

REVISION OF PTERANDRA (MALPIGHIACEAE)

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Pterandra comprises 14 species of trees and shrubs of Central and South America, which are readily recognized by the nature of the inflorescence as well as details of floral and vegetative morphology. Its closest relative appears to be *Acmanthera* Griseb., with which it shares winged anthers, a gynoeceium of three essentially free carpels with subapically inserted styles, and a fruit composed of three subspherical dry cocci. The type species of *Acmanthera* was first described by Adrien de Jussieu (1838) in *Pterandra* though assigned to its own section, which was later elevated to generic level (Grisebach 1858). The two genera differ most strikingly in their inflorescences and stipules. In *Pterandra* the inflorescence consists of 2–6-flowered fascicles borne in the axils of bracts or leaves that are crowded at branch apices. The intra- and epipetiole stipules are entirely to partly connate and less than 1 cm long. In *Acmanthera* the flowers are crowded on an elongate unbranched pseudoraceme terminating an axillary branch. The four stipules are fused into a deciduous sheath enclosing the stem and range from 1.5 to 11 cm long. W. R. Anderson (1978), in his delineation of the subfamily Byrsosimoideae, assigned *Pterandra* and *Acmanthera*, along with the monotypic genus *Coleostachys* Adr. Juss., to his tribe Acmanthereae. Currently, he and M. W. Chase are investigating the phylogeny of the Malpighiaceae by comparing evidence from chloroplast DNA and morphology, and preliminary results confirm this grouping, with *Pterandra* and *Acmanthera* as sister groups. The third genus of Malpighiaceae with winged anthers and a fruit composed of cocci is *Lophanthera* Adr. Juss. It is included in the Galphimieae (W. R. Anderson 1978), because its carpels are connate and have apical styles; it does not cluster with *Pterandra* and *Acmanthera* in the molecular analyses. For further comments about *Acmanthera* and *Lophanthera*, see W. R. Anderson's accounts of these genera (1975, 1981, 1983).

Only one species of *Pterandra* is well collected, *P. pyroidea*, a small shrub with clusters of showy pink flowers common throughout central Brazil; the equally large- and pink-flowered *P. hatschbachii* is known from only three collections, all from the type locality. The other species have inconspicuous and thus easily overlooked flowers and are known from one to few collections from localities only rarely visited or from several collections but mostly from the same area (*P. arborea*, *P. ultramontana*). As Fig. 1 shows, most species appear isolated from each other (only *P. evansii* and *P. hirta* are known to be at least partly sympatric), but future collections may fill the gaps. Little is known about habitats other than that most species were collected in forests. The exceptions are *P. hatschbachii* and *P. pyroidea*, which occur in the campos and cerrado of the Brazilian Planalto, and *P. eglei*, of campo in Pará (Brazil); *P. flavescens* was said to be growing in savanna bordering a river. The habitat is unknown for *P. andersonii*.

Compared to most other genera of Malpighiaceae, *Pterandra* is still only poorly known. Jussieu (1833) based the genus on Saint-Hilaire's collections of *P. pyroidea* from central Brazil; the second species, *P. arborea*, was not described until

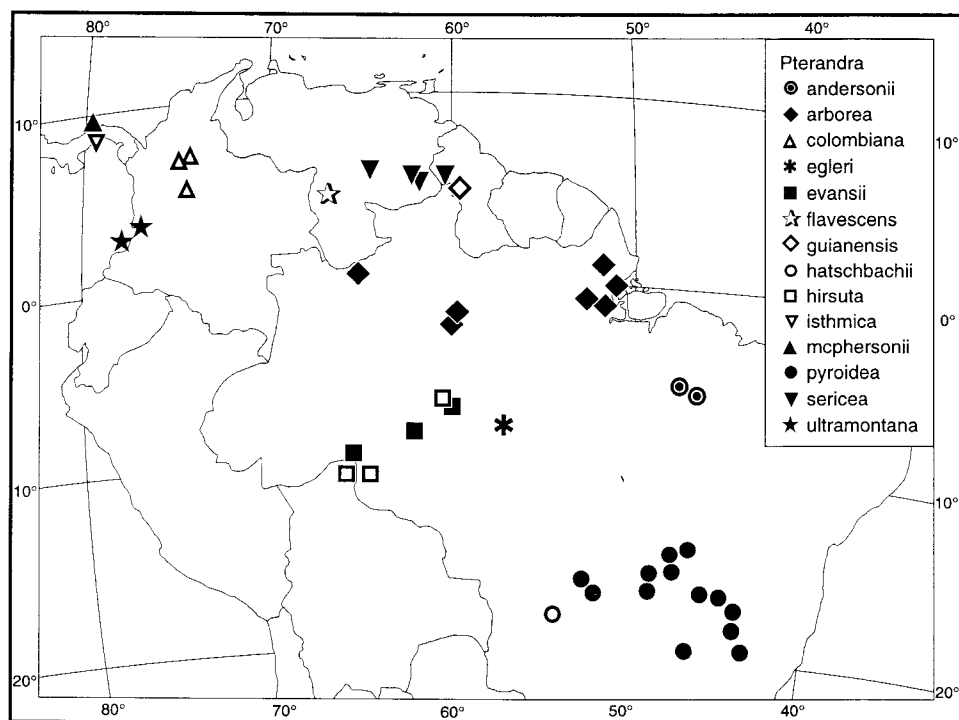


FIG. 1. Distribution of *Pterandra*.

1932. The many collecting efforts in Central and South America launched since World War II have greatly increased our knowledge of that flora and revealed many novelties. Since 1953, eight more species of *Pterandra* were recognized, and another four are added here (*P. andersonii*, *P. colombiana*, *P. hirsuta*, and *P. mcphersonii*).

INFRAGENERIC RELATIONSHIPS

Although the genus is readily circumscribed, the species are separated by unique combinations of characters otherwise shared in the genus as well as by characters unique to particular species. Because there is so little material available for all species except *P. pyroidea*, it is very difficult to assess the degree of variation of a particular character within a species, and future collections may show that the present circumscriptions are too narrow. It is therefore with some hesitancy that the consensus cladogram presented here is proposed as an estimation of the relationships within *Pterandra*.

The cladistic analysis was conducted using PAUP 3.1.1 (Swofford 1993). *Acmanthera* was designated as the outgroup for the 14 species of *Pterandra* and 12 characters were used (Table 1). Too few mature fruits were available to include characters pertaining to the cocci, seeds, and embryos. A chromosome count has been reported only for *P. egleri* (W. R. Anderson 1993).

1. Habit: 0 = large shrubs to trees; 1 = small shrubs. Future collections may allow finer distinctions in habit. *Pterandra andersonii* is known from only two collections, both described as a low shrub, and thus clusters with *P. hatschbachii*

TABLE 1. Data matrix for fourteen species of *Pterandra* and the outgroup *Acmanthera*.

	1	2	3	4	5	6	7	8	9	10	11	12
<i>Acmanthera</i>	0&1	0	0&1	0	0	1	0	0	0	0	0	0
<i>P. andersonii</i>	1	0	0	1	1	0	0	1	0	1	0	0
<i>P. arborea</i>	0	0	0	1	0	0	1	1	1	1	0	0
<i>P. colombiana</i>	0	0	1	1	0	0	1	1	0	1	0	0
<i>P. egleri</i>	0	0	0	1	0	0	0	1	0	1	0	0
<i>P. evansii</i>	0	1	0	1	0	0	0	1	0	1	0	0
<i>P. flavescens</i>	0	0	0	1	0	0	0	1	0	0	0	0
<i>P. guianensis</i>	0	0	0	1	0	0	1	1	1	0	0	0
<i>P. hatschbachii</i>	1	0	1	1	1	0	0	1	0	1	1	1
<i>P. hirsuta</i>	0	1	0	1	0	0	0	1	0	1	0	0
<i>P. isthmica</i>	0	0	2	1	0	0	0	1	1	1	0	1
<i>P. mcphersonii</i>	0	0	1	1	0	0	1	1	1	1	0	0
<i>P. pyroidea</i>	1	0	0&1	1	1	0	0	1	0	1	1	1
<i>P. sericea</i>	0	0	2	1	0	0	0	1	1	0	0	0
<i>P. ultramontana</i>	0	0	0	1	0	0	0	1	0	1	0	0

and *P. pyroidea*, but it is possible that this species, like some others, varies from shrub to small tree.

2. Attachment of hairs of the abaxial laminar vesture: 0 = medifixed; 1 = basifixed. The common condition in *Pterandra* and *Acmanthera* is for these hairs to be medifixed. *Pterandra hirsuta* differs in that the abaxial vesture of the lamina is composed almost entirely of basifixed hairs. In *P. evansii* it consists of medifixed hairs except for some tufts of basifixed hairs in the axils of the secondary veins at the costa and scattered along the costa. Other aspects of abaxial vesture, except for density, are too little known to be included in the analysis. For example, in *P. flavescens* and *P. ultramontana* the hairs are ferruginous; yet, the color fades to yellowish with age. Thus, it is possible that in other species these hairs are actually ferruginous and that the whitish to yellowish color is a result of age or drying procedures. In *P. egleri* these hairs vary from golden to ferruginous. The shape of the hairs also varies. In most species they are terete, but in *P. ultramontana* they are flat and scalelike. Some such flat hairs are intermixed with the terete hairs in the abaxial vesture of some leaves of *P. flavescens*, *P. mcphersonii*, and *P. sericea*. *Pterandra egleri* stands alone in that the vesture is tomentose and composed of wavy to crisped, subsessile to stalked hairs.

3. Abaxial surface of laminas: 0 = sparsely to moderately pubescent (the epidermis readily visible); 1 = glabrate to glabrous; 2 = densely pubescent (the epidermis mostly hidden). Only *P. colombiana*, *P. mcphersonii*, and *P. hatschbachii* are characterized by laminas nearly lacking abaxial laminar vesture; both *Acmanthera* and *P. pyroidea* were coded as polymorphic for this trait. *Pterandra egleri* was scored as moderately pubescent, but the tomentose vesture is sloughed

off in age. *Pterandra isthmica* and *P. sericea* share abaxially densely sericeous laminae. More collections may reveal that the abaxial leaf vestiture in at least some species is as variable as in *P. pyroidea*.

4. Pellucid cells: 0 = absent; 1 = present. All species of *Pterandra* have pellucid cells in the abaxial leaf surface, but *Acmanthera* lacks them. The species for which the most material is available, *P. arborea* and *P. pyroidea*, show that the presence of these pellucid cells varies greatly from abundant to a few along the margin. Thus, only the presence but not the disposition of these cells was scored for the analysis.

5. Length of petiole of the larger leaves: 0 = more than 0.5 cm long; 1 = up to 0.5 cm long. The leaves of *P. hatschbachii* and *P. pyroidea* are noteworthy for the short petioles, even in the largest leaves not more than 0.5 cm long. In the two collections of *P. andersonii* the petioles of the largest leaves are also mostly very short though they rarely reach 1 cm. This species was scored as having short petioles, but additional collections may show that length of the petioles is variable.

6. Fusion of stipules: 0 = fused across the petiole, at a node resulting in two deltate to cordate structures; 1 = all four stipules fused into a sheath enclosing the node and part of the internode. *Acmanthera* is characterized by the second condition, and *Pterandra* by the first. In *Pterandra*, the degree of fusion appears to be variable from entirely connate to nearly so to connate only in the basal 1/3 to 1/2; however, too little material is available to evaluate the constancy of degree of fusion within a species. All degrees of fusion occur in the two better-collected species, *P. arborea* and *P. pyroidea*.

7. Abaxial stipular surface: 0 = pubescent; 1 = glabrous. Only four species, *P. arborea*, *P. colombiana*, *P. mcphersonii*, and *P. guianensis*, have the stipules abaxially glabrous even when very young. In *Acmanthera* and the remaining species of *Pterandra*, the stipular structures are abaxially pubescent, though the vestiture is sometimes abraded in age.

8. Inflorescence structure: 0 = pseudoraceme; 1 = fascicles crowded along an axis. All species of *Acmanthera* have a pseudoraceme, a common type of inflorescence in the family, but *Pterandra* is unique in having aggregates of fascicles in the axil of bracts, each composed of a pair of stipules and a rudimentary leaf, or, less commonly, in the axil of a young leaf.

9. Attachment of flowers to axis: 0 = sessile or at most subsessile; 1 = fascicles borne on a short projection up to 3 mm long. In *Acmanthera* and most species of *Pterandra*, the first condition is characteristic, but in *P. arborea*, *P. guianensis*, *P. mcphersonii*, and *P. sericea* at least some of the fascicles on an axis are elevated on a short projection. The degree of plasticity of this feature can only be assessed with the examination of more material.

10. Number of flowers: 0 = 3 or fewer per fascicle; 1 = 4–6 per fascicle. In most species of *Pterandra* the fascicles are composed of 4–6 flowers, but in *P. flavescens*, *P. guianensis*, and *P. sericea* of only 2–3 flowers. One fascicle of *P. egleri* appeared 3-flowered, which may indicate a broader range than 4–6 in that species.

11. Color of petals: 0 = white to cream; 1 = pink. Only *P. hatschbachii* and *P. pyroidea* have pink petals. In the other species, it is often noted on labels that the petals are yellow, a common condition in age. Petals are persistent even in fruit, and care must be taken to note the age of the flower when assessing petal color. On the label of one collection of *P. andersonii* the "flowers" are said to be pink, which, if true, would be another attribute shared with *P. hatschbachii* and *P. pyroidea*; however, that collection is in mature fruit, and thus the description of color was based on very old petals.

12. Size of limb of petal: 0 = less than 6 mm in diameter; 1 = 6 mm or more in diameter. *Pterandra hatschbachii* and *P. pyroidea* also share large petal size in addition to petal color. The only other species with large petals is the otherwise dissimilar *P. isthmica*.

The analysis yielded three most parsimonious trees of 22 steps each (CI = 0.73; RI = 0.71; RC = 0.52). Figure 2 shows the trees and the strict consensus tree. As can be seen from the latter, the position of five species is particularly unstable. *Pterandra evansii* and *P. hirsuta* are similar in many characters, but *P. eglei*, *P. flavescens*, and *P. ultramontana* differ from these two as well as each other in a number of characters unique to each species. As noted above, future collection of most species may well result in different scoring of characters. For example, the position of *P. andersonii* would change if it were found that its habit is not restricted to "small shrub" and that large leaves vary in the length of the petiole. Yet, it seems likely that the two cerrado species, *P. hatschbachii* and *P. pyroidea*, as well as the pairs *P. evansii*/*P. hirsuta*, *P. colombiana*/*P. mcphersonii*, and *P. isthmica*/*P. sericea* will continue to be considered sister-species. *Pterandra arborea* and *P. guianensis* morphologically are more similar to each other than to other species; however, *P. guianensis* is known only from the type collection.

Many more collections of all species from additional localities, except for *P. pyroidea*, should reveal more characters suitable for use in proposing a phylogeny. Unfortunately, given that most species of *Pterandra* are easily overlooked by casual collectors and are found in areas little visited, it is unlikely that such additional material will be forthcoming in the near future. The results of the analysis presented here may be considered a first step in understanding the links between these fourteen species.

TAXONOMY

Pterandra Adr. Jussieu in Saint-Hilaire, Fl. bras. merid. 3: 72. 1833 ["1832"].—
LECTOTYPE, designated by Cuatrecasas, 1958: *Pterandra pyroidea* Adr. Juss.

Shrublets, shrubs, or trees to 30 m. Stems with a pattern of a long internode followed by a series of very short internodes, branchlets densely sericeous when young, becoming glabrous. Leaves opposite; laminas elliptical or narrowly so to obovate or oblanceolate, apex obtuse (-mucronate) to acute (-mucronate) to acuminate to sometimes caudate, base cuneate or sometimes rounded or slightly truncate, adaxially pubescent when young but soon becoming glabrous or sometimes glabrate, abaxially sparsely to densely sericeous with medifixed hairs or glabrate to glabrous (tomentose in *P. eglei*, hirsute with basifixed hairs in *P. hirsuta*), eglandular but abaxially commonly sprinkled with pellucid cells or these concentrated along the margin, costa and secondary veins prominent abaxially (in *P. flavescens* only the costa, in *P. pyroidea* and *P. eglei* the tertiary veins as well); petioles densely sericeous or sparsely so in age; stipules intra- and epipetiole, each pair entirely connate or distally notched or only the proximal 1/4–3/4 connate and distally free, adaxially hirsute (becoming glabrous in *P. sericea*), abaxially glabrous or densely sericeous (sometimes sparsely so in age). Inflorescence a series of 2–6-flowered fascicles, these sessile or borne on very short projections on the new growth, usually in the axil of a deciduous bract composed of a pair of stipules and a rudimentary leaf in the stem regions with very short internodes (in *P. flavescens* and *P. sericea* usually in the axils of leaves), the fascicles thus crowded

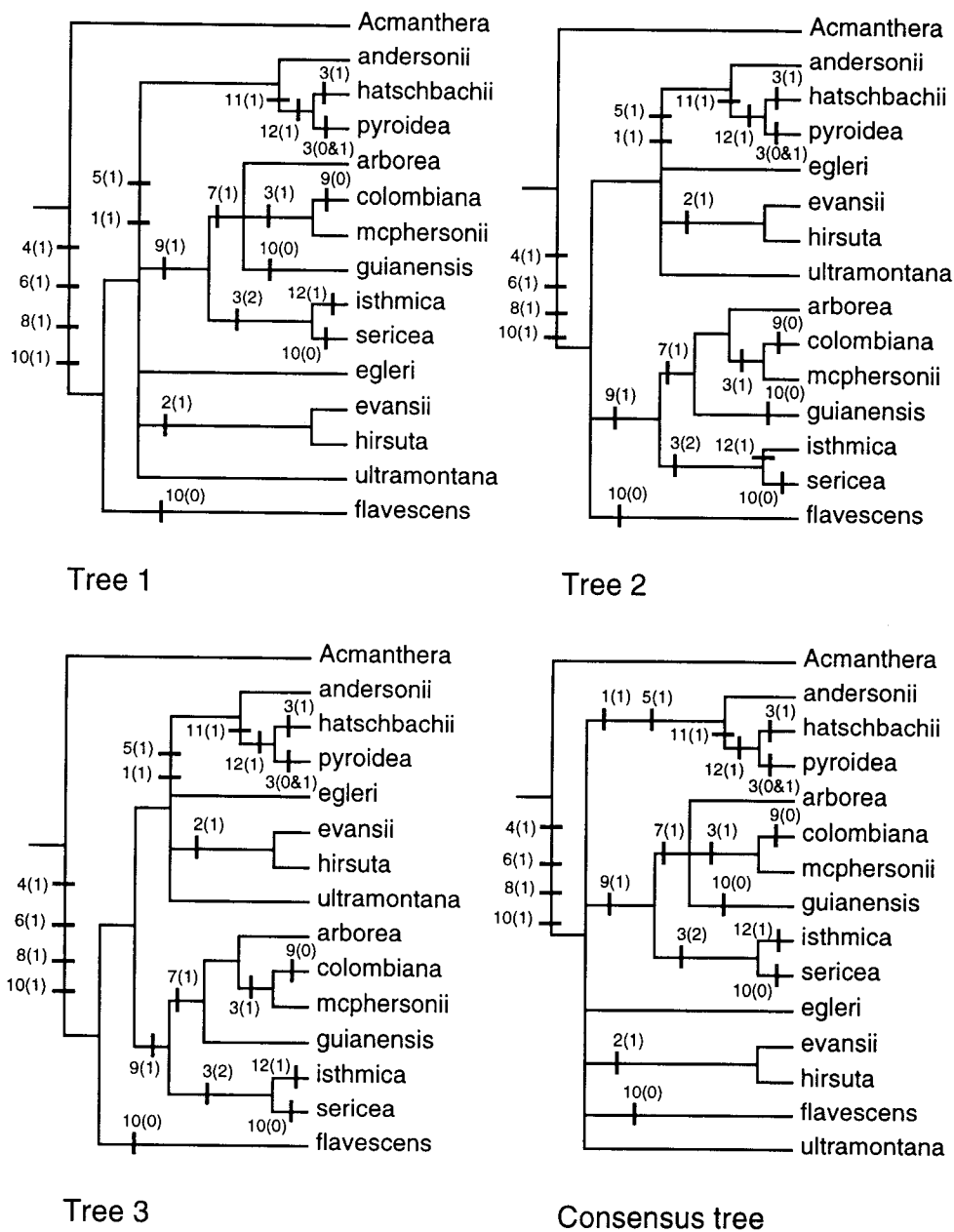


FIG. 2. Three most parsimonious cladograms and the consensus tree for 14 species of *Pterandra* and the outgroup *Acmanthera*.

below the developing shoot apex or below a flush of new leaves; flowers borne on slender pedicels, each subtended by a pair of bracteoles and one bract, peduncles absent; calyx, corolla, and androecium persistent in fruit. Sepals 5, narrowly triangular but the distal 1/2–2/3 often ligulate, apex recurved to revolute during anthesis but erect in fruit, each sepal bearing two elliptical glands (glands sometimes irregularly present and/or irregular in size or sometimes entirely absent in *P. pyroidea* and *P. sericea*, each sepal sometimes bearing only one gland in *P. egleri*). Petals 5, clawed with the limb \pm flat, the posterior one slighter larger than the

lateral four and with a slightly thicker claw, white or cream ("greenish yellow" in *P. guianensis*), becoming yellow in age, or pink, adaxially glabrous, abaxially sparsely to densely sericeous on the claw and center of limb (often glabrous in *P. hatschbachii*) or sometimes the abaxial pubescence nearly covering the entire limb except for a narrow marginal band, the limb elliptical to broadly obovate or suborbicular (elliptical to oblong in *P. guianensis*) and often decurrent on the claw, the margin erose or sometimes subentire, commonly with few to numerous pellucid cells abaxially. Androecium of 10 free stamens, those opposing the sepals shorter than those opposing the petals; filaments flat, glabrous except for a basal adaxial tuft (adaxially hirsute in *P. sericea*); anthers equal, glabrous, 4-locular, the connective enlarged and exceeding the locules, the outer two locules each with a longitudinal wing; pollen tri- and tetracolporate. Receptacle with a ring of basifixed hairs, these forming tufts adhering adaxially at the base of the petals, sepals, and filaments. Gynoeceum of 3 uniovulate, distinct carpels; styles free, inserted subapically, subulate, glabrous or with scattered hairs adaxially in the proximal 1/5–3/4, the stigma apical, minute; ovary hirsute-tomentulose, the hairs mostly basifixed. Fruit a schizocarp of three cocci borne on a small torus; coccus subspherical, dry, indehiscent, hirsutulose-tomentulose (glabrescent in *P. colombiana*), often the areole with spongy tissue or only with a margin of scarious or cartilaginous tissue, carpophore absent; seed subspherical, outer cotyledon slightly larger than the inner, both folded back on themselves and the inner cotyledon nested within the outer cotyledon.

The single chromosome count known for the genus, $n = 12$ for *P. eglei*, is consistent with numbers reported for the Byrsonimoideae, which are $n = 6, 12,$ or ca. 24 (see W. R. Anderson, 1993).

KEY TO THE SPECIES OF PTERANDRA

1. Petals pink; petioles of even the largest leaves only 0.1–0.5 cm long; small shrubs to 2 m.
 2. Laminas abaxially tomentose to sparsely so (rarely glabrate); stipules 3.5–8 mm long, 4–7 mm wide; petals sparsely to densely sericeous on claw and center of limb; Brazil (Distrito Federal, Goiás, and Minas Gerais; Mato Grosso?). 1. *P. pyroidea*.
 2. Laminas abaxially glabrous or with some scattered hairs, especially on the major veins; stipules 2–2.5 mm long and wide; petals abaxially glabrous or very sparsely sericeous on claw and center of limb; Brazil (Mato Grosso). 2. *P. hatschbachii*.
1. Petals white or cream or greenish yellow, often becoming yellow in age; petioles up to 3.5 cm long, well over 0.5 cm long in larger leaves (except to 1 cm long in *P. andersonii*); shrubs or trees to 30 m.
 3. Abaxial laminar pubescence composed mostly of erect basifixed hairs and a few scattered medifixed hairs; Brazil (Amazônas, Rondônia) and Bolivia (Beni). 11. *P. hirsuta*.
 3. Abaxial laminar pubescence composed entirely of medifixed hairs (in *P. evansii* often also with tufts of basifixed hairs in the axils formed by the costa and secondary veins, and sometimes with basifixed hairs also scattered along the costa), or the laminas abaxially glabrate to glabrous.
 4. Stipules abaxially glabrous even in bud (but often with a sericeous patch at point of attachment to petiole in *P. guianensis*, with a sericeous patch at the apex in *P. colombiana*).
 5. Bracts and bracteoles abaxially densely pubescent; laminas abaxially sparsely sericeous, the hairs evenly distributed.
 6. Petals white; pedicels 0.4–0.6 mm in diameter, the pubescence white or silvery; leaf apex obtuse or acute or acuminate with a tip to 1 cm long; pellucid cells on abaxial surface of lamina abundant to sometimes absent; Brazil (Amapá, Amazônas, Pará). 4. *P. arborea*.
 6. Petals greenish yellow; pedicels 0.8–1 mm in diameter, the pubescence golden-yellow; leaf apex acuminate to caudate, the tip up 1.5 cm long; pellucid cells in abaxial surface of lamina very few to absent; Guyana. 5. *P. guianensis*.

5. Bracts and bracteoles abaxially glabrous or with some hairs on the costa and/or a tuft at the apex; laminas abaxially glabrate or very sparsely sericeous and the hairs widely scattered.
 7. Fascicles of flowers sessile, the pedicels 1.4–2 cm long; petioles up to 3.5 cm long; Colombia (Antioquia). 6. *P. colombiana*.
 7. Fascicles of flowers borne on short projections (up to 3 mm long), the pedicels 1–1.5 cm long; petioles up to 1.3 cm long; Panama (Colón). 7. *P. mcphersonii*.
4. Stipules abaxially densely sericeous, sometimes sparsely so in age (especially in *P. ultramontana*).
 8. Laminas abaxially tomentose with subsessile to stalked hairs, the pubescence not appressed and shed in patches in older leaves, the tertiary veins as well as the costa and secondary veins prominent abaxially; Brazil (Pará). 14. *P. eglei*.
 8. Laminas abaxially glabrate or sparsely to densely sericeous and the pubescence appressed (in *P. evansii* often also with tufts of basifixed hairs in the axils formed by the costa and secondary veins, and sometimes with basifixed hairs also scattered along the costa), the costa and the secondary veins or only the costa prominent abaxially, the tertiary veins somewhat raised or not.
 9. Laminas abaxially very sparsely sericeous with a few widely scattered, ferruginous, appressed hairs (the hairs sometimes faded to white or yellowish in age), only the costa prominent abaxially, the secondary veins at most very slightly raised; Venezuela (Amazonas). 12. *P. flavescens*.
 9. Laminas abaxially evenly sericeous, the hairs white to yellowish (ferruginous in *P. ultramontana*), the costa and the secondary veins prominent abaxially.
 10. Laminas abaxially finely sericeous with ferruginous hairs (in old leaves the hairs sometimes faded to yellow or golden), the hairs flattened and scalelike; stipules 4.5–6 mm long, 4–5 mm wide; Colombia (Valle, Isla Gorgona). 13. *P. ultramontana*.
 10. Laminas abaxially sparsely to densely sericeous with white to yellowish hairs, the hairs terete; stipules 2.5–4 mm long, 2.5–3.8 mm wide.
 11. Laminas abaxially densely sericeous, the hairs closely spaced and overlapping, each hair not readily discernible; pedicels 0.6–1 mm in diameter, the pubescence golden-yellow.
 12. Filaments adaxially hirsute; limb of lateral petals 3.5–4.3 mm long, 2.8–3.6 mm wide; Guyana, Venezuela (Bolívar). 9. *P. sericea*.
 12. Filaments glabrous except for a basal tuft; limb of lateral petals 6.5–7 mm long, 5.2–5.5 mm wide; Panama (Panamá). 8. *P. isthmica*.
 11. Laminas abaxially sparsely sericeous, the hairs well separated and each readily discernible, not at all to slightly touching and overlapping; pedicels 0.3–0.4 (–0.5) mm in diameter, the pubescence white to silvery.
 13. Laminas lanceolate to narrowly elliptical, the base acute or rounded, the petiole of larger leaves more than 1 cm long, abaxial vesture composed mostly of medifixed hairs but often also with tufts of basifixed hairs in the axils formed by the costa and secondary veins, and sometimes with basifixed hairs also scattered along the costa), apex of lamina acute to acuminate with a tip to 1.8 cm long; Brazil (Amazônia, Rondônia). 10. *P. evansii*.
 13. Laminas obovate to broadly elliptical, the base cuneate, the petiole of even the larger leaves only up to 1 cm long, abaxial pubescence composed only of medifixed hairs, apex of lamina rounded (–mucronate) to acute; Brazil (Maranhão). 3. *P. andersonii*.

1. ***Pterandra pyroidea*** Adr. Jussieu in Saint-Hilaire, Fl. bras. merid. 3: 74. 1833 ["1832"].—TYPE: BRAZIL. Minas Gerais: "in campis," *Saint-Hilaire B(1)* 1376 (holotype: P!; isotype: P!).

Pterandra psidiifolia Adr. Jussieu in Saint-Hilaire, Fl. bras. merid. 3: 73. 1833 ["1832"]. *Pterandra pyroidea* f. *psidiifolia* (Adr. Jussieu) Niedenzu, Arbeiten Bot. Inst. Königl. Lyceums Hosianum Braunsberg 5: 33. 1914.—TYPE: BRAZIL. Minas Gerais: "in monte Serra da Canastra," *Saint-Hilaire C(1)* 395 (holotype: P!; isotype: P!).

Shrublets of unbranched or little-branched stems to 2 m arising from a woody base. Laminas 6.5–16 cm long, 3.3–9 cm wide, elliptical to obovate, apex obtuse (-mucronate) to acute (-mucronate) or briefly acuminate, acumen up to 8 mm long, base rounded to truncate, adaxially tomentulose to sparsely so to glabrate to glabrous, abaxially tomentulose to sparsely so to sometimes glabrate, the hairs 0.6–1.7 mm long, medifixed, terete, wavy to crisped to curled, white to yellowish, subsessile or with a stalk to 0.2 mm long, overlapping, pellucid cells abundant to absent in abaxial surface or sometimes only along the margin, costa and secondary and tertiary veins prominent abaxially; petioles 2.5–5 mm long, densely sericeous; each pair of stipules entirely connate or sometimes nearly so but the apex notched or connate in the proximal 3/4 but the distal 1/4 free, 3.5–8 mm long, 4–7 mm wide, adaxially hirsute, abaxially sericeous. Inflorescence of sessile to subsessile, 4–6-flowered fascicles borne below young or mature leaves or distal new leaves not yet developed at anthesis, each fascicle subtended by a deciduous bract composed of a pair of stipules and a rudimentary leaf; pedicels 0.7–2.5 cm long, 0.5–0.7 mm in diameter, densely white-sericeous; bracts 1.8–3 (–4) mm long, 1–2.5 mm wide, triangular, bracteoles 1.4–2.5 mm long, 0.4–1 mm wide, narrowly triangular to linear, bracts and bracteoles with the apex acute, abaxially with hairs concentrated on and adjacent to the costa and apex. Sepals 2.7–4.2 mm long, 2.5–4.3 mm wide, triangular, apex obtuse, erect or slightly recurved, glands 0.8–2 mm long, 0.5–1.2 mm wide, or glands absent. Petals pink, the limb broadly obovate or elliptical to orbicular, margin erose, abaxially very sparsely to densely sericeous on claw and center of limb or over most of limb except for a band along the margin ca. 0.5 mm wide or sometimes glabrate to glabrous; lateral petals: claw 0.8–1.5 mm long, limb 6–7 (–8) mm long, 4.5–6 (–7.5) mm wide; posterior petal: claw 1–1.5 mm long, limb 6.5–8.5 mm long, 5.5–7.5 mm wide. Filaments glabrous except for an adaxial basal tuft of hairs, those of stamens opposing sepals 1.8–2.5 mm long, those of stamens opposing petals 2–3.2 mm long; anthers 1.8–2.3 mm long, wing of outer locules 0.3–0.5 mm wide. Styles 3.8–5.4 mm long, 0.3–0.4 mm in diameter, glabrous. Coccus 4–4.5 mm high, 4–5 mm in diameter, hirsutulose-tomentulose; torus up to 0.5 mm high; embryo globose, ca. 3 mm long, radicle ca. 1.3 mm long, outer cotyledon ca. 5.7 mm long, ca. 2.5 mm long, folded at 1/2 its length and the distal tip folded over the inner cotyledon, inner cotyledon ca. 4.5 mm long, ca. 2.5 mm wide, folded three times. Chromosome number unknown.

Phenology. Collected in flower from April through December, in fruit from September to December.

Distribution (Fig. 1). Brazil (Distrito Federal, Goiás, and Minas Gerais; one collection purportedly from Mato Grosso); cerrado, campo sujo, and campo; 650–1000 m.

REPRESENTATIVE SPECIMENS. **Brazil.** DISTRITO FEDERAL: Brasília, bacia do Rio São Bartolomeu Rebrotamento, 14 May 1980, *Heringer et al.* 4771 (IBGE, MICH); Chapada da Contagem, ca. 15 km E of Brasília, 700–1000 m, 18 Aug 1964, *Irwin & Soderstrom* 5274 (NY, UB, US); ca. 35 km SW of Brasília on rd to Anápolis, 700–1000 m, 5 Sep 1964, *Irwin & Soderstrom* 6032 (F, MICH, MO, NY, UB); Córrego Jeriva, ca. 10 km E of Brasília, 975 m, 15 Sep 1965, *Irwin et al.* 8342 (NY, UB); near Córrego Taquarí, E of Lagôa Paranoá, 975 m, 28 Apr 1966, *Irwin et al.* 15404 (NY); 30 km N of Brasília, Córrego Sobradinho, Farm No. 19, 4 Oct 1963, *Maguire et al.* 57015 (MICH, MO, NY).—GOÍAS: Serra Geral do Paraná, 3 km by rd S of São João da Aliança, 1040 m, 23 Mar 1973, *Anderson* 7750 (NY, UB); ca. 15 km (straight line) N of Corumbá, 1230 m, 16 May 1973, *Anderson* 10421 (MICH, NY, UB); Ipameri, Rio Corumbá, 4 Oct 1976, *Hatschbach* 38930 (MBM, MICH); Alto Paraíso, 2–5 km Oeste, 1200 m, 15 Oct 1990, *Hatschbach* 54571 (MBM, MICH); Serra do Caiapó, ca. 35 km S of Caiapônia on rd to Jataí, 17°12'S, 51°47'W, 800–1000 m, 19 Oct 1964, *Irwin & Soderstrom* 7055 (F, MICH, NY); Chapada dos Veadeiros, 24 km NW of Veadeiros, rd to Cavalcante, 14°S.

47°W, 1200 m, 22 Oct 1965, *Irwin et al. 9511* (F, MICH, NY, UB).—MATO GROSSO (perhaps an error for Minas Gerais, see below): without locality, 15 Jul 1969, *Saddi RFA12314* (MICH).—MINAS GERAIS: 5 km by rd NE of Rio Manso and Couto de Magalhães, 17°53'S, 44°15'W, 960–1000 m, 13 Apr 1973; *Anderson 8762* (F, MICH, NY, W); Jaguará, 28 Oct 1965, *Goodland 122* (F, MICH, MO, NY); Buenópolis, Serra do Cabral, a 6–7 km da cidade, 17°53'S, 44°15'W, 760 m, 12 Oct 1988, *Harley et al. 24857* (F, MBM, MICH, RB, UB); Araxá, Rod. BR-262, 12 Oct 1982, *Hatschbach 45623* (MBM, MICH); S'Ana do Riacho, 25 Oct 1974, *Hatschbach 35325* (MBM, MICH); Belo Horizonte, Morro das Pedras, 1000 m, 18 Sep 1945, *Williams & Assis 7574* (BR, F, GH, MO, NY, R, U).

Pterandra pyroidea is a common plant of the Brazilian Planalto, where it forms little-branched shrubs bearing showy clusters of large pink flowers. It is similar to *P. hatschbachii* of Mato Grosso, a weak shrublet (less than 0.5 m tall) also with large pink petals, which differs most strikingly in its glabrous or nearly glabrous herbage and flowers. It has very small stipules, only 2–2.5 mm long and wide; those of *P. pyroidea* are 3.5–8 mm long, 4–7 mm wide. The only record of *P. pyroidea* from Mato Grosso (*Saddi RFA12314*) is questionable. The label only records the collector, date, and “Mato Grosso.” Perhaps the specimen was collected in Minas Gerais, and the abbreviation “MG” misinterpreted as “Mato Grosso.” It seems unlikely that such a common and conspicuous plant would have been overlooked by all other collectors who visited Mato Grosso.

- 2. *Pterandra hatschbachii*** W. R. Anderson, *Contr. Univ. Michigan Herb.* 19: 388, 1993.—TYPE: BRAZIL, Mato Grosso: Alto Araguaia, Rib. Claro, 22 Sep 1974, *Hatschbach 35085* (holotype: MBM!; isotype: MICH!). Fig. 3.

Shrublets less than 0.5 m tall arising from woody, trailing, underground stems. Laminas 4.2–12.5 cm long, 1.5–4.4 cm wide, obovate or oblanceolate to elliptical, apex acute (-mucronate) to obtuse (-mucronate) to emarginate (-mucronate), base cuneate or rounded to truncate, adaxially glabrous, abaxially entirely glabrous or sparsely sericeous on the costa and major veins or glabrate, the hairs 0.3–1.3 mm long, medifixed, terete, straight or wavy, white and golden, sessile or subsessile or with a stalk up to 0.1 mm long, rarely also with a few basifixed hairs ca. 0.4 mm long, pellucid cells along margin of abaxial surface or absent, costa and secondary veins prominent abaxially, tertiary veins usually slightly raised as well; petioles 1–2.5 mm long, densely sericeous; each pair of stipules entirely connate or nearly so but with the apex notched, or connate in the proximal 1/3–1/2 and distally free, 2–2.5 mm long and wide, adaxially hirsute, abaxially sericeous. Inflorescence of sessile to subsessile, ca. 6-flowered fascicles below a flush of new leaves or sometimes the distal new leaves not yet developed at anthesis, each fascicle subtended by a deciduous bract composed of a pair of stipules and a rudimentary leaf; pedicels 0.9–2.5 cm long, 0.3–0.4 mm in diameter, densely yellowish to white-sericeous; bracts 1–1.7 mm long, 0.5–1 mm wide, triangular, bracteoles 0.7–1.2 mm long, 0.2–0.5 mm wide, linear to narrowly triangular, bracts and bracteoles with the apex acute, abaxially with scattered hairs especially along the costa and on the apex. Sepals 2.3–2.5 mm long, 1.8–2.7 mm wide, triangular, apex obtuse, revolute or recurved, glands 1–1.8 mm long, 0.6–1 mm wide. Petals pink (fading to white in age), the limb orbicular or broadly obovate, margin erose, abaxially glabrous to sparsely sericeous on claw and center of limb; lateral petals: claw (0.8–) 1–1.3 mm long, limb 6–7 (–7.5) mm long, (4.5–) 5–5.5 mm wide; posterior petal: claw 1.2–1.5 (–1.7) mm long, limb 6.5–7.5 mm long and wide. Filaments glabrous except for an adaxial basal tuft of hairs, those of stamens opposing sepals 2–2.5 mm long, those

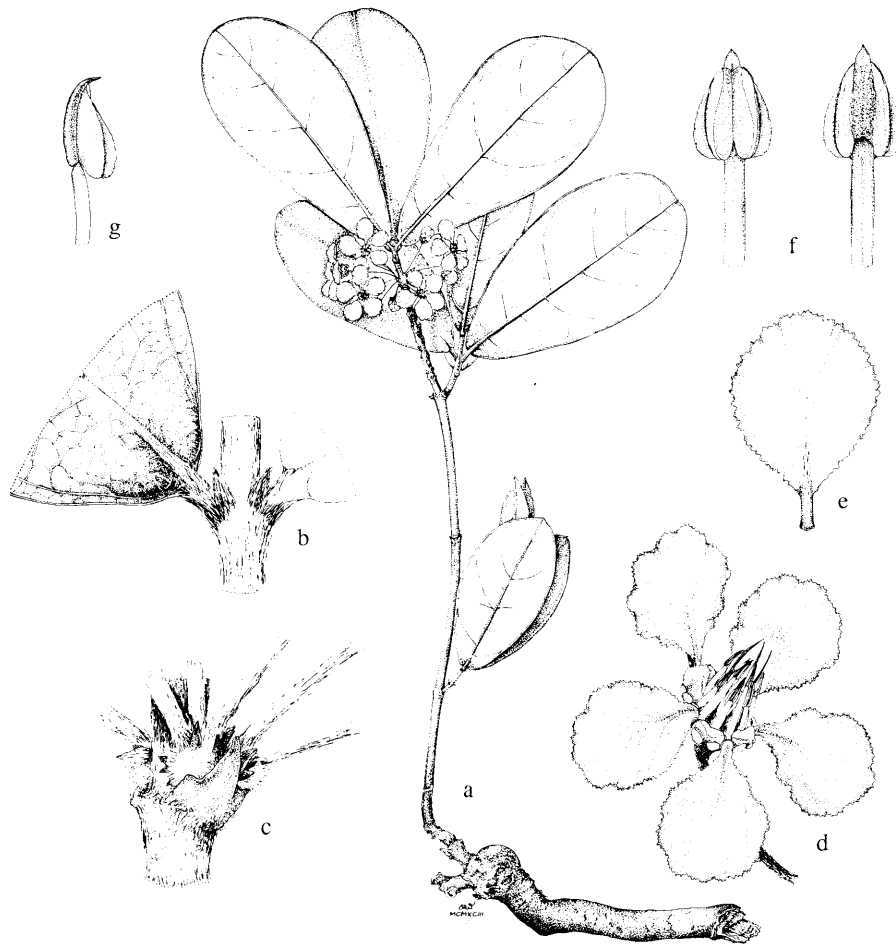


FIG. 3. *Pterandra hatschbachii*. a. Habit, $\times 0.5$. b. Portion of stem with leaf bases and stipules, $\times 5$. c. Base of flower cluster with bracts and bracteoles, the entire cluster subtended by a large bract (composed of a rudimentary leaf and stipules), $\times 5$. d. Flower, posterior petal at upper left, $\times 2.5$. e. Posterior petal, abaxial view showing sparse pubescence on costa, $\times 3.5$. f. Distal portions of stamens, adaxial (left) and abaxial (right) views, $\times 7.5$. g. Distal portion of stamen, lateral view, $\times 7.5$. (Based on: a, b, d–g, *Hatschbach 35085*; c, *Hatschbach 33276*; drawn by Karin Douthit.)

of stamens opposing petals 2.5–3.3 mm long; anthers 1.4–2 mm long, wing of outer locules 0.2–0.3 mm wide. Styles 4.5–5.2 mm long, 0.3 mm in diameter, glabrous or with scattered hairs adaxially in the proximal 1/5. Coccus ca. 3.5 mm high and in diameter, hirsutulose-tomentulose; torus up to 0.5 mm high (?); mature seed not seen. Chromosome number unknown.

Phenology. Collected in flower in September, November, and February, in young fruit in November.

Distribution (Fig. 1). Brazil (Matro Grosso); forming dense carpets in grassy campos; ca. 800 m.

ADDITIONAL SPECIMENS EXAMINED. **Brazil.** MATO GROSSO: Mpio. Alto Araguaia, vicinity of Ribeirão Claro, NW of Alto Araguaia, ca. 800 m, 15 Feb 1975, *Anderson 11400* (MBM, MICH); Mpio. Alto Araguaia, Alto Araguaia, 15 Nov 1973, *Hatschbach 33276* (MBM, NY).

Pterandra hatschbachii is known only from the vicinity of the type locality in Mato Grosso, close to the border with Goiás. It shares many characters with *P. pyroidea*, a common species of the cerrado and campo of Goiás and Minas Gerais. Both are low shrubs bearing showy inflorescences composed of large flowers with pink petals. In all other species the petals are white or cream. *Pterandra hatschbachii* is readily separated from *P. pyroidea* by its low stature, small stipules (only 2–2.5 mm long and wide), and glabrous or at most very sparsely pubescent vegetative parts and petals.

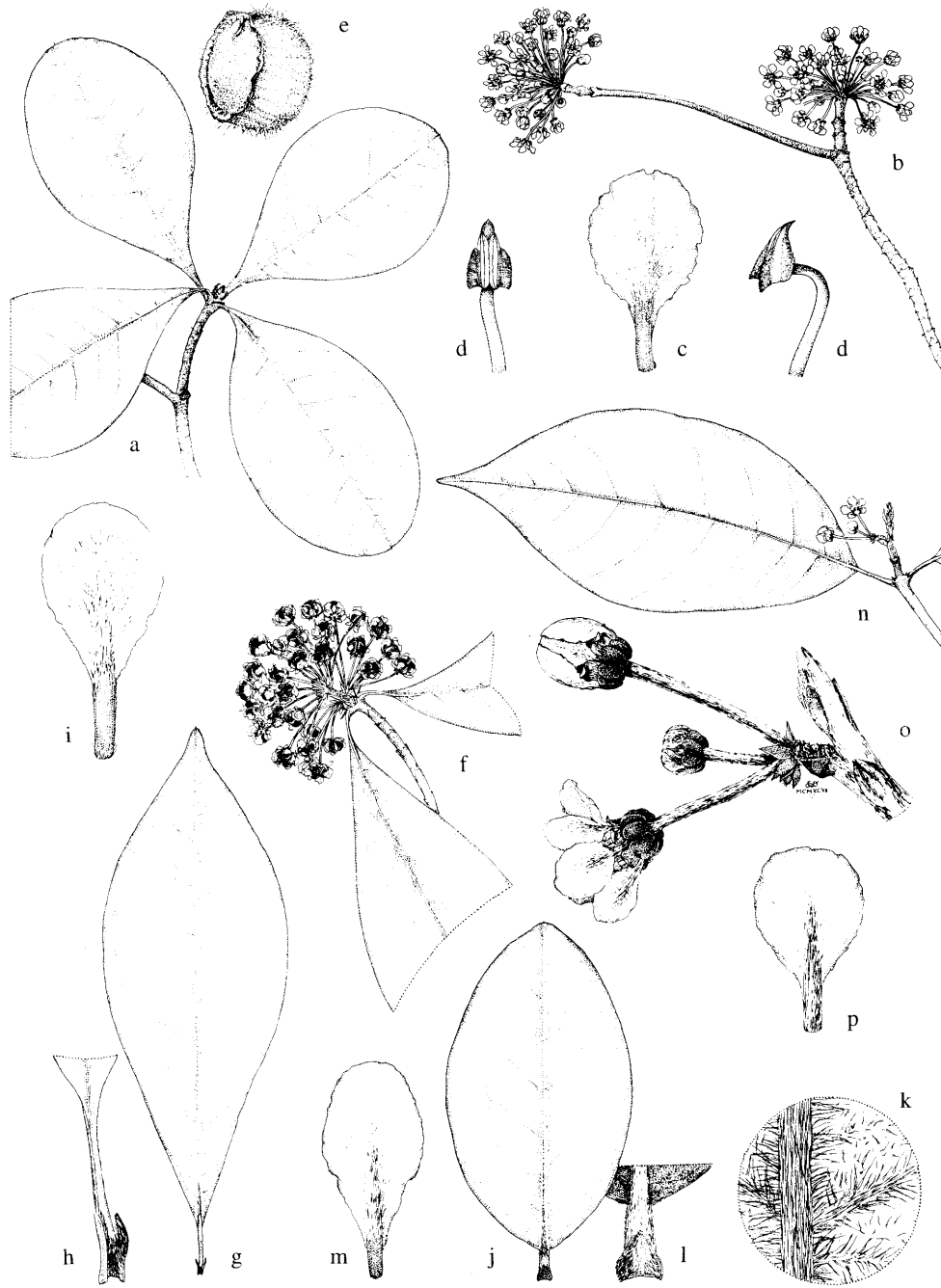
3. *Pterandra andersonii* C. Anderson, sp. nov.—TYPE: BRAZIL. Maranhão: Grajaú, 140 m, 3 Aug 1909, *Lisbôa 2507* (holotype: NY!; isotypes: MG! RB!).

Fig. 4a–e.

Frutex usque ad 3 m altus. Laminae 6.2–12.5 cm longae, 3.5–7 cm latae, obovatae vel ellipticae, supra glabrae, subtus sericeae vel sparsim sericeae sed costa dense sericea; petioli 0.3–1 cm longi, dense sericei; stipulae (2.5–) 3–3.5 mm longae lataeque, connatae, adaxialiter hirsutae, abaxialiter sericeae. Inflorescentia ex fasciculis sessilibus vel subsessilibus constans, floribus cujusque fasciculi 4–6, sine foliis juvenilibus per anthesin; pedicelli 1.2–1.7 cm longi, 0.4–0.5 mm diametro, dense albo-sericei. Petala cremea (?), limbo late elliptico vel late obovato vel suborbiculari; limbi petalorum lateralium 3.5–4 mm longi, ca. 3 mm lati, limbus petali postici ca. 4.5 mm longus, 3.5–4 mm latus. Filamenta praeter caespitem basalem glabra. Styli ca. 4.3 mm longi. Cocci 3–3.5 mm alti et diametro, hirsutulo-tomentosi.

Shrubs to 3 m. Laminas 6.2–12.5 cm long, 3.5–7 cm wide, obovate to elliptical, apex obtuse (-mucronate) to acute, base cuneate, adaxially glabrous, abaxially sericeous or sparsely so but densely so on the costa, the hairs (0.1–) 0.2–0.7 (–0.9) mm long, medifixed, terete, straight, mostly white or some golden, sessile or subsessile or sometimes with a stalk up to 0.1 mm long, slightly touching or overlapping or not, pellucid cells present in abaxial surface, costa and secondary veins prominent abaxially, tertiary veins usually slightly raised as well; petioles 0.3–1 cm long, densely sericeous; each pair of stipules connate, (2.5–) 3–3.5 mm long and wide, adaxially hirsute, abaxially sericeous. Inflorescence of sessile or subsessile, 4–6-flowered fascicles, each fascicle subtended by a deciduous bract composed of a pair of stipules and a rudimentary leaf, distal new leaves not yet developed at anthesis; pedicels 1.2–1.7 cm long, 0.4–0.5 mm in diameter, densely white-sericeous; bracts 1.3–2.5 mm long, 0.8–1.5 mm wide, triangular, bracteoles 1–1.5 mm long, 0.3–0.6 mm wide, very narrowly triangular to linear, bracts and bracteoles

FIG. 4. *Pterandra andersonii*, *P. colombiana*, *P. hirsuta*, and *P. mcphersonii*. a–e, *P. andersonii*. a. Terminal portion of shoot with four leaves, $\times 0.5$. b. Terminal portion of shoot with two inflorescences, $\times 0.5$. c. Petal, abaxial view, $\times 5$. d. Distal portions of stamens, adaxial (left) and lateral (right) views, $\times 7.5$. e. Coccus, lateral view, $\times 5$. f–i, *P. colombiana*. f. Terminal portion of shoot with infructescence, $\times 0.5$. g. Leaf, $\times 0.5$. h. Base of leaf with stipules (basally connate but free in the distal 1/2), adaxial view, $\times 1.5$. i. Petal, abaxial view, $\times 5$. j–m, *P. hirsuta*. j. Leaf, $\times 0.5$. k. Detail showing abaxial laminar pubescence composed of basifixed hairs, $\times 10$. l. Base of leaf with connate stipules, adaxial view, $\times 1.5$. m. Petal, abaxial view, $\times 5$. n–p, *P. mcphersonii*. n. Terminal portion of shoot with one leaf and old inflorescence (only one fascicle remaining), $\times 0.5$. o. Fascicle of flowers, borne on a short projection, $\times 2.5$. p. Petal, abaxial view, $\times 5$. (Based on: a–d, *Lisbôa 2507*, e, *Pinheiro 12*; f–i, *Callejas et al. 4656*; j–l, *Moraes M. & Takanã G. 1857*; m, *Anderson 12298*; n–p, *McPherson 11745*; drawn by Karin Douthit.)



with the apex acute, abaxially glabrous except for tuft at the apex and appressed often scattered hairs on and adjacent to the costa. Sepals ca. 2.3 mm long, ca. 1.7 mm wide, narrowly triangular (the distal 2/3 ligulate), recurved, glands 1.6–1.8 mm long, ca. 0.7 mm wide. Petals “yellow” (?; probably creamy white and becoming yellow or perhaps pink in age), the limb broadly elliptical or broadly obovate to suborbicular, margin erose, abaxially sparsely sericeous on claw and center of limb or only on limb and the claw glabrous to glabrate; lateral petals: claw 1.2–1.5 mm long, limb 3.5–4 mm long, ca. 3 mm wide; posterior petal: claw 1.5–1.6 mm long, limb ca. 4.5 mm long, 3.5–4 mm wide. Filaments glabrous except for an adaxial basal tuft of hairs, those of stamens opposing sepals ca. 2 mm long, those of stamens opposing petals ca. 3 mm long; anthers ca. 1.2 mm long, wing of outer locules 0.2 mm wide. Styles ca. 4.3 mm long, ca. 0.3 mm in diameter, with scattered hairs adaxially in the proximal 1/4. Coccus 3–3.5 mm high and in diameter, hirsutulose-tomentulose; torus ca. 1 mm high; mature seed not seen. Chromosome number unknown.

ADDITIONAL SPECIMENS EXAMINED. **Brazil.** MARANHÃO: Imperatriz, próximo do campo de Aviação. 31 Jul 1976. *Pinheiro 12* (MICH).

Pterandra andersonii is known from only two collections from Maranhão, Brazil (Fig. 1). It resembles *P. pyroidea* of central Brazil in that its leaves have a cuneate base and a very short petiole (only up to 1 cm long); however, the laminas of *P. andersonii* are abaxially sericeous rather than tomentulose, and it has smaller stipules and smaller flowers. *Pterandra pyroidea* and the similar *P. hatschbachii* have pink petals. Those of *P. andersonii* are noted on the label as “amarella” (*Lisbôa 2507*) and “avermelhada” (*Pinheiro 12*; in fruit); however, most likely the petals are creamy white at the onset of anthesis and turn yellow or reddish in age, as in other species with white petals. The laminas of the type collection are strikingly obtuse at the apex (Fig. 4a), yet larger laminas of *Pinheiro 12*, from a vegetative branch with long internodes, are acute.

This species is named for William R. Anderson, student of Malpighiaceae, who first noted its distinctness.

4. *Pterandra arborea* Ducke, Bull. Mus. Hist. Nat. (Paris), sér. 2, 4: 736. 1932.—

TYPE: BRAZIL. Amazonas: Manaus, 3 Aug 1929, *Ducke s.n.* [*RB23649*] (holotype: RB!; isotypes: G! K! P! US!).

Tree to 30 m. Laminas 7.5–18.5 cm long, 3.5–8.5 cm wide, elliptical to obovate, apex obtuse to acute but commonly acuminate, acumen up to 10 mm long, base cuneate, adaxially glabrate to glabrous but often with appressed hairs on the major veins, abaxially sparsely sericeous (densely so on the major veins), the hairs 0.1–0.4 mm long, medifixed, terete, straight, white to yellowish to golden, sessile, not or only slightly overlapping, pellucid cells abundant in abaxial surface to absent, costa and secondary veins prominent abaxially, tertiary veins usually slightly raised as well; petioles 0.8–2 cm long, densely sericeous; each pair of stipules connate or the distal 1/3–1/2 free, 2.5–3.5 mm long, ca. 3 mm wide, adaxially hirsute, abaxially glabrous but with a sericeous band at the base. Inflorescence of 4–6-flowered fascicles, sessile or borne on a projection up to 1.4 mm long below a flush of new leaves, each fascicle subtended by a deciduous bract composed of a pair of stipules and a rudimentary leaf; pedicels 0.8–2.2 cm long, 0.4–0.6 mm in

diameter, densely white- or silvery-sericeous; bracts 1–1.6 mm long, 1.2–1.5 mm wide, bracteoles 1.2–1.3 mm long, 1.2–1.3 mm wide, bracts and bracteoles triangular, the apex acute to mucronate, abaxially densely white-sericeous. Sepals 1.8–3.2 mm long, 1.8–2.2 mm wide, narrowly triangular (the distal 2/3 ligulate), apex obtuse, recurved to revolute, glands 1.8–2.5 mm long, 1–1.2 mm wide. Petals white (turning pale yellow in age), the limb elliptical to obovate to suborbicular, margin erose, abaxially densely sericeous on claw and center of limb or only along the central vein; lateral petals: claw 0.7–1.3 mm long, limb (2.8–) 3.5–4.2 mm long, (2.2–) 2.5–2.8 mm wide; posterior petal: claw (0.8–) 1–1.5 mm long, limb (3.5–) 4.2–4.3 mm long, (2.5–) 2.8–3 mm wide. Filaments glabrous except for an adaxial basal tuft of hairs or sometimes adaxially with scattered hairs in the proximal 1/2, those of stamens opposing sepals 1.2–2.1 mm long, those of stamens opposing petals 1.8–3.5 mm long; anthers 0.6–0.9 mm long, wing of outer locules 0.2 mm wide. Styles (2.5–) 3.5 mm long, 0.2–0.4 mm in diameter, with scattered hairs adaxially in the proximal 1/4–3/4. Coccus 3–3.7 mm high, 3.2–3.8 mm in diameter, hirsutulose-tomentulose or sparsely so; torus 1.5–2 mm high; embryo globose, ca. 3 mm in diameter, radicle ca. 1.8 mm long, outer cotyledon ca. 5.7 mm long, ca. 1.8 mm wide, folded at 1/2 of its length and the tip folded over the inner cotyledon, inner cotyledon ca. 4 mm long, ca. 1.6 mm wide, folded at 1/2 of its length. Chromosome number unknown.

Phenology. Collected in flower in March and from July through October, in fruit in January and from July through November.

Distribution (Fig. 1). Brazil (Amapá, Amazonas, Pará); in forest; 50–800 m.

ADDITIONAL SPECIMENS EXAMINED. **Brazil.** AMAPÁ: Serra do Navio, Rio Amapari, 70–300 m, 4 Nov 1954, *Cowan 38123* (MICH, NY); Mazagão, área do Felipe VI, 26 Aug 1985, *N. T. Silva 5524* (MG).—AMAZONAS: Reserva Florestal Ducke, Manaus–Itacoatiara, Km 26, 02°53'S, 59°58'W, 14 Aug 1996, *Assunção 365* (MICH); Dist. Agropecuário, Reserva 1501 (Km 41) of the WWF, INPA MCS Project, 02°24'–02°25'S, 59°43'–59°45'W, ca. 50–125 m, 25 Nov 1988, *Boom et al. 8649* (F, NY); Manaus, margem do igarapé do Bindá, 30 Jul 1956, *Coelho INPA 4009* (IAN, INPA); estrada Manaus–Caracará, Km 58, Reserva Biológica INPA–SUFRAMA, Sep 1976, *Coelho & Damiano 855* (INPA); Reserva Florestal Ducke, Manaus–Itacoatiara, Km 26, 02°53'S, 59°58'W, 27 Jul 1994, *Hopkins 1468* (MICH); Dist. Agropecuário, 90 km NNE de Manaus, Reserva 1501 (Km 41), Projeto Dinâmica Biológica de Fragmentos Florestais, 02°24'–25'S, 59°43'–45'W, 50–125 m, 11 Aug 1991, *Oliveira et al. 144* (NY); Dist. Agropecuário, Fazenda Dimona of the WWF, INPA MCS Project, 72 kms N of Manaus, 02°19'S, 60°05'W, ca. 50–125 m, 6 Nov 1988, *Pacheco et al. 49* (MBM, NY); Reserva Florestal Ducke, Km 26, 31 Aug 1966, *Prance et al. 2122* (F, MG, MICH, NY, R, US); estrada Manaus–Caracará, Km 39, Reserva Experimental de Silvicultura Tropical, Ribamar, 14 Sep 1977, *Ramos 221* (INPA); Reserva Florestal Ducke, Manaus–Itacoatiara, Km 26, 02°53'S, 59°58'W, 21 Jul 1994, *Ribeiro 1346* (MICH); Reserva Florestal Ducke (P-69), 21 Aug 1963, *Rodrigues 5444* (F); Manaus, estrada Manaus–Itacoatiara, Km 160, 15 Oct 1965, *Rodrigues 7244* (INPA); Manaus, estrada Manaus–Itacoatiara, Km 125, 24 Sep 1965, *Rodrigues 7577* (INPA); Reserva Florestal Ducke, perto da estação meteorológica, 9 Sep 1964, *Rodrigues 32* (F); Reserva Florestal Ducke, 21 Jul 1964, *Rodrigues & Loureiro 5961* (F, US); Manaus, estrada Manaus–Itacoatiara, Km 73, 30 Aug 1965, *Rodrigues & Loureiro 7058* (INPA); between Missão Salesiana and Serra Pirapucú, Rio Maturacá, 400–800 m, 13 Jan 1966, *N. T. Silva & Brazão 60825* (F, MG, MICH, NY).—PARÁ: Estação Ecológica do Jari, Projeto Reserva Genética, SEMA, 00°75'S, 52°30'W, 14 Oct 1987, *Beck 98* (NY).

Pterandra arborea is a common tree in the area of Manaus and thus more frequently collected than other species, except *P. pyroidea*. It had been considered endemic to the Manaus region but in the last 30 years has also been found in Amapá, Pará, and northwestern Amazonas. It is one of four species in which the stipules are glabrous abaxially even in bud. *Pterandra arborea* is most similar to

P. guianensis of Guyana, which differs most strikingly in its 2–3-flowered fascicles and stout, golden-yellow pedicels. In *P. arborea* the abaxial surface of the laminas commonly is sprinkled with abundant pellucid cells; in *P. guianensis* such cells are few or absent.

5. *Pterandra guianensis* W. R. Anderson, Mem. New York Bot. Garden 32: 35. 1981.—TYPE: GUYANA. Mt. Ayanganna, below 762 m, 3 Aug 1960, *Tillett et al.* 45011 (holotype: MICH!; isotypes: F! K! NY! US!).

Trees to 20 m. Laminas 8.5–14 cm long, 3.6–6 cm wide, oblanceolate to elliptical, apex acuminate to subcaudate, acumen up to 1.5 cm long, base cuneate, adaxially glabrous or sometimes with appressed hairs on the costa, abaxially sparsely sericeous, the hairs 0.1–0.6 (–0.7) mm long, medifixed, terete, straight, yellowish to golden, sessile, not or only slightly touching or overlapping, pellucid cells in abaxial surface very few to absent, costa and secondary veins prominent abaxially, tertiary veins not raised or sometimes very slightly so; petioles 0.8–1.5 cm long, densely sericeous; each pair of stipules entirely connate or mostly connate but notched at the apex, 3–3.7 mm long, 2.5–3 mm wide, adaxially hirsute, abaxially glabrous but often with a sericeous patch at point of attachment to petiole. Inflorescence of 2–3-flowered fascicles borne on short projections ca. 0.5–3 mm long below a flush of new leaves, each fascicle subtended by a deciduous bract composed of a pair of stipules and a rudimentary leaf; pedicels (0.8–) 1.3–1.7 (–2.3) cm long, (0.6–) 0.8–1 mm in diameter, densely golden-sericeous; bracts 1.3–1.5 mm long and wide, bracteoles 1.2–1.3 mm long, ca. 1 mm wide, bracts and bracteoles triangular, the apex acute, abaxially densely sericeous. Sepals 2.5–2.7 mm long, 2.2–2.5 mm wide, narrowly triangular (the distal 1/2 ligulate), apex obtuse, recurved, glands 1.6–1.8 mm long, 0.8–0.9 mm wide. Petals “greenish yellow,” the limb oblong to elliptical, margin subentire, abaxially sericeous on claw and more sparsely so on center of limb; lateral petals: claw 0.8–1.1 mm long, limb 4–4.3 mm long, (2.5–) 3–3.3 mm wide; posterior petal: claw 1.3–1.4 mm long, limb 4.5–4.7 mm long, 3.5–4 mm wide. Filaments glabrous except for an adaxial basal tuft of hairs, those of stamens opposing sepals 1.7–1.8 mm long, those of stamens opposing petals ca. 2.1 mm long; anthers 1.1 mm long, wing of outer locules 0.2 mm wide. Styles ca. 2.6 mm long, ca. 0.2 mm in diameter, glabrous. Mature fruit not seen. Chromosome number unknown.

Pterandra guianensis is known only from the type collected in mixed evergreen forest on Mt. Ayanganna in Guyana (Fig. 1). Like the somewhat similar Amazonian *P. arborea*, it has the stipules abaxially glabrous and the bracts and bracteoles abaxially densely pubescent. *Pterandra guianensis* is readily separated by its stout and golden-yellow pedicels and fascicles of only 2–3 flowers.

6. *Pterandra colombiana* C. Anderson, sp. nov.—TYPE: COLOMBIA. Antioquia: Zaragoza, Corregimiento Saltillo en la vía Zaragoza–Segovia, 3.7–16 km S de Zaragoza, 07°26'N, 74°50'W, 150–200 m, 13 Jul 1987, *Callejas et al.* 4656 (holotype: MICH!; isotypes: HUA! MO! NY!). Fig. 4f–i.

Arbor usque ad 22 m alta. Laminae 8–19.5 cm longae, 2.7–8 cm latae, obovatae vel ellipticae, supra glabrae, subtus sparsissime sericeae vel glabratae; petioli 0.8–3.5 cm longi, juniores dense sericei, vetustiores glabrati; stipulae 2.8–4 mm longae, 3–4 mm latae, connatae sed distaliter liberae, adaxialiter hirsutae, abaxialiter glabrae sed apice sericeae. Inflorescentia ex fasciculis sessilibus constans,

floribus cujusque fasciculi 4–6, sine foliis juvenilibus per anthesin; pedicelli 1.4–2 cm longi, 0.5–0.6 mm diametro, dense aureo-sericei vel albo-sericei. Petala alba, limbo late obovato vel suborbiculari, 3.2–4.5 mm longo, 2.8–4 mm lato. Filamenta praeter caespitem basalem glabra. Styli 3.5–4.8 mm longi. Cocci ca. 3.5 mm alti et diametro, glabri vel glabrati sed margine areolae pubescentes.

Tree to 22 m. Laminas 8–19.5 cm long, 2.7–8 cm wide, elliptical to obovate, apex acuminate to caudate, acumen up to 2 cm long, base cuneate, adaxially glabrous, abaxially very sparsely sericeous to glabrate, the hairs 0.1–0.9 mm long, medifixed, terete, straight, white to yellowish, sessile, widely spaced and rarely touching, pellucid cells present in abaxial surface, costa and secondary veins prominent abaxially, tertiary veins usually slightly raised as well; petioles 0.8–3.5 cm long, densely sericeous when young, becoming glabrate; each pair of stipules connate in the proximal 1/3–1/2 and distally free, 2.8–4 mm long, 3–4 mm wide, adaxially hirsute, abaxially glabrous except for a sericeous patch at the apex. Inflorescence of sessile, 4–6-flowered fascicles, each fascicle subtended by a deciduous bract composed of a pair of stipules and a rudimentary leaf, usually the lowestmost cluster at a node above a pair of mature leaves, distal new leaves not yet developed at anthesis; pedicels 1.4–2 cm long, 0.5–0.6 mm in diameter, densely yellowish or white-sericeous; bracts 1.8–2.4 mm long, 1–1.5 mm wide, triangular, bracteoles 1.8–2 mm long, 0.4–0.6 mm wide, linear, bracts and bracteoles with the apex acute, abaxially glabrous or pubescent on the costa in the distal 1/2 and/or with a tuft of hairs at the apex. Sepals 2.5–3 mm long, 1.8–2.3 mm wide, narrowly triangular (the distal 1/2 ligulate), apex obtuse, recurved, glands 1.6–2 mm long, 0.8–1 mm wide. Petals white (becoming yellow in age), the limb broadly obovate to suborbicular, margin subentire to slightly erose, abaxially densely sericeous on claw and center of limb or over most of limb except for a marginal band ca. 0.5 mm wide; lateral petals: claw (0.8–) 1–1.2 mm long, limb 3.2–4.5 mm long, 2.8–4 mm wide; posterior petal: claw 1.3–1.5 mm long, limb 3.2–4.5 mm long, 2.8–4 mm wide. Filaments glabrous except for an adaxial basal tuft of hairs, those of stamens opposing sepals 1.1–1.2 (–1.5) mm long, those of stamens opposing petals 2–2.5 mm long; anthers 0.9–1.1 mm long, wing of outer locules 0.2–0.3 mm wide. Styles 3.5–4.8 mm long, 0.2–0.3 mm in diameter, glabrous or with scattered hairs adaxially in the proximal 1/5–1/4. Coccus ca. 3.5 mm high and in diameter, glabrous or glabrate except for a ring of hairs around the areole; torus up to 0.5 mm high; mature seed not seen. Chromosome number unknown.

Phenology. Collected in flower in September, December, January, and July, in fruit in July.

Distribution (Fig. 1). Colombia (Antioquia); in wet forest; 150–800 m.

ADDITIONAL SPECIMENS EXAMINED. **Colombia.** ANTIOQUIA: Segovia, Corregimiento Fraguas, vía Zaragoza–Segovia, 25.5–40 km S de Zaragoza, 07°24'N, 74°50'W, 250 m, 13 Jul 1987, *Callejas & Betancur 4667* (HUA, MICH, MO, NY); San Luis, Corregimiento de El Prodigio, Finca Dormene y Serranías, 06°06'N, 74°48'W, 350–400 m, 25 Jun 1990, *Cárdenas et al. 2863* (MICH); San Luis, autopista Medellín–Bogotá, 2 km de Río Claro hacia Río Samaná, 790 m, 13 Jan 1983, *Cogollo & Brand 354* (MO); San Luis, autopista Medellín–Bogotá, sector Río Samaná–Río Claro, puente sobre la quebrada Cristalina, 790 m, 19 Dec 1982, *Cogollo & Estrada 317* (MO); Anorí, Tirana Creek, at the confluence with Río Anorí, 5 km upriver from Providencia, 400–900 m, 6–12 Sep 1973, *Soejarto 4258* (HUA, MEDEL).

Pterandra colombiana is distinctive for its relatively large laminas that are nearly glabrous or at most very sparsely sericeous below. The only other species with glabrate laminas is *P. mcphersonii*, which also has abaxially glabrous stipules.

In *P. mcphersonii* the fascicles of flowers are borne on small projections, whereas those of *P. colombiana* are always sessile. Of the species of *Pterandra* known in fruit, *P. colombiana* is the only one in which the mature cocci are glabrous except for a ring of hairs at the areole; in others the cocci are hirsutulose-tomentulose.

7. *Pterandra mcphersonii* C. Anderson, sp. nov.—TYPE: PANAMA. Colón, Santa Rita ridge, SE of Colón, about 12 rd-mi from Trans-isthmian Hwy, 09°25'N, 79°40'W, 500 m, 17 Sep 1987, *McPherson 11745* (holotype: MO!).

Fig. 4n-p.

Arbor usque ad 11 m alta. Laminae 7–13 cm longae, 3–6 cm latae, ellipticae, supra glabrae, subtus sparsissime sericeae vel glabratae; petioli 0.7–1.3 cm longi, juniores dense sericei, vetustiores glabrati; stipulae 3–4.5 mm longae, 3–4 mm latae, connatae sed distaliter liberae, adaxialiter hirsutae, abaxialiter glabrae sed apice margineque sericeae. Inflorescentia ex fasciculis sessilibus vel brevistipitatis constans; floribus cujusque fasciculi 4 (–6?), sine foliis juvenilibus per anthesin; pedicelli 1–1.5 cm longi, 0.6–0.7 mm diametro, dense aureo-sericei. Petala alba, limbo late obovato vel suborbiculari; limbi petalorum lateralium 5–5.2 mm longi, (4–) 4.2–4.8 mm lati, limbus petali postici 5.5–6 mm longus, 4.2–4.5 mm latus. Filamenta praeter caespitem basalem glabra. Styli ca. 3.5 mm longi. Cocci maturi ignoti.

Tree to 11 m. Laminas 7–13 cm long, 3–6 cm wide, elliptical, apex acuminate, acumen up to 1.5 cm long, base cuneate, adaxially glabrous, abaxially very sparsely sericeous to glabrate, the hairs 0.1–0.7 mm long, medifixed, terete or also some flattened, straight, golden, sessile, rarely touching, pellucid cells very few in abaxial surface, costa and secondary veins prominent abaxially, tertiary veins not raised or sometimes slightly so; petioles 0.7–1.3 cm long, densely sericeous when young, becoming glabrate; each pair of stipules connate in the proximal 1/2, distally free, 3–4.5 mm long, 3–4 mm wide, adaxially hirsute, abaxially glabrous except for hairs along the margin and apex. Inflorescence of 4 (–6?)-flowered fascicles, these subsessile or borne on short projections up to 3 mm long, each fascicle subtended by a deciduous bract composed of a pair of stipules and a rudimentary leaf, the lowestmost cluster at a node above a pair of mature leaves, distal new leaves not yet developed at anthesis; pedicels 1–1.5 cm long, 0.6–0.7 mm in diameter, densely golden-sericeous; bracts ca. 1.8 mm long, ca. 1 mm wide, triangular, bracteoles 1.5–1.7 mm long, ca. 0.8 mm wide, narrowly triangular, bracts and bracteoles with the apex acute, abaxially glabrous or with hairs on the costa in the distal 1/3 and at the apex. Sepals ca. 2.5 mm long, ca. 2.2 mm wide, narrowly triangular (the distal 1/2 ligulate), apex obtuse, recurved, glands 2.2–2.3 mm long, ca. 1 mm wide. Petals white (becoming yellow in age), the limb broadly obovate to suborbicular, margin subentire, abaxially sericeous on claw and center of limb; lateral petals: claw 0.9–1 mm long, limb 5–5.2 mm long, (4–) 4.2–4.8 mm wide; posterior petal: claw 1–1.1 mm long, limb 5.5–6 mm long, 4.2–4.5 mm wide. Filaments glabrous except for an adaxial basal tuft of hairs, those of stamens opposing sepals 1.4–1.5 mm long, those of stamens opposing petals 2.1–2.2 mm long; anthers 1.4–1.5 mm long, wing of outer locules 0.4 mm wide. Styles ca. 3.5 mm long, 0.3 mm in diameter, glabrous. Mature fruit not seen. Chromosome number unknown.

Pterandra mcphersonii is known only from the type, collected in primary rain forest (now disturbed) in Panama (Fig. 1). It is readily separated from the other Panamanian species, *P. isthmica*, by the lack of abaxial pubescence on the laminas and stipules. The laminas and stipules of *P. isthmica* are abaxially densely sericeous. *Pterandra colombiana*, the only other species with abaxially glabrous

leaves, differs in its longer petioles and pedicels, and in having the fascicles sessile instead of borne on a short projection.

This species is named for Gordon D. McPherson, student of Euphorbiaceae and discerning collector.

- 8. *Pterandra isthmica*** Cuatrecasas & Croat, Ann. Missouri Bot. Gard. 67: 918. 1981 ["1980"].—TYPE: PANAMA. Panamá: NE of town of Cerro Azul, 20 km by rd from Inter-American Hwy, 8 Mar 1975, *Mori & Kallunki 5007* (holotype: MO!; isotypes: MICH! US!).

Small trees to 4 m. Laminas 4–6.1 cm long, 2–3.5 cm wide, elliptical to obovate, apex acute (-mucronate) to short-acuminate, acumen up to 0.3 cm long, base cuneate, adaxially glabrate to glabrous but with appressed hairs on the major veins, abaxially sericeous, the hairs 0.4–1.1 mm long, medifixed, terete, wavy, mostly white but a few golden, sessile to subsessile, overlapping, pellucid cells only along margin or rarely also in abaxial surface or absent, costa and secondary veins prominent abaxially, tertiary veins not raised or sometimes slightly so; petioles 0.4–1 cm long, densely sericeous; each pair of stipules proximally connate but the distal 1/2 free, 2.8–3 mm long, 2.5–2.8 mm wide, adaxially hirsute, abaxially densely sericeous. Inflorescence of 4–6-flowered fascicles borne on short projections 1–1.8 mm long below a flush of new leaves, each fascicle subtended by a deciduous bract composed of a pair of stipules and a rudimentary leaf; pedicels 1.6–2 cm long, 0.8–1 mm in diameter, densely yellowish to golden-sericeous; bracts 1.6–1.8 mm long, 0.9–1 mm wide, bracteoles 2–2.2 mm long, ca. 1 mm wide, bracts and bracteoles narrowly triangular, the apex acute, abaxially glabrous except for appressed hairs on and adjacent to the costa. Sepals 3.5–3.7 mm long, 3 mm wide, narrowly triangular (the distal 1/2 ligulate), apex obtuse, slightly recurved, glands 1.5–1.7 mm long, 0.6–0.7 mm wide. Petals "white" (fide Cuatrecasas and Croat), the limb obovate to elliptical, margin erose, abaxially densely sericeous on claw and center of limb; lateral petals: claw 1.5–1.8 mm long, limb 6.5–7 mm long, 5.2–5.5 mm wide; posterior petal: claw ca. 2 mm long, limb 7–7.5 mm long, 5.5–5.8 mm wide. Filaments glabrous except for an adaxial basal tuft of hairs, those of stamens opposing sepals ca. 2 mm long, those of stamens opposing petals ca. 3 mm long; anthers ca. 1.5 mm long, wing of outer locules 0.4 mm wide. Styles ca. 4 mm long, ca. 0.3 mm in diameter, glabrous, inserted at apex. Coccus ca. 3.7 mm high, ca. 4 mm in diameter, hirsutulose-tomentulose; torus ca. 1.5 mm high; mature seed not seen. Chromosome number unknown.

Pterandra isthmica is known only from the type, collected in premontane rain forest in Panama (Fig. 1). The dense abaxial pubescence of the laminas is similar to that found in *P. sericea*, but that species differs in its 3-flowered fascicles, smaller petals (the limb 3–4 mm wide), and hirsute filaments.

- 9. *Pterandra sericea*** W. R. Anderson, Brittonia 28: 407. 1977 ["1976"].—TYPE: GUYANA. Upper Mazaruni River, small island across river from Isla Casabe, 175 m, 9 Dec 1951, *Maguire 32715* (holotype: MICH!; isotypes: F! K! NY! US!). Fig. 5.

Shrubs or trees to 15 m. Laminas 3–8.5 cm long, 1.6–4.3 cm wide, elliptical to obovate, apex acute (-mucronate) to sometimes briefly acuminate, acumen up to 0.5 cm long, base cuneate, adaxially glabrate to glabrous but with appressed hairs on the costa, abaxially densely sericeous, the hairs 0.4–1.2 mm long, medifixed,

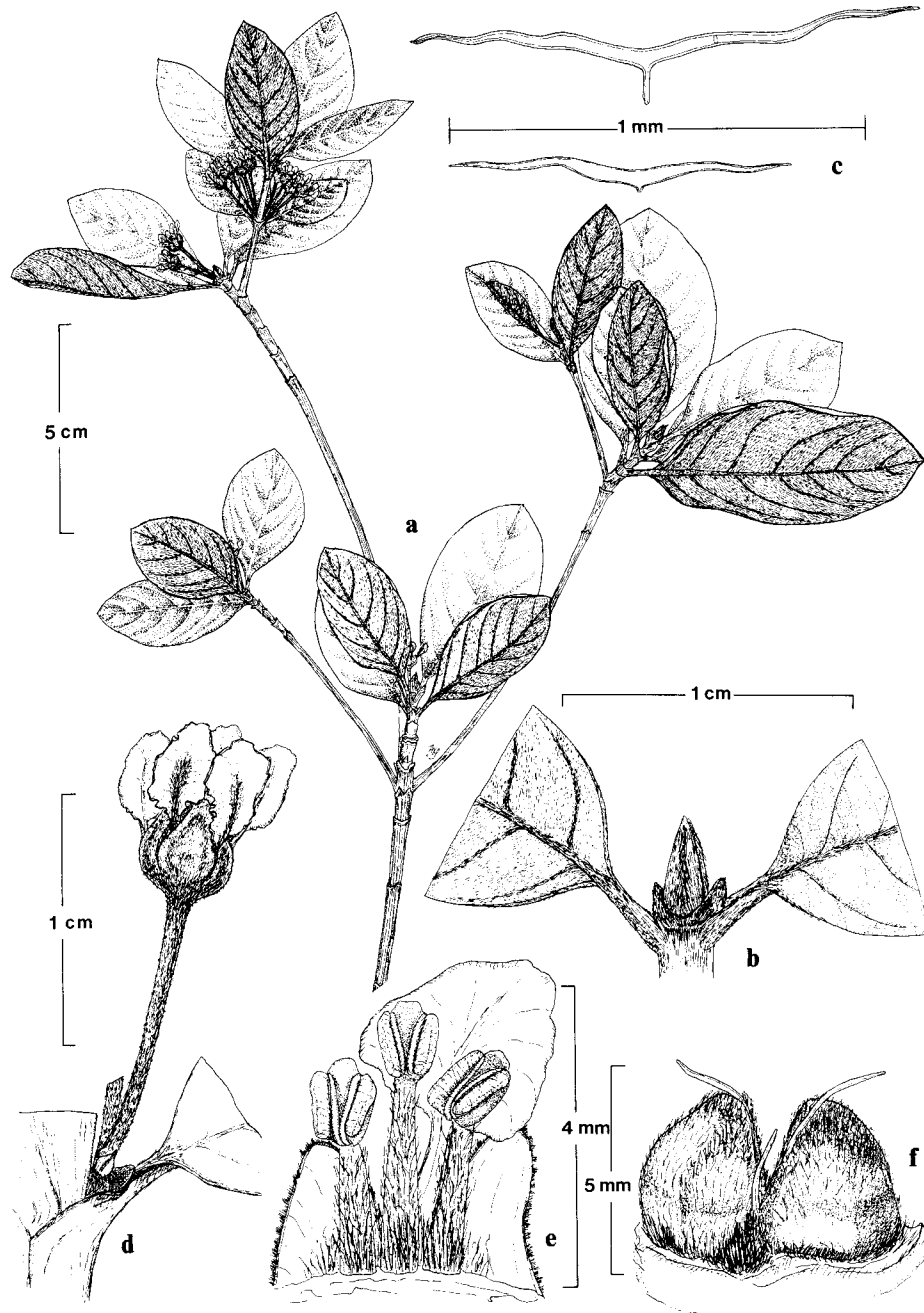


FIG. 5. *Pterandra sericea*. a. Flowering branch. b. Portion of stem with leaf bases and stipules. c. Hairs from abaxial surface of lamina. d. Fascicle of flowers in leaf axil (all but one flower removed). e. Three stamens, stamen at left and right each opposing a sepal, stamen in center opposing a petal. f. Immature fruit (one carpel aborted). (Based on: a-d, f, Maguire 32715; e, Wurdack 34405; drawn by Annette Seidenschnur Mahler.)

terete or rarely some flattened, wavy, white to yellowish, sessile to subsessile, overlapping, costa and secondary veins prominent abaxially, tertiary veins not raised or sometimes slightly so; petioles 0.3–1.3 cm long, densely sericeous; each pair of stipules entirely connate or mostly connate but notched at the apex, 3–4 mm long, 3–3.8 mm wide, adaxially hirsute but becoming glabrous with maturity, abaxially densely sericeous but becoming glabrate to glabrous with maturity, sometimes

only glabrescent in the distal 1/2. Inflorescence of 3-flowered fascicles, each fascicle subsessile or borne on short projections to 1.5 mm long in the axil of a new leaf, or sometimes each cluster subtended by a deciduous bract composed of a pair of stipules and a rudimentary leaf; pedicels 0.9–1.6 cm long, 0.6–0.8 mm in diameter, densely golden-sericeous; bracts 2–2.4 mm long, 0.7–0.8 mm wide, bracteoles 1.8–3 mm long, 0.4–1 mm wide, bracts and bracteoles linear, the apex acute, abaxially densely sericeous. Sepals 2–3 mm long, 2–2.4 mm wide, triangular (the distal 1/2 sometimes ligulate), apex obtuse, glands 1–1.7 mm long, 0.5–1.2 mm wide, or glands absent. Petals white to greenish white (becoming pale yellow in age), the limb broadly elliptical to suborbicular, margin erose, abaxially densely sericeous on claw and center of limb; lateral petals: claw 1–1.4 mm long, limb 3.5–4.1 mm long, 3–4 mm wide; posterior petal: claw 1.4–1.7 mm long, limb 3.8–4.3 mm long, 3–4 mm wide. Filaments with an adaxial basal tuft of hairs and also adaxially hirsute, those of stamens opposing sepals 1.8–2 mm long, those of stamens opposing petals 2.4–2.7 mm long; anthers 1–1.3 mm long, wing of outer locules 0.2 mm wide. Styles 3–3.2 mm long, ca. 0.2 mm in diameter, glabrous or with a few scattered hairs at the base. Mature fruit not seen. Chromosome number unknown.

Phenology. Collected in flower from February through May, and in August, October, and December.

Distribution (Fig. 1). Venezuela (Bolívar) and adjacent Guyana; in forest; 100–800 m.

ADDITIONAL SPECIMENS EXAMINED. **Venezuela.** BOLÍVAR: Dtto. Piar, aonda de Mayupa, vía a la Isla Orquídea, 5 May 1979, *Benítez de Rojas 2573* (F); Isla de las Orquídeas, Río Carrao, cerca del Cerro Auyantepui, 700–800 m, 9 Oct 1984, *Bono 4399* (VEN); Río Caura from foot of gorge below Salta Para, downstream 8 km, 06°03'N, 65°04'W, 250 m, 14 Aug 1985, *Horner et al. 271* (MO); Aripao, Río Caura, aguas abajo del Campamento de EDELCA, 06°19'52"N, 64°31'44"W, 100 m, 20 Aug 1995, *Rosales C. et al. 1596* (MICH); Chimantá Massif, Río Apacará over igneous rock, 1.4 mi downstream from mouth of Río Abacapá to mouth of Río Abacapá, W side of Apacará-tepui, 415 m, 29 Mar 1953, *Steyermark 74677* (F, MICH, NY); slopes above Morrison-Knudsen Camp and Pilot Plant, 700–750 m, 26 Feb 1953, *Wurdack 34405* (F, MICH, NY).

Pterandra sericea superficially resembles the Panamanian *P. isthmica*, with which it shares a dense abaxial laminar pubescence. It differs from that species in its 3-flowered fascicles and smaller petals; *P. isthmica* has 4–6-flowered fascicles and petals with the limb 6.5–7 mm long and 5.2–5.5 mm wide. *Pterandra sericea* is the only species in the genus in which the filaments are adaxially hirsute rather than bearing only a basal tuft of hairs.

10. *Pterandra evansii* Cuatrecasas, Brittonia 11: 170, 1959.—TYPE: BRAZIL. Amazonas: Rio Marmelos (headwaters), Aug 1948, *Schultes & López 10332* (holotype: US!; isotypes: GH! IAN!).

Shrubs or small trees to 4 m. Laminas 5.6–15 cm long, 2–5.7 cm wide, lanceolate to narrowly elliptical, apex acute (-mucronate) to acuminate, acumen up to 1.8 cm long, base acute, adaxially glabrous but sometimes with appressed hairs on the costa, abaxially sericeous, the hairs 0.1–0.4 (–0.6) mm long, medifixed, terete, straight, white to yellowish, sessile, slightly or not at all touching or overlapping, often also with tufts of basifixed hairs in the axils formed by the costa and secondary veins, and sometimes with basifixed hairs also scattered along the costa, pellucid cells present in abaxial surface, costa and secondary veins prominent abaxially, tertiary veins not raised or sometimes slightly so; petioles 0.5–1.4 cm long, densely sericeous; each pair of stipules entirely connate or nearly so but the apex notched or connate in the proximal 3/4 but the distal 1/4 free, 2.8–4 mm long,

3–3.5 mm wide, adaxially hirsute, abaxially sericeous (the pubescence abraded from stipules on old growth). Inflorescence of sessile, 4–5-flowered fascicles below a flush of new leaves or sometimes the distal new leaves not yet developed at anthesis, each fascicle subtended by a deciduous bract composed of a pair of stipules and a rudimentary leaf; pedicels 1.2–1.8 (–2.8) cm long, 0.3–0.4 mm in diameter, densely white-sericeous; bracts 2–3 mm long, 0.6–1.4 (–1.8) mm wide, triangular, bracteoles 1.5–2.5 mm long, 0.3–0.7 (–1.1) mm wide, linear, bracts and bracteoles with the apex acute, abaxially sericeous or with hairs concentrated on the costa. Sepals 2–2.4 mm long, 1.8–2 mm wide, narrowly triangular (the distal 1/2 ligulate), apex obtuse, recurved, glands 1.4–1.7 mm long, 0.8–1 mm wide. Petals white to cream, the limb elliptical to obovate or suborbicular, margin erose, abaxially sericeous on the claw and most of limb except for a marginal band 0.3–0.5 mm wide; lateral petals: claw (0.8–) 1–1.2 mm long, limb 4–5 mm long, 3–3.5 mm wide; posterior petal: claw 1.5–1.8 mm long, limb 5–5.5 mm long, 4–4.5 mm wide. Filaments glabrous except for an adaxial basal tuft of hairs, those of stamens opposing sepals 1.5–1.8 mm long, those of stamens opposing petals 2.7–3 mm long; anthers 1.1–1.3 mm long, wing of outer locules 0.2 mm wide. Styles 3.2–3.5 mm long, 0.2 mm in diameter, with a few scattered hairs adaxially in the proximal 1/5. Coccus 2.8 mm high and in diameter, hirsutulose-tomentulose; well-developed torus not seen; mature seed not seen. Chromosome number unknown.

Phenology. Collected in flower from June through August, in fruit in August.

Distribution (Fig. 1). Brazil (Amaz nas, Rond nia); in “campo natural” and forest, along rivers.

ADDITIONAL SPECIMENS EXAMINED. **Brazil.** AMAZ NAS: Novo Aripuan , BR-230, 150 km ao N de Humait  e 30 km para o S na rod. do Estanho, 16 Apr 1985, 08 20'S, 61 45'W, *Cid Ferreira 5596 p.p.* (INPA, MG); Novo Aripuan , sub-base Proj. RADAM SC-20-XD-Ponto 22, margen do Rio Preto, 30 Aug 1975, *Cordeiro 704* (MG, MICH); Novo Aripuan , Igarap  Preto, SC-20-XD-Ponto 30, 30 Jun 1975, *da Silva 109* (MG).—ROND NIA: track between Mutumparan  and Rio Madeira, 5 Jul 1968, *Prance et al. 5554* (INPA, MG, MICH, MO, NY, VEN).

Pterandra evansii is very similar to *P. hirsuta* but differs most notably in the abaxial laminar pubescence. In *P. hirsuta* that vesture is composed of erect basifixed hairs mixed with a few medifixed hairs. In *P. evansii* the laminas are abaxially sparsely sericeous, i.e., the hairs are appressed and medifixed; however, they usually also have tufts of basifixed hairs in the axils formed by the costa and secondary veins and sometimes also along the costa. *Cid Ferreira 5596* from Amaz nas, Brazil, is a mixed collection of both species.

11. *Pterandra hirsuta* C. Anderson, sp. nov.—TYPE: BOLIVIA. Beni: Prov. Vaca Diez, 19.4 km al N de Guayaramer n camino a Cachuela Esperanza, 10 32'S, 65 38'W, 140 m, 18 Sep 1994, *Moraes M. & Takan  G. 1857* (holotype: MICH!). Fig. 4j–m.

Arbor vel frutex usque ad 12 m altus. Laminae 5–12.5 cm longae, 2.5–6 cm latae, ellipticae, supra glabrae vel costa sparsissime sericeae, subtus pilos erectos et paucos medifixos ferentes; petioli 0.5–1.2 cm longi, dense sericei; stipulae 4–7 mm longae, 4–5 mm latae, connatae sed distaliter liberae, adaxialiter hirsutae, abaxialiter sericeae. Inflorescentia ex fasciculis sessilibus constans, floribus jusque fasciculi 4–6, sine foliis juvenilibus per anthesin; pedicelli (0.8–) 1.2–2.3 cm longi, 0.4–0.5 mm diametro, dense albo-sericei. Petala alba vel cremea, limbo

elliptico vel late obovato; limbi petalorum lateralium 4.2–5 mm longi, 3–4 mm lati, limbus petali postici 5–5.5 mm longus, 4–5 mm latus. Filamenta praeter caespitem basalem glabra. Styli 3–4.3 mm longi. Cocci maturi ignoti.

Shrubs or trees to 12 m. Laminas 5–12.5 cm long, 2.5–6 cm wide, elliptical, apex acute (-mucronate) to obtuse, base rounded to cuneate, adaxially glabrous or with a few appressed hairs on the costa, abaxially hirsute with erect basifixed hairs and also some medifixed hairs, all terete, white to golden, basifixed hairs 0.1–0.7 mm long, medifixed hairs 0.4–1.1 mm long, subsessile or with a stalk up to 0.1 mm long, pellucid cells abundant to very few in abaxial surface or mostly along margin, costa and secondary veins prominent abaxially, tertiary veins usually slightly raised as well; petioles 0.5–1.2 cm long, densely sericeous; each pair of stipules entirely connate or nearly so but the apex notched or the distal 1/4 free, 4–7 mm long, 4–5 mm wide, adaxially hirsute, abaxially sericeous. Inflorescence of sessile, 4–6-flowered fascicles, each fascicle subtended by a deciduous bract composed of a pair of stipules and a rudimentary leaf, distal new leaves not yet developed at anthesis; pedicels (0.8–) 1.2–2.3 cm long, 0.4–0.5 mm in diameter, densely white-sericeous; bracts 2–4 mm long, 1–2 mm wide, triangular, bracteoles 1.4–3 mm long, 0.5–0.8 (–1.2) mm wide, narrowly triangular to linear, bracts and bracteoles with the apex acute, sericeous on the costa and adjacent region but glabrous along the margin. Sepals 2.3–3.3 mm long, (1.7–) 2–2.4 mm wide, triangular, apex obtuse or acute, recurved to revolute, glands 1.3–1.8 mm long, 0.7–1 mm wide. Petals white to cream, the limb elliptical to broadly obovate, margin erose, abaxially densely sericeous on claw and most of limb except for a marginal band ca. 0.5 mm wide; lateral petals: claw 1.2–1.4 mm long, limb 4.2–5 mm long, 3–4 mm wide; posterior petal: claw 1.2–1.5 mm long, limb 5–5.5 mm long, 4–5 mm wide. Filaments glabrous except for an adaxial basal tuft of hairs, those of stamens opposing sepals 1.8–2.6 mm long, those of stamens opposing petals 3–3.4 mm long; anthers 1–1.3 mm long, wing of outer locules 0.2–0.3 (–0.4) mm wide. Styles 3–4.3 mm long, ca. 0.3 mm in diameter, with scattered hairs adaxially in the proximal 2/3–3/4. Mature fruit not seen. Chromosome number unknown.

Phenology. Collected in flower in September, in young fruit in March.

Distribution (Fig. 1). Brazil (Amaz nas, Rond nia) and adjacent Bolivia (Beni); in forest at riverside and in "pampa-monte"; 140–220 m.

ADDITIONAL SPECIMENS EXAMINED. **Bolivia**. BENI: Prov. Vaca Diez, Guayaramer n hacia Riberalta, 23 Sep 1993, *de Michel & Beck 2181* (MICH). **Brazil**. AMAZ NAS: Novo Aripuan , BR-230, 150 km ao L de Humait  e 30 km para o S na rod. do Estanho, 08 20'S, 61 45'W, 16 Apr 1985, *Cid Ferreira 5596 p.p.* (MG, MICH).—ROND NIA: along Rio dos Paca s Novos, just above and below the first cachoeira, ca. 220 m, 28 Mar 1978, *Anderson 12298* (INPA, MICH).

Pterandra hirsuta differs from all other species in that the abaxial laminar pubescence is composed almost entirely of basifixed hairs. In other aspects, it is most similar to *P. evansii*, which has the laminas abaxially sericeous but usually with tufts of basifixed hairs in the axils of the secondary veins at the costa and also along the costa.

12. *Pterandra flavescens* Maguire, Mem. New York Bot. Gard. 8: 128. 1953.—

TYPE: VENEZUELA. Amazonas: Cerro Sipapo (Par que), banks of Lower Ca o Negro, 1500 m, 25 Dec 1948, *Maguire & Politi 28104* (holotype: NY!; isotypes: BM, F! RB! US! VEN).

Shrub or small tree to 10 m. Laminas 5–9.8 cm long, 2–5 cm wide, elliptical to slightly obovate, apex obtuse-mucronate, base cuneate, adaxially glabrate but densely pubescent on the costa, abaxially very sparsely sericeous but densely sericeous on the costa, the hairs 0.1–0.7 mm long, medifixed, mostly terete but some flattened, straight, ferruginous (or fading to yellowish in age), sessile, widely spaced and never touching, pellucid cells abundant to sparse in abaxial surface or sometimes absent, costa prominent but the secondary veins only very slightly if at all raised; petioles 1.5–2.7 cm long, densely sericeous; each pair of stipules entirely connate or nearly so but the apex notched or the distal 1/3 free, 3.5–4.5 mm long and wide, adaxially hirsute, abaxially densely sericeous. Inflorescence of subsessile, 3-flowered fascicles, each fascicle borne in the axil of a new leaf; pedicels 1.5–2.7 cm long, 0.6–0.8 mm in diameter, densely ferruginous-sericeous; bracts 1.7–2.7 mm long, 0.7–1.3 mm wide, narrowly triangular, bracteoles 1.8–3 mm long, 0.6–0.9 mm wide, linear, bracts and bracteoles with the apex acute, abaxially densely sericeous. Sepals 2–2.8 mm long, 2.3–3 mm wide, narrowly triangular or the distal 1/2 ligulate, apex obtuse, erect or slightly recurved, glands 1.7–2.5 mm long, 1–1.4 mm wide. Petals cream or pale yellow (probably in age), the limb broadly obovate to suborbicular, margin erose, abaxially densely sericeous on claw and center of limb; lateral petals: claw 1–1.2 (–1.5) mm long, limb 4.5–5 mm long, 3.7–4.5 mm wide; posterior petal: claw 1–1.5 mm long, limb 5–5.2 mm long, 4–5 mm wide. Filaments glabrous except for an adaxial basal tuft of hairs, those of stamens opposing sepals 2.2–2.5 mm long, those of stamens opposing petals 2.5–3 mm long; anthers 1.1–1.4 mm long, wing of outer locules 0.4 mm wide. Styles 2.8–3.2 mm long, 0.3–0.4 mm in diameter, glabrous. Coccus ca. 4.5 mm high, 3.8–3.9 mm in diameter, hirsutulose-tomentulose; torus ca. 1.5 mm high; immature embryo with the inner cotyledon folded four times and enveloped by the outer cotyledon (folded at 1/2 its length and the distal tip folded over the tip of the inner cotyledon). Chromosome number unknown.

Phenology. Collected in flower and young fruit in December.

Distribution (Fig. 1). Venezuela, Amazonas, along Río Caño on the Cerro Sipapo; in savanna and marshes along the river; 1500 m.

ADDITIONAL SPECIMENS EXAMINED. **Venezuela.** AMAZONAS: Cerro Sipapo (Paráque), Caño Negro, 1500 m, 15 Dec 1948, *Maguire & Politi* 27692 (NY, US), 27692A (NY), 25 Dec 1948, 27946 (F, GH, MO, NY).

Pterandra flavescens has very distinctive leaves. Abaxially only the costa is prominent, and the secondary veins are only very slightly if at all raised. In all other species, the costa as well as the secondary veins are prominent. The laminas are abaxially very sparsely flecked with ferruginous hairs (fading in age). The flowers are grouped into 3-flowered clusters, each borne in the axil of a new leaf. In most other species the flowers number 4–6 per cluster and are usually borne in the axil of a deciduous bract composed of a pair of stipules and a rudimentary leaf.

13. *Pterandra ultramontana* Riley ex Cuatrecasas, *Webbia* 13: 557. 1958.—TYPE: COLOMBIA. Nariño: Gorgona Island, 20 Nov 1924, *Collenette* 707 (holotype: K!; isotypes: F! NY! US!).

Tree to 25 m. Laminas 6.5–19 cm long, 3–6.7 cm wide, elliptical or narrowly so to obovate, apex acute-mucronate to acuminate, acumen up to 1.5 cm long or sometimes obtuse-mucronate, base cuneate, adaxially glabrous or glabrate, abaxially sericeous, the hairs 0.1–0.2 (–0.4) mm long, medifixed, flattened and scalelike, straight, ferruginous (sometimes faded to yellowish or white), sessile, rarely touching or overlapping, costa and secondary veins prominent abaxially, tertiary veins slightly raised; petioles 1–2 cm long, sericeous; each pair of stipules entirely connate or the apex notched or connate in the proximal 1/3–1/2 and distally free, 4.5–6 mm long, 4–5 mm wide, adaxially hirsute, abaxially sericeous but sparsely so in age. Inflorescence of sessile 4–6-flowered fascicles, each fascicle subtended by a deciduous bract composed of a pair of stipules and a rudimentary leaf, the lowest-most cluster at a node above 1–2 pairs of mature leaves (or these already lost), distal new leaves not yet developed at anthesis; pedicels 1.2–2.8 cm long, 0.4–0.6 mm in diameter, densely ferruginous-sericeous; bracts 1.8–2.7 mm long, 1–1.8 mm wide, triangular, bracteoles 1.1–2.2 mm long, 0.2–0.8 mm wide, narrowly triangular to linear, bracts and bracteoles with the apex obtuse to acute, abaxially glabrous or pubescent on the costa. Sepals 2–2.5 mm long and wide, narrowly triangular (the distal 1/2–3/4 ligulate), apex obtuse, recurved to revolute, glands 1.4–2.3 mm long, 1–1.2 mm wide. Petals white to cream, the limb broadly elliptical or oblong to suborbicular, margin subentire to slightly erose, abaxially sericeous or sparsely so on claw and center of limb; lateral petals: claw 0.8–1.2 mm long, limb (2.5–) 3–3.5 mm long, 2.5–3 mm wide; posterior petal: claw 1–1.2 mm long, limb 3.2–4 mm long, 2.8–3 mm wide. Filaments glabrous except for a sparse adaxial basal tuft of hairs, those of stamens opposing sepals 1.1–1.6 mm long, those of stamens opposing petals 2–2.3 mm long; anthers 1–1.2 mm long, wing of outer locules 0.3 mm wide. Styles 3.2–3.5 mm long, 0.3 mm in diameter, glabrous. Cocculus ca. 2.8 mm high and in diameter, hirsutulose-tomentulose; torus up to 1 mm high (?); mature seed not seen. Chromosome number unknown.

Phenology. Collected in flower February through April and in September; date of immature fruiting collection unknown.

Distribution (Fig. 1). Colombia (Valle and Gorgona Island, Nariño); transition between tropical wet forest and pluvial forest; 50–100 m.

ADDITIONAL SPECIMENS EXAMINED. **Colombia.** NARIÑO: Gorgona Island, 15 Oct 1924, *Collenette* 589 (F, NY).—VALLE: Bajo Calima, 10–20 m, 9 Apr 1961, *Cabrera R. 554* (F, MICH); Bajo Calima Concession, ca. 1.5 km from end of Gasolina Rd, in Juanchaco area, BV-82, ca 16 km NW of Buenaventura, 03°50'N, 77°10'W, 50 m, 9 Jun 1987, *Faber-Langendoen et al. 818* (MO); Bajo Calima, concession ca. 20 km N of Buenaventura, 03°40'N, 77°00'W, 50 m, 4 Jul 1987, *Faber-Langendoen 1197* (MICH); Bajo Calima, ca. 1.5 km NW of Buenaventura, 03°59'N, 77°05'W, 50 m, 12 Apr 1987, *Gentry et al. 56807* (MO); Bajo Calima, Lijal-Gasolina rd bifurcation, 03°58'N, 77°W, 50 m, 10 Jun 1988, *Gentry 62804* (MICH); Bajo Calima, ca. 15 km N of Buenaventura, 03°56'N, 77°08'W, 18 Feb 1983, *Gentry & Juncosa 40472* (MICH, MO); Bajo Calima, ca. 10 km due N of Buenaventura, 03°56'N, 77°08'W, ca. 50 m, 1982, *Mazuera 34* (MO); Bajo Calima, Concesión Pulpapel, Buenaventura, 03°55'N, 77°W, 100 m, 27 Mar 1985, *Monsalve B. 825* (MICH, MO).

Pterandra ultramontana is distinguished by the unique abaxial pubescence of the laminas, composed of ferruginous, flattened and scalelike hairs 0.1–0.2 (–0.4) mm long. In older laminas the color sometimes fades to yellow, but this may also be a result of drying procedures. *Pterandra ultramontana* has been confused with *P. colombiana*, but in that species the abaxial surface of the laminas and stipules is glabrous.

14. *Pterandra egleri* W. R. Anderson, Contr. Univ. Michigan Herb. 19: 386. 1993.—

TYPE: BRAZIL. Pará, Alto Tapajós, Rio Cururú, Erereri, 25 Jul 1959, *Egler 1033* (holotype: MG!; isotypes: HB! IAN! MICH! NY! R!).

Shrubs or small trees to 5 m. Laminas 4.5–9.4 cm long, 2–4.4 cm wide, elliptical or narrowly so, apex acute (-mucronate), base rounded, adaxially glabrous, abaxially tomentose but becoming glabrate to glabrous in age, the vestiture shed in patches, the hairs 0.5–1.4 mm long, medifixed, terete, wavy and crisped, golden to ferruginous, subsessile or with a stalk up to 0.2 mm long, pellucid cells only along margin or rarely also in abaxial surface or absent, costa and secondary and tertiary veins prominent abaxially; petioles 0.5–1.1 cm long, densely sericeous; each pair of stipules entirely connate or sometimes notched at the apex, (2.5–) 3–4.5 mm long, 3–4 mm wide, adaxially hirsute, abaxially densely sericeous (the pubescence abraded from stipules on old growth). Inflorescence of sessile, (3–) 4–6-flowered fascicles below a flush of new leaves or sometimes the distal new leaves not yet developed at anthesis, each cluster subtended by a deciduous bract composed of a pair of stipules and a rudimentary leaf, sometimes the lowestmost cluster at a node above a pair of mature leaves; pedicels 1.1–1.7 cm long, 0.5–0.6 mm in diameter, densely yellowish to white-sericeous; bracts 1.5–1.8 mm long, 0.7–1 mm wide, narrowly triangular, bracteoles 1.2–2 mm long, 0.3–0.5 mm wide, linear, bracts and bracteoles with the apex acute, abaxially sericeous. Sepals 1.7–3.2 mm long, 1.2–2.2 mm wide, triangular or narrowly so (the distal 1/2 sometimes ligulate), apex obtuse, slightly recurved to revolute, glands 0.8–1.3 mm long, 0.5–0.8 mm wide; sometimes with only 1 gland per sepal. Petals white (becoming yellow in age), the limb orbicular or suborbicular, margin erose, abaxially densely sericeous on claw and on limb in the proximal 2/3 except for marginal band ca. 0.5 mm wide, the distal 1/3 glabrous; lateral petals: claw 0.7–1 mm long, limb 3.3–5 mm long, 3.5–4.5 mm wide; posterior petal: claw 0.8–1.2 mm long, limb 4–5.2 mm long, 3.5–5 mm wide. Filaments glabrous except for an adaxial basal tuft of hairs, those of stamens opposing sepals 1.7–2 mm long, those of stamens opposing petals 2.7–3 mm long; anthers 0.3 mm long, wing of outer locules 0.3 mm wide. Styles 3.5–4.5 (–4.7) mm long, 0.2–0.3 mm in diameter, with a few scattered hairs adaxially in the proximal 1/4–1/3. Coccus 2.6–3 mm high and in diameter, hirsutulose-tomentulose; torus ca. 1 mm high; embryo globose, ca. 2.3 mm in diameter, radicle 1.2 mm long, outer cotyledon ca. 3.7 mm long, ca. 1.5 mm long, folded at 1/2 of its length and the tip folded over the inner cotyledon, inner cotyledon ca. 3 mm long, ca. 1.5 mm wide, folded twice. Chromosome number: $n = 12$ (based on *Anderson 10895*; W. R. Anderson 1993).

Phenology. Collected in flower and fruit in February, July, and October.

Distribution (Fig. 1). Brazil (Pará); in campo; ca. 200 m.

ADDITIONAL SPECIMENS EXAMINED. **Brazil.** PARÁ. Region of Missão Velha, ca. 2 km N of Rio Cururú, 07°45'S, 57°20'W, ca. 200 m, 13 Feb 1974, *Anderson 10895* (IAN, MICH, NY); Bara de S. Manoel, Rio Tapajós, 12 Oct 1973, *Ribeiro 348* (MICH).

Pterandra egleri is readily recognized by the tomentose abaxial laminar vestiture, which is shed patchily in age. In all other species, except *P. hirsuta* and *P. pyroidea*, the abaxial pubescence is appressed. *Pterandra pyroidea*, of Goiás and Minas Gerais, is also similar in that the tertiary veins of the lamina are prominent abaxially; it is most readily separated by its larger flowers with pink petals. *Pterandra*

hirsuta differs from all other species in that the abaxial laminar pubescence consists of erect basifixed hairs mixed with some medifixed hairs. In *P. egleri* all hairs composing the leaf pubescence are medifixed.

EXCLUDED NAMES

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= *Acmanthera* (Adr. Jussieu) Grisebach in Martius, Fl. bras. 12(1): 29. 1858.

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Pterandra opulifolia Rusby, Descr. S. Amer. pl. 38. 1920. = *Hiraea opulifolia*
(Rusby) Niedenzu in Engler, Pflanzenreich IV. 141(1): 144. 1928.

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