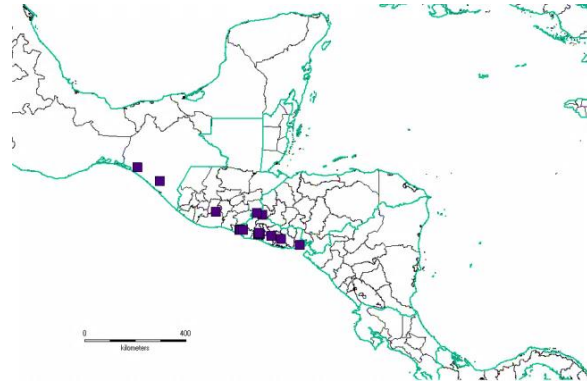
**24.** *P. acutissima*



**25.** *P. alushii* (meso)



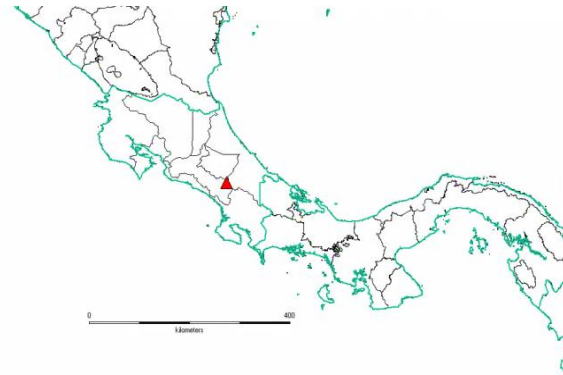
26 *P. annularis* (▲)ssp. nov. “Chiriqui-bigLeaves (●)



27. *P. axitliana*



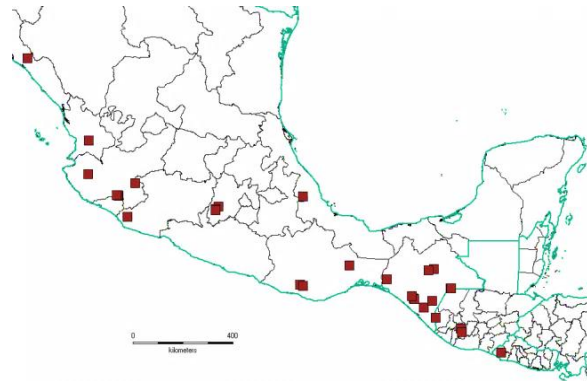
28. *P. chiapensis*



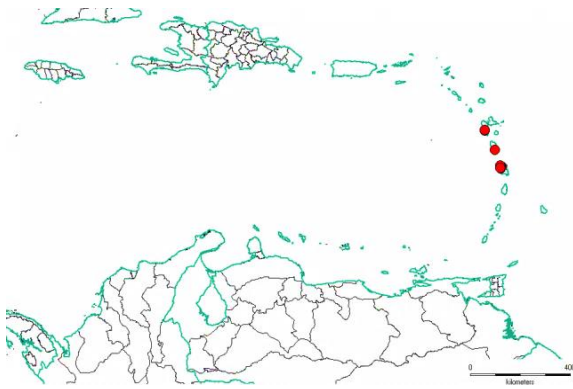
29. *P. chirripoensis* (meso)



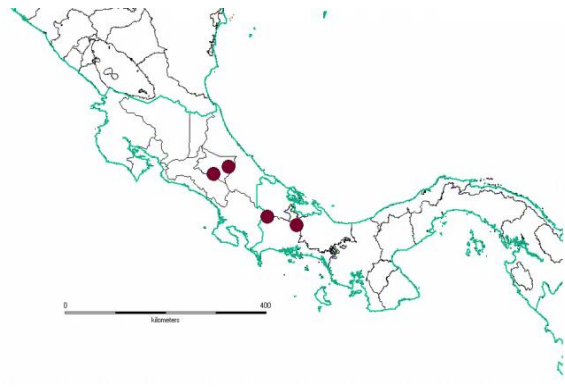
30. *P. compacta*



31. *P. cortapico*



32. *P. dussii*



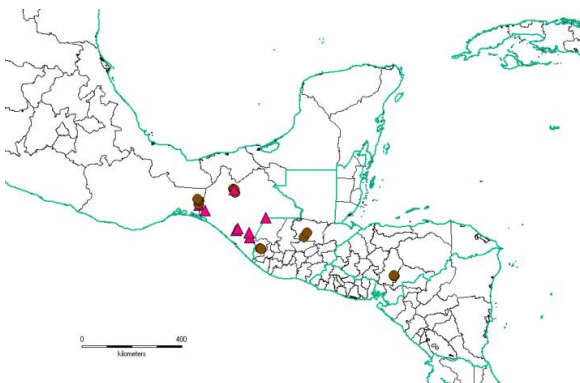
33. *P. fortunensis*



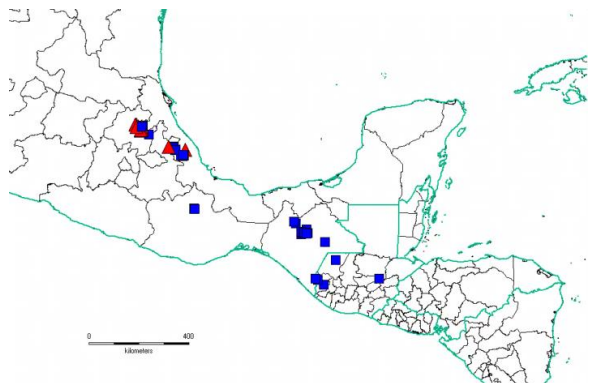
34 *P. guatemalensis*



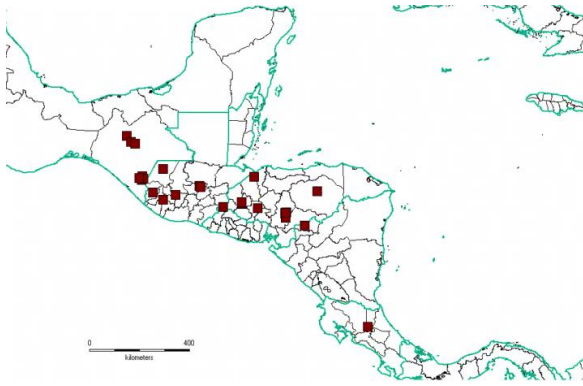
35 *P. haberii* (meso)



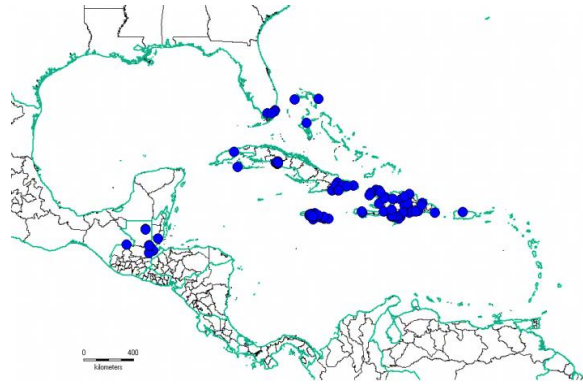
36-36a *P. lundelliana* (▲) ssp. nov. shPet-coriacLvs (●)



37.-37a *P. matudae* (■) var. nov. hidalgo-veracruz (▲)



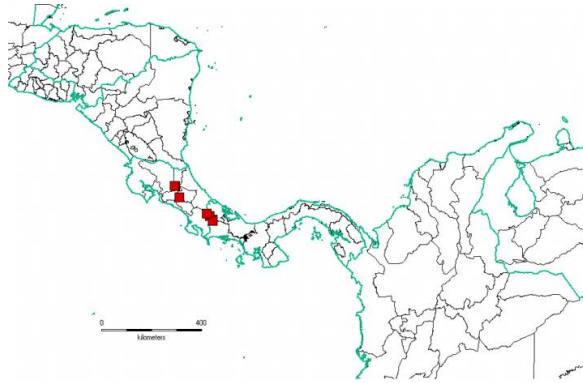
38. *P. mesoamericana* (meso)



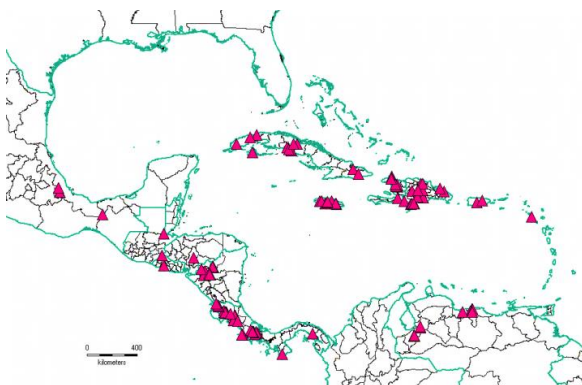
39. *P. myrtifolia*



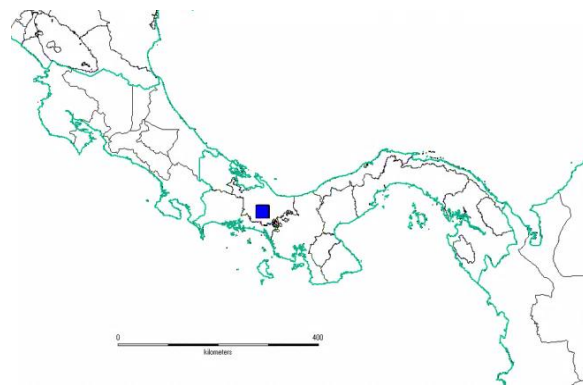
40. *P. nonnihilum* (meso)



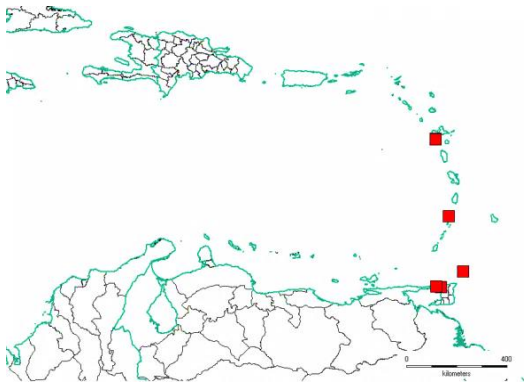
41. *P. nubila* (meso)



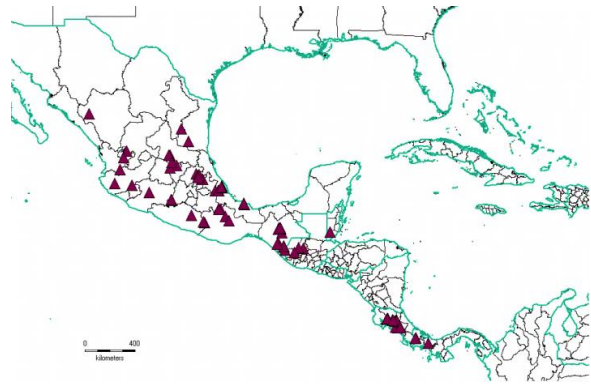
42. *P. occidentalis*



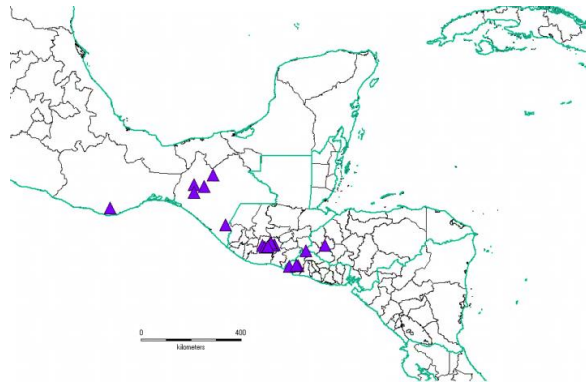
43. *P. pankhurstii* (meso)



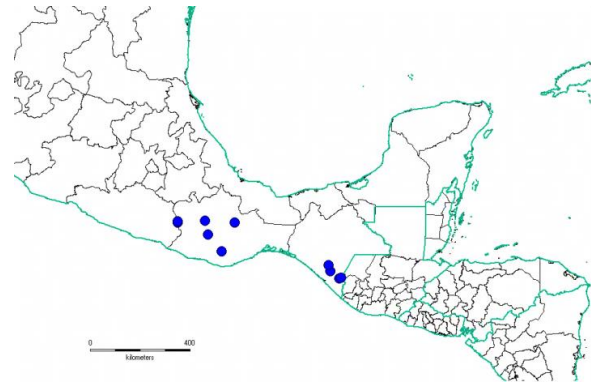
44. *P. pleuradenia*



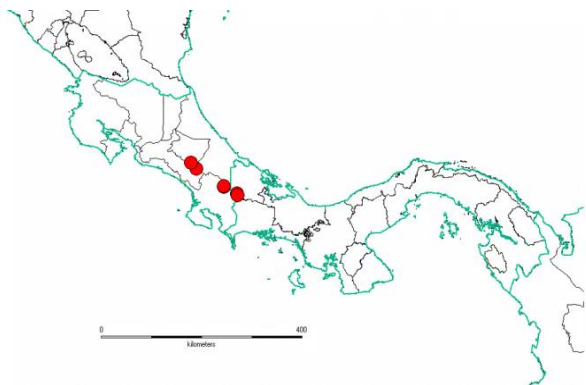
45. *P. rhamnoides*



46. *P. salasii*



47. *P. tartarea*



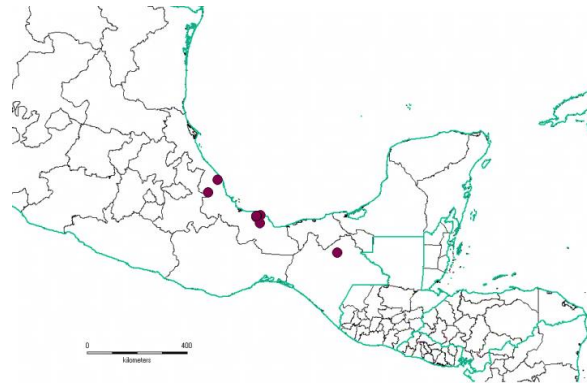
48. *P. terraba-sierpensis (meso)*



49. *P. tetradenia*



**50.** *P. tuberculata*



**51.** *P. tuxtliensis (meso)*



**52.** *P. vulcanica (meso)*



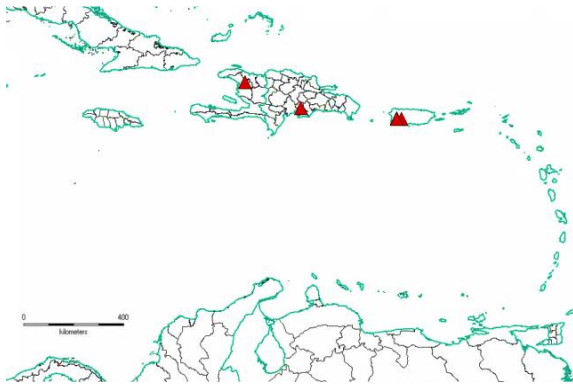
**53.** *P. sp. nov. ("aff myrtifolia-Belize")*



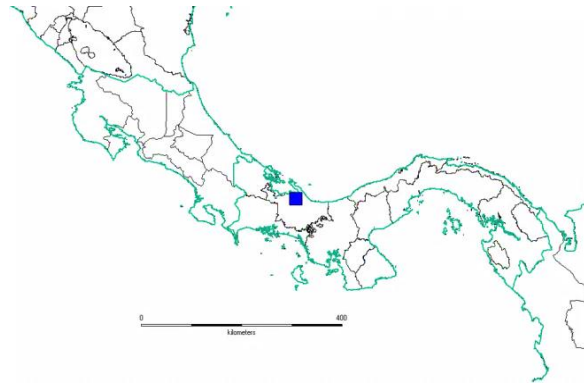
**54.** *P. sp. nov. ("aff. lundelliana-Motozintla")*



**55.** *P. sp. nov. ("aff. myrtifolia Contreras-Guatemala")*



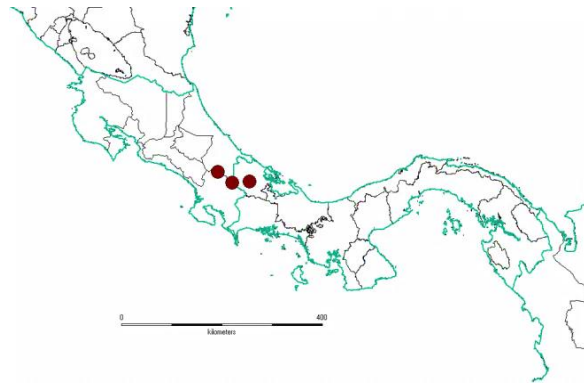
56. *P. sp. nov.* (“*aff. pleuradenia-smallLeaves*”)



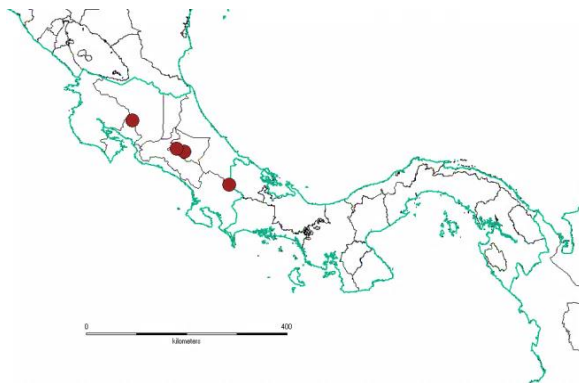
57. *P. sp. nov.* (“*bocasdelToro-Panama*”)



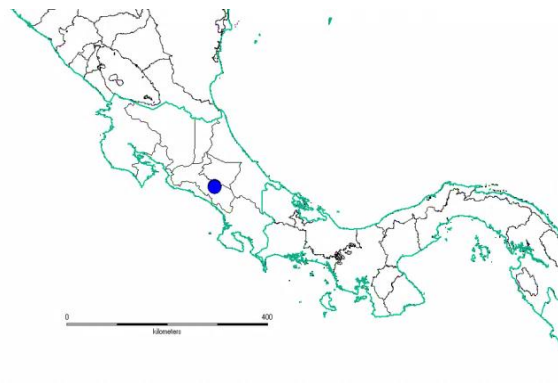
58. *P. sp. nov.* (“*Cerro Jefe Panama-Venezuela-Veracruz*”)



59. *P. sp. nov.* (“*cerro Casma-CostaRica*”)

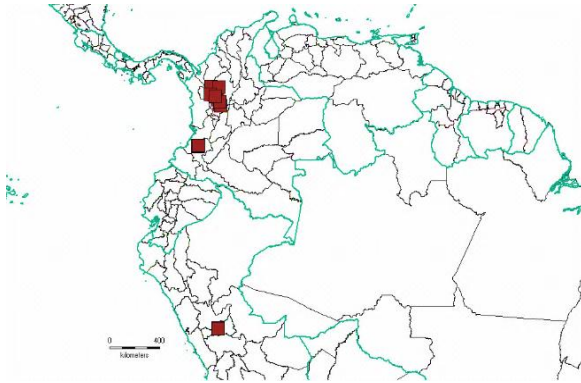


60. *P. sp. nov.* (“*dota-tilaran-CostaRica*”)



61. *P. sp. nov.* (“*central gland Savegre-CostaRica*”)

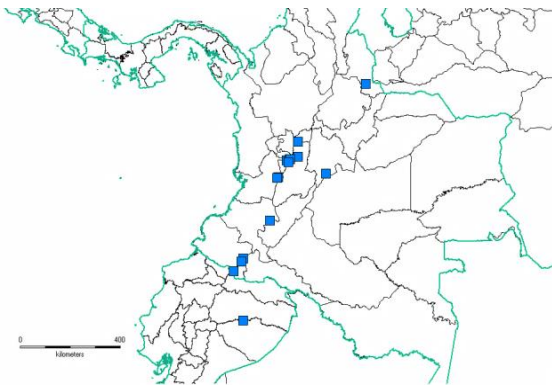
**NORTHERN ANDES**



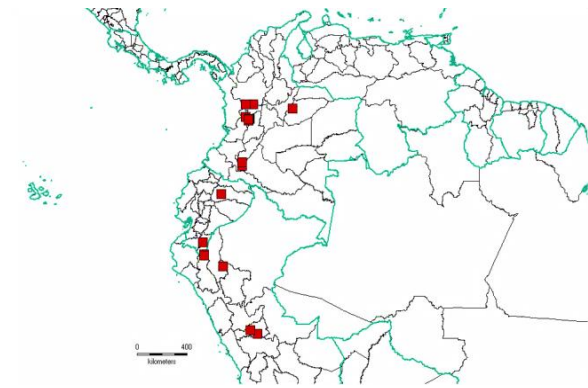
**62.** *P. antioquiensis*



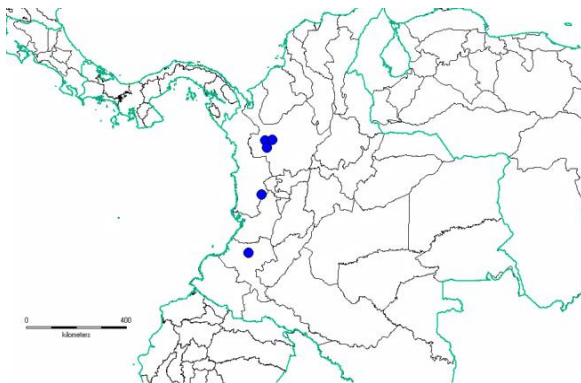
**63.** *P. buxifolia*



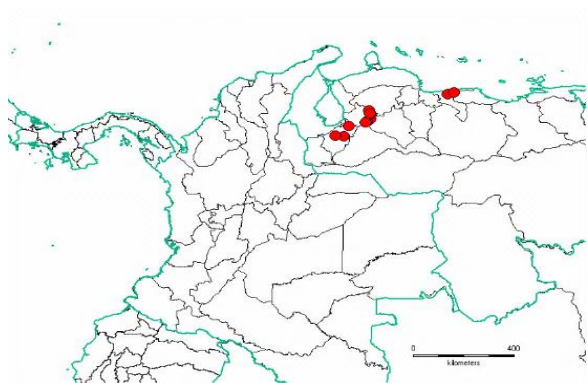
**64.** *P. falcata*



**65.** *P. littlei*

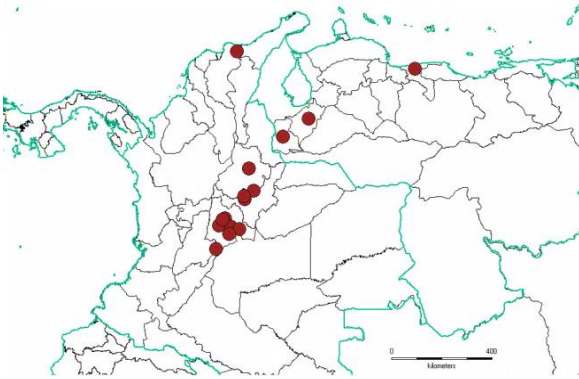


**66.** *P. megacarpa*



**67.** *P. moritziana*





68. *P. "robusta"*



69. *P. muris*



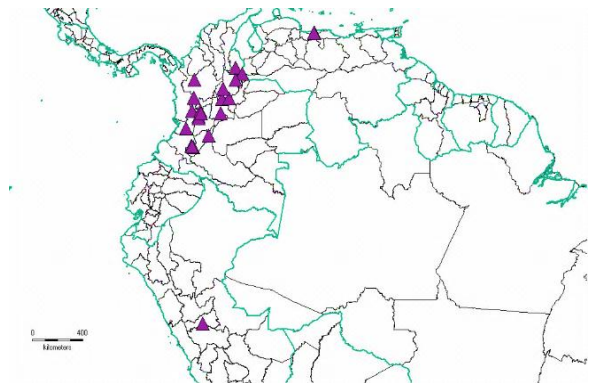
70. *P. ocellata*



71. *P. opaca*



72. *P. strobilifera*



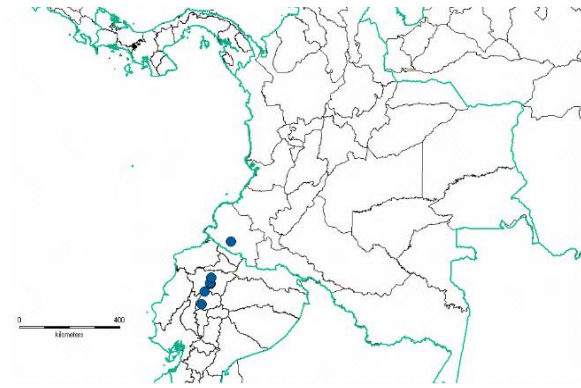
73. *P. urotaenia*



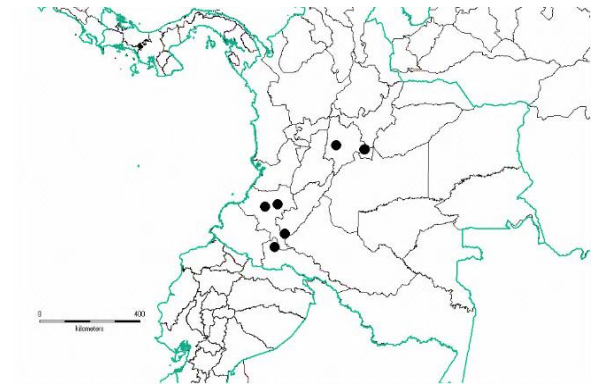
74. *P. sp. nov.* ("bruijnii Li – VEN")



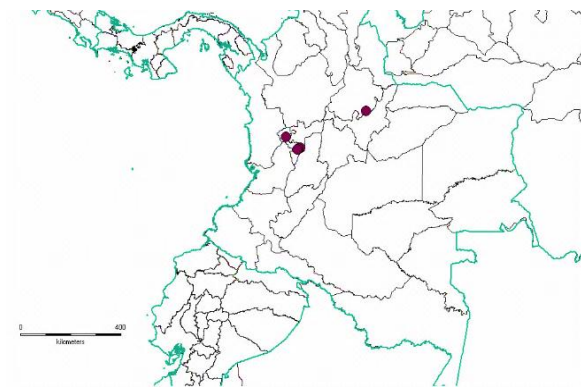
75. *P. sp. nov.* ("aff-debilis –midelevation-COL")



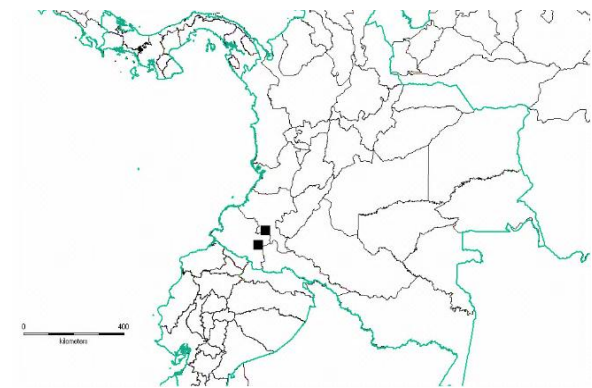
76. *P. sp. nov.* ("aff. brittoniana midelevation ECU")



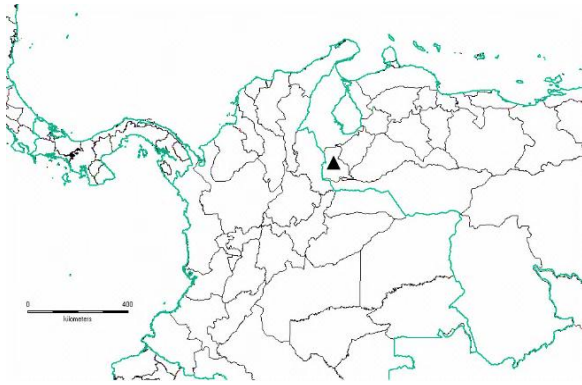
77. *P. sp. nov.* ("aff. littlei - arcuate second-veins")



78. *P. sp. nov.* ("aff. opaca-4glands")



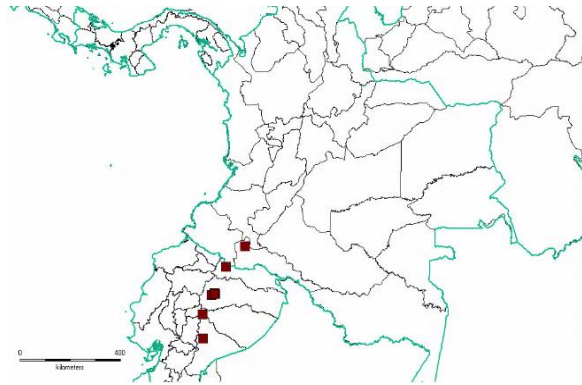
79. *P. sp. nov.* ("aff. opaca Patia Cauca")



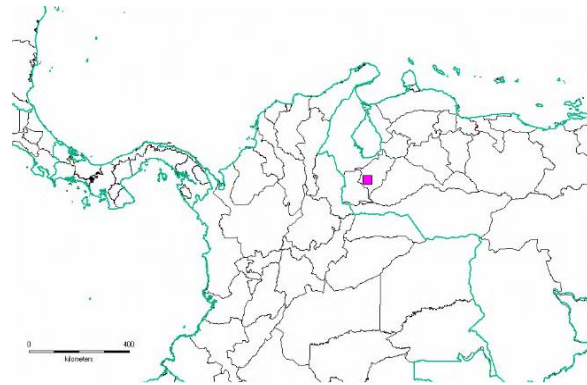
**80.** *P. sp. nov.* (“*aff. antioquiensis Tachira-Venezuela*”)



**81.** *P. sp. nov.* (“*aff. muris ParamoUrrao-COL*”)



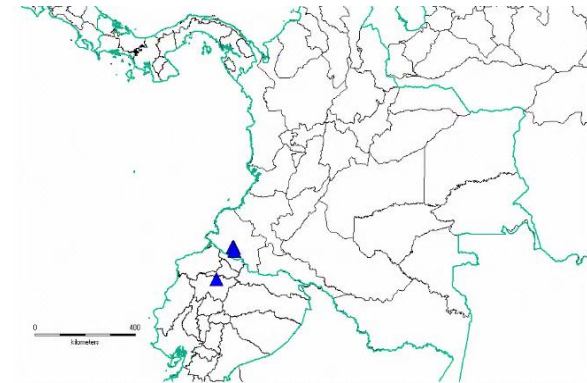
**82** *P. sp. nov.* (“*aff. muris Quijos-Ecu*”)



**83.** *P. sp. nov.* (“*badilloiLi-VEN*”)



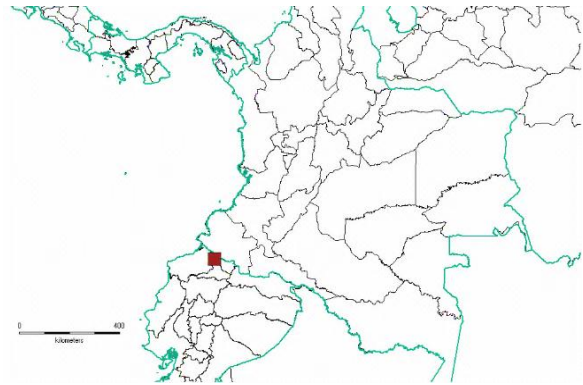
**84.** *P. sp. nov.* (“*colombianaLi*”)



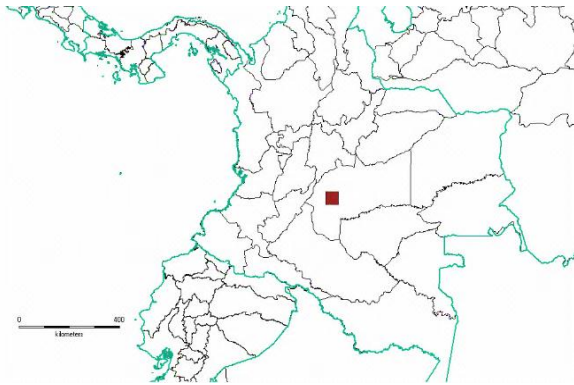
**85.** *P. sp. nov.* (“*Bingleaves-La Planada-Col*”)



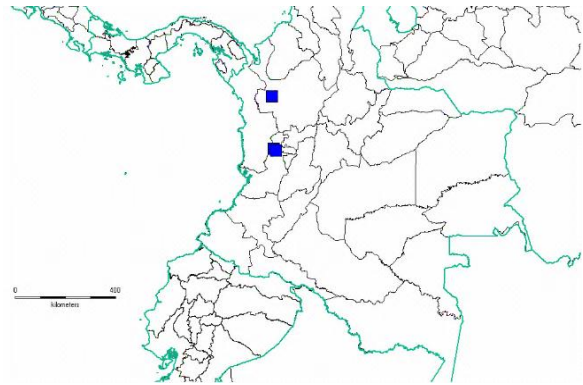
86. *P. sp. nov.* ("Lasser-Trujillo-Ven")



87. *P. sp. nov.* ("lustrous-Lvs Tulcan-Ecu")



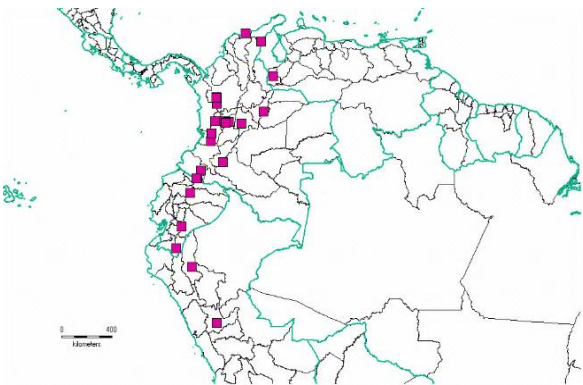
88. *P. sp. nov.* ("macarena-Colombia")



89. *P. sp. nov.* ("multiglans-Western-Col")



90. *P. sp. nov.* ("North-Santander-aff. littlei")



91. *P. sp. nov.* ("rugosa (pp)-Spruce")



92. *P. sp. nov.* ("Sierra San Luis – Ven")



93. *P. sp. nov.* ("Santa Elena-Antioquia 4glands")

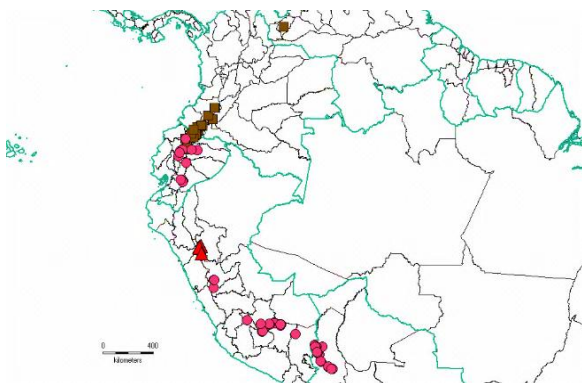


94. *P. sp. nov.* ("steyermarkiiLi – Ven")



95. *P. sp. nov.* ("tachira- Venezuela dryForest")

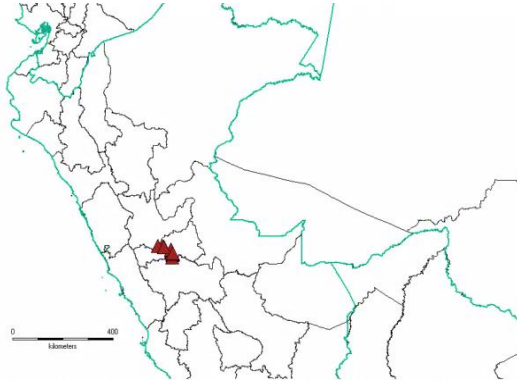
**CENTRAL ANDES**



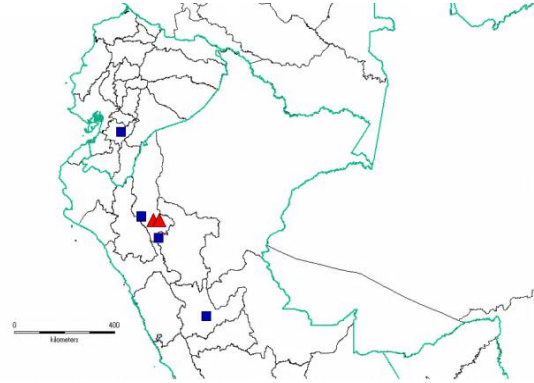
96. *P. brittoniana* (●) var. nov. solisiiLi (■)  
var. nov. "abiseo-short-pet" (▲)



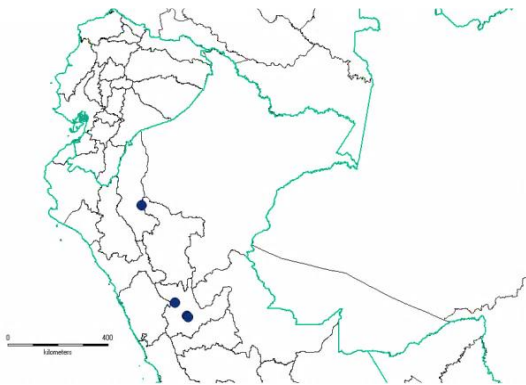
97. *P. integrifolia*



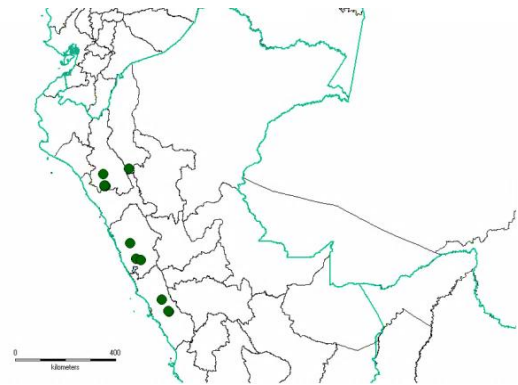
98. *P. oblonga*



99. *P. ovalis* (■) var. *nummularia* (▲)



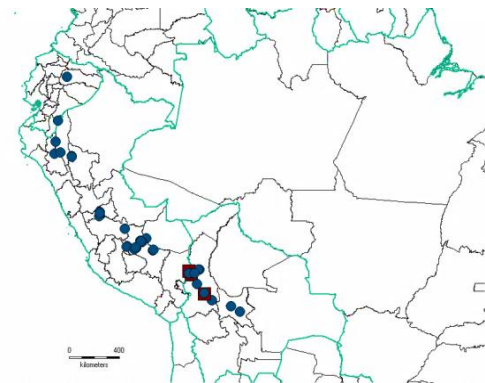
100. *P. pleiantha*



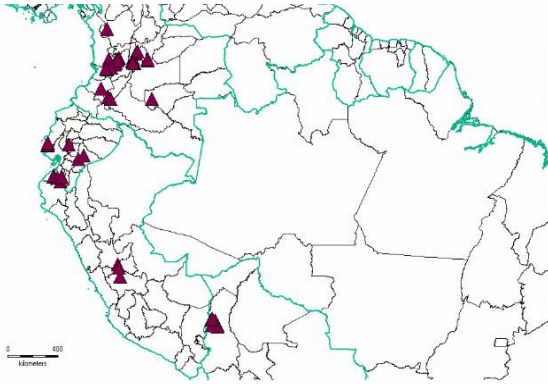
101. *P. rigida*



102. *P. ruiziana*



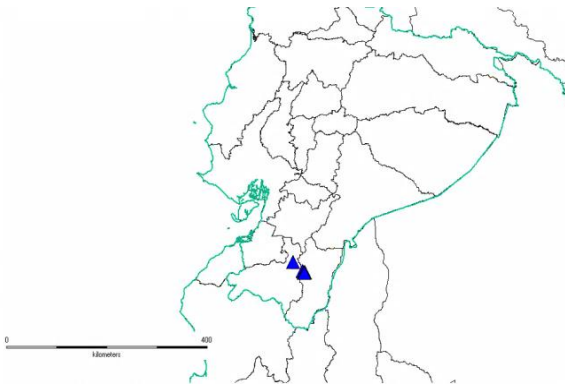
103. *P. stipulata* (●) var. *nov. acha* (■)



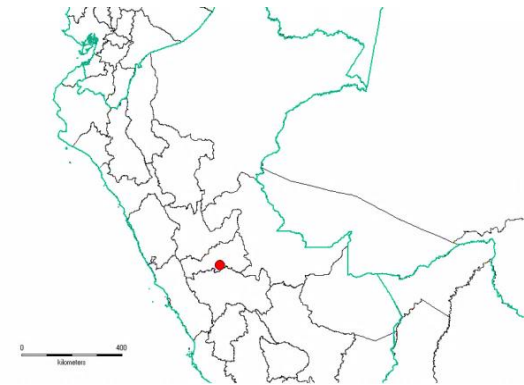
**104.** *P. subcorymbosa*



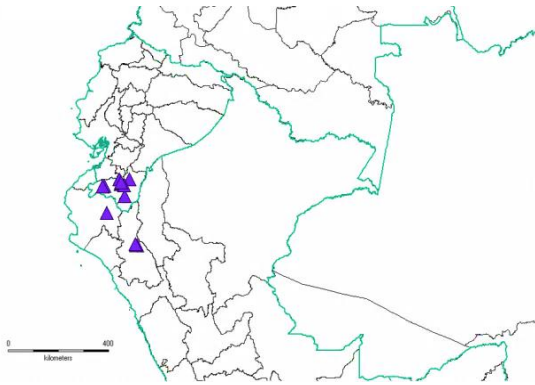
**105.** *P. sp. nov.* ("Aglands-Knapp-Peru")



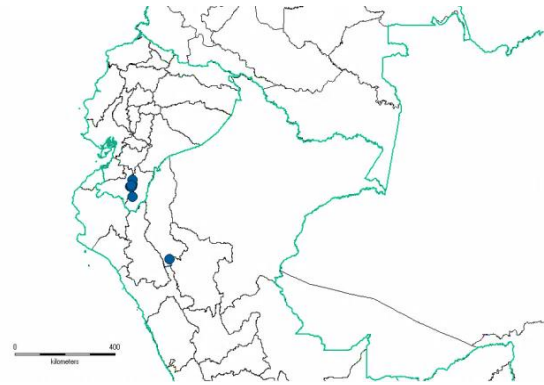
**106.** *P. sp. nov.* ("aff.guanaiensis-LOJA")



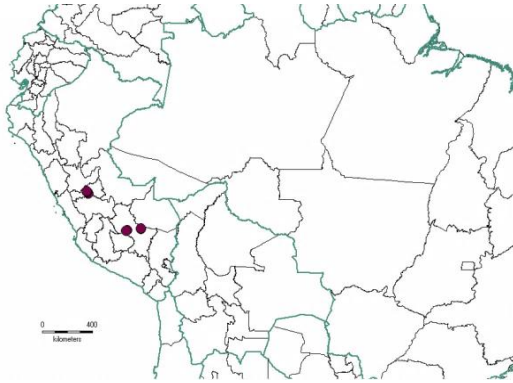
**107.** *P. sp. nov.* ("aff.littlei-Oxapampa")



**108.** *P. sp. nov.* ("aff.opaca-SouthEcuador")



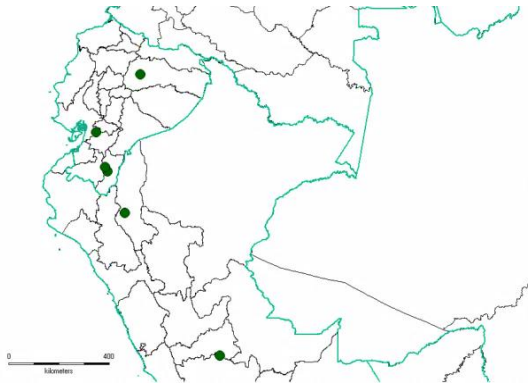
**109.** *P. sp. nov.* ("aff.ruiziana Loja-Ecu")



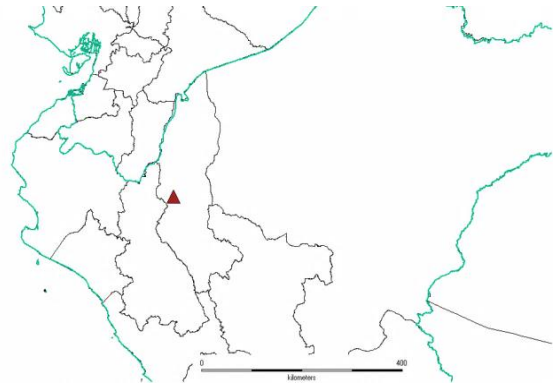
**110.** *P. sp. nov.* (“*aff. pearcei-Oxapampa Chartaceous-lvs*”)



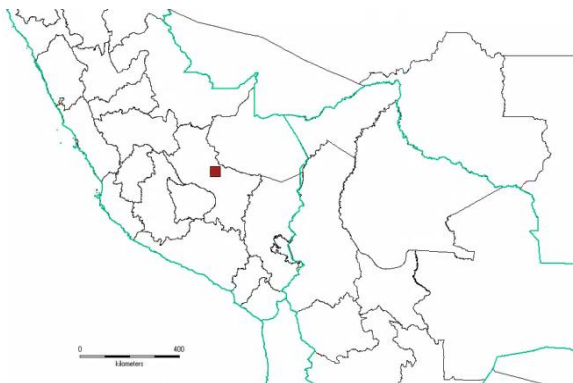
**111.** *P. sp. nov.* (“*archidona-midelevation-Ecu*”)



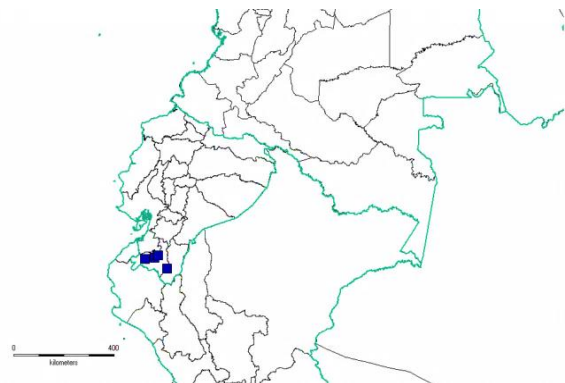
**112.** *P. sp. nov.* (“*bagua-stipulata*”)



**113.** *P. sp. nov.* (“*bagua-Imaza-PERU*”)

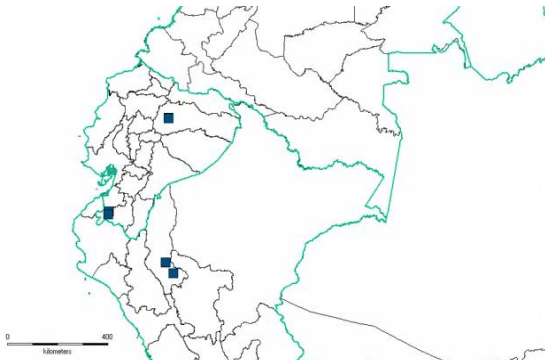


**114.** *P. sp. nov.* (“*Calca-highlevation-Peru*”)

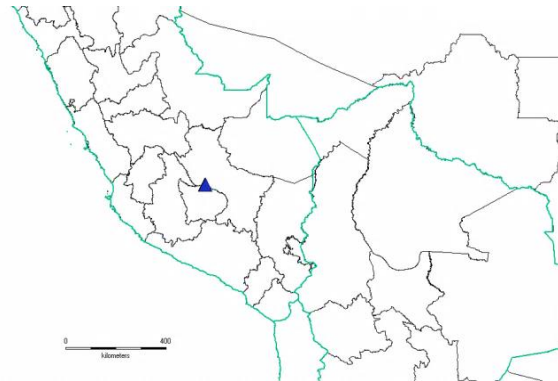


**115.** *P. sp. nov.* (“*celica-LOJA-Ecu*”)

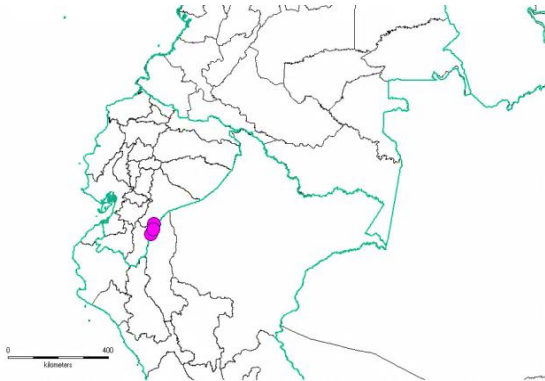




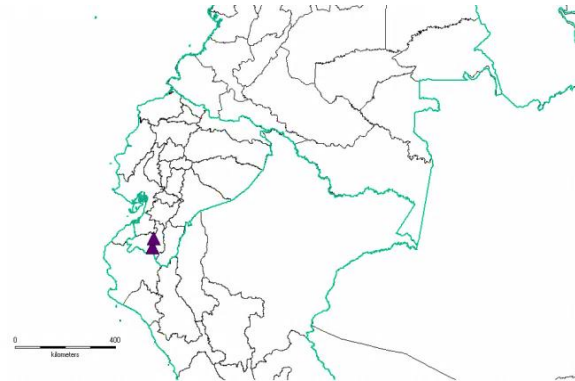
**116.** *P. sp. nov.* ("chachapoyas-Peru-vdWerff")



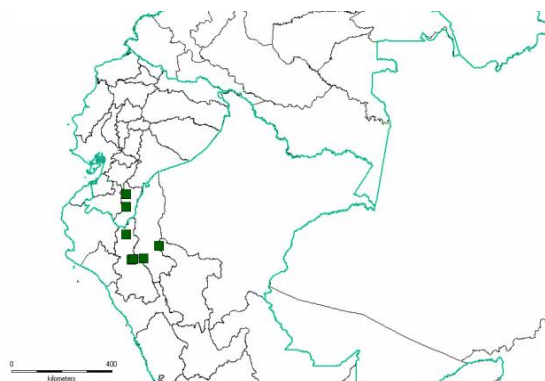
**117.** *P. sp. nov.* ("choquequirao-PERU")



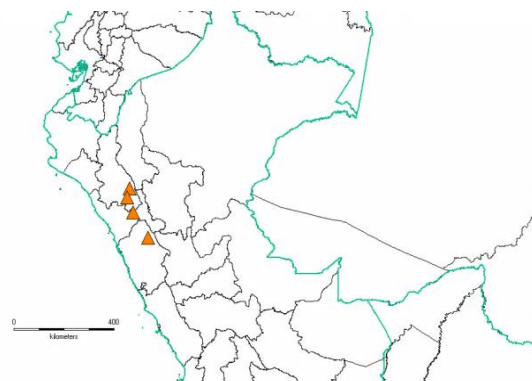
**118.** *P. sp. nov.* ("cordillera-Condor-highlevation")



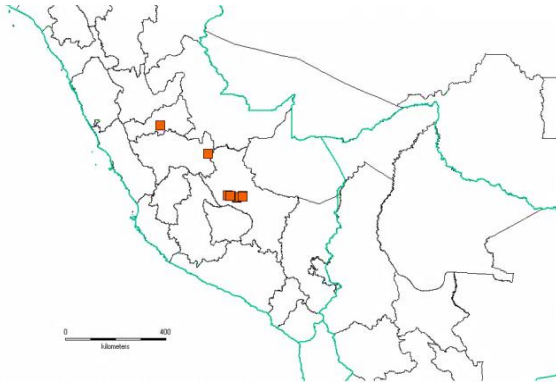
**119.** *P. sp. nov.* ("crrAhuaca-pyrogenic-Ecu")



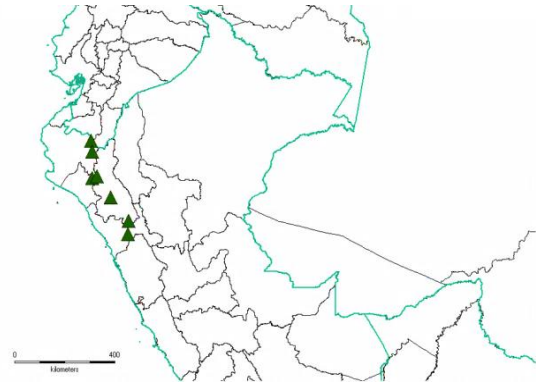
**120.** *P. sp. nov.* ("cutervoPERU-HighElev-Gentry")



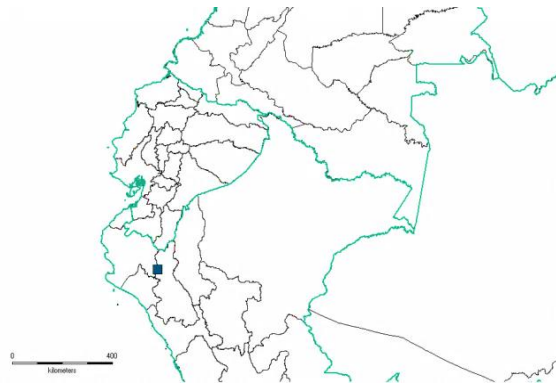
**121.** *P. sp. nov.* ("ferreyranaLi-Peru")



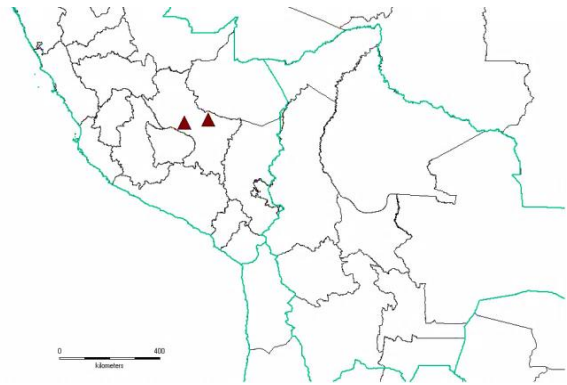
**122.** *P. sp. nov.* ("integrifolia-aff-Huamantupa-Peru")



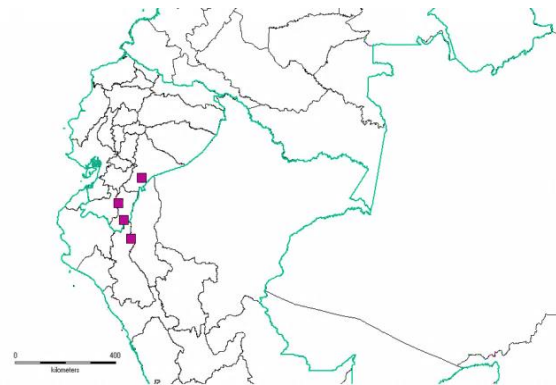
**123.** *P. sp. nov.* ("aff rigida Huancabamba-PER")



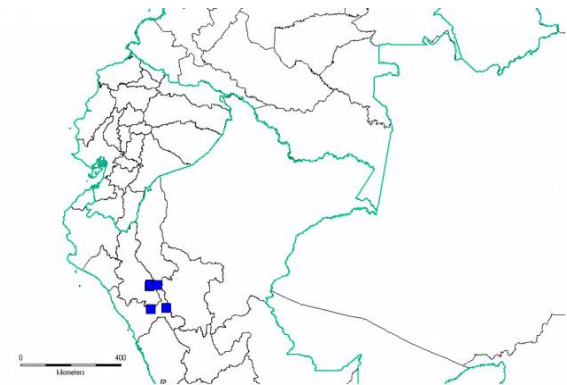
**124.** *P. sp. nov.* ("jaen-PERU")



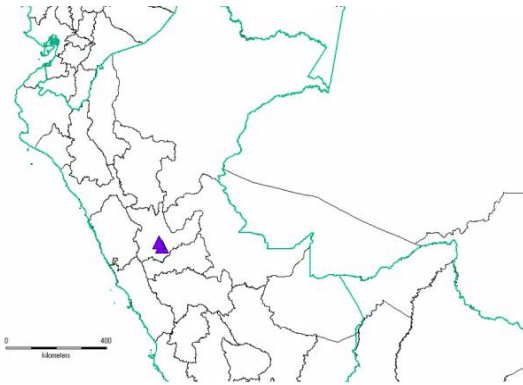
**125.** *P. sp. nov.* ("MachuPichu-shortInfl")



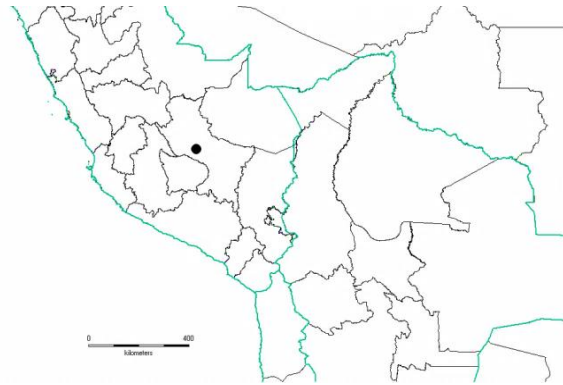
**126.** *P. sp. nov.* ("morona-ECU-bigfruit")



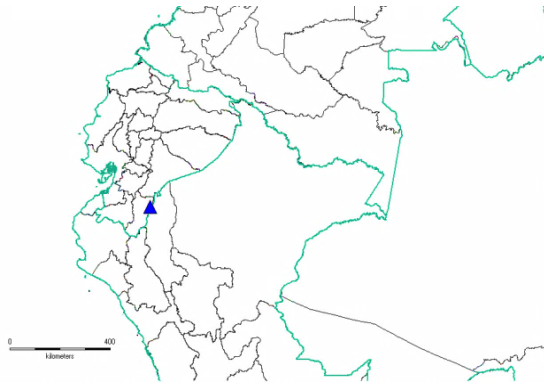
**127.** *P. sp. nov.* ("nuneziiLi-Peru")



**128.** *P. sp. nov.* ("peruensisLi")



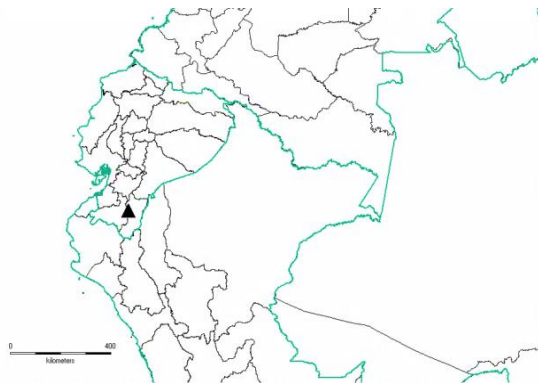
**129.** *P. sp. nov.* ("piper-like Urubamba-Peru")



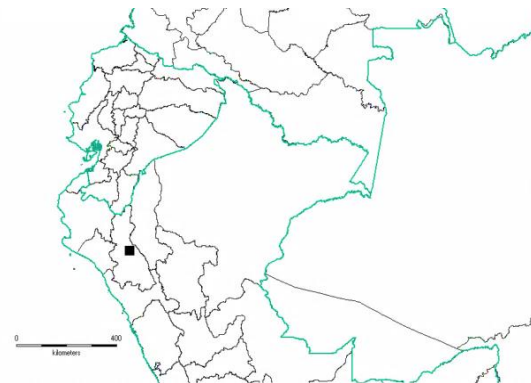
**130.** *P. sp. nov.* ("Quizhpe-cordillera Condor")



**131.** *P. sp. nov.* ("short raceme- SanFrancisco-Ecu")

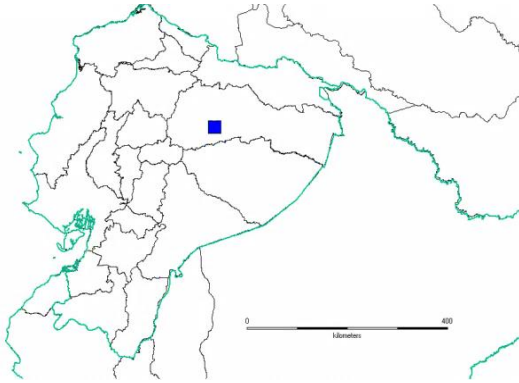


**132.** *P. sp. nov.* ("short Petiole SanFrancisco-Ecu")

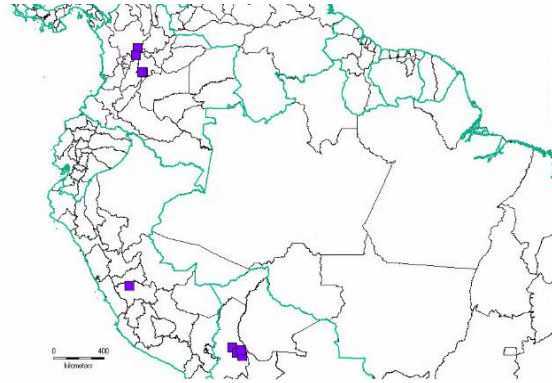


**133.** *P. sp. nov.* ("Socota-Peru")

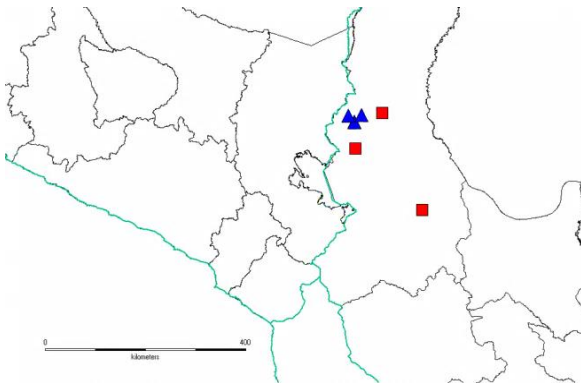
**SOUTHERN ANDES**



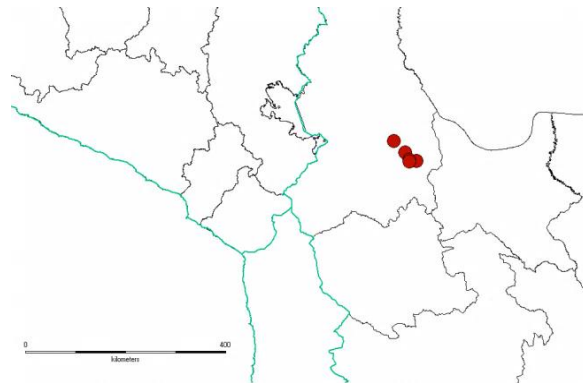
**134.** *P. sp.nov.* ("sumaco-galeras-Ecuador")



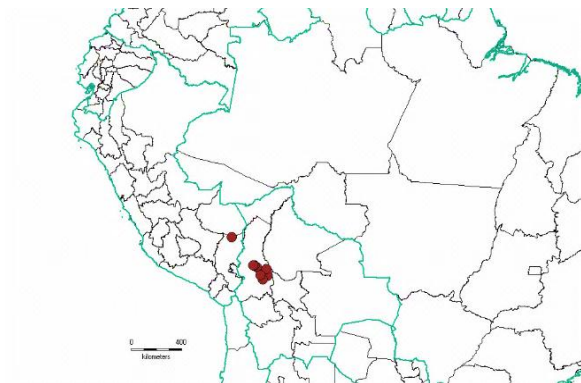
**135.** *P. guanaiensis*



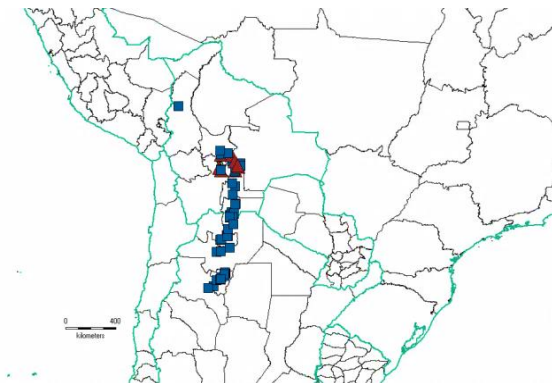
**136.-** *P. "micradenia"* (■)  
*P. "micradenia" var.nov. "pelechuco"* (▲)



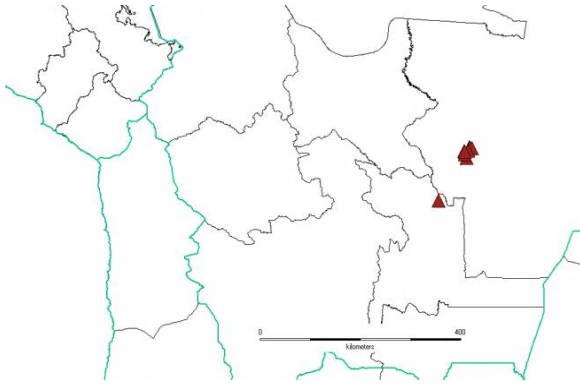
**137.** *P. "bangii"*



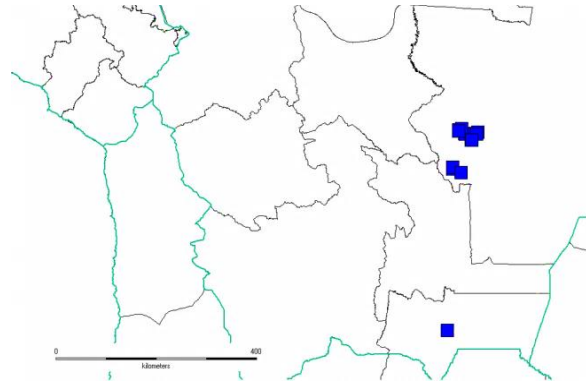
**138.** *P. pearcei*



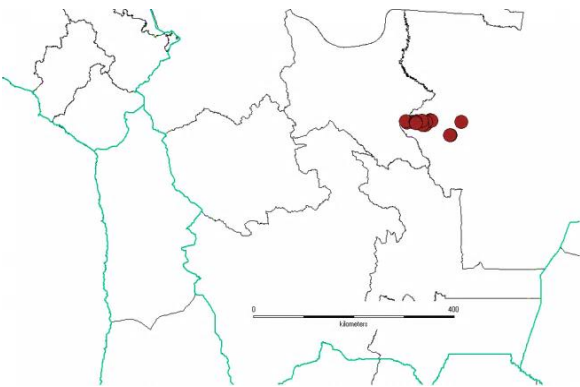
**139.** *P. tucumanensis* (■)  
*var.nov. "steinbachii-BOL"* (▲)



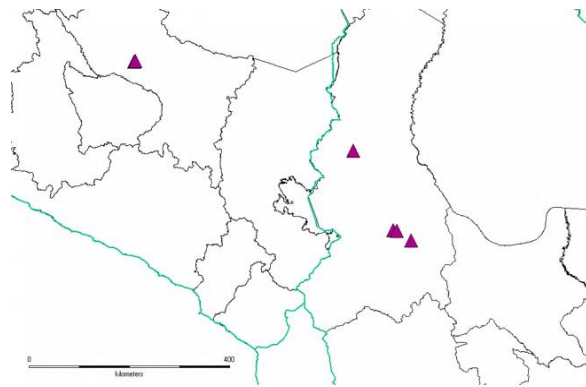
**140.** *P. sp. nov.* (“*aff. chamisoana-midElev-Bolivia*”)



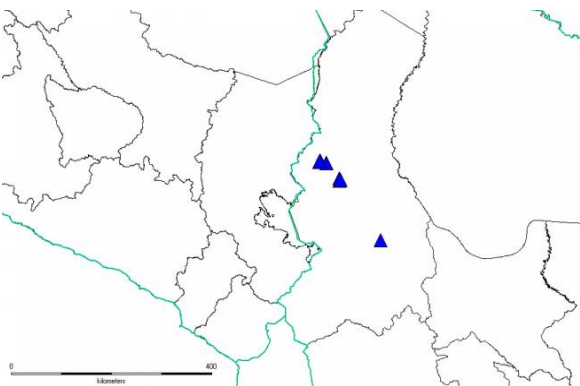
**141.** *P. sp. nov.* (“*aff. oleifolia-caudata-Bolivia*”)



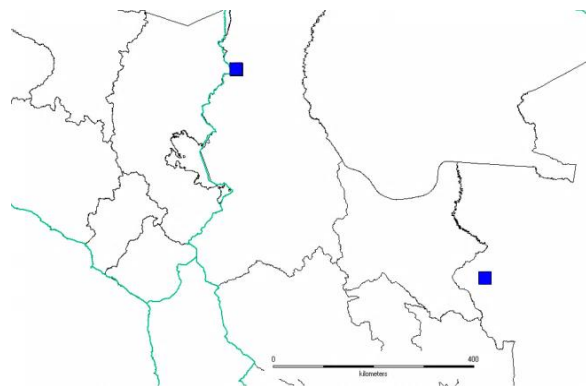
**142.** *P. sp. nov.* (“*aff. reflexa Bolivia*”)



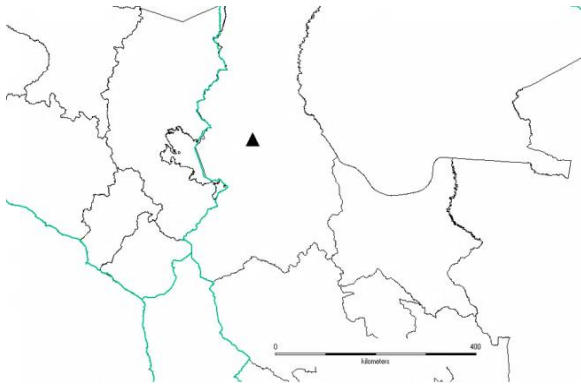
**143.** *P. sp. nov.* (“*aff. integrifolia-Urubamba-Peru*”)



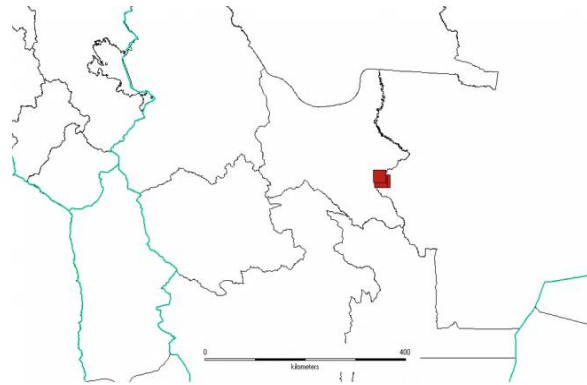
**144.** *P. sp. nov.* (“*aff. williamsii-BigLeaves-Bolivia*”)



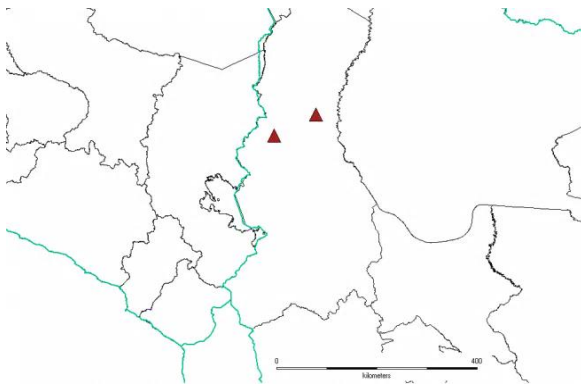
**145.** *P. sp. nov.* (“*aff. williamsii-lateral-glands*”)



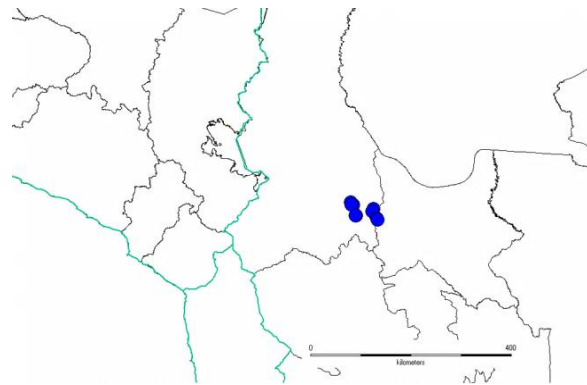
**146.** *P. sp. nov.* (“*aff. williamsii-doubleFlower*”)



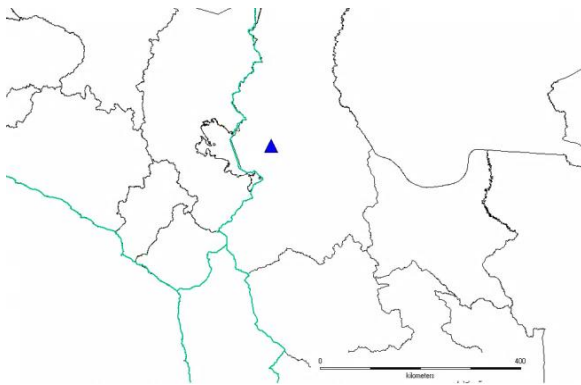
**147.** *P. sp. nov.* (“*caballero-Bolivia*”)



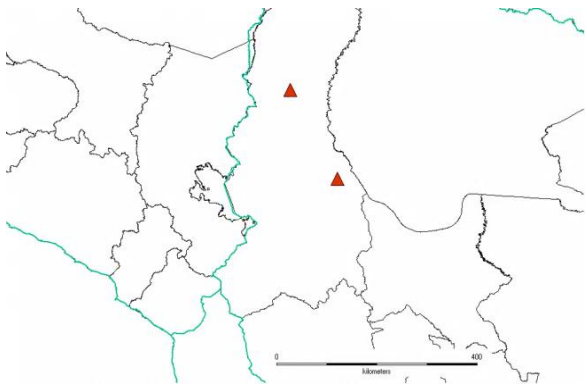
**148.** *P. sp. nov.* (“*centralgland-Bolivia*”)



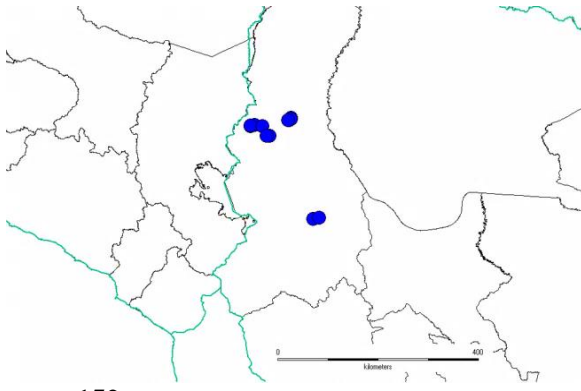
**149.** *P. sp. nov.* (“*Choquetanga-Bolivia*”)



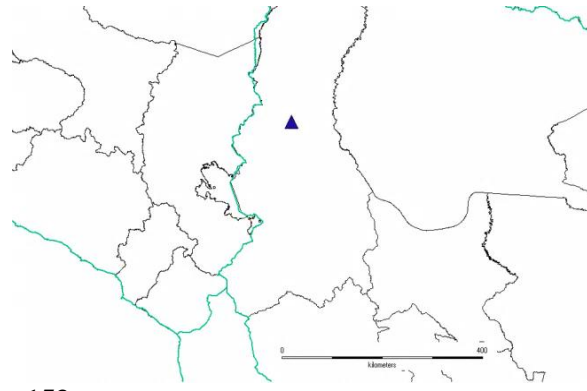
**150.** *P. sp. nov.* (“*high-elevation-Sorata-Bolivia*”)



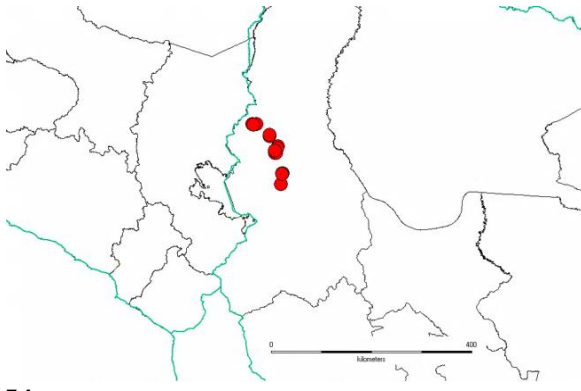
**151.** *P. sp. nov.* (“*Macia-SouthMadidi-Bolivia*”)



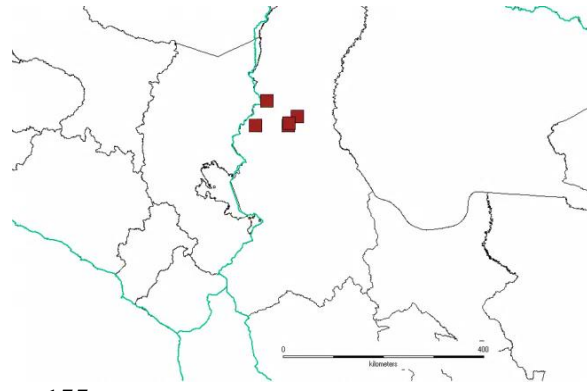
**152.** *P. sp. nov.* (“*aff.pearcei-Madidi-Bol*’”)



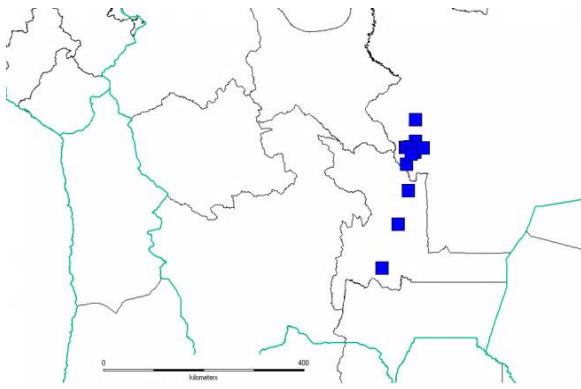
**153.** *P. sp. nov.* (“*micro-flowers-Uchupiamonas-Bol*”)



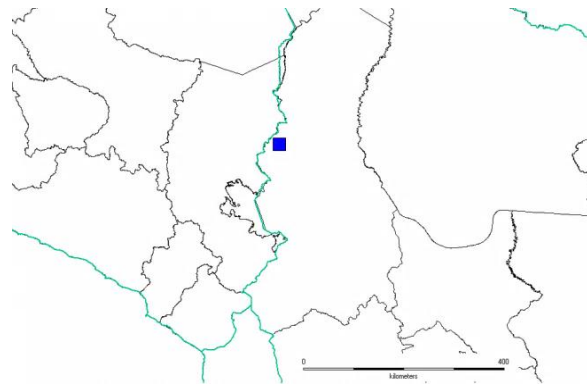
**154.** *P. sp. nov.* (“*multiglandulosa- pectinateVeins-Bol*”)



**155.** *P. sp. nov.* (“*multiglandulosa-ApoloBolivia*”)



**156** *P. sp. nov.* (“*aff. oleifolia- obscureGlands-Bolivia*”)



**157** *P. sp. nov.* (“*rhytidomeBark-Madidi-Bol*”)

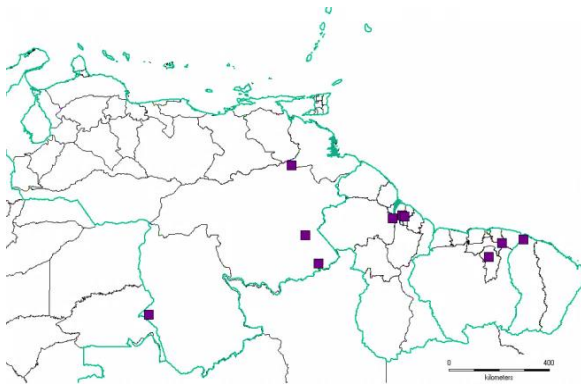


158. *P. sp. nov.* ("BigLeaves-2glands-SouthBolivia")

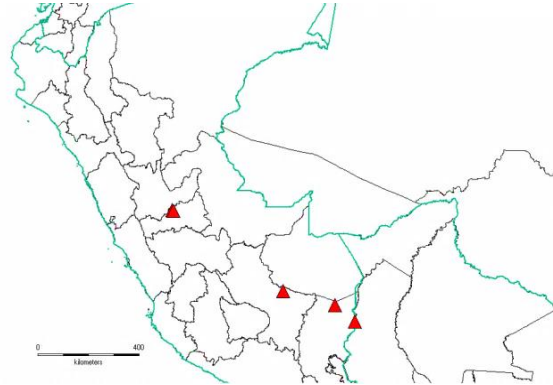


159. *P. sp. nov.* ("zenteno-TarijaBolivia")

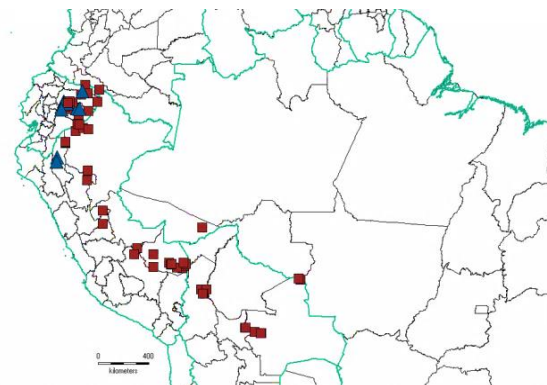
**AMAZON, GUIANAS AND NORTHERN SOUTH AMERICA LOWLANDS**



160. *P. accumulans*



161. *P. amplifolia*

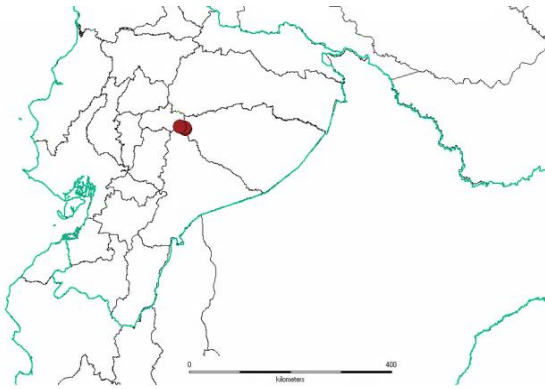


162. *P. debilis* (■) var. nov. "Ecuador500streams" (▲)



163. *P. espinozana*

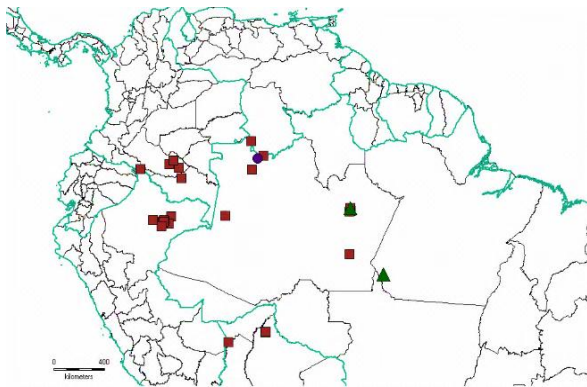




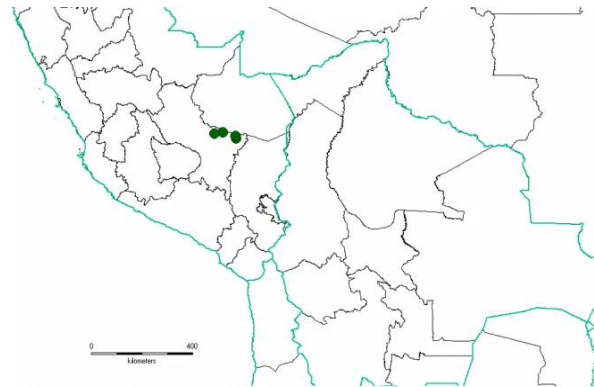
164. *P. herthae*



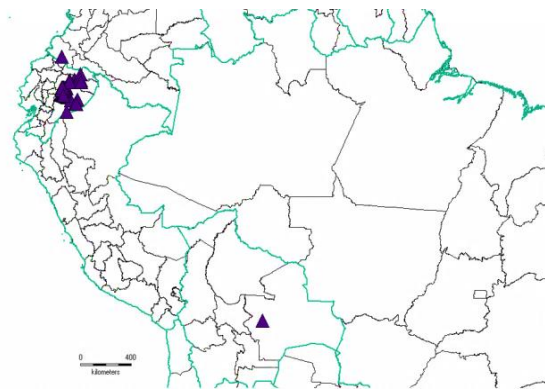
165. *P. lichoana*



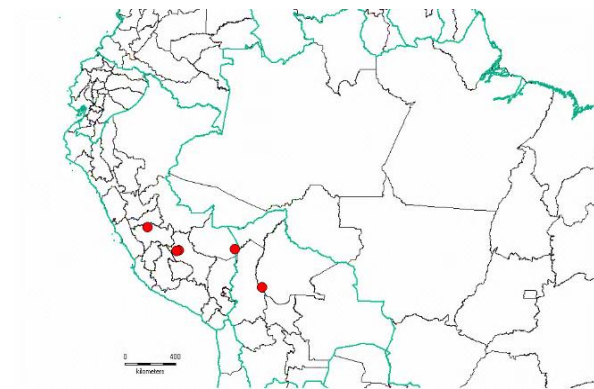
166.-*P. rotunda* (■) var.nov. "cucui-BR" (●)  
var.nov. "igapo-Amazon" (▲)



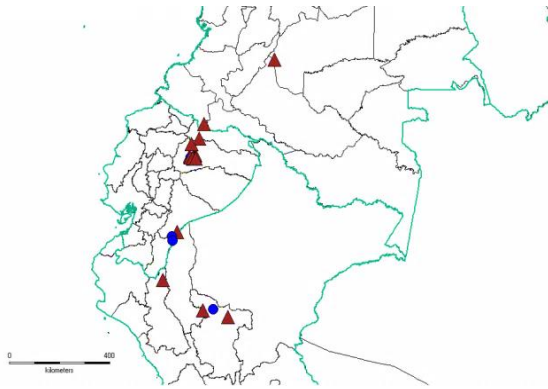
167. *P. sana*



168. *P. schultzeae*



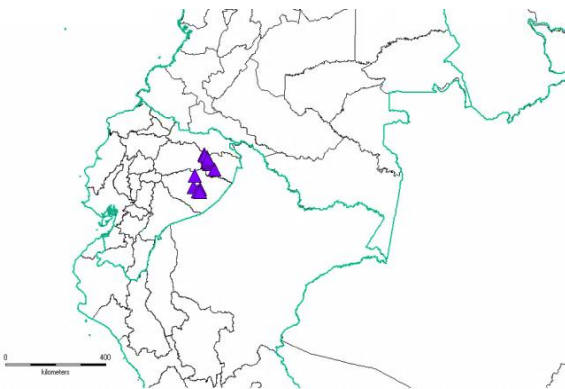
169. *P. vana*



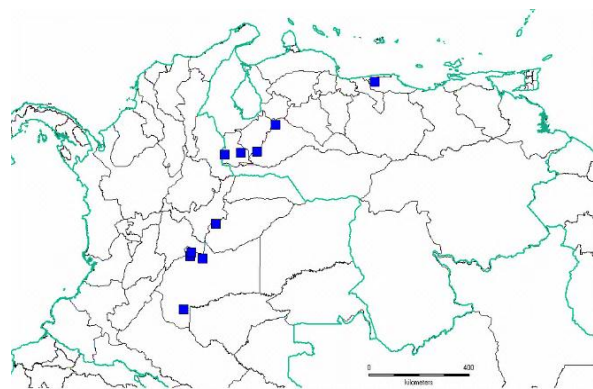
170. *P. williamsii* (▲) var. nov. "condoriense" (●)



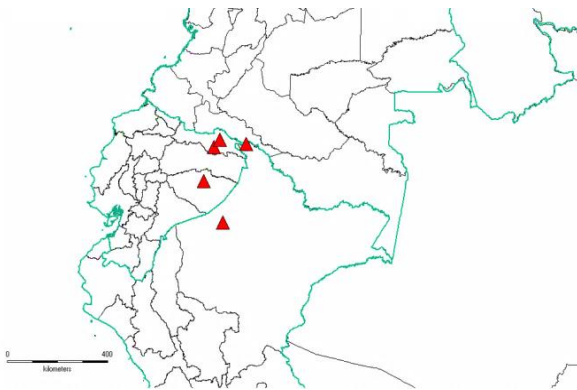
171. *P. wurdackii*



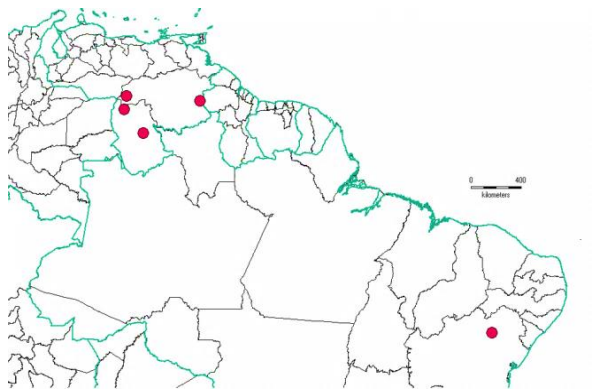
172. *P. sp. nov.* ("aff-amplifolia-Yasuni-ECU")



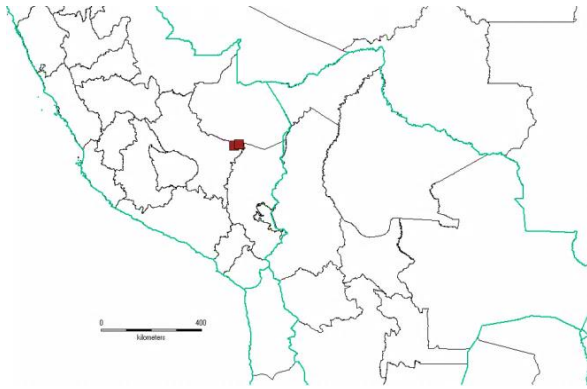
173. *P. sp. nov.* ("aff.debilis-OrinocoBasin-Venezuela")



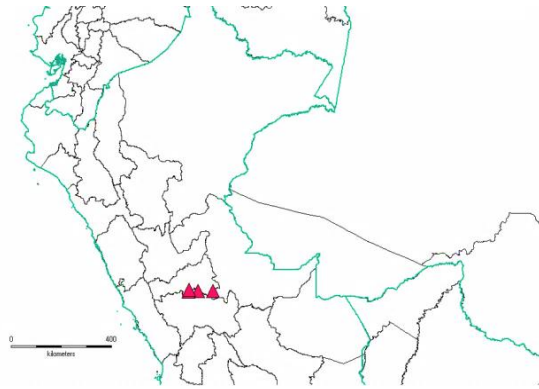
174. *P. sp. nov.* ("aff.debilis-sucumbios-Ecu")



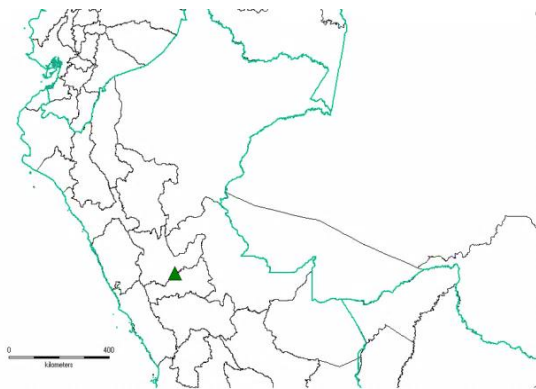
175. *P. sp. nov.* ("aff.lichiana-granSabana-Venezuela")



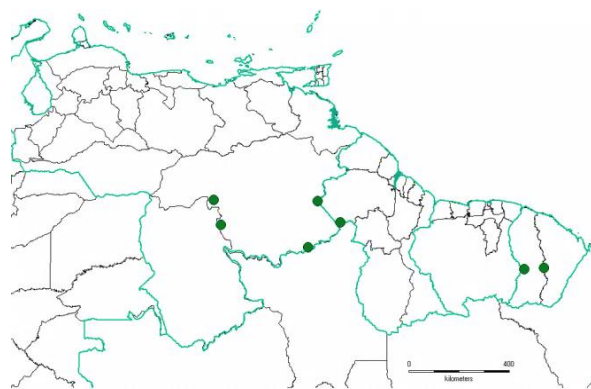
**176.** *P. sp. nov.* (“*aff.sana-quispicanhis-Peru*”)



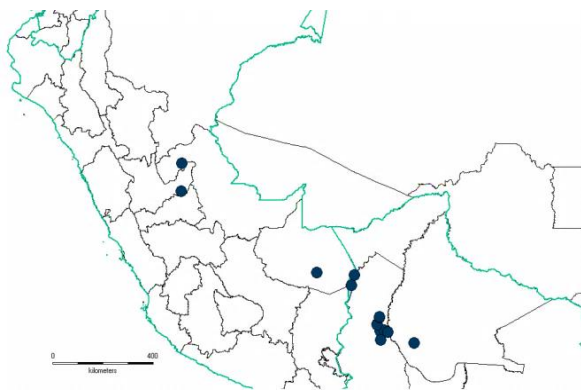
**177.** *P. sp. nov.* (“*aff.sana-Smith1600m*”)



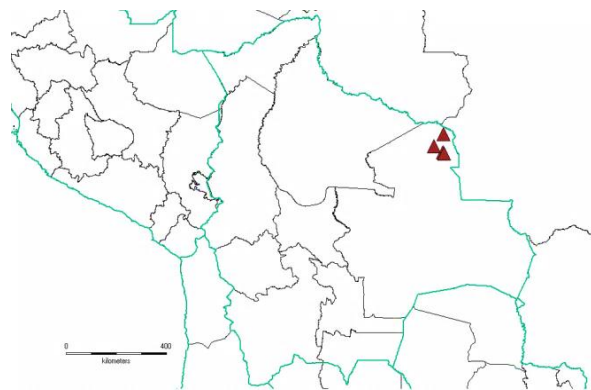
**178.** *P. sp. nov.* (“*brevistylinaLi-Peru*”)



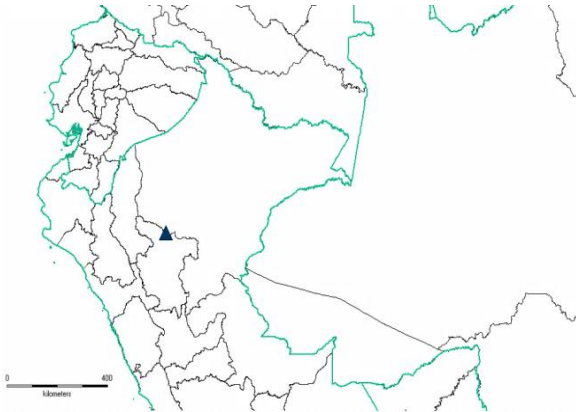
**179.** *P. sp. nov.* (“*cedeño-aff.ocellata-Venezuela*”)



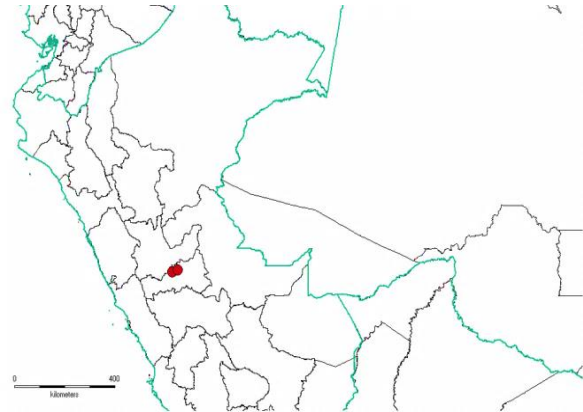
**180.** *P. sp. nov.* (“*debilis.aff-Madidi-Bolivia*”)



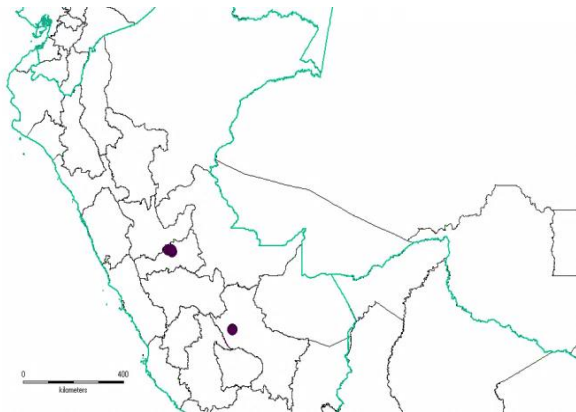
**181.** *P. sp. nov.* (“*huanchaca-SantaCruz-Bolivia*”)



**182.** *P. sp. nov.* ("longiracemosoLi Peru")



**183.** *P. sp. nov.* ("Paucartambo-Nuñez")



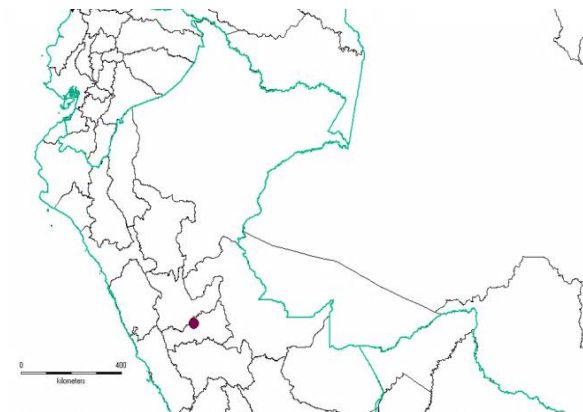
**184.** *P. sp. nov.* ("rojas-palcazu-Peru")



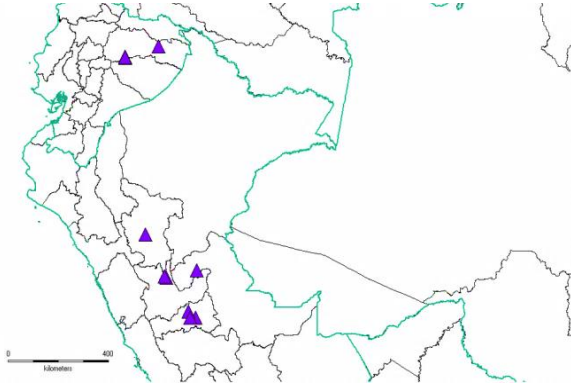
**185.** *P. sp. nov.* ("rotunda aff. paleDrying-Lowlands")



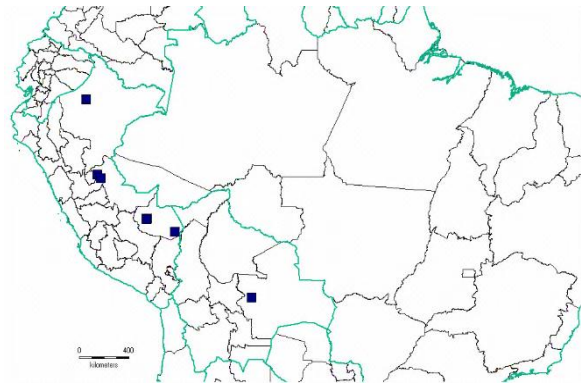
**186.** *P. sp. nov.* ("pittieriiLi-Venezuela")



**187.** *P. sp. nov.* ("plainveins-Pozuzo-Peru")

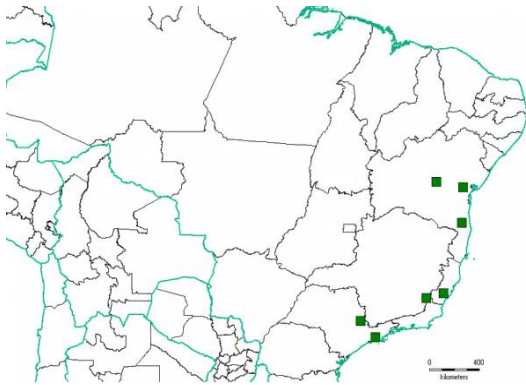


188. *P. sp. nov.* ("rotunda-aff.-JatunSacha")

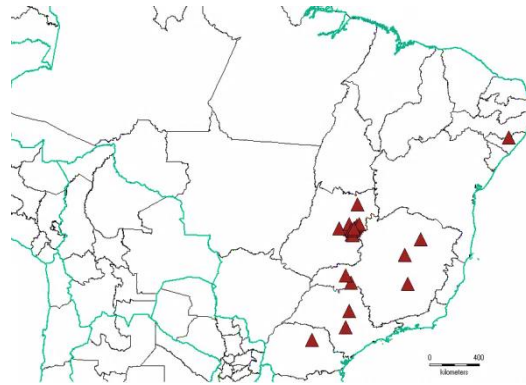


189. *P. sp. nov.* ("vana-aff.-small-leaves-Peru")

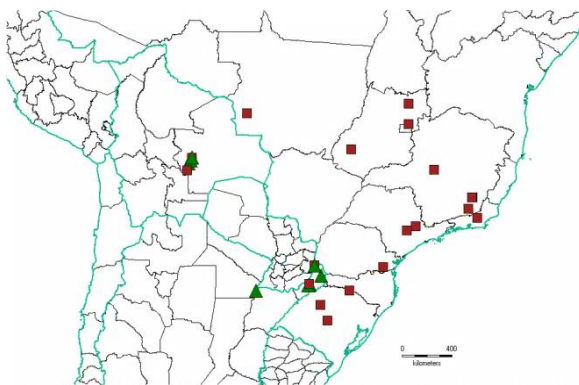
**SOUTHEASTERN SOUTH AMERICA**



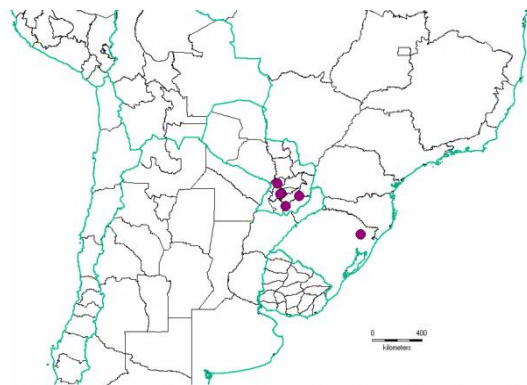
190. *P. brasiliensis*



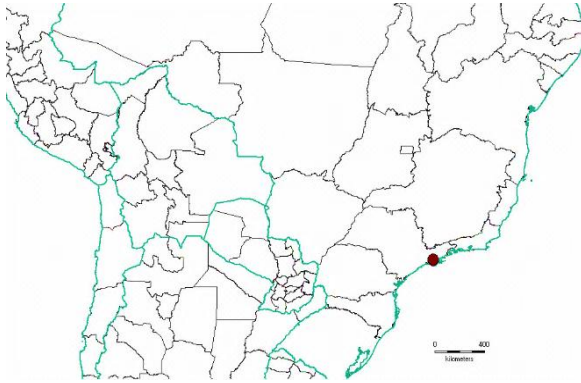
191. *P. "gardneri"*



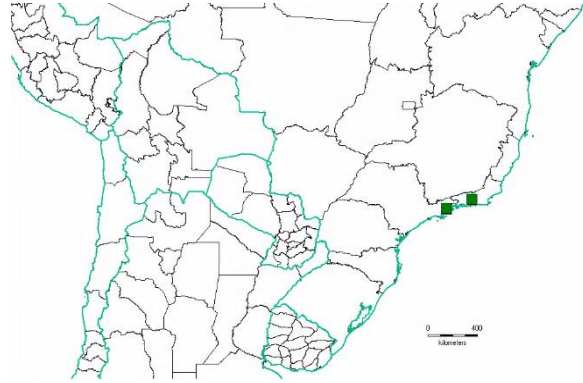
192. *P. chamissoana* (■), *var. nov. nobasalGI-Iguazu* (▲)



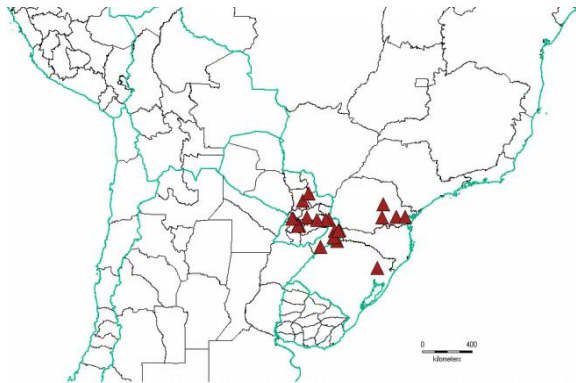
193. *P. ligustrina*



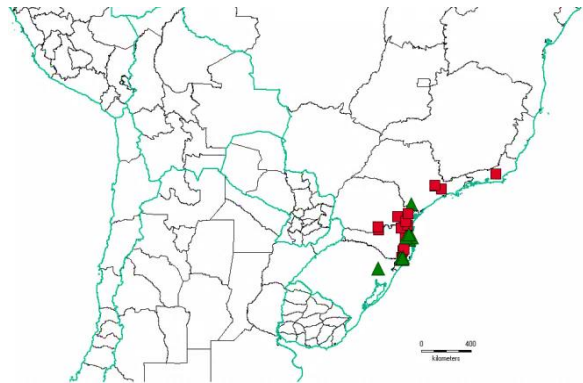
**194.** *P. "biritiba"*



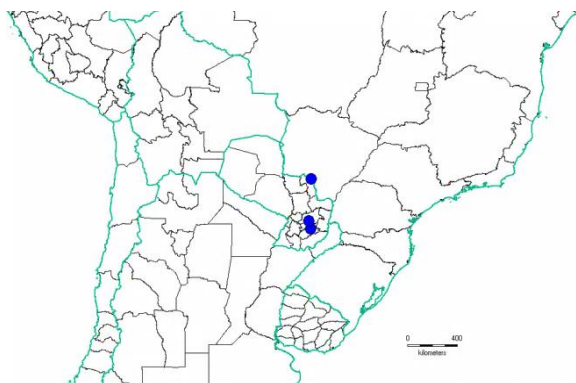
**195.** *P. "glaziovii"*



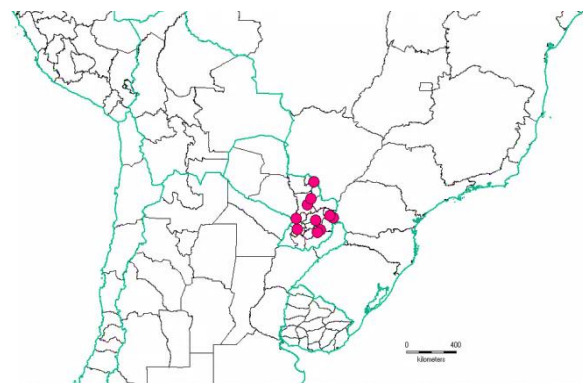
**196.** *P. oleifolia*



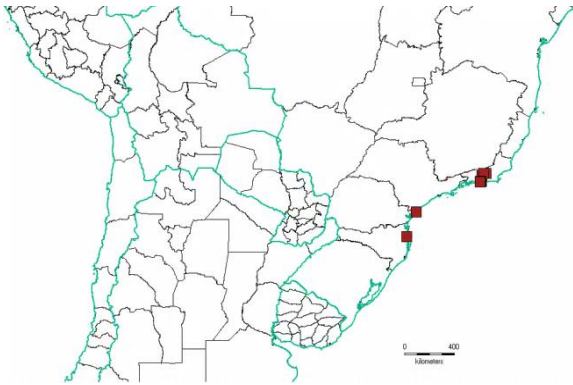
**197.** *P. omissa* (■), *var. nov. itajai-coastal* (▲)



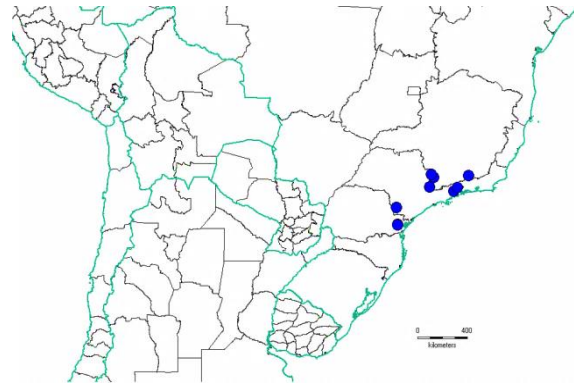
**198.** *P. oxyphylla*



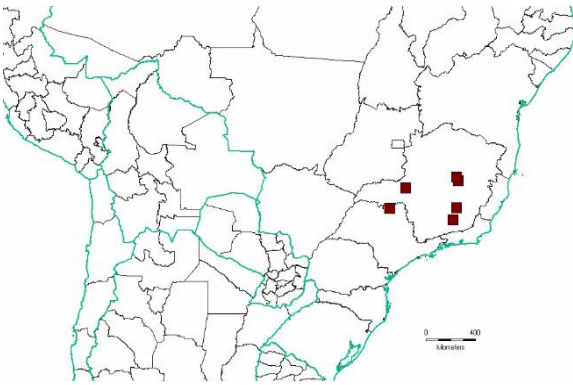
**199.** *P. ravenii*



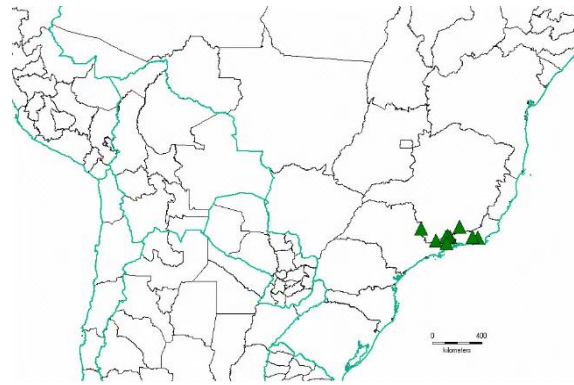
200. *P. reflexa*



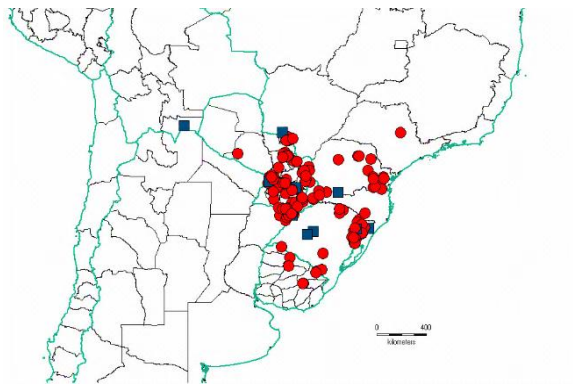
201. *P. sellowii*



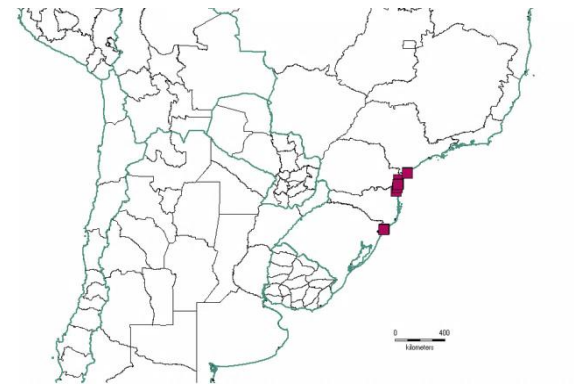
202. *P. "longifolia"*



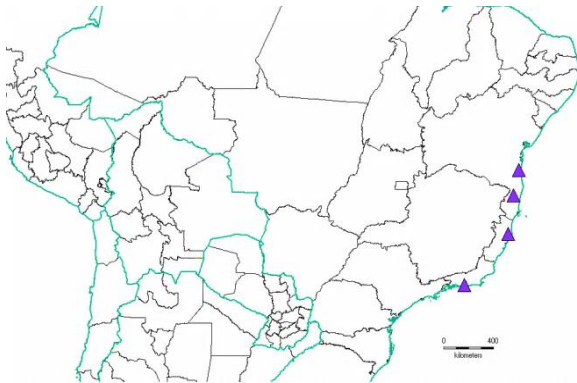
203. *P. sellowii* var. "petiolaris"



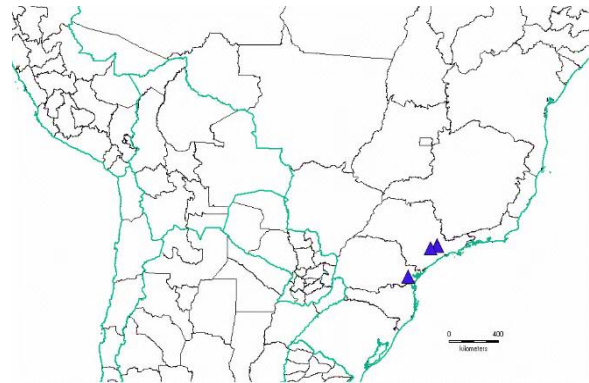
204. *P. subcoriacea* (●), var. nov. *cunneateLvs* (■)



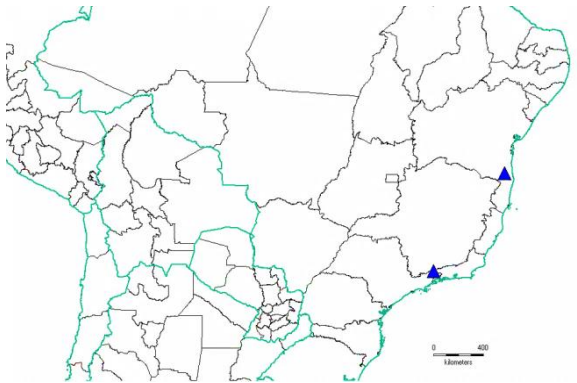
205. *P. ulei*



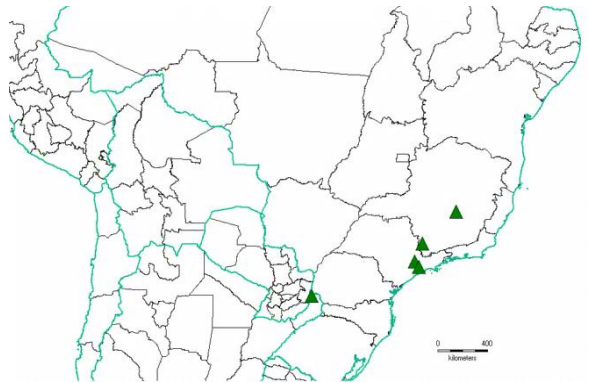
**206.** *P. sp. nov.* ("bahia-lowelevation-BRA")



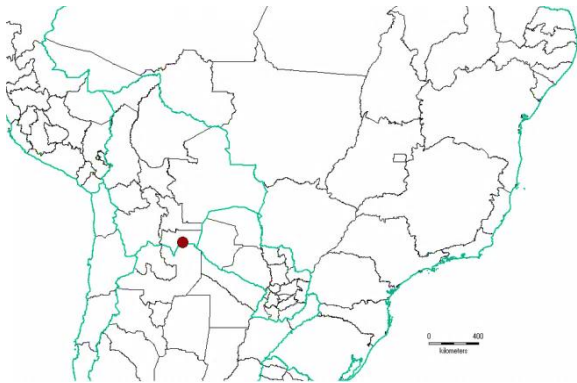
**207.** *P. sp. nov.* ("NarrowLeaves- JundaiJapi-BRA")



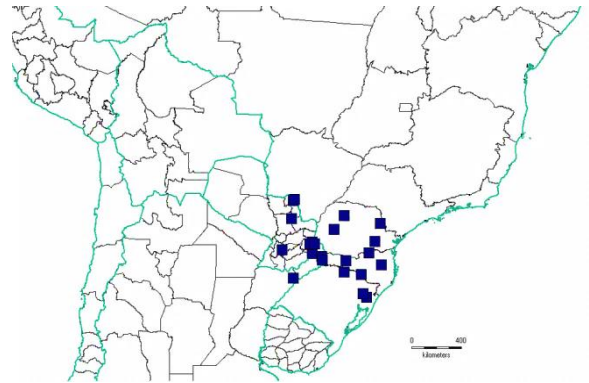
**208.** *P. sp. nov.* ("aff-reflexa-submarginalGlands-BRA")



**209.** *P. sp. nov.* ("aff.brasiliensis-slimPetiole")

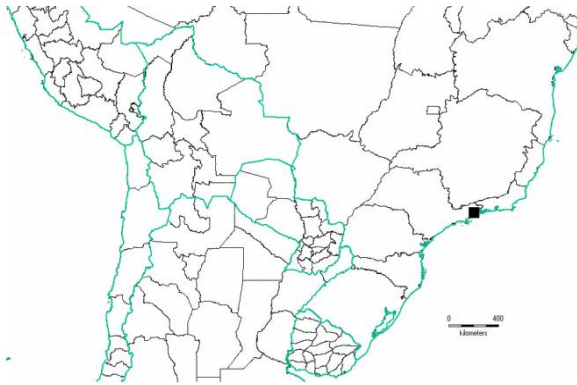


**210.** *P. sp. nov.* ("aff.chamissoana-Chaco-Bolivia")

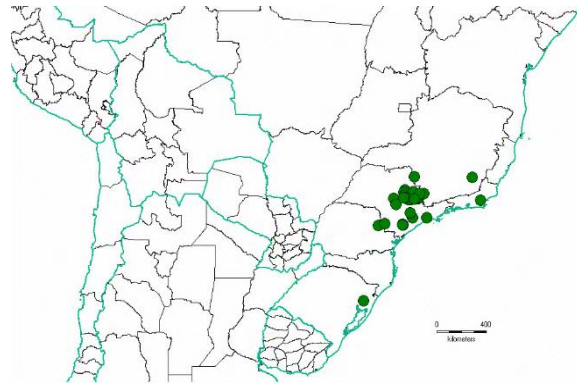


**211.** *P. sp. nov.* ("aff.oleifolia-submarginalGlands")

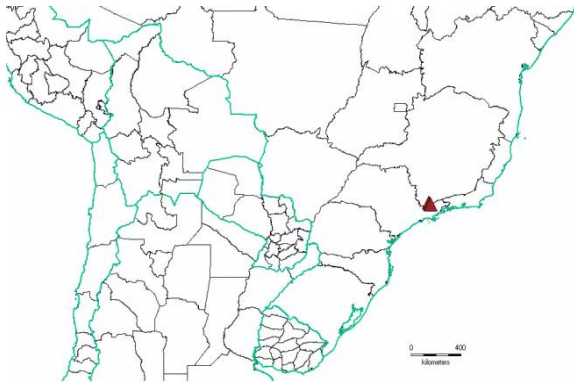




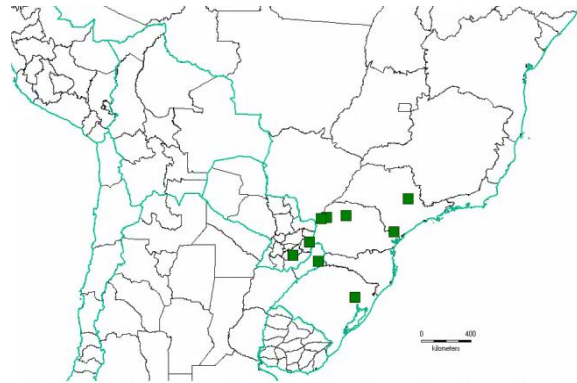
**212.** *P. sp. nov.* (“*aff. glaziovii-erectShortRaceme*”)



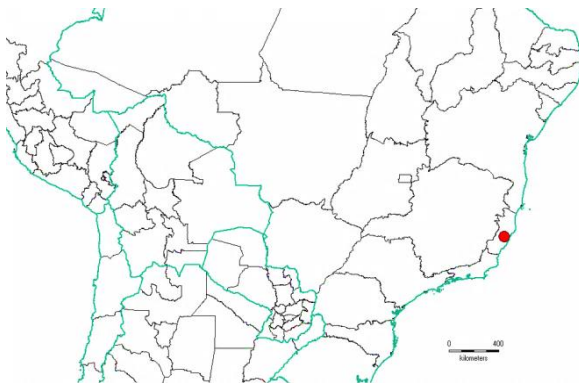
**213.** *P. sp. nov.* (“*aff. oleifolia-RioClaro-SP-BRA*”)



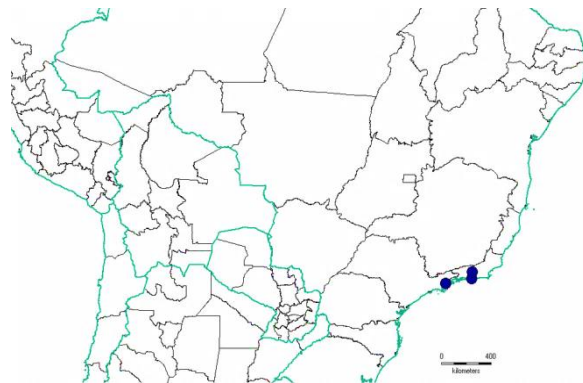
**214.** *P. sp. nov.* (“*petioleGlands-camposJordao-SP*”)



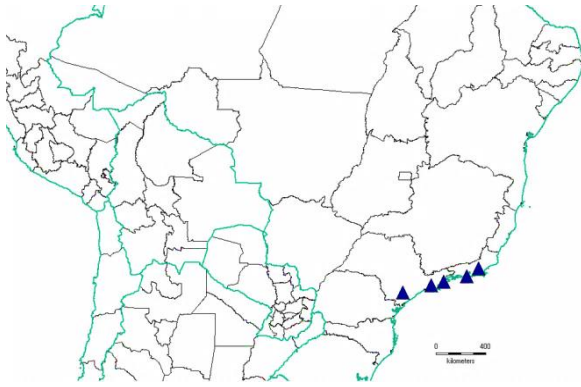
**215.** *P. sp. nov.* (“*duseni-Parana-BRA*”)



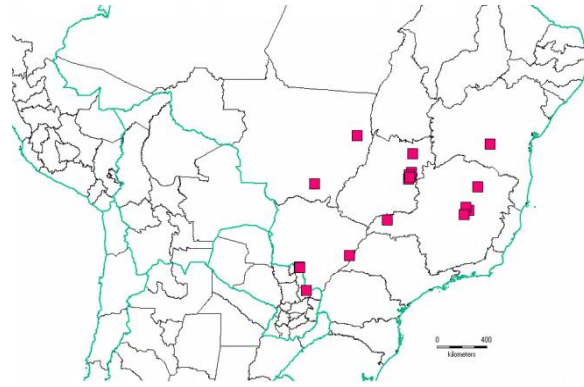
**216.** *P. sp. nov.* (“*macularGlands-EspirituSanto-BRA*”)



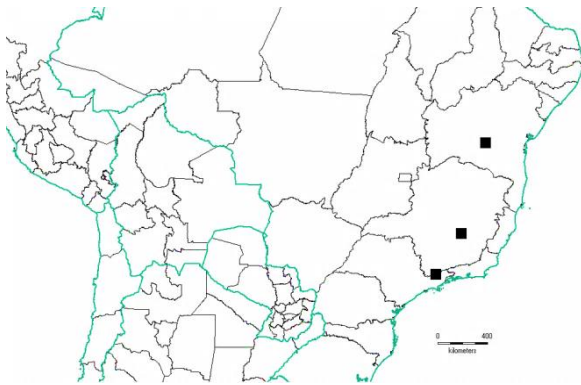
**217.** *P. sp. nov.* (“*glaziovii-aff-oblongLeaves-BRA*”)



**218.** *P. sp. nov.* ("guillem43-aff.glaziovii")



**219.** *P. sp. nov.* ("grandifolia"-aff.subcoriacea")



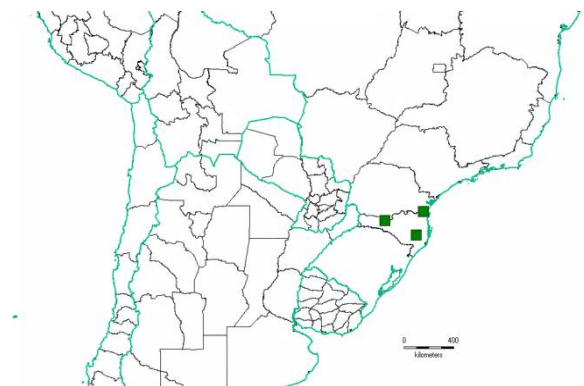
**220.** *P. sp. nov.* ("highlev-mucronulateLeaves-BR")



**221.** *P. sp. nov.* ("Iguape-Coastal-BRA")



**222.** *P. sp. nov.* ("martius555-BRA")



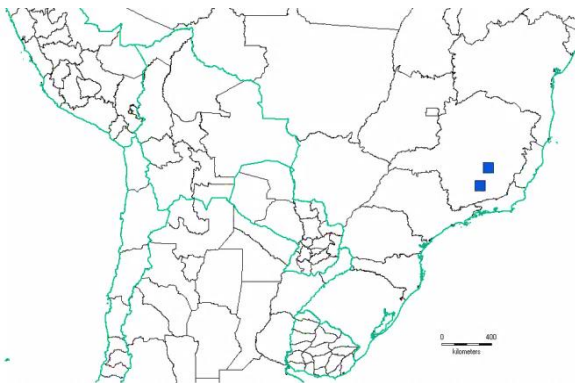
**223.** *P. sp. nov.* ("obovate-leaves- SCatarina-BR")



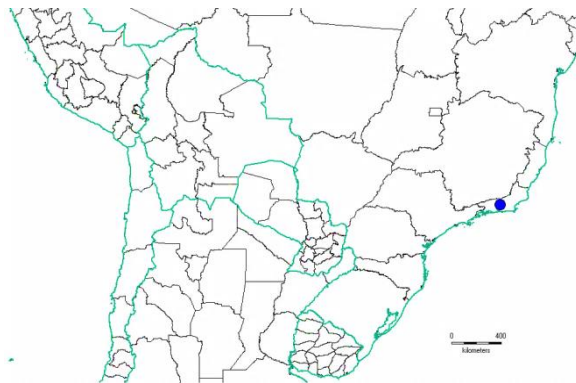
**224.** *P. sp. nov.* (Santa Catarina- Serrado Mar-BRA")



**225.** *P. sp. nov.* (serra-Sao Luiz-Curitiba-BRA")



**226.** *P. sp. nov.* ("serra da Piedade-BRA")



**227.** *P. sp. nov.* ("ultralong Petiole-2 macular Glands")

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## CHAPTER 2

### THE TAXONOMIC REVISION OF *Prunus* L. FOR THE MESOAMERICAN FLORA

#### INTRODUCTION

##### **The Flora Mesoamericana project**

Flora Mesoamericana is considered the most important regional flora published in the Spanish language and covers the tropical area that extends between the Isthmus of Panama (for practical issues the Panamian-Colombian border) as its southern and eastern limit and the Peninsula of Yucatán and Isthmus of Tehuantepec (an area around the Western boundaries of the Mexican states of Chiapas and Tabasco) as the northern and western limits, respectively (Knapp, 2002). The first volume was published in 1994; however, already in 1972, Peter Raven from Missouri Botanical Garden, first proposed the idea for a Central American flora, and afterwards in 1979, P. Raven, José Saukhán from the Universidad Nacional Autónoma de México and John F.M. Cannon from the British Natural History Museum decided to configure the project as it is known today (Davidse, Sousa Sánchez, & Knapp, 1995). This project intends to be as comprehensive as possible with the purpose of becoming the main taxonomic reference for all vascular plants in the area but also beyond its limits where many are distributed, providing full descriptions, specimen annotations (on-line through [tropicos.org](http://tropicos.org)) and identification keys.

## The Taxonomic History of the Evergreen Species of *Prunus* in Mesoamerica and Mexico

The occurrence and diversity of *Prunus* outside of temperate North America and Eurasia has been frequently underestimated. All the tropical and several subtropical species of the genus are evergreen and have been usually grouped under the subgenus *Laurocerasus* (Tourn. Ex Duh.) Rehd. (Kalkman, 1965; Rehder, 1940). Linnaeus (1753) in his seminal work, *Species Plantarum*, did not recognize any species from tropical America and erroneously assigned the earliest known Neotropical specimen of the genus collected by Sloane from Jamaica, as a member of the genus *Celastrus* (Celastraceae). Based on Caribbean specimens, Swartz (1788) and (1800) recognized the first two species of *Prunus* in the Neotropics, *P. occidentalis* Sw. and *P. sphaerocarpa* Sw., the latter based on Sloane's collection and afterward synonymized under *P. myrtifolia* (L.) Urban. In the present revision, both taxa have been identified as part of the mainland flora of Mesoamerica too. The first species described from mainland Mexico was *Cerasus ferruginea* DC. in 1825 from the state of Jalisco (combined under *Prunus* in 1841 by Steudel); however, Koehne (1915), the author of the only revisionary study for the tropical American species published so far, treated this species as *ignotae sedis* since he was unable to have access to the original material. *P. ferruginea* is a small to medium size tree with conspicuous rufous indumentum on the lower face of the leaves (which are conspicuously truncate to cordate at the base), the twigs and the floriferous shoots, and it is distributed mainly at the bottom of dry canyons next to watercourses in western and northwestern Mexico. In 1837, *P. brachybotrya* Zucc., from the state of Veracruz was the first Mexican species published from humid tropical zones. Two years after, Schlechtendal (1839) in his compilation of the American species of *Laurocerasus* unnoticed the existence of *P. brachybotrya* but proposed two new species from the

state of Veracruz, *P. laurifolia* Schltldl and *P. samydoides* Schltldl; the former was considered a synonym of *P. brachybotrya* by Koehne (1915) and the latter is a currently accepted name for a remarkable species in the genus because the unique very short basally branched floriferous shoots with miniature flowers.

After those few 19<sup>th</sup> century contributions, no other evergreen species was published until the revision by Koehne (1915), who additionally to the two species previously known from Central America, proposed five new species under the group (subseries) *Mesocraspedon* Koehne (*P. annularis*, *P. cortapico*, *P. erytroxylon*, *P. tetradenia* and *P. tuberculata*), other three species under the section *Neocalycinia* Koehne (*P. barbata*, *P. cornifolia* and *P. rhamnoides*) and one widely distributed and frequently cultivated species under the section *Iteocerasus* Presl, *P. capuli* Cav. For differentiating species, Koehne and subsequent authors relied mainly on variation of the indumentum of the hypanthium, the number and location of the leaf glands, the presence of domatia and details about measurements of racemes, pedicels, petals, anthers, and drupes. During the rest of the 20<sup>th</sup> century some isolated contributions increased the number of published names in Mexico and Mesoamerica to 32 (Johnston, 1938; Lundell, 1968; McPherson, 1988; Standely, 1923; Williams, 1966) and three local floras: Mexico (Standely, 1922), Costa Rica (Standley, 1937) and Guatemala (Standley & Steyermark, 1946), compiled independently the native and cultivated species for each country. However, neither of the publication of novelties nor the floras provided critical taxonomic discussions about the native species, and particularly the latter focused the discussion mainly on the cultivated species of the genus. The last published species for the region was *P. fortunensis* McPherson (1988), a small leafed species from Panama close to *P. annularis* Koehne, at that time known only from a single collection.

## MATERIALS AND METHODS

This treatment is based on the already published revision of the genus *Prunus* for the Spanish language Flora Mesoamericana treatment (Pérez-Zabala, 2015). However, all the descriptions were comprehensively revised in order to write a clear English version and further details about the venation architecture following terminology of Ellis et al. (2009) were added. It includes 28 native species, 11 of them are new species identified during this revision, and 3 introduced cultivated species. They were delimited based on detailed observational data gathered from leaf, floral and fruit variation with special emphasis on the former since leaf architecture, venation patterns, glands placement and stipules shape were consistently diagnostic traits for all species and the variation of flowers was in general more subtle. The taxa are organized in alphabetical order, complete descriptions are provided for each one plus an abbreviated statement about habitat and distribution (vegetation coverage type, countries, elevation range and assessment of general distribution either the case of being endemic to the Mesoamerican region as defined by Knapp (2002) or distributed elsewhere), local names (followed by country), and taxonomic discussion (diagnostic characters, similar species, variants and nomenclatural issues). Lectotypes selected for some names in Pérez-Zabala (2015), are also cited here. Over 800 botanical records (each one with either one or several specimens) were morphologically examined from 23 herbaria, A, ASU, B, BM, BRIT, CAS, CR, DAV, DS, F, GH, HULE, K, LAGU, LL, MEXU, MO, NY, P, TEX, UC, US, XAL (herbarium abbreviations following Thiers (continuously updated)), although some specimens were accessed through high resolution images available in web portals such as <http://plants.jstor.org> and <http://midwestherbaria.org>. For all species, a full list of examined specimens from the Mesoamerican region (specimens out of its limits are



referenced in chapter 1) and originally not included in the Flora is provided, except for the cultivated taxa *P. armeniaca*, *P. domestica* and *P. persica* for which a single specimen per country is cited. All the morphological information further used for building the full descriptions, taxonomic comments and identification keys were handled using a java implementation of the DELTA suite of programs first developed by M. J. Dallwitz (1980) named “open-delta” which was retrieved from the Atlas of Living Australia website project (M.J. Dallwitz, Paine, & Zurcher, 2014). The information about botanical records, nomenclature and geographic data were managed using the software BRAHMS (Filer, 2014 and onwards).

## **RESULTS AND DISCUSSION (TAXONOMIC TREATMENT)**

### **Prunus L.**

*Amygdalopsis* M. Roem., *Amygdalus* L., *Armeniaca* Scop., *Cerasus* Mill., *Emplectocladus* Torr.,

*Lauro-cerasus* Tourn. ex Duhamel, *Microcerasus* Webb et Berthel., *Padus* Mill., *Persica* Mill., *Prunophora* Neck., *Pygeum* Gaertn.

Trees, shrubs, or sub-shrubs; deciduous, semi-deciduous or evergreen; mostly unarmed but some species with branch apices thorny. Most recent extension units (vegetative growth units) glabrous or hairy, usually lenticellate, varying in length; buds glabrous or hairy, enclosed by ovate to deltoid cataphylls frequently trilobate and with a ventral hairy line next to the attachment to the shoot; vegetative shoots as well as floriferous shoots sometimes subtended by transitional

distally trilobate leaves (transitional cataphylls). *Leaves* simple, alternate, margins entire to dentate; generally petiolate; secondary vein framework frequently brochidodromous, sometimes eucamptodromous, secondary veins sometimes with domatia basally in the axil when departing from the midrib; glands generally present on leaf surface, laminar, marginal or petiolar, in pairs from one to several; stipules frequently early deciduous, subulate to widely expanded and foliaceous. *Floriferous shoots* emerging from the axil of either cataphylls or leaves on short (brachyblasts) or regular shoots, generally with a single axis (racemose), sometimes either basally branched or with the axis shortened appearing as umbels or fascicles, or even reduced to a single flower; basal cataphylls of floriferous shoots similar in shape to those on vegetative shoots, usually early deciduous. *Flowers* generally hermaphroditic, sometimes the pistil reduced and non-functional; floral bracts usually early deciduous, bracteoles sometimes present; hypanthium generally fully developed; sepals 5, deltoid to lingulate, valvate; petals 5 (rarely up to 10), generally white, sometimes yellow, pink or greenish, attached to the margin of the hypanthium, free, membranous, spatulate to orbicular and generally unguiculate at the base, sometimes sepal-like; stamens 10-20(-85), generally in 2 series but some species with just 1 or 3 to many, filaments filiform, free, anthers generally glabrous, dorsifixed; pistil 1-carpellate, style terminal, ovary superior, placed at the base of the hypanthium, with 2 ovules but usually just one maturing, ovule hemitropous with 1 or 2 obturators next to the micropyle, stigma capitate to discoid. *Fruit* a drupe, 1(rarely 2) seed, with a longitudinal depressed suture, sometimes inconspicuous; exocarp thin, glabrous to hairy, sometimes pruinose; endocarp woody, surface smooth, rugose, foveolate to sulcate, attached or not to the mesocarp; pyrene laterally compressed to globose; seed pendulous, testa membranous with a ventral raphe, endosperm scanty or absent.  $\times = 8$ .

Approximately 450 spp. distributed mostly in temperate regions of North America (about 30 spp.), Eurasia (about 150 spp.) and tropical and subtropical regions of America (245 spp.), Southeast Asia (about 60 spp.), and Africa (1-2 spp.). In Mesoamerica (and the rest of tropical America) many species are distributed in middle to high elevations (1000 to 3500 meters), but a considerable number are also found in lowlands and foothills below 1000 m.

### **Artificial key to the species**

1. Floriferous shoots noticeably short, appearing as fascicles with up to 3 flowers, or sometimes just one flower; cultivated plants in Mesoamerica.

2. Leaves broadly ovate to suborbicular; petiole more than 15 mm. long.       **2. P. armeniaca**

2. Leaves ovate, obovate, or oblong (more than twice as long as wide), petiole up to 12 mm.

3. Current season axillary units of extension basally unbranched, bearing separately floriferous shoots (fascicle like) and vegetative shoots; secondary veins less than 8; endocarp relatively smooth.       **7. P. domestica**

3. Current season axillary units of extension basally branched bearing a central vegetative bud and two lateral flowering buds, generally only one of the lateral develops, secondary veins 12 or more; endocarp sulcate or foveolate.       **14. P. persica**

1. Floriferous shoots racemose with several flowers, usually a single axis, sometimes branched from the most basal nodes, plants generally native or naturalized.

4. Axils from secondary veins to midrib with pocket domatia; leaf glands on petioles or leaf margins and producing enations similar to teeth.

5. Floriferous shoots with leaves at the 1/3 lower part and transitional cataphylls present at the base of new expanding shoots.       **17. P. serotina**

5. Floriferous shoots without basal leaves or transitional cataphylls in new shoots.

6. Leaf margin entire or slightly sinuate; leaf glands submarginal or marginal; floriferous shoots emerging at the same time that vegetative units extend. **15. P. rhamnoides**

6. Leaf margin serrate; leaf glands petiolar; floriferous shoots emerging after vegetative units end extension.

7. Both vegetative and floriferous shoots hairy, secondary veins 13 or more.

**4. P. chiapensis**

7. Both vegetative and floriferous shoots glabrous, secondary veins up to 12.

**16. P. salasii**

4. Secondary veins axils not forming pockets with domatia; leaf glands laminar or sometimes adjacent to the margin.

8. Inner surface of the hypanthium hairy; leaf glands basal or sub-basal and next to the midrib; stipules linear or subulate, generally puberulent dorsally; anthers 0.9 mm long or longer, oblong-elliptic.

9. Upper leaf surface bullate, lower surface rugose and villous; leaf glands width 0.7 mm or lower. **9. P. guatemalensis**

9. Upper leaf surface plain, lower surface plain and glabrous or sometimes sparsely tomentose, leaf glands width 0.8 mm or more.

10. Floriferous shoots generally branched at base.

**13. P. occidentalis**

10. Floriferous shoots with a single axis.

11. Leaves sparsely tomentose on the lower face (mainly visible in young leaves), the larger more than 11 × 4.7 cm; floriferous shoots more than 5 cm long. **6. P. cortapico**

11. Leaves glabrous below, generally less than  $11 \times 3.5$  cm; floriferous shoots less than 5 cm long. **21. P. sp. A**

8. Inner surface of the hypanthium glabrous; leaf glands placed variously; stipule shape various, dorsally glabrous; anthers generally less than 0.9 mm long, when longer than elliptic.

12. Leaf glands absent.

**20. P. tuberculata**

12. Leaf glands 2 or more.

13. Leaf glands 4 (some leaves of a particular individual can get just two, some specimens can have consistently more than 4).

14. Mature leaves more than  $12.5 \times 5.3$  cm.

**19. P. tetradenia**

14. Mature leaves generally less than  $12 \times 5$  cm.

15. Leaves 3 times longer than their wide, secondary veins 9-10.

**11. P. matudae**

15. Leaves less than 3 times longer than their wide, secondary veins up to 8.

16. External bark of new shoots with a whitish velamen; stamens 10-14 in 1 series.

**12. P. myrtifolia**

16. New shoots not whitish superficially; stamens 16-20 arranged in 2 series.

17. Stipules free, secondary veins 9 or more, opening angle

of less than 60 degrees from the midrib. **10. P. lundelliana**

17. Stipules ventrally fused, secondary veins up to 8,

generally coming off more than 60 degrees from the midrib.

18. Leaves more than  $6 \times 3$  cm; petiole more than  $7 \times 1$  mm.

**1. P. annularis**

18. Leaves less than  $5 \times 2.5$  cm; petiole less than  $5.5 \times 1$  mm.

**26. P. sp. F**

13. Leaf glands 2.

19. Leaf glands more than 1.5 mm wide, oblong, and attached to the midrib; stipules 9 mm long or more; fruits ovate to pyriform, 16 mm high or more.

**5. P. compacta**

19. leaf glands generally less than 1.5 mm wide, if larger then unattached to the midrib; stipules up to 4 mm long; fruits globose to sub-globose, less than 16 mm high.

20. Stipules ventrally connate.

21. Leaf glands sub-marginal or reaching the margin and creating a small enation.

**22. P. sp. B**

21. Leaf glands placed between the first and second pair of secondary veins or sub-basal but not next to the margin.

22. Secondary veins 9-10

23. Stipules lanceolate with hyaline margin; sepals up to 0.5 mm long.

**3. P. axitliana**

23. Stipules deltoid-ovate with not hyaline margin; sepals more than 0.6 mm long.

24. Leaves coriaceous, generally up to  $12 \times 4$  cm,  
leaf apex shortly acuminate; flower pedicels

generally less than 4 mm long. **23. P. sp. C**

24 Leaves chartaceous, generally more than  $10 \times 4$   
cm, leaf apex long acuminate; flower pedicels more

than 6 mm long. **28. P. sp. H**

22. Secondary veins up to 8.

25. Leaves up to 2.5 cm wide; floriferous shoots bearing up  
to 13 flowers; stamens 10-16, arranged in one series.

**8. P. fortunensis**

25. Leaves more than 2.5 cm wide; floriferous shoots  
bearing more than 18 flowers; stamens 16 or more arranged  
in two series.

26. Stipules deltoid, up to 2 mm long; flower  
hypanthium campanulate; anthers 0.5-0.7 mm long.

**1. P. annularis**

26. Stipules subulate, more than 2.5 mm long;  
flower hypanthium infundibuliform; anthers 0.8-0.9  
mm long. **30. P. sp. J**

20. Stipules free.

27. Stipules linguiform or ovate, broad, frequently falcate; stamens  
ca. 10 arranged in 1 series; floriferous shoots up to 2 cm long.

**24. P. sp. D**

27. Stipules deltoid or lanceolate; stamens 15 or more arranged in 2 or more series; floriferous shoots more than 3 cm long.

28. Shrubs; leaves generally up to 4.5 cm long, base rounded.

**31. P. sp. K**

28. Shrubs or trees; leaves generally longer than 5 cm, base acute or obtuse but not rounded.

29. Leaf glands sub-marginal placed at less than 3 mm from the base, generally more than 1 mm wide; anthers more than 1 mm long.

**29. P. sp. I**

29. Leaf glands laminar, sometimes submarginal but then separated more than 10 mm from the base; generally, less than 1 mm wide; anthers up to 0.9 mm long.

30. Leaves rigid coriaceous; most recent units of extension exceeding 4 mm diam. at the base, floriferous shoots more than 3.5 cm long.

**18. P. tartarea**

30. Leaves chartaceous to flexuous coriaceous; most recent units of extension up to 2 mm diam. at the base; floriferous shoot up to 3.5 cm long.

31. Leaves generally less than  $7.5 \times 2.8$  cm, dull above when dry; flower pedicels generally 5-6 mm long.

**25. P. sp. E**



31. Leaves generally more than  $8.8 \times 3.5$  cm,  
lustrous above when dry; flower pedicels 6-8 mm  
long. 27. P. sp. G

**1. *Prunus annularis*** Koehne, *Bot. Jahrb. Syst.* 52: 308 (1915). Type. Costa Rica. Au bord do Rio Segundo, 2000 m, 10 Jan 1890, *Tonduz, A. 1714* (Lectotype, W, designated by Pérez-Zabala (2015); isoelectotype, BR)

Shrubs to trees 5-15(-18) m; bark on the branches slightly fissured, sometimes with transversal cracks as extension rings. Most recent extension units 1.5-2 mm diam. at base, with 7-9 leaves per unit, glabrous; lenticels  $0.5-1 \times 0.5-0.8$  mm, elliptic to narrowly oblong, slightly protuberant, moderately dense; cataphylls  $2-2.5 \times 2-2.5$  mm, broadly ovate and apiculate, glabrous. Leaves  $4.5-9(-12) \times 2.3-4.5(-7)$  cm, 1.8-2.5 times longer than wide, ovate-elliptic to ovate, equilateral, chartaceous to sub-coriaceous; leaf upper face opaque, appanate or slightly bulliform, glabrous, lower face opaque, appanate, glabrous; secondary vein framework festooned brochidodromous, midrib 0.5-0.6 mm wide, slightly depressed above, prominent below, secondary veins 6-7, departing at 60-70 degrees from the midrib, slightly depressed above, flat below; intercostal tertiary veins alternate percurrent sinuose with epimedial frequently reticulate at the upper two thirds of the lamina, slightly depressed above, impressed below, quaternary and lower vein orders inconspicuous; leaf base obtuse to rounded, margin entire to slightly undulate, not cartilaginous, apex variously acuminate; leaf glands (2-)4, 0.5-0.7 mm wide, rounded, slightly depressed and appearing crateriform, laminar, the lower pair on or below the first

pair of secondary veins, the upper pair above the second pair of secondary veins; stipules  $1.5-2 \times 0.6-0.8$  mm,  $0.7-1.3$  mm at the insertion level, early deciduous, ovate to oblong, ventrally connate along  $\frac{3}{4}$  of the length, margin cartilaginous and with some subapical ventral trichomes; petiole  $7-11$  ( $-15$ )  $\times 1-1.3$  mm, slightly canaliculate, flexuous at base, sometimes reddish, glabrous. Floriferous shoots with a single axis, subflexuous, from last season or older units of extension,  $30-60 \times 0.8-1$  mm, with 18-28 flowers per axis evenly distributed along the axis, subflexuous, sulcate, glabrous; peduncle  $2-3 \times 1-1.3$  mm; floral bracts c.  $1 \times 1.3$  mm long, deltoid, early deciduous, dorsally glabrous with minute ventral trichomes towards the apex. *Flowers* with pedicel  $2.5-7 \times 0.4-0.6$  mm, glabrous; hypanthium  $1.8-2 \times 2-2.5$  ( $-3.5$ ) mm, campanulate, glabrous, sometimes strumose outside; sepals  $0.6-0.7 \times 0.8-0.9$  mm, obtuse to deltoid, cucullate and protruding laterally from the hypanthium; petals  $1.8-2 \times 1.8-2$  mm,  $0.4-0.6$  wide at the basal claw, obdeltoid, cream, margin entire, apex acute; stamens 16-20, in 2 series, the outer longer than the inner one, filaments  $2.5-3.5$  mm, glabrous, anthers  $0.5-0.7 \times 0.4-0.5$  mm, elliptic; pistil  $2.5-3$  mm, glabrous, ovary  $0.5-0.8 \times 0.4-0.5$  mm, style  $2-2.3 \times 0.3-0.4$  mm, stigma  $0.7-0.8$  mm wide, peltate. *Drupes*  $14-16 \times 12-13 \times 10-11$  mm, subglobose, apiculate, red when mature, ventral suture slightly depressed; fruiting pedicel  $4-7 \times 1-1.3$  mm; pericarp smooth, glabrous; mesocarp less than 2 mm in dry; endocarp  $0.3-0.35$  mm wide, smooth.

**Habitat and Distribution:** Forest or forest fragments in humid regions. Costa Rica and Panama. 600-2200 m. (Endemic).

**Comments:** *Prunus annularis* may be recognized by generally having 4 leaf glands (some leaves from the same specimen could have just 2), the ovate leaves with a relatively long and

flexuous petiole, the stipules ovate, the anthers comparatively small and the fruit relatively big (more than 14 mm long). Some deviant specimens from Chiriquí (Panama) and south-eastern Costa Rica that could be considered as a different taxon have generally bigger leaves (up to 15 × 8 cm), oblong-lanceolate, coriaceous, with 8-9 secondary veins and the floriferous shoots rigid, longer than 6 cm and with bigger flowers overall. However, a better knowledge of the range of morphological variation of *P. annularis* in other localities of Costa Rica and Panama based on extensive field observations will be required to clarify whether a new subspecies (or species) should eventually be proposed, or such “bulkier” appearance of those specimens is due to local conditions of growth. On the other hand, numerous specimens collected at elevations over 2200 m in Costa Rica and Panama and frequently attributed to *P. annularis* correspond to 6 new species here presented.

**Local names:** Mariquita, zapotillo (Costa Rica).

**Specimens examined:** **COSTA RICA.** La Palma de San Ramon, 1140 m, 23 Oct 1922, *Brenes, A. 3771* (F, NY); ibidem, 1140 m, 30 May 1927, *Brenes, A. 5527* (NY); ibidem, 1140 m, 13 Mar 1929, *Brenes, A. 6744b* (NY); Tilaran, Río Negro, Atlantic slope, 1500 m, 22 Nov 1986, *Haber, WA. 6390* (MO); Tiorels du Barba, Massif du Barba, au bore du Rio Segundo, 2000 m, 10 Jan 1890, *Tonduz, A. 1722* (US); Tiorels du Barba, vert. Atlantic, 2500 m, 15 Feb 1890, *Tonduz, A. 2025* (US); **Alajuela:** Reserva Biológica Monteverde Río Peñas Blancas, sociedad IQPSA, Ston's, 800 m, 1 Mar 1990, *Bello, E. 1994* (CR, MO); San Ramon, La Palma de San Ramon, 1140 m, 31 Dec 1927, *Brenes, A. 5932* (NY); San Ramon, Reserva Forestal San Ramon, slopes above and in the valley of the Río San Lorencito, 850 m, 12 Mar 1987, *Burger, WC. 12140* (CAS, MO); San Ramon, Reserva forestal, 1000 m, 12 Mar 1987, *Gómez-Laurito, J. 11425* (F); Reserva Forestal San Ramón Campamento Río San Lorencito, 900 m, 24 Mar 1989, *Gómez-Laurito, J. 11792* (F, MO); Region of Zarcero, 1740 m, 15 Nov 1937, *Smith, A. A646* (MO); Viento Fresco, 1600 m, 13 Feb 1926, *Standley, PC. 47868* (US); **Cartago:** Paraiso, cañón del Río Grande de Orosí y aluvi3n, 1550 m, 23 Oct

1983, *Chacón, A. I. 1480* (MO); **Guanacaste**: Tilarán, Cordillera de Tilarán, reserva Biológica del Colegio de Monteverde, 1600 m, 10 Jan 1992, *Bello, E. 4333* (CR); ibidem, 1600 m, 10 Jan 1992, *Bello, E. 4334* (CR, MO); Liberia, Parque Nacional Guanacaste, cuenca del Tempisque, estación Maritza, sendero a Cacao, 600 m, 12 Jun 1996, *Espinoza, R. 1537* (MO); Monteverde, cloud forest. Transect 4, 1550 m, 12 Jul 1990, *Gentry, A. 71567* (MO); three km N Santa Elena, Atlantic exposure near continental divide on Bello farm, 1500 m, 20 Dec 1985, *Haber, WA. 3835* (MO); Tilarán, Cordillera de Guanacaste, Tierras Morenas. Z.P. Tenorio, 1050 m, 23 Aug 1994, *Rodriguez, G. 321* (MO); **Heredia**: Barva, Parque Nacional Braulio Carrillo, Cordillera Central, sendero del transecto on ridge between second and third creek crossing below refugio at 2070 m, 2080 m, 23 Aug 1992, *Boyle, B. 3190* (CR, MO); Heredia, along the Sarapiquí road, 0.5 km south of the Río La Paz waterfall, 1400 m, 13 May 1974, *Hartshorn, G. 1493* (MO); Heredia, Vara Blanca de Sarapiquí, north slope of Central Cordillera, 1500 m, Jul 1937, *Skutch, AF. 3302* (MO, US); **Punta Arenas**: Montes de oro, Zapotal, 1200 m, Apr 1961, *Jiménez, O. s.n.* (F, NY); ibidem, 1500 m, May 1961, *Jiménez, O. s.n.* (F, NY, US); **Puntarenas**: Reserva Biológica Monteverde, La Torre, 1600 m, 26 Jan 1989, *Bello, E. 708* (MO); Reserva Biológica Monteverde, Río Guacimal, 1500 m, 31 May 1989, *Bello, E. 930* (MO); Flora de MonteVerde, provincias Alajuela, Puntarenas y Guanacaste, 1520 m, 9 Feb 1977, *Dryer, VJ. 1177* (F, MO); Cordillera de Tilarán. San Luis: Buen Amigo, camino a Veracruz Monteverde, 1100 m, 7 Mar 1994, *Fuentes, Z. 649* (CR, MO); Monteverde, reserva forestal, Transect # 1, 1550 m, 22 Aug 1984, *Gentry, A. 48798* (MO); Monteverde, 1550 m, 9 Dec 1978, *Haber, WA. 248* (MO); Monteverde, upper San Luis River valley below Monteverde on Pacific slope, 1200 m, 17 Dec 1985, *Haber, WA. 3921* (MO); Monteverde Cloud Forest Reserve, on continental divide in area of TV towers, 1700 m, 29 Dec 1985, *Haber, WA. 4010* (MO); Monteverde, comunidad, 1400 m, 10 Mar 1987, *Haber, WA. 6898* (MO); Cordillera de Tilarán, Monteverde, Pacific slope, within community, 1400 m, 1 Jan 1992, *Haber, WA. 10970* (CR, MO); Cordillera de Tilarán, Monteverde, road from gas station to TV towers, Pacific slope, 1600 m, 15 Mar 1992, *Haber, WA. 11071* (CR, MO); ibidem, 1600 m, 15 Mar 1992, *Haber, WA. 11076* (CR, MO); ibidem, narrow ridge, 1650 m, 18 Apr 1992, *Haber, WA. 11110* (CR, MO); Monteverde area, ca 0.5 km from Reserva Monteverde, on the way downtown to Monteverde, 1580 m, 22 Sep 2002, *Wen, J. 6812* (US); On the way from Santa Elena to Santa Elena Cloud Forest Reserve. Ca 1.5 km from Santa Elena, 1550 m, 23 Sep 2002, *Wen, J.*

6846 (US); Santa Elena cloud forest reserve, 1720 m, 23 Sep 2002, *Wen, J.* 6853 (US); **San José:** Acosta, Z.P. Cerros de Carraigres, fila Bustamante, Cerro Carraigres, bosque primario en Fila El Alto, cerca de la gruta, 2100 m, 16 Apr 1994, *Morales, JF.* 2685 (CR); Tarrazu, faja costeña del Valle de Parrita, concepción de Tarrazú, bosque primario en la Fila San Isidro, camino a San Isidro, 700 m, 26 Mar 1995, *Morales, JF.* 3756 (CR, MO). **PANAMA. Chiriquí:** Cerro Colorado, top, Bocas Road, 1500 m, 17 Feb 1977, *Folsom, J.* 1806 (MO); Comarca Ngöbe-Buglé, distrito de Nole Duima. Corregimiento de Hato Chamí, La Nevera, aproximadamente 28 km al Norte del puente sobre Río San Félix, 1630 m, 23 Jan 2008, *Galdames, C.* 6040 (MO, SCZ); Near Cerro Colorado, ca. 4.2 miles from Chami [Chame] Camp, 1500 m, 16 Apr 1986, *McPherson, G.* 8965 (MO).

**2. *Prunus armeniaca* L., *Sp. Pl.* 474 (1753).** Type. *Anon. s.n.*, Herb. Linn. 640.12. (Lectotype, LINN, designated by Browicz, 1969): Illustr.: Krüssmann, *Man. Cult. Broad-leaved Trees Shrubs* 3: 23, t. 5 (1986).

Shrubs or trees up to 10 m tall, tree crown broad and rounded; bark on the branches striate longitudinally, glossy, reddish to deep brown. Most recent vegetative extensions 1.2-1.5 mm diam. at base with ca. 5 leaves per unit, generally deciduous or sometimes only partially (Mesoamerica), glabrous when mature, puberulent when expanding; lenticels 0.4-0.5 × 0.5-0.7 mm, transversally elliptic to rounded, slightly prominent and lighter than the bark, sparse; cataphylls 1-1.5 × 1.2-1.8 mm, oblong-deltoid, ciliate; transitional cataphylls present, c. 5-2.5 mm, trilobite, margins dentate-glandular, ventrally tomentose. *Leaves* with blades 4.5-7(-10) × 4-6(-8) cm, 0.9-1.3 times longer than wide, broadly ovate to suborbiculate, membranous to subcoriaceous, leaf size gradually diminishing along the extension unit being the basal-most less than ¼ de dimensions than

the apical one; upper surface opaque to slightly lustrous, glabrous or muriculate, lower surface opaque and flat, with sparse trichomes on the midrib but young leaves sparsely puberulent uniformly; secondary vein framework semicraspedodromous, midrib 0.3-0.5 mm wide, above impressed or flat, slightly prominent below; secondary veins 4-6, departing at 30-45 degrees from the midrib, gradually ascending towards the margin, forming shallow pouches surrounded by hairs at the intersection with the midrib, applanate above and below; tertiary veins percurrent sinuous, flat at both sides, quaternary veins reticulate, areolation well developed with open branched endings; base truncate to subcordate, equilateral or slightly asymmetrical, margin unevenly serrate with rounded teeth, apex shortly acuminate; leaf glands 2(-4), 0.6-1 mm wide, cyathiform, slightly prominent, basally marginal or petiolar, paired or not; stipules ca.  $5 \times 2$  mm, ca. 1.2 mm at the insertion, early deciduous, free, lacinate up to 4-lobate, margin dentate-glandular; petiole  $15-25 \times 0.5-1.2$  mm, slightly sulcate adaxially, sometimes reddish, puberulent. *Floriferous shoots* generally with a single flower (sometimes 2), emerging basally from lateral short shoots; basal cataphylls c. 3 mm long, ovate, cucullate; bracts ca.  $1 \times 1.5$  mm, broadly ovate, persistent, puberulent ventrally. *Flowers* with pedicel  $0-2 \times 1.5-2$  mm, puberulent; hypanthium  $3-5 \times 2.5-3$  mm, tubular-campanulate, puberulent outside, light red to purple; sepals  $3-5 \times 3-4$  mm, ovate-oblong, apex obtuse to rounded, reflexed in open flowers, slightly puberulent outside, glabrous inside; petals  $10-15 \times 10-15$  mm, ca. 1 mm wide at the basal claw, obdeltoid to spatulate, white or pink, with margin undulate, apex rounded, glabrous; stamens 30-35(-40), arranged in 3 or more unequally long series; filaments 6-8 mm, white, sparsely puberulent towards the base; anthers  $1-2.5 \times 1-1.5$  mm, elliptic or suborbicular, pistil 10-20 mm, villous on the ovary, ovary  $2.5-3.5 \times 1.5-2$  mm,

style 10-15 × 0.4-0.5 mm, stigma 0.6-0.7 mm wide, subpeltate. *Drupes* 40-60 mm, ovoid to subglobose and laterally compressed, yellow to reddish, ventral suture conspicuously depressed; fruiting pedicel up to 2 × 3 mm, without hypanthium remnants, pericarp smooth, velutinous; mesocarp fleshy up to 25 mm wide, yellow to orange; pyrene ca. 25 × 17 × 11 mm, laterally compressed, endocarp 2-3 mm thick, smooth with 3 sharp ridges along the ventral side.

**Habitat and distribution:** Cultivated. Chiapas, Mex. (*Laughlin* 387, US). 1500-2500 m. Probably native to central Asia, widely cultivated in temperate and Mediterranean climate-type regions.

**Comments:** *Prunus armeniaca* has been reported as occasionally cultivated in Guatemala (Standley & Steyermark, 1946). This is a deciduous species clearly dissimilar from other cultivated *Prunus* in Mesoamerica by the suborbicular leaves with relatively long petioles, the semicraspedodromous vein framework with secondary veins sharply ascendant towards the margin, the stipules deeply laciniate, the flowers with noticeably short pedicel and the laterally very compressed pyrene with smooth surface.

**Local names:** Albaricoque.

**3. *Prunus axitliana*** Standl., *J. Wash. Acad. Sci.* 13: 438 (1923). Type. EL Salvador. La Libertad: collected on hills near Santa Tecla, 1100 m, Mar 1923, *Calderón, S 1519* (holotype, US; isotypes, GH, NY)

Shrubs or trees 5-25 m tall; shoot bark superficially fissured to furfuraceous, with transverse

cracks present, greyish. Most recent vegetative units of extension 1.5-2 mm diam. at base, with 7-8 leaves per unit, glabrous, reddish when young; lenticels 0.2-0.3 mm, rounded, slightly prominent, moderately dense; cataphylls 1.5-1.8 × 1.8-2.1 mm, ovate, glabrous. *Leaves* with blades (5.5-)7.5-9(-10.5) cm, 1.9-2.6 times longer than wide, elliptic-ovate to elliptic, equilateral, subcoriaceous, drying usually light green; upper surface smooth, lustrous, lower smooth, opaque, glabrous; young leaves reddish; secondary vein framework festooned brochidodromous, midrib 0.5-0.6 mm wide, impressed above, slightly prominent below; secondary veins 9-10, departing at 45-50 degrees from the midrib, straight proximally and anastomosing towards the margin, impressed or appressed above; intercostal tertiary veins transversally ramified, percurrent towards the margin, inconspicuous above, flat below, quaternary venation irregular reticulate with some open endings; leaf base acute to obtuse, margin entire with collenchymatous edge 0.2-0.3 mm wide, apex shortly acuminate; leaf glands 2, 0.8-1.2(-1.5 mm) wide, rounded to elliptic, flat with the edge slightly prominent, sub-basal and attached to the midrib on the first pair of secondary veins to between the first and the second pair and up to 10 mm from the base; stipules 1.7-2 × 0.4-0.5 mm, 0.6-0.7 mm at the insertion, linguiform, early deciduous, coriaceous, glabrous, margin erose, apex rounded and membranous; petiole 8-11 × 0.8-1.1 mm, canaliculated, generally reddish, glabrous. *Floriferous shoots* with a single axis, subflexuous, emerging on most recent units of extension, 25-35 × 0.3-0.5 mm, with 15-18 flowers unevenly distributed; axis smooth or slightly striate, glabrous; peduncle 5-6 × 0.8-1 mm, basal cataphylls 0.7-0.8 × 0.5-0.6 mm, rhomboid, trilobate, early deciduous, glabrous. *Flowers* with pedicel 5-6 × 0.4-0.5 mm, glabrous; hypanthium ca. 2 × 3 mm, campanulate, inside glabrous; sepals 0.4-0.5 × 0.6-0.8 mm, broadly deltoid, apex rounded; petals 2-2.2 × 2-2.5 mm, 0.8-1 mm wide at the basal claw, obdeltoid to orbicular, white, margin erose, apex sinuate; stamens c. 20, arranged in 2



series, both series around the same length, filaments 2.2-2.5 mm, glabrous, anthers 0.6-0.7 × ca. 0.5 mm, elliptic; pistil 4-5 mm, glabrous, ovary 1-1.3 × ca. 1 mm, style 3-3.5 × 0.3-0.4 mm, stigma 0.7-1 mm wide, infundibuliform. *Drupes* 13-16 × 13-15 × 12-13 mm, globose, ventral suture slightly raised, dark purple when mature; fruiting pedicel 6-7 × 1.5-2 mm, with both base and apex expanded; pericarp smooth, glabrous; mesocarp barely fleshy; endocarp ca. 0.6 mm thick.

**Habitat and distribution:** Wet forests and border of forests. Chiapas, Mex.; Guatemala; El Salvador. 380-1600 m. (Endemic).

**Comments:** *Prunus axitliana* is close to *P. lundelliana* but differs by the 2 (vs. 4) more conspicuous sub-basal glands next to the midrib, the vein framework festooned brochidodromous, the bigger linguiform stipules, the shorter floriferous shoots, and the fruits globose and bigger in size.

**Local names:** Cangrejillo, Pullulo negro, sapuyulo (El Salvador).

**Specimens examined:** EL SALVADOR. **Ahuachapán:** Parque Nacional El Imposible. Finca San Benito. San Francisco Menendez, 1060 m, 31 Oct 1978, *Chinchilla, JM 9* (MHES, NY); Concepción de Ataco, Cantón El Arco, Finca La Esperanza, 1074 m, 8 Dec 2009, *Galán, P 621* (LAGU); San Francisco Menéndez, El Corozo, Mariposario, zona alta. "Los Sánches", 380 m, 22 Feb 2000, *Rosales, JM 247* (B, LAGU, MEXU, MO); municipio San Fco. Menéndez, Hda. San Benito. Al Sur de Managuita, 700 m, 8 Feb 1992, *Sandoval, E 246* (B, LAGU, MO); Al Centro de la Quebrada Seca, 900 m, 28 Apr 1998, *Sandoval, E 1855* (F, MO); San Benito, en el Guatalón, 1050 m, 2 Feb 1995, *Sandoval, M 824* (MO); **Chalatenango:** Mpio. San Ignacio. Quebrada boscosa ca. 1.9 km al E de El Rosario, después de la Peña de Cayaguanca, 1300 m, 1 May 2002, *Linares, JL 5999* (MEXU); **La Libertad:** Jardín Botánico La Laguna, 800 m, 19 Oct

1984, *Pank s.n.* (LAGU); Santa Tecla, 790 m, 10 Apr 1922, *Standley, PC 23011* (GH,US); Slopes volcan San Salvador, 1230 m, 22 Jan 1949, *Williams, LO 15239* (UC); **La Paz:** El Refugio, San Benito, 620 m, 15 Feb 1998, *Gonzalez, JC 518* (MO); **La Unión:** Conchagua, Loma de Cuadras, 787 m, 2 Dec 2006, *Menjivar, J 795* (MHES); **San Vicente:** Volcán San Vicente, 1200 m, 7 Mar 1922, *Standley, PC 21515* (GH,US); **Santa Ana:** San José Ingenio, P.N. Montecristo, la quebrada de Tomás, 1200 m, 28 Sep 2001, *Martínez, VM CMC00421* (DAV,MO); Dept. Santa Ana. San José Ingenio, P.N. Montecristo, la cueva de la golondrina, 700 m, 7 Sep 2001, *Martínez, VM 339* (B, BM, LAGU, MEXU, MO); San José Ingenio, P.N. Montecristo, la cueva del león, 1100 m, 29 Nov 2001, *Martínez, VM 390* (MO); San José Ingenio, P.N. Montecristo, el infiernillo, 1600 m, 23 Feb 2002, *Martínez, VM 747* (MO); **Usulután:** Laguna Alegria, Volcan Alegria, 1360 m, 22 Jun 1999, *Monro, A 3013* (MO). **GUATEMALA. Sacatepéquez:** Alotenango. El Astillero, 1.5 km carretera de Alotenango a Escuintla, 1350 m, 19 Nov 1994, *Castillo Mont, JJ 2519* (F, GH, MO, NY, US); 2.3 miles SW of Alotenango on road from Antigua to Escuintla, slopes of Volcán del Fuego, 1300 m, 26 Jul 1977, *Croat, T 41937* (MO). **MEXICO. Chiapas:** Mapastepec, Santa Rita, 600 m, Jan 1938, *Matuda, E 2016* (DS, F, GH, MEXU, NY, UC, US); Tonalá, Ejido Las Palmas, 620 m, 29 Apr 2002, *Reyes-García, A 4614-b* (MEXU, MO).

**4. *Prunus chiapensis*** Standl. et L.O. Williams ex Ant. Molina, *Ceiba* 14: 1 (1968). Type. MEXICO. Chiapas: in woods, Fraylesca, near Siltepec, 1600 m, 6 Mar 1945, *Matuda, E. 5194* (holotype, EAP; isotypes, LL, MO).

*Syn: Prunus siltepecana* Lundell. *Wrightia* 4: 87 (1968) (nom. illeg.). Type: Mexico: Chiapas, in woods, Fraylesca, near Siltepec, *Matuda, E. 5194* (holotype, LL)

Tree 10-12 m, shoot bark superficially fissured longwise. Most recent vegetative units of extension 2-3 mm wide at base, containing 5 leaves per unit, hispidulous; lenticels 0.5-0.7 × 0.3-

0.5 mm, narrowly oblong, very prominent, scarce; cataphylls ca.  $1.5 \times 1.4$  mm, deltoid, puberulent dorsally, tomentose ventrally. *Leaves*  $10-16 \times 4.5-8$  cm, 2-2.7 times longer than wide, elliptic-oblong to oblong, equilateral, chartaceous; upper leaf side appanate, faintly lustrous, glabrous, lower side rugulose, opaque, villous mainly on the veins and more evenly in young leaves, trichomes obscure basally; secondary vein framework semicraspedodromous, midrib 1.3-2 mm wide, impressed above, very prominent below; secondary veins (10-) 13-15, departing at 60-70 degrees from the midrib, proximally straight and anastomosing towards the edge, impressed above, prominent below, basal axils with the midrib invaginated to form domatia; intercostal tertiary veins alternate percurrent and sinuous exmedially, admedially with frequent free branched epimedial perpendicular to the midrib, inconspicuous above, slightly prominent below; quaternary and lower rank veins inconspicuous ; leaf base obtuse to rounded, margin serrate with collenchymatous edge 0.1-0.2 mm wide, apex shortly acuminate; leaf glands 2, 0.8-1.3 mm wide, clavate, placed marginally on the petiole but not paired, 2-3 mm from leaf base; stipules ca.  $2.5 \times 1$  mm, narrowly deltoid, early deciduous, free, puberulent dorsally, tomentose ventrally; petiole  $15-25 \times 1.3-1.8$  mm, puberulent. *Floriferous shoots* with a single axis, flexuous, striate, hirsute, emerging from most recent units of extension,  $7-11 \times 1.5-2.3$  mm, with 28-40 flowers irregularly spaced and separated 2-5 mm between groups of flowers, peduncle  $6-10 \times 1.5-2.3$  mm. *Flowers* with pedicels 0.6-0.8 mm long, hirsute, flanked by a bract scar 1-1.3 mm wide; hypanthium  $2.2-3.5 \times 2.2 - 2.8$  mm, turbinate , externally puberulous; sepals  $1.1-1.7 \times 1.1-1.4$  mm, deltoid-ovate, apex obtuse or rounded, slightly puberulent basally and cartilaginous distally; petals  $2.2-2.8 \times 2.5-3$  mm, 0.8 mm wide at the claw, obdeltoid, white, with three main veins distally branched, margin erose, apex rounded; stamens ca. 20, in two series with the outer longer than the inner one, filaments 2.5-4.8 mm long, anthers  $0.9-1 \times 0.4-0.5$  mm, oblong

elliptic; pistil 6-7 mm long. *Drupes* 9-12 × 7-10 × 7-9 mm, ovoid, acuminate, the ventral suture appanate; pedicels 5-8 × 0.8 mm; pericarp smooth, pannose; mesocarp thin, barely flesh.

**Habitat and distribution:** Mesophyll humid or sub-humid forests and river shores. Chiapas, Mex.; Guatemala; El Salvador. 1400-2000 m. (Endemic).

**Comments:** *P. chiapensis* may be recognized by the dentate leaves, pubescent below mainly on the veins and the petiole, with secondary vein pattern semicraspedodromous and the 2 petiolar clavate glands placed close to the base of the lamina.

**Local names:** pitarrillo (El Salvador), Carreto (Guatemala).

**Specimens Examined:** EL SALVADOR. **Santa Ana:** bosque nebuloso de Montecristo, 2000 m, 23 Jun 1977, *Martinez, R 1063* (MHES). GUATEMALA. **Huehuetenango:** Rio Blanco bridge, near to, 2000 m, 17 Sep 1971, *Molina R., A 26573* (F, US); in deep cayon of tributary of Rio Blanco 5 km west above Aguacatán, 2000 m, 11 Jan 1974, *Molina R., A 30226* (US); along Rio Azul, below Jacaltenango, 1400 m, 4 Sep 1942, *Steyermark, JA 51860* (GH).

**5. *Prunus compacta*** L.O. Williams, *Brittonia* 18: 266 (1966). Type. Guatemala. Huehuetenango: San Juan Ixcoy, Sierra de los Cuchumatanes, along road to Huehuetenango, 7 miles south of San Juan Ixcoy, 3000 m, 4 Feb 1965, *Breedlove, DE. 8500* (holotype, F; isotypes, CAS, MICH, NY, US (2))

Trees 8-10 m tall; shoot bark superficially fissured, greyish. Most recent units of extension 3-3.5 mm diam. at base, with 7-9 leaves per unit, glabrous; lenticels 0.5-0.7 × 0.5-0.8 mm, elliptic or rounded, slightly prominent, moderately dense, light yellow; cataphylls 3.5-5 × 3-4 mm,

deltoid, glabrous. *Leaves* with blades 13-18 × 6-7.5 cm, 2-2.5 times longer than wide, oblong-ovate, elliptic-oblong to obovate, equilateral, subcoriaceous to chartaceous; with upper side flat, slightly lustrous, lower side flat, opaque, glabrous; secondary vein framework festooned brochidodromous, midrib 1-1.3 mm wide, impressed above, prominent below, tinted dark purple; secondary veins 10-12, departing at 55-70 degrees from midrib, straight proximally, anastomosing towards the margin, impressed above, applanate below; intercostal tertiary venation alternate percurrent, the intersecondary basiflexed, impressed above, flat below, quaternary venation irregular reticulate; leaf base obtuse to rounded, margin entire with collenchymatous edge 0.1-0.2 mm wide, apex shortly acuminate; leaf glands 2, 1.5-2 mm long, narrowly elliptic, flat, basal and attached to the midrib; stipules 9-12 × 2.5-4.5 mm, 4-4.5 mm at the insertion, linguiform, free, early deciduous, glabrous, with margin cartilaginous; petiole 10-17 × 1.5-2 mm, barely canaliculated above, attached to the stem by a lateral protuberance up to 3 mm raised. *Floriferous shoots* with one axis, rigid, emerging on most recent units of extension, 40-45 × 2.3-2.7 mm, with 25-30 flowers, evenly and densely arranged on the axis, glabrous; peduncle 5-6 × 2.5 mm; basal cataphylls 4.5-5 × 4-4.5 mm, deltoid, floral bracts deltoid, early deciduous. *Flowers* with pedicel 1-3 × 1.5-2 mm, glabrous; hypanthium 2.5-3 × 2.5-3.5 mm, infundibuliform, glabrous inside; sepals 1-1.3 × 1-1.5 mm, deltoid, apex obtuse; petals 1.8-2.2 × 1.5-2 mm, 0.6-0.7 mm wide at the claw, obdeltoid, white, margin erose, apex obtuse; stamens 20-25, in two series, the outer longer than the inner one, filaments 3-4 mm long, glabrous, anthers 0.8-1 × 0.5-0.7 mm, elliptic-oblong; pistil 5.5-6 mm, glabrous, ovary 2-2.5 × ca. 2 mm, style 2.3-3 × 0.2-0.3 mm, stigma 1-1.2 mm wide, peltate. *Drupes* 18-22 × 14-16 × 11-14 mm, ovoid to pyriform, ellipsoid across, ventral suture applanate; fruiting pedicel 3-5 × 1.5-2 mm; pericarp smooth, glabrous; mesocarp barely fleshy.

**Habitat and distribution:** Mesophyll forests with *Pinus*, *Abies* and *Quercus*. G (*Breedlove* 11476, LL). 2500-3100 m. (Endemic).

**Comments:** *Prunus compacta* may be recognized by the large leaves, subcoriaceous or chartaceous, the leaf glands basal and narrow, big linguiform stipules around 1 cm long, the floriferous shoots axis relatively short and thick with flowers arranged densely and the ovoid to pyriform fruits bigger than other species in the region.

**Specimens Examined**—GUATEMALA. Huehuetenango: San Juan Ixcoy, Sierra de los Cuchumatanes, along road to Huehuetenango, 5 miles south of San Juan Ixcoy, 2800 m, 5 Aug 1965, *Breedlove*, DE 11476 (CI, DS, F,TEX); Ixcan, Sierra de los Cuchmatanes, trail between Tunimá and Quisil, 2500 m, 8 Jul 1942, *Steyermark*, JA 48424 (F,US).

**6. *Prunus cortapico*** Kerber ex Koehne, *Bot. Jahrb. Syst.* 52: 307 (1915). Type: Mexico, Colima, *Kerber 19* (not found).

*Syn:* *Prunus skutchii* I.M. Johnst. *J. Arnold Arbor.* 19:117. (1938). Type: Guatemala: Suchitepequez, Finca Moca, *Skutch, A.F. 2077* (holotype, A; isotypes, MO, NY, US).

Trees 12-30(-40) m tall; shoot bark externally fissured, greyish, or sometimes reddish. Most recent units of extension 2.5-3.5 mm diam. at base, with 6-8 leaves per unit, barely to moderately tomentulose with simple trichomes 0.2-0.3 mm long, hyaline, appressed, spread, generally present in young shoots and almost absent on mature shoots; lenticels 1-2 × 0.4-0.7 mm, elliptic to oblong, slightly protuberant, scattered; cataphylls ca. 3 × 3 mm, deltoid, trilobed at the apex, sericeous dorsally, glabrescent ventrally. *Leaves* (9-)11-17(-20) × (3.5-)4.7-7(-8) cm, 2-2.8(-3.2) times longer than wide, oblong-ovate to oblong-lanceolate, equilateral, subcoriaceous to

chartaceous; upper side flat, faintly lustrous, glabrous, lower side appanate; opaque, glabrous or puberulent in young leaves, trichomes when present bordering the midrib and secondary veins; secondary vein framework weak brochidodromous or appearing eucamptodromous, midrib 1-1.5 mm wide, impressed above, prominent below, secondary veins 10-11, departing at 50-80 degrees from midrib, straight initially and curved upwards towards the margin, flat above, slightly prominent below; intercostal tertiary veins alternate percurrent sinuous, perpendicular from the secondaries, intersecondary veins irregularly present, flat at both sides, quaternary and lower order venation reticulate polygonal, barely visible; base obtuse to rounded, sometimes briefly cordate, margin entire with collenchyma 0.1-0.2 mm wide, apex shortly acuminate; leaf glands 2, 1-1.5(-2.5) mm long, elliptic, flat to impressed, basal, adnate to the midrib, sometimes displaced upwards up to 5 mm from base; stipules 3-5 × 0.6-1 mm, c. 1 mm at the insertion, subulate to cuneate, early deciduous, free, sparsely tomentose or glabrescent dorsally, tomentose at the base ventrally, margin ciliolate; petiole 12-20(-25) × 1-2 mm, deeply canaliculated above, glabrous or puberulent in young shoots. *Floriferous shoots* with a single axis, subflexuose, emerging on older units of extension, 50-90 × 0.7-1.2 mm, with 18-26(-30) flowers, unevenly separated on the axis, 3-4(-8) mm apart; axis striate, glabrous or sparsely tomentose; peduncle 2-4 × 1-1.5 mm; cataphylls c 2 × 2 mm, apically trilobate, dorsally tomentose, ventrally only on the middle lobe; bracts c 2.5-0.7 mm, narrowly oblong, early deciduous, dorsally tomentose, ventrally glabrous. *Flowers* with pedicel (2-)4-6(-12) × 0.3-0.6 mm, glabrous or tomentose; hypanthium (3-)4-5 × 3-5(-6) mm, campanulate, internally villous, trichomes concentrated at the base of sepals and bottom of hypanthium; sepals 5 (sometimes up to 7), 1-1.5 × ca. 1 mm, cuneate, apex rounded, slightly puberulous; petals sometimes up to 7, 2.5-3 × 1.7-2.5(-3) mm, 0.6-0.8 mm wide at the claw, obdeltoid, white, margin erose, apex rounded, glabrous dorsally, densely villous ventrally

at the base; stamens 30-35, arranged in two series, the outer longer than the inner one, filaments (2-)3-5 mm long, glabrous, anthers 1.2-2 × 0.3-0.5 mm, oblong-elliptic; pistil 3.5-5 mm, ovary 1.5-2 × 1-1.5 mm, glabrescent, style 2-3 × 0.2-0.4 mm, stigma 0.6-0.8 mm wide, subpeltate. *Drupes* 16-20 × 12-15 × 12-15 mm, longitudinally ellipsoid, ventral suture impressed, yellow and turning dark red when fully mature; fruiting pedicel 13-17 × 1.2-1.6 mm, distally expanded and forming a rim originated from the base of the hypanthium; pericarp smooth, glabrous with some scattered trichomes around the base; endocarp 1 mm wide, smooth.

**Habitat and distribution:** humid and subhumid montane mesophyll forests, rocky slopes, riparian vegetation, and coffee plantations. Chiapas, Mex.; Guatemala; El Salvador. 700-2500 m. (México (Colima, Jalisco, México, Michoacán, Nayarit, Oaxaca, Sinaloa, Veracruz), Mesoamerica.)

**Comments:** *Prunus cortapico* is a species broadly distributed from El Salvador to Northwest México in the state of Sinaloa. It can be recognized by the overall immense size of the adult individuals, the twigs, leaves, and young floriferous shoots puberulent (which can turn glabrous when mature), the secondary veins prominent below and flexed towards the margin, the leaf glands adnate to the midrib and fully basal or sub-basal and the anthers up to 2 mm long.

**Local names:** Sapuyulo (El Salvador).

**Specimens Examined**—**EL SALVADOR.** **Ahuachapán:** Sierra de Apaneca, region of Finca Colima, 900 m, 17 Jan 1922, *Standley, PC 20058* (US). **GUATEMALA.** **Sololá:** Volcán San Pedro, North facing slopes towards Lago de Atitlán, above villa de San Pedro, 2500 m, 7 Jun 1942, *Steyermark, JA 47220* (US); **Suchitepequez:** Finca Moca, 1150 m, 8 Jan 1935, *Skutch, AF 2077* (A, MO, NY,US). **MEXICO.**



**Chiapas:** Angel Albino Corzo, along slopes of Río Cuxtepec below Finca Cuxtepec, 1080 m, 13 Dec 1980, *Breedlove, DE 48619* (CAS, MEXU, TEX); above Finca Cuxtepec, 1380 m, 14 Dec 1980, *Breedlove, DE 48657* (CAS, DAV, GH, MEXU, MO); Jiquipilas, A 7.83 Km al NO de Tiltepec, 1025 m, 25 Apr 2002, *Calónico Soto, J 23010* (MO, XAL); Bella Vista, El Nuevo Pacayal, 1040 m, 17 Nov 1977, *Calzada, JI 3917* (XAL); Pijijiapan, Ejido El Rosario, 26 km al N del puente Margaritas que esta sobre la carretr. Pijijiapan. Zona de amortiguamiento, 750 m, 20 Apr 2006, *Martínez Meléndez, N 1488* (MO); Escuintla, Mt. Ovando, 1300 m, 14 Nov 1945, *Matuda, E 16246* (MEXU, MO, US); La Trinitaria, Col. Cuauhtemoc, al lado N sobre carretera de terraceria km. 17, 1450 m, 10 Jun 1984, *Méndez, A 7654* (MEXU, MO, XAL); Oxchuc, Cascada Río Mesbiljaz, 1660 m, 15 Jun 1984, *Méndez, A 7675* (MEXU, MO, XAL); La Trinitaria, Col. Cuauhtemoc, 1400 m, 25 Jun 1984, *Méndez, A 7740* (F, MEXU); Oxchuc, Cascada de Coralito en la carr. San Cristóbal a Ocosinco, 2100 m, 20 Mar 1986, *Méndez, A 8908* (MEXU, MO); Cacahoatán, Alpujarra, 750 m, 5 Oct 1984, *Ventura V., E 417* (MEXU, XAL).

**7. *Prunus domestica* L., *Sp. Pl.* 475 (1753).** Lectotype: not designated yet. Illustr.: Wu et al., *Fl. China Ill.* 9: 164, t. 3 (2004).

*Prunus communis* Huds., *Fl. Angl.* ed. 2: 212 (1778).

Small tree up to 10 m tall, sometimes shrubs; shoot bark smooth, semi-lustrous, grayish. Most recent units of extension 3-4 mm diam. at the base, angled, sometimes sharp at the end, with 7-8 leaves per unit, glabrous or pubescent when young, frequently reddish; lenticels 0.1-0.3 mm wide, rounded, appanate, moderately dense; cataphylls 4-5 × 1-1.5 mm long, deltoid or narrowly deltoid, glabrous. Leaves (2-)4-8(-10) × (1.3-)1.7-3.5(-4) cm, 1.5-2.1 times longer than wide, elliptic, ovate-lanceolate or obovate, equilateral, membranous to chartaceous; upper side opaque, flat to slightly bulliform (specially leaves from immature plants), glabrous (sometimes

furfuraceous), lower surface opaque, flat, sparsely puberulent, mainly on the midrib and lower part of secondary veins; young leaves elliptic-obovate, generally with more dense indument; secondary vein framework brochidodromous, sometimes eucamptodromous, midrib ca. 0.3 mm wide, impressed above, prominent below; secondary veins 5-7, departing at 30-45 degrees from the midrib, straight initially and curving up towards the margin, unevenly arranged, appanate above, impressed below, with proximal axils invaginate, mostly those at the lower half of the lamina, sometimes with tufts and forming domatia; tertiary venation percurrent sinuous, flat above, slightly prominent below, quaternary and lower order veins irregular polygonal reticulate; base cuneate to decurrent, margin dentate or crenate, without evident cartilaginous collenchyma, apex acute to shortly acuminate or sometimes obtuse; leaf glands 2-4, ca. 0.5 mm wide, cyathiform, protruding and forming the first 1-3 marginal teeth pairs; stipules 4-5 × 0.5-0.7 mm, 0.3-0.5 mm at the insertion, early deciduous, free, subulate, puberulent, margin glandular dentate, membranous; petiole 10-25 × 0.4-0.5 mm, shallowly canaliculated above, laterally compressed, glabrous or slightly puberulent. Floriferous shoots compressed appearing fascicles with up to 3 flowers or reduced to a single flower, emerging solitary or in pairs from the base of short lateral shoots, axis rigid; cataphylls 1-1.3 × 1-1.5 mm, deltoid; bracts 1-1.3 × 1-1.5 mm, broadly ovate, apically trilobite, cucullate, persistent during flower development, glabrous. *Flowers* with pedicel 8-15 × 0.4-0.8 mm, dispersedly puberulent, angled; hypanthium 2-3 × 4-5 mm, campanulate, glabrous or puberulent outside, villose inside; sepals 2-4 × ca. 1.5 mm, oblong-lanceolate, denticulate, reflexed in mature flowers, apex obtuse, glabrous or puberulent outside, puberulent inside; petals 8-13(-15) × 5-10 mm, 0.7-1 mm wide at the claw, obovate to orbicular, white or white greenish, margin erose, apex rounded to obtuse or slightly emarginated, glabrous; stamens 25-40, in 2 series, the outer longer than the inner one, filaments 5-10 mm,

puberulent at the base, anthers 0.5-0.7 × 0.4-0.5 mm, elliptic; pistil 8-10 mm, glabrous, ovary 1-1.5 × 0.8-1.2 mm, style 6-8 × 0.2-0.3 mm, stigma ca. 0.5 mm wide, peltate or subpeltate, puberulent. Drupes (20-)40-50(-60) × 20-50 mm, globose or transversally ellipsoid, ventral suture conspicuously depressed, hypanthium deciduous, dark blue, dark purple, reddish, yellow or green; pericarp smooth, glabrous; mesocarp fleshy usually more than 15 mm wide; endocarp slightly reticulate.

**Habitat and distribution:** cultivated in open areas. Chiapas, Mex. (*Laughlin 578*, US); Guatemala (Standley, 1946: 466); Costa Rica (*Morales 19477*, INB). 1500-3000 m. Probably native to Eastern Mediterranean, widely cultivated around the world mainly in temperate zones.

**Comments:** *P. domestica* is a deciduous cultivated species distinguished by the obovate leaves, crenate to dentate, puberulent below, clustered at the end of shoots and with relatively slender flexuous petiole; flowers are generally more than 3 cm wide, greenish, sepals puberulent inside; the fruits have diverse size, the mesocarp wide and fleshy, the pericarp glabrous and the pyrene is smooth or slightly reticulate outside.

**Local names:** ciruela.

**8. *Prunus fortunensis*** McPherson, *Ann. Missouri Bot. Gard.* 75: 373 (1988). Type. Panama. Bocas del Toro: Fortuna Dam region, near trail along continental divide. Forested slopes, *McPherson, G. 8404* (holotype, PMA; isotypes, CAS, INB, K, MEXU, MICH, MO, NY, TEX, US). Illustr.: McPherson, *Ann. Missouri Bot. Gard.* 75: 374, t. 1 (1988).

Tree 5-14 m; shoot bark fissured and grayish. Most recent extension units 1-1.5 mm diam. at base, with 4-6 leaves per unit, glabrous; lenticels 0.5-0.7 × 2-3 mm, elliptic, protuberant, moderately dense; cataphylls 1.5-2 × 1-1.2 mm, broadly deltoid, puberulent inside next to the margin. *Leaves* with blades 3.5-6(-7.5) × 1.4-2.5(-3) cm, 2.2-2.8 times longer than wide, elliptic to elliptic-obovate, equilateral, chartaceous, secondary vein framework festooned; upper side gently bulliform, slightly lustrous, glabrous, lower side flat to rugulose, opaque, glabrous; midrib 0.3-0.4 mm wide, impressed above, prominent below; secondary veins 6-7, departing at 60-70 degrees from the midrib, gradually ascending, unevenly spaced, impressed above, appanate below; intercostal tertiary venation irregular reticulate, impressed above, flat below, quaternary venation inconspicuous; leaf base obtuse and abruptly decurrent up to ½ petiole length, margin entire and slightly sinuate towards the apex, marginal collenchyma 0.1 mm wide, apex shortly acuminate; leaf glands (1)2, in some individual leaves absent, 0.5-1 mm wide, rounded to elliptic, impressed, next to the margin (on the outer 1/3 portion from the midrib) on the first pair of secondary veins or between the first and second pair and at 5-8 mm from the base; stipules 1.2-1.8 × 0.5-0.7 mm, ca. 1 mm at the insertion, deltoid, early deciduous, almost fully fused along the ventral side, dorsally glabrous, margin erose, apex acute; petiole 5-8 × 0.8-1 mm, shallowly canaliculated above, glabrous. *Floriferous shoots* with a single axis, subflexuous, emerging from most recent units of extension, 35-48 × 0.5-0.7 mm, with 11-13 flowers unevenly arranged on the axis, distanced 1-2 mm apart; axis shallowly striate, glabrous; peduncle 4-6 × 0.8-1 mm, cataphylls 0.8-1.1 × 1.5-2 mm, deltoid; bracts 2.5-2.8 × 0.5-0.7 mm, narrowly deltoid to subulate, early deciduous, glabrous. *Flowers* with pedicel 2.5-4.5 × 0.4-0.5 mm, glabrous; hypanthium c. 1.5 × 2-2.5 mm, campanulate, glabrous inside; sepals 0.8-1 × 0.8-1 mm, deltoid with rounded apex; petals 1.5-2 × 1.5-1.7 mm, 0.3-0.4 mm wide at the claw, deltoid to obdeltoid,

white, margin erose, apex rounded; stamens 10-16, arranged on a single series, filaments 1.2-1.8 mm, glabrous, anthers 0.5-0.8 × 0.4-0.5 mm, elliptic; pistil 2.5 mm long, glabrous, ovary ca. 1 mm wide, style ca. 1.5 × 0.5 mm, stigma 0.6-0.7 mm wide, peltate. *Drupes* 10-12 × 10-11 × 8-9 mm, subglobose, ventral suture applanate, purple; fruiting pedicel 5-6 × 0.6-0.8 mm; pericarp smooth, glabrous; mesocarp scanty; endocarp smooth.

**Habitat and distribution:** Lower montane humid forests. Costa Rica, Panamá. 1110-2050 m. (Endemic).

**Comments:** *P. fortunensis* may be distinguished by the relatively small leaves with venation impressed in the upper side and prominent below, the leaf base decurrent down to half of the petiole, the two submarginal leaf glands, the ventrally fused stipules, the weak petiole, the petals up to 2 mm long and stamens arranged in one series.

**Specimens Examined.** COSTA RICA. **Cartago:** Paraiso, Reserva Forestal Río Macho, Cuenca del Reventazón, Río Pejibaye, 1800 m, 22 Jul 1998, *Alfaro, E. 1791* (MO); Turrialba, Valle del Reventazón, Grano de Oro, Moravia de Chirripó, 1110 m, 29 Jun 1993, *Campos, P. 112* (CR, MEXU, MO); **Puntarenas:** Coto Brus, Z.P. Las Tablas. Cuenca Terraba-Sierpe. Zona Protectora Las Tablas, Sura, 7 km NO de Progreso, 2050 m, 18 Jan 1997, *Navarro, E. 587* (MO).

**9. *Prunus guatemalensis*** I.M. Johnst., *J. Arnold Arbor.* 19: 118 (1938). Type. Guatemala. Chimaltenango: Chichavac, 2400 m, 29 Jul 1933, *Skutch, A.F. 504* (holotypus, A; isotypus, A, BM, EAP (2), F (2), MICH, P, US (2))

Tree 7-18 m; shoot bark fissured and with transverse cracks forming plates on older branches.

Most recent units of extension 2.5-4 mm diam.at the base, with 5-6 leaves per unit, pubescent, strigose to pannose; lenticels 1-1.5 × 0.2-0.4 mm, narrowly oblong, slightly prominent, scarce; cataphylls 4.5-5 × 1.5-2 mm, narrowly deltoid, dorsally puberulent. *Leaves* with blades 10-15(-19) × (3-)4-6.5(-8) cm, 2.3-2.6 times longer than wide, elliptic-ovate or elliptic, equilateral, coriaceous to subcoriaceous; leaf upper side weakly bullate, opaque to slightly lustrous, glabrous, lower side rugose, opaque, densely villous in young leaves but mainly along the sides of veins on mature leaves; secondary vein framework brochidodromous, midrib 1-1.4 mm wide, impressed above, very protuberant below, with scattered hairs; secondary veins 10-12, departing at 50-70 degrees from midrib, gradually ascending, depressed above, slightly prominent below; intercostal tertiary veins percurrent sinuous obtuse, irregularly reticulate at some parts, intersecondaries present on the distal half, impressed above, prominent below, quaternary venation irregular reticulate, slightly raised; leaf base obtuse to rounded, rarely acute, margin entire with collenchymatous edge 0.1-0.2 mm wide and slightly revolute, apex acute or shortly acuminate; leaf glands 2, 0.5-0.7 mm wide, rounded, impressed and crateriform because a prominent edge, basal; stipules 6-7.5 × 1-1.3 mm, subulate, free, persistent in expanding shoots, puberulent dorsally and pubescent ventrally, margin entire, coriaceous; petiole 8-12 × 1.5-2 mm, canaliculated above, strigillose. *Floriferous shoots* with one axis, subflexuous, emerging from old extension units, (30-)50-80 × 0.5-0.7 mm, with (12-)18-26 flowers, unevenly spaced, 4-6(-8) mm apart; axis slightly striate, scarcely puberulent; peduncle 3-5 × 0.7-1.3 mm; cataphylls 1.3-1.5 × 1.5-1.8 mm, deltoid; bracts 2.2-2.8 × 1-1.3 mm, narrowly deltoid, early deciduous, puberulent internally, margin ciliate. *Flowers* with pedicel (2-)3-4(-6) × 0.4-0.6 mm, recurved, hirsute; hypanthium 2.5-3 × 2.5-3.5 mm, broadly campanulate, lanuginose outside, basally hispid inside with trichomes longer than outside ones; sepals 1.2-1.5 × 1-1.5 mm, deltoid, apex

apiculate, glabrous or slightly puberulent; petals 2.3-2.8 × 2.2-2.6 mm, 0.4-0.8 mm wide at the claw, obdeltoid, white, margin entire, apex rounded; stamens 24-28, in two series, outer series longer than the inner one, filaments 1.5-2 mm, glabrous, anthers 0.9-1.1 × 0.4-0.5 mm, oblong-elliptic; pistil 3-3.5 mm, glabrous, ovary 1.2-1.8 × 1-1.4 mm, style 1.5-1.8 × 0.3-0.4 mm, stigma 0.7-0.8 mm wide, reniform and irregularly lobed. *Drupes* unknown.

**Habitat and distribution:** Montane mesophyll forests and riparian forests. Chiapas, Mex.; Guatemala. 2000-2700 m. (Endemic).

**Comments:** *P. guatemalensis* may be distinguished from the similar species *P. cortapico* and *P. occidentalis* by the leaves elliptic with upper side bulliform and glabrous, the lower side rugose and villose on the veins, the smaller leaf glands basal and crateriform, the shorter floriferous shoots, puberulent when mature and the flowers with recurved pedicel and anthers around 1 mm long.

**Local names:** Hormiguillo negro (Chiapas).

**Specimens examined:** MEXICO. Chiapas: Motozintla, Steep canyon, SW side of Cerro Mozotal, 11 km NW of the junction of the road to Motozintla along the road to El Porvenir and Siltepec, 2100 m, 27 Jun 1972, *Breedlove, DE. 25903* (DS, MO); Siltepec, Ventana, 2100 m, 30 Jul 1941, *Matuda, E. 4546* (F, GH,MEXU,NY,TEX,US); La Grandeza, 2016 m, 19 May 1945, *Matuda, E. 5545* (DS,F(2),MEXU,NY,TEX).

**10. *Prunus lundelliana*** Standl., *Publ. Field Mus. Nat. Hist., Bot. Ser.* 22: 77 (1940). Type. Mexico. Chiapas: Siltepec, Hacienda, 1700 m, Jan 1938, *Matuda, E. 1906* (holotype, F; isotypes,

A, DS, EAP, MEXU, MICH, NY (2), US (2)).

Tree up to 14 m; shoot bark fissured longitudinally bumped around the lenticels. Most recent units of extension 1.2-1.8 diam. at base, with 6-8 leaves per unit, glabrous; lenticels 0.5-0.6 × 0.3-0.5 mm, elliptic, appanate, dense; cataphylls 1.8-2.4 × 1.8-2.4 mm, deltoid, trilobate, dorsally glabrous, ventrally hispid on the mid apex. *Leaves* with blades (7-)8.3-12(-16) × (2.5-)4.5-7(-8) cm, 2.3-3.1 times longer than wide, elliptic-ovate to lanceolate-oblong, subcoriaceous; upper surface flat, moderately lustrous, lower surface opaque, glabrous; secondary vein framework brochidodromous, midrib 0.6-0.9 mm wide, flat to impressed above, slightly prominent below, secondary veins 9-10, departing at 45-60 degrees from the midrib, relatively straight and becoming almost vertical when joining the subjacent pair, the first pair decurrent onto the midrib up to the leaf base, flat above, slightly prominent below; intercostal tertiary venation alternate percurrent, exmedially sinuous, admedially reticulate, 1 or 2 basiflexed epimedial veins underneath the intersecondaries, inconspicuous above, slightly prominent below, quaternary venation irregularly reticulate, sometimes slightly prominent below; leaf base acute to obtuse and progressively decurrent, margin entire with collenchymatous edge 0.1-0.2 mm wide, apex shortly to long acuminate with the midrib excurrent; leaf glands 4, less frequent 2 or 3, 0.6-0.8 mm wide, rounded to elliptic, slightly depressed, the lower pair on the first secondary veins or lower (absent or just one when leaves have 2 or 3 glands), the upper pair placed on the second pair of secondary veins halfway from margin to midrib and up to 20 mm from the base, sometimes smaller supplementary glands are present on the end of subsequent secondary veins; stipules 1.3-1.6(-2.5) × 0.5-0.6 mm, 0.5-0.6 mm at the insertion, subulate, early deciduous, ventrally connate along the 1/3 basal, glabrous, margin entire, apex cartilaginous; petiole (5-)8-



13(-15) × 1-1.5 mm, canaliculated above, glabrous. *Floriferous shoots* with one axis, subflexuous, placed on either more recent or old units of extension, 3-50 × 0.6-0.8 mm, with 22-26 flowers, unevenly placed on the axis, 3-4.5 mm apart, axis slightly striate, glabrous; peduncle 1-3 × 0.8-1.5 mm; cataphylls 1.2-1.3 mm, ovate, trilobate apically, glabrous; bracts 1-1.2 × 0.5-0.6 mm, narrowly deltoid, early deciduous, ventrally tomentose on the midrib with adpressed trichomes that emerge at the tip like apical cilia. *Flowers* with pedicel 5-7(-9) × 0.3-0.6 mm, flexuous, glabrous; hypanthium 2-2.8 × 2.8-3.5 mm, broadly campanulate, glabrous inside; sepals ca. 1 × 1 mm, deltoid to deltoid-ovate with apex obtuse; petals 2-2.5 × 2-2.5 mm, obdeltoid, white, margin entire, apex rounded; stamens 20-24, in 2 series, the outer as long as the inner one, filaments 2.3-3 mm, anthers 0.6-0.8 × 0.4-0.5 mm, elliptic; pistil 4.5-5.5 mm, glabrous, ovary 1.5-2 × 1-1.5 mm, style 2-3 × 0.3-0.4 mm, stigma 0.7-1 mm wide, subpeltate to capitate. *Drupes* 8-12 × 6-10 × 6-10 mm, subglobose, ventral suture impressed, reddish to dark purple when ripe; fruiting pedicel 5-8 × 1-1.5 mm; pericarp smooth, glabrous; mesocarp scanty.

**Habitat and distribution:** Montane mesophyll forests and *Pinus* and *Quercus* forests. Chiapas, Mex; Guatemala; Honduras. 1275-2100 m. (Endemic).

**Comments:** *Prunus lundelliana* may be recognized by the conspicuous lenticels, the leaves chartaceous and ovate, lustrous above, with decurrent bases, main veins prominent below, 4 leaf glands placed on the two first secondary vein pairs, flowers with relatively long pedicels and fruits ovate, apiculate, and relatively small. Some collections from northwestern Chiapas (eg. *Breedlove* 49347, MO) have coriaceous leaves and a vague morphological resemblance to *P. tartarea* that would suggest hybridization. The collection *Matuda* 2016 (US) cited as paratype of *P. lundelliana* in the protologue is assigned here to *P. axitliana* because it presents only 2 glands,

the pedicels are short, and its geographic locality is below 1000 m elevation.

**Specimens examined: MEXICO. Chiapas:** Jitotol, 4 miles north, 1650 m, 12 Feb 1965, *Breedlove, DE. 8967* (DS, F); Lago monte bello, 25 miles east of la Trinitaria, 1500 m, 13 Apr 1965, *Breedlove, DE. 9690* (DS); Jitotol, En carretera a Pueblo Nuevo Solistahuacan, 1700 m, 29 May 1965, *Breedlove, DE. 10141* (DS, TEX); Cintalapa, Ridge, SE of Cerro Baul on the border of the state of Oaxaca. 16 km NE of Rizo de Oro along a logging road to Colonia Figaroa, 1450 m, 27 Apr 1972, *Breedlove, DE. 24852* (DS, MEXU, MO,TEX); Jitotol, Slope, along the Rio Hondo 6.5 km N of Jitotol along road to Pichucalco, 1700 m, 27 Jan 1973, *Breedlove, DE. 32721* (DS, MEXU, MO,NY); Motozintla, Steep canyon, SW side of Cerro Mozotal, 11 km NW of the junction of the road to Motozintla along the road to El Porvenir and Siltepec, 2100 m, 21 Nov 1976, *Breedlove, DE. 41664* (DS, MEXU); Jitotol, 5 km SE of Jitotol along road to Bochil, 1600 m, 9 Jan 1981, *Breedlove, DE. 49347* (CAS, MEXU, MO,NY,SLPM,TEX); Mapastepec, Reserva El Triunfo, Poligono 1; El Tomatal-Barranca Honda, 1275 m, 1 May 1989, *Heath, M. 176* (CAS,MEXU); Mpio. Jaltenango; Reserva El Triunfo, Poligono 1; Campamento/HO Trail to F. Prusia, 1500 m, Dec 1989, *Heath, M. 255* (MEXU); Jiquipilas, Loc. "La Palmita", 5.82 Km al SO de Tiltepec, 1430 m, 24 Apr 2002, *León V.; Esther. 377-a* (MEXU,MO,XAL); Pasital (in Siltepec, Sierra Mariscal), 2000 m, 30 Dec 1936, *Matuda, E. 0391* (MEXU,MO,TEX,US); Cerca y al sur de Pueblo Nuevo Solistahuacán, 1800 m, 8 Mar 1950, *Miranda, F. 6119* (MEXU); Finca Prusia por camino a Mapastepec hasta cerca Triunfo (S. Jaltenango), 1850 m, 24 Feb 1951, *Miranda, F. 7019* (MEXU,US); Cintalapa, Montaña, al SE de Cerro Baul, 1450 m, 4 May 1988, *Palacios E., E. 363* (MEXU); Jitotol, Rio Hondo, 3 mi N of Jitotol, 1650 m, 21 Jun 1970, *Thorne, R. 40156* (DS); **Oaxaca:** San Miguel Chimalapa, Cabecera del cañon hierba santa. 4 km en linea recta al NO de Benito Juarez, 1600 m, 3 Jan 1986, *Maya, S. 2670* (MEXU); Santa María Chimalapa, 10 km en linea recta al NO de Benito Juarez, 1700 m, 4 May 1986, *Maya, S. 3277* (MEXU); ibidem, 1700 m, 4 May 1986, *Maya, S. 3281* (MEX); San Miguel Chimalapa, Vlle del Rio Portamonedas, 38 km al norte de San Pedro Tepanatepec, 1300 m, 7 Mar 1987, *Maya, S. 4256* (MEXU).

**11. *Prunus matudae*** Lundell, *Phytologia* 1: 369 (1940). Type. Mexico. Chiapas: Mt. Tacana, 1000 m, Aug 1938, *Matuda, E. 2453* (holotype, MICH; isotypes, GH, LL, MEXU, MO, NY)

Small trees or shrubs 3-8(-20) m; branches bark longitudinally striate, light gray. Most recent units of extension 1-1.3 mm diam. at the base, with 5-6 leaves per unit, glabrous; lenticels 0.4-0.6 × 0.3-0.4 mm, elliptic, slightly prominent, scarce; cataphylls 1-1.2 × 1-1.2 mm, deltoid, dorsally glabrous, ventrally tomentose around the base. *Leaves* 5-8.5(-11) × (1-)1.5-2.8(-3.3) cm, (2.8-) 3-3.9 times longer than wide, ovate lanceolate to lanceolate-oblong, equilateral, chartaceous; upper side appanate, opaque or slightly lustrous, lower side flat, opaque, glabrous; secondary vein framework festooned brochidodromous, midrib 0.4-0.6 mm wide, impressed above, slightly prominent below, secondary veins 9-10, departing at 45-55 degrees from midrib, straight up to the intersection with the subjacent vein when become ascending, anastomosing at one third the distance between the margin and the midrib, flat above and below; intercostal tertiary venation mainly irregular reticulate and connecting with epimedial acroflexed, flat above and below, minor veins irregular reticulate; leaf base obtuse to rounded and abruptly decurrent at the end, margin entire with collenchymatous edge 0.1-0.2 mm wide, apex long or shortly acuminate; leaf glands (2-)4(-6), 0.5-0.7 mm wide, rounded, flat, close to the middle of the lamina on the first and second pair of secondary veins; stipules 2.5-4 × 0.4-0.8 mm, 1 mm at the insertion, linguiform, connate along a narrow strip next to the shoot-side margin up to 1/3 their length from the base, persistent in young shoots, glabrous, margin entire, apically cartilaginous; petiole 5-8(-11) × 0.5-0.8 mm, shallowly canaliculated above, subflexuous, glabrous. Floriferous shoots with a single axis, subflexuous, emerging on old units of extension, (20-)30-50 × 0.4-0.7 mm, with 12-20(-24) flowers, more densely arranged towards the apex; axis shallowly striate,

glabrous; peduncle  $2-3 \times 0.4-0.8$  mm; cataphylls  $0.8-1.5 \times 1-1.5$  mm, deltoid; bracts  $0.5-0.7 \times$  ca.  $0.5$  mm, broadly ovate and rounded at the apex, early deciduous, glabrous. *Flowers* with pedicel  $3-6 \times 0.3-0.5$  mm, glabrous; hypanthium  $1.6-2.3 \times 2-2.5$  mm, turbinate or campanulate, glabrous; sepals  $0.5-0.7 \times 1-1.2$  mm, broadly deltoid, apex obtuse; petals  $1-1.8 \times 1.5-2.2$  mm,  $0.4-0.5$  mm wide at the claw, obdeltoid to spatulate, white, with only a mid-vein visible, margin entire, apex rounded; stamens 18-20, arranged in 2 series with the outer longer than the inner one, filaments  $1.2-2.5$  mm, glabrous, anthers  $0.5-0.6 \times 0.5-0.6$ , elliptic to suborbicular; pistil  $2.5-3.5$  mm, in some flowers vestigial or non-functional, glabrous, ovary ca.  $1 \times 0.7-0.8$  mm, style  $2-2.5 \times 0.2-0.3$  mm, stigma  $0.5-0.7$  mm wide, infundibuliform and with the outline irregular. *Drupes*  $8-11 \times 8-10 \times 7-10$  mm, ovoid, the ventral suture impressed, dark purple when mature; fruiting pedicel  $5-7 \times 1-1.5$  mm; pericarp smooth, glabrous; mesocarp scanty.

**Habitat and distribution:** Montane mesophyll forests, *Quercus* and *Pinus* forests and riparian forests. Chiapas, Mex.; Guatemala. 1200-2700 m (México (Hidalgo, Oaxaca, Puebla, Veracruz), Mesoamerica.)

**Comments:** *Prunus matudae* may be distinguished from other species distributed in northern Mesoamerica by the combination of leaves relatively small, chartaceous, oblong-lanceolate, with 4 glands centrally placed aside of the midrib and 2-3 mm from it, petioles weak and subflexuous and the floriferous shoots relatively short with flowers bearing small petals.

**Specimens examined:** GUATEMALA. **El Progreso:** Joya Pacayal, Sierra de Las Minas, between Finca Piamonte and top of Montaña Piamonte, 2500 m, 7 Feb 1942, *Steyermark, JA. 43687* (US); **Huehuetenango:** San Mateo Ixtatan, 4 miles east of municipality, 2600 m, Feb 1965, *Breedlove, DE. 8773* (DS); **San Marcos:** Aldea Fraternidad, Sierra Madre Mountains, between San Rafael Pie de la Cuesta and

Palo Gordo, west facing slope of Sierra Madre, 2000 m, 10 Dec 1963, *Williams, LO. 25945* (GH, NY, US).

**MEXICO. Chiapas:** Chamula, NE slope of Zontehuitz, 2820 m, 2 Dec 1964, *Breedlove, DE. 7822* (DS); San Cristóbal las Casas, near crest of ridge on road from San Cristobal las Casas to Tenejapa, Chamula paraje of Las Ollas, 2500 m, 19 Feb 1965, *Breedlove, DE. 9060* (DS, TEX, US); San Cristóbal las Casas, steep heavily wooded northeast slope of Zontehuitz near summit, 2800 m, 20 Jul 1965, *Breedlove, DE. 11134* (DS, TEX, US); Unión Juárez, deep precipitous canyons on the SE side of Volcán Tacaná above Talquian, 2700 m, 12 Nov 1972, *Breedlove, DE. 29431* (DS, MEXU, MO,NY,TEX); La Independencia, third ridge along logging road from Las Margaritas to Campo Alegre, 2300 m, 3 Jul 1981, *Breedlove, DE. 51305* (CAS, MEXU, MO,NY); San Cristóbal de las Casas, west side of Zontehuitz, 2743 m, 17 Oct 1981, *Breedlove, DE. 53607* (CAS); San Cristóbal de las Casas, a 1 km de Tzontehuitz, 2350 m, 7 Sep 1994, *Chamé O., A. 369* (CAS); Chamula, Cerro Tzontehuitz, 2700 m, 14 Nov 1991, *González E. 1673* (MEXU); Pueblo Nuevo Solistahuacán, ca. 3 km SE in Selva Negra, 1750 m, 31 Mar 1952, *Harrell, B. 452* (MEXU); Pueblo Nuevo Solistahuacán, A 1 km del mirador el caminero hacia Tapilula, 1900 m, 28 Mar 1983, *Magaña A., MA. 1073* (MEXU,XAL); Chamula, Shuket tón, Acahual de encino, 2410 m, 14 Jul 1995, *Martínez, M. 260* (MEXU); Tenejapa, paraje Shohleh, 2500 m, 6 Apr 1966, *Méndez, A. 783* (CAS); Tenejapa, Mahbenchauk, along a small river in the barrio of Tih Ha', 1100 m, 14 Feb 1967, *Méndez, A. 2084* (BRIT,DS,TEX,US); Tenejapa, Colonia Achlum, 2400 m, 15 May 1967, *Méndez, A. 2345* (DS); Tenejapa, Rancho Banabil, 2200 m, 26 Apr 1983, *Méndez, A. 5934* (MEXU); Sinacantan, Muk'tawitz Cerro de Huitepec, 2600 m, 15 Feb 1986, *Méndez, A. 8857* (MEXU,MO); 2150 m, 20 Jul 1993, *Ruiz-Diaz, M. 161* (XAL); Chamula, Paraje Ichin ton, 2195 m, 23 May 1988, *Santis Ruiz, C. 866* (CAS,MEXU,TEX); Mak'bil Vo', 3 y medio km, 2195 m, 8 Jan 1988, *Santíz C., E. 529* (CAS,MO,NY).

**12. *Prunus myrtifolia* (L.) Urb., *Symb. Antill.* 5: 93 (1904). *Celastrus myrtifolius* L., *Sp. Pl.* 196 (1753). Type. Jamaica. *Sloane*, "Myrti folio arbor, foliis latis subrotundis, flore albo racemoso" in *Sloane, Voy. Jamaica*, 2: 79, t. 193, f. 1 (1725). (Lectotype, illustration designated**

by Urban, 1904, specimen at BM).

*Syn: Prunus sphaerocarpa* Sw. *Prodr.* 80. (1788). Type. Swartz *s.n.*; no date; West Indies (Hispaniola) (syntypes, LD, S).

*P. tikalana* Lundell. *Wrightia* 4(2): 88. 1968. Type. Guatemala. Petén: Tikal National Park, Tikal, in zapotal on Remate road E of Aguada Tikal, 28 Jan 1964. *Lundell CL. 17570* (holotype, LL; isotypes, CAS (2), G (3), K, MEXU (2), MICH, MO (2), NY, RSA (2), U, US).

Trees up to 20 m tall; shoots bark fissured, grayish, in the twigs superficially light gray to whitish. Most recent units of extension 1-1.5 mm diam. at the base, with 4-7 leaves per unit, glabrous; lenticels 0.5-0.8 × 0.3-0.7 mm, elliptic to rounded, slightly prominent, moderately dense; cataphylls 1.5-1.8 × 1-1.5 mm, ovate, glabrous. *Leaves* with blades 7-10(-12) × (3-)3.5-5 cm, 1.8-2.4 times longer than wide, oblong-ovate to elliptic-ovate, less frequently lanceolate, equilateral, subcoriaceous to chartaceous; upper side appanate and lustrous, lower side appanate and sometimes opaque; secondary vein framework festooned brochidodromous, midrib 0.5-0.8 mm wide, flat or impressed above, prominent below, secondary veins 7-8, departing at 55-70 degrees from the midrib, increasing the angle after the intersection with the subjacent vein, appanate above and below; intercostal tertiary veins irregular reticulate and connecting with epimedial veins, exmedially some percurrent sinuous, flat above and below, minor veins irregular reticulate; leaf base rounded, margin entire with collenchymatous edge 0.1-0.2 mm wide, apex abruptly acuminate; leaf glands (1-)4(-6), 0.5-0.8 mm wide, rounded, flat, the lower pair basal or sub-basal and the upper pair between the first and the second pair of secondary veins or on top of the last one; stipules 2-2.5(-5) × 0.5-0.7 mm, 1 mm at the insertion, linear-

linguiform, persistent on newer shoots, glabrous, margin entire and cartilaginous; petiole 8-12 × 1-1.3 mm, shallowly canaliculated above, glabrous. *Floriferous shoots* with a single axis, subflexuous, emerging on most recent units of extension, 30-45(-60) × 0.7-1 mm, with 20-26 flowers, unevenly arranged on the axis, 1.5-3 mm distanced apart; axis faintly striate, glabrous; peduncle 1-3 × 1-1.3 mm; cataphylls 1.5-1.7 × 1-1.2 mm, trilobate; bracts 2-2.5 × 0.6-0.8 mm, linguiform, early deciduous, glabrous; *Flowers* with pedicel 3-5(-9) × 0.3-0.5 mm, glabrous; hypanthium 1.5-1.7 × 1.5-2 mm, turbinate or campanulate, glabrous inside; sepals 0.5-0.7 × 0.8-1.2 mm, broadly deltoid with rounded apex; petals 1.7-2.2 × 1.7-2.2 mm, 0.5-0.6 mm wide at the claw, obdeltoid, cream or white, margin erose, apex rounded; stamens 10-14, arranged in a single series, filaments 1-1.7 mm, glabrous, anthers 0.5-0.6 × 0.3-0.4 mm, elliptic; pistil 2.5-3.5 mm long, glabrous, ovary 1-1.3 × 1-1.2 mm, style 2-2.5 × 0.2-0.3 mm, stigma 0.6-0.8 mm wide, peltate. *Drupes* 8-12 × 8-11 × 8-9 mm, globose, ellipsoid across, ventral suture applanate, red or dark purple when ripe; fruiting pedicel 5-8 × 0.8-1 mm; pericarp smooth, glabrous; mesocarp exceeding 2 mm thick; endocarp ca. 0.2 mm wide, smooth.

**Habitat and distribution:** Lowland evergreen forests, riparian forests, and limestone formations. Chiapas, Mex.; Belize; Guatemala. 30-1200 m (USA (Florida), Mesoamerica, Jamaica, Cuba, Dominican Republic, Haiti, Puerto Rico, Bahamas.)

**Comments:** *P. myrtifolia* may be recognized by the white bark covering of new shoots, the leaves with venation applanate above and below, stipules narrowly linguiform and 4 leaf glands; the floriferous shoots are relatively short, and the stamens are up to 14 placed on a single series. This is an iconic species from dry to humid lowlands all around the Caribbean basin frequently associated to limestone-derived soils.

**Local names:** Quiebra hacha (Guatemala).

**Specimens examined:** **BELIZE.** Toledo: Bladen natural Reserve, 180 m, 21 May 1999, *Brewer, SW.* 487 (DAV). **GUATEMALA.** El Petén: Tikal, 50 m, 19 Mar 1975, *Lundell, CL. 19126* (CAS); Pusila, La Cumbre, 400 m, 18 Apr 1977, *Lundell, CL. 20832* (DAV, NY, TEX). **Izabal:** El Estor, in high forest on top of hill, 800 m, 22 Mar 1972, *Contreras, E. 11473* (MEXU, MO, US); ibidem, 700 m, 23 Mar 1972, *Contreras, E. 11478* (MEXU, MO, P); ibidem, 700 m, 23 Mar 1972, *Contreras, E. 11479* (MEXU, MO); between cienaga y ceja, along the Peten-Rio Dulce highway, 80 m, 13 Mar 1972, *Tún-Ortíz, R. 2382* (US); El chorro, along the Petén-Rio Dulce Highway, 180 m, 18 Mar 1972, *Tún-Ortíz, R. 2477* (F, US). **Petén:** La Cumbre, [Caserio] Sapurul, 250 m, 6 Apr 1977, *Lundell, CL. 20733* (CAS, MEXU, MO, NY). **MEXICO.** **Chiapas:** Ocosingo, Cordón del Chaquistero, Estación Biológica de Chajul, 400 m, 30 Jul 1996, *Ibarra Manríquez, G. 4014* (MEXU, MO).

**13. *Prunus occidentalis*** Sw., *Prodr.* 80 (1800). Type. Jamaica, *Sloane s.n.* (lectotype, S-870231, designated by Pérez-Zabala (2015)). Illustr.: Sagra, *Hist. Fís. Cuba, Bot.* 12: t. 40bis (1855), as *Cerasus occidentalis*.

Trees up to 35 m tall, frequently with basal buttress; shoot bark fissured, gray, frequently scaly and peeling. Most recent units of extension 2-2.5 mm at the base, with 6-7 leaves per unit, glabrous or glabrescent; lenticels 0.2-0.7 × 0.2-0.5 mm, elliptic, slightly protruding, moderately dense; cataphylls 1.5-2.5 × 1.5-2 mm, deltoid, marginally puberulent. *Leaves* with blades (9-)12-16(-20) × (3-)4.5-5.5(-10) cm, (1.8-)2-2.8(-3.2) times longer than wide, oblong-lanceolate to elliptic-oblong, equilateral, subcoriaceous to chartaceous; upper side appanate, faintly lustrous, glabrous, lower side appanate, opaque, glabrescent or sparsely puberulent with trichomes mainly



on the midrib, the young leaves more conspicuously puberulent; secondary vein framework weak brochidodromous, appearing eucamptodromous, midrib 0.8-1.5 mm wide, impressed above, protuberant below, secondary veins 9-10, departing at 45-60 degrees from the midrib, gradually ascending, impressed or flat above, applanate or slightly prominent below; tertiary veins percurrent, course perpendicular to the midrib, sinuous towards the margin, epimedial up to 4 between secondaries and intersecondaries rare, flat above and below, quaternary veins irregular reticulate; base acute or obtuse, rarely rounded, abruptly decurrent at the end, margin entire with collenchymatous edge 0.1-0.2 mm wide, apex acute to sharply acuminate; leaf glands 2, (0.8-)1.5-3 mm long  $\times$  0.4-1 mm wide, elliptic-oblong, impressed, basal and adnate to the midrib; stipules 4-5  $\times$  0.8-1.2 mm, ca. 1.2 mm at the insertion, lanceolate to subulate, free, early deciduous, sparsely tomentose on both sides, margin ciliolate, coriaceous; petiole 10-22  $\times$  1-2 mm, conspicuously canaliculated adaxially, glabrous or with some hairs next to the base in immature leaves. *Floriferous shoots* with a main axis basally ramified and frequently appearing fascicles of racemes, less frequently a single unbranched axis, flexuous to subflexuous, emerging on old units of extension, (30-)60-100(-120)  $\times$  0.7-1.3 mm, with 12-18(-32) flowers per axis, unevenly arranged on the axes, distanced 3-4 mm apart; axes slightly striate, sparsely puberulent; peduncle 3-5  $\times$  1-2 mm; cataphylls 1.3-1.5  $\times$  1-1.5 mm, deltoid; bracts 1.5-2  $\times$  0.3-0.4 mm, narrowly deltoid to subulate, early deciduous, puberulent next to the margin and apex ventrally. *Flowers* with pedicel (1.5-)3-8(-10)  $\times$  0.5-0.8 mm, sparsely puberulent; hypanthium 2.5-3(-3.5)  $\times$  3.5-5(-6) mm, campanulate to broadly campanulate, villous inside; sepals ca. 1.5  $\times$  1.2 mm, deltoid, apex acute, sparsely tomentose outside and densely tomentose inside; petals 2.2-2.8  $\times$  2-2.5 mm, 0.7-1 mm wide at the claw, obdeltoid to spatulate, white, margin erose, apex rounded, densely tomentose ventrally; stamens 24-32, in 2 series, the outer longer than the inner one,

filaments 2-3.5 mm, glabrous, anthers (0.8-)1-1.5(-1.8) × 0.4-0.6 mm, oblong-elliptic, pistil 4-5 mm, ovary 2-2.5 × 1-1.8 mm, basally villous, style 1.5-2 × 0.4-0.5 mm, stigma ca. 1 mm wide, peltate. *Drupes* 15-20(-25) × 12-17 × 11-17 mm, longitudinally ellipsoid, ventral suture impressed, varying from yellowish to dark red subject to ripeness level; fruiting pedicel 5-13 × 1.5-2 mm; pericarp smooth, sparsely hirsute; mesocarp fleshy up to 5 mm thick; endocarp 0.3-0.5 mm wide, smooth.

**Habitat and distribution:** Cloud forests, coffee plantations, agricultural landscapes, and riparian forests. Chiapas, Mex.; Guatemala; Honduras; El Salvador; Nicaragua; Costa Rica; Panama. 20-2420 m. (México (Veracruz), Mesoamerica, Venezuela, Jamaica, Cuba, Dominican Republic, Haiti, Puerto Rico, Guadalupe, Trinidad and Tobago.)

**Comments:** *P. occidentalis* may be recognized by the big leaves with flat secondary veins below, sparsely puberulent (indument more conspicuous while expanding), with 2 conspicuous basal leaf glands adnate to the midrib; the floriferous shoots are ramified from the cataphylls or from the most basal flowers axils and are relatively short and dense. Leaf venation and flower details are crucial to differentiate this species from the closely related *P. cortapico*. Some specimens from southern Costa Rica previously identified as *P. subcorymbosa* Ruiz ex Koehne are here assigned to *P. occidentalis*.

**Local names:** Mamey, mamey oloroso (Panamá).

**Specimens examined: COSTA RICA.** Ciudad Universitaria Rodrigo Facio, San Pedro de Montes de Oca, 1400 m, *Gómez, LD. 23065* (MO). **Alajuela:** Reserva Biológica Monteverde Río Peñas Blancas, Finca Wilson Badilla, 800 m, 30 Mar 1989, *Bello, E. 782* (MO); Reserva Biológica Monteverde Río Peñas Blancas, parcela de Alemán, 900 m, 25 Jun 1989, *Bello, E. 986* (MO); Reserva Biológica Monteverde Río Peñas Blancas, 900 m, 22 May 1987, *Haber, WA. 7290* (MO); ibidem, 850 m, 15 Mar 1988, *Haber, WA. 8396* (MO); Upala, Parque Rincón de La Vieja, Puesto Santa María, del mirador por la fila hasta el sesteo de la danta, de donde se baja hasta el canal, 900 m, 4 Mar 1988, *Herrera, G. 1592* (F, GH, MEXU, MO); Tapasco, Canton Alfaro Ruiz, 1650 m, 6 Jan 1940, *Smith, A. p 2227* (UC). **Cartago:** Santa Maria de Dota, Rio Blanco de Coper, 2420 m, 19 Sep 2002, *Wen, J. 6733* (US); ibidem, 2420 m, 19 Sep 2002, *Wen, J. 6772* (US). **Guanacaste:** Tilarán, Cordillera de Tilarán. Reserva Biológica del Colegio de Monteverde, 1600 m, 10 Jan 1992, *Bello, E. 4317* (CR, MO); Parque Nacional Guanacaste, Estación Mengo, Volcán Cacao, 1060 m, 29 Oct 1989, *Chacón, A; I. 2504* (MO); Liberia, P.N. Guanacaste. Cord. de Guanacaste, Cerro Cacao, estación Cacao, 1100 m, 11 Apr 1991, *Chávez, C. 527* (INB, MO); Parque Nacional Rincón de la Vieja, the SE slopes of Volcán Santa María, above Estación Hacienda Santa María, 900 m, 27 Jan 1983, *Davidse, G. 23434* (MO); Tilarán, Río Chiquito Zona Monteverde, finca de Campos, vertiente Atlántica, 1100 m, 7 Jun 1987, *Haber, WA. 7459* (MO); Liberia, Río Las Minas, Los Arenales, SW slope Volcan Cacao, 900 m, 3 Aug 1986, *Janzen, D. 12493* (MO); P. Nac. Rincón de la Vieja; Sector Los Narajos, camino a San Jorge, 760 m, 11 Jan 1991, *Rivera, G. 941* (MO); P. Nac. Rincón de la Vieja Sector Las Pailas a 600 m de la catarata, 1400 m, 14 Jan 1991, *Rivera, G. 968* (MO); Parque Nacional Guanacaste, Gongora station, near the bridge, 1135 m, 21 Sep 2002, *Wen, J. 6793* (US). **Heredia:** San Rafael, Cordillera Central. San Rafael, bosque de la Hoja, 1650 m, 21 Feb 1993, *Morales, JF. 1141* (CR, MO); Barva, cuenca del Tárcoles San Jose de la Montana, 1900 m, 4 Feb 1997, *Rodríguez, A. 1952* (MO). **Puntarenas:** Zona Protectora Las Tablas Estación Las Alturas, las Alturas de Coto Brus, 1400 m, 10 Dec 1991, *Aguilar, R. 723* (MO); Cantón de Osa Agua Buena, oeste. Rincón, 50 m, 17 Oct 1992, *Aguilar, R. 1380* (MO); Cantón de Perez Zeledon, Cordillera de Talamanca, entre las confluencias de la quebrada Altamira y el Rio Blanco, 1580 m, 10 Apr 1995, *Aguilar, R. 4056* (INB, MEXU, MO); Coto Brus, cuenca Terraba-Sierpe, las Mellizas, Sabalito, 1400 m, 7 Jan 1997, *Alfaro, E. 1091* (MO); Coto Brus, cuenca Terraba-Sierpe. Las Mellizas, Cafrosa, 1200 m, 14 Jan 1999,

*Alfaro, E. 1924* (MO); Cordillera de Tilarán. Guacimal, Altos de Río Veracruz, Finca Brenes, 1300 m, 12 Jan 1990, *Bello, E. 1804* (CR, MO); R.B. Monteverde; Cordillera de Tilarán, Río Guacimal, Comunidad-Reserva, 1500 m, 4 Mar 1990, *Bello, E. 2111* (CR, MO); Cordillera de Tilarán, Finca Brena, 1100 m, 3 Jun 1993, *Fuentes, Z. 340* (CR, MO); Monteverde, lower montane forest, Transect 1, 1400 m, 14 Jul 1990, *Gentry, A. 71651* (MO); Monteverde, forest patch in community, 1400 m, 27 Feb 1981, *Haber, WA. 440* (MO); Forest edge in Monteverde, 1440 m, 26 Feb 1981, *Haber, WA. 441* (MO); Monteverde community along cliff edge on Pacific slope, 1200 m, 12 Dec 1985, *Haber, WA. 3707* (MO); Monteverde Cloud Forest Reserve, Pacific slope, 1500 m, 12 Jan 1986, *Haber, WA. 4265* (MO); ibidem, 1400 m, 15 May 1986, *Haber, WA. 4953* (MO); Reserva Biológica Monteverde vertiente Pacífica, 1500 m, 24 Feb 1988, *Haber, WA. 8208* (MO); Monteverde, comunidad, 1350 m, 10 Mar 1988, *Haber, WA. 8294* (MO); ibidem, 1350 m, 25 Jun 1988, *Haber, WA. 8477* (MO); Cordillera de Tilarán, Monteverde, Pacific slope, within community, 1400 m, 1 Jan 1992, *Haber, WA. 10971* (CR, MO); Osa, R.F. Golfo Dulce; Península de Osa, Rancho Quemado, en fila directamente al Oeste del pueblo, 300 m, 11 Jul 1991, *Hammel, B. 18311* (CR, MO, UC); Canto Coto Brus, Mellizas, near La lucha, 1350 m, 6 Oct 2002, *Wen, J. 6969* (US); Canton Coto Brus, near Progreso, on the way from Progreso to Las Tablas, ca. 2 km N of Progreso, 1200 m, 6 Oct 2002, *Wen, J. 6972* (US); ibidem, 1200 m, 6 Oct 2002, *Wen, J. 6973* (US). **San José:** Escazu, Cerro Pico Blanco, camino entre Pico Blanco y Cerro de la Cruz, 1700 m, 10 Mar 1984, *Cowan, C. 4519* (MEXU, TEX); Acosta, on roads between Escuadra and Tiqueres, 1530 m, 10 Oct 2002, *Wen, J. 7042* (US). **EL SALVADOR. La Libertad:** Nueva San Salvador, Jardín Botánico La Laguna, 805 m, 12 Dec 1985, *Berendsohn, WG. 361* (MO). **San Salvador:** Jardín Botánico, zona 29 N, 800 m, 23 Oct 1990, *Lopez, E. RV-00516* (MO). **Santa Ana:** bosque nebuloso de Montecristo, 2000 m, 2 Feb 1978, *Reyna, ML. 1138* (MHES). **GUATEMALA. Petén:** Los Arcos-Cadenas Road, Km 143/144, west, 20 m, 17 Dec 1969, *Contreras, E. 9378* (ASU, DS, MO, TEX). **HONDURAS. Morazán:** Montaña La Tigra, south west of San Juancito, 1800 m, 2 Feb 1966, *Molina R., A. 17024* (GH, US). **MEXICO. Chiapas:** 20 km al NW de Raudales, 300 m, 7 Apr 1966, *González Quintero, L. 3506* (DS). **NICARAGUA. Estelí:** Municipio de Estelí, asentamiento Puertas Azules, 1300 m, 17 Apr 1999, *Rueda, RM. 10924* (MO); Municipio de Estelí, Reserva Natural Mirafior, Comarca Puertas Azules, 800 m, 14 May 1999, *Rueda, RM. 11156* (MO); Municipio de Estelí, Reserva Natural Tisey,

Comunidad La Almaciguera, 1350 m, 16 Mar 2000, *Rueda, RM. 13158* (MO). **Jinotega:** Municipio de Wiwili, Zona de Amortiguamiento de Bosawas, Macizos del Cerro Kilambé, 500 m, 9 Apr 1998, *Rueda, RM. 8123* (MO); Reserva Natural Cerro Kilambé, 950 m, 22 Apr 2000, *Rueda, RM. 13332* (CAS, HULE, MO); Municipio de Wiwili. Reserva Cerro Kilambé, 1400 m, 7 Sep 2000, *Rueda, RM. 14925* (HULE, MO); Km 151, old highway between Matagalpa and Jinotega, 1445 m, 22 Jan 2009, *Stevens, WD. 27936* (HULE, MO); 5 km E of Jinotega along road through Los Papales, 1275 m, 9 Feb 2010, *Stevens, WD. 29596* (HULE, MO). **Madriz:** Municipio de Somoto. Reserva Natural Tepesomoto. La Patasta, 1200 m, 18 May 2000, *Rueda, RM. 13626* (MO); Municipio de Somoto. Reserva Natural Tepesomoto. La Patasta, 1200 m, 20 May 2000, *Rueda, RM. 13731* (MO, P). **Matagalpa:** Behind La Selva Negra Hotel, slopes of Cerro Picacho, near the border with Dept. Jinotega, 1200 m, 23 May 1985, *Davidse, G. 30282* (MO); ibidem, 1200 m, 23 May 1985, *Davidse, G. 30391* (MO); along Canal Trail on S side of Cerro Picacho, above Selva Negra hotel, 1418 m, 16 Jun 2008, *Stevens, WD. 27269* (HULE, MO); near Santa María de Ostuma, Cordillera Central de Nicaragua, 1300 m, 21 Feb 1963, *Williams, LO. 24766* (F, NY, US). **PANAMA. Chiriquí:** Rio Chiriquí viejo, near Sawmill, 3 km of camp El Volcan. PanAmerican Highway, 1300 m, 5 Mar 1943, *Little-Jr, EL. 6080* (MO, US); NW of Cerro Punta, at INRENARE station in Parque Amistad, 2200 m, 16 Oct 1992, *McPherson, G. 15888* (MO); El Hato, Volcán Barú, foothills of Volcano, North of El Hato, 1550 m, 5 Jun 1957, *Stern, WL. 54 A* (DS, MO, US); 6 miles above Cerro Punta on the Boquete trail, 2286 m, 5 Mar 1974, *Tyson, E. 7106* (MO); ibidem, 2134 m, 11 Mar 1974, *Tyson, E. 7208* (MO). **Darién:** Serranía de Majé. Cerro Chucantí, 800 m, 11 Mar 2004, *Aizprúa, R. B4082* (MO, PMA). **Veraguas:** Montijo, Cerro Hoya, subiendo por el río Pedregal, 1030 m, 9 Mar 1997, *Deago, J. 454* (CAS, MO).

**14. *Prunus persica* (L.) Batsch, *Beytr. Entw. Gewächsreich* 1: 30 (1801). *Amygdalus persica* L. *Sp. Pl.* 472 (1753). Type. *Anon. s.n.*, Herb. Linn. 639.2 (lectotype, LINN, designated by Blanca y Díaz de la Guardia in Cafferty and Jarvis (2002)). Illustr: Thomé, *Fl. Deutschl.* ed. 2, 3: t. 321 (1905 [1904]), as *P. vulgaris*.**

Shrubs or trees up to 7 m tall, with a wide outspreading branched crown; shoot bark fissured, scabrous or scaly when aging, gray to deep brown. Most recent units of extension 3-3.5 mm diam. at the base, with 8-12 leaves per unit, generally deciduous but it could be semi-deciduous in tropical or subtropical regimes (Mesoamerica), glabrous; lenticels 0.2-0.5 × 0.2-0.5 mm, elliptic to rounded, slightly prominent and darker than the surrounded bark, moderately dense; cataphylls 4-5 × 1.5-2.5 mm, narrowly deltoid, puberulent around the apex. Leaves with blades 5-12(-15) × 2-4 cm, 3.2-4.2 times longer than wide, obovate-lanceolate, oblong-lanceolate, elliptic-oblong or elliptic, equilateral, membranous to subcoriaceous; upper side lustrous and applanate, glabrous, lower side opaque and applanate, puberulent mainly along the sides of the midrib, immature leaves sparsely puberulent; secondary vein framework weak brochidodromous, sometimes appearing eucamptodromous, midrib 0.5-0.8 mm wide, impressed above, slightly prominent below, secondary veins 12-15, departing at 50-70 degrees from the midrib, gradually ascending, flat above, slightly prominent below, the proximal axils forming a shallow pouch with not apparent domatia; intercostal tertiary veins percurrent reticulate mixed, epimedial veins frequent but intersecondaries uncommon, flat above and below, minor veins reticulate polygonal; leaf base cuneate to acute, margin serrate to serrulate, apex acute, sometimes shortly caudate at the apex; leaf glands (0-)2(-6), 1-1.2 mm wide, cyathiform, prominent on the margin and placed on the lower teeth; stipules 5-8.5 × 0.5-1.2 mm, 0.8-1.2 mm at the insertion, persistent in young expanding shoots, free, lanceolate to subulate, puberulent, with dentate margins protruding up to 0.5 mm, coriaceous; petiole 6-12 × 0.5-1.2 mm, deeply canaliculated above, puberulent. Floriferous shoots placed laterally at the base of short shoots, generally reduced to a single flower (sometimes 2); cataphylls 3-3.5 × 3-3.5 mm, broadly ovate, cucullate; bracts 1.5-3 × 1.5-2.5 mm, deltoid, persistent, sericeous towards the apex, the trichomes falling easily. *Flowers*

with pedicel (1-)2-3 × 1.2-1.5 mm, puberulent; hypanthium 3-5 × 5-8 mm, campanulate, excurved at the apex, puberulent outside, villous inside with pale trichomes clustered at the base, pale rose to purple; sepals 4-6 × 3-4 mm, ovate-oblong, apex obtuse to rounded, sparsely puberulent outside, glabrous inside; petals 10-14(-18) × (7-)9-12 mm, ca. 0.5 mm wide at the claw, obdeltoid to orbicular, pale to dark pink, sometimes white and after anthesis usually reddish at the base, margin erose, apex irregular, glabrous; stamens 20-30(-36), mostly antesealous in 3 or more series, the outer series slightly longer than the rest, filaments 8-12 mm, white to dark red, sparsely puberulent next to the base, anthers 0.4-0.5 × 0.4-0.5 mm, elliptic to suborbicular; pistil 13-17 mm, ovary 2-3 × 1-2 mm, villous, style 10-13 × 0.2-0.3 mm, stigma 0.5-0.7 mm wide, subpeltate. *Drupes* (30-)40-60(-80) × (30-)40-60(-90) × 40-60 mm, ovoid, subglobose or oblate and cordate at the base, yellow to orange or tinged purple, ventral suture conspicuously depressed, pyrene laterally compressed; fruiting pedicel up to 5 × 2 mm, the hypanthium not persistent; pericarp smooth, glabrous, or velutinous; mesocarp considerably fleshy up to 30 mm thick; endocarp 5-7 mm thick, deeply furrowed.

**Habitat and distribution:** *Cultivated.* Chiapas (*Ton 2124*, MEXU); Guatemala (*Montes s.n.*, UVAL); Honduras (*Molina R. 31939*, MEXU); El Salvador (*Rodríguez y Monterrosa 1175*, MO); Nicaragua (*Rueda et al. 17438*, MO); Costa Rica (*Morales 19478*, INB). 800-2800 m. (Probably native to China, extensively cultivated around the world mainly in temperate Mediterranean regions.)

**Comments:** *Prunus persica* is commonly cultivated and sometimes naturalized in Mesomerica (Standley & Steyermark, 1946). This a deciduous species that can be recognized by the narrow and toothed leaves, clustered at the end of the shoots; the flowers are generally

solitary, with big pink petals that change color during their lifespan. The fruit is usually more than 50 mm wide, subglobose, or ventrally flattened with the exocarp velutinous (or glabrous in nectarines which are rarely cultivated in Mesoamerica), and the pyrene deeply furrowed.

**Local names:** Doraz, duraznal, durazno, melocotón (all countries).

**15. *Prunus rhamnoides*** Koehne, *Bot. Jahrb. Syst.* 52: 283 (1915). Type. Guatemala. Quiché: San Miguel Uspantan, 2000 m, Apr 1892, *Heyde et Lux in Herb. J. Donnell Smith 3090* (Lectotype, US-354940!, designated by Pérez-Zabala (2015); isolectotype, GH, NY).

*Syn: Prunus barbata* Koehne, *Bot. Jahrb. Syst.* 52: 284 (1915). Type. Guatemala. Cumbre de Xuipach, Febr. 1878, *Bernoulli & Cario 2916* (not found)

*Syn: Prunus cornifolia* Koehne. *Bot. Jahrb. Syst.* 52: 284 (1915). Type. Costa Rica: Wälder des Copey, 1800 m, Feb 1898, *Tonduz in herb J. Donnell Smith 7355 [in Herb. Nat. Costar. 11678]* (syntypes, BM (2), F, GH, M, NY (2), P, UC, US (3))

Tree up to 20 m; shoot bark superficially fissured, reddish, or light gray in newer segments, dark gray in older ones. Most recent units of extension 1-1.6 mm diam. at the base, with 6-7 leaves per unit, glabrous (mostly in specimens from Costa Rica) or hispidulous; lenticels 0.3-0.5 × ca. 0.1 mm, lengthy oblong, plain, scars; cataphylls 1-1.5 × 0.6-1 mm, deltoid, trilobate, cucullate, with the mid lobe longer than the laterals, glabrous or with some trichomes on the margin or inside. *Leaves* with blades (3-)6-8.5(-11) × (1.7-)2.3-3.5(-4) cm, 2.2-3(-3.5) times longer than wide, elliptic-ovate or elliptic, equilateral, subcoriaceous; upper side appanate,



slightly to very lustrous, lower side applanate, opaque to slightly lustrous, glabrous or with some scattered trichomes on the midrib; secondary vein framework festooned brochidodromous, the midrib 0.6-0.8 mm wide, applanate or impressed above, prominent below, secondary veins 7-8, departing at 45-65 degrees from the midrib, gradually ascending, plain above, slightly prominent below, the axils at the intersection with the midrib (and generally the ones on the lower half of the lamina) forming pouches containing domatia protected by tufts with hyaline-golden trichomes up to 0.4 mm long; intercostal tertiary veins irregular reticulate, percurrent sinuous exmedially, flat above and below, minor veins inconspicuous; leaf base obtuse to rounded, margin undulate with collenchymatous edge 0.1-0.2 mm wide, apex short to long acuminate; leaf glands (0-)2 (rarely up to 4), 0.3-0.6 mm wide, elliptic, impressed, marginal or sometimes submarginal, placed at 3-10 mm from the base and usually creating an enation that resembles a teeth; stipules 2.5-3 × 0.4-0.8 mm, 0.5-0.8 mm at the insertion, linear to subulate, early deciduous, free, minutely dentate along the outer margin, dorsally glabrous, tomentose ventrally on the lower half; petiole (5-)7-15(-20) × 0.6-1.1 mm, canaliculated above, glabrous or hispidulous. *Floriferous shoots* with a single axis, flexuous, emerging simultaneously with last units of extension, 20-50 × 0.6-0.9 mm, with 8-13(-15) flowers, unevenly distributed on the axis, 2-4 mm apart; axis striate, glabrous or puberulent; peduncle 8-12 × 0.6-1 mm; cataphylls c. 1 × 0.3-0.4 mm, cuneate; bracts 1.7-3 × 0.4-0.6 mm, subulate, persistent, puberulent towards the apex. *Flowers* with pedicel 2-4(-7) × 0.4-0.5 mm, glabrous or hirsute; hypanthium 0.7-1.5 × 2.5-3.5 mm, openly campanulate to rotate, inside glabrous or sometimes (in Mexico) sparsely setose at the base, with ascending veins protruding; sepals 1-1.4 × 0.8-1.2 mm, deltoid, apex acute, margin hyaline, sometimes with glandular teeth and ciliolate, slightly puberulent next to the apex; petals 2-2.5 × 2-2.5 mm, 0.5 mm wide at the claw, obdeltoid, whit a main vein

conspicuous, white, margin erose, apex acute or irregular, glabrous; stamens 20-24, arranged in two series of similar length, filaments 2-2.8(-3.2) mm, glabrous, anthers 0.3-0.5 × 0.3-0.5 mm, suborbicular; pistil 1.8-2.2 mm long, glabrous, ovary 0.8-1.2 × 0.8-1 mm, style 1-1.3 × 0.2-0.3 mm, stigma 0.5-0.6 mm wide, subpeltate to capitate. *Drupes* 12-14 × 9-12 × 9-12 mm, ovoid to ellipsoid, ventral suture impressed, red to dark purple when ripe; fruiting pedicel 4-8 × 0.8-1 mm with hypanthium persistent; pericarp smooth, glabrous; mesocarp moderately fleshy up to 4 mm wide; endocarp 0.3-0.4 mm wide.

**Habitat and distribution:** montane mesophyll forests, forests with *Pinus* and *Quercus*, forest edges, and riparian forests. Chiapas, Mex.; Belize; Guatemala; Costa Rica; Panama. 950-3300 m. (México (Durango, Guanajuato, Guerrero, Hidalgo, Jalisco, México, Michoacán, Nuevo León, Oaxaca, Puebla, Tamaulipas, San Luis Potosí, Veracruz; Mesoamerica.)

**Comments:** *P. rhamnoides* is characterized by the sparse indumentum on all the organs, especially visible on new shoots, the presence of domatia on the basal axils of secondary veins, the leaf glands marginal and slightly protruding laterally, the hypanthium broadly campanulate to rotate and persistent on top of the fruits and the mesocarp moderately fleshy.

**Local names:** Capulín, Cochoc, (México).

**Specimens examined:** BELIZE. Toledo: Along divide of Maya Mountains, Bladen Nature Reserve, 950 m, 13 May 1996, *Holst, B. 5274* (BRH, MO). COSTA RICA. Salatrál de San Marcos, 1350 m, Apr 1893, *Tonduz, A. 7829* (US). Alajuela: San Ramon, Reserva Biológica Monteverde, Cordillera de Tilarán, camino a la Torre, 1550 m, 27 Feb 1992, *Bello, E. 4440* (CR, MO); Cordillera de Tilarán. Monteverde, 1500 m, 22 May 1977, *Dryer, VJ. 1368* (F,MO); Reserva Forestal Grecia, bosque del Niño, 1000 m, 16 Jan 1987, *Herrera, G. 403* (BRIT,F,MO); Zarcero, remnant of cloud forest on mountains of Cordillera Central, about 2

km east of Zarcero, 2000 m, 15 Feb 1966, *Molina R., A. 17107* (MO,US); Zarcero, Region of Zarcero, 2300 m, 5 Jan 1938, *Smith, A. H1* (MO); Zarcero, hills above La Brisa de Zarcero, 2100 m, 10 Mar 1938, *Smith, A. H439* (MO); La Brisa de Zarcero, 2100 m, 10 Mar 1938, *Smith, A. pc 265* (US); Alfaro Ruiz, Palmira, 2130 m, 23 Apr 1937, *Stork, HE. 4146* (UC). **Cartago:** El Guarco, Reserva Forestal Río Macho, cuenca del Reventazón, La Esperanza del Guarco, 2840 m, 21 Apr 1999, *Alfaro, E. 2251* (MO); El Guarco, Cartago/San José province border, about 7.4 km southeast of El Empalme on the Cordillera de Talamanca, 2500 m, 15 Mar 1978, *Almeda, F. 4224* (CAS, MO); San Gerardo de Dota, Cerro de la Muerte, al margen de la carretera via Savegre, 2691 m, 8 Jun 2011, *Sanín, D. 5023* (MEDEL). **Guanacaste:** 2-3 km south of Monte verde cloud forest, 1500 m, 6 Mar 1986, *Almeda, F. 5360* (CAS). **Heredia:** Barva, growing on slopes of Volcán Barba, 2100 m, 9 Feb 1965, *Blaisdell, RS. 124* (MO); Heredia, Parque Nacional Braulio Carrillo, upper Volcán Barva, Atlantic slope, ca. 0.5 km below (to north of) main trail to Laguna Barva, 2750 m, 28 Apr 1992, *Boyle, B. 816* (MO); ibidem, 2750 m, 28 Apr 1992, *Boyle, B. 823* (MO); Heredia, Parque Nacional Braulio Carrillo, sendero del transecto, 2210 m, 30 May 1992, *Boyle, B. 870* (MO); Barva, entre Porosati y Sacramento, faldas de V. Barva, 2000 m, 27 Feb 1997, *Hammel, B. 20883* (INB); Tiorels du Barba, Alto del Roble, 1800 m, May 1888, *Pittier, H. 217* (US); Barva, San Jose de la Montana, Paso Llano, cuenca del Tarcoles, 1900 m, 4 Feb 1997, *Rodríguez, A. 1951* (MO); Heredia, Vara Blanca de Sarapiquí, north slope of Central Cordillera, between Poás and Barba volcanoes, 1710 m, Feb 1938, *Skutch, AF. 3502* (MO, US); Barva, Parque Nacional Braulio Carrillo, sector Volcan Barva, 2600 m, 4 Oct 2002, *Wen, J. 6942* (US). **Puntarenas:** Coto Brus, Cuenca Terraba-Sierpe. Loma Indio, 1580 m, 10 Jan 1999, *Alfaro, E. 1885* (MO); Coto Brus, Cuenca Terraba-Sierpe. Z.P. Tablas, en las faldas de Quijada del Diablo, 1620 m, 26 May 1999, *Alfaro, E. 2309* (MO); Coto Brus, zona protectora Las Tablas, Río Cotoncito, 2000 m, 10 Dec 1983, *Chacón, A; I. 1787* (MO); Foothills of the Cordillera de Talamanca, between Sitio Cotón (Cotonsito) and Mellizas, 1300 m, 11 Mar 1984, *Davidse, G. 25571* (MO); Cordillera de Tilarán, San Luis, Finca Brenes, Monteverde, 1100 m, 7 Mar 1994, *Fuentes, Z. 644* (CR, MO); Monteverde, 1400 m, 13 Oct 1978, *Haber, WA. 211* (MO); Monteverde; lower community along cliff edge and below on Pacific slope, 1000 m, 17 Jan 1986, *Haber, WA. 4317* (MO); R.B. Monteverde, Cordillera de Tilarán, detrás de Restaurant Monteverde, 1200 m, 9 Feb 1994, *Lépiz, E. 149* (CR, MO); Coto Brus, Z.P. Las Tablas, cuenca Terraba-Sierpe, zona

Protectora Las Tablas, Neblina, 1440 m, 17 Jan 1997, *Navarro, E.* 568 (MO); Estacion biologica Monteverde, 1580 m, 22 Sep 2002, *Wen, J.* 6828 (US); cantón Coto Brus, Mellizas, near La lucha, 1350 m, 6 Oct 2002, *Wen, J.* 6968 (US); ibidem, 1350 m, 6 Oct 2002, *Wen, J.* 6970 (US). **San José:** Desamparados, About 2-6 km south of Higuito on the dry lower slopes of Altos Tablazo, 1356 m, 20 Feb 1978, *Almeda, F.* 3746 (CAS, MO); Z. P. Cerros de Escazú, Cedral, vereda entre Alto Hierba Buena y Poás de Aserrí, 1600 m, 28 Mar 1992, *Morales, JF.* 238 (MO); Aserrí, Z.P. cerros de Carraigres, fila Aguabuena, Quebrada Delicias, 1500 m, 15 Feb 1996, *Morales, JF.* 5238 (MO). **GUATEMALA. Chimaltenango:** Chichavac, 2400 m, 23 Mar 1933, *Skutch, AF.* 332 (P, US); ibidem, 2400 m, 20 Apr 1933, *Skutch, AF.* 343 (US); ibidem, 2400 m, 8 Jul 1933, *Skutch, AF.* 369 (US). **Quiché:** Hedgerow along Nebaj-Aguacatan trail, 2500 m, 12 Dec 1934, *Skutch, AF.* 1915 (US). **Totonicapán:** Momostenango, San Vicente Buenabaj, cerro Tená, 3300 m, 26 Apr 2000, *Véliz, M. MV.* 2M.8767 (MEXU); **MEXICO. Chiapas:** San Cristóbal de las Casas, Southwest side of Zontehuitz, 2800 m, 7 Apr 1965, *Breedlove, DE.* 9583 (DS); El Porvenir, Steep slopes, 3-4 km W of El Porvenir along road from Huixtla to Siltepec, 2800 m, 17 Jan 1973, *Breedlove, DE.* 31791 (DS, F, MEXU, MO); Siltepec, steep slope along ravines, on the ridge above Siltepec on the road to Huixtla, 2000 m, 18 Jan 1973, *Breedlove, DE.* 32007 (DS, MEXU, MO); San Cristóbal de las Casas, west side of Zontehuitz near summit, 2743 m, 17 Oct 1981, *Breedlove, DE.* 53608 (CAS); Tenejapa, Rancho Banavil, 2380 m, 4 Jul 1994, *González E., M.* 2060 (MEXU); San Cristóbal de las Casas, Estación Biológica huitepec-PRONATURA, 2450 m, 23 Apr 1991, *González E., M.* 1459 (MEXU); Chamula, steep slope with *Quercus* near the paraje of Yal'ichin on the road to Chenalo, 1829 m, 16 Apr 1966, *Laughlin, RM.* 683 (DS, MEXU); San Cristóbal de las Casas, Cerro Hueytepec, 2560 m, 22 Apr 1945, *Little-Jr, EL.* 9943 (CAS); ibidem, 2450 m, 26 Jul 1995, *Martínez, M.* 263 (MEXU); El Porvenir, Mt. Male, 3100 m, 6 Jul 1941, *Matuda, E.* 4672 (MEXU); Motozintla, Pinabeto, 2585 m, 9 Jul 1945, *Matuda, E.* 5468 (MEXU); Chamula, 600 m adelante desvío a torre Tzontehuitz, camino a Mitontic, 2720 m, 25 Apr 1995, *Mejía, H.* 272 (MEXU); Chamula, a 150 m al norte de la escuela de Chiviltenal, 2340 m, 10 Jul 1995, *Mejía, H.* 544 (MEXU); San Cristóbal de las Casas, Cerro Huitepec, 2370 m, 5 Jun 1984, *Méndez, A.* 7616 (MO); Chamula, Cerro de Tzonte Huitz, al N de San Cristóbal, 2100 m, 25 Jul 1985, *Méndez, A.* 8376 (MEXU,MO); San Cristóbal de las Casas, Cerro Huitepec, 2300 m, 1 Apr 1986, *Méndez, A.* 8959 (MO); Finca Prusia, Arroyo del Charro (S. Jaltenango),

1450 m, 22 Feb 1951, *Miranda, F. 6962* (MEXU,US); camino San Cristobal-Tenejapa, 2100 m, 29 Apr 1993, *Ochoa-Gaona, S. 4067* (CAS); Siltepec, Carr. El Porvenir - Siltepec, tramo a El Rosario, 2080 m, 1 Jun 1988, *Palacios E., E. 563* (MEXU); San Cristóbal de las Casas, Estación Biológica Huitepec, 2400 m, 18 Apr 1995, *Ramírez-Marcial, N. 671* (CAS, MEXU); Mpio. Angel Albino Corzo y Mapastepec, campamento El Triunfo en el Polígono I de la reserva de la biosfera El Triunfo, 1860 m, 8 May 1993, *Solís Galvéz, R. 63* (MEXU); San Cristóbal de las Casas, 2700 m, 21 Jun 1970, *Thorne, R. 40090* (DS).  
**PANAMA. Chiriquí:** Bocas & Chiriqui. Cerro Colorado mine area, from Chami station to ca. 9 miles along road, 1750 m, 27 Mar 1986, *Hammel, B. 14990* (MO).

**16. *Prunus salasii*** Standl., *Trop. Woods* 32: 14 (1932). Type. Guatemala. Sacatepéquez: Antigua, Cafetales El Pintado, *García-Salas, J. 1437* (holotypus, F)

Trees up to 35 mm tall; shoot bark longitudinally fissured. More recent units of extension 2-2.5 mm diam. at the base, with 5-8 leaves per unit, glabrous; lenticels 0.6-1 × 0.4-0.6 mm, elliptic, prominent, moderately dense; cataphylls 2.5-3 × 0.4-0.6 mm, deltoid to narrowly deltoid, puberulent with lutescent trichomes placed ventrally at the base and along a raised midrib. *Leaves* with blades (8-)11.5-15(-17) × 4.5-6.5(-7.5) cm, (2-)2.3-2.8 times longer than wide, oblong-ovate to oblong-lanceolate, equilateral, subcoriaceous to chartaceous; leaf upper side appanate, slightly lustrous, glabrous, lower side rugulose, lustrous to opaque, glabrous; the secondary vein framework weak brochidodromous appearing semicraspedodromous, midrib 0.8-1 mm wide, depressed above, prominent below, secondary veins 10-12, departing at 50-65 degrees from the midrib, gradually ascending, impressed above, slightly prominent below, the axils at the intersection with the midrib containing pouch domatia sometimes protected by tufts with reddish trichomes; intercostal tertiary veins percurrent sinuous exmedially, epimedials

numerous and basiflexed, intersecondaries sporadic, inconspicuous above, flat or slightly prominent below, minor veins reticulate polygonal; leaf base obtuse or rounded, margin serrate with 3-4 teeth/cm, teeth ending with a spherical or cuneate dark projection, collenchymatous edge 0.1-0.2 mm wide, apex shortly acuminate; leaf glands 2(-4), 0.8-1.4 mm wide, clavate, placed on the petiolar ridges continuous from the leaf margin at slightly different distance from the leaf base and facing up; stipules 3-4 × 1-1.3 mm, 2-2.5 mm at the insertion, lanceolate, with a central crest ventrally, free, early deciduous, glabrous, margin entire, coriaceous; petiole 13-22(-30) × 1-1.4 mm, deeply canaliculate above, glabrous. *Floriferous shoots* with a single axis, subflexuous, emerging on most recent units of extension, (70)100-140(-180) × 1-1.3 mm, with 40-60 flowers unevenly arranged on the axis, distanced 1-3 mm apart; axis striate, glabrescent to sparsely puberulent (becoming more densely puberulent during the fruiting); peduncle 5-8 × 1.2-1.5 mm; cataphylls 1.5-2 × 1-1.5 mm, deltoid; bracts 1.8-2.5 × 0.4-0.6 mm, narrowly deltoid, early deciduous, puberulent with marginal hyaline trichomes. *Flowers* with pedicel 2-3(-4.5) × 0.4-0.7 mm, glabrous; hypanthium 2-3 × 2.5-3.5 mm, campanulate to infundibuliform, glabrous inside; sepals 0.8-1.2 × 0.8-1 mm, deltoid-ovate, apex obtuse to rounded, margin membranous, lacinate to irregularly fimbriate; petals 2.5-3.5(-4.5) × 2.5-3.5(-4.5) mm, 0.6-0.8 mm wide at the claw, obdeltoid, white, pinnate veined, margin erose and with some fimbriae, apex rounded; stamens 20-28, arranged in 2 series of similar length, filaments 3.5-4 mm, glabrous, anthers 0.6-0.8 × 0.2-0.4 mm, elliptic; pistil 3.5-4 mm long, glabrous but becoming puberulent when enlarging to fruit, ovary 1-1.3 × 0.5-0.6 mm, style 2.5-3 × 0.2-0.3 mm, stigma 0.7-0.8 mm wide, subpeltate to capitate. *Drupes* 15-18 × 13-15 × 1.3-1.5 mm, ovoid and apiculate, ventral suture applanate, dark red when riped; fruiting pedicel 5-6 × 1-1.5 mm; pericarp rugulose, puberulent or hirsute basally when immature; mesocarp slightly fleshy, ca. 3 mm thick; endocarp ca. 0.5 mm

thick.

**Habitat and distribution:** Cloud forests, evergreen or semideciduous lowland forests, coffee plantations and some open deforested areas. Chiapas, Mex.; Guatemala; Honduras; El Salvador. 600-2000 m. (Mexico, Mesoamerica).

**Comments:** *P. salasii* may be differentiated from the closely related species *P. chiapensis* by the glabrous leaves with longer petioles, the 2 leaf glands placed on the on marginal crests of the petiole facing up, the marginal teeth with callous tissue on the apex (probably colleters), the basal axil of secondary veins clearly forming a pocket and the floriferous shoots as long or longer than the leaves.

**Local names:** carreto (Guatemala); cereza, cereza montés, sapoyolillo, zapoyolillo (Mexico).

**Specimens examined:** **EL SALVADOR. Ahuachapán:** El Imposible, San Benito, en lacima del Cerro Campana, 1000 m, 16 Mar 1992, *Sandoval, E. 314* (MO). **Santa Ana:** Cerro Monte Cristo, 2000 m, 2 Jan 1959, *Allen, PH. 7132* (US); P.N. Los Volcanes, sector Los Andes, la piedra pacha, barranca el mezcal, 1800 m, 22 Jul 2005, *Monterrosa S., J. 1022* (MO). **Sonsonate:** Juayua, Cantón Los Naranjos, Cerro EL Aguila. Sector El Rosario, 1989 m, 27 Dec 2013, *Rodriguez, D. 4740* (LAGU). **GUATEMALA. Chimaltenango:** Acatenango, 4 km de la carretera Patzicia a Actenango, 2000 m, 2 Feb 2002, *Véliz, M. MV 12245* (MEXU). **Guatemala:** Jardín Botánico de la USAC, 1500 m, 3 Jul 1984, *Díaz, A. 3907* (MO); Ciudad Universitaria, Zona 12, 1500 m, Jun 1993, *Véliz, M. s.n.* (MO). **Sacatepéquez:** 2000 m, 10 Sep 1993, *Castillo Mont, JJ. 1923* (F, GH, NY, US); Near Antigua, 1500 m, Nov 1938, *Standley, PC. 59958* (F, MO, NY, US); Antigua, El Panorama, 1527 m, 20 Jul 2010, *Véliz, M. 21466* (CAS); Cerro Carnaval, 2170 m, 31 Oct 2010, *Véliz, M. 22129* (CAS). **HONDURAS. Lempira:** Gracias, Parque Nacional de Celaque. Sendero entre La Planta eléctrica y la primera casa abandonada de Don Tomás, 1500 m, 28 Jan 1992, *House, P. 1179* (MO, TEFH);

**MEXICO. Chiapas:** Motozintla, steep slopes, 45-50 km NE of Huixtla along road to Motozintla, 1900 m, 28 Dec 1972, *Breedlove, DE. 31097* (F,MEXU,MO,NY,TEX); Cerros de Don Ventura, al NO de Tuxtla Gutiérrez, 1000 m, 30 Dec 1948, *Miranda, F. 5114* (MEXU); Cerro Brujo (Sur Ocozocuaula), 1470 m, 4 Jan 1949, *Miranda, F. 5176* (MEXU); Tuxtla Gutierrez, cerca de la laguna, camino a Montecristo, unos 27 km al norte de Tuxtla, 1100 m, 17 Nov 1949, *Miranda, F. 5694* (MEXU,US); Tuxtla-Gutierrez, 536 m, 11 Feb 1988, *Palacios E., E. 310* (MEXU,XAL); Tuxtla Gutiérrez, Jardín Botánico, F. Miranda, 536 m, 11 Feb 1988, *Palacios E., E. 536* (MEXU); **Oaxaca:** Pochutla, Cafetal concordia, near Pochutla, 1000 m, 18 Aug 1918, *Popenoe, W. 836* (US).

**17. *P. serotina*** Ehrh., *Gartenkalender* 3: 285 (1783). *Nom. cons.* and epitype proposed by Gandhi, Reveal, and Brouillet (2009). Type. United States of America, Pennsylvania, Westmoreland, 29 May 1979, *Wood, E. et.al. 4207* (epitype, GH). Illustr.: Sargent, *Silva* 4: t. 159 (1892).

Trees up to 20(-30) m; shoot bark black, dark red or brown, the main trunk peeling into wide scales. Most recent units of extension 1-2 mm diam. at the base, with 7-8 leaves per unit, glabrous or pubescent; lenticels 0.2-0.6 mm wide, elliptic or rounded, slightly protuberant, scarce to moderately dense; cataphylls 1.5-2.5 × 1-2.5 mm, deltoid-trilobate with the mid lobe longer than the lateral ones, glabrous, transitional cataphylls present, foliaceous, 4-6 per shoot, 7-10 × 3-5 mm, spatulate, margin irregularly dentate, apex mucronate, persistent only during the period of expansion of new vegetative or floriferous shoots. *Leaves* with blades 5-12(-15) × 1.5-6 cm, ovate-elliptic, elliptic-obovate or lanceolate-oblong, oblique at the base, subcoriaceous to chartaceous; leaf upper side appanate, usually lustrous, glabrous, lower side appanate, opaque, glabrous or sparsely puberulent, trichomes mostly concentrated parallel to the midrib next to the



basal axils of secondary veins; secondary vein framework weak brochidodromous, appearing eucamptodromous, midrib 0.5-1 mm wide, impressed above, slightly prominent below, secondary veins (8-)12-18, departing at 60-70 degrees from the midrib, gradually ascending, course sinuous, flat above and below, with attachment axil to the midrib forming pouches working as domatia; intercostal tertiary venation percurrent sinuous exmedially, flat above, slightly prominent below, minor veins reticulate polygonal; leaf base acute to obtuse with 2 enations as teeth next to the petiole, margin serrate with callous incurved teeth, 5-7 teeth/cm, collenchymatous edge more than 0.2 mm wide, apex short to lengthy acuminate; leaf glands (0-)2(-4), 0.3-0.8 mm wide, cyathiform, marginal or petiolar, placed on the position of the first pair of teeth (when 4 then also the second pair); stipules 7-13 × 1-2.5 mm, 1-2 mm at the insertion, subulate to falcate, early deciduous, generally ciliate, margin irregularly dentate, membranous, apex acuminate; petiole 7-25(-30) × 0.8-1.5 mm, narrowly canaliculated above, predominantly glabrous and with a cluster of trichomes below next to the lamina and visible mainly in young leaves, sometimes reddish. *Floriferous shoots* with a single axis, subflexuous, the basal 1/3 portion with 1-4 leaves smaller than ones on vegetative shoots, 9-20(-24) × 0.1-0.2 cm, with 20-35(-90), unevenly distanced along the axis, 2-6 mm apart; axis striate, glabrous or puberulent; peduncle (2.5-)3-8 × 2-13 mm; cataphylls 3-5 × 1.5-2 mm, cuneate; bracts 3-5 × 0.6-1 mm, narrowly deltoid or subulate, early deciduous, glabrous, laciniate, sometimes with marginal glands, the distal ones shorter and ovate. *Flowers* with pedicel 3-10 × 0.5-1.5 mm, glabrous; hypanthium 1.5-3 × (2-)2.5-4.5(-6) mm, campanulate to broadly campanulate (after anthesis), glabrous or slightly puberulous outside, villous inside basally around the ovary, with conspicuous veins sometimes protuberant; sepals 1-2.5 × 1-2.5 mm, deltoid to deltoid-ovate with apex apiculate or acute, margin cartilaginous with some glandular trichomes; petals (1.8-)2.5-

3.5(-4.5) × 2-4(-5) mm, 0.3-0.5 mm wide at the claw, obdeltoid, white, margin erose, apex emarginated to rounded; stamens 16-20, in 2 series with the outer longer than the inner one, filaments (1-)3-4(-5) mm long, glabrous, anthers 0.5-1 × 0.5-1 mm, elliptic; pistil 2.5-4 mm long, glabrous, ovary 1-1.7 × 0.7-1.5 mm, style 1-2.5 × 0.2-0.4 mm, stigma 0.6-1 mm, peltate or subpeltate. *Drupes* 6-12 × 6-12 × 6-12 mm (up to 25 mm in fresh), globose or subglobose, ventral suture impressed, red to dark purple when ripened; fruiting pedicel 3-12 × 0.5-0.8 mm with persistent hypanthium; pericarp smooth, glabrous; mesocarp noticeably fleshy up to 5 mm thick; endocarp 0.2-0.3 mm thick, smooth.

**Habitat and distribution:** cultivated and naturalized. 1200-3000 m. Chiapas, Guatemala, Honduras, El Salvador, Costa Rica, Panama. Widely distributed in the Americas mainly in the northern hemisphere, cultivated and naturalized in Europe.

Key to subspecies of *P. serotina* distributed in Mesoamerica

1. Leaves generally more than 2.5 times longer than wide; floriferous shoots flexuous; anthers more than 0.8 mm long. **17a. *P. serotina* subsp. *capuli***

1. Leaves generally 2-2.5 times longer than wide; floriferous shoots subflexuous or erect; anthers less than 0.7 mm long. **17b. *P. serotina* subsp. *serotina***

**17a. *Prunus serotina*** Ehrh. subsp. ***capuli*** (Cav.) McVaugh, *Brittonia* 7: 308 (1951). *Prunus capuli* Cav., *Anales Hist. Nat.* 2: 110 (1800). Type. Ecuador: Tungurahua, Anon. s.n. (*expedicion Malaspina*) (lectotype, designated by Romoleroux (1996) (MA). Illustr.: Romoleroux, *Fl. Ecuador* 56: 137, t. 45A-B (1996).

*Prunus capollin* Zucc. var. *prophyllosa* Donn. Sm., *Bot. Gaz.* 42(4): 293. 1906. Type. Guatemala: Sacatepéquez: San Rafael, between Mixco and Antigua, Mar 1905, *Maxon & Hay* 3666 (holotype, US)

*P. salicifolia* Kunth in H.B.K., *Nov. Gen. Sp. Pl.* 6: 241 (1824) Type. Colombia. s.l., 1766, *Humboldt & Bonpland s.n.* (holotype, P)

Most recent units of extension glabrous. *Leaves* with blades 8-12 × 2.5-4 cm, 2.5-3.5(-4.5) times longer than wide, lanceolate-oblong; subcoriaceous to coriaceous; petiole 10-20(-30) × 13-20 mm. *Floriferous shoots* flexuous with 30-40 flowers; pedicel 2.5-5 × 0.7-1.2; sepals 1.5-2.5 × 1.5-2.5 mm; petals 3-4 × 3-4 mm; anthers 0.8-1 × 0.5-0.8.

**Habitat and distribution:** Cultivated and naturalized in open areas or forests. Chiapas, Mex; Guatemala; Honduras; El Salvador; Costa Rica; Panamá. 1200-3000 m. (México (Distrito Federal, Hidalgo, Jalisco, México, Michoacan, Nayarit, Oaxaca, Puebla, Tlaxcala, Veracruz), Mesoamerica, Venezuela, Colombia, Ecuador, Peru, Bolivia, Argentina).

**Comments:** This subspecies may be recognized by the leaves narrowly lanceolate, acuminate, the floriferous shoots axis thicker and longer than the type subspecies and generally with 3-4 subtending leaves.

**Local names:** capulí, cerezo, cerezo de castilla.

**Specimens examined:** EL SALVADOR. **Chalatenango:** Mpio. de San Ignacio, entre El Cerro El Pital y Las Pilas. Veg. de Pinar, 29 Apr 2001, *Linares, JL. 5200* (MEXU); **Santa Ana:** Metapan, Parque Nacional Montecristo, la quebradona del portesuelo, 1900 m, 23 Feb 2002, *Martínez, VM. s.n. (e)* (MEXU); **GUATEMALA.**

**Quetzaltenango:** San Mateo, 2300 m, 2 Apr 1978, *Germán, MT. 723* (MEXU, MO); Quetzaltenango, North slope of Cerro de Baul, 2499 m, 21 Jan 1945, *Sharp, AJ. 4519* (MEXU, MO). **Quiché:** 2 km S of Chichicastenango, 5 Apr 1970, *Harmon, W. 2237* (MO, UMO); Between Chajul and Nebaj, 1981 m, 7 Feb 1946, *Sharp, AJ. 4688* (MEXU). **HONDURAS. Morazán:** La Labranza, Cerro de Uyuca, 1800 m, 3 Apr 1957, *Molina R., A. 7870* (US). **MEXICO.** La Cuna, Mt. Ajusco, 18 Apr 1900, *Trelease, W. 55* (MO). **Chiapas:** Huistán, Ejido Chilil, 2350 m, 26 Feb 1989, *González E., M; M. 651* (MEXU); San Cristóbal de las Casas, Estación Biológica Huitepec-Pronatura, 2400 m, 13 Jun 1989, *González E., M; M. 666* (MEXU); San Cristóbal de las Casas, Cerro San Cristóbal, 2225 m, 16 Feb 1966, *Laughlin, RM. 67* (CAS, MEXU); Mt. Male, near Porvenir, 3200 m, 21 Apr 1906, *Matuda, E. 4689* (MEXU, MO); Siltepec, Cascada, 1600 m, 1 Mar 1945, *Matuda, E. 5179* (MEXU); Tenejapa, en el paraje "Kotoltez", 1650 m, 10 Apr 1982, *Méndez, A. 4195* (MEXU); Alrededores de S. Andrés Chamula, 18 Apr 1943, *Miranda, F. 2651* (MEXU); Chamula, Yaal Ichin, 2110 m, 25 May 1993, *Ruiz Díaz, J de. 53* (MEXU). **PANAMA. Chiriquí:** Parque Nacional Volcán Barú. Boquete, camino hacia el Volcán, 2300 m, 6 Nov 2002, *Aizprúa, R. B3562* (MO).

**17b. *Prunus serotina* Ehrh. subsp. *serotina*.**

Most recent units of extension glabrous or pubescent. *Leaves* with blades 6-9(-15) × ca. 4 cm, 2-2.5 times longer than wide, elliptic-obovate or elliptic or ovate, membranous to chartaceous; petiole 8-15(-20) × 9-15 mm. *Floriferous shoots* subflexuous to erect, with 20-35 flowers; *flowers* with pedicel 4-10 × 0.5-0.8 mm; sepals 1-1.5 × 1-2 mm; petals 2.5-3.5 × 2.5-3.5 mm; anthers 0.5-0.7 × 0.5-0.6 mm.

**Habitat and distribution:** Cultivated and naturalized in montane forests and river shores. Ch (*Breedlove y McClintock 23633*, MO); G (*Williams et al. 23202*, US). 1300-3000 m. (Canada, USA, México (Durango, Jalisco, México, Michoacán, Morelos, Nuevo León, Oaxaca, San Luis Potosí, Tamaulipas, Veracruz; Mesoamerica).

**Comments:** This subspecies may be recognized by the elliptic to obovate leaves with the apex acute or shortly acuminate; the floriferous shoots have just 2 or 3 subtending leaves, and the axis is generally shorter, slender and bears flowers with longer pedicels than the subspecies *capuli*

**Especimens examined.** **GUATEMALA. Chimaltenango:** 7.6 km. E. of Patzún, 2000 m, 21 Jun 1970, *Harmon, W. 2608A* (MO); **Huehuetenango:** Along road 13 km west of Huehuetenango, near Puente de Xinaxo, 1800 m, 30 Dec 1940, *Standley, PC. 81535* (F, US); **Sacatepéquez:** Entre San Lucas Sacatepéquez y Antigua Guatemala, 3 May 1990, *Castillo Mont, JJ. 1055* (MO, US); Volcán de Acatenango, Concepción Calderas, 2100 m, 11 Mar 1999, *Véliz, M. MV-99.6960* (MEXU). **Sololá:** Volcán San Pedro, North facing slopes towards Lago de Atitlan, above village of San Pedro, 1800 m, 7 Jun 1942, *Steyermark, JA. 47171* (US); near nahuala, Sierra Madre mountains, 2500 m, 17 Dec 1962, *Williams, LO. 23202* (US). **MEXICO. Chiapas:** San Cristóbal de las Casas, 2200 m, 10 Jan 1972, *Breedlove, DE. 23633* (MEXU, MO); San Cristóbal de las Casas, 2200 m, 10 Jan 1972, *Breedlove, DE. 23672* (MEXU); Ixtapa, Along road from Zinacantan center to Ixtapa between Burrero and Ixtapa, 1100 m, 18 Aug 1976, *Breedlove, DE. 39654* (MEXU, MO).

**18. *Prunus tartarea*** Lundell, *Wrightia* 4: 87 (1968). Type. Mexico. Chiapas: Sierra Madre, Saxchanal, 2700 m, 1 Jul 1941, *Matuda, E. 4300* (holotype, LL; isotypes, S, F, GH, MEXU, MO, NY, US).

Trees up to 15 m tall; trunk bark plated and light red, scaly and gray to reddish at the shoots. Most recent units of extension 4-6 mm wide at the base, with 4-5 leaves per unit, glabrous; lenticels 0.5-1.2 × 0.2-0.3 mm, narrowly oblong, transversally oriented, slightly prominent, sparse; cataphylls 3-4 × 3-3.5 mm, widely deltoid, glabrous. *Leaves* with blades (7.5-)10-13(-15) × (3.2-)4-5.5 cm, 2.5-3.1 times longer than wide, elliptic-obovate to elliptic-oblong or elliptic,

equilateral or slightly oblique, rigid coriaceous; upper side applanate, lustrous, lower side applanate, rugulose, slightly lustrous, glabrous; secondary vein framework brochidromous, midrib 0.6-1 mm wide, depressed above, protuberant and angled below, secondary veins 7-8, departing at 50-70 degrees from the midrib, initially straight and becoming almost vertical when connecting with the subjacent vein, inconspicuous or impressed above, slightly prominent below; intercostal tertiary veins irregular reticulate, inconspicuous above, applanate below, minor veins not visible; leaf base obtuse and decurrent at the end, margin entire with collenchymatous edge 0.1-0.2 mm wide, apex acute to shortly acuminate; leaf glands 2, sometimes absent at individual leaves, 0.6-1 mm wide, elliptic, impressed, laminar on the first vein pair at 10-20 mm from the base and 2-4 mm from the margin; stipules 4-5 × 1-2 mm, 2-2.5 mm at the insertion, subulate, early deciduous, glabrous, margin entire; petiole 6-10(-12) × 1.5-2 mm, canaliculated, glabrous. *Floriferous shoots* with a single axis, flexuous, emerging on most recent units of extension, 35-70 × 0.8-1.2 mm, with 20-25 flowers, more densely arranged towards the apex; axis shallowly striate, glabrous; peduncle 1-3 × 1.2-1.4 mm; bracts 1-1.4 × 1-1.2 mm, deltoid, early deciduous, glabrous. *Flowers* with pedicel 2-3.5(-5) × 0.4-0.5 mm, glabrous; hypanthium 2-2.5 × 1.8-2.5 mm, turbinate to campanulate, glabrous inside, ascending veins conspicuous outside; sepals 0.8-1 × 1-1.3 mm, widely deltoid, apex rounded; petals 2-2.7 1.8-2.5 mm, orbicular, white, widely triveined, margin erose, apex rounded; stamens 22-26, in two series around the same length, filaments 2.5-3.5 mm, glabrous, anthers 0.6-0.8 × 0.3-0.4 mm, elliptic; pistil 3-3.8 mm long, glabrous, ovary 1-1.3 × 1-1.2 mm, style 2.5 × 0.4-0.5 mm, stigma 0.7-0.8 mm wide, subpeltate. *Drupes* 1.3-1.5 mm wide, subglobose, ventral suture impressed; fruiting pedicel 5-7 × 0.6-0.8 mm; pericarp smooth, glabrous; mesocarp scanty.

**Habitat and distribution:** *Pinus* and *Quercus* forests. Chiapas. 1800-2800 m. (Mexico (Oaxaca); Mesoamerica).

**Comments:** *Prunus tartarea* may be distinguished by the relatively thick, scaled, and reddish shoots, the leaves coriaceous and lustrous with veins barely conspicuous and the 2 laminar glands placed on the first pair of secondary veins. The floriferous shoots are flexuous and bear flowers with relatively long pedicels.

**Specimens examined:** MEXICO. Chiapas: Jaltenango, Reserva El triunfo, 1800 m, 17 May 1982, Calzada, JI. 9078 (XAL); Motozintla, Boqueron, 2540 m, 3 May 1945, Matuda, E. 5377 (MEXU, TEX); Motozintla, Niquivil, 2786 m, 15 May 1945, Matuda, E. 5491 (F, MEXU, TEX).

**19. *Prunus tetradenia*** Koehne, *Bot. Jahrb. Syst.* 52: 309 (1915). Type. Mexico. Veracruz: Sierra Madre zwischen Misantla und Naolinco, 2000 m, Aug 1912, Purpus, CA. 6181 (lectotype, UC-14997, designated by Pérez-Zabala (2015)).

Trees 6-20 m tall; shoot bark rugose, dark gray. Most recent units of extension 2-2.5 mm wide at the base, with 9-10 leaves per unit, glabrous; lenticels 0.4-0.6 mm wide, rounded, slightly prominent, moderately dense, light gray; cataphylls 4-5 × 3-4 mm, deltoid, glabrous. Leaves with blades 13-17(-19) × (4-)5-8 cm, 2-2.4 times longer than wide, obovate to oblong-lanceolate, slightly oblique, coriaceous to subcoriaceous; leaf upper side appanate, slightly lustrous, lower side appanate opaque, glabrous; secondary vein framework brochidodromous, midrib 1-1.5 mm wide, appanate or impressed above, prominent below, secondary veins 9-11, departing at 40-60 degrees from the midrib to which are decurrently attached, gradually ascending, first pair of

secondaries pectinate, flat above, flat to slightly prominent below; intercostal tertiary veins percurrent sinuous, epimedial basiflexed and frequently subjacent to the intersecondaries, flat above and below, minor veins irregular reticulate, barely visible; leaf base acute to obtuse and basally decurrent, margin entire, collenchymatous edge 0.1-0.2 mm wide, apex acute to shortly acuminate; leaf glands 4 (rarely 2), the lower 2 narrowly elliptic or subrotund and up to 2 mm long, attached to the midrib or distanced up to 4 mm from it and placed below the first part of secondary veins, the upper gland pair rotund, 0.5-1 mm wide, impressed, placed on the first pair of secondary veins or between the first and the second; stipules 7-10(-12) × 1-2 mm, 1.5-2.3 mm at the insertion, linguiform to falcate, persistent on young shoots, glabrous, margin entire; petiole 12-18(-20) × 1.5-2 mm, slightly sulcate, glabrous. *Floriferous shoots* with a single axis, subflexuous, emerging on either most recent or older units of extension, (35-)70-90(-120) × 0.5-1 mm, with 28-32 flowers, unevenly arranged on the axis, 2-4 mm apart; axis smooth or slightly striate, glabrous; peduncle 12-15 × 1.5-3 mm, cataphylls 1.5-1.8 × 1.5-2 mm, widely ovate-trilobate; bracts 2-2.5 × 0.8-1 mm, narrowly deltoid with 2 incipient lateral lobes, early deciduous, glabrous. *Flowers* with pedicel 5-8(-12) × 0.5-0.8 mm, glabrous; hypanthium 2.5-3 × 2.5-3.5 mm, campanulate to broadly campanulate, glabrous inside; sepals 0.8-1.2 × 1.1-1.4 mm, widely deltoid, apex obtuse; petals 2.5-2.7 × 2.5-2.7 mm, 0.5-0.7 mm wide at the claw, orbicular, white, pinnate veined with 3-4 pairs of lateral eucamptodromous veins, margin entire, apex rounded; stamens 20-24, in two series, the outer longer than the inner one, filaments 2-4.3 mm (inner ones up to 2.5 mm), glabrous, anthers 0.6-0.8 × 0.4-0.6 mm, elliptic; pistil 4.5-5.5 mm long, glabrous, sometimes reduced and nonfunctional in individual flowers, ovary 1-1.5 × 1-1.5 mm, style 3-4 × 0.3-0.5 mm, stigma 0.5-0.8 mm wide, subpeltate. *Drupes* 15-22 × 15-25 × 15-22 mm, globose or transversally ellipsoid, ventral suture depressed; pedicel 5-8 × 1.5-2.2 mm;



pericarp smooth, glabrous; mesocarp c. 2 mm wide; endocarp 0.2-0.3 mm wide.

**Habitat and distribution:** Montane mesophyll forests, primary and secondary forests Chiapas. 1200-2100 m. (Mexico (Hidalgo, Oaxaca, Veracruz); Mesoamerica).

**Comments:** *P. tetradenia* may be recognized by the obovate leaves larger than most of the rest of Mesoamerican species, with leaf base acute or obtuse and conspicuously decurrent, 4 leaf glands, stipules linguiform to falcate longer than 7 mm and the fruits globose or transversally ellipsoid and wider than 15 mm.

**Local names.** Capulín de ardilla, zapotillo (Mexico).

**Specimens examined: MEXICO. Chiapas:** Rayón, Near Puerto del Viento, 9 miles NW of Pueblo Nuevo Solistahuacán along road to Tapiula, 1850 m, 20 Aug 1965, *Breedlove, DE. 11976* (DS, F, NY, US); Rayón, Steep slope in the Selva Negra 10 km above Rayón Mezcalapa along road to Jitotol, 1700 m, 27 Jan 1973, *Breedlove, DE. 32663* (DS, MEXU, MO); Angel Albino Corzo, Reserva de la Biosfera El Triunfo, sendero Palo Gordo, polígono Zona núcleo I., 1800 m, 10 Nov 2004, *Martínez Meléndez, N. 511* (MO); Siltepec, Letrero, near Siltepec, 2000 m, 6 Jul 1941, *Matuda, E. 4337* (DS, F, GH, MEXU, MO, NY); Tenejapa, La Cueva Yashanal, 1700 m, 15 Mar 1984, *Méndez, A. 7400* (ASU, MEXU); Solistahuacan, Selva Negra, al NO de Pueblo Nuevo, (adelante de Rincón Chamula), 1800 m, 30 Dec 1959, *Miranda, F. 9186* (MEXU, US).

**20. *Prunus tuberculata* Koehne, *Bot. Jahrb. Syst.* 52: 308 (1915). Type. México. Oaxaca, Monte Pelado, 2450 m, Feb 1840, *Galeotti, H. 3121* (lectotype, G-356406 (designated by Pérez-Zabala (2015))); isoelectotypes, G-356407, US-573057, P-3358894, P-3358895).**

Trees up to 15 m tall; shoot bark longitudinally fissured, dark gray to almost black. Most recent units of extension 2-3 mm diam. at the base, with 7-8 leaves per unit, glabrous; lenticels 0.5-0.8 × 0.3-0.5 mm, elliptic, becoming very protuberant in the older branches, moderately dense; cataphylls 1.5-1.8 × 2-2.2 mm, broadly deltoid, with two conspicuous lateral lobes, glabrous. *Leaves* with blades 6-13 × 2.2-4(-4.5) cm, 2.7-3.4 times longer than wide, oblong-lanceolate to elliptic-ovate, usually asymmetrical at the basal insertion, coriaceous; leaf upper side slightly bullate, lustrous, lower side applanate, opaque, light green when fresh, glabrous; secondary vein framework festooned brochidodromous, midrib 0.7-1 mm wide, applanate or impressed above, prominent below, secondary veins 7-9, departing at 60-75 degrees from the midrib, straight until the intersection with the subjacent vein and then becoming more ascending, impressed above, flat below; intercostal tertiary veins irregular reticulate, intersecondaries conspicuous, flat above and below, minor veins irregular reticulate; leaf base acute or obtuse, margin entire with collenchymatous edge 0.1-0.2 mm wide, apex shortly acuminate; leaf glands absent; stipules ca. 2.5 × 0.5-0.8 mm, 0.8-1 mm at the insertion, lanceolate, early deciduous, glabrous, margin entire with scattered trichomes; petiole 8-15 × 1-1.5 mm, slightly canaliculate above, glabrous. *Floriferous shoots* with a single axis, erect, emerging on most recent units of extension, 35-55(-70) × 0.8-1 mm, 24-32 flowers, unevenly distanced along the rachis, 1-2 mm apart; axis striate, glabrous; peduncle 3-4 × 1.2-1.5 mm; cataphylls 2.8-3.3 × 2.5-2.7 mm, trilobate, retuse at the apex; bracts 1.5-1.7 × 1-1.2 mm, deltoid, early deciduous, glabrous, dorsally crested, apex cartilaginous. *Flowers* with pedicel 1.5-3 × 0.5-0.7 mm, glabrous, superficially strumose; hypanthium 1.8-2.8 × 2.2-2.8(-3.3) mm, turbinate to campanulate, glabrous inside, surface rugose, pink; sepals 0.8-1 × 0.8-1.2 mm, deltoid, apex acute; petals 1.5-2 × 1.5-2 mm, 0.5-0.7 mm wide at the claw, orbicular, white, triveined, margin erose, apex rounded; stamens 14-17 in

two series about the same length, filaments 2.5-3 mm, glabrous, anthers 0.7-0.8 × 0.4-0.5 mm, elliptic-oblong; pistil 3.5-4(-5) mm long, glabrous, ovary 1-1.5 × 0.8-1.2 mm, style 2-2.5 × 0.4-0.5 mm, stigma 0.7-0.8 mm wide, subpeltate. *Drupes* 1.2-1.4 × 1-1.2 × 0.8-1 mm, subglobose, apiculate, ventral suture impressed, red to dark red; fruiting pedicel 2-3 × ca. 1 mm; pericarp smooth, glabrous; mesocarp less than 2 mm thick; endocarp 0.3-0.4 mm wide, smooth.

**Habitat and distribution:** Montane mesophyll forests with *Quercus*, *Persea*, *Weinmannia* among other groups. Ch (*Breedlove* 49754, MEXU). 2300-3000 m. (Mexico (Oaxaca), Mesoamerica)

**Comments:** *P. tuberculata* may be distinguished from closed species (e.g., *P. brachybotrya* from the state of Veracruz) by the stems with very prominent lenticels, the leaves relatively rigid, the absence of leaf glands, the leaf base asymmetrical, the festooned brochidodromous secondary veins very conspicuous below and the relatively short erect floriferous shoots. The only two specimens known from Chiapas have subcoriaceous leaves and general leaf measurements at the lower range of the species. A further study could help to clarify the taxonomic status of those deviant populations.

**Specimens examined:** MEXICO. Chiapas: Tenejapa, near Colonia Ach'lum, 2700 m, 10 Feb 1981, *Breedlove*, *DE*. 49754 (CAS, MEXU); Tenejapa, Rancho Banabil, 2400 m, 20 Jul 1984, *Méndez*, *A*. 7767 (MEXU).

### **New species found during the preparation of the Flora Mesoamericana treatment**

11 new species were proposed and described in the treatment of the genus for Flora

Mesoamericana (Pérez-Zabala, 2015), but since the Flora has a standard not revisionary format, not intended for the publication taxonomic novelties, they were left unnamed and no type specimens were explicitly cited and as a consequence the status for those species remains as unpublished. In this chapter, the proposed type is designated and the proposed epithet (inside quotation marks) for each one is mentioned after the numbering with capital letters published in the Flora. It is clear that this thesis does not constitute an effective publication according to the article 30.8 of the Nomenclature Code; however, these descriptions are the same that are going to be sent for publishing after this dissertation is submitted.

**21. *Prunus* sp. nov. A. “acutangulata”**

Close related to *P. cortapico* Koehne by the narrow deltoid stipules, oblong leaves with 2 basal glands, the presence of indument in buds and inner surface of the hypanthium, the narrow oblong anthers larger than 1 mm long and ellipsoid drupes around 20 mm long by differing by the glabrous smaller leaves with slender petioles, the shorter and slender racemes with flowers with shorter hypanthium and a smaller number of stamens.

Type (proposed). Mexico. Oaxaca: Miahuatlan, 36 km SW of Miahuatlan along road to San Pablo Cuatlan, 1500 m, 8 Feb 1983 (fl), *D. Neill 5422* (holotype (MO-3130163); isotype (MEXU-1288904))

Tree, up to 18 m tall; bark longitudinally fissured, considerably thick at the branches. Most recent vegetative growth units 1.2–1.5 mm wide at the base once mature, holding 6–

8 leaves, glabrous; lenticels 0.4–0.6 x 0.2–0.3 mm, elliptic, barely prominent, sparse; buds hirsutulous with some setose hyaline hairs towards the top; cataphylls c. 0.8 x 1.7 mm, narrowly deltoid, glabrous. *Leaves* with blades (6–)7.4–10(–12) × (2.2–)2.7–3.4(–4.5) cm, 2.3–3.4 times longer than wide, oblong-lanceolate or elliptic-oblong, equilateral, subcoriaceous to chartaceous; slightly lustrous and applanate above, opaque and applanate beneath, glabrous at both sides; secondary vein framework weak brochidodromous, appearing eucamptodromous, midrib 0.7–1 mm wide, impressed above, very prominent beneath, secondary veins 9–10, departing at 45–65 degrees from the midrib, gradually ascending, impressed above and beneath, tertiary vein fabric mostly alternate percurrent, inconspicuous above, impressed beneath, quaternary veins mixed percurrent; leaf base obtuse to rounded, shortly decurrent; margin entire, recurved, collenchymatous edge ca. 0.1 mm wide; apex acute with excurrent glandular tipped midrib; glands 2, rarely none, 0.7–1.3 mm long, narrowly oblong or elliptic, applanate, 1–3 mm from the base, contiguous to the midrib or sometimes on the lateral sides of the petiole; stipules 2.5–3.5 × 0.8 mm, ca. 1 mm at the insertion, early deciduous, narrowly deltoid, setose ventrally, margin entire and narrowly acute apex; petiole 13–17(–20) × 0.7–1.2 mm, shallowly canaliculated from the base, flexuous, glabrous. *Floriferous shoots* with a single axis, subflexuous, mainly emerging on previous season units of extension, 35–50 × 0.6–0.9 mm, (12–)14–16 flower, unevenly spaced and distanced up to 4 mm apart, axis slightly striate, glabrous; peduncle 2–3.5 × 0.9–1.1 mm; cataphylls ca. 1.5 × 1.5 mm, broadly deltoid, ciliolate at the top; bracts ca. 1.5 × 0.5 mm, linguiform, early deciduous, dorsally glabrous, ventrally setose along a middle line up to half the length, marginally ciliolate. *Flowers* with pedicel (2.5–)3–5 × 0.4–0.5 mm, glabrous; hypanthium 2.3–3 × 3.5–4(–4.5) mm,

broadly campanulate, inside with setose trichomes basally; sepals 0.8–1 × 0.5–0.8 mm, deltoid, apex acute, cucullate, margin lacinate, glabrous; petals 1.5–2.5 × 1–1.8 mm, 0.5–0.9 mm at the claw, obdeltoid, white, triveined with the mid vein dominant, margin erose, apex emarginate, glabrous dorsally and ventrally with a tuft of trichomes at the base; stamens 18–20, in two series with the outer longer than the inner ones; filaments 1–2.5 mm long, glabrous; anthers 1–1.4 × 0.4–0.7 mm, oblong-elliptic; pistil ca. 3.5 mm long, glabrous; ovary 1.5 × 1.3 mm; style 2–2.3 × 0.4 mm; stigma ca. 0.6 mm wide, subpeltate. *Drupes* 18-22(-24) × 17–20 × 15–17 mm, globose to slightly ellipsoid, apiculate, transversal section ellipsoid symmetrical, ventral suture plain; pedicel 5–9 × 1.2–1.5 mm; pericarp smooth when dry, glabrous; mesocarp less than 2 mm deep in dry specimens; endocarp 0.4–0.5 mm thick; seeds ellipsoid.

**Habitat and Distribution:** only known from Mexico in the Pacific slopes of the Sierra Madre del Sur (states of Guerrero, Mexico, Michoacán, and Oaxaca) and from the central highlands in Chiapas. It occurs in low and mid elevation mesophyll forests between 600 - 1700 m. characterized by a dry season at winter and hot humid summers (Rzedowski & Huerta, 2006).

**Comments:** *P. "acutangulata"* could be considered close related to *P. cortapico* because sharing diagnostic characters as the long and rather subulate stipules, the pubescent foliar buds, the leaves with basal glands attached to the midrib and mucronate leaf apex, the flowers with slender pedicels, oblong longer than 1 mm anthers and hypanthium tomentose inside and the widely elliptic fruits relatively bigger than most of the Neotropical species. They both belong to the *P. occidentalis* group which also includes

*P. subcorymbosa* from South America, *P. ferruginea* and *P. ochoteranae* from Mexico. However, in this new species the leaves are consistently smaller, the apex end is glandular, the petioles are slender; the floriferous axes and pedicels are significantly thinner, the petals have a basal tuft of trichomes placed ventrally and the fruits are generally larger and globose.

**Etymology:** The proposed species epithet refers to the shape of both the leaf and sepal apex. This name was originally proposed by C.L. Li and assigned as herbarium name to some specimens cited here.

**Specimens examined:** **MEXICO.** Temascaltepec, Acatitlan, 1150 m, 21 Jan 1933, *Hinton, GB. 3183* (ASU, DES, F, US); Temascaltepec, Ixtapan, 1100 m, 22 Jun 1934, *Hinton, GB. 6206* (US); San Carlos, 900 m, 1843, *Liebmann, F. 1757* (F); **Chiapas:** Tenejapa, Ojo de Agua Yashanal, 1700 m, 10 Mar 1984, *Méndez, A. 7377* (MEXU, MO, TEX, XAL). **Guerrero:** Campo Morádo and hills above town. Dry deciduous forest, with *Quercus* and *Bursera*, 1400 m, 22 May 1987, *Miller, JS. 2895* (MEXU, MO). **México:** Temascaltepec, Pantoja, 1500 m, 4 Dec 1932, *Hinton, GB. 2865* (GH, HINTON). Temascaltepec, Volcan, 1360 m, 12 May 1933, *Hinton, GB. 3918* (NY, UC, US). **Michoacán:** Aquila, Barranca de Jorge, 3 km al este de Aquila, 350 m, 29 Feb 1980, *Guerrero C., B. 745* (XAL). **Oaxaca:** Cerro Marimba, 600 m, 14 Dec 1983, *Torres C., R. 4342* (MEXU, NY).

## 22. *Prunus* sp.nov. **B.** “nubila”

Resembles *P. annularis* Koehne by the ventrally fused stipules, leaves size and shape, venation architecture, petiole length and racemes general size, but it has narrower leaves with caudate apex, more secondary veins, only 2 submarginal glands, flowers with larger sepals, petals and

anthers and the smaller ellipsoid to obovate fruits.

Type (proposed). Costa Rica. Heredia: Parque Nacional Braulio Carrillo, Estación Carrillo, costado sur, 2650 m, 5 May 1990 (fl), *Rivera, G. 268* (holotype, MO-5564132)

Tree, up to 15 m tall, outer bark forming thick plates of rhytidome on older braches. Most recent *units of extension* 1–1.5 mm wide at the base, with 7–8 leaves, glabrous; lenticels 0.2–0.4 × 0.2–0.3 mm, elliptic, faintly prominent, sparse; vegetative buds glabrous; cataphylls c. 2 x 0.8 mm, ovate and trilobate with the apical lobe longer than the lateral ones, glabrous dorsally and with a row of brown sub-apical trichomes ventrally. *Leaves* with blades 4.7–6.8(–7.5) × 1.6–2.3(–3.1) cm, 2.7–3.2 times longer than wide; oblong-lanceolate, equilateral, subcoriaceous, glabrous; slightly lustrous and rugulose above; opaque and appanate beneath; midrib 0.4–0.6 mm wide, slightly depressed above, prominent beneath; secondary vein framework festooned brochidodromous with 7–9 main vein pairs, departing at 50–65 degrees from the midrib, gradually ascending, impressed above, flat beneath; tertiary vein fabric mostly irregularly reticulate connecting with epimedial veins, impressed above, flat beneath; quaternary and lower rank veins inconspicuous; leaf base obtuse, abruptly decurrent at the end; margin entire-undulate, collenchymatous edge ca. 0.1 mm wide, apex acuminate; leaf glands 2, 0.5–0.6 mm diameter, elliptic, impressed, placed up to 6 mm from de base either adjacent to the margin or separated up to 1 mm from it, frequently forming a marginal enation; stipules 2.7–3.2 × 0.5–0.7 mm, 0.8 mm at the base, oblong-lanceolate, ventrally connate along a crest extending two thirds up from the base and next to the side facing the shoot, temporally persistent in new growth units, dorsally glabrous and with some sparse trichomes



ventrally, margin entire; petiole (5-)7-10(-12) × 0.8-1(-1.2) mm, shallowly canaliculated, glabrous, subflexuous. *Floriferous shoots* with a single axis, subflexuous, mainly emerging on most recent growth units, (20-)25-35(-50) × 0.8-1 mm, with 15-18 flowers, unevenly distanced on the rachis, 2-4 mm between groups of flowers, axis conspicuously striate, glabrous; peduncle 7-13(-17) × 0.8-1 mm; cataphylls ca. 1.5 × 1 mm wide, deltoid and apically minutely trilobed with lateral lobes shorter than the middle one. *Flowers* with pedicel 4-6 × 0.5-0.6 mm, glabrous; hypanthium 1.8-2.2 × 2.2-3 mm, funnellform, internally glabrous; sepals 1-1.2 × 1.3-1.5 mm, obelliptic to subrotund, cucullate with a conspicuous dorsal gibbosity, apex rounded, margin undulate and cartilaginous, appearing sub-petaloid; petals 2-2.5 × 2.5-3 mm, 0.4-0.5 mm wide at the claw, obdeltoid, white, the venation suprabasally divided into five distally freely ramified veins, margin erose, apex rounded; stamens 15-18, in two series with the outer longer than the inner ones; filaments 2-3.5 mm long, glabrous; anthers 0.7-0.8 × 0.5 mm, elliptic, the connective more than half their total length; pistil 3-3.5 mm long, glabrous; ovary 1 × 0.8 mm; style 2 × 0.3 mm; stigma 0.9-1 mm wide, peltate. Fruits 11-13 × 8-9 × 7-9 mm, ellipsoid to obovate (rarely subglobose) and conspicuously apiculate, transverse section ellipsoid symmetrical, ventral suture plain; fruiting pedicel 5-7 × 0.8-1 mm, distally expanded forming a narrow reddish rim; pericarp smooth when dry, glabrous; mesocarp less than 2 mm thick; endocarp 0.1 mm thick.

**Habitat and Distribution:** only known from isolated high elevation places along the Talamanca mountain range in Panama and Costa Rica and the central volcanic massif in Costa Rica corresponding to montane rain forests between 2250 - 3000 m. It is distributed

in areas close to *P. annularis*; for example, in the area of Barva Volcano where the type specimen of that species was collected, it is distributed generally below 2100 m, the new species occupies habitats over 2300 m.

**Comments:** *P. "nubila"* differs from similar species such as *P. annularis* and *P. fortunensis* by the relatively narrow leaves, very acuminate, with secondary and tertiary veins more conspicuously depressed on the upper side, petioles conspicuously flexuous near to the base, the 2 elliptic glands placed adjacent to the margin (vs. separated from the margin and on the secondary veins). The flowers also have pedicels flexuous at the base, sepals cucullate with petaloid appearance towards the apex, petals comparatively larger than the similar species and the fruit is more longitudinally elongate and frequently obovate. Previous herbarium determinations have assigned specimens of this taxon to *P. cornifolia* (= *P. rhamnoides*) probably based on the leaf shape and glands placement, but that species belong to a different group (with *P. urotaenia* Koehne from South America) because the leaf domatia, the wide hypanthium and the relatively fleshy mesocarp.

**Etymology:** the proposed specific epithet refers to the habitat in high elevation cloud forests.

**Specimens examined:** **COSTA RICA. Cartago:** Cantón Guarco, 2300 m, 14 Apr 1967, *Madriz, A.* 58 (F). **Heredia:** along road from Sacramento to Laguna del Barva, SW slope of Volcán Barva, 2650 m, 30 Apr 1986, *Grayum, MH.* 7534 (MEXU, MO); Barva, Parque Natural Braulio Carrillo. Cordillera Central. Volcán Barva, 2680 m, 17 Sep 1994, *Lépiz, E.* 552 (F, MO); ibidem, 2600 m, 7 Aug 1989, *Rivera, G.* 5 (MO). **Limón:** Parque Internacional La Amistad, el Valle de Silencio, Turberas #2. Z, 2400 m, 15 Feb 2012, *Monro, A.* 7247 (MO). **Puntarenas:** Coto Brus, Las Mellizas, siguiendo la línea divisoria Costa Rica-

Panamá, entre Cerro Pando y Cerro Nubes, Hito Geográfico 340, camino de la Sierra, 2465 m, 15 Aug 1989, *Chacón, A. 332* (MO); Cordillera de Talamanca, upper slopes of Cerro Echandi, 2700 m, 23 Aug 1983, *Davidse, G. 23981* (MO). **PANAMA. Chiriquí:** Cerro Pando, 2250 m, 22 Sep 1996, *Galdames, C. 3330* (NY).

### 23. *Prunus* sp.nov. C. “mesoamericana”

In leaf shape, the presence of two glands, raceme length and fruit shape somewhat similar to *P. brachybotrya* Zucc. but differing by the shorter petiole, the glands not attached to the midrib, the denser racemes with flowers shorter in the pedicels and smaller overall.

Type (proposed). MEXICO. Chiapas: Siltepec, Ventana, near Siltepec, in virgin forest, 2100 m., 25 Jul 1941 (fl), *Matuda, E. 4536* (holotype, US-1891354; Isotypes, GH, MEXU-538039, MEXU-15203, MO-1219517, NY)

Tree, until 35 m tall, branches bark rugose turning scaly with age, greyish. Most recent units of extension 1.8–2.2 mm wide at the base, with 7–9 leaves, transition between units conspicuous, glabrous; lenticels 0.3–0.5 × 0.1–0.2 mm, elliptic, slightly prominent, sparse to moderately dense; buds glabrous; cataphylls 2.5–2.8 × 2–2.2 mm, deltoid and shallowly trilobate with the mid lobe longer than the lateral ones, ventrally puberulent close to the apex. *Leaves* with blades (6-)7–12(–15) × (1.5-)2–4(–6) cm, 2.6–3.5(–4.4) times longer than wide, oblong-lanceolate to oblong-elliptic, equilateral, coriaceous; slightly lustrous above, opaque beneath, surface applanate and glabrous at both sides; midrib 0.7–1 mm

wide, impressed above, very prominent beneath; secondary vein framework brochidodromous with 9–10 main vein pairs, departing at 60–75 degrees from the midrib, gradually ascending, flat at both sides; tertiary vein fabric alternate percurrent, connecting mostly with intersecondary veins, inconspicuous above, flat or sometimes inconspicuous beneath; quaternary and lower rank veins inconspicuous; leaf base obtuse; margin entire with collenchymatous edge ca. 0.1 mm wide, apex shortly acuminate; leaf glands 2, 0.6–0.8 mm wide, rounded, flat or impressed and crateriform, sub-basal or laminar, generally on top or under the first pair of secondary veins, usually closer to the margin than to the midrib and 2–10 mm from the base; stipules  $2.5\text{--}3.5 \times 1\text{--}1.5$  mm, 1–1.2 mm at the base, deltoid-oblong, connate ventrally along more than  $\frac{3}{4}$  their length on the edge facing the shoot, early deciduous, with entire cartilaginous hyaline margin, glabrous; petiole  $8\text{--}11 \times 1\text{--}1.4$  mm, shallowly canaliculated, glabrous. *Floriferous shoots* with a single axis, relatively erect, emerging mainly on previous season growth units,  $(20\text{--})35\text{--}65\text{--}(100) \times 1\text{--}1.4$  mm, with 15–22(–30) flowers, more densely distanced distally, separated 0.5–2.5 mm between them; axis slightly canaliculated, glabrous; peduncle  $2\text{--}3\text{--}(6) \times 1.2\text{--}1.8$  mm; cataphylls  $1.5\text{--}1.7 \times 2\text{--}2.5$  mm wide, deltoid, with the midrib dorsally protruding as a keel, tomentose ventrally with a patch of trichomes below the apex; bracts  $1\text{--}1.3 \times 0.5\text{--}0.7$  mm, narrowly deltoid, early deciduous, mostly glabrous but ciliolate marginally. *Flowers* with pedicel  $(1\text{--})2.5\text{--}4\text{--}(6) \times 0.5\text{--}0.7$  mm, glabrous, superficially rugose; hypanthium  $1.7\text{--}2 \times 2\text{--}2.3$  mm, campanulate, internally glabrous; sepals  $0.6\text{--}0.8 \times 0.5\text{--}1$  mm, deltoid or deltoid-ovate, cucullate with a dorsal gibbosity, apex obtuse, margin irregularly lacinate; petals  $1.5\text{--}1.8 \times 1.5\text{--}1.8$  mm, 0.7–0.8 mm wide at the claw, obdeltoid or spatulate, white, pinnate veined with two suprabasal main lateral veins, margin erose, apex rounded;

stamens (14–)18–24, in two series with the outer longer than the inner ones; filaments 2–3.5 mm long, glabrous; anthers 0.4–0.6 × 0.3–0.4 mm, elliptic, the connective more than half their total length; pistil 2–2.4 mm long, glabrous; ovary 0.8–1 × 0.5–0.8 mm; style 1–1.3 × 0.2–0.3 mm; stigma 0.5–0.6 mm wide, subpeltate. *Drupes* 11–13(–16) × 12–15(–18) × 11–12(–15) mm, globose to oblate and minutely apiculate, transverse section rounded to symmetrically ellipsoid, ventral suture impressed; fruiting pedicel 2–3 × 1.2–1.8 mm, distally expanded forming a narrow rim; pericarp smooth when dry, glabrous; mesocarp less than 2 mm deep; endocarp 0.4–0.5 mm (ca. 1 mm at the base) thick.

**Habitat and Distribution:** widely distributed in wet forests across a relatively wide elevation range (950 - 3000 m) in the Sierra Madre Mountain range from central Chiapas to northern Nicaragua (northern Mesoamerica).

**Comments:** *P. "mesoamericana"* can be differentiated from other species in the area by the oblong leaves with two slightly depressed glands; the flowers with relatively short pedicels, small petals and small anthers, and the fruits oblate and larger than 12 mm wide. Specimens of this species have been formerly identified as *P. brachybotrya* Zucc., a species only found at the eastern Sierra Madre in the states of Veracruz, Oaxaca, and Hidalgo, but they differ from that by the blade generally smaller with glands separated from the midrib, shorter petioles, tertiary vein fabric relatively inconspicuous, the floral pedicels shorter, anthers smaller and the fruits bigger and frequently wider than longer. The leaf shape and size of this species also resembles *P. matudae* and *P. lundelliana*, but those taxa have less coriaceous leaves with four glands and more laxiflorous racemes. One specimen from the northern mountains of Honduras known as Sierra La Esperanza (*Mejia*

331) and other from the western Sierra of Chuchumatanes in Guatemala (*Veliz 7992*) that have larger leaves, relatively short racemes, and bigger fruits, represent variants that keep leaf architecture concordance with the rest of the species, but which status could be evaluated with more collections in the future.

**Etymology:** The proposed specific epithet refers to its widespread and exclusive distribution in Mesoamerica, extending from Chiapas (Mex.) to Nicaragua.

**Local names.** cerezo, cerezo de monte (Honduras).

**Specimens examined:** **EL SALVADOR. Santa Ana:** Cerro Monte Cristo, 2300 m, 4 Feb 1954, *Heed, WB.* (US); San José Ingenio, P.N. Montecristo, camino al triffinio, 2000 m, 11 Jul 2002, *Monterrosa S., J.* 277 (MO); ibidem, los descombros, 2100 m, 3 Sep 2002, *Monterrosa S., J.* 333 (MO); ibidem, 2000 m, 3 Sep 2002, *Monterrosa S., J.* 353 (MO); **GUATEMALA. Baja Verapaz:** Unión Barrios, east of km 162/163, 1630 m, 10 Aug 1975, *Lundell, CL.* 19602 (CAS, MEXU, MO); Niño Perdido, on San José Road, 1950 m, 16 May 1977, *Lundell, CL.* 20891 (CAS, MEXU, MO). **Chimaltenango:** Cerro Chichoy near Chichoy, where the departments of Chimaltenango, Quiché and Sololá join, 2800 m, 26 Jan 1949, *Williams, LO.* 15351 (MO, US). **Huehuetenango:** San Mateo Ixtatan, La Miona, 3000 m, 16 Mar 2000, *Véliz, M.* MV 2M.7992 (MEXU, MO). **San Marcos:** 1 mile above Africa, ca. 3.3 miles above Finca Armenia above San Rafael, 1600 m, 13 Jul 1977, *Croat, T.* 40932 (MO); San Marcos, between San Marcos and Patí, 1500 m, 1952, *Williams, LO.* 18861 (F, US). **Suchitepequez:** Volcan Zunil, 1200 m, 31 Jan 1940, *Steyermark, JA.* 35262 (F). **HONDURAS. Cortés:** a ambos lados del Sendero a Cerro Cantiles, 20 km al Oeste de San Pedro Sula, Parque Nacional Cusuco, 1940 m, 19 Mar 1993, *Mejía, D.* 331 (MO); **Francisco Morazán:** Tatumbla, Montaña de El Uyuca, bosque húmedo de Valle Encantado, 1600 m, 1989, *Anonymous.* 18 (MEXU, MO); Tatumbla, El Uyuca, 950 m, 23 May 1998, *Araque, J.* 170 (MEXU); Distrito Central, in mountains above San Juancito, 2000 m, 22 Feb 1949, *Williams, LO.* 15672 (GH, MO, US (2)); Distrito Central, montaña La Tigra, San Juancito Mountains about 15 km NE of Tegucigalpa, 2000 m, 30 Dec 1962, *Williams, LO.* 23271

(DS, GH, MEXU, NY, P, UC, US); **Intibucá:** 15 km NE of La Esperanza, 1500 m, 4 Nov 1974, *Hazlett, D.* 2216 (MO); **Lempira:** Gracias, Celaque National Park, 2010 m, 11 Nov 1991, *Hawkins, T.* 55 (MO); Gracias, Parque Nacional de Celaque, cerca del Campamento de Don Tomás, 1900 m, 7 Jul 1991, *House, P.* 1024 (MEXU,MO); ibidem, 2100 m, 12 Jul 1991, *House, P.* 1054 (EAP, HEH, MO, TEFH); Gracias, Parque Nacional de Celaque, sendero entre la planta eléctrica y la primera casa abandonada de Don Tomás, 1500 m, 28 Jan 1992, *House, P.* 1177 (EAP,MO,TEFH); **Morazán:** San Juancito, bosque de nubes de Rancho Quemado, 2000 m, 19 Jun 1948, *Molina R., A.* 2810 (US); San Juancito, bosque nebuloso de Montaña La Tigra, 2000 m, 31 May 1957, *Molina R., A.* 8549 (F,GH,US); bosque denso montaña La Tigra, S.O de San Juancito, 2100 m, 31 May 1962, *Molina R., A.* 10648 (GH,US); ibidem, 2000 m, 11 Jun 1963, *Molina R., A.* 12733 (NY,US); ibidem, 2000 m, 13 Jul 1964, *Molina R., A.* 14492 (NY,US); near el Rosario, Mt San Juancito, 1700 m, 27 Feb 1969, *Molina R., A.* 23403 (DS); San Juancito, bosque de montaña La Tigra, 2000 m, 2 Jun 1973, *Molina R., A.* 27924 (US); San Juancito, 2400 m, Jul 1960, *Pfeifer, HW.* 1954 (US); San Juancito, floresta de nubes de Montaña la tigre, 1800 m, 7 Aug 1952, *Williams, LO.* 5288 (GH, US); ibidem, 1800 m, 7 Aug 1952, *Williams, LO.* 5298 (DS, F, GH, US); near to Rancho Quemado, mountans of San Juancito, 1900 m, 24 Aug 1952, *Williams, LO.* 18580 (DS, GH, US); **Olancho:** (El Filo): Alrededor de El Filo, 15 km al Noroeste de Catacamas, Parque Nacional de Agalta, 1920 m, 1 Jun 1992, *Mejía, D.* 140 (MO); **MEXICO. Chiapas:** Motozintla, SW side of Cerro Mozotal, 11 km NW of the junction of the road to Motozintla along the road to El Porvenir and Siltepec, 2100 m, 27 Jun 1972, *Breedlove, DE.* 25703 (DS, MEXU, MO); Larráinzar, Near the summit of Chuchil Ton, northeast of Bochil, 1700 m, 3 Aug 1972, *Breedlove, DE.* 26824 (MO); Motozintla, SW side of Cerro Mozotal, 2100 m, 25 Nov 1981, *Breedlove, DE.* 55718 (CAS); El Porvenir, Mt. Male, near Porvenir, 3000 m, 6 Jul 1941, *Matuda, E.* 4667 (GH, MEXU, MO, NY); San Cristóbal de las Casas, Cerro Huitepec; al W de San Cristobal, 2500 m, 25 Sep 1984, *Méndez, A.* 7978 (MEXU); San Cristóbal de las Casas, Paraje de La Soledad Los Cerezos, en el Rancho El Chivero, 2400 m, 27 Oct 1994, *Ramírez-Marcial, N.* 602 (MEXU); **NICARAGUA. Nueva Segovia:** San Fernando, Cerro Mogoto, Finca Las Brisas, 1600 m, 13 Jun 2011, *Coronado, I.* 6222 (HULE).

**24. *Prunus* sp.nov. D. “haberii”**

Somewhat similar to *P. axitiliana* Standl. by the leaf shape, the presence of two glands and the short racemes but it differs by the generally smaller more coriaceous leaves, the linguiform stipules, the racemes pauciflorous, the flowers with a bracteole below the sepals, narrower hypanthium and just 10 stamens and the smaller fruits.

Type (proposed): COSTA RICA. Puntarenas: Cordillera de Tilarán. Monteverde, Los Llanos, 2 km W of Santa Elena along road to Interamerican Highway, 1200 m, 20 Jan 1992 (fl & fr), *Haber, W.A. 10992* (holotype: MO-5564120; isotype: CR)

Tree, up to 12 m tall, bark at newer shoots smooth to scaly, tin gray, turning cracked on older branches. Most recent extension units c. 1.5 mm wide at the base, with up to 15 leaves, covered by a white-grey velamen, transition between units barely demarcated, glabrous; lenticels 0.5–0.7 mm, rounded, prominent, very sparse, light yellow; vegetative buds glabrous; cataphylls 2–2.5 × 1–1.5 mm, trilobate with the lateral around half the length of the middle one, glabrous; transitional cataphylls present, up to 3, 1.5–2 × 1–1.2 mm, trilobed with lateral lobes larger than the middle one. *Leaves* with blade (5–)5.4–7(–8) × (1.5–)1.8–3.2 cm, 2.3–3(–3.4) times longer than wide, elliptic-ovate or elliptic, slightly asymmetrical and appearing falcate sometimes, coriaceous, either olive or pale brown when dry; above slightly lustrous, applanate; beneath opaque, applanate, glabrous; secondary vein framework weak brochidodromous, appearing eucamptodromous; midrib 0.4–0.6 mm wide, flat or impressed above, prominent beneath, ending before the apex tip; secondary veins 6–7, departing at 30–45 degrees from the midrib, gradually ascending,



applanate above, slightly prominent beneath; intersecondary veins exmedially ramified forming a tertiary reticulate fabric inconspicuous above and impressed beneath; quaternary and lower rank veins inconspicuous; leaf base cuneate to acute and decurrent at the end; margin entire and slightly revolute, collenchymatous edge wider than 0.2 mm; apex acute to shortly acuminate; leaf glands (1)2, 0.3–0.6 mm diameter, rounded or elliptic, flat to impressed, up to 15 mm from the base, generally on the first pair of secondary veins but sometimes either on or below the second pair; stipules 2.5–3.2 × 0.5–1 mm, 0.8–1 mm at the base, linguiform and falcate, free, persistent on young shoots, glabrous, with cartilaginous hyaline margin, wider around the middle; petiole 6–9 × 0.8–1 mm, canaliculated, glabrous. *Floriferous shoots* with a single axis, subflexuous, emerging mainly on most recent growth units, 15–20(–25) × 0.7–0.9 mm, 10–15 flowers, unevenly spaced, up to 3 mm apart, axis striate, glabrous; peduncle 2–4 × ca. 1 mm; cataphylls 2–2.3 × 1.5–1.8 mm wide, deltoid with incipient lateral lobes shorter than the middle one, tomentose ventrally; bracts 1–1.5 × 0.8–1 mm, early deciduous, dorsally glabrous, tomentose ventrally. *Flowers* with pedicel 2–3(–5) × 0.3–0.4 mm, glabrous, with bracteoles ca. 1 mm in the upper third of the pedicel only appreciable in immature flowers; hypanthium 1.2–2 × 1.7–2.5 mm, campanulate, glabrous inside, conspicuously ridged outside; sepals 0.5–0.7 × 0.7–0.8 mm, deltoid-ovate, cucullate, apex rounded; petals 1.4–1.7 × 1.4–1.7 mm, 0.4–0.5 mm wide at the claw, obdeltoid, white, venation pinnate with 3 secondary branches, margin erose, apex emarginate; stamens 10, in a single series; filaments 1–2.2 mm long, glabrous; anthers 0.6–0.9 × 0.6–0.9 mm, suborbicular; pistil ca. 2 mm long, glabrous; ovary 0.5–0.7 × 0.5–0.6 mm; style c. 1 × 0.3 mm; stigma 0.7–0.8 mm wide, peltate and irregular at the edge. *Drupes* 10–11 × 7–10 × 7–9 mm, subglobose,

ventral suture slightly raised, dark purple when mature; fruiting pedicel 5–6 × 0.5–0.7 mm; pericarp slightly rugose when dry, glabrous; mesocarp thin, less than 2 mm deep; endocarp c. 0.2 mm thick; seed ca. 7 mm wide, globose.

**Habitat and Distribution:** Endemic of Pacific slopes of the cordillera de Tilarán in the Northwest of Costa Rica in elevations between 1200 and 1300 m. This area corresponds to a wet forests with some microclimatic dryness because the exposition to the oceanic winds (Nadkarni, Matelson, & Haber, 1995).

**Comments:** *P. "haberii"* may be distinguished by the combination of new shoots covered by a white velamen, leaves with cuneate or acute bases, secondary veins angle relatively steeply and obscurely anastomosing appearing eucamptodromous; the floriferous shoots are very short and bear flowers relatively small with minute bracteoles on the pedicel, 10 stamens arranged on only one series and filaments and pistil relatively short; the fruits are subglobose with the suture scar slightly raised. Based on the leaf shape, the presence of two glands, the venation architecture, the linguiform stipules and the tendency of green drying, this new species seems related to *P. axitliana* from El Salvador but not to the sympatric *P. annularis*; however, the former has bigger leaves with glands placed more centrally, flexuous racemes, flowers slightly bigger with more stamens and bigger fruits.

**Etymology:** The proposed specific epithet refers to collector of the type specimen, William Haber, a US botanist who performed complete floristic studies at Monteverde Reserve in Costa Rica (Haber, 2000) and initially identified a group of his specimens

collected in a mountain ridge exposed to relatively dry winds as a putative non described species of *Prunus*.

**Specimens examined:** COSTA RICA. Puntarenas: Cordillera de Tilarán. Los Llanos. Río Guacimal y Río Lagarto. Finca de Emiliano Arguedas. Monteverde, 1280 m, 2 Aug 1991, *Bello, E.* 2687 (CR, MO); Cordillera de Tilarán. Santa Elena, Los Llanos. Monteverde, 1300 m, 6 Jan 1992, *Bello, E.* 4309 (CR); Cordillera de Tilarán. Monteverde, Los Llanos 1 km W of Santa Elena, 1200 m, 7 Jan 1992, *Haber, WA.* 10977 (CR, MO); Cordillera de Tilarán. Monteverde, Bajo Tigre Trail, 1200 m, 8 Jan 1992, *Haber, WA.* 10978 (CR, F, MO); Cordillera de Tilarán. Monteverde, headwaters of Río Amapola, 3 km SE from the village of San Luis. Pacific slope moist forest, 1200 m, 28 Jan 1993, *Haber, WA.* 11419 (CR, MO).

## **25. *Prunus* sp.nov. E. “terraba-sierpensis”**

The relatively small leaves with two glands and the flowers overall size resembles *P. fortunensis* McPherson, however, differs by the larger number of secondary veins, the more central placement of the glands, the shorter racemes, and the flowers with longer pedicels and laciniate sepals at the margin.

Type (proposed): COSTA RICA. Puntarenas: Buenos Aires, cuenca Térraba-Sierpe, estación Tres Colinas, colecta en bosque y potrero, 1940 m., 9 Sep 1996 (fl), *Alfaro, E.* 723 (holotype: MO-5575865; isotypes: F-2249850, NY)

Shrubs, up to 6 m tall, younger shoots bark longitudinally fissured, becoming tessellate and accruing rhytidome on older branches; most recent extension units 1.5–2 mm wide at the base, with 9–10 leaves, glabrous; lenticels 0.2–0.4 × 0.2–0.4 mm, elliptic or rounded,

prominent, sparse; cataphylls, ovate with a mid-dorsal crest protruding onto a caudex, glabrous; transitional cataphylls present, generally 3,  $2.5-3 \times 0.8-1$  mm, trilobed with the lateral lobes 1–1.5 mm longer than the middle one, glabrous dorsally, tomentose ventrally along the mid region. *Leaves* with blades  $(4-5.2-7.2(-8) \times 1.7-2.6(-3.2)$  cm, 2.3–3.1 times longer than wide, elliptic-ovate to elliptic-obovate, slightly asymmetrical, coriaceous; opaque and plain above and beneath; glabrous; secondary vein framework brochidodromous, midrib 0.5–0.8 mm wide, slightly depressed above, slightly prominent beneath, secondary veins 9–10, departing at 50–60 degrees from the midrib, gradually ascending distally, decurrently attached to the midrib, impressed above and beneath, tertiary vein fabric composed mainly by epimedials branching as a mixed reticulate, inconspicuous above, impressed beneath, quaternary and lower rank veins inconspicuous; leaf base acute or obtuse and finally decurrent along all the petiole; margin entire, collenchymatous edge ca. 0.1 mm wide; apex acuminate and mucronate at the end; glands 2 (rarely 4), 0.7–1.2 mm diameter, rounded or elliptic, impressed, placed on or next to the second pair of secondary veins and between the  $\frac{1}{4}$  to  $\frac{1}{2}$  the distance from the midrib to the margin; stipules  $2-2.2 \times 0.7-1$  mm, 1–1.2 mm at the base, deltoid, persistent on young shoots, free, dorsally glabrous, tomentose and crested along the midrib ventrally, margin entire; petiole  $(3-5-7(-8) \times 0.9-1.2$  mm, shallowly canaliculated, glabrous. *Floriferous shoots* with a single axis, flexuous, emerging mainly on most recent growth units,  $20-30 \times 0.6-0.9$  mm, with 12–15 flowers more densely arranged towards the apex, 2–5 mm apart, axis slightly striate, glabrous; peduncle  $2-2.5 \times 0.6-0.9$  mm; cataphylls c.  $0.5 \times$  ca. 1 mm wide, incipiently trilobate with the central lobe shorter than the lateral ones; uppermost bracts  $1-1.2 \times 0.5-0.7$  mm, narrowly deltoid, cucullate, early deciduous,

dorsally glabrous, ventrally with a basal row of ciliate segmented trichomes. *Flowers* with pedicel 5–6.5(–8) × 0.3–0.6 mm, glabrous; hypanthium 1.5–2 × 2–2.8 mm, funnellform, internally glabrous; sepals 0.7–0.8 × 1–1.2 mm, broadly deltoid, cucullate, apex acute, margin erose to irregularly laciniate; petals 1.5–1.7 × 1.8–2.3 mm, 0.4–0.5 mm wide at the claw, obdeltoid, white, pinnate veined with 5–7 lateral veins, margin erose, apex irregular or unguiculate; stamens 12–16, in two series with the outer longer than the inner ones, filaments 1.3–2 mm long, glabrous, anthers 0.6–0.9 × 0.5–0.6 mm, elliptic, the connective more than half their total length; pistil 2.5–3 mm long, glabrous; ovary 0.7–1 × 0.7–0.8 mm; style 1.5–1.8 × 0.4–0.5 mm; stigma 0.6–0.8 mm wide, subpeltate. *Drupes* ca. 10 × 8 × 7 mm, ovate, with ellipsoid asymmetrical section, ventral suture plain, green; fruiting pedicel 5–7 × 0.5–0.6 mm, distally expanded forming a narrow rim; pericarp smooth when dry, glabrous; mesocarp barely fleshy (less than 2 mm deep); endocarp ca. 0.1 mm thick.

**Habitat and Distribution:** Mid to high elevation wet forest in the Terraba Sierpe basin that corresponds to the pacific slope of the Cordillera de Talamanca in elevations between 1940 - 3200 m. This basin is located near to the Peninsula de Osa region, which is reported with an important number of endemic species and biogeographical affinities with South America (Zamora, Hammel, & Grayum, 2004).

**Comments:** *P. "terraba-sierpensis"* may be recognized by the suberose bark on older shoots giving the surface a grooved appearance, the high number of secondary veins on a relatively small leaf species, the petiole comparatively shorter than closed related Costa Rican species (e.g. *P. fortunensis* and *P. "nubila"*), the very short floriferous shoots, the flowers with pedicels relatively long and sepals with laciniate margin. Specimens of this

taxon have been identified previously as *P. fortunensis* possibly considering the elliptic leaves with two glands, little conspicuous venation and the small flowers subtended by slender pedicels. However, that species has more delicate leaves with near to margin glands, shorter petioles, more conspicuous veins, and flowers with fewer stamens. On the other hand, the more common Costa Rican species *P. annularis* which can occur in the same area has larger ovoid leaves with four glands, longer racemes, and flowers with larger pieces in general.

**Etymology:** the proposed specific epithet refers to the basin formed by the rivers Terraba and Sierpe placed on the Pacific slope of Southern Costa Rica (Puntarenas province) in which all the known specimens have been collected.

**Specimens examined:** COSTA RICA. **Puntarenas:** Coto Brus, Zona Protectora Las Tablas, Cuenca Térraba-Sierpe, Sendero a Cerro Echandi, 2500 m, 14 Aug 1997, *Alfaro, E. 1368* (MO); Cordillera de Talamanca, slopes between Cerro Echandi and Cerro Burú, 2600 m, 24 Aug 1983, *Davidse, G. 24019* (MO); Coto Brus, Z.P. Las Tablas. Cuenca Terraba-Sierpe. Sendero a Cerro Echandi, 2230 m, 19 Nov 1997, *Gamboa R., B; B. 1962* (F, MO); Buenos Aires, P.N. La Amistad. Cuenca Térraba-Sierpe. Tres Colinas; Cerro Kutsí, 2100 m, 21 Nov 2000, *González, L. 1185* (INB, MO). **San José:** Perez Zeledon, Parque Nacional Chirripó, Cuenca Térraba-Sierpe, Llano Bonito, 2300 m, 5 May 1997, *Aguilar, R. 5077* (MO); Perez Zeledon, Cuenca Térraba-Sierpe, Estación Cuericí, Sendero El Carbon, 5 km east Villa Mills, 2800 m, 1 Dec 1996, *Gamboa R., B. 932* (MO).

## 26. *Prunus* sp.nov F. “nonnihilum”

Leaf size and shape and overall size of racemes and flowers resembling somewhat *P. fortunensis* McPherson, but differs by the leaves with shortly acuminate apex, basally asymmetric lamina, 4 glands, less conspicuous venation, the flowers with larger petals, funnellform hypanthium and more stamens, and the longer continuing elongating branches.

Type (proposed): COSTA RICA. San José: Dota, Copey, Area no protegida Providencia. Peor es nada. Camino Real entre Cerro Lira y California, Finca Medio Queso, 1800 m, 11 Dec 1994 (fl, fr), *Herrera, G. 7450* (holotype: NY; isotypes: F-2166068, MO-5020473).

Small tree, up to 6 m tall; bark on branches fissured, light brown. Most recent extension units ca. 1.5 mm wide at the base, with ca. 10 leaves, glabrous, transition between units barely evident apparently by undergoing continuous terminal growth in the form of short strobiliform shoots progressively lengthening after the emergence of lateral floriferous shoots; lenticels 0.4–0.5 × 0.2 mm, elliptic, prominent, dense; cataphylls ca. 1.5 × 1.2 mm, trilobed with the mid lobe longer than the lateral ones, dorsally glabrous and ventrally with some trichomes on the midrib. *Leaves* with blades 4–5.2 × 2–2.5 cm, 2–2.3 times longer than wide, elliptic-ovate or elliptic, slightly asymmetrical at the base, coriaceous, slightly lustrous and rugose above; opaque and applanate beneath, glabrous; secondary vein framework festooned brochidodromous; midrib 0.5–0.7 mm wide, flat or impressed above, prominent beneath, secondary veins 7–8, departing at 60–65(–70) degrees from the midrib, gradually ascending, impressed above, flat beneath, intersecondaries connecting perpendicularly to major secondaries and arching towards the midrib, intercostal tertiary venation openly reticulate next to the midrib and alternate percurrent towards the margin, impressed above, flat and hardly visible beneath; quaternary and lower rank veins

inconspicuous; leaf base obtuse or rounded and at the end abruptly decurrent on the adaxial side until the lower third of the petiole; margin entire, slightly revolute, collenchymatous edge ca. 0.1 mm wide; apex shortly acuminate; glands 4 (rarely 2 or 3), the lower ones 0.5–0.7 mm wide, the upper ones 0.6–1.1 mm wide, rounded to elliptic, slightly raised, the lower pair sub-basal immediately below the first pair of secondary veins, the upper pair on or around the second secondary vein pair midway between the margin and midrib; stipules 1.5–2 × 0.5–0.9 mm, 1–1.3 mm at the insertion, deltoid-oblong, early deciduous, glabrous, margin entire, ventrally fused next to the inward edge; petiole 4–5.5 × 0.8–1 mm, shallowly canaliculated, glabrous. *Floriferous shoots* with a single axis, subflexuous, emerging mainly from most recent extension units, 30–40(-50) × 0.8–1 mm, with 18–22 flowers, more densely spaced towards the apex, axis striate, glabrous; peduncle 3.5–8 × 0.8–1 mm; cataphylls 0.8–1 × 1–1.2 mm wide, deltoid; bracts 0.7–1 × 0.6–1 mm, deltoid, early deciduous, dorsally glabrous and ventrally hispidulous below the apex. *Flowers* with pedicel 3–5(-7) × 0.5–0.8 mm, glabrous; hypanthium 1.5–2 × 2–2.5 mm, funnellform, glabrous inside; sepals 1–1.2 × 0.8–1 mm, cuneate, apex rounded; petals 1.7–2.3 × 2–2.5 mm, 0.5–0.6 mm wide at the claw, obdeltoid, white, with a central vein and two suprabasal lateral braches openly ramified, margin entire, apex rounded; stamens 18–20, in two series with the outer longer than the inner ones; filaments 1.5–2.5 mm long, glabrous; anthers 0.5–0.6 × 0.5–0.6 mm, suborbicular, the connective more than half their total length; pistil 3.5–4.5 mm long, glabrous; ovary 1.6–2 × 1–1.3 mm; style 2 × 0.3–0.4 mm; stigma 0.8–1 mm wide, subpeltate and reniform. *Drupes* 9–11 × 8–10 × 8–9 mm, globose to subglobose, with ellipsoid symmetrical section, ventral suture appanate, purple when mature; fruiting pedicel 5–7 × 0.8–1 mm, distally expanded



forming a narrow rim; pericarp slightly rugose when dry, glabrous; mesocarp less than 2 mm deep; endocarp 0.2–0.3 mm thick, smooth; seeds 6–7 x 7–8 mm, globose.

**Habitat and Distribution:** Endemic to the Pacific mid elevation (1600 – 1800 m) slopes of the region of Cerro de la Muerte in the Cordillera of Talamanca.

**Comments:** *P. nonnihilum* may be differentiated from other Costa Rican species with small leaves (less than 8 cm long) by the new extension units emerging initially as strobile-like short shoots, the relatively small leaves with four laminar glands slightly raised from the surface, the secondary veins impressed above and flat beneath, the base extending down on the petiole as a narrow adaxial wing and the deltoid ventrally-fused stipules; the flowers have a funnellform hypanthium that partially remains as a rim when the fruit matures. The presence of fused stipules is a character state not seen before this revision and it is shared among several small leaved Mesoamerican species including *P. annularis* and *P. fortunensis*. Since stipules have the role of initially protecting the leaf primordia and in the case of *Prunus* develop before than laminas (Weberling, 2006), the fused stipules could act as a more effective protective cap of young blades in rainy areas as seen in many Costa Rican montane localities. The presence of four glands suggest that this species can be closer to *P. annularis* than to other small leaved species, also the continuous growing apical short shoots leave behind narrowly spaced cataphyll scars that resembles the transversal cracks seen in some specimens of *P. annularis* (including the type specimen) that were the base for its epithet.

**Etymology:** The proposed specific epithet refers to the locality of the type, “Peor es nada”, corresponding to a Spanish language idiom that translates, better than nothing.

**27. *Prunus* sp.nov G. “tuxtensis”**

Leaf shape, long floral pedicels and overall flower size resembles *P. tetradenia* Koehne but differing in leaves of smaller size with commonly 2 glands and less notorious secondary veins, deltoid stipules, racemes shorter, flowers with shorter hypanthium, distally extended petals, less stamens, and the fruits smaller.

Type (proposed): MEXICO. Veracruz: San Andrés Tuxtla, Lote 71, estación de Biología Tropical Los Tuxtlas, selva alta perennifolia, 450 m, 12 Dec 1985 (fl), *Sinaca C., S. 358* (holotype: XAL-70000; isotypes: MEXU-428735, MO-3601317)

Tree, up to 25 m tall, bark on branches tessellated rugose, generally light brown, dark gray at newest shoots. Most recent extension units 1–1.3 mm wide at the base, with 7–8 leaves, transition between units smoothly demarcated, glabrous; lenticels 0.4–0.7 × 0.4–0.6 mm, elliptic to rounded, flat, sparse, glaucescent; cataphylls ca. 2 × 2 mm, deltoid. *Leaves* with blades (8–)8.5–11(–12) × (3–)3.5–5(–6) cm, 2–2.8 times longer than wide, ovate-elliptic to elliptic-oblong, equilateral to slightly asymmetrical, subcoriaceous to coriaceous; lustrous and applanate above, slightly lustrous and applanate beneath, glabrous, pale tin in dry specimens; secondary vein framework brochidodromous; midrib 0.5–0.8 mm wide, impressed above, prominent beneath, secondary veins 6–7, departing at

45–50 degrees from the midrib, gradually ascending next to the margin, conspicuously decurrently attached to the midrib, flat and almost inconspicuous above, flat beneath; tertiary vein fabric exmedially ramified with epimedial veins distally acroflexed and forming internal loops from the third secondary pair up, inconspicuous above, flat beneath, quaternary and lower rank veins inconspicuous; leaf base obtuse and gradually decurrent, margin entire-undulate, revolute, collenchymatous edge ca. 0.1 mm wide, apex acute; leaf glands generally 2 but sometimes individual leaves have 0, 1, 3 or 4, 0.5–1 mm wide, rounded, impressed to depressed and crateriform, located between the first and second pair of secondary veins, frequently at different levels midway from the midrib to the margin, additional glands when present usually close to the midrib and either on the first secondary vein pair or sub-basal; stipules 1.3-1.5 × 0.7–0.9 mm, ca. 1 mm at the insertion, deltoid, free, early deciduous, dorsally glabrous and ventrally tomentose, margin entire; petiole 7–10(–12) × 1–1.5 mm, shallowly canaliculate, glabrous. *Floriferous shoots* with a single axis, flexuous, appearing mainly from most recent extension units, 25–45 × 0.5–0.8 mm, 15–20 flowers unevenly spaced on the axis, 2–3 mm apart, axis striate, glabrous; peduncle 2–3 × 1–1.2 mm; cataphylls and bracts early deciduous, not seen. *Flowers* with pedicel 6–8 × 0.3–0.5 mm; hypanthium 1.5–2 × 2.5–3 mm, turbinate; sepals 0.6-0.8 × 0.6-0.8 mm, deltoid, cucullate, margin erose, apex obtuse; petals 2.5–3 × 2–2.3 mm, 0.4–0.5 mm wide at the claw, ovate, white, pinnately veined, margin erose, apex deltoid prolonged and trilobate at the end; stamens 16–20, in two series with the outer longer than the inner ones, filaments 1.8–2.8 mm long, glabrous; anthers 0.7–0.8 × 0.7–0.8 mm, suborbicular, the connective less than the half the longitude of them; pistil 4–4.5 mm long, glabrous, ovary 1.3–1.5 × 1.2–1.3 mm; style 2.5–3 × 0.2 mm; stigma 0.5–0.6 mm wide, subpeltate. *Drupes*

12–16 × 12–14 × 12–14 mm, ovate or subglobose, apiculate, with rounded transversal section; fruiting pedicel 7–8 × 1–1.3 mm; pericarp smooth when dry, glabrous; mesocarp ca. 3 mm deep in dry specimens; endocarp 1–2 mm thick.

**Habitat and Distribution:** Endemic to lowlands and foothills (300-1000 m) of the southern part of the Gulf of Mexico in the states of Veracruz and Chiapas. The habitat corresponds to humid tropical forests with a short and distinct dry season during winter months. This area corresponds to an isolated system of volcanic mountains in the Isthmus of Tehuantepec (separated from the Eastern Sierra Madre) and the western edge of the Sierra Madre Septentrional of Chiapas with presence of *Liquidambar spp.* (Altingiaceae), *Quercus spp.* (Fagaceae) and *Pinus spp.* (Pinaceae) (Rzedowski & Huerta, 2006).

**Comments:** *Prunus "tuxtlenensis"* may be recognized by the leaves turning pale tin when dry, with relatively few secondary veins considerably ascending when arise from the midrib, the petals apex that have a distinctive trilobed tongue-like extension, the anthers suborbicular with the connective relatively short and the fruits relatively large and apiculate. The petal apical extension which has not been registered in any other species is seen more easily in just opened flowers because it tends to wither in older petals. The length of such extension is variable among petals in a single flower and it could be related to a tighter sealing of the quincuncial floral bud. The most similar species is *P. tetradenia* mainly from mid to high elevation forest in the state of Veracruz which however has bigger linguiform to falcate stipules, bigger opaque leaves with 4 glands and longer racemes with long pedicelated flowers. Some earlier determinations have assigned specimens of this new taxa to *P. brachybotrya*, *P. lundleliana* or *P. myrtifolia*; however,

the former two species are from higher elevations and have more conspicuous venation and the latter is a lowland taxa that has four glands, flowers with fewer stamens and smaller fruits.

**Etymology:** The proposed specific epithet refers to the type locality, the region of “Los Tuxtlas” that includes isolated volcanic formations surrounded by lowlands in the southern part of the Mexican State of Veracruz.

**Specimens examined:** **MEXICO. Chiapas:** Yajalón, Rancho Carmen, 850 m, 6 Feb 1984, *Méndez, A. 7201* (MEXU, MO); Yajalón, Rancho Carmen, 900 m, 25 Mar 1984, *Méndez, A. 7475* (CAS, MEXU). **Veracruz:** San Andrés Tuxtla, Volcán San Martín Tuxtla, 700 m, 10 Nov 1974, *Calzada, JI. 1660* (XAL); Hueyapán de Ocampo, Santa Rosa Cintepec, camino Catemaco-Coatzacoalcos, 550 m, 16 Mar 1985, *Cedillo T., R. 3100* (XAL); San Andrés Tuxtla, Volcán San Martín, ladera S, 1200 m, 30 Mar 1956, *Miranda, F. 8367* (XAL); San Andrés Tuxtla, Cerro Lázaro Cárdenas, lote 71. Estación de Biología Tropical Los Tuxtlas, 300 m, 31 Mar 1986, *Sinaca C., S. 513* (MEXU, MO, XAL); 1030 m, 15 Jun 2005, *Velasco-Sinaca, E. 685* (MEXU, NY); Teocelo, 1000 m, 15 Nov 1971, *Ventura A., F. 4498* (CAS, UMO).

## 28. *Prunus* sp.nov H. “alushii”

Similar to *P. brachybotrya* Zucc. considering the elliptic-oblong leaves with 2 glands and conspicuous oblique running secondary veins and the general size of flowers and fruits, but differing by the leaves with chartaceous texture, less secondary veins and shorter petioles and the longer racemes with flowers subtended by longer pedicels, shorter and narrower hypanthium, and far smaller anthers.

Type (proposed): MEXICO. Chiapas: Yajalón, Río Culpitillo, 700 m, 20 Jun 1982 (fl & fr), Méndez A. 4344 (holotype: XAL; isotypes: MEXU-404141, MEXU-402561).

Tree, up to 20 m tall; bark on terminal branches dark grey and sulcate, light grey and cracked on the main trunk. Most recent extension units 1.5–2 mm wide at the base, with ca. 10 leaves, transition between units barely clear, glabrous; lenticels 0.5–0.7 × 0.2–0.4 mm, elliptic, slightly prominent, dense; cataphylls 2.7–3.2 × 1.7–2 mm, ovate and trilobed with the lateral lobes wider than the central one, glabrous both dorsally and ventrally. *Leaves* with blade (8.5-)10–16(-18) × (3-)4–6.5(-7) cm, 2.4–3.2 times longer than wide, elliptic-ovate to elliptic-oblong (the newer ones elliptic-lanceolate), equilateral, chartaceous; slightly lustrous and applanate above, opaque and applanate beneath, glabrous; secondary vein framework brochidodromous; midrib 0.7–1 mm wide, depressed above, prominent beneath, secondary veins 9–10, departing at 50–60 degrees from the midrib, gradually ascending, slightly depressed above, flat to slightly prominent beneath; intercostal tertiary vein fabric alternate percurrent, inconspicuous above, impressed beneath; quaternary and lower rank veins irregular reticulate; leaf base obtuse, margin entire with collenchymatous edge inconspicuous, apex long acuminate; leaf glands 2, 0.4–0.8 mm diameter, rounded, flat, generally placed over or below the first pair of secondary veins at 3–10 mm from the base and 1–4 mm from the midrib; stipules 2.5–3.4 × 1.4–1.7 mm, 1–1.2 mm at the insertion, broadly ovate and falcate, persistent on young shoots, connate along most of their ventral surface, glabrous, with cartilaginous hyaline margin and ventrally striate; petiole 7–13 × 1–1.3 mm, shallowly canaliculated, laterally compressed, glabrous. *Floriferous shoots* with as single axis, subflexuous or relatively

erect, emerging mainly from axils of leaves on previous season extension units, 55–85(–95) × 1–1.3 mm, with 20–36 flowers unevenly distributed, 1 to 5 mm between them, axis slightly striate, glabrous; peduncle (2–)5–8(–15) × 1.2–1.5 mm; cataphylls 4–4.5 × 2.8–3.5 mm wide, 2–2.5 at the base, broadly ovate, trilobate with the central lobe larger than the lateral ones; bracts 1–1.6 × 0.8–1.6 mm, deltoid, early deciduous, mostly glabrous but with some very sparse cilia on the margin. *Flowers* with pedicel (2.5–)6–10 × 0.4–0.5 mm, glabrous; hypanthium 1.5–2 × 1.8–2.2 mm, turbinate or funnelform, glabrous inside; sepals 0.5–0.9 × 0.7–1 mm, deltoid, apex acute; petals 1.5–2 × 1.5–2 mm, 0.3–0.5 mm at the base, orbicular, white, venation faintly visible with one central vein basally branching in three, margin erose, apex emarginate or rounded; stamens 18–22, in two series with the outer longer than the inner ones, filaments 1.5–2.5(–3) mm long, glabrous, anthers 0.3–0.4 × 0.3–0.4 mm, suborbicular, the connective more than half their total length; pistil 3–3.5 mm long, glabrous, ovary 1.2–1.5 × 0.8–1 mm, style 1.5–2 × 0.2–0.3 mm, stigma 0.5–0.7 mm wide, subpeltate. *Drupes* 0.9–1.1 × 0.8–1 × 0.8–1 mm, subglobose and apiculate, with ellipsoid symmetrical cross section, ventral suture applanate, green; fruiting pedicel 6–10 × 0.5–0.7 mm; pericarp smooth when dry, glabrous; mesocarp less than 2 mm deep; endocarp around 0.1 mm thick.

**Habitat and Distribution:** humid lowlands and foothills between 500 - 1120 m of intermountain valleys in the geographic regions of the Montañas de los Choles in Chiapas and Sierra Los Cuchumatanes in Guatemala.

**Comments:** *Prunus* “*alushii*” may be distinguished by the combination of twigs with dense and prominent lenticels, relatively big leaves, chartaceous, and elliptic-oblong, with

long acuminate apex, the stipules ovate-falcate and ventrally connate; the floriferous shoots and pedicels are relatively long, the flowers have funnelform hypanthium and very small anthers and the subglobose fruit with very thin endocarp. Specimens of this new taxon have been generally identified as *P. brachybotrya* probably based on the elliptic-oblong leaves with two glands, patent secondary veins, long petioles and long pedicelated flowers; however, that taxon is distributed in higher elevations mainly in central Veracruz, it has coriaceous leaves, fully basal glands, thicker petioles, subulate stipules and denser and shorter racemes with flowers subtended by shorter petioles. The most similar species is in fact *P. compacta*, an endemic from high elevations in the sierra de Cuchumatanes with very dense racemes and pyriform fruits which share with the new species the linguiform stipules and a similar general venation pattern. Since both species are distributed in this Sierra (though *P. "alushii"* is also present in nearby areas in Chiapas) which is characterized by limestone derive soils (Anderson, Burkart, Clemons, Bohnenberger, & Blount, 1973), that specific edaphic condition could represent a vegetation filter and as a consequence an ecological common history may be behind their evolutionary relationships.

**Etymology:** The proposed specific epithet is dedicated to the Mexican collector Alush Shilom Ton (Alonso Mendez Ton).

**Specimens examined:** GUATEMALA. **Huehuetenango:** Ixcán, Sierra de los Cuchumatanes, between Cerro Chiblac and Finca San Rafael, 500 m, 24 Jul 1942, *Steyermark, JA. 49477* (F, US). **Quiché:** Cotzal, Finca San Francisco, 1120 m, 6 Dec 1934, *Skutch, AF. 1860* (GH, NY, US). **MEXICO. Chiapas:** Sabanilla, Finca Morelia, 650 m, 5 Jun 1983, *Méndez, A. 6098* (MEXU, MO); Yajalón, Río y Rancho Carmen, 600 m, 25 Jun 1983, *Méndez,*



A. 6230 (MEXU, MO); Sabanilla, Finca Carmen, 500 m, 15 Jul 1983, Méndez, A. 6339 (F, MEXU, MO); Yajalón, La espalda del cerro Tz'iz Ton, 600 m, 30 Aug 1983, Méndez, A. 6537 (MEXU).

**29. *Prunus* sp.nov I. “vulcanica”**

Somewhat resembling *P. axitliana* Standl. because the elliptic leaves with 2 glands and the relatively big fruit, but differs by the leaves with coriaceous texture, rather ascendant secondary veins and shorter basally expanded petioles, the racemes erect longer and thicker at the axis and the larger flowers in general with much larger anthers.

Type (proposed): GUATEMALA. Acatenango; Vegetación del volcán de Acatenango, Volcán de Fuego, 2700 m, 11 Sep 1993 (fl), *Arias & Véliz 93.3299* (holotype: MO-5871672)

Shrubs or trees, up to 5 m tall; bark on young branches dark grey with sparse transversal grooved scars, becoming plated when older. Most recent extension units 2–3 mm wide at the base, with 7–8 leaves, transition between units barely visible, glabrous; lenticels 1.2–1.5 × 0.4–0.7 mm, elliptic to eye shaped, paler than the bark, slightly prominent to protuberant, relatively dense; vegetative buds glabrous; cataphylls 2–3.5 × 2–2.5 mm, deltoid, dorsally glabrous, tomentose ventrally; 2–3 transitional cataphylls present, approximately the same size than basal cataphylls, trilobed with the lateral lobes longer than the central one, same indument than basal cataphylls, subtending preformed lateral reiterations. *Leaves* with blades (4–)4.5–7(–8.5) × 2–2.7(–3.3) cm, 2.2–2.8 times longer than wide, elliptic-obovate to obovate, equilateral, coriaceous; lustrous and applanate

above, opaque and applanate beneath, glabrous; secondary vein framework weak brochidodromous, appearing eucamptodromous, midrib 0.5–0.8 mm wide, flat above, very prominent beneath, secondary veins 5–6, 40–50 degrees from the midrib, abruptly more ascending when merging the immediately underneath secondary vein, impressed above and almost inconspicuous, flat beneath; tertiary vein fabric irregular reticulate, inconspicuous above, flat and almost inconspicuous beneath; quaternary and lower rank veins inconspicuous; leaf base cuneate to acute, margin entire and revolute, collenchymatous edge more than 0.2 mm wide, apex shortly acuminate and mucronolate at the tip; leaf glands 2, 1–1.7 mm long, elliptic, up to 3 times longer than wide, flat, sub-basal at 2–3 mm from the base and ca. 1 mm from the margin; stipules  $2.5\text{--}3.5 \times 0.5\text{--}0.7$  mm, 0.7–1 mm at the insertion, subulate, free, persistent on young shoots, glabrous, with cartilaginous hyaline margin, mucronate apex; petiole  $5\text{--}7 \times 1\text{--}1.5$  mm, canaliculated, basally attached by a conspicuous protuberance on the shoot, glabrous. *Floriferous shoots* with a single axis, relatively erect, emerging mainly from axils of leaves on most recent extension units,  $3.5\text{--}5$  cm  $\times$  0.8–1.2 mm, with 15–20 flowers, more densely distanced towards the apex, axis striate, glabrous; peduncle  $3\text{--}7 \times$  ca. 1.5 mm; cataphylls  $1.5 \times 2$  mm wide, trilobate with the central lobe shorter than the lateral ones, the base amplexicaul with the lateral arms minutely dentate; bracts  $2\text{--}2.5 \times 1\text{--}1.2$  mm, narrowly deltoid or linguiform, early deciduous, hyaline, ciliate at the apex and base with trichomes coming out from the ventral side. *Flowers* with pedicel  $2\text{--}4 \times 0.5\text{--}0.7$  mm, glabrous; hypanthium  $2.2\text{--}2.8 \times 2.5\text{--}3.5$  mm, campanulate, inside glabrous; sepals  $0.8\text{--}1 \times 1\text{--}1.5$  mm, deltoid-ovate, apex rounded; petals  $2\text{--}2.7 \times 1.5\text{--}2.2$  mm, 0.5–0.6 mm at the claw, obdeltoid, white, with a midrib supra-basally divided in three openly branched lateral veins, margin

entire, apex rounded; stamens 20–24, in two series with the outer longer than the inner ones; filaments 2.5–3(–3.5) mm long, glabrous; anthers 1–1.2 × 0.5–0.6 mm, elliptic, the connective more than half their total length; pistil 4–4.5 mm long, glabrous, ovary 2–2.5 × 1.5–1.8 mm, style 2.5–3 × 0.3–0.5 mm, stigma 0.8–1 mm wide, peltate. *Drupes* 15–17 × 12 × 1 mm, ovate and acuminate, with ellipsoid asymmetrical cross section, ventral suture aplanate; pedicel 4–6 × 1–1.2 mm; pericarp smooth when dry, glabrous; mesocarp less than 2 mm deep in dry specimens; endocarp 0.2 mm thick.

**Habitat and Distribution:** high elevation cloud forest between 2400 and 3800 m in the wet slopes of the volcanoes Acatenango and Atitlán in Guatemala.

**Comments:** *Prunus* “*vulcanica*” has relatively thick new shoots, coriaceous leaves with fewer secondary veins compared to other species in Guatemala, the leaf base cuneate to acute, the margin revolute and cartilaginous, two sub-basal glands and relatively visible and persistent stipules. The floriferous shoots are erect, the anthers larger than any other high elevation species and the fruits are ovate and apiculate. It could be considered close to *P. axitliana*, a species distributed in lower elevations (up to 1600 m) from El Salvador to Chiapas since it has leaves with two sub-basal glands, generally drying pale green, linguiform stipules, and relatively big globose fruits. However, traits like the rigid coriaceous leaves and erect racemes clustered towards the tips of the branches, probably related with adaptation to high elevation wind exposed habitats, make this taxon unique among the Mesoamerican species.

**Etymology:** The proposed specific epithet refers to the volcanoes Acatenango and Atitlán in Guatemala, the only known localities so far.

**Specimens examined:** GUATEMALA. **Chimaltenango:** faldas del Volcan Acatenango, 2400 m, 27 Nov 1993, *Castillo Mont, JJ; Juan. 2071* (F, MO, NY); vegetación del volcán de Acatenango, Volcán de Fuego, 3180 m, 13 Feb 1993, *Luarca, R. 93.2670* (MO). **Sololá:** Volcán Atitlán, south facing slopes, 2500 m, 11 Jun 1942, *Steyermark, JA. 47427* (F, US).

### 30. *Prunus* sp.nov. **J.** “*pankhurstii*”

Considering the relatively small leaves with 2 glands and ventrally fused stipules it is close to *P. fortunensis* McPherson but, differing by the larger leaves with caudate apex, the longer stipules, the dichotomous branching pattern, and the flowers with funnellform hypanthium, larger petals, and more stamens.

Type (proposed). Panama. Chiriqui-Bocas del Toro border. Vicinity of Cerro Colorado, along mining road on divide, 1300 m, 27 Jan 1989 (fl), *McPherson 13642* (MO-5564125).

Trees, up to 12 m tall, bark on past season branches transversally fissured and becoming plated, light brown, wood dark red. Most recent extension units 1.3–1.7 mm wide at the base, containing 5–7 leaves, transition between units conspicuously demarcated, shoots with a trifurcate-like branching pattern consisting of two lateral shoots emerging simultaneously from the axils of the two basal-most leaves on a main expanding shoot, glabrous; lenticels 0.5–0.8 × 0.2–0.4 mm, elliptic, prominent, sparse; cataphylls ca. 1.7 × 2

mm, deltoid trilobate with the middle lobe slightly shorter than the lateral ones, glabrous dorsally and densely brown tomentose ventrally; transitional cataphylls present, ca.  $2 \times 1$  mm, 3 to 5, linguiform trilobed. *Leaves* with blade (4.5-)5–7.5  $\times$  1.6–2.5(-3) cm, 2.4–3.4 times longer than wide, oblong-ovate to ovate-lanceolate, equilateral or slightly asymmetrical, subcoriaceous; slightly lustrous and applanate above; opaque and applanate beneath, glabrous; secondary vein framework brochidodromous, midrib 0.5–0.7 mm wide, slightly depressed above, prominent beneath, secondary veins 7–8, departing at 55–70 degrees from the midrib, gradually ascending, impressed above, flat beneath; tertiary vein fabric with epimedials reticulate both proximally and distally and intercostals percurrent sinuous, impressed above, flat beneath; quaternary veins conspicuous and irregularly reticulate; leaf base acute to obtuse and finally decurrent onto 1/3 of the petiole, margin entire-undulate, irregularly revolute, collenchymatous edge less than 0.2 mm wide, apex long acuminate to caudate; leaf glands (1-)2(-3), 0.8–1 mm long, elliptic, generally twice as long as it is wide, impressed, located between the first and second pair of secondary veins, usually midway between the midrib and the margin or closer to the latter and up to 20 mm from the leaf base; stipules  $2.5\text{--}3.2 \times 0.5\text{--}0.6$  mm, 0.5–0.6 mm at the base, subulate, fused to each other ventrally along the midrib, early deciduous, margin entire, glabrous dorsally and brown tomentose ventrally; petiole  $10\text{--}14 \times 0.8\text{--}1.2$  mm, canaliculated, proximally slightly swollen and flexuous, glabrous. *Floriferous shoots* with a single axis, subflexuous, emerging mainly from axils of leaves on previous extension units,  $35\text{--}40 \times 0.8\text{--}1$  mm, with 20–25 flowers, unevenly distanced and tending to be more densely arranged towards the apex, 2–4 mm apart, axis striate, glabrous; peduncle  $3\text{--}5 \times 0.9\text{--}1.2$  mm; cataphylls ca.  $1 \times 1.3$  mm wide, deltoid truncate and minutely tricuspidate.

*Flowers* with pedicel 3–5 × 0.4–0.6 mm, glabrous; hypanthium 1.5–2 × 2–2.4 mm, funnelform, glabrous inside; sepals 0.5–0.8 × 0.8–1.2 mm, deltoid, cucullate, apex rounded, margin cartilaginous bearing 2 lateral tooth-like enations; petals 2–2.3 × 2–2.3 mm, 0.4–0.5 mm at the claw, orbicular, white, pinnate veined with the two lower lateral veins openly ramified, margin entire, apex rounded; stamens 18–20, in two series with the outer longer than the inner ones, filaments 1.2–2.3 mm long, glabrous, anthers 0.8–0.9 × 0.4–0.5 mm, elliptic, the connective extending along more than half their total length; pistil 2.3–2.6 mm long, glabrous, absent in some flowers, ovary 0.7–0.8 × 0.7–0.8 mm; style 1.5–1.8 × 0.2–0.3 mm; stigma 0.7–0.8 mm wide, peltate. *Drupes* ca. 10 × 8 × 7 mm, ovate and apiculate, with ellipsoid asymmetrical section, ventral suture appanate; frutining pedicel 4–6 × 0.5–0.7 mm, distally expanded forming a narrow rim; pericarp smooth when dry, glabrous; mesocarp less than 2 mm deep in dry specimens; endocarp ca. 1 mm thick.

**Habitat and Distribution:** mid elevation wet forests between 1300 – 1630 m of western Panamá surrounding Cerro Colorado Mountain in the Cordillera Central. This mountain is located in the Tabasará range which is separated from the Talamanca Mountain range that runs from western Panama all along Costa Rica and it is recognized because the rich copper deposits.

**Comments:** *P. "pankhurstii"* may be recognized by the remarkable architecture of the shoots consisting of a main axis with two lateral branches emerging from the axils of proximal leaves, the leaves with relatively long and slim petioles, flexuous and enlarged at the proximal edge, the apex long acuminate to caudate, the two elliptic glands, the stipules

subulate and ventrally connate and the anthers considerably bigger than the close related species *P. annularis*. This species can be also considered close to the here described *P. "nubila"* because the leaves with relatively long petioles, narrow laminas, caudate apex, 2 non-basal glands, subulate and ventrally fused stipules, the branches architecture and long pedicelated flowers; but *P. pankhurstii* has leaves tending to be waved and less coriaceous in texture, the glands are located closer to the midrib, the petioles are slender and the flowers do not have petaloid rounded sepals.

**Etymology:** The proposed specific epithet is dedicated to the recently deceased British botanist Richard John Pankhurst (1940-2013) who compiled the world check list of the family Rosaceae.

**Specimens examined:** PANAMA. **Bocas del Toro:** Region of Cerro Colorado, on trails from continental divide, 7 miles from Chami [Chame] Camp, cloud forest, 1500 m, 12 Apr 1986, *McPherson, G.* 8827 (MO); Vicinity of Cerro Colorado, on trail along creek 8.6 miles from Camp Chami [Chame], forest, 1400 m, 14 Apr 1986, *McPherson, G.* 8888 (MO).

### **31. *Prunus* sp.nov. K. "chirripoensis"**

Leaf and racemes sizes resemble *P. "nonnihilum"* but differing by the leaves with only two glands located between the first and second pair of lateral veins, the venation relatively flat on both sides, the flowers with taller and wider hypanthium, larger anthers, and the bigger obovate fruits.

Type (proposed): COSTA RICA. San José: Perez Zeledon, Cerro Chirripó, deforested area along trail known as Abra, heavily overgrown with weeds, 2500 m, 6 Apr 1969 (fl & fr), *Davidse 1650* (Holotype F-1753864; Isotypes GH, MO-2192118, NY).

Shrubs, up to 4 m tall; bark on the branches longitudinally fissured with peeling strips, pale brown. Most recent extension units 1.8–2 mm diam. at the base, containing 8–9 leaves, glabrous; lenticels 0.5–0.7 × 0.2–0.3 mm, narrowly oblong, slightly prominent, sparse; vegetative buds glabrous; cataphylls 1.8–2 × 1–1.2 mm, trilobate with lateral lobes larger than the central one and tipped by a glandular tissue, glabrous dorsally and tomentose with abundant brown trichomes septate ventrally. *Leaves* with blade 3.5–4.5(–5.5) × 1.6–2.4 cm, 2–2.3 times longer than wide, ovate-elliptic, equilateral, rigid coriaceous; lustrous and slightly bullate above, slightly lustrous and appanate beneath, glabrous; secondary vein framework brochidodromous, midrib 0.5–0.7 mm wide, impressed above, prominent beneath, secondary veins 6–7, departing at 60–70 degrees from the midrib, initially straight and becoming more ascending after joining the preceding vein, impressed above, slightly prominent beneath; tertiary vein fabric with 2 or 3 alternate percurrent veins connecting to intersecondaries, inconspicuous above, flat and almost inconspicuous beneath; quaternary and lower rank veins inconspicuous; leaf base rounded, decurrent at the end; margin entire, revolute, collenchymatous edge more than 0.2 mm wide, apex shortly acuminate with excurrent glandular tipped midrib; leaf glands 2, 0.8–1 mm diam., rounded, flat, located on the first pair of veins, generally on the outer third of each half of the lamina, up to 5 mm from the base; stipules ca. 1 × 0.4 mm, deltoid, slightly falcate, free, early deciduous, with cartilaginous margin and protuberant



midrib, drying dark brown, glabrous; petiole (3–)4–5 × 0.8–1(–1.2) mm, canaliculate, attached to the shoot by a conspicuous outgrowth, glabrous. *Floriferous shoots* with a single axis, relatively erect, emerging mainly on most recent extension units, 32–50 × 0.8–1 mm, with 18–22 flowers, densely distanced towards the apex, axis smooth, glabrous; peduncle 6–10 × 0.8–1 mm; bracts ca. 1.2 × 0.8 mm, deltoid with erose to lacinate margin, early deciduous, glabrous dorsally, tomentose ventrally. *Flowers* with pedicel 4–6 × 0.4–0.6 mm, canaliculate, glabrous; hypanthium 2.5–3 × 3–3.8 mm, broadly campanulate, glabrous inside; sepals 0.8–1 × 1.5–2 mm, broadly deltoid, apex obtuse, the margin cartilaginous and lacinate; petals 2–2.3 × 1.7–2 mm, 0.4–0.5 mm at the claw, obdeltoid, white, basally tri-veined and distally pinnate veined, margin erose, apex extended and narrowly deltoid in three petals and shorter and rounded in the other two; stamens 20–25, in two series with the outer 1 mm longer than the inner ones, filaments 1.5–3 mm long, glabrous, anthers ca. 0.8 × 0.7 mm, suborbicular, the connective less than the half the longitude of them; pistil 3.5–4 mm long, glabrous, ovary 1.5–1.8 × 1–1.3 mm, style 2.5–2.8 × 0.2–0.3 mm, stigma 0.8 mm wide, waved. *Drupes* 12–13 × 9–10 × 9–10 mm, obovate, rounded across, ventral suture impressed, dark purple when mature; fruiting pedicel 5–7 × 1 mm; pericarp smooth when dry, glabrous; mesocarp more than 2 mm deep in dry specimens; endocarp 0.3–0.4 mm thick; seeds 7–8 across, globose.

**Habitat and Distribution:** wet cloud forests around 2500 m of the western slopes of the Chirripo massif (the highest peak in Costa Rica) which is located in the Talamanca Mountain ridge, San José Province. This area corresponds to vegetation zone denominated tropical upper montane cloud/rain forest, dominated by oak (*Quercus* spp.) and members

of the family Myrsinaceae with lots of bamboos (*Chusquea*) in the understory (Kappelle, 2016).

**Comments:** *P. "chirripoensis"* may be recognized by the relatively small, rigid coriaceous, obscured veined and short petiolate leaves with two conspicuous sub-basal glands and both the cataphylls and leaves with a glandular tissue at the tip. The flowers of this species are bigger than other species with leaves up to  $5.5 \times 2.4$  cm and the fruits are obovate with a conspicuous fleshy mesocarp. The combination of small leaves with 2 glands, thin petioles and brochidodromous festooned secondary venation pattern suggests closeness with *P. fortunensis*, but this new species has shrubby habit and a general denser and thicker morphology that could be associated with the high mountain habitat. In contrast, the latter species has arboreal habit, less coriaceous leaves arranged loosely on the branches and mid-elevation geographic distribution.

**Etymology:** The proposed specific epithet refers to the type and also only known locality.

### **Excluded species**

*Prunus brachybotrya* Zucc., *Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss.* 2: 348 (1836 [1837]). Holotype: Mexico, unknown state, *Zuccarini s.n.* (M).

*Lauro-cerasus mexicana* M. Roem., *Prunus laurifolia* Schldl., *P. schiedeana* Steud.

Previously identified from Mesoamerica but an extensive revision of material from Mexico have shown that *P. brachybotrya* is restricted to montane mesophyll forests between 1600 and 2200 m elevation in the Mexican states of Veracruz and Oaxaca. Most of the material from Mesoamerica previously associated to this name correspond to a new species (*P. sp. nov.* B “*mesoamericana*”), whilst other specimens were misidentified.

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## CHAPTER 3

# THE PHYLOGENY OF *Prunus* L. (WITH AN EXPANDED SAMPLING OF THE NEW WORLD TROPICAL SPECIES) AND THE HISTORY OF ITS ENVIRONMENTAL NICHE IN TERMS OF WATER AVAILABILITY

### INTRODUCTION

The explanation of patterns of geographic distribution requires the simultaneous consideration of both the ecology and the evolutionary history of the organisms (Wiens & Donoghue, 2004). For plants, climate, a major component of the ecological space, can be a crucial determinant of the geographic occupancy (Hampe & Jump, 2011). Climatic fluctuations through time can trigger phenotypic adaptive changes which eventually became fixed and increase the chance of colonization of new areas. In the other hand, functional constraints resulting from either prior directional selection processes or deep developmental limitations can drive spatial sorting and consequently geographic range changes when plants are exposed to new climatic scenarios (Ackerly, 2009). The retention of primary ecological tolerance has been found as a general trend which is associated with both a tendency for constrained variation of key morphological or physiological traits among closely related species and more frequent dispersals in the biogeographic history (Donoghue, 2008; Wiens et al., 2010).

In the new World tropics (NWT), palaeoecological and geological studies have revealed multiple changes in the distribution of wet and dry climatic regimes, which considerably influenced biogeographic history of the region during the Cenozoic (Graham, 2010). Specifically,

past expansions of drier conditions could have connected presently scattered seasonally dry areas to each other and potentially also with Northern hemisphere subtropical and temperate dry habitats (Caetano et al., 2008; R. Toby Pennington, Lavin, & Oliveira-Filho, 2009). Currently patchy distributions or biogeographic disjunctions of many lineages that possess dryness tolerance have been explained by those past expanded habitats (Axelrod, 1975; Wen & Ickert-Bond, 2009). However, the frequent generalization that tropical habitats are always associated with wet environments has led to underestimation of the actual climatic heterogeneity of many groups and consequently also of the influence of dry past regimes in their evolutionary history (R. T. Pennington et al., 2010; Sarkinen, Iganci, Linares-Palomino, Simon, & Prado, 2011).

Worldwide distributed and highly diverse genera that include members distributed in subtropical and temperate dry habitats, mesophytic temperate forest and tropical forests (e.g., *Ilex* (Aquifoliaceae), *Prunus* (Rosaceae) and *Styrax* (Styracaceae)), and specifically wide-ranging distributions (both geographically and ecologically) in the NWT; could be good candidates to tests the influence of climatic dry historical fluctuations in the evolutionary history of the main biomes of the New World flora during the Tertiary and Quaternary as well as biogeographic hypotheses like the Madrean-Tethyan disjunction (Axelrod, 1975). Particularly, *Prunus*, an almost cosmopolitan group (Mabberley, 2017) with more than 400 species and 228 species currently recognized in the NWT (see chapter 1 of this dissertation), occurs in the NWT across a wide climatic range spanning from moist forest to seasonally dry (including sub-humid) places in the Caribbean islands, the Brazilian Cerrado biome and some dry inter-Andean and Mesoamerican valleys (Linares-Palomino, Oliveira-Filho, & Pennington, 2011; Vasquez & Phillips, 2000). *Prunus* is widely known for the economic and cultural importance of several of its species (e.g. cherries, peaches, plums, apricots, almonds, cherry blossoms) (Kalkman, 2004) and also because



of the frequent occurrence in dry and arid habitats around the World (Rieger & Duemmel, 1992; Rieger, Lo Bianco, & Okie, 2003). The genus is the only member of the tribe Amygdaleae DC. which is part of the subfamily Amygdaloideae Arn. (Synonymous with Spiraeoideae Arn. sensu Potter et al. (2007)) and is sister to *Lyonothamnus floribundus* A. Gray, the sole member of the tribe Lyonothamneae (Xiang et al., 2017). Previous phylogenetic studies in general have supported its subdivision into three main groups (clades) discernible by inflorescence type: ‘solitary flower’ group (temperate and subtropical deciduous), ‘corymbose’ group (temperate deciduous) and ‘racemose’ group (temperate, subtropical and tropical evergreen plus some temperate deciduous) (Chin, 2012; Chin, Shaw, Haberle, Wen, & Potter, 2014; Chin, Wen, Johnson, & Potter, 2010; Shi, Li, Sun, Yu, & Zhou, 2013)

The ‘solitary flower’ group integrated mostly by species traditionally classified in the subgenera *Amygdalus* and *Prunus* and the ‘corymbose’ group integrated mostly by species traditionally classified in the subgenus *Cerasus*, have been consistently recognized as clades in latter studies (Hodel, Zimmer, & Wen, 2021; Zhao et al., 2016). However, the racemose species have been recovered either as monophyletic (Chin et al., 2014) or polyphyletic (Zhao et al., 2016; Zhao et al., 2018) due to inconsistencies between plastid and nuclear genomes suggesting multiple ancient hybridization events. Within the ‘racemose’ clade, the NWT species of *Prunus* have been suggested to form a monophyletic group (Chin, 2012; Chin et al., 2014); nevertheless, their relationships are still poorly known, mostly because of poor sampling. Although most of the species with racemose inflorescences are from the tropics, some are distributed in temperate seasonally dry Mediterranean habitats and share with tropical taxa similar magnitude of some leaf traits (e.g. low specific leaf area-SLA) (Ackerly, 2004) that can favor survival in seasonally dry regimes by increasing hydraulic safety (Nardini, Peda, & Rocca, 2012; Sack et al., 2012).

The response of the plants to the environment in an evolutionary scale can be manifested both by structural changes reflected in the expression of key traits and alternatively by the occupied space where a combination of biophysical variables allows the individuals to grow and reproduce. The latter can be observed as geographical distribution patterns that have associated climatic and edaphic conditions suitable to the thriving of specific groups of plants and denominated the ecological niche (Soberon & Nakamura, 2009). As the niche can be interpreted as a response driven by a combination of multiple factors it could be seen as a concomitant trait that could be evaluated in comparative analyses to explore its role in the evolutionary history of a group (Warren, Glor, & Turelli, 2008). A phylogenetic hypothesis and quantitative information about the ecological preferences of the evaluated species are the required inputs for exploring questions about the evolution of the ecology of a group. Based on the observed highly variable distribution in the humidity gradient (Banda-R et al., 2016; Rieger & Duemmel, 1992) and previous works that suggested the role of climate in the evolutionary patterns of *Prunus* (Chin, Lutz, Wen, & Potter, 2013); this study seeks to investigate first the placement and relationships of the NWT members by improving the sampling of species of *Prunus* in the context a broad phylogeny of the genus, and subsequently examines the role of ecological constraints related to water availability and particularly the impact of climatic aridity in the evolutionary history of the whole group with a particular emphasis on the NWT species exploring the evolutionary patterns of the ecological preference of the species inferred from correlative models of current niche species distributions.

## MATERIALS AND METHODS

### **Taxon sampling**

This study was designed to include in the phylogeny of the genus *Prunus* as many species from the NWT as possible. Initially, 164 tissue samples obtained from herbarium specimens and silica gel preserved tissues from freshly acquired collections belonging to 125 neotropical species were initially processed for DNA extraction. However, only 41 samples yielded successful amplifications of all selected DNA regions, meanwhile 68 samples yielded low quality or incomplete sequences and for 55 samples not significant DNA was obtained. Most of the successful samples were silica gel preserved material from recent collections.

Data of the 41 NWT taxa with complete sequences of all targeted regions were added to the respective from 91 species identified at the GenBank with species level verifiable determination and data of the DNA regions selected for this work. A total of 132 taxonomic units of *Prunus* were analyzed corresponding to 126 species representing all the main clades previously identified (Chin et al., 2014; Zhao et al., 2016) but with the NWT species considerably better represented and taxonomically consistent with the synopsis made in Chapter 1. Outgroups were chosen to include other genera of Amygdaloideae and members of all subfamilies of Rosaceae. In addition, a member of the sister clade of Rosaceae in Rosales, Rhamnaceae (Zhang, Soltis, Yang, Li, & Yi, 2011), was used to root the resulting phylogenies.

## **DNA extraction and amplification**

10-25 mg of tissue was used for extractions depending on availability. Tissue sources were fresh young leaves preserved in silica gel collected in field trips between 2010 and 2013 and dry material from unmounted duplicates (mostly from specimens without alcohol intermediate preservation) sent from MO and GOET to DAV herbarium. Destructive sampling from already mounted herbarium specimens was avoided taking in account that DNA deterioration is common in collections of tropical areas due to alcohol pretreatment of samples in the field before the desiccation procedure (Schweinfurt method), heat drying and chemical or physical routine treatments against pest infestation in stored collections (Forrest et al., 2019).

The CTAB extraction protocol used for dry samples preserved in silica gel or taken from herbarium specimens was an optimization based on Cota-Sánchez, Remarchuk, and Ubayasena (2006) which consider the high quantity of tannins and other secondary metabolites present in the leaves of many tropical wooden plants. The protocol eventually implemented was the following:

### **DNA Extraction Protocol (modified from Cota Sánchez et al, 2006)**

1. 10-25 mg of dry tissue (previously stored in the -80°C freezer) was grinded with liquid nitrogen and inert sand. Then 750 ml of 2X CTAB buffer was added to the grinded tissue continuing the mixing.
2. 5 µl of β-mercaptoethanol was added to 2 ml tubes and furthermore the CTAB-tissue mix was potted in the tube. Each tube was mixed thoroughly.
3. The tubes were incubated in a water bath at 57°C for 2.2 hours swirling them several times every 15 min.
4. 1 µl of RNAase was added to the mix and incubated at 37°C during 30 min. Afterwards they were cold to room temperature.
5. 700 µl of chloroform-isoamyl alcohol was added to each tube and mixed inverting them 20 to 50 times. The tubes were centrifugated at 10,000 RPM during 15 min and the aqueous supernatant phase was transferred to a new tube.
6. 700 µl of chloroform-isoamyl alcohol was added again to each tube and mixed inverting them 20 to 50 times. Then the supernatant was transferred to a new tube.
7. 1/3th of the volume (aprox 300 µl) of ice cold isopropanol was added to the tubes, the content was mixed gently and stored at -30°C for at least 8 hours.
8. The tubes were centrifugated at 10000 RPM for 15 min, afterwards the supernatant was discarded, and the pellet remained at the bottom of the tube was saved and vacuum dry afterwards.
9. 300 µl of ice-cold isopropanol was added again to the tubes with the dry pellet, they were inverted around 10 times. Afterwards was stored for 1 hour and centrifugated at 10000 RPM during 15 min.
10. Recover the pellet drying it for 1-2 hours.
11. Pellet was washed in 500 µl of 70% ethanol
12. Centrifuge at 10000 RPM during 10 min, pour off ethanol
13. Dry pellet for 5 hour or more.
14. Resuspend in 30-50 µl TE Buffer or dd water.

Samples whose DNA extracts were of low quality or rendered poor results in the PCR, were re-extracted from new loads of tissue using the DNeasy Plant Mini Kit (Qiagen, Santa Clarita, CA) following the manufacturer's recommended protocol. After extraction, DNA concentration and quality was measured using the Nanodrop 1000 Spectrophotometer (Thermo Scientific Inc. Waltham, Massachusetts, USA).

PCR mixes and thermocycler protocols were optimized for each DNA region considering the sequence lengths. Bovine serum albumin (BSA) and betaine were used to overcome PCR inhibition due to possible DNA contaminants (Kreader, 1996). PCR reactive quantities summed up for a 50 µl mix. The nuclear ITS region was amplified using primers ITS6 (5'tcgtacaagaaggttccgtaggtga3') and ITS9 (5'ccgcttattgatatgcttaaac3') designed by Sang-Hun Oh and published by (Potter et al., 2007). Two chloroplast regions were sequenced: the trnH-psbA intergenic spacer using primers trnH (5'ggtatgcatgaacgtaatgctc3') and psbA (5'cgcgcatggtggattcacaatcc3') (Shaw & Small, 2004), and trnL intron + trnL-trnF intergenic spacer using primers Tab-c (5'cgaaatcggtagacgctacg3') and Tab-f (5'attgaactggtgacacgag3') (Taberlet, Gielly, Pautou, & Bouvet, 1991). For the first and last regions, shorter intermediate primers were used occasionally. PCR reactive mixes and programs were optimized following assessment of DNA quality and concentration after several test attempts (Table 3.1).

<b>DNA region</b>	<b>Reaction mix</b>	<b>PCR program</b>
<b>ITS 3-9 and 2-6</b>	9 µl water (dd), 2.5 µl buffer 10X (with (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> ), 1.75 µl MgCl (25 mM), 1.25 µl dNTP (2mM), 0.75 µl forward primer ((10mM), 0.75 µl reverse primer ((10 mM), 8 µl betaine (5mM), 0.25 µl bovine serum albumin (0.4% BSA), 0.25 µl TAQ polymerase.	initial denaturation of 4 min at 90°C; 30 cycles of 40 sec at 94°C, 45 sec at 50.2 °C, 1 min at 72 °C, final elongation of 7 min at 72°C.

<b>ITS 6-9</b>	7.75 µl water, 2.5 µl buffer 10X, 1.75 µl MgCl <sub>2</sub> , 2 µl dNTP, 0.75 µl FP, 0.75 µl RP, 8 µl betaine, 0.25 µl BSA, 0.25 µl TAQ. With some recalcitrant samples this alternative mix were used: 7.75 µl water, 2.5 µl 10X buffer, 1.75 µl MgCl <sub>2</sub> , 2 µl dNTP, 0.75 µl FP, 0.75 µl RP, 8 µl betaine, 0.25 µl BSA, 0.25 µl TAQ.	initial denaturation of 5 min at 94°C; 35 cycles of 40 sec at 94°C, 1 min at 50.2 °C, 1 min 20sec at 72 °C, final elongation of 7 min at 72°C.
<b>trnH-psbA</b>	10 µl water, 2.5 µl buffer, 2 µl MgCl <sub>2</sub> , 1.75 µl dNTP, 0.75 µl forward primer, 0.75 µl reverse primer, 5.75 µl betaine, 0.25 µl BSA, 0.25 µl TAQ.	initial denaturation of 3 min at 92°C; 33 cycles of 45 sec at 94°C, 45 sec at 52.5 °C, 1 min 10sec at 72 °C, final elongation of 5 min at 72°C.
<b>TrnL intron (c-d)</b>	10 µl water, 3.5 µl buffer 10X, 2.5 µl MgCl <sub>2</sub> , 1.5 µl dNTP, 0.75 µl FP, 0.75 µl RP, 5 µl betaine, 0.25 µl BSA, 0.25 µl TAQ.	initial denaturation of 3 min at 94°C; 33 cycles of 45 sec at 94°C, 1 min at 55 °C, 1 min 30 sec at 72 °C, final elongation of 7 min at 72°C.
<b>TrnL-F</b>	10 µl water, 2.5 µl buffer 10X, 1.75 µl MgCl <sub>2</sub> , 2 µl dNTP, 0.75 µl FP, 0.75 µl RP, 5.75 µl betaine, 0.25 µl BSA, 0.25 µl TAQ.	Same as previous

*Table 3.1 PCR reaction mixes and programs used for each DNA segment. All preparations have 1 µl of extracted DNA.*

DNA amplicons sizes were verified through electrophoresis in agarose gel using a ladder as a reference for the expected size. PCR products positively visualized in the gel were cleaned using QIAquick Gel Extraction Kit (Qiagen, Santa Clarita, CA). Successful PCR products were sliced off and underwent a cleaning process using the Qiagen® cleaning kit. DNA quality and concentration was again assessed with the nanodrop to verify minimum concentration and quality required before the samples were submitted to sequencing. Cleaned DNA segments were sequenced with ABI Prism® 3730 Genetic Analyzer (Thermo Fisher Scientific Inc.) using the

BigDye® Terminator v. 3.1 Cycle Sequencing Kit at UC Davis DNA sequencing facility. DNA sequences of species not directly sampled were obtained from information publicly available in the GenBank (see Table 3.2 for a complete list of taxa, some relevant features and GenBank accession numbers for those not sequenced in this work).

Geographic range for niche analyses (MaxEnt)	Name	Taxonomy (traditional group)	Distribution	Inflorescence	ITS	trnL and trnL-trnF	psbA-trnH
East Asia including China	<i>Rhamnus ussuriensis</i> J.J. Vassil	OUT-Rhamnaceae	China	Fascicle or cyme	KR0833 17.1	KM4062 92.1	KM4062 49.1
North America	<i>Fragaria chiloensis</i> (L.) Mill.	OUT-Potentilleae Sweet.	West coast North America and Chile	Cyme	AF16348 4.1	AF16353 4.1	GQ4767 54.1
South America	<i>Kageneckia angustifolia</i> D. Don	OUT-Maleae	Endemic to Chile. It grows from Limari to Talca (30° to 35° S) in the Chilean Coast Range and in the Andes.	Terminal fascicle or panicle	JQ39235 4.1	DQ8632 19.1	JQ39062 7.1
North America	<i>Lindleya mespiloides</i> Kunth	OUT-Maleae Small	Mexico	Solitary flower	JQ39235 6.1	DQ8632 20.1	MN4729 52.1
East Asia including China	<i>Neillia thyrsiflora</i> D. Don	OUT-Neillieae Maximowicz	Southern China, Bhutan, India, Indonesia (Java, Sumatra), Myanmar, Nepal and North Vietnam.	Raceme or panicle	AF48714 8.1	AF34854 9.1	JN04553 9.1
North America	<i>Oemleria cerasiformis</i> (Torr. & A. Gray) J.W. Landon	OUT-Exochordeae Reveal.	Pacific coast of North America	Raceme	AF31871 5.1	AF34855 1.1	BLAST from KY4199 23.1
North America	<i>Physocarpus opulifolius</i> (L.) Maxim.	OUT-Neillieae	Eastern North America	Corymbiform raceme	JQ77689 6.1	JQ03419 1.1	AY5006 37.1
East Asia including China	<i>Prinsepia sinensis</i> (Oliv.) Hallier	OUT-Exochordeae	Manchuria (Heilongjiang, Jilin, Liaoning, Nei Mongol).	Fascicle	AF31875 1.1	AF34855 8.1	GQ4352 48.1



NorthAmerica	<i>Purshia tridentata</i> (Pursh) DC.	OUT-Dryadeae Lamarck & de Candolle	Western USA.	Solitary flower	DQ8863 57.1	AF34856 2.1	DQ1001 88.1
EastAsia including China	<i>Rosa odorata</i> (Andrews) Sweet	OUT-Roseae	Yunnan (China)	Solitary flower	FJ52770 6.1	GU5751 27.1	GU5751 42.1
NorthAmerica	<i>Rubus odoratus</i> L.	OUT-Roseae	Eastern North America, and south along the Appalachian Mountains to Alabama.	Mostly cymes	KM0376 78.1	EF05533 4.1	EU75053 7.1
EastAsia including China	<i>Sorbaria sorbifolia</i> (L.) A. Braun	OUT-Sorbarieae Rydberg	Temperate areas of Asia including Siberia, far eastern Russia, northern China, Japan and Korea.	Panicle	AF31875 8.1	AF34856 9.1	JN04724 1.1
EastAsia including China	<i>Spiraea sericea</i> Turcz.	OUT-Spiraeae DC	Northern China, Japan, Mongolia and eastern Russia.	Corymbiform raceme	MK5704 53.1	KY7417 67.1	KF98317 6.1
NorthAmerica	<i>Vauquelinia californica</i> (Torr.) Sarg.	OUT-Maleae	Southwestern United States to Sonora in Mexico.	Corymbiform cyme	KX4677 28.1	AF34857 3.1	JQ39062 5.1
Africa	<i>Prunus africana</i> (Hook.f.) Kalkman	<i>Laurocerasus sect Lauroc</i>	Tropical Africa to south Africa and Madagascar	Axillary simple raceme (ASR)	EU66910 9.1	JX41445 1.1, HQ2437 09.1	HQ1887 01.1
Asia (central)	<i>P. bokhariensis</i> Royle ex C.K.Schneid.	<i>Prunus</i>	Pakistan	Corymbiform fascicles on dedicated brachyblasts (CFDB)	GQ1796 63.1	HQ2439 91.1, HQ2437 54.1	HQ1887 43.1
	<i>P. bucharica</i> B.Fedtsch.	<i>Persica</i>	Tajikistan, Uzbekistan and Afghanistan.	Solitary flower on dedicated brachyblasts (SFDB)	AF31871 9.1	HQ2437 58.1, HQ2439 95.1	HQ1887 47.1
	<i>P. ferganensis</i> (Kost. & Rjab.) Y.Y.Yao	<i>Persica</i>	Arid regions of central Asia in Kyrgyzstan, Uzbekistan (Fergana Valley).	SFDB	DQ0062 80.1	HQ2437 89.1, HQ2440 26.1	JN04662 0.1

	<i>P. kuramica</i> (Korsh.) Kitam.	<i>Persica</i>	Afghanistan and nearby areas of Pakistan.	SFDB	KC6037 38.1	AF31866 2.1, HQ2438 16.1	HQ1887 98.1
	<i>P. petunnikowii</i> Rehder	<i>Persica</i>	Central Asia, Uzbekistan.	SFDB	AY1771 35.1	HQ2438 60.1, HQ2440 97.1	HQ1888 34.1
	<i>P. spinosissima</i> Franch.	<i>Persica</i>	Central Asia, Afghanistan, and Iran.	SFDB (can have lateral brachyblas ts with 3 flowers each)	JQ92660 5.1	HQ2441 48.1, HQ2439 11.1	HQ1888 81.1
Asia (eastern including China)	<i>P. buergeriana</i> Miq.	<i>Padus</i>	China (including Taiwan), Korea and Japan. Some records in Burma, Sikkim, Bhutan and N epal.	ASR	JQ77685 4.1	HQ2437 59.1, HQ2439 96.1	HQ1887 48.1
	<i>P. davidiana</i> (Carrière) N.E.Br.	<i>Persica</i>	China	SFDB	DQ0062 81.1	HQ2437 79.1, AF31869 7.1	HQ1887 65.1
	<i>P. discoidea</i> (T.T.Yu & C.L.Li) Z.We & Y.B.Chang	<i>Cerasus</i>	Southeastern China: Anhui, Jiangxi, Zhejiang.	CFDB	JQ03415 3.1	JQ03417 6.1	HQ4270 51.1
	<i>P. glandulosa</i> Thunb.	<i>Prunus</i>	Eastern China and Japan.	SFDB (or fascicle)	AF18562 2.1	AF42990 5.1, AF31868 0.1	AY5006 22.1
	<i>P. grayana</i> Maxim.	<i>Padus</i>	China and Japan	Terminal racemes with basal leaves (TRBL)	JQ77685 7.1	HQ2437 96.1, HQ2440 33.1	HQ1887 80.1
	<i>P. hypoleuca</i> (Koehne) J.Wen	<i>Padus (ex Maddenian)</i>	Eastern and central to western China.	RBL	JQ77688 8.1	JX41445 2.1	HQ1887 00.1
	<i>P. japonica</i> Thunb.	<i>Prunus</i>	Central China to the Korean peninsula.	CFDB	AF14538 3.1	AF42990 8.1, HQ2440 45.1	HQ1887 90.1

<i>P. kansuensis</i> Rehder	<i>Persica</i>	China (Gansu, Guizhou, Hubei, Qinghai, Shaanxi and Sichuan provinces).	SFDB	JQ92660 1.1	KF99003 6.1	KF99003 6.1
<i>P. maackii</i> Rupr.	<i>Cerasus</i> ( <i>Padus</i> <i>sensu fl</i> <i>China</i> )	Korea, both banks of the Amur River in Manchuria in northeastern China, and Amur Oblast and Primorye in southeastern Russia.	Corymbiform racemes on dedicated shoots (CRDB)	JQ77686 3.1	JQ03417 5.1	HQ1888 01.1
<i>P. mandshurica</i> (Maxim.) Koehne	<i>Prunus</i> ( <i>Armeniaca</i> )	Northeast China, Manchuria (northeast China/southeast Russia) and Korea.	SFDB (2 flowers)	JF97810 9.1	HQ2439 86.1, HQ2437 49.1	AY5006 19.1
<i>P. maximowiczii</i> Rupr.	<i>Cerasus</i>	Korea, China (Heilong Jiang, Jilin, Liaoning, and Zhejiang), Russia (Khabarovsk, Primorye, and Sakhalin), and Japan (Hokkaido, Honshu, and Kyushu).	Raceme and double racemes with foliate bracts subtending the flowers	AF14353 2.1	KP76007 1.1	KP76007 1.1
<i>P. mira</i> Poit. & Turpin	<i>Persica</i>	Foothills of the Himalayas and the Tibetan plateau.	SFDB	DQ0035 51.1	HQ2438 26.1, AF31866 4.1	HQ1888 09.1
<i>P. mume</i> Siebold & Zucc.	<i>Prunus</i> ( <i>Armeniaca</i> )	Southern China around the Yangtze River.	SFDB (or fascicle)	JF97811 8.1	KF76545 0.1	KF76545 0.1
<i>P. obtusata</i> Koehne	<i>Padus</i>	Tibet, southern China and Taiwan.	TRBL	JQ77686 9.1	HQ2438 39.1, HQ2440 76.1	HQ1888 18.1
<i>P. pseudocerasus</i> Lindl.	<i>Cerasus</i>	Central and western China	CFDB (or short racemes)	EF21107 9.1	HQ2438 73.1, HQ2441 10.1	GQ4352 76.1
<i>P. salicina</i> Lindl.	<i>Prunus</i>	Widespread in China.	CFDB	AF31872 5.1	JQ03418 6.1	AB2014 51.1
<i>P. schneideriana</i> Koehne	<i>Cerasus</i>	Southeastern China.	SFDB or CFDB	JQ77683 1.1	JQ03417 3.1	HQ4270 52.1
<i>P. serrulata</i> Lindl.	<i>Cerasus</i>	Originally from central and eastern China to southern Japan through central and southern Korea	CRDB	AF31872 1.1	JX84740 0.1, HQ2438 99.1	HQ1888 66.1

	<i>P. serrulata</i> v <i>spontanea</i> (Maxim.) Chin S.Chang	<i>Cerasus</i>	Eastern Asia and Japan.	CRDB	AY0525 08.1	KP76007 3.1	KP76007 3.1
	<i>P. sibirica</i> L.	<i>Prunus</i> ( <i>Armeniaca</i> <i>a</i> )	Eastern China, Japan, Korea, Mongolia, and eastern Siberia.	SFDB	AF31873 9.1	HQ2439 00.1, HQ2441 37.1	KP08980 9.1
	<i>P. simonii</i> Carrière	<i>Prunus</i>	Hebei province in China.	SFDB (or fascicle)	AF31872 0.1	AF31867 3.1, HQ2439 01.1	AY5006 18.1
	<i>P. subhirtella</i> Miq.	<i>Cerasus</i>	Japan	CRDB	JQ77683 2.1	KP76007 5.1	KP76007 4.1
	<i>P. tomentosa</i> Thunb.	<i>Cerasus</i> ( <i>Prunus</i> )	Southern and eastern China.	SFDB (or 2 flowers)	AF18561 7.1	AM2826 88.1	AY5006 24.1
	<i>P. triloba</i> Lindl.	<i>Amygdalus</i> ?	China, North Korea and eastern Russia.	Solitary flowers at the base of brachyblasts (SFBB)	EU66908 8.1	JQ03419 0.1	GQ4352 77.1
	<i>P. wilsonii</i> Diels ex Koehne	<i>Padus</i>	Southeastern China	TRBL	JQ77688 1.1	HQ2439 39.1, JQ03418 4.1	HQ1889 05.1
	<i>P. yedoensis</i> Matsum.	<i>Cerasus</i>	Japan	Umbelliform short terminal raceme with 3-4 flowers	JQ77683 3.1	KP76007 0.1	KP76007 0.1
	<i>P. zippeliana</i> Miq.	<i>Laurocerasus</i> <i>sect</i> <i>Lauroc</i>	Southern and central China, Taiwan, Japan and northern Vietnam.	Axillary simple raceme or homothetic double raceme	JQ77684 9.1	HQ2439 40.1, HQ2441 77.1	AB2546 43.1
Asia (general)	<i>P. armeniaca</i> L.	<i>Prunus</i> ( <i>Armeniaca</i> <i>a</i> )	Armenia, Caucasus, the Himalaya, West China, and Japan.	SFDB (2 flowers)	JQ03415 7.1	JQ03418 7.1	FN6758 30.1
	<i>P. persica</i> (L.) Batsch	<i>Persica</i>	Originally domesticated and cultivated in northwest China between the Tarim	SFDB	JQ77682 1.1	JQ03418 3.1	HQ3364 05.1

			Basin and the north slopes of the Kunlun Mountains.				
Asia (tropical)	<i>P. arborea</i> (Blume) Kalkman	<i>Laurocerasus sect Mesopygeum</i>	South Thailand, Malaysia, Sumatra, Philippines to New Guinea	Simple or double homothetic racemes or appearing as fascicle of racemes	JQ92662 2.1	HQ2437 35.1, HQ2439 74.1	HQ1887 18.1
	<i>P. costata</i> (Hemsl.) Kalkman	<i>Laurocerasus sect Mesopygeum</i>	New Guinea	ASR	JQ92661 8.1	HQ2440 12.1, HQ2437 75.1	HQ1887 62.1
	<i>P. dolichobotrys</i> (Lauterb. & K.Schum.) Kalkman	<i>Laurocerasus sect Mesopygeum</i>	New Guinea and Bismarck Arch. Papuan islands.	ASR	HM8568 13.1	HQ2440 18.1, HQ2437 81.1	HQ1887 67.1
	<i>P. fordiana</i> Dunn	<i>Laurocerasus sect Lauroc</i>	Southern China (Guandong), Cambodia and Vietnam.	ASR	AF17953 0.1	HQ2440 29.1, HQ2437 92.1	HQ1887 76.1
	<i>P. grisea</i> (Blume ex Müll.Berol.) Kalkman	<i>Laurocerasus sect Mesopygeum</i>	Burma, Philippines Thailand, Southern Vietnam, all Malesia including New Guinea.	ASR (from extant or fallen leaves)	EU66910 2.1	HQ2438 01.1, HQ2440 38.1	HQ1887 81.1
	<i>P. henryi</i> Koehne	<i>Laurocerasus sect Mesopygeum</i>	Northeastern India, Buthan, eastern Pakistan, southern China (Yunnan), Burma, Thailand, Laos, Cambodia and Vietnam.	ASR or raceme in bundles of 2-6 (sometimes compound and forming a distinct panicle)	JQ92662 0.1	HQ2438 02.1, HQ2440 39.1	HQ1887 85.1
	<i>P. javanica</i> (Teijsm. & Binn.) Miq.	<i>Laurocerasus sect Lauroc</i>	Southeast tropical Asia (Thailand, southern Vietnam, Sumatra, JavaPalawan, Celebes, New Guinea)	ASR (or homothetic double racemes)	HM8568 07.1	HQ2438 09.1, HQ2440 46.1	HQ1887 94.1

	<i>P. lancilimba</i> (Merr.) Kalkman	<i>Lauroceras</i> <i>us sect</i> <i>Mesopygeu</i> <i>m</i>	Southern China (Yunnan), Burma, northern Vietnam.	ASR (or homothetic double racemes)	HM8568 12.1	HQ2438 17.1, HQ2440 54.1	HQ1887 99.1
	<i>P. malayana</i> Kalkman	<i>Lauroceras</i> <i>us sect</i> <i>Mesopygeu</i> <i>m</i>	Endemic to Malaysia peninsula (Pahang)	Panicle	EU66910 7.1	HQ2438 22.1, HQ2439 86.1	HQ1888 03.1
	<i>P. napaulensis</i> (Ser.) K. Koch	<i>Padus</i>	Eastern foothills of the Himalayas, including Nepal, Myanmar, south and southeastern China, Bhutan, N India, N Myanmar, Nepal, Sikkim	TRBS	EU66910 6.1	HQ2440 72.1, HQ2438 35.1	HQ1888 14.1
	<i>P. oligantha</i> Kalkman	<i>Lauroceras</i> <i>us sect</i> <i>Mesopygeu</i> <i>m</i>	East New Guinea	ASR	JQ92661 9.1	HQ2438 42.1, HQ2440 79.1	HQ1888 21.1
	<i>P. phaeosticta</i> Maxim.	<i>Lauroceras</i> <i>us sect</i> <i>Lauroc</i>	Southern and central China, Taiwan, India (Assam), East Pakistan, North Thailand and North Vietnam.	ASR (on leafless shoot)s	EU66909 5.1	HQ2438 67.1, HQ2441 04.1	KP09586 8.1
	<i>P. pullei</i> (Koehne) Kalkman	<i>Lauroceras</i> <i>us sect</i> <i>Mesopygeu</i> <i>m</i>	New Guinea	ASR	JQ77683 7.1	HQ2441 11.1, HQ2438 74.1	HQ1888 48.1
	<i>P. stipulacea</i> Maxim.	<i>Lauroceras</i> <i>us sect</i> <i>Mesopygeu</i> <i>m</i>	Borneo, Sumatra and southern Thailand.	Double homothetic racemes appearing fascicles	EU66910 3.1	HQ2441 49.1, HQ2439 12.1	HQ1888 82.1
	<i>P. undulata</i> Buch.-Ham. ex D.Don	<i>Lauroceras</i> <i>us sect</i> <i>Lauroc</i>	South of Himalayas from Nepal to southwestern tropical Asia in Indonesia.	Umbranch ed racemes (1 to 3) on brachyblas ts	HM8568 06.1	HQ2439 29.1, HQ2441 66.1	HQ1888 95.1
Europe Mediterra nean	<i>P. brigantina</i> Nyman	<i>Prunus</i> ( <i>Armeniac</i> <i>a</i> )	France and Italy	SFDB (or fascicle)	AF31872 3.1	AM2826 62.1	HQ1887 44.1
	<i>P. domestica</i> L. ssp. <i>Insittia</i> (L.) Fiori & Paol.	<i>Prunus</i>	Eastern Mediterranean basin.	CFDB	EU66909 7.1	AM2826 71.1	HE9667 61.1

	<i>P. lusitanica</i> L.	<i>Laurocerasus sect Lauroc</i>	Northern and central Portugal, Canary Is. and Madeira.	ASR	FJ89910 1.1	FJ89912 8.1, HQ2438 19.1	HQ1888 00.1
	<i>P. spinosa</i> L.	<i>Prunus</i>	Europe, western Asia, and locally in northwest Africa.	SFBB	EU79689 6.1	AM2826 80.1	HE9667 65.1
Europe and Middle East	<i>P. avium</i> (L.) L.	<i>Cerasus</i>	Europe, Anatolia, Maghreb, and western Asia to the Caucasus and northern Iran. Originated possibly in the area between the Black and Caspian seas of Asia Minor.	CFDB	HM8568 05.1	HQ2437 52.1, HQ2439 89.1	FJ39555 1.1
	<i>P. cerasifera</i> Ehrh.	<i>Prunus</i>	Southeast Europe and western Asia	CFDB (in clusters)	JQ77688 5.1	AM2826 64.1	FJ49330 6.1
	<i>P. cerasus</i> L.	<i>Cerasus</i>	Southwest Asia and eastern Europe	CFDB	AF31872 9.1	HQ2437 68.1, EF01097 0.1	FN6758 32.1
	<i>P. domestica</i> L.	<i>Prunus</i>	Origin probably in The Caucasus between the Black Sea and the Caspian Sea.	CFDB	AF31871 3.1	AM2826 68.1	FN6758 33.1
	<i>P. dulcis</i> (Mill.) Rehb.	<i>Persica</i>	From Syria and Turkey to India and Pakistan.	SFDB (or pair)	KC6037 33.1	GQ1796 68.1, HQ2437 17.1	HQ1887 09.1
	<i>P. laurocerasus</i> L.	<i>Laurocerasus sect Lauroc</i>	Eastern Europe, Greece, Turkey, southern Russia between the Black and the Caspian Seas, northern Persia.	ASR	AF31872 4.1	JQ03417 7.1	FN6758 34.1
	<i>P. mahaleb</i> L.	<i>Cerasus</i>	Mediterranean region, Iran and parts of central Asia.	TRBL	AF31874 7.1	HQ2438 21.1, AY5007 61.1	AY5006 31.1
	<i>P. padus</i> L.	<i>Padus</i>	Northern and eastern Europe and northern Asia.	TRBL	JQ77687 1.1	HQ2438 46.1, HQ2440 83.1	KP76007 2.1
	<i>P. prostrata</i> Labill.	<i>Microcerasus (Prunus)</i>	Mediterranean region, the Caucasus, Iran, Kashmir and Afghanistan.	SFBB	AF49241 5.1	HQ2438 71.1, HQ2441 08.1	HQ1888 45.1
	<i>P. scoparia</i> Schneider	<i>Persica</i>	Kurdistan, Iran, Turkmenistan and Afghanistan.	SFDB	JQ92660 4.1	HQ2438 87.1, HQ2441 24.1	HQ1888 59.1

	<i>P. webbii</i> (Spach) Fritsch	<i>Persica</i>	Northeastern Mediterranean basin, the Balkans and Anatolia.	SFDB (can form clusters, fascicle like)	KC6037 44.1	HQ2439 38.1, HQ2441 75.1	HQ1889 04.1
Neotropics (identified with the suffix "neo" in the phylogenies). "" for working names of inedit new species.	<i>P. "acutangulata"</i>	<i>NEO</i>	South-western Mexico	ASR	this study	this study	this study
	<i>P. aff chamissoana</i> Koehne	<i>NEO</i>	Southern Andes	ASR	this study	this study	this study
	<i>P. brittoniana</i> Rusby	<i>NEO</i>	Central and southern Andes	ASR	this study	HQ2439 93.1, HQ2437 56.1	HQ1887 45.1
	<i>P. buxifolia</i> Koehne	<i>NEO</i>	Northern Andes	ASR	this study	this study	this study
	<i>P. "celicaEcu spnov"</i>	<i>NEO</i>	Central Andes	ASR	this study	this study	this study
	<i>P. cortapico</i> Koehne	<i>NEO</i>	South-western Mexico and northern Mesoamerica	ASR	this study	this study	this study
	<i>P. debilis</i> Koehne <i>vnov</i>	<i>NEO</i>	Amazonian	ASR	this study	this study	this study
	<i>P. ferruginea</i> Steud.	<i>NEO</i>	Western Mexico	ASR	this study	this study	this study
	<i>P. "gardneri" spnov</i>	<i>NEO</i>	Central Brazil	ASR	this study	this study	this study
	<i>P. guanaiensis</i> Rusby <i>aff</i>	<i>NEO</i>	Northern Andes	ASR	this study	this study	this study
	<i>P. integrifolia</i> (C. Presl) Walp.	<i>NEO</i>	Andes	ASR	this study	this study	this study
	<i>P. "integrifolia recurv"</i>	<i>NEO</i>	Northern Andes	ASR	this study	this study	this study
	<i>P. integrifolia</i> <i>Bol</i>	<i>NEO</i>	Andes	ASR	HM8568 11.1	HQ2440 42.1, HQ2440 42.1	HQ1887 88.1
	<i>P. littlei</i> Pérez-Zab.	<i>NEO</i>	Northern Andes	ASR	this study	this study	this study



<i>P. megacarpa</i> Pérez-Zab.	NEO	Northern Andes	ASR	this study	this study	this study
<i>P. muris</i> Cuatrec.	NEO	Northern Andes	ASR	this study	this study	this study
<i>P. muris</i> Son	NEO	Northern Andes	ASR	this study	this study	this study
<i>P. myrtifolia</i> aff <i>Peten</i> <i>spnov</i>	NEO	Lowlands of Yucatan peninsula	ASR	this study	this study	this study
<i>P. myrtifolia</i> (L.) Urb.	NEO	Caribbean Basin	ASR	JQ77684 1.1	HQ2438 34.1, HQ2440 71.1	KJ42689 4.1
<i>P. oblonga</i> J.F. Macbr.	NEO	Central Andes.	ASR	JQ92661 3.1	HQ2438 44.1, HQ2440 81.1	HQ1888 23.1
<i>P. oleifolia</i> aff <i>spnov</i>	NEO	Southern Andes	ASR	HM8568 10.1	this study	this study
<i>P. oleifolia</i> Koehne	NEO	Southern Andes and Chaco	ASR	HM8568 10.1	HQ2438 41.1, HQ2440 78.1	HQ1888 20.1
<i>P. opaca</i> (Benth.) Walp.	NEO	Northern Andes	ASR	this study	this study	this study
<i>P. "orinoco"</i> <i>spnov</i>	NEO	Orinoco Basin	ASR	this study	this study	this study
<i>P. reflexa</i> Walp. aff <i>spnov</i>	NEO	Southern Andes	ASR	JQ92661 4.1	HQ2438 78.1, HQ2441 15.1	HQ1888 50.1
<i>P. rhamnoides</i> Koehne	NEO	Mesoamerica	ASR	this study	HQ2439 02.1, HQ2441 39.1	HQ1888 68.1
<i>P. rigida</i> Koehne	NEO	Central Andes	ASR	this study	this study	this study
<i>P. samydoides</i> Schltdl.	NEO	Lowlands of eastern Mexico	Homothetic double raceme or fascicle of them	this study	this study	this study

<i>P.</i> “ <i>SFcoSPet</i> ” <i>spnov</i>	<i>NEO</i>	Central Andes	ASR	this study	this study	this study
<i>P.</i> “ <i>SFcoSRac</i> ”_ <i>spnov</i>	<i>NEO</i>	Central Andes	ASR	this study	this study	this study
<i>P.</i> “ <i>hasslerBra</i> ” <i>spnov</i>	<i>NEO</i>	Cerrado - Southern Brazil - Paraguay	ASR	this study	this study	this study
<i>P.</i> “ <i>solisii</i> ” <i>spnov</i>	<i>NEO</i>	Northern Andes	ASR	this study	this study	this study
<i>P.</i> “ <i>tarijaBol</i> ” <i>spnov</i>	<i>NEO</i>	Southern Andes	ASR	this study	this study	this study
<i>P.</i> “ <i>tarijaBol2</i> ” <i>spnov</i>	<i>NEO</i>	Southern Andes	ASR	this study	this study	this study
<i>P.</i> “ <i>XicoMex</i> ” <i>spnov</i>	<i>NEO</i>	Central Mexico	ASR	this study	HQ2439 03.1, HQ2441 40.1, this study	this study
<i>P.</i> “ <i>StelenaCol</i> ” <i>spnov</i>	<i>NEO</i>	Northern Andes	ASR	this study	this study	this study
<i>P. stipulata</i> J.F. Macbr.	<i>NEO</i>	Central Andes	ASR	this study	this study	this study
<i>P.</i> <i>subcoriacea</i> Koehne <i>vnov</i>	<i>NEO</i>	Cerrado - Southern Brazil - Paraguay	ASR	this study	this study	this study
<i>P.</i> <i>subcorymbosa</i> Ruiz ex Koehne	<i>NEO</i>	Andes, mid and low elevations	Homothetic double raceme	this study	this study	this study
<i>P. tetradenia</i> Koehne	<i>NEO</i>	Eastern Mexico, mid-elevations	ASR	this study	this study	this study
<i>P.</i> <i>tucumanensis</i> Lillo	<i>NEO</i>	Southern Andes.	ASR	HM8568 09.1	HQ2441 63.1, HQ2439 26.1	HQ1888 94.1
<i>P. urotaenia</i> Koehne	<i>NEO</i>	Northern and Central Andes	ASR	this study	this study	this study

	<i>P. urotaenia2</i> <i>Neo</i>	<i>NEO</i>	Northern and Central Andes	ASR	this study	this study	this study
	<i>P. vana</i> J.F.Macbr. <i>aff</i> <i>spnov Neo</i>	<i>NEO</i>	Amazonian	ASR	JQ92661 2.1	HQ2437 16.1, HQ2439 53.1	HQ1887 08.1
NorthAm erica	<i>P. alabamensis</i> C.Mohr	<i>Padus</i>	Sotheastern USA	TRBL	JQ77685 0.1	HQ2437 13.1, HQ2439 50.1	HQ1887 05.1
	<i>P. americana</i> Marshall	<i>Prunus</i>	Northamerica except California, Arizona, Nevada, Western Canada and Alaska	CRDB	AF17948 8.1	JQ03418 5.1	AY5005 95.1
	<i>P. andersonii</i> A.Gray	<i>Prunus</i>	Desertic areas in eastern California and central western Nevada in the eastern slopes of the Sierra Nevada.	SFDB (2 flowers)	AF31873 5.1	HQ2437 25.1, HQ2439 62.1	HQ1887 16.1
	<i>P. caroliniana</i> (Mill.) Aiton	<i>NEO</i>	Southern USA	ASR	this study	this study	this study
	<i>P. caroliniana2</i>	<i>NEO</i>	Southern USA	ASR	JQ77683 6.1	HQ2437 61.1, AY0554 65.1	AY5006 36.1
	<i>P. cercocarpifolia</i> Villarreal	<i>Empectrocladus</i>	Chihuahuan Desert, in the south of the Mexican state of Coahuila.	SFDB	JQ92661 0.1	JX41444 8.1	JX41455 2.1
	<i>P. eremophila</i> Prigge	<i>Empectrocladus</i>	Endemic to the Mojave Desert within northeastern San Bernardino County, California.	SFDB (or 2 flowers)	JQ92660 6.1	JX41444 7.1	JX41455 1.1
	<i>P. fasciculata</i> (Torr.) A. Gray	<i>Empectrocladus</i>	Southwestern United States (Arizona, California, Nevada, Utah) and northwestern Mexico (Baja California).	SFDB (or 2 flowers)	AF31875 2.1	JX41444 1.1	JX41445 5.1
	<i>P. havardi</i> (W.Wight) S.C.Masoni	<i>Empectrocladus</i>	Western Texas in the United States to northern Chihuahua across the Río Grande in Mexico.	SFDB	EU66909 6.1	JX41444 9.1	JX41455 3.1
	<i>P. lyonii</i> (Eastw.) Sarg.	<i>NEO</i> - <i>California</i>	California and Baja California	ASR (from cataphyls on brachyblas ts)	JQ77683 8.1	AF31869 6.1, AF31874 3.1	this study

<i>P. maritima</i> Marshall	<i>Prunus</i>	East Coast of the United States, from Maine south to Maryland.	CFDB (2-4 flowers)	EU66909 8.1	JQ03417 8.1	AY5006 09.1
<i>P. minutiflora</i> Engelm. ex A. Gray	<i>Empectrocladus</i>	Texas and northern Mexico.	SFDB	JQ92660 8.1	JX41445 0.1	JX41455 4.1
<i>P. nigra</i> Aiton	<i>Prunus</i>	Eastern North America.	CFDB	AH0093 74.1	HQ2438 36.1, HQ2440 73.1	HQ1888 15.1
<i>P. pensylvanica</i> L.f.	<i>Cerasus</i>	Widespread across much of Canada, northeastern USA and the Appalachian Mountains as far south as northern Georgia and eastern Tennessee.	Corymbiform lateral short raceme	EU66909 0.1	HQ2438 49.1, HQ2440 86.1	HQ5968 02.1
<i>P. pumila</i> L.	<i>Prunus</i>	Eastern and central Canada and the northern United States.	CFDB	AH0101 43.1	HQ2438 75.1, EU60619 1.1	AY5006 23.1
<i>P. serotina</i> Ehrh.	<i>Padus</i>	Central to eastern USA and southward to Mexico and Guatemala.	TRBL	EU66910 4.1	HQ2438 97.1, JX41445 3.1	DQ0062 22.1
<i>P. serotina</i> s <i>capuli</i> (Cav. ex Spreng.) McVaugh	<i>Padus</i>	Central Mexico to Guatemala + introduced south to northern Argentina	TRBL	this study	this study	this study
<i>P. serotina</i> s <i>virens</i> (Wooton & Standl.) McVaugh	<i>Padus</i>	Arizona., New Mexico, Texas, northern and western Mexico.	TRBL	JQ77687 6.1	HQ2438 98.1, HQ2441 35.1	HQ1888 65.1
<i>P. subcordata</i> Benth.	<i>Prunus</i>	California and Oregon.	CRDB	AF31874 5.1	HQ2439 14.1, HQ2441 51.1	AY5006 12.1
<i>P. texana</i> Scheele	<i>Prunus</i>	Endemic to south-central Texas.	SFBB	AY1771 39.1	AY5007 78.1, AY5007 59.1	AY5006 11.1
<i>P. virginiana</i> L.	<i>Padus</i>	Canada, most of the United States (except some states in the Southeast) and northern Mexico.	TRBL	JQ77688 0.1	AF34856 1.1	GU5624 09.1

Table 3.2. Taxa (including outgroups) organized by geographic range assigned for MaxEnt analyses with traditional taxonomic infrafamilial or subgeneric grouping (within *Prunus*), detail of distribution, inflorescence typology (following Weberling (1992)) and GenBank accessions (for sequences not obtained in this study).

### **Alignment and Phylogenetic Analyses**

Sequences were checked, assembled, and edited using the software Chromas 2.6.5 (Technelysium, Helensvale, Australia). Multiple sequence alignments for all markers were generated using the MUSCLE algorithm available in MEGAX (Kumar, Stecher, Li, Knyaz, & Tamura, 2018). Afterwards, alignments were extensively manually edited in MEGAX platforms based on the assumption of maximizing similarity between sequences on the shorter possible total length (minimizing insertions). This approach is similar to the use of consistency as an optimizing strategy (Kemena & Notredame, 2009) in which stable regions in the core of *Prunus* were visually identified and used as structural aligners for more variable parts and guides for the incorporation of outgroups. Post-edition for configuring to run the phylogenetic analyses were done with Mesquite (Maddison & Maddison, 2020). The concatenated (combined) alignment of the three regions (with the trnL-F region divided in two segments, the trnL intron and trnL-trnF intergenic spacer) contained 146 specimens and 2166 bp: the chloroplast trnH-psbA from 1 to 541, trnL intron from 542 to 1133, trnL-trnF spacer from 1134 to 1442, and the nuclear ITS-6-9 region from 1443 to 2166. Characteristics of the datasets were measured with SeqState package (Muller, 2005) and counting of insertion-deletion characters done following the simple and complex coding methods (Simmons & Ochoterena, 2000). Two partitions were defined to calculate independent substitution models (associated to the clock model assumed for tree dating), the first between the first and second segment and the other between the third and the fourth. Bayesian inference were

carried using BEAST (Bayesian Evolutionary Analysis Sampling Trees) v. 2.5.1 (Bouckaert et al., 2019) as implemented by CIPRES Science Gateway (Miller, 2010) from BEAST2 XML configuration files that were generated using BEAUti2 graphical interface and pos-edited with XML copy editor 1.2.1.3 (<https://xml-copy-editor.sourceforge.io/>). In the parameters, GTR plus invariant ( $=0.07103$ ) model was assumed as substitution model based on MEGAX results and probability of rates of substitution were estimated from equal priors. The tree evolutionary model was assumed as Birth Death with a relative death rate estimated from a prior of 0.05. Gamma parameters for all partitions were set as  $\alpha=0.03$ ,  $\beta=1.0$  and gamma shape exponential with  $\text{mean}=1.0$ . All substitution parameters were set with  $\alpha=0.05$  and  $\beta=10.0$  (20.0 for AG). Uncorrelated lognormal relaxed (ucln) clock mean parameters settings were  $\alpha=2.0$  and  $\beta=0.01$ , and standard deviation parameters were  $\alpha=2.0$  and  $\beta=0.05$ . Markov chain Monte Carlo (MCMC) chain length parameter was set to 50,000,000 with tree sampling frequency set to every 2,000 trees. Divergence branch ages were estimated using three fossil constraints dating calibration points as follows:

1. The origin of the racemose clade considering the fossil of *Prunus hirsutipetala* D.D.Sokoloff, Remizowa et Nuraliev found (Sokoloff et al., 2018) dated in the Priabonian (37.2-33.9 ma). This fossil species was taxonomically placed as close to members of Old World evergreen tropical species of *Laurocerasus* as defined by Kalkman (1965) and part of the racemose group as identified by Chin et al. (2014). A prior with a minimum age of 33.9 ma (lognormal  $\mu=1.5$ ,  $\sigma=0.5$ ) was established.

2. A constraint for the minimum age of the clade of *Prunus* other than the racemose core clade based on the oldest fossil species clearly identified (based on flowers), *P. cathybrownae* (Benedict, DeVore, & Pigg, 2011) of the Late early Eocene (Tom Thumb member of the Klondike

Mountain Formation dated at  $49.42 \pm 0.54$  Ma). Even though *P. cathybrownae* was not originally associated to any clade, the relatively long pedicels and filaments suggest its affinities with the traditionally circumscribed subg. *Cerasus* or *Prunus*. Another earlier record, the fossil endocarps of *P. wutuensis* Y. Li, T. Smith, C .J. Liu, N . Awasthi, J. Yang, Y.F. Wang & C.S. Li from the Early Eocene Wutu formation in China (Li et al., 2011) was not included in the calibration since they were not associated to a precise slice of time as *P. cathybrownae*, and not flowers or leaves that provided unequivocally confidence of the taxonomic placement were registered along the endocarps. The minimum age for the stem of the clade grouping most of the non-tropical and non-racemose species of *Prunus* was set at 49.4 ma (lognormal distribution, mean = 1.5 and sigma = 0.5).

3. The constraint for the minimum age of the crown of Rosaceae was established based on the estimate of Xiang et al. (2017) on a dated phylogeny. Since it is an indirect estimated age constraint, a normal narrow probability distribution was adopted (mean= 0 sigma= 1) with a mean in the real time space of 101.6 Ma.

The statistics of the posterior estimates of the BEAST analyses were inspected in Tracer v.1.7.1 (Rambaut, Drummond, Xie, Baele, & Suchard, 2018). The best tree was calculated from the posterior sample of phylogenetic time-trees of the Markov chain Monte Carlo (MCMC) using TreeAnnotator v.2.6.0. Burning percentage was set to 10%., node heights were calculated as mean heights and all branches were annotated.

Complementarily, as a comparison reference for the Bayesian BEAST inferred topology, using CIPRES remote server ML analyses were executed using RAxML (v.8.2.12) (Stamatakis, 2014) and RAxML-NG (v. 1.1.0) (Kozlov, Darriba, Flouri, Morel, & Stamatakis, 2019) using the substitution model setup applied in BEAST and Bayesian trees were inferred using MrBayes

v.3.2.6 (Huelsenbeck & Ronquist, 2001) with similar priors than BEAST and 20 million generations. In the ML analyses, several test runs were performed to estimate the number of alignment patterns, observe the results behavior with several bootstrap iteration numbers and evaluate consistency among the best trees found in each run. Bootstrap search number were manually set at three hundred, and ML tree search was performed with the RAxML option “-f a” (rapid Bootstrap analysis and search for best-scoring ML tree in one program run). Only the tree with the best likelihood score was taken in account (assuming as the closest to represent the true phylogeny) following the recommendation of Stamatakis (2016).

## **Niche analyses**

### **Species occurrences and climatic data**

High-resolution (30 arc second  $\approx$  1 km) WorldClim version 2.1 (Stephen E. Fick & Robert J. Hijmans, 2017) and SoilGrids-1km (Hengl et al., 2014) raster layers were used to calculate niche envelopes based on species occurrences. Neotropical taxa occurrences were extracted from the database supporting the taxonomic synopsis (Chapter 1) in which coordinates of every single botanical record was corroborated or georeferenced when needed (if possible). For the rest of species, GBIF occurrences data (GBIF.org, 2020) was extracted and filtered restricting data source mostly to preserved specimens, including coordinates, excluding cultivated individuals and within the limits of a polygon circumscribing their natural distribution according with available taxonomic literature (Table 3.1).

### **Environmental niche estimation**



A presence-only approach for calculating probability of occurrence in each pixel (distribution modelling) of the areas of interest was implemented using a correlative model with 12 environmental variables (Table 3.3) in the package MaxEnt (Phillips, Dudík, & Schapire, 2020). From the total 19 WorldClim-2 variables (Stephen E Fick & Robert J Hijmans, 2017) a subset of 7 was selected a priori excluding those considered redundant because are quantified by quarter (rather than month), those based on ranges (rather than means or extreme values) and temperature seasonality (to disregard the latitudinal region influence). Additionally, three soil variables from SoilGrids (Hengl et al., 2014) were chosen considering only continuous chemical properties and their relationship with limiting conditions for plant growing. Cationic exchange capacity (CEC) by reflecting nutrients content (Manrique, Jones, & Dyke, 1991), pH reflecting potential limiting toxicities (Penn & Camberato, 2019) and organic matter content related to the vegetation and other biological contributions to the soil (Schmidt et al., 2011). The annual layers of Aridity Index (AI) and Actual Evapotranspiration (AET) were also included as reinforcing variables related to water stress conditions that combine WorldClim and CGIAR-CSI PET data. AI is a numerical indicator of dryness of the climate at a given location based on long-term climatic water deficits and is calculated as the ratio Precipitation/Potential Evapotranspiration (A. Trabucco & R. J. Zomer, 2019). AET is a measure of water balance dependent on the available atmospheric energy, vegetation characteristics, quantity of water available in the soil and soil hydrological properties (Trabucco & Zomer, 2010). Since the main question is about the evolutionary history of dry habitat tolerance, AI was a priori selected to analyze in the phylogenetic comparative analyses and therefore to get insights in the history of tolerance to water stress of *Prunus* considering its ability for summarizing in a single easy interpretable value the long-term impact of the climatic variables solar radiation and precipitation which are directly connected with crucial

morphological and physiological adaptations, fitness, and geographic patterns. The thresholds used to classify the aridity regime types that helped interpretation of results were defined following Verbist, Santibañez, Gabriels, and Soto (2010) as follow: arid (below 0.2), semiarid (0.2 to 0.5), dry subhumid (0.5-0.65), wet subhumid (0.65-1.0) and humid (above 1.0).

Type	Abbreviation	Name	Units
Bioclimatic	BIO1	Annual Mean Temperature	°C
	BIO5	Max Temperature of Warmest Month	°C
	BIO6 =	Min Temperature of Coldest Month	°C
	BIO12 =	Annual Precipitation	Mm
	BIO13 =	Precipitation of Wettest Month	Mm
	BIO14 =	Precipitation of Driest Month	Mm
	BIO15 =	Precipitation Seasonality (Coefficient of Variation)	
Water balance	AET <sub>YR</sub>	Actual evapotranspiration per year	mm/Yr
	AI	Aridity Index	
Soil	Carbon	Soil organic carbon content	‰ (g kg <sup>-1</sup> ),
	PH	Soil pH in H <sub>2</sub> O solution	pH
	CEC	Cation-exchange capacity of the fine earth fraction	(cmol + /kg)

Table 3.3. Variables used to estimate probability of occurrence with MaxEnt.

MaxEnt geographic modelling for all species were made with linear, quadratic and hinge features, 25% of random test, 20000 Maximum number of background points and prevalence empirically set to 0.2 for neotropical species and 0.3 for rest of the world species based on the previous knowledge of relatively scarcity of most of the species cited in literature and observed in the field (van Proosdij, Sosef, Wieringa, & Raes, 2016). The threshold rule was specified as “maximum training sensitivity plus specificity” considering its highly precision predicting plant distributions-(Flores-Tolentino, Ortiz, & Villaseñor, 2019). Considering the patterns of botanical

collecting activity in the Neotropics, a bias file was applied to the neotropical species models calculated based on the database of localities built for the synopsis following the method of Stolar and Nielsen (2015). The bias file was not generated for the rest of areas because in most of them there is a wider botanical exploration coverage and the limited knowledge about their collecting patterns.

### **Niche comparison and evolution analyses**

For these analyses, a new phylogenetic tree with only 119 taxa and consequently a shorter alignment of 1871 characters was estimated with BEAST. All the species of Rosaceae used as outgroups in the full phylogeny other than the two species of Neillieae. Additionally, taxa with a single (or zero) record with coordinates and duplicate records of species were excluded.

Predicted niche occupancy profiles (PNO) for each species (in the new tree) within their correspondent range region (es denoted in Table 3.2) were calculated integrating species probability distributions derived with the whole set of variables in MaxEnt with respect to AI using R package PHYLOCLIM (Heibl & Calenge, 2013). A single matrix of PNOs for all species was consolidated afterwards and used to calculate the ancestral climate tolerances through the nodes of the tree as implemented by Evans, Smith, Flynn, and Donoghue (2009) and adopted by the package PHYLOCLIM and alternatively visualized by the function “phenogram” of the package PHYTOOLS (Revell, 2012). Niche overlap based on PNOs of the AI dimension (and additionally based on the whole set of variables for the Neotropical taxa) was calculated in terms of the statistics D and I based on Schooner’s D and Hellinger distances respectively as implemented by Warren et al. (2008) and Broennimann et al. (2012) using the R package PHYLOCLIM. A correlation-like matrix was obtained and then a visual pairwise comparison of the whole set of species was performed with the R package CORRLOT (Wei et al., 2017).

To understand whether the trait variation can be explained by the phylogeny; initially, the degree of phylogenetic signal was explored with the K-statistic and Lambda transformations of the phylogeny in relation with the trait studied as developed by Pagel (1999) and implemented in PHYTOOLS. K, tests whether the distribution of the trait disparity is concentrated within subclades or evenly distributed across the entire phylogeny (Blomberg, Garland, & Ives, 2003). Meanwhile, lambda ( $\lambda$ ), assesses the degree of phylogenetic covariance (compared to a Brownian motion model –BM-) through measuring of the phylogenetic signal in the residuals. Values of  $\lambda$  close to 1, would agree with the BM model which would indicate traits changing linearly with shared and total path lengths (Pagel, 1999).  $\lambda$  close to 0 can indicate selection completely determined by the environment (Cooper, Jetz, & Freckleton, 2010). On the other hand, K values between 0 and 1 are interpreted similar to  $\lambda$ , but values above 1 indicates higher trait similarity within subclades than expected under a BM model and hence localized trait conservatism (Ackerly, 2009).

In order to explore the mode of the trajectories of trait evolution, AI tips data was fit to the main continuous trait evolution models (Brownian motion (BM) , Ornstein-Uhlenbeck (OU) (Hansen, 1997), Early Burst (EB) (Blomberg et al., 2003), Mean trend (MT) (BM with a directional trend) and white noise (WN)) as implemented by the function “fitcontinuous” in package GEIGER (Pennell et al., 2014). Therefore, model adequacy was estimated following two methods as implemented by Soul and Wright (2021): 1.) performing 100 simulations of the evolution of the selected trait under the BM and OU models and fitting the five main continuous evolution models (BM simulation to BM, EB, MT and WN and OU simulations to OU) to the simulated new values of the tips of the trees and comparing the mean and distribution of variation of Akaike Information Criteria (AIC) calculated from each model among them with an overall non-parametric Kruskal-

Wallis tests and pairwise Wilcoxon rank sum tests. 2.) incorporating variation across trees by sampling one hundred random trees from the posterior of the BEAST MCMC inferred trees, then fitting the sampled trees to each of the five evolution models and comparing the AICs as in the first case. For manipulation of trees and data and statistical analyses, besides the aforementioned, other R packages used were: APE (Paradis, Claude, & Strimmer, 2004), CAPER (Orme et al., 2013), , OUWIE (Beaulieu, Jhwueng, Boettiger, & O'Meara, 2012), and PICANTE (Kembel et al., 2010).

## RESULTS

### Phylogenetic analyses

The phylogenetic reconstruction confirms its phylogenetic identity of the genus *Prunus* within Rosaceae as a monophyletic group internally divided into two main clades: one composed by taxa (mostly deciduous) with solitary flowers, corymbose inflorescences, terminal racemes, and some with lateral racemes; and other one composed mostly by evergreen tropical taxa (but some distributed in subtropical and mild temperate areas as well), all of them with racemose inflorescences. In the first main clade two subclades can be recognized: one integrated by taxa with solitary flowers (traditionally subg. *Prunus* and *Amygdalus* and smaller groups as *Armeniaca* and *Emplectocladus*) plus *P. serotina* complex. The second subclade groups taxa with corymbose inflorescences (traditionally placed in subg. *Cerasus*), terminal racemes (traditionally placed in subg. *Padus*), and neotropical species with pubescent shoots and flowers (“*P. cortapico* group” that includes *P. cortapico*, *P. ferruginea*, *P. acutangulata*, *P. subcorymbosa* and *P. lyonii*), and additionally a separate subclade with the neotropical species placed in the section *Neocalycinia* of the grex *Calycopadus* by Koehne (1915) (*P. urotaenia* and *P. rhmanoides*) plus a subclade integrated by a couple of species with wide pubescent hypanthium traditionally placed in the subg. *Padus* (*P. wilsonii* and *P. napaulensis*). The second main clade (tropical racemose) has a subclade integrated by *P. javanica*, *P. phaeosticta* and *P. zippeliana* (members of the sect. *Laurocerasus* sensu Kalkman (1965) ) recovered as sister to the rest of taxa which indeed are organized in two main subclades: one with most of the neotropical racemose taxa (except those in the *Padus*-

*Cerasus* group previously mentioned) and the other one with the core of paleotropical species. In the main clade of neotropical taxa, *P. caroliniana* was recovered as sister to the rest of the group (similarly to Chin et al. (2014)) which for its part is divided in two subclades: one including species with a tendency to have basal and submarginal glands (e.g. *P. stipulata*, *P. brittoniana*, *P. aff. oleifolia*) and the other with laminar glands and frequently two pair of glands (e.g., *P. rigida*, *P. muris*, *P. myrtifolia*, *P. opaca*). In the neotropical main clade a total of eight subgroups (clades) of species were identified that might correspond to taxonomic units (Table 3.4). However, the low support at some nodes and still very limited species sampling restricts this classification to be conclusive. The subgroups recovered in the phylogeny are partially consistent with morphological and sometimes geographical affinities identified in the taxonomic treatment (chapter 1) and particularly leaf architecture characters were more indicative. Also, they confirm some of the proposed species' circumscriptions and inner variants and the discussion about taxonomic affinities among species.

Subclade (work name)	Members	Morphological similarities	Geographic distribution
" <i>guanaiensis</i> "	<i>P. guanaiensis</i> _aff <i>P.</i> "sFcoSRac spnov" <i>P.</i> "celicaEcu spnov" <i>P.</i> "stelenaCOL spnov" <i>P. rigida</i>	Leaves with impressed secondary and minor veins below. 2 or 4 glands.	Northern and central Andes, above 1500 m.
" <i>muris</i> "	<i>P.</i> "integrifolia recurv" <i>P.</i> "solisii spnov" <i>P. muris</i> <i>P.</i> "muris_Son" <i>P. megacarpa</i>	Leaves with prominent secondary and tertiary veins below.4 glands.	Northern Andes, above 1500 m.
" <i>debilis</i> "	<i>P.</i> "gardneri spnov" <i>P.</i> "hasslerBra spnov"	Leaves with impressed secondary and minor veins	Central and southern Brazil, Amazon,

	<p><i>P.</i> “Orinoco spnov”  <i>P. subcoriacea</i> vnov  <i>P. debilis</i> vnov  <i>P.</i> “sFcoSPet spnov”  <i>P.</i> “vana_affsmlvs spnov”</p>	below, lustrous above. 2 glands.	Andean eastern foothills, generally below 1500 m.
“ <i>myrtifolia</i> ”	<p><i>P. myrtifolia</i>  <i>P.</i> “myrtifolia_aff_Peten”  <i>P. samydoides</i>  <i>P. tetradenia</i>  <i>P.</i> “xicoMex spnov”</p>	Leaves thin with impressed secondary and minor veins below, linguiform stipules, 4 (or more) glands. Flexuous racemes.	Caribbean basin and Gulf of Mexico basins in Mexico, generally below 1500 m.
“ <i>opaca</i> ”	<p><i>P. littlei</i>  <i>P. opaca</i>  <i>P. buxifolia</i></p>	Coriaceous leaves, secondary veins relatively impressed, weak brochidodromous. 2 glands.	Northern Andes, above 1500 m.
“ <i>integrifolia</i> ”	<p><i>P. integrifolia</i>  <i>P. stipulata</i>  <i>P. oblonga</i>  <i>P. brittoniana</i>  <i>P. tucumanensis</i></p>	Coriaceous leaves, frequently toothed, sometimes linguiform stipules, 2 basal glands.	Central and southern Andes, generally above 1500 m.
“ <i>oleifolia</i> ”	<p><i>P. oleifolia</i>  <i>P.</i> “oleifolia_aff spnov”  <i>P.</i> “tarijaBol2 spnov”  <i>P.</i> “tarijaBol spnov”  <i>P.</i> “reflexa-aff spnov”  <i>P.</i>” chamissoana_affBol spnov”</p>	Leaves with impressed secondary and minor veins below. 2 glands. Very small flowers.	Southern Andes, Cerrado and Chaco forests, below 1500 m.
“ <i>caroliniana</i> ”	<p><i>P. caroliniana</i></p>	Leaves with impressed veins below, lustrous above, entire to serrate. 2 glands.	Southern USA

Table 3.4. Subclades identified in the main neotropical clade.



ML best trees reconstructed with RAxML also recovered two main clades: one with the “solitary flower” and “corymbose inflorescence” species together and the rest of taxa in a second clade. Bootstrap support at the stem of the “corymbose” clade, and at the base of several subclades forming a grade below the Neotropical core, constituted by the racemose temperate deciduous species, the “*P. serotina*” complex, the “*P. cortapico*” clade and the “*Neocalycinia*” clade are very weak (supplementary material, Figure 1), suggesting the lack of conclusive information (particularly from the plastid regions) for resolving these morphological mixed groups.

Separation of racemose species in several clades could be explained by developmental differences of inflorescences and flowers as presence of aborting flowers, presence of bracteoles, reduction of elements of the androecium and micropyle origin (Wang et al., 2019). The tropical main clade here identified always has leafless axillary racemes (vs. generally terminal with subtending leaves in the “temperate” and “*P. serotina*” groups), flowers with deciduous hypanthium (vs. persistent after maturity) and flower and inflorescence surfaces glabrous (vs. hairy).



The main recognized clades and relationships found in the BEAST phylogeny with the combined dataset, are similar to the ML trees of Chin et al. (2014), but with differences in the placement of part of the racemose taxa related to despaired evolutionary histories between the nuclear ITS and plastid datasets. Their “temperate racemose” clade (subg. *Padus* and some members of *Laurocerasus*) was placed sister to the “corymbose” clade and *P. serotina* sister to the “tropical racemose” clade in the phylogeny based on nuclear dataset, meanwhile the “temperate racemose” was placed sharing the clade with of the “evergreen racemose group” and *P. serotina* nested within the “temperate racemose” group based on the plastid dataset. As a consequence, Chin et al. (2014), suggested an ancient hybridization event at the origin of the racemose clade, that was later inferred actually as multiple independent allopolyploid events occurred in the early history of the genus involving an hypothetical extinct maternal ancestor (Zhao et al., 2016). In the present study, the nuclear ITS sequence similarly is the most informative region and higher determinant of the topology recovered (Table 3.5). In contrast, the plastid-only based phylogeny depicts a topology poorly supported in many nodes arranging all the species with racemes as part of a single clade and the solitary plus corymbose in another clade (supplementary material, Figure 2). In the former clade the relationships of the core Neotropical taxa are poorly resolved and the taxa of the Paleotropics and those racemose deciduous or temperate are intermixed compared to the reference tree from the combined dataset. However, some subclades of closely related species as the “*P. cortapico*” and “*P. serotina*” groups keep discernible.

<b>Dataset</b>	<b>Total length</b>	<b>Constant</b>	<b>Variable</b>	<b>Parsimony informative</b>	<b>% of parsimony informative</b>	<b>Length range</b>	<b># of INDEL complex/simple</b>
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	(with insertions)						
<b>trnH-psbA</b>	541	215	302	165	30.5	193-412	12/199
<b>(1871)</b>	425	313	99	55	12.9	193-315	5/89
<b>trnL intron</b>	592	357	172	78	13.2	394-522	42/86
<b>(1871)</b>	521	417	86	41	7.9	474-498	39/46
<b>trnL-trnF spacer</b>	309	135	150	76	24.6	209-236	24/72
<b>(1871)</b>	260	170	71	33	12.7	209-225	21/38
<b>ITS-6-9 region</b>	724	248	454	312	43.1	570-636	59/206
<b>(1871)</b>	665	322	330	209	31.4	570-616	52/116

Table 3.5. Characteristics of individual data sets. The rows with the name of the DNA markers correspond to the complete dataset with 2166 sites. The rows (1871) correspond to the dataset with 119 selected taxa and 1871 sites used in the comparative analyses. Parsimony informative sites are those that have at least two different nucleotides. Sites not counted as constant, or variable are insertions (when all but one taxa have gaps at that site).

Divergence times calculated in this study (Table 3.6) approximate to those calculated by Chin et al. (2014) using a ML method but their age deviation ranges are larger than the estimated with BEAST. The stem node of *Prunus* was estimated around 76 Ma and around 25 Ma elapsed until the crown split of the group. Then the origin of the genus could have occurred around the Cretaceous-Tertiary boundary after which a strong global ecological reconfiguration might have been occurred due to the Cretaceous-Paleogene extinction event (Graham, 2011). Furthermore, the origin of the main clades may have been influenced by climatic changes occurred in the Paleocene-

Eocene Thermal Maximum (PETM) (Gingerich, 2006) and Early Eocene Climatic Optimum (EECO) (Hyland & Sheldon, 2013) as Chin et al. (2014) extensively discussed.

<b>Crown node</b>	<b>Mean (Ma)</b>	<b>95% HPD (Ma)</b>
<i>Prunus</i>	51.77	49.79 - 54.39
Main clade “solitary + corymbose”	47.37	36.76 - 54.30
“Solitary flower”	27.56	18.18 - 37.21
Solitary + <i>P. serotina</i>	38.95	27.75 - 49.13
<i>P. serotina</i> complex	7.39	2.48 - 13.60
“corymbose” + “terminal racemose”	35.59	24.60 - 47.90
Main clade “tropical racemose”	37.68	34.11 - 44.45
“core racemose neotropical”	24.48	17.17 - 31.86
“racemose paleotropical	27.87	20.54 - 35.08
“early paleotropical”	26.95	16.49 - 36.26

Table 3.6. Estimated ages of crown nodes (Ma) based on BEAST analysis (from the phylogeny with 145 terminals)

Complementary, an independently reconstructed tree with 119 taxa based on a shorter sequence alignment (1871 sites) and only two taxa as outgroups (Table 3.5), that was used subsequently in the comparative analyses, rendered the same topology and taxa ordering (Figure 3.2) than the full tree with 145 terminals and several taxa of Rosaceae as outgroups (Figure 3.1).

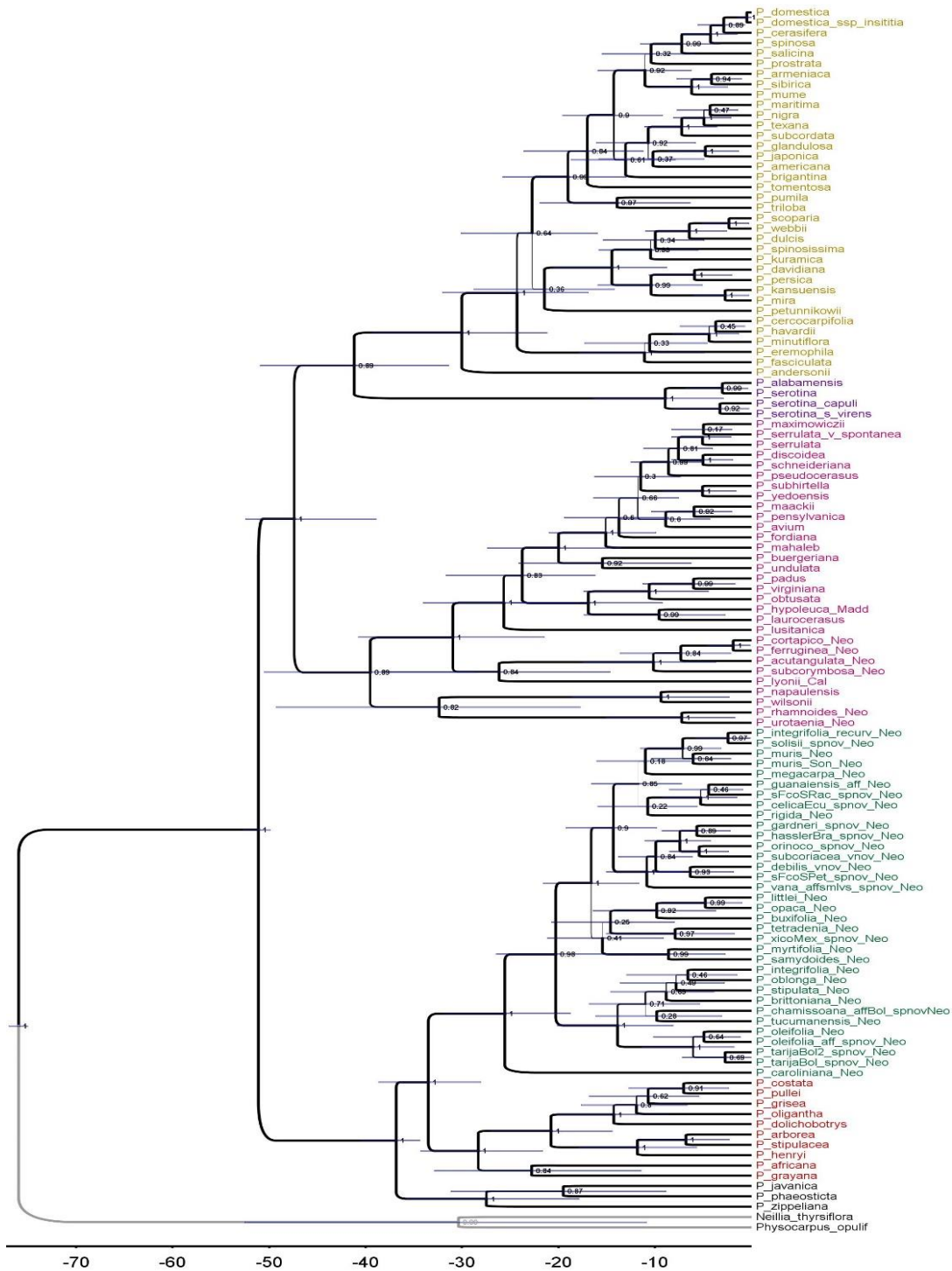


Figure 3.2. BEAST Chronogram of the genus *Prunus* based on a combined DNA dataset including the 119 taxa selected for the comparative analyses. Clades colored by their members: solitary inflorescence (orange), *P. serotina* group (purple), *Cerasus*+*Padus* group (magenta), Neotropical (green), Core Paletropical (red), tropical basal (black).

## Niche overlap

Overall, pairwise comparison of niche overlaps in terms of the variable Aridity Index (AI) among taxa ordered by the phylogenetic tree (Figure 3.2) are presented in Figure 3.4. The metrics D and I exhibit significant magnitude differences as expected (Warren et al., 2008) with values for D (mean = 0.441) lower than I (mean = 0.603). Metric D general distribution indicates a tendency for the analyzed species of relatively low to medium potential to occupy the same geographic space given the environmental suitability per species calculated by MaxEnt. A significant frequency of environmental uniqueness based on AI suggests multiple effective adaptation events related to changes in the water availability through evolutionary time (see supplementary material 1, figures 3). In Figure 3.4, bands with overall low D overlap value (white or pale colored) are evidence of clades with ecologically specialized species associated to extreme environments as for example in arid or semi-arid regions in the case of the *Emplectocladus* clade, *P. dulcis* and relatives, the “*oleifolia*” clade in the Neotropics and several isolated species like *P. scoparia* and *P. lyonii*. Also, they could be associated to wet regions, such as the *P. serotina* complex, part of the paleotropical clade, or the “*muris*” clade in the Andes. Complementary, the metric I, which reflect the overlapping of probably distributions of AI between species pairs, shows that the spectrum of tolerance of many species highly intercepts with others, even though there is not significant geographic overlapping. However, white to pale blue long bands in the plot (also present in metric D) indicate environmental specialization towards the edges of the gradient (either very dry or very humid) of some groups of phylogenetically closely related species. The patches of high similarity (warmer colors) around the diagonal in both metrics, suggests phylogenetic clustering of drought tolerance adaptations widely distributed through the whole gradient. However, some taxa with a wide range of environmental tolerance correspond to domesticated species (e.g., *P. persica*, *P.*

*lusitanica* or *P. serotina*) that include a considerable number of occurrences out of the native distribution areas and consequently have a less identifiable ecological fingerprint in the modeling and less evident AI affinities with closely related taxa.

When niche similarity through time was analyzed, a moderate tendency of increasing AI overlap (Figure 3.3) was inferred. The higher frequency of higher overlap in younger nodes can indicate certain degree of convergent ecological distribution toward multiple tolerances to water stress expressed in the geographic space but also functional lability of some lineages placed within clades with a particular hydraulic identity.

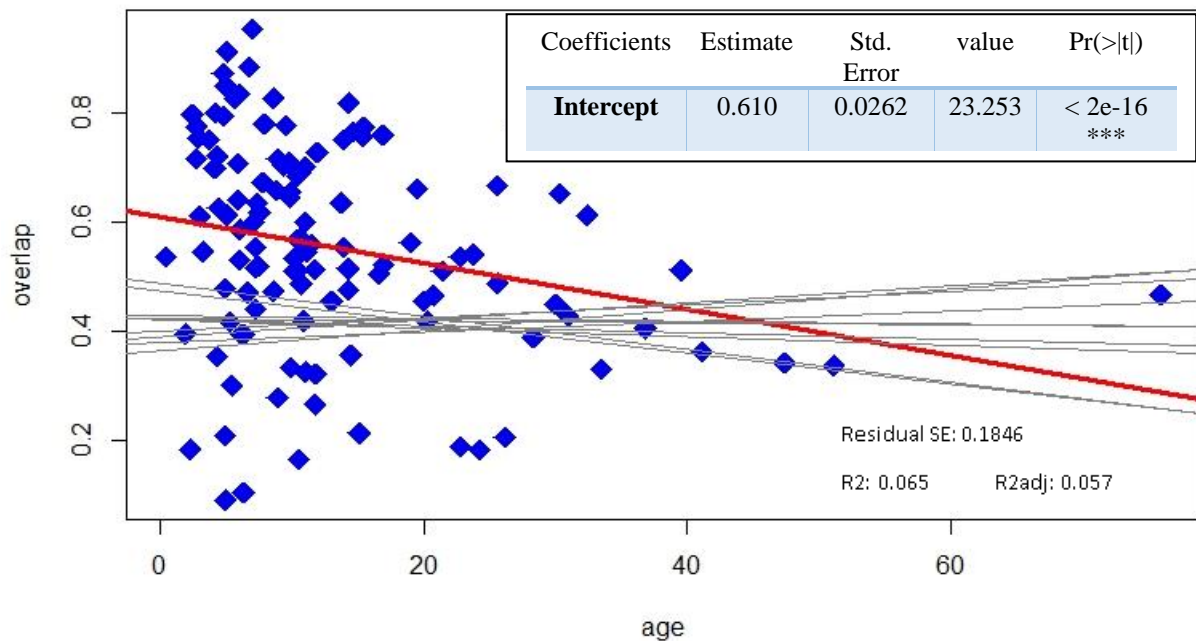


Figure 3.3. Niche overlap correlation analysis through time. Overlap of niche (based on AI) measured as Shoener’s D. Gray lines corresponds to MonteCarlo replications. Red line represents the regression line tendency.



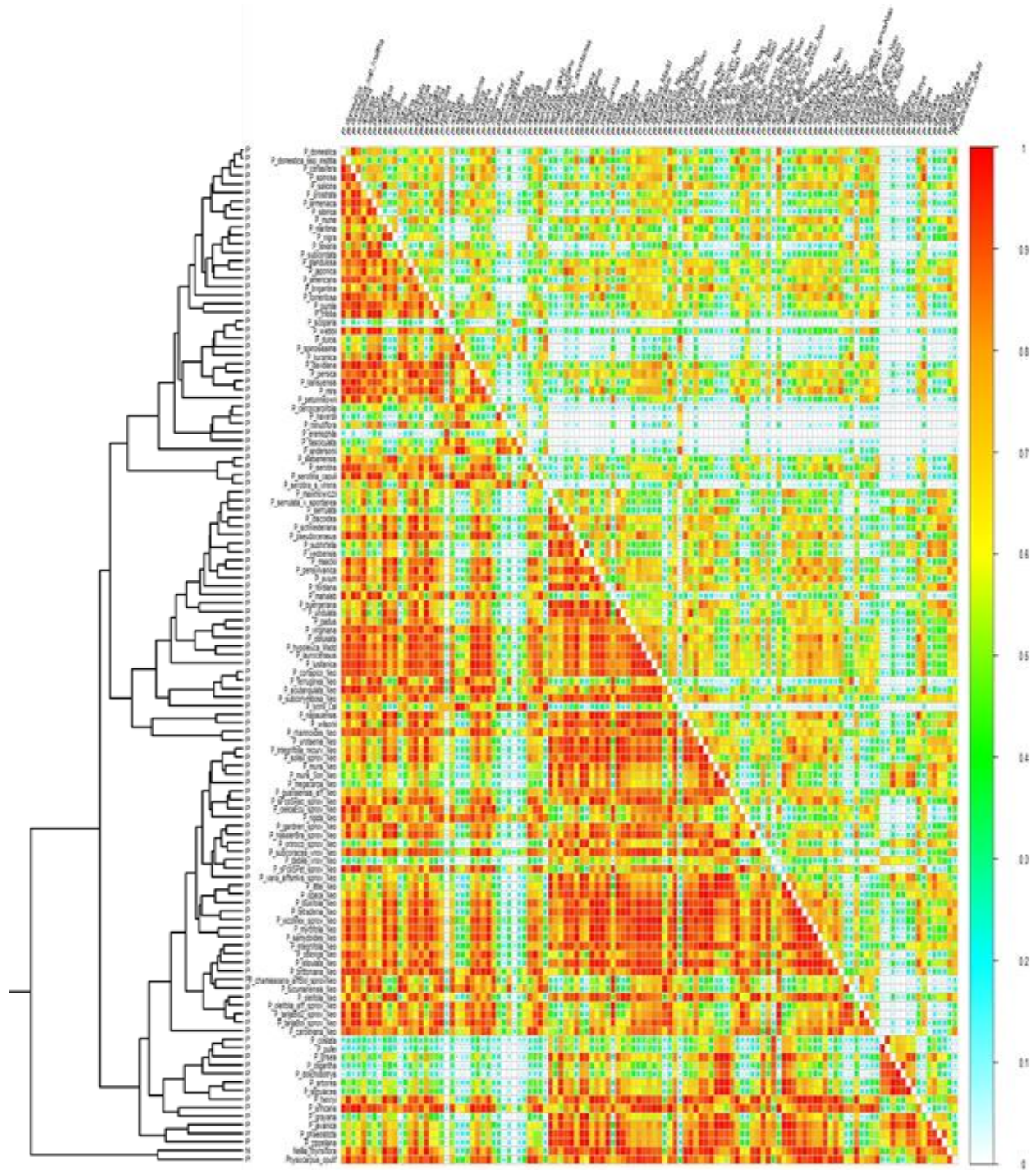


Figure 34. Pairwise comparison of niche overlap (single dimension climatic niche from the variable aridity index) expressed by the statistics D (upper triangle) and I (lower triangle). Species organized in the sequence of its phylogenetic position (Figure 3.2) as shown in the tree at the left. Dataset in supplementary material 2.

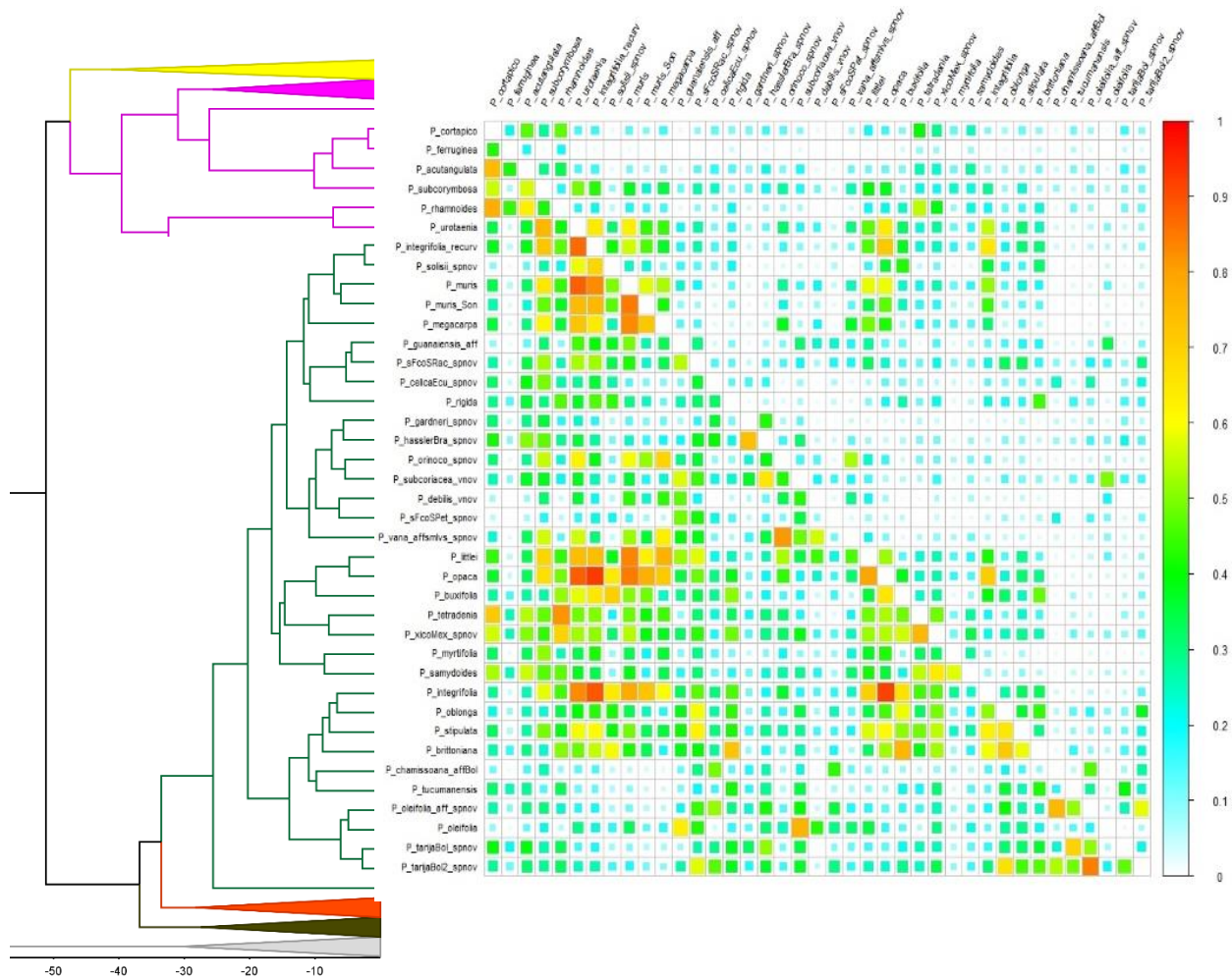


Figure 3.5. Pairwise comparison of niche overlap of the neotropical species (from all the variables) expressed by the statistics D (upper triangle) and I (lower triangle). Species organized in the sequence of its phylogenetic position and clades colored according to the clade color code adopted in Figure 3.2 as shown in the tree at the left with the rest of the clades collapsed.

Comparisons of the combined (multi variable) niche envelope of the Neotropical taxa (Figure 3.5), suggests a less notorious overall ecological overlapping among species. Association between phylogenetically closed taxa and environmental proximity in terms of I index is only registered within the “*muris*”, “*opaca*” and “*integrifolia*” subclades, all represented by Andean moist forest species. Also, high similarity is frequently registered between species of the latter subclades. In contrast, D metric evidenced very few significant similarities and reflects the narrow predicted

environmental based geographic distributions inferred for most of the species (see supplementary material 1), suggesting a wide variety of niche profiles for *Prunus* in the region considering the combination of climatic and edafic variables.

### **Niche evolution**

Niche predictions shown that two variables associated to environmental tolerance limits, precipitation of the driest month (BIO14) and minimum temperature of the coldest month (BIO6) were the highest contributors in average to the MaxEnt models in the full set of species (see supplementary material 2, MaxEnt models results). The former, related to water stress tolerance and the latter to elevation and latitude, are clearly linked to geographic suitability. Both can be associated to AI (the evaluated variable in niche evolution) because their long-term effects on annual rainfall balance and potential evapotranspiration (A Trabucco & R. J. Zomer, 2019). The phenogram calculated from species PNOs (plotted displaying only AI mean values to facilitate the visualization, see Figure 3.6), suggests the presence of a gradient of aridity tolerance among the main clades with partially overlapped ranges. The “solitary flowers” clade has an evident tendency towards subhumid to arid (up to desertic) conditions that may have favored colonization processes with strong community filtering scenarios like those occurred during mid and late Cenozoic pulses of aridification (Saarinen, Mantzouka, & Sakala, 2020). Furthermore, all main clades except for the “racemose paleotropical”, have a considerable representation in subhumid or dryer regimes suggesting resilient capacity to diversify in water stress situations within clades but a considerable expansion of the humidity preferences when the whole genus is considered. An early divergence in aridity tolerance around 50 Ma is suggested from a hypothetical ancestral condition just below of the subhumid threshold in which the main “tropical racemose” clade followed a course towards humid regimes meanwhile the other primary clade tended towards subhumid and arid regimes.

Within the tropical group, the significant number of dry tolerant present species integrating the core NWT clade influenced a trend towards dry regimes along its stem group between 25 to 35 ma, a time around the Oligocene-Miocene transition widespread aridification event that also impacted the Neotropics (Antoine et al., 2021). Thus, positive selection of early lineages of the clade in those changing environmental conditions could have been favored by the retention of an ancestral capacity of adaptation to dry conditions. Further colonization of more humid places by the “*muris*” subclade and some members belonging to other subclades could be explained by multiple shifts to more humid regimes emerged during the Miocene and the Pliocene. In general, the capability to adapt to novel dry local regimes appeared during the Neogene in the Andes and the rest of the Neotropics (Särkinen, Pennington, Lavin, Simon, & Hughes, 2012) could explain the current widespread of *Prunus* in the NWT including also the Caribbean islands and the dry subtropical areas where it constitutes an important floristic element (Howard, 1974). Similarly, New World tropical dry forest characteristic groups as the genera of Fabaceae, *Coursetia* DC. and *Poissonia* Baill., have been inferred to have stem nodes since the Oligocene-Miocene transition and crown diversification all along the Miocene and the Pliocene, suggesting a long history of dry habitats in the region but also multiple emergence of local dry spots (Särkinen et al., 2012). Finally, other factors may have played a role in the current distribution of the lineages of NWT *Prunus* like the Andean and central American mountain range uplift, local soil constraints, regional barriers and biotic interactions (Dick & Pennington, 2019), but the assessment of their contributions will require a more complete sampling of NWT species in the phylogeny.



## Patterns of niche diversification

To evaluate if the selected trait (AI) is changing correlated with the branching pattern of the phylogeny, phylogenetic signal (in terms of mode and tempo) and several models of continuous trait evolution were studied. Phylogenetic signal mode K tests (Figure 3.7) confirmed a significant degree of non-independence from the phylogeny (or positive signal) with less signal than expected under Brownian motion (BM), meaning that changes in the trait are smaller than expected following the branch lengths. To investigate whether a trend or constraint is driven the adaptation to various AI conditions was analyzed next comparing models.

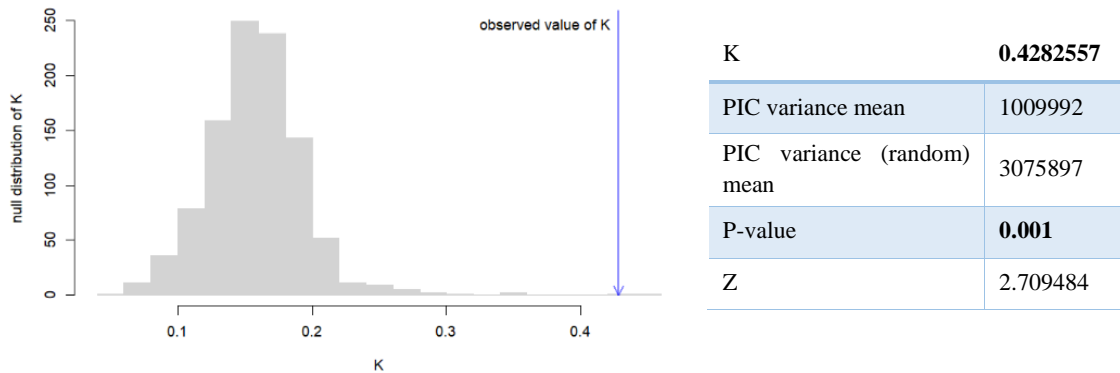


Figure 3.7. K test and graph of null distribution of randomizations: PIC: Phylogenetically independent contrasts. P-value: based on 1000 randomizations, P-value of observed vs. random variance of PICs. Z: Z-score of observed vs. random variance of PICs

A second test, Pagel's lambda (Figure 3.8), confirms the significant phylogenetic signal (maximum likelihood value = 0.872), suggesting that AI suitability models have a change rate in the tree close to BM.

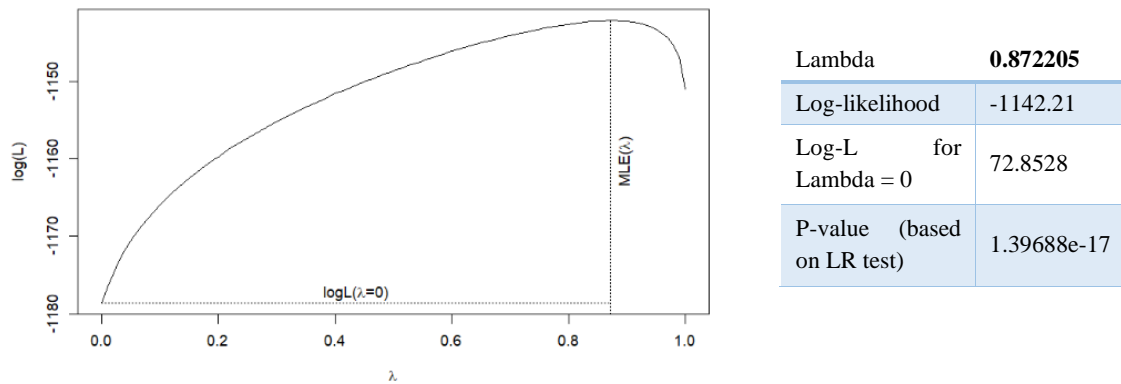


Figure 3.8. Pagel's Lambda test and likelihood surface of the estimation of its value.

After confirming the phylogenetic signal, AI evolutionary trajectory in the phylogeny was latter fitted to the three main models for continuous variables (Table 3.7). The Brownian motion was the best performer suggesting a tendency of the main clades towards expanding the trait space (and possibly favoring differentiation of local regimes as the phenogram suggests) instead of a trait space constrained with a default sole tendency, or in another case, an early (rapid) evolution of the range of adaptation to specific tolerances.

	AIC	Log likelihood	Standard error	Parameters
<b>Brownian motion (BM)</b>	<b>2290.6199</b>	<b>-1142.2056</b>	<b>2155.798708</b>	<b><math>\sigma^2 = 417427.6175</math> <math>\theta = 9607.289064</math></b>
Ornstein-Uhlenbeck (OU 1 optimum)	2292.4737	-1142.0614	1957.449850	alpha = 0.007742 $\sigma^2 = 562438.3529$ theta = 9605.413978
Early Burst (EB)	2292.7621	-1142.2056	2155.752729	a = -0.000001 $\sigma^2 = 417506.8768$ theta = 9607.279441

Table 3.7. Model of evolution fitting for Aridity Index. Model with the best fitting indicated in bold. 100 iterations were performed for each model with the best fit found in only one of them.

BM was also marginally confirmed as a better model than OU according to the AICs score when simulated variation in the trait was accounted (Figure 3.9). However, EB and MT, which are themselves variations of BM, were not distinguishable one another and from BM (Table 3.8), reflecting the overlapping range of tolerances observed among the clades. Also, this result can be related to inherent error in the inference of the niche envelope taken in account that the environmental layers are modeled and not direct field observations. Finally, white-noise (a random non-phylogenetic trait trajectory) was rejected.

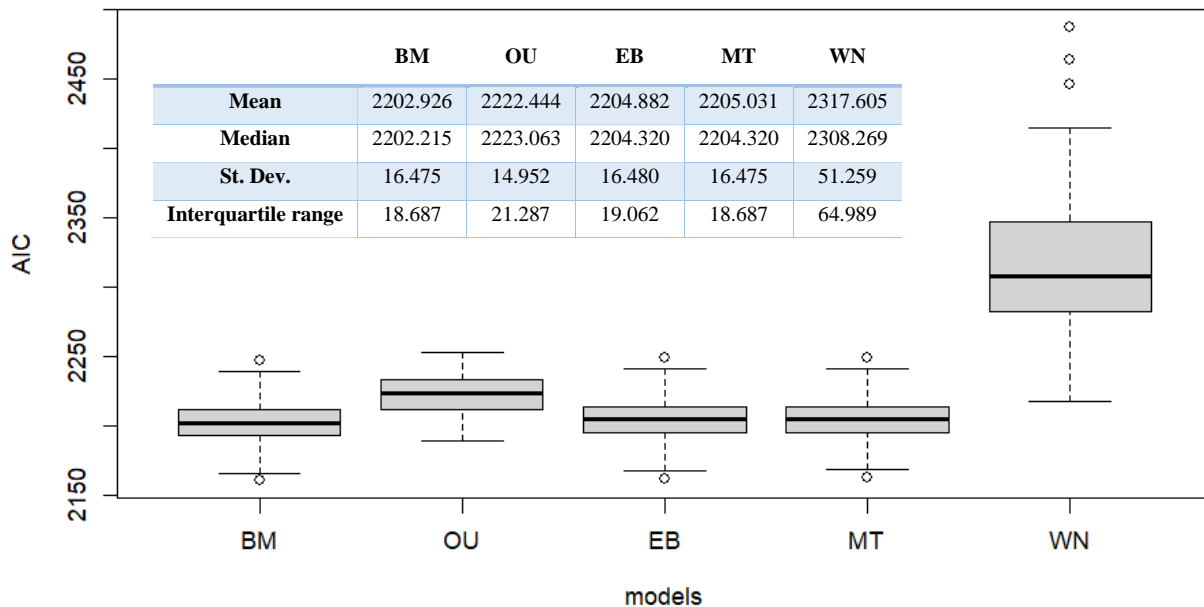


Figure 3.9. Median and variation in Akaike Information Criteria (AIC) fitting five candidate models of the continuous evolution of the aridity index (AI) and accounting for variation among 100 simulations of data under the BM parameters. Kruskal-Wallis test (BM; OU; EB; MT): chi-squared = 79.455, p-value < 2.2e-16.



	<b>BM</b>	<b>OU</b>	<b>EB</b>	<b>MT</b>
<b>OU</b>	2.144e-14			
<b>EB</b>	0.3008	2.126e-12		
<b>MT</b>	0.2796	3.23e-12	0.9815*	
<b>WN</b>	< 2.2e-16	< 2.2e-16	< 2.2e-16	< 2.2e-16

Table 3.8. P-values for a Wilcoxon-rank sum test of pairwise comparison between AICs values for each model accounting variation of the measured trait.

The closeness among some models also suggests that AI change could have had variations in the rate through time with lower-than-expected expansion or temporary stasis periods; consequently, the phylogenetic signal associated to BM could appear ambiguous. Also, errors in the inference of relationships among some taxa resulting in very short inner branches or polytomies, may influence the differentiation among BM variations.

To evaluate the impact of phylogenetic estimation accounting for the variability of trees recovered from the MCMC, a random sample of 100 trees from the BEAST posterior was incorporated to see its impact in the model fitting. BM was again the most suitable model (Figure 3.10), but in this case with significant difference from competing models (Table 3.9). However, the significant dispersion of the score of AICs from some trees (seen as upper outliers) reveals the variability associated to inconsistencies in the resolution of some nodes.

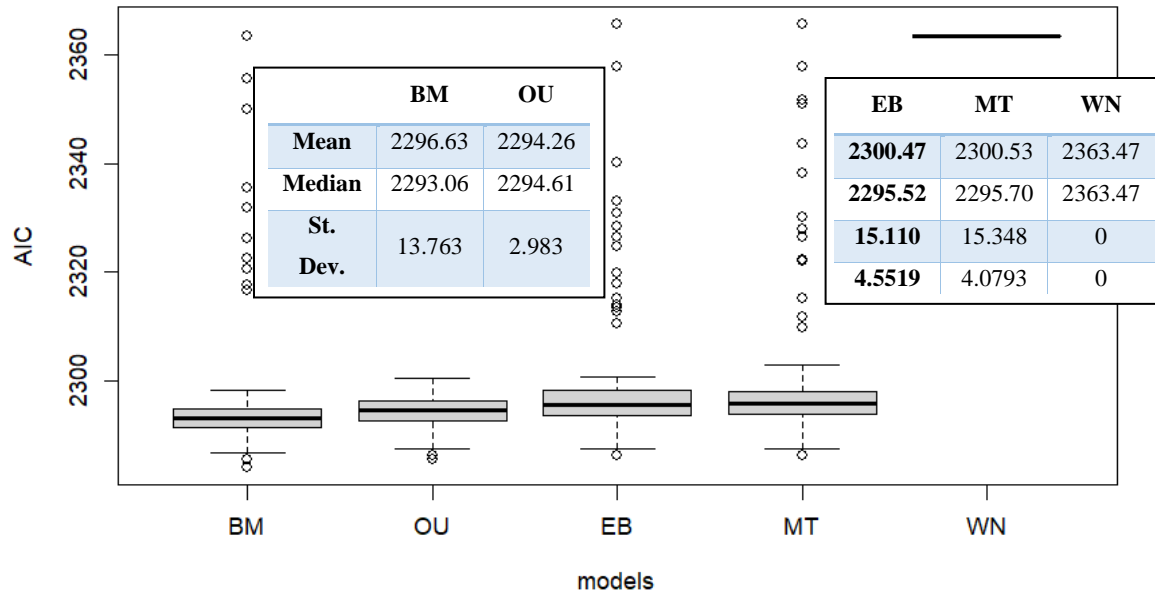


Figure 3.10. Median and variation in AIC for five candidate models fitting the continuous evolution of the aridity index (AI) and accounting for tree topology estimation variability (100 random trees sampled from the posterior of the BEAST output). Kruskal-Wallis test (BM; OU; EB; MT): chi-squared = 36.915, p-value = 4.795e-08.

	BM	OU	EB	MT
OU	0.003656			
EB	1.257e-06	0.005447		
MT	5.438e-07	0.002379	0.9192 *	
WN	< 2.2e-16	< 2.2e-16	< 2.2e-16	< 2.2e-16

Table 3.9. P-values for a Wilcoxon-rank sum test of pairwise comparison between AICs values for each model accounting for tree topology variability. \*: non-significant.

## DISCUSSION

The polyphyletic nature of neotropical racemose taxa separated in three clades, namely “*P. cortapico*” group, “*P. rhamnoides*” group (both recovered as part of the main clade of mainly deciduous species with solitary flowers, or corymbose, or terminal racemose inflorescence) and the “tropical racemose core” clade, is partially consistent with taxonomic empirical grouping suggested in early works based on deciduousness of the calyx, presence of domatia and gland position (Kalkman, 1965; Koehne, 1915). Additionally, the deep divergence of those groups suggests three separate events of dispersal: an earlier one for the main tropical clade mediated by long dispersal possibly from the Paleogene Boreotropics through a hypothetical Antillean land bridge (Graham, 2011), another during the Miocene for the “*P. cortapico*” clade and a later one from a possibly more recent event for the small group of “*P. rhamnoides*”.

Previous studies have suggested that ecology has had an important relevance in regional diversification patterns in the Neotropics (Hughes, Pennington, & Antonelli, 2012; Luebert & Weigend, 2014; R.T. Pennington, Lavin, et al., 2004). Ecological historical changes have been determined by geological and climatic events such as global aridification periods (i.e., Oligocene and Miocene cooling events) (Armijo, Lacassin, Coudurier-Curveur, & Carrizo, 2015; Herbert et al., 2016), regional scale mountain ridges uplifts (e.g., Andes, Central American ridges) (Strecker et al., 2007) and climate patterns changes in the Amazon basin (Jaramillo et al., 2010). Changing ecological constraints could have played a role in the ambivalent water demand of the core “tropical racemose” lineage which appears to have an early tendency towards humid habitats; but,

according to the current distribution of several species in subhumid habitats, it would be expected a retention of adaptability towards dry regimes that contributed to its diversification and expansion during the Neogene. The relatively low diversity and abundance (number of individuals) of NWT *Prunus* in some humid forest plot surveys (e.g., ter Steege et al. (2019), but contrastingly higher in some dry forests inventories (Banda-R et al., 2016), is consistent with the hypothesis that phylogenetic niche conservatism related to drought tolerance have influenced the historical patterns of colonization and the current distribution of *Prunus* in the region. Water stress, even as a seasonal event, have a strong capacity of floristic filtering when physiological survival thresholds are overcome affecting the capacity of effective reproduction and recruiting of seedlings (Engelbrecht et al., 2007). A analogous effect of a strong dry season in the tropics can be observed with the frost effect in temperate regions which impair the water conductivity and only adapted taxa can survive (Morin & Lechowicz, 2013). Globally, *Prunus* has an important diversity of temperate and desert species with hydraulic adaptations expressed in the form of leaf and root modifications (Cochard, Barigah, Kleinhenz, & Eshel, 2008; Rieger & Duemmel, 1992). The findings of the present study suggests that the diversification and distribution of the genus in the Neotropics have been favored in drought prone areas and that ability have enabled the current widespread distribution in the NWT in areas with a more humid regime but seasonally dry seasons, or in some cases currently wet areas that in the past have suffered temporal drought events. Similarly, some dry-affiliated taxa in the Neotropics have been reported to be widespread across the precipitation gradient meanwhile wet-affiliated ones are restricted to wet areas that can result in narrower geographic extent (when evaluated at the level of genus) but high species diversity concentrated in historically stable wet environments (Esquivel-Muelbert et al., 2017). In this sense, current niches of *Prunus* in the NWT seem to be influenced by early diversification trends in terms

of hydraulic management in a similar way that other widespread groups (e.g., *Palicourea* and *Psychotria* in Rubiaceae (Sedio, Paul, Taylor, & Dick, 2013)), indicating the fundamental role of background functional capabilities in determining the presence of the group in the communities despite of a wide set of historical colonization opportunities. Moreover, the niche evolutionary patterns found here, support the fundamental evolutionary ecology hypothesis that for plants “is easier to move than to evolve” (Ackerly, 2003; Donoghue, 2008).

Although a biogeographic analysis was not the aim of this study, a relatively geographic structured phylogeny within each of the main identified clades (and within the main Neotropical clade as shown in Table 3.4) and a significant phylogenetic signal respect to the aridity gradient, support the idea that differential water stress tolerance has been an important driver of geographic expansion of the genus both globally and in the NWT. In the NWT, pulses of range expansion could have occurred through geographically located pockets of lineages with an ecological identity following environmental regional changes. Divergence times inside the main clades of the genus placed the origin of several geographic delimited subclades in the late Oligocene and along the Miocene, suggesting the occurrence during that period of multiple events of long distance dispersal that could be associated to fluctuating climate conditions as those documented that caused important biotic turnovers in the Oligocene/Miocene boundary in the Himalayas (Deng, Wu, Wang, Su, & Zhou, 2021).

It is expected that morphological and physiological traits are ultimately linked to the adaptive response of the species to environmental conditions (in this case expressed by the AI signature) that could be interpreted as a measure of response to drought (Oliveira et al., 2021). Vascular architecture details related to vulnerability to cavitation have been previously revealed to have a considerable variation across species of *Prunus* (Cochard et al., 2008). The tendency of

phylogenetically structured vessel and pit traits that help to cope with water stress situations also has previously suggested for the genus (Scholz et al., 2013), with two structural significant different groups corresponding to the two main clades identified in this study. As a general trend, cavitation-resistance variation has also been reported to be reflected in modifications of stem habit and leaf architecture and anatomy (Markesteyn, Poorter, Paz, Sack, & Bongers, 2011; Oliveira et al., 2021), which is indeed highly variable across species of *Prunus* (Bortiri, Heuvel, & Potter, 2006; Chin et al., 2013; Rehder, 1940) and consequently could be explored in conjunction with the evolution of the ecological envelope in further studies.

## CONCLUSIONS

This study confirms the main structure of the classification of *Prunus* found in previous works in which most of the evergreen tropical (and few subtropical) species with axillary racemes are placed in a clade, the deciduous species with solitary (or fasciculate) type inflorescence in another one, and the generally deciduous species with corymbose or racemose inflorescences in a clade sister to the last group. However, the clade here recovered grouping mainly deciduous species has some differences with previous studies considering the inclusion of NWT species that were recovered out of the main clade. Additionally, unusual placement the *P. serotina* complex here resolved as sister to the solitary flower clade, may be related to its allotetraploid nature and the hybrid origin with a parental within that clade (Paireon, Jacquemart, & Potter, 2008). Separation of evergreen racemose species in 5 clades reveals that homologies in the morphology of the inflorescence should be reinterpreted and that concerted variation of other characters as vestiture,

leaf architecture, stipules, leaf glands and floral parts should be considered. With the neotropical species being now the most diverse part of the genus (see chapter 1 of this dissertation), further denser sampling is necessary to get an approach to a definitive subgeneric classification and have new insights in the history of biogeographic and ecological processes occurred in the area. In general, better sampling of tropical species can help to test for example the validity of the Boreotropics hypothesis (Dick & Pennington, 2019) and its impact in the origin and early diversification of the genus.

Affinity of *Prunus* to dry climates is highly extended and can be traced to its early diversification. The current cosmopolitan distribution of *Prunus* may have been favored by a retention of drought tolerance that facilitated the colonization and survival in regions with seasonality of water availability or where historical changes in the climate reduced humidity during considerable multiyear periods. In the NWT, evolutionary retention of tolerance to dryness appears to be related to the relatively high species diversity and more abundance observed in forests and scrublands with marked seasonal precipitation regimes as the Cerrado in Brazil, the Chaco in Paraguay, the Chiquitano forests in Bolivia, the Huancabamba depression between Ecuador and Peru and Sierra Madre Occidental in Mexico (see Chapter 1). Water stress tolerance may also have been relevant in the considerable diversification of clades inferred to have occurred from the Eocene to the Miocene, a range of time with several recorded global aridification events (R.T. Pennington, Cronk, & Richardson, 2004; Strömberg, 2011). The history of drought tolerance in *Prunus* has a significant phylogenetic structure with main clades with distinct AI ranges but partially overlapping among them. Also, subclades and more recent diverged species groups are frequently clustered around their aridity proximity. However, the ability to cope with drought has not hampered the possibilities of evolving in wetter climatic regimes, evidencing that this retained

ecological resistance has not been a limiting evolutionary constraint as would be expected whether an OU model with an attracting optimum for the niche space would be favored in the model tests. Instead, there has been a relatively broad ecological establishment process (as expected by a BM model) that could explain the wide geographic distribution in the NWT and worldwide.

Future integrative studies could try to understand the drivers of the current dissimilar abundance and contrasting distribution areas of *Prunus* in the NWT and other areas of the World manifested by the overlapping of numerous endemic (and frequently rare) species with some widely distributed in regional scale floristic assemblages (Das, Ahmed, & Singh, 2011; Potter, 2011). Those studies should consider the interactions of climate, soil, topography, morphological constraints, and biogeographic history under a perspective of functional phylogenetics and ecology.



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