A REVIEW OF THE GENUS *PARAGONIA* (BIGNONIACEAE)[1, 2]

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Abstract

Paragonia (Bignoniaceae) is a genus of two species, *P. brasiliensis* and *P. pyramidata*, the latter containing two varieties (var. *pyramidata* and var. *tomentosa*). Both species are lianas with subulate-appressed pseudostipules, lavender to magenta, tubular-campanulate corollas, linear-oblong fruit, and winged seeds. *Paragonia pyramidata* var. *pyramidata* is distributed from southern Mexico to southern Brazil and Uruguay, whereas *P. pyramidata* var. *tomentosa* is restricted to southern Brazil. *Paragonia brasiliensis* is known only from a few states in eastern Brazil. A key to flowering and fruiting material, maps of species distributions, graphs of flowering and fruiting phenology, and an illustration of *P. pyramidata* var. *pyramidata* are provided.

Paragonia Bureau (Bignoniaceae) is a ditypic genus of lianas with lavender to magenta, tubular-campanulate corollas, linear-oblong fruit, and winged seeds (Fig. 1). It is distinguished from other genera of the liana tribe Bignonieae by a combination of characters that includes stems with four phloem arms in cross section, subulate-appressed pseudostipules, bifid or trifid tendrils, moniliform-puberulent corolla tubes, psilate 3-colporate pollen, and the absence of interpetiolar glandular fields (Gentry, 1973, 1977, 1978, 1982a, b; Gentry & Tomb, 1979). *Paragonia* is generally found in lowland portions of Central and South America and is a common component of tropical moist forest, tropical wet forest, and premontane wet forest environments.

Paragonia brasiliensis (Baill.) A. H. Gentry is a poorly known species restricted to portions of eastern Brazil (Fig. 2). *Paragonia pyramidata* (Rich.) Bureau var. *pyramidata* is more wide-ranging (Fig. 3) and morphologically variable than the geographically restricted *P. pyramidata* var. *tomentosa* Bureau & K. Schum., of south-central Brazil (Fig. 2).

This treatment attempts to compile all information available on *Paragonia*, notably that obtained by the late Alwyn H. Gentry during his extensive investigations of Bignoniaceae. The maps of geographic distribution and graphs of flowering and fruiting phenology presented here were derived from a database initiated during Gentry's studies of the family.

History

Paragonia was described by Bureau in 1872 based on *Bignonia lenta* Mart. ex DC. (1845). However, *Bignonia lenta* is considered synonymous with a previously described species, *Bignonia pyramidata* Rich. (1792), and thus the epithet *pyramidata* takes precedence. A second species, *Paragonia brasiliensis*, was originally described by Baillon in 1888 as the sole member of the genus *Sanhilaria*. *Paragonia* was monotypic until 1976, when Gentry transferred *Sanhilaria brasiliensis* into *Paragonia*. Gentry (1976a) evaluated the type of *P. brasiliensis* and concluded that it was specifically distinct from *P. pyramidata* because of its softly puberulous, short-petioled leaves, trifid tendrils, narrower inflorescence, acute corolla lobes, costate calyx, and compressed fruit that lack the sandpaper-like surface of fruit of *P. pyramidata* (Table 1). However, the puberulence of the type specimen of *P. brasiliensis* is not manifest in all collections (Gentry, 1976a).

Systematics

According to Gentry and Tomb (1979), the genera *Paragonia*, *Leucocalantha* Rodr., *Spathicalyx* J. C. Gomes, *Manaosella* J. C. Gomes, *Ceratophytum*

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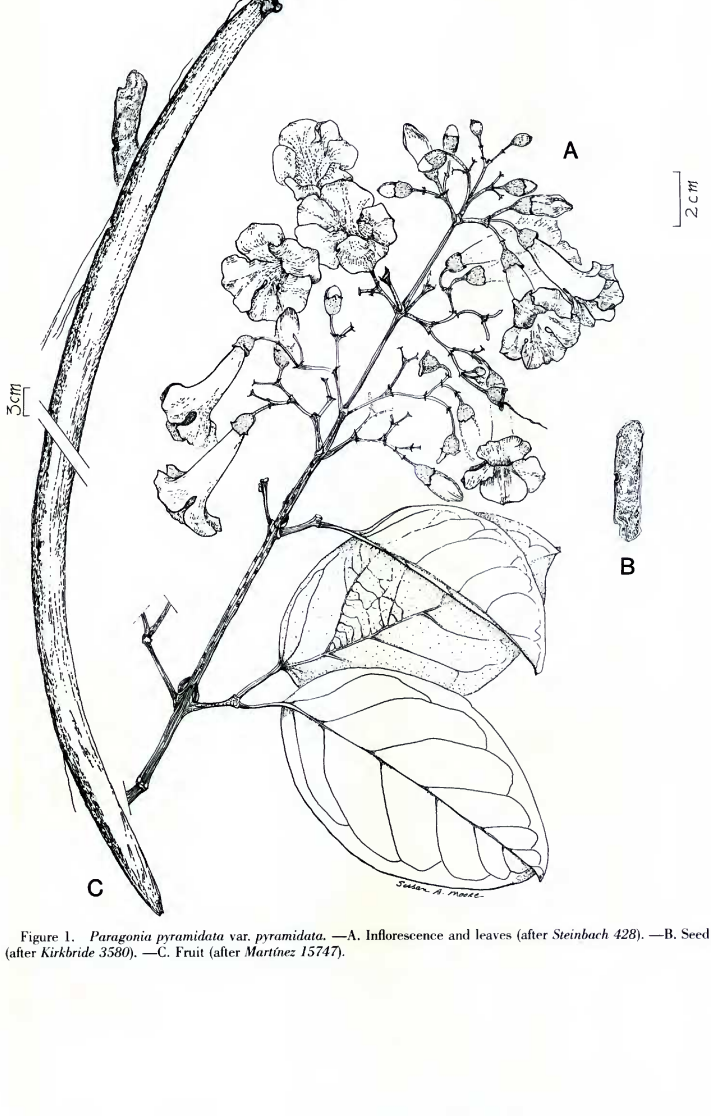
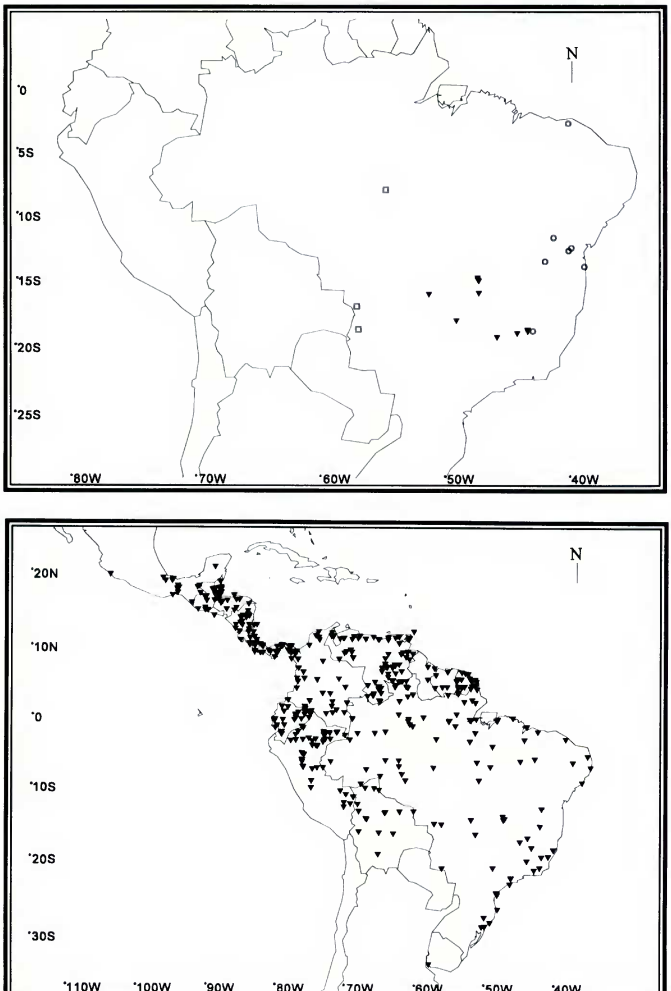


Figure 1. *Paragonia pyramidata* var. *pyramidata*. —A. Inflorescence and leaves (after *Steinbach 428*). —B. Seed (after *Kirkbride 3580*). —C. Fruit (after *Martínez 15747*).



Figures 2, 3. Geographic distributions. —Figure 2 (top). *Paragonia brasiliensis* (circles), *P. pyramidata* var. *tomentosa* (triangles), and collections of anomalous specimens of *P. pyramidata* (squares). —Figure 3 (bottom). *Paragonia pyramidata* var. *pyramidata*.

Table 1. Features used to differentiate *Paragonia pyramidata* and *P. brasiliensis* (after Gentry, 1976).

P. pyramidata	*P. brasiliensis*
1. Tendril tip minutely bifid (rarely trifid)	Tendril tip minutely trifid
2. Petioles and petiolules well developed	Petioles and petiolules reduced, obsolescent
3. Leaflets elliptic or ovate-elliptic, the apex obtuse to acuminate	Leaflets narrowly elliptic to oblanceolate, the apex obtuse
4. Calyx ecostate	Calyx conspicuously ribbed
5. Inflorescence broadly paniculate	Inflorescence racemose-paniculate
6. Capsule subterete, sandpaper-surfaced, moderately lepidote	Capsule strongly compressed, smooth-surfaced, densely lepidote (when immature)
7. Corolla lobes rounded	Corolla lobes acute
8. Mexico to southern Brazil	Eastern Brazil (Bahia and Minas Gerais)

Pitt., *Tynanthus* Miers, and *Periarrabidaea* A. Samp. may form a natural group because they share pubescent corolla tubes, 2–3(multi)-fid tendrils, and "more or less psilate 3(–4)-colpate pollen." *Paragonia pyramidata* has psilate, microperforate, 3-colporate pollen with narrow colpi (Tomb & Gentry, unpublished), whereas the pollen of *P. brasiliensis* is unstudied.

Simmonds (1954) reported a chromosome count of $2n = 40$ for *Paragonia pyramidata*. Of the 23 genera of Bignonieae cited by Goldblatt and Gentry (1979), only 2 (*Mansoa* and *Pachyptera*) have diploid chromosome numbers other than $2n = 40$. The near uniformity of chromosome numbers in Bignonieae supports the monophyly of this lineage (Goldblatt & Gentry, 1979), but provides little information regarding relationships among genera of the tribe.

Distribution

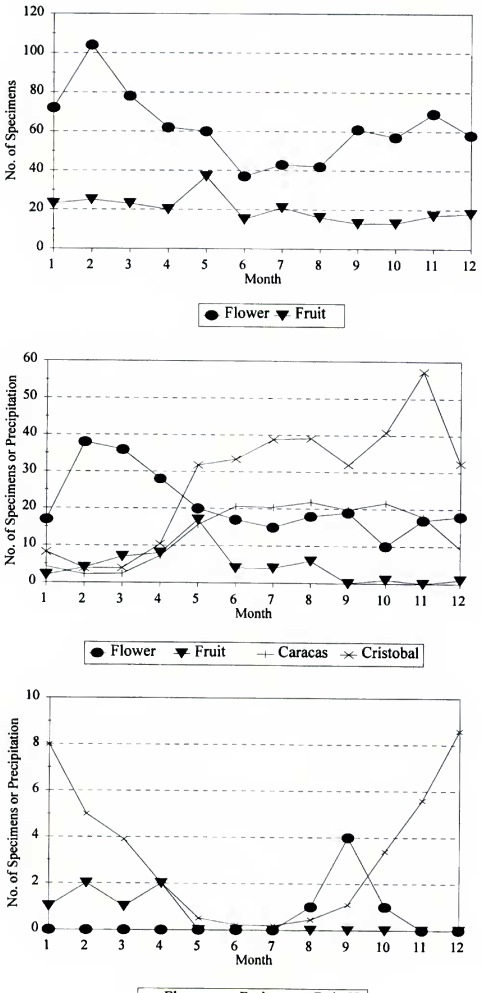
Paragonia pyramidata is wide-ranging throughout the Neotropics (Figs. 2, 3), typically below 1000 m, although collections extend to 2066 m. Common through all of Central America and the northern half of South America, *P. pyramidata* var. *pyramidata* extends southward to the eastern Andes in Peru and Bolivia, and across Brazil to the eastern shore of South America. The northernmost collections are from Mexico, in Colima and the Yucatán Peninsula. The southernmost collection examined was from Uruguay (adjacent to Buenos Aires, Argentina), with other collections from the Brazilian states of Paraná and São Paulo. Gentry (1973, 1977) reported that *P. pyramidata* occurs in Argentina, but no collections from Argentina were seen in the present investigation. Gentry (1973, 1977, 1978, 1982a, 1982b) reported collections from Guadeloupe (West Indies), but other collections from the Caribbean are not documented. *Paragonia pyramidata* var. *tomentosa* is more restricted than variety *pyramidata* and is found only in south-central Brazil (Fig. 2).

Paragonia brasiliensis is more restricted geographically than *P. pyramidata* var. *pyramidata* and occupies higher (500–1000 m) and drier portions of eastern Brazil (Fig. 2), i.e., the states of Ceará, Bahia, and Minas Gerais. It is likely that *P. brasiliensis* occurs in Pernambuco, Piauí, Rio Grande do Norte, and Paraíba, but collections from these states were not seen.

Phenology

Large bees are the primary pollinators of *Paragonia pyramidata*, and flower production follows the "cornucopia" strategy (Gentry, 1976b). "Cornucopia" species produce numerous flowers over a period of several weeks, and a wide range of pollinators are attracted during this period. The cornucopia strategy is the most widespread and generalized of the five flowering patterns typical of Central American Bignoniaceae (Gentry, 1974). Gentry (1976b) documented the cornucopia pollination strategy for *P. pyramidata* in tropical moist forest, tropical wet forest, and premontane wet forest environments.

Graphs of flowering and fruiting phenology for *P. pyramidata* var. *pyramidata* show that flower and fruit production occur throughout the year (Figs. 4, 5). Peaks in the number of flowering and fruiting collections were in February and May, respectively. However, the wide geographic range of *P. pyramidata* var. *pyramidata* (Fig. 3) may obscure more localized phenological patterns. Figure 5 presents flowering and fruiting phenology for collections from Panama, Colombia, and Venezuela only. Mean monthly precipitation in centimeters for Cristóbal, Panama, and Caracas, Venezuela, was plotted to assess floral and fruiting phenology relative to precipitation. A marked peak in flowering occurs in February during the dry season, with a smaller peak in fruit production occurring in May during the first part of the wet season. However, numbers of collections from south of the equator did not peak during the dry season (not graphed). Thus, the floral and fruiting phenology of *P. pyramidata* var.



Figures 4–6. —Figure 4 (top). Flowering and fruiting phenology of *P. pyramidata* var. *pyramidata* for all collections. —Figure 5 (middle). Flowering and fruiting phenology of *P. pyramidata* var. *pyramidata* from Panama, Colombia, and Venezuela. Mean monthly precipitation in cm is plotted (1×) for Caracas, Venezuela, and (2×) for Cristóbal, Panama. —Figure 6 (bottom). Flowering and fruiting phenology of *P. pyramidata* var. *tomentosa*. Mean monthly precipitation in cm is plotted (0.25×) for Belo Horizonte, Brazil.

pyramidata appears to be influenced by regional climatic conditions.

There were few fertile collections of *P. pyramidata* var. *tomentosa* (Fig. 6). The six flowering specimens were all collected at the beginning of the wet season, between August and September. Fruiting collections were limited to the latter part of the wet season, from January to April. Although these data are preliminary, they indicate that *P. pyramidata* var. *tomentosa* differs phenologically from *P. pyramidata* var. *pyramidata*.

Assessments of flowering and fruiting phenology of *P. brasiliensis* did not reveal clear trends because of the limited number of fertile collections available; four flowering collections are known from January, one from June, and two from November. Of the two known fruiting collections, one is from January and the other is from February. Flowering and fruiting probably peak during the first few months of the year, but additional collections are needed to confirm this.

Economic and Ethnobotanical Uses

Reports of uses for *Paragonia* are limited. Gentry (1992) cited the use of *Paragonia* as a treatment for stomach and intestinal problems. *Paragonia pyramidata* is one of several lianas used by native peoples "para tomar agua" (Gentry, in press). Macbride (1961) reported that the stems of *P. pyramidata* are used for lashings.

Materials and Methods

Gentry compiled a private database of label information from herbarium specimens he collected and from specimens at other herbaria that he examined personally. Gentry's database has been incorporated into the Missouri Botanical Garden database-management system, TROPICOS, which also contains label information for all other *Paragonia* specimens housed at MO. All types were assumed to have been seen by Gentry unless otherwise noted. Gentry did not always designate types as "holotype," "isotype," or "syntype," and the designations presented here are based upon inferences drawn from Gentry's work and the original literature; these type designations were not based on personal verification of specimens at the various herbaria. Uncertainty of the type designation is indicated by a question mark.

Data used for mapping and phenology were downloaded from TROPICOS. For records with no latitude/longitude coordinates in TROPICOS, approximate coordinates were obtained from gazetteers produced by the U.S. Board on Geographic Names, Office of Geography, Dept. of the Interior. Distribution maps were produced using the computer program VERSAMAP 1.51 (C.H. Culberson, Newark, Delaware, 1991–1995). Graphs of flowering and fruiting phenology were generated using the computer program Quattro Pro 7.00 (Corel Inc., 1996). Phenology is reported as the number of flowering specimens collected during each month of the year; detailed studies of flower production (per plant, per population, per species, or per time period) have not been conducted. Amounts of precipitation used in the graphs of phenology were obtained from *Agroclimatological Data for Latin America and the Caribbean* (FAO, 1985).

Taxonomic Treatment

Paragonia Bureau, Bull. Soc. Bot. France 19: 17. 1872. TYPE: *Bignonia lenta* Mart. ex DC. [= *Paragonia pyramidata* (Rich.) Bureau].

Sanhilaria Baill., Hist. Pl. 10: 27. 1888 [1891], non Leandro (1838). TYPE: *Sanhilaria brasiliensis* Baill. [= *P. brasiliensis* (Baill.) A. H. Gentry].

Hilariophyton Pichon, Bull. Soc. Bot. France 92: 228. 1945. TYPE: *Sanhilaria brasiliensis* Baill. [= *P. brasiliensis* (Baill.) A. H. Gentry].

Lianas; stems woody with 4 phloem arms in cross section; branchlets terete, lenticellate, with interpetiolar glandular fields lacking, glabrate to lepidote or densely puberulent; pseudostipules subconical, subulate (basally expanded with acuminate tips), curved inward and appressed or nearly appressed to branchlets or angled away from branchlet and nearly appressed to the subtending petiole, eglandular, glabrate to puberulent. *Leaves* opposite, petiolate, estipulate, 2-foliolate with oppositely arranged simple leaflets and a bifid or trifid (rarely simple) terminal tendril (or tendril scar); petioles and petiolules puberulent, the petiolules sulcate; distal adaxial petiolar glandular fields present or absent; leaflets entire, chartaceous, glabrate to densely puberulent beneath, venation brochidodromous, the midrib and secondary veins prominent, glandular fields in axils lacking, margins slightly undulate. *Inflorescences* elongate terminal or axillary panicles, many-flowered; rachis and peduncles minutely bracteate, the axes minutely scurfy to densely puberulent. *Flowers* ovoid in bud, the calyx expanding before corolla emergence; calyx cupular-campanulate, minutely and densely lepidote to sparingly lepidote or moniliform-pubescent, the calyx apically truncate except for minute, mucronate teeth, costate or ecostate, the margin frequently split and/or reflexed, often ciliate; corolla zygomorphic, tubular-campanulate, lavender to ma-

genta, frequently with a white throat, the outer surface densely moniliform-pubescent and the inner surface glabrate with a ring of elongate, dense, moniliform pubescence immediately below insertion of stamens; corolla lobes 5 (2 upper and 3 lower), short-orbicular, rounded to acute, the inner and outer surfaces moniliform-pubescent; fertile stamens didynamous with a single staminode present, stamens and staminode adnate to the corolla; fertile anthers glabrous, with two spreading thecae, included; disk present; ovary cylindrical, usually densely lepidote; ovules 2-seriate in each locule; stigma bipartite, the divisions laterally flattened or partially fused and appearing hollow, included. *Fruit* a compressed, woody, linear-oblong septicidal capsule, dark brown to tan, the valves dehiscing parallel to the septum, the midline inconspicuous, and the surface conspicuously tuberculate to nearly smooth, many-seeded; seeds oblong, flattened, bialate, the body ovoid and frequently bipartite.

Paragonia contains two species and ranges from Mexico to Brazil and Uruguay. Collections are also reported from Guadeloupe (Gentry, 1973, 1977, 1978, 1982a, b).

Key to Species of *Paragonia*

1a. Petioles < 10 mm long; petiolules ≤ 6 mm long; petiolar glandular field absent or obscured by pubescence; tendrils trifid; pseudostipules usually angled sharply away from the branchlet; inflorescence axes glandular-puberulent; calyx costate; fruit surface nearly smooth ..... 1. *P. brasiliensis*

1b. Petioles ≥10 mm long; petiolules ≥10 mm long; petiolar glandular fields present and evident; tendrils generally bifid, rarely trifid or simple; pseudostipules appressed or nearly appressed to the branchlet; inflorescence axes lepidote-puberulent to densely tomentose-puberulent; calyx smooth; fruit surface tuberculate ..... 2. *P. pyramidata*

1. Paragonia brasiliensis (Baill.) A. H. Gentry, Ann. Missouri Bot. Gard. 63: 70. 1976. *Sanhilaria brasiliensis* Baill., Hist. Pl. 10: 27. 1888 (1891). *Hilariophyton brasiliensis* (Baill.) Pichon, Bull. Soc. Bot. France 92: 228. 1945. TYPE: Brazil. Minas Gerais: *St. Hilaire 745* (holotype, P).

Lianas; branchlets terete, drying brown, puberulent; pseudostipules angled away from branchlet and nearly appressed to the subtending petiole, puberulent. *Leaves* 6–10 cm long, 2-foliolate with a single, minutely trifid, terminal tendril (or tendril scar); petioles 6–8 mm long, lepidote-puberulent to densely puberulent, glandular fields lacking; petiolules 3–6 mm long, sulcate, lepidote-puberulent to densely puberulent; leaflets 4–9 × 1.5–4.0 cm, elliptic, apices acute with minute mucronate tips lacking, bases acute to obtuse, with 5–8 principal secondary vein pairs, the lamina frequently punctate, glabrate above and glabrate to densely puberulent below. *Inflorescences* to 12 cm long, glandular-puberulent, several-flowered; rachis and peduncles minutely bracteate, the bracts linear-triangular, 2–3 × 1 mm, ± persistent, eglandular, puberulent; pedicels 4–9 mm long, densely puberulent. *Flowers* ovoid in bud; calyx 5–6 × 8 mm, costate, densely lepidote to moniliform-pubescent, apically truncate except for 5 minute, mucronate teeth, dark glands present on distal half of calyx, the margin smooth to ciliate; corolla exserted ca. 45 mm beyond the calyx lip, 3–4 mm wide at the calyx lip, 15 mm wide at the mouth, the outer surface densely moniliform-pubescent and the inner surface glabrate with a ring of dense uniseriate pubescence at the level of the calyx lip; corolla lobes 15 × 12 mm, the apices acute; fertile stamens 12 or 16 mm long, inserted into the inner ring of corolla pubescence, the single staminode 4 mm long, inserted beyond the ring of corolla pubescence; disk 1 × 2 mm; ovary 3 mm long; style ca. 21 mm long. *Capsule* 40 × 1 cm, drying dark, the outer surface nearly smooth or minutely lepidote; seeds 1.0 × 3.5 cm.

Paragonia brasiliensis is a poorly known species from the eastern Brazilian states of Bahia, Minas Gerais, and Ceará (Fig. 2). All collections known are from 500 to 1000 m, typically in the caatinga. Patterns of flowering and fruiting phenology are not evident because only nine fertile collections were available (flowering collections: four from January, one from June, and two from November; fruiting collections: one each from January and February). Peak flowering probably occurs from November to January. However, because a single flowering collection is known from June, *P. brasiliensis* may not have a rigidly constrained flowering period.

Additional specimens. BRAZIL. **Bahia**: Mun. Caetite, 20 km E de Caetite, 14°08'S, 42°15'W, 500 m, *Arbo et al. 5652* (MO); Rodovia BR 4, 60 km N da divisa com Minas Gerais, 14°50'S, 39°00'W, *Belem 1196* (CEPEC, H, MO); Rod. BR-116 (Mun. Candido Sales), *Hatschbach & Silva 50026* (MO); Jequie, 13°05'S, 40°04'W, *Heringer 10277* (IAN, NY, UB); Serra da Agua de Rega 28 km N of Seabra, road to Agua de Rega, 12°25'S, 41°46'W, 1000 m, *Irwin et al. 31159* (MO, NY, UB); BR 4, km 966, *Pabst & Pereira 8364* (MO); 6 km antes de Planalto Bahiana, *Pereira & Pabst 9539* (MO); 9 km de Maracas rumo a Caatinga, 13°26'S, 40°27'W, *Pereira & Pabst 9705* (MO). **Ceará**: Serra da Meruoca, Sitio J. Antonio, 03°28'S, 40°30'W, *Fernándes s.n.* (EAC-1950).

The stems and leaves of *Paragonia brasiliensis*

are often dark and densely puberulent, particularly on the short petioles and petiolules. The tendrils of *P. brasiliensis* are trifid rather than bifid as is usually observed in *P. pyramidata*. Petiolar glandular fields were not observed in *P. brasiliensis*, and these are a nearly ubiquitous feature of *P. pyramidata*. The inflorescence axes of *P. brasiliensis* are glandular-puberulent, whereas those of *P. pyramidata* are lepidote-puberulent to densely tomentose-puberulent. The costate calyces of *P. brasiliensis* are distinct from the smooth calyces of *P. pyramidata*. Gentry (1976; Table 1) reported that the inflorescences of *P. brasiliensis* are narrower than those of *P. pyramidata*. However, fertile collections of *P. brasiliensis* are few, and it is difficult to assess whether inflorescence width is a useful character to distinguish the two species. Gentry (1976) reported that the fruit of *P. brasiliensis* are "strongly compressed," whereas those of *P. pyramidata* are subterete. The few fruiting collections of *P. brasiliensis* that are available possess immature fruit, and any generalizations based on these collections would be somewhat speculative. Despite the immaturity of the *P. brasiliensis* fruiting collections, the nearly smooth fruit surface of *P. brasiliensis* appears distinct from the tuberculate surface of *P. pyramidata* fruit.

2. Paragonia pyramidata (Rich.) Bureau, Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1893: 104. 1894. *Bignonia pyramidata* Rich., Actes Soc. Hist. Nat. Paris 1: 110. 1792. *Tabebuia pyramidata* (Rich.) DC., in A. DC., Prodr. 9: 214. 1845. TYPE: French Guiana, *Leblond 292* (holotype, P-LA).

Lianas; branchlets terete, drying gray, tan, or occasionally dark brown, the younger growth glabrate to densely tomentose and the older stems often rough-surfaced. *Leaves* 10–30 cm long, 2-foliolate with a single, minutely bifid or trifid (rarely simple) terminal tendril (or tendril scar); petioles 10–20 mm, glabrate to lepidote or densely tomentose-puberulent, the distal adaxial glandular fields usually present and either evident or obscured by pubescence; petiolules 1–2 cm, lepidote to densely tomentose-puberulent; leaflets 7–26 × 3.5–13.0 cm, narrowly to broadly elliptic, elliptic-orbicular or ovate-elliptic, apices acute with minute mucronate tips present, bases broadly acute to obtuse or rounded, with 4–5(6) principal secondary vein pairs, the lamina punctate, nearly glabrate above and glabrate to sparsely puberulent or densely tomentose-puberulent below. *Inflorescences* to 18 cm long, lepidote-puberulent to densely tomentose-puberulent, many-flowered; rachis and peduncles minutely bracteate, the bracts linear-triangular, 2 × 1 mm, caducous, eglandular, puberulent to densely tomentose-puberulent; pedicels to 12 mm long, lepidote or tomentose-puberulent. *Flowers* ovoid in bud; calyx 5–7 × 6–7 mm, ecostate, glabrate to lepidote, mealy, or densely tomentose-puberulent, occasionally sparsely and minutely puberulent, apically truncate except for 5 mucronate teeth, the margin ciliate; corolla tubular-campanulate, exserted 35–40 mm above calyx lip, 2–4 mm wide at calyx lip, 15–20 mm wide at mouth, the outer surface densely moniliform-pubescent and the inner surface glabrate with a ring of dense uniseriate pubescence at the level of the ovary apex; corolla lobes 12–15 × 16–20 mm, the apices rounded; fertile stamens 16 or 19 mm long, inserted at inner ring of corolla pubescence, the single staminode 4 mm long, inserted beyond the ring of corolla pubescence; disk 1 × 3 mm; ovary 3 mm long; style 20–25 mm long. *Capsule* 32–52 × 1.0–1.5 cm, dark to light brown or uniformly tan to silvery-tan, the outer surface tuberculate to finely tuberculate and lepidote; seeds 1 × 4 cm. Figures: Gentry (1973, fig. 24), Gentry (1982a, fig. 19), Gentry (1982b, fig. 31), Gentry (1997, fig. 339), Sprague (1903, figs. 2771, 2772).

Paragonia pyramidata ranges from southern Mexico through Central America and South America east of the Andes, to southern Brazil and Uruguay (Fig. 3). Gentry (1973, 1977) included Argentina in the distribution of *P. pyramidata*, but no collections from Argentina were located during this investigation. It typically ranges from 0 to 1000 m, with collections reported to 2066 m. *Paragonia pyramidata* is common in tropical and premontane wet forests, and thrives in a diversity of ecological conditions from dry hillsides to swamps (Gentry, 1973).

The subulate, appressed (or nearly appressed) pseudostipules, large "lauraceous" leaflets, and distinctive, sweet smell of the freshly crushed leaves are important field characters for *P. pyramidata* (Gentry, 1973, 1978). The minutely bifid (versus trifid) tendrils and absence of interpetiolar glandular fields distinguish *P. pyramidata* from the vegetatively similar *Ceratophytum tetragonolobum* (Jacq.) Sprague & Sandw. (Gentry, 1973).

Although Bureau described *Paragonia pyramidata* var. *elliptica* in 1845, and Bureau and Schumann described *P. pyramidata* var. *tomentosa* in 1896, Gentry (1973, 1977, 1982a, b) did not recognize varieties of *P. pyramidata*, and regarded variation in pubescence as "taxonomically unimpor-

tant" (Gentry, 1976a). However, my inspection of specimens from South America revealed forms clearly identifiable as variety *tomentosa*, and these are restricted to a specific geographic area (Fig. 2). Variety *tomentosa* apparently grows intermixed with the glabrate variety *pyramidata*. However, no intermediates were identified.

The characters of the glabrate and pubescent varieties differ more in frequency of expression than in fundamental structure, e.g., all characters of variety *tomentosa* are present in variety *pyramidata* but at different frequencies. The principal difference between the two varieties is in the overall pubescence; variety *pyramidata* is usually glabrate and variety *tomentosa* is typically densely tomentose-puberulent. The leaflets of variety *tomentosa* are generally wider and more nearly ovate than the elliptic leaflets typical of variety *pyramidata*. Typically, variety *pyramidata* has minutely puberulent inflorescence axes, whereas those of variety *tomentosa* are densely tomentose-puberulent. The calyces of variety *tomentosa* are densely tomentose-puberulent, whereas those of variety *pyramidata* are glabrate to lepidote (rarely mealy; see below). The fruit surface of variety *tomentosa* is uniformly tan, whereas that of variety *pyramidata* varies from dark brown to light tan and is generally less lustrous and more coarsely tuberculate. The fruit surface of variety *tomentosa* is often more finely textured and more lustrous than that of variety *pyramidata*.

Anomalous collections of *Paragonia pyramidata* that do not fit clearly into either variety *tomentosa* or variety *pyramidata* are known from the Brazilian states of Pará, Mato Grosso, and Mato Grosso do Sul. These anomalous collections are well removed from the main range of variety *tomentosa* (Fig. 2). The Pará collection (*Prance et al. P25318*) has glabrate-mealy calyces and elliptic leaflets, and inflorescence and leaflet pubescence reduced in density and length. The Mato Grosso do Sul collection (*Hatschbach et al. 52475*) has tomentose-puberulent leaflets (indistinguishable from those of variety *tomentosa*), short-tomentose inflorescence axes, and glabrate-mealy calyces. The Mato Grosso collection (*Prance et al. 26131*) has evenly but sparsely short-pubescent leaves (no young inflorescence axes or calyces are present because the specimen is fruiting). These anomalous collections were excluded from the variety descriptions and key. Additional collections are needed to assess the taxonomic status of the anomalous specimens.

The correlation among character states (of leaflet shape, leaf pubescence, and fruit surface) for some collections warrants recognition of variety *tomentosa* as distinct from variety *pyramidata*. However, the absence of character state discontinuities (in individual characters) between the taxa argues against recognition of variety *tomentosa* as a species or subspecies. More detailed investigations may provide additional characters to support recognition of this variety at a higher taxonomic level.

KEY TO VARIETIES OF *P. PYRAMIDATA*

1a. Leaflets glabrate or nearly so, narrowly to broadly elliptic, only occasionally ovate-elliptic or elliptic-orbicular, the bases broadly acute to obtuse; calyx glabrate to lepidote, occasionally sparsely and minutely puberulent ..... 2a. *P. pyramidata* var. *pyramidata*

1b. Leaflets puberulent to densely tomentose-puberulent beneath, ovate-elliptic or less commonly broadly elliptic, the bases rounded to broadly obtuse; calyx densely tomentose-puberulent ..... 2b. *P. pyramidata* var. *tomentosa*

2a. Paragonia pyramidata var. pyramidata

Bignonia laurifolia Vahl, Eclog. Amer. 2: 44. 1798. TYPE: Trinidad, *von Rohr s.n.* (holotype, C).

Bignonia ehretioides Cham., Linnaea 7: 704–705. 1833 ["1832"]. TYPE: Brazil. *Sellow s.n.* (holotype?, B not seen by Gentry).

Bignonia rupestris Gardner, London J. Bot. 1: 179. 1842. TYPE: Brazil. Rio de Janeiro: *Gardner 78* (holotype?, K).

Bignonia lenta Mart. ex DC., in A. DC., Prodr. 9: 159. 1845. TYPE: Brazil. Amazonas: *Martius 2977* (holotype, M; isotype, G-DC).

Bignonia martiusiana DC., in A. DC., Prodr. 9: 156–157. 1845. TYPE: Brazil. Pará: 1817, *Martius s.n.* (holotype, BR).

Pachyptera dasyantha DC., in A. DC., Prodr. 9: 176. 1845. TYPE: Brazil. Rio São Francisco, *Blanchet 2903* (holotype, G-DC; isotype, K).

Pachyptera perrottetii DC., in A. DC., Prodr. 9: 176. 1845. TYPE: French Guiana. *Perrottet 2851* (holotype, G-DC).

Pachyptera striata DC., in A. DC., Prodr. 9: 176. 1845. TYPE: Brazil. São Paulo: *Lund 783* (holotype?, G-DC).

Pachyptera umbelliformis DC., in A. DC., Prodr. 9: 175–176. 1845. SYNTYPES: Brazil. São Paulo: *Martius s.n.* (M not seen by Gentry); Rio Paraibia, *Neuwied s.n.* (M not seen by Gentry).

Pithecoctenium reticulare DC., in A. DC., Prodr. 9: 197. 1845. TYPE: Brazil. Without locality or collector (holotype?, G-DC).

Zeyheria ["Zeyheria?"] *surinamensis* Miq., Linnaea 18: 250. 1845 ["1844"]. TYPE: Suriname. *Focke 230* (holotype, U, excluding leaves of *Cydista aequinoctialis* (L.) Miers; isotype, K).

Bignonia sinclairii Cerón, Bot. Voy. Sulphur 129. 1845. TYPE: Panama. *Sinclair s.n.* (holotype, K).

Arrabidaea dichasia Donn. Sm., Bot. Gaz. 20: 6. 1895. TYPE: Honduras. San Pedro Sula: *Thieme 5393* (isotypes?, NY, US).

Paragonia schumanniana Loes., Bot. Jahrb. Syst. 23: 130. 1897. TYPE: Nicaragua. Matagalpa: *Rothschuh 230* (holotype?, B).

Adenocalymna densiflora Rusby, Mem. New York Bot.

Gard. 7: 355. 1920. TYPE: Bolivia. Cataracts of Bopi River, *Rusby 484* (isotypes?, NY, US).

Petastoma leiophyllum Kraenzl., Repert. Spec. Nov. Regni Veg. 17: 58. 1921. TYPE: Brazil. Paraná: *Dusén 8633* (isotype?, K).

Petastoma macrocalyx Kraenzl., Repert. Spec. Nov. Regni Veg. 17: 59. 1921. TYPE: Brazil. São Paulo: *Heiner 569* (holotype, S; photo, K).

Young branchlets glabrate to lepidote; petioles and petiolules glabrate to lepidote, with distal adaxial petiolar glandular fields usually present and conspicuous; leaflets narrowly to broadly elliptic, infrequently elliptic-orbicular or ovate-elliptic, the leaflet bases acute to obtuse or infrequently rounded, the surface glabrate or nearly so above, glabrate to sparsely puberulent below; rachis and peduncles glabrate to lepidote or puberulent; pedicels and calyces lepidote, occasionally sparsely and minutely puberulent or glabrate; outer surface of capsule dark to light brown or (less commonly) tan.

Paragonia pyramidata var. *pyramidata* ranges from southern Mexico through Central America and South America east of the Andes, to southern Brazil and Uruguay (Fig. 3). Collections of *Paragonia pyramidata* var. *pyramidata* are known from 0 to 2066 m. It is common in tropical and premontane wet forests and thrives in a diversity of ecological conditions from dry hillsides to swamps (Gentry, 1973). Flowering occurs throughout the year, and collections peak in February (Figs. 4, 5). Fruiting collections increase from January to April and peak in May.

Representative specimens. MEXICO. **Campeche**: 5 km S de Ulmal, *Cabrera 2308* (MO). **Chiapas**: 6 km al sur de la desviacion a Chancala, *Cabrera & Cabrera 6216* (MO). **Colima**: W of Manzanillo Bay, 5 mi. W of Santiago, Peña Blanca, 19°00′N, 104°00′W, 90–150 m, *McVaugh 15707* (MICH). **Oaxaca**: Mpio. Sta. Maria Chimalapa, 16°55′00″N, 94°40′30″W, 300 m, *Hernández 180* (MO). **Quintana Roo**: 10 km al oeste de La Pantera, *Cabrera & Cabrera 4252* (MO). **Tabasco**: Balancan, Finca la Esperanza, 17°48′N, 91°32′W, 50 m, *Calzada et al. 2651* (MO). **Veracruz**: 10 km N of Sontecomapan, vic. Playa Escondida, 18°35′N, 95°03′W, 100 m, *Nee 24741* (MO). **Yucatán**: Tzucacab, 20°04′N, 89°03′W, *Enríquez 645* (MEXU). BELIZE. **Belize**: N of Hwy. S of Altunha, 0 m, *Gentry 8259* (MO). **Cayo**: Sibun River near Hummingbird Hwy., 17°26′N, 88°16′W, 66–100 m, *Gentry 8432* (MO). **Corozal**: 1 mi. N of Buena Vista, 16°34′N, 88°32′W, *Gentry 8547* (MO). **Orange Walk**: 10 mi. S of Orange Walk, 17°15′N, 88°47′W, *Whitefoord 2599* (MO). **Stann Creek**: Carib Reserve, 16°57′N, 88°15′W, *Gentle 3100* (MICH). **Toledo**: Río Temash, 15°59′N, 88°55′W, *Dwyer 12924* (MO). GUATEMALA. **Alta Verapaz**: Cubilquitz, 15°40′N, 90°25′W, 350 m, *von Tuerckheim 7648* (MO). **Escuintla**: Río Michatoya, SE of Escuintla, 14°48′N, 90°47′W, *Standley 89136* (F). **Izabal**: Puerto Méndez, bank of Río Gracias a Dios, 15°53′N, 89°13′W, *Contreras s.n.* (F). **Jutiapa**: between San José Acatempa and Río de Los Esclavos, 14°15′N, 90°08′W, 900–1200 m, *Standley 60621* (F). **Petén**: Camino para El Remate, km 69, parque Tikal, 17°00′N, 89°42′W, *Tun 1214* (F, MO). **Retalhuleu**: between Nueva Linda and Champerico, 14°25′N, 91°49′W, 120 m, *Standley 87669* (F). EL SALVADOR. **La Libertad**: El Amatalito, 13°29′N, 89°16′W, *Villacorta et al. 844* (MO). HONDURAS. **Atlántida**: between Tela & Pajuiles, 15°44′N, 87°27′W, 200 m, *Molina & Molina 25719* (F). **Colón**: Río Guaimoreto, 4.5 mi. NE of Trujillo, 15°57′N, 85°54′W, *Saunders 299* (MO). **Comayagua**: 19 km NW of Siguatepeque, 14°25′N, 87°37′W, 566 m, *Webster et al. 12748* (LL). **Cortés**: Cerca de Choloma, carretera San Pedro Sula–Cortés, 15°30′N, 88°00′W, 100 m, *Molina 6667* (F, LL). **El Paraíso**: valley of Río Dantas, barranco El Muro, 14°10′N, 86°30′W, 733 m, *Webster et al. 12048* (MO). **Gracias a Dios**: Mosquitia, Río Plátano, 0–4 hrs. upriver from village of Ras, 15°30′N, 84°40′W, 0 m, *Gentry et al. 7521* (F, MO). **Islas de la Bahía**: Isla de Roatán, camino entre Roatán y Sandy Bay, 16°23′N, 86°30′W, 0–50 m, *Nelson & Romero 4495* (MO). **Olancho**: Culmi, 14°45′N, 86°00′W, 500 m, *Nelson & Romero 4634* (MO). **Santa Bárbara**: Montana al mineral del Mochita, 15°10′N, 88°20′W, 900 m, *Molina 5603* (F). NICARAGUA. **Carazo**: 1 km E of San Marcos, 11°55′N, 86°12′W, *Neill 260* (MO). **Chontales**: Cerro Oluma, Cordillera Amerisque, 750 m, *Gentry et al. 43918* (MO). **Jinotega**: below Peñas Blancas via El Tuma, 13°15′N, 85°41′W, 1200 m, *Neill 7139* (MO). **Managua**: El Zapotal E of Managua, 12°09′N, 86°07′W, 15 m, *Garnier 1049* (K). **Matagalpa**: 7 km al NO de Esquipulas, 12°40′N, 85°43′W, 800 m, *Moreno 25421* (MO). **Río San Juan**: between Río Santa Cruz and Caño Santa Crucita, 11°03′N, 84°25′W, 50 m, *Stevens 23408* (MO). **Zelaya**: 12 km SW of Bonanza near Lago Siempreviva, 14°02′N, 84°34′W, 300 m, *Neill 4037* (MO). COSTA RICA. **Alajuela**: Bord de la route à Carrillo, 09°54′N, 83°33′W, 300 m, *Pittier 2497* (CR, G, US). **Cartago**: Las Vueltas, Tucurrique, 635 m, *Tonduz 7481* (BM, CR, GH, K, US). **Guanacaste**: 17 km SW of Nicoya, 12 km SW of Curime, 10°03′N, 85°32′W, 100–300 m, *Liesner 5027* (MO). **Heredia**: Finca La Selva, the OTS Field Station, 100 m, *Wilbur 34424* (MO). **Limón**: Río Colorado between Caño Bravo and Caño Pereira, 10°43′N, 83°42′W, 5 m, *Stevens 24058* (MO). **Puntarenas**: Osa Peninsula near Rincón, 09°55′N, 84°13′W, *Gentry 1210* (F, MO). **San José**: El General Viejo, El General Valley, 09°11′N, 83°30′W, 750 m, *Williams et al. 28484* (F, MO). PANAMA. **Bocas del Toro**: Lower Río San Pedro Valley, 08°49′N, 81°33′W, *Gordon 20D* (MO). **Canal Zone**: Barro Colorado Island, Fuertes Cove, 09°11′N, 79°57′W, *Croat 8136* (MO). **Chiriquí**: W of Río Chorchita, 08°22′N, 82°15′W, *Gentry 5849* (MO). **Cocle**: 1 mi. N of El Valle, 08°36′N, 80°33′W, *Gentry & Dwyer 3572* (MO). **Darién**: Río Balsas between Manene and Río Coasi, 08°15′N, 77°59′W, *Hartman 12523* (MO). **Herrera**: 1.4 mi. S of Ocú, 07°57′N, 80°47′W, *Gentry 3129* (MO). **Los Santos**: 10 mi. N of Tonosí, 07°24′N, 80°27′W, *Tyson et al. 2941* (MO, SCZ). **Panamá**: Río Corona, along Pan Am Hwy., 08°27′N, 80°01′W, *Gentry 2903* (MO). **San Blas**: Ailigandi, 09°14′N, 78°01′W, 0–66 m, *Hammel & D'Arcy 4997* (MO). **Veraguas**: 2 mi. S of Santa Fe, 08°31′N, 81°05′W, *Gentry 2942* (MO).

TRINIDAD AND TOBAGO. **Trinidad**: Tamana, 10°20′N, 61°05′W, *Broadway 5600* (MO). **Tobago**: The Widow, 11°15′N, 60°44′W, *Broadway 4576* (U).

COLOMBIA. **Amazonas**: Puerto Nariño, 03°29′N, 70°30′W, 100 m, *Rudas et al. 2023* (MO). **Atlántico**: Barranquilla, Juanmina, 10°58′N, 74°54′W, 10 m, *Dugand*

6926 (COL). **Boyacá**: El Humbo, 1333 m, *Lawrance 800* (MO). **Caquetá**: 21–22 km E of Morelia, 01°31′N, 75°41′W, 260–280 m, *Gentry et al. 9074* (MO), **Chocó**: 31 km E of Quibdó, ca 14 km E of Tutunendo, 05°45′N, 76°32′W, *Gentry & Brand 36887* (MO). **Córdoba**: Río Sinu, 09°24′N, 75°49′W, 120–200 m, *Cuadros 4175* (MO). **Cundinamarca**: Guaduas, 1040–1320 m, *García-Barriga 12338* (COL). **Guaviare**: Río Ranchería, 02°35′N, 72°38′W, 100 m, *Haught 4023* (COL). **Magdalena**: Rincón Hondo, *Allen 412* (MO). **Meta**: Sierra la Macarena, Río Guapaya, 02°45′N, 73°55′W, 475 m, *Philipson et al. 1689* (COL). **Nariño**: Mun. Tumaco, Llorente, 01°49′N, 78°46′W, *de Benavides 627* (COL). **Putumayo**: Río Putumayo opposite mouth of Río Cueppi, 00°30′N, 76°00′W, 200 m, *Gentry et al. 22117* (MO). **Santander**: Barranca Bermeja (El Centro), 07°03′N, 73°52′W, 100 m, *Haught 2212* (MO). **Valle**: Río Naya, Puerto Merizalde, 03°16′N, 77°25′W, *Cuatrecasas 14296* (COL). **Vaupés**: Mitu, lower Río Kubiyu, 01°08′N, 70°03′W, *Zarucchi 1261* (MO). ECUADOR. **El Oro**: Road Zaracay–Las Piedras, 250 m, *Harling et al. 15624* (MO). **Esmeraldas**: W of San Mateo, Reserva Forestal de Jardín Tropical, Universidad Técnica Luis Vargas Torres, 00°54′N, 79°37′W, 100–130 m, *Gentry & Lajones 73057* (MO). **Guayas**: 2–4 km W of Bucay, 02°10′S, 79°06′W, 170 m, *Gentry 12287* (MO). **Los Ríos**: 12.5 km E of Patricia Pilar, Centinela, 02°45′S, 80°33′W, 466 m, *Hansen et al. 7784* (MO). **Manabí**: Cuchilla Seca above Estero Perro Muerto, Machalilla National Park, 01°36′S, 80°42′W, 480 m, *Gentry & Josse 72645* (MO). **Napo**: Coca, Coca–Yuca road 15 km SE of Coca, 03°03′S, 79°40′W, 250 m, *Harling et al. 19877* (MO). **Pastaza**: Río Capihuari, 02°30′S, 76°50′W, 285 m, *Øllgaard et al. 35079* (AAU, MO). **Pichincha**: 35 km N of Santo Domingo de los Colorados, 00°15′S, 79°09′W, 250 m, *Gentry 9593* (MO). PERU. **Amazonas**: 65 km N de Pinglo, Río Santiago, 04°26′S, 77°39′W, 200 m, *Huashikat 1813* (MO). **Cusco**: Quispicanchis Province, 13°13′S, 70°45′W, 643 m, *Núñez 13813* (MO). **Huánuco**: San Martín–Río Sion, 07°40′S, 76°46′W, *Schunke 2359* (COL, MO). **Junín**: E de La Merced, 11°03′S, 75°19′W, 1000 m, *Schunke 6213* (LA). **Loreto**: Alto Amazonas, Río Pastaza, lago Rimachi, 04°20′S, 76°35′W, 200 m, *Díaz & Ruiz 936* (MO). **Madre de Dios**: Manú National Park, Cocha Cashu, 11°45′S, 71°00′W, *Emmons 1025* (MO). **Pasco**: Oxapampa, Palcazu valley, on Río Palcazu, 10°10′S, 75°13′W, 300 m, *Smith 3929* (MO). **Puno**: ridge between Río Candamo and Río Guacamayo, 13°30′S, 69°50′W, 400–600 m, *Gentry et al 77002* (MO). **San Martín**: Puerto Pizana, Mariscal Cáceres, Tocache Nuevo, 08°11′S, 76°30′W, 350 m, *Schunke 6872* (MO). **Ucayali**: Yarinacocha (Cano a Pucallpa), 250 m, *Vásquez & Jaramillo 1542* (MO). BOLIVIA. **Beni**: Cercado Province Trinidad, 14°49′S, 64°48′W, 150 m, *Gentry & Perry 77504* (MO). **Cochabamba**: Todos Santos–Chapare, 17°30′S, 65°40′W, 300 m, *Steinbach 428* (F, MO, NY, U, WIS). **La Paz**: Chaquimayo, 17 km NW of Apolo near Río Marchariapo, 14°34′S, 68°28′W, 1000 m, *Gentry 71118* (MO). **Pando**: Nicolás Suárez Río Tahuamanu, 11°06′S, 67°36′W, *Fernández & Susanna 8498* (MO). **Santa Cruz**: Parque Amboro, 17°42′S, 63°35′W, 530 m, *Seidel 3045* (MO). VENEZUELA. **Amazonas**: Dept. Atabapo, Río Cunucunuma, 03°40′N, 65°45′W, 180–210 m, *Steyermark et al. 126165* (MO). **Anzoátegui**: Río León by Quebrada Danta, 10°01′N, 64°13′W, 500 m, *Steyermark 61076* (VEN). **Apure**: Distr. Muñoz, 5 km W of Bruzual–San Fernando Hwy., 07°45′N, 69°17′W, 70 m, *Davidse & González 14793* (MO). **Aragua**: Chuao, 10°13′N, 67°33′W, 50 m, *Pittier 12121* (M, VEN). **Bolívar**: Mpio. Raul Leoni, 04°18′N, 62°05′W, 490 m, *Delgado 83* (MO). **Delta Amacuro**: E of Río Grande and El Palmar, 08°20′N, 61°40′W, *Gentry & Berry 14975* (MO). **Distrito Federal**: between La Sabana and Caruao, 10°37′N, 66°23′W, *Berry 924* (MO). **Falcón**: Cerro Socopo, 10°30′N, 70°45′W, 440–1200 m, *Liesner et al. 8295* (MO). **Lara**: Serranía de Terapaima, S de Barquisimeto, 10°10′N, 69°30′W, 800–1000 m, *Saer 443* (VEN). **Maracay**: 10°15′N, 67°36′W, *Vogl 817* (M). **Miranda**: S of Santa Cruz, 10 km W of Cupira, 10°09′N, 65°48′W, 18–20 m, *Steyermark & Davidse 116416* (MO). **Monagas**: Reserva Forestal de Guarapiche, 09°53′N, 62°53′W, 10 m, *Castillo 719* (MO). **Portuguesa**: T. F. Amazonas, Dpto. Atabapo, alto Río Orinoco, 30 km al SE de La Esmeralda, 03°05′N, 65°52′W, *Aymard 8017* (MO). **Sucre**: Distr. Benítez, Serranía de la Paloma, 10°30′N, 63°07′W, 45–50 m, *Steyermark et al. 121402* (MO). **Yaracuy**: entre San Felipe & Marín, 10°20′N, 68°44′W, *Pittier 12093* (M, VEN). **Zulia**: Dtto. Mara, Río Cocuy, 10°52′N, 72°29′W, *Hayward 201* (MO). SURINAME. **Nickerie**: area of Kabalebo Dam project, 03°34′N, 55°59′W, 30–130 m, *Lindeman et al. 15* (MO). **Saramacca**: Saramacca River, Toekoemoetoe Creek, 05°51′N, 55°53′W, *Maguire 24918* (IAN, MICH, MO). FRENCH GUIANA. **Cayenne**: 2 ième saut de Maroüini près d'Antecume Pata, 03°18′N, 54°04′W, *Cremers 4999* (MO). **Saül**: 03°38′N, 53°12′W, 220 m, *Gentry et al. 63076* (MO). BRAZIL. **Acre**: Km 60 from Rio Branco on Rio Branco-Brasileia Rd., 10°50′S, 68°00′W, *Lowrie et al. 425* (MO). **Amapá**: Oiapoque, BR 156, 109 km SSE of Oiapoque O-Calcoene, 03°00′N, 51°30′W, *Mori et al. 17241* (MO). **Amazonas**: Aeroporto de Barcelos, 00°58′S, 62°57′W, *Silva et al. s.n.* (INPA-38180) (MO). **Bahia**: Estrada Canavieiras-Ouricana, 14°00′S, 42°00′W, *Almeida 572* (CEPEC). **Ceará**: Pico Alto, Pacoti, 04°13′S, 38°56′W, *Angelica s.n.* (EAC-11712). **Distrito Federal**: Corrego Papuda, *Heringer et al. 11172* (MO). **Espirito Santo**: Reserva Florestal da CVRD, 20°51′N, 41°07′W, *Peixoto et al. 3354* (MO). **Goiás**: Estrada Alto Paraíso-Teresina, 17°52′S, 51°48′W, *Heringer et al. 2400* (MO). **Maranhão**: Engenho, Mun. de Vitoria do Arari, 04°25′S, 44°45′W, *Rosa 2463* (MO). **Mato Grosso**: MT. BR 158, depois na Rod. para o Provoado de Vila Rica, 10°S, 51°W, *Cid et al. 6448* (MO). **Minas Gerais**: 15 km W of Para de Minas, 19°15′S, 44°37′W, 760 m, *Davidse & Ramamoorthy 10808* (MO); 2 km downstream from Bela Vista, on Rio Mocoes, 03°22′S, 51°50′W, *Sobel et al. 4859* (MO). **Paraiba**: Arcias, 01°21′N, 53°15′W, *Moraes 1539* (MO). **Paraná**: Parque Marumbi, 25°28′S, 48°52′W, *Gentry & Zardini 49763* (MO). **Pernambuco**: Cabo, 08°17′S, 35°02′W, *Lima 61–3725* (MO). **Piauí**: R. Napuera, abaixa do Taboleirinho, 07°00′S, 43°00′W, *Ducke s.n.* (MG-9134). **Rio Grande do Sul**: Faz. do Arroio p. Osorio, 29°54′S, 50°16′W, *Rambo 45133* (B). **Rio de Janeiro**: Petropolis Mata do Judau, 22°31′S, 43°10′W, 700 m, *Sucre & Braga 4255* (MO). **Rondônia**: Km 16 on road to Saldana close to Guajara-Mirin, *Kirkbride & Lleras 2710* (MO). **Santa Catarina**: Isla Santa Catarina, Saco Grande, 27°36′S, 48°30′W, 200–400 m, *Lourteig 2343* (MO). **São Paulo**: Cananeia, Parque Estadual da Ilha do Cardoso, 23°33′S, 46°39′W, *Kirizawa & Romaniuc 1259* (MO). URUGUAY. Playa S. Domingo, Río Uruguay, 34°12′S, 58°18′W, *Tweedie 1347* (P).

2b. Paragonia pyramidata var. **tomentosa** Bureau & K. Schum., in Mart., Fl. Bras. 8, pt. 2, fasc. 118: 182. 1896. TYPE: Brazil. Minas Gerais: Uberabá, Formigas, *Regnell III-48* (holotype?, UPS).

Young stems moderately to densely tomentose-puberulent; petioles and petiolules densely tomentose-puberulent, the distal adaxial petiolar glandular fields absent or present but obscured by pubescence; leaflets elliptic-orbicular to ovate-elliptic, infrequently narrowly to broadly elliptic, the bases rounded to broadly obtuse, or infrequently acute, the lamina nearly glabrate above and moderately to densely puberulent or tomentose-puberulent below (especially along veins); rachis and peduncles moderately to densely tomentose-puberulent; pedicels and calyces densely puberulent to tomentose-puberulent; outer surface of the capsule uniformly tan to silvery-tan or (less commonly) dark.

Paragonia pyramidata var. *tomentosa* is known from the Brazilian states of Goiás and Minas Gerais, and the Distrito Federal, as well as Paraguay (Fig. 2). Collections are known from 410 to 950 m. The few reports available indicate that *P. pyramidata* var. *tomentosa* grows on rocky forested slopes or in forested areas associated with streams or meadows. The few fertile specimens were collected at the beginning of the wet season, between August and September (Fig. 6). Fruiting collections were limited to the latter part of the wet season, from January to April.

Additional specimens examined. COUNTRY UNKNOWN. Without exact locality, *Macedo 5450* (US). BRAZIL. **Distrito Federal**: Brasilia, *Heringer et al. 1172* (MO); Brasilia, bacia do Rio São Bartolomeu, *Heringer et al. 5990* (MO); vicinity of Sobredinho, *Prance & Silva 59085* (NY); ca. 25 km N of Brasilia, *Irwin et al. 13999* (MO, NY, US); na margem do Rio das Salinas, *Kirkbride 3580* (NY), *3639* (NY). **Goiás**: ca. 20 km S of Caiaponia, *Anderson et al. 9440* (MO, NY); between Jataí and Caiaponia, 40 km from Caiaponia, *Hunt & Ramos 6272* (NY). **Minas Gerais**: ca. 15 km W of Pará de Minas, *Davidse & Ramamoorthy 10808* (MO, NY); km 618 Rodovia Uberaba-B. Horizonte, *Duarte 44873* (MO); entre Lagoa Santa e Serra do Cipó, *Duarte 6389* (MO); Rio Doce, Mun. Jaboticatubas, *Hatschbach 35255* (MO); Beira do corregodo Carmo, Ituintaha, *Macedo 586* (NY, US); Fundas, Ituiutaba, *Macedo 2608* (US); Uberabá, *Regnell s.n.* (US). PARAGUAY. In regione cursus superioris fluminis Apa., *Hassler 8418* (NY).

Nomina Nuda

Bignonia striata DC., in A. DC., Prodr. 9: 174. 1845, nomen nudum.

Temnocydia elliptica Mart. ex DC., in A. DC., Prodr. 9: 156. 1845, nomen nudum.

Temnocydia lenta Mart. ex DC., in A. DC., Prodr. 9: 159. 1845, nomen nudum.

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Index to Numbered Exsiccatae

1 = *Paragonia brasiliensis* (Baill.) A. H. Gentry; **2a** = *Paragonia pyramidata* (Rich.) Bureau var. *pyramidata*; **2b** = *Paragonia pyramidata* var. *tomentosa* Bureau & K. Schum. Collections are listed alphabetically by the prin-

cipal collector. All specimens entered into TROPICOS were assumed to have been examined by A. H. Gentry. Specimens examined by the author were primarily those duplicates housed at MO, although loans of Brazilian specimens from NY and US were also examined. All collections examined by the author are indicated by a "!" in superscript.

Agostini 1626! **2a**; *Alencar 47* **2a**; *Allen 412*! **2a**, *898*! **2a**, *1751*! **2a**, *4166*! **2a**, *5505* **2a**; *Almeida 572* **2a**; *Alston 8715* **2a**; *Amaral et al. 439*! **2a**; *Anderson 11979* **2a**; *Anderson et al. 9440*! **2b**; *Antonio & Hahn 4224*! **2a**; *Araquistain & Moreno 2384*! **2a**; *Arbo et al. 5652*! **1**; *Aronson 856* **2a**; *Asplund 18904* **2a**, *20398* **2a**; *Austin et al. 7162*! **2a**; *Ayala 2461*! **2a**, *2496*! **2a**, *2511*! **2a**, *3715* **2a**; *Ayala & Arevalo S. 4249*! **2a**; *Ayala et al. 3380*! **2a**, *3382*! **2a**, *3925*! **2a**, *5672*! **2a**, *5773*! **2a**; *Aymard 6213* **2a**, *8017* **2a**; *Aymard et al. 6911*! **2a**, *6942*! **2a**.

Balee 1961! **2a**, *1963*! **2a**; *Balick et al. 2218*! **2a**; *Balslev & Madsen 10597*! **2a**; *Bangham 339* **2a**; *Barbour 5402*! **2a**; *Barclay 2777* **2a**; *Barfod et al. 48413* **2a**; *Barreto 1500* **2a**; *von Bayern 330* **2a**; *Beaman & del Alvarez 6353* **2a**; *Beck 3456*! **2a**, *15135*! **2**, *18802* **2a**, *20046*! **2a**; *Belem 1196*! **1**; *Belshaw 3120* **2a**; *Berg et al. BG756* **2a**; *Berlin 378* **2a**, *673* **2a**; *Bernardi 2914*! **2a**, *6653*! **2a**; *Berry 681*! **2a**, *924*! **2a**; *Billiet & Jadin 1610*! **2a**, *4602*! **2a**; *Black 47-1945*! **2a**, *49-8412* **2a**, *49-8486* **2a**; *Black & Foster 48-3394* **2a**; *Black & Ledoux 50-10726* **2a**; *Blanchet 2903* **2a**; *Bonifaz 275*! **2a**; *Boyan 217* **2a**; *Brandbyge et al. 30552*! **2a**; *Bravo H. 1* **2a**; *Breteler 3531* **2a**; *Bristan 1157p.p.* **2a**; *Broadway 2273* **2a**, *4576* **2a**, *5600*! **2a**; *Brown 86* **2a**; *Bunting 11611*! **2a**; *Bunting & Licht 835* **2a**; *Bunting & Stoddart 8904* **2a**; *Burger et al. 10602* **2a**.

Cabrera 2308! **2a**, *6216*! **2a**; *Calzada et al. 2651*! **2a**, *2692*! **2a**; *Carauta 853*! **2a**; *Cardona 6* **2a**, *74* **2a**, *504* **2a**, *1410* **2a**; *Carpio 1675* **2a**; *Castillo 719* **2a**; *Cavalcante 1636* **2a**, *1911* **2a**, *2399*! **2a**; *Cavalcante & Silva 1637* **2a**; *Cazalet & Pennington 5182* **2a**; *Cedillo 3638*! **2a**; *Cedillo T. 2611*! **2a**, *3283*! **2a**, *3377*! **2a**; *Cerón 6052* **2a**; *Cerón et al. 2009*! **2a**; *Cerón & Cerón 4585* **2a**; *Cid & Lima 3675* **2a**, *107690* **2a**; *Cid et al. 189*! **2a**, *369*! **2a**, *632*! **2a**, *679*! **2a**, *6448*! **2a**, *6927*! **2a**; *Clewell & Cruz 4136*! **2a**; *Colella et al. 1671* **2a**; *Conrad & Conrad 3013*! **2a**; *Contreras 2644*! **2a**, *2884*! **2a**, *9188* **2a**, *9750*! **2a**; *Conzatti et al. 3070*! **2a**; *Cordeiro 1018*! **2a**; *Correa 1762*! **2a**; *Cowan 38330*! **2a**, *38458*! **2a**, *38556*! **2a**; *Cowell 193* **2a**; *Cremers 4999*! **2a**, *5400*! **2a**, *7266*! **2a**, *7965*! **2a**, *8125*! **2a**; *Cremers & Feuillet 12430* **2a**; *Croat 271* **2a**, *4762*! **2a**, *4805*! **2a**, *4917*! **2a**, *5591*! **2a**, *5615*! **2a**, *5641*! **2a**, *5645*! **2a**, *5705* **2a**, *6538*! **2a**, *6584*! **2a**, *7131*! **2a**, *7695*! **2a**, *7744*! **2a**, *7895*! **2a**, *7896*! **2a**, *8136*! **2a**, *8309*! **2a**, *8370*! **2a**, *9106*! **2a**, *9227*! **2a**, *9510*! **2a**, *10161* **2a**, *10212 p.p.* **2a**, *10358* **2a**, *11932* **2a**, *14626* **2a**, *14940* **2a**, *19671*! **2a**, *44243* **2a**, *49782*! **2a**; *Cuadros 4175*! **2a**; *Cuatrecasas 8986* **2a**, *10835* **2a**, *14296* **2a**, *16141* **2a**, *17691* **2a**; *Cuatrecasas & Willard 26027* **2a**; *Cuatrecasas & Llano 24117* **2a**; *Cumana 1357* **2a**, *1546* **2a**; *Cuming 1179* **2a**.

Daly et al. 1408! **2a**; *Davidse 32184*! **2a**; *Davidse & González 14793*! **2a**, *14860*! **2a**; *Davidse & Ramamoorthy 10808*! **2b**; *Davis 818*! **2a**; *de Benavides 627* **2a**; *de Cabrera 4252*! **2a**; *de Granville 5164*! **2a**, *8161* **2a**; *de Granville et al. 8161*! **2**, *9589*! **2a**, *9648*! **2a**, *10034*! **2a**; *de Mello 38* **2a**; *de Moraes 1539*! **2a**; *de Morsie 1539* **2a**; *de Nevers 4749* **2a**; *de Nevers et al. 7628*! **2a**; *de Paula 1081* **2a**; *Delascio C. & Guánchez 10988*! **2a**; *Delgado 83*! **2a**; *Deward 158*! **2a**; *Díaz S. 793*! **2a**; *Díaz S. & Ruiz 871*! **2a**, *936*! **2a**; *Díaz S. et al. 213*! **2a**, *604*! **2a**, *617*! **2a**; *Dionizia et al. 195*! **2a**; *Dodson & Gentry 6436*! **2a**; *Dodson et al. 7105*! **2a**; *Duarte 763A*! **2a**, *4082*! **2a**, *6389*! **2b**, *44873*! **2b**; *Duarte & Falcão 3310* **2a**; *Ducke 2583* **2a**; *Dugand 6926* **2a**; *Dugand & Jaramillo 4078* **2a**; *Dugue-Jaramillo 2017* **2a**; *Duke 14251*! **2a**; *Duke & Nickerson 14910*! **2a**; *Dusén 8633*! **2a**, *12034*! **2a**; *Dwyer 2892*! **2a**, *4377A*! **2a**, *12924*! **2a**, *12996*! **2a**, *13053* **2a**, *14795*! **2a**, *Dwyer & Dieckman 13018*! **2a**; *Dwyer et al. 13037*! **2a**.

Echeverry E. 3340 **2a**; *Egler 47638*! **2a**; *Eiten & Eiten 3936*! **2a**; *Elcoro 317*! **2a**; *Emmons 51*! **2a**, *99*! **2a**, *102*! **2a**; *Encarnación 1269*! **2a**; *Enríquez 645* **2a**, *6762* **2a**; *Eugenio 216* **2a**; *Euler Marín 6* **2a**.

Fagerlind & Wibom 2344 **2a**; *Fagerlind et al. 2487b* **2a**; *Fendler 519* **2a**; *Fernández 673* **2a**, *1720* **2a**, *2555*! **2a**, *8498*! **2a**; *Ferreyra 18508*! **2a**; *Feuillet 123* **2a**; *Flores 62*! **2a**; *Florschutz & Maas 2465*! **2a**; *Focke 930* **2a**; *Foldats 365-App* **2a**; *Folsom 9456*! **2a**; *Forero et al. 1878*! **2a**, *2508*! **2a**, *3506*! **2a**, *4149*! **2a**, *4597*! **2a**, *5015*! **2a**, *6349*! **2a**; *Fosberg 29110*! **2a**; *Foster 689* **2a**, *1090* **2a**; *Foster & Terborgh 6112* **2a**; *Foster et al. 3348*! **2a**; *von Friedrichsthal 517* **2a**; *Froes 11739*! **2a**, *12537–231* **2a**, *26674* **2a**, *34095a* **2a**, *34095 p.p.* **2a**, *34267* **2a**; *Fromm et al. 1290* **2a**; *Fuchs & Zanella 21812*! **2a**.

García-Barriga 10650 **2a**, *12338* **2a**, *13844* **2a**; *Gardner 78* **2a**; *Garnier 1049* **2a**; *Garwood 1000*! **2a**; *Gentle 1415*! **2a**, *1943*! **2a**, *2764* **2a**, *2831* **2a**, *3100* **2a**, *3837* **2a**, *6583*! **2a**, *8010*! **2a**, *8246*! **2a**, *8666*! **2a**, *8669*! **2a**, *8906*! **2a**, *9243*! **2a**; *Gentry 430*! **2a**, *433* **2a**, *451*! **2a**, *719* **2a**, *721*! **2a**, *725*! **2a**, *1037* **2a**, *1158*! **2a**, *1179* **2a**, *1180* **2a**, *1210* **2a**, *1237* **2a**, *1245* **2a**, *1282* **2a**, *1307* **2a**, *1316* **2a**, *1417*! **2a**, *1544*! **2a**, *1580*! **2a**, *1764*! **2a**, *1789*! **2a**, *1835*! **2a**, *1899*! **2a**, *2170* **2a**, *2210*! **2a**, *2311*! **2a**, *2459*! **2a**, *2527*! **2a**, *2588*! **2a**, *2694*! **2a**, *2903*! **2a**, *2942*! **2a**, *3030*! **2a**, *3129*! **2a**, *3710*! **2a**, *3759*! **2a**, *3782*! **2a**, *3801*! **2a**, *4109*! **2a**, *4183*! **2a**, *4187* **2a**, *4258*! **2a**, *4406*! **2a**, *4501*! **2a**, *4690*! **2a**, *5002*! **2a**, *5020* **2a**, *5246*! **2a**, *5588*! **2a**, *5849*! **2a**, *6384*! **2a**, *7795*! **2a**, *8070*! **2a**, *8080*! **2a**, *8223*! **2a**, *8247*! **2a**, *8259*! **2a**, *8286*! **2a**, *8432*! **2a**, *8462*! **2a**, *8491*! **2a**, *8547*! **2a**, *8579*! **2a**, *9348*! **2a**, *9560*! **2a**, *9593*! **2a**, *9666*! **2a**, *9732*! **2a**, *9990*! **2a**, *10065*! **2a**, *12287*! **2a**, *12465*! **2a**, *12484*! **2a**, *12501*! **2a**, *28195*! **2a**, *41242*! **2a**, *55611D*! **2a**, *69436*! **2a**, *70799*! **2a**, *71118*! **2a**, *78597*! **2a**, *79281*! **2a**; *Gentry & Berry 14975*! **2a**; *Gentry & Brand 36887*! **2a**; *Gentry & Dwyer 3572*! **2a**; *Gentry & Estensoro 70516*! **2a**, *70591*! **2a**; *Gentry & Josse 72382* **2a**, *72645*! **2a**; *Gentry & Lajones 73057*! **2a**; *Gentry & Lott 30799*! **2a**; *Gentry & Mostacedo 75610*! **2a**; *Gentry & Núñez 66001*! **2a**; *Gentry & Perry 77504*! **2a**; *Gentry & Revilla 16319*! **2a**, *16364*! **2a**, *20498*! **2a**, *20794*! **2a**; *Gentry & Smith 44942*! **2a**, *45097* **2a**, *45106*! **2a**; *Gentry & Zardini 49763*! **2a**, *49839*! **2a**; *Gentry et al. 7521*! **2a**, *7527* **2a**, *9074*! **2a**, *10440* **2a**, *10680*! **2a**, *15680*! **2a**, *18442*! **2a**, *18485*! **2a**, *19633*! **2a**, *21298*! **2a**, *21756* **2a**, *22117*! **2a**, *25850*! **2a**, *26853*! **2a**, *27160*! **2a**, *31296a*! **2a**, *32497*! **2a**, *38143*! **2a**, *43918*! **2a**, *44316*! **2a**, *53813*! **2a**, *56186*! **2a**, *58807* **2a**, *60149*! **2a**, *63076*! **2a**, *68772*! **2a**, *73879*! **2a**, *74306*! **2a**, *77002*! **2a**, *77250A*! **2a**; *Gillespie 1420*! **2a**, *2435*! **2a**, *2437* **2a**; *Gilmartin 698* **2a**; *Ginés 4255* **2a**; *Glaziou 4702*! **2a**, *6720*! **2a**, *12986*! **2a**, *12971*! **2a**, *15159*! **2a**; *Gómez et al. 20363* **2a**, *21095* **2a**; *Gonggrijp 13042* **2a**; *González & Davidse 930*! **2a**; *Gordon 20D*! **2a**, *80C–b*! **2a**, *118C* **2a**; *Goulding 75A* **2a**, *1156* **2a**, *1295* **2a**, *1325* **2a**, *1393* **2a**; *Grández 829* **2a**, *1014*! **2a**, *1037* **2a**, *1685*! **2a**, *2055*! **2a**; *Grández et al. 1088*! **2a**; *Grant 11002 p.p.* **2a**; *Guánchez 773*! **2a**;

Gudiño 1339' **2a**; *Gutiérrez 1095* **2a**; *Gutiérrez & Schultes 568* **2a**, *829* **2a**; *Gutte et al. 1627C* **2a**.

Hammel & D'Arcy 4997 **2a**; *Hansen et al. 7784'* **2a**; *Harling & Andersson 11948'* **2a**, *11965'* **2a**, *16525'* **2a**; *Harling et al. 15624'* **2a**, *19877'* **2a**; *Hartman 12523'* **2a**; *Harvey 5285* **2a**; *Hassler 8418* **2a**; *Hatschbach 1704'* **2a**, *7405* **2a**, *8630* **2a**, *25790'* **2a**, *33560* **2a**, *35255'* **2b**, *39324'* **2a**, *44498'* **2a**, *45753'* **2a**, *45978'* **2a**; *Hatschbach & Guimaraes 19067* **2a**; *Hatschbach & Silva 50026'* **1**; *Hatschbach et al. 52475'* **2a**; *Haught 2212'* **2a**, *2725'* **2a**, *3599'* **2a**, *3988* **2a**, *4023* **2a**; *Hayes 413* **2a**, *915* **2a**, *1043* **2a**; *Hayward 192'* **2a**, *201'* **2a**; *Heringer 7214* **2a**, *8730'* **2a**, *8877* **2a**, *9483* **2a**, *10277'* **1**, *10586'* **2a**, *10635'* **2a**; *Heringer et al. 330'* **2a**, *1172'* **2b**, *2400* **2a**, *5990'* **2b**; *Hernández G. 180'* **2a**; *Herrera 4591* **2a**, *5087* **2a**; *Heyde 419'* **2a**, *731'* **2a**; *Holm-Nielsen et al. 21080* **2a**, *21125'* **2a**, *21451'* **2a**, *21651* **2a**, *21925B* **2a**; *Holst 2031* **2a**, *4371'* **2a**, *4406'* **2a**; *Holt & Blake 686'* **2a**; *Hoogte & Roersch 3430* **2a**; *Hopkins et al. 650'* **2a**, *676'* **2a**; *Horner et al. 165'* **2a**; *Huashikat 1083'* **2a**, *1193'* **2a**, *1239'* **2a**, *1526'* **2a**, *1813* **2a**; *Huber 581* **2a**; *Hufi 1925'* **2a**; *Hunt & Ramos 6272* **2a**.

IFAT 7783 **2a**; *Ibarra M. 733'* **2a**, *1107'* **2a**, *3142'* **2a**; *Irwin & Soderstrom 6851'* **2a**; *Irwin et al. 8145'* **2a**, *9464!* **2a**, *13999'* **2b**, *31159'* **1**, *55547'* **2a**, *55548'* **2a**, *57646'* **2a**.

Jacobs 2963 **2a**; *Jansen-Jacobs 1661'* **2a**; *Jaramillo & Coello 4149 p.p.* **2a**; *Jaramillo-Mejía & Palacios 7914* **2a**; *Játiva & Epling 931'* **2a**; *Jones 306* **2a**; *Kayap 105'* **2a**, *116'* **2a**, *151'* **2a**; *Kennedy & Steiner 2454'* **2a**; *Kerber 178* **2a**; *Kernan 119* **2a**, *130'* **2a**, *1107* **2a**; *Killeen 2853'* **2a**; *Killip 35078'* **2a**, *37242* **2a**, *37531* **2a**; *Killip & Smith 30593'* **2a**; *Kirizawa & Romaniuc N. 1259'* **2a**; *Kirkbride 3639'* **2b**; *Kirkbride & Kirkbride 3580'* **2a**; *Kirkbride & Lleras 2710'* **2a**; *Klein 1142'* **2a**; *Klug 1283'* **2a**, *1676'* **2a**, *1996'* **2a**, *2623'* **2a**, *3409'* **2a**; *Knab 18'* **2a**; *Knapp & Alcorn 7426'* **2a**; *Kohkemper 931* **2a**; *Krukoff 6213'* **2a**, *6272!* **2a**, *8739'* **2a**; *Kuhlmann 594* **2a**, *1102* **2a**, *2272'* **2a**, *6117* **2a**, *7160'* **2a**, *41414'* **2a**.

Lanjouw 1169 **2a**; *Lasser & Foldats 3010* **2a**; *Lathrop 6766* **2a**, *6773* **2a**; *Laughlin 269* **2a**; *Lawesson et al. 43471* **2a**, *43549* **2a**; *Lawrance 800'* **2a**; *Lent 3304* **2a**; *León 459'* **2a**, *719* **2a**; *Lescure 241'* **2a**, *798'* **2a**, *2385* **2a**; *Lewis 4048'* **2a**, *12490* **2a**, *12719* **2a**, *12933* **2a**, *37628'* **2a**, *37669'* **2a**; *Lewis et al. 171'* **2a**; *Liesner 1978* **2a**, *5020* **2a**, *5027* **2a**; *Liesner & Carnevali 22766'* **2a**; *Liesner & González 9180'* **2a**; *Liesner & Morillo 13974'* **2a**, *14021'* **2a**; *Liesner et al. 7673'* **2a**, *8295'* **2a**; *Lima 61–3725'* **2a**; *Lima & Nelson 755'* **2a**; *Lindeman et al. 15'* **2a**, *99'* **2a**; *Lizot 73* **2a**; *Londoño et al. 1608'* **2a**; *Long 118* **2a**; *Lourteig 2342* **2a**, *2343'* **2a**; *Lowrie et al. 425'* **2a**; *Luetzelburg 114* **2a**, *327* **2a**; *Lugo 2922'* **2a**, *3010'* **2a**; *Lund 783* **2a**, *2047* **2a**; *Lundell 6463'* **2a**, *16060'* **2a**, *16351'* **2a**.

Maas et al. 5477' **2a**, *5546'* **2a**; *Macedo 586* **2b**, *2608* **2b**; *Maguire 24918'* **2a**; *Maguire & Fanshawe 23366* **2a**; *Maguire & Stahel 25001* **2a**; *Maguire et al. 36759* **2a**, *53989'* **2a**; *Marcano-Berti 281* **2a**; *María 101* **2a**; *Marín 3'* **2a**, *6* **2a**, *731'* **2a**; *Martinelli 7151'* **2a**; *Martínez 13387'* **2a**, *13399'* **2a**; *Martínez S. 15066'* **2a**, *15215'* **2a**, *15220'* **2a**, *15741'* **2a**, *15747'* **2a**; *Martins & Nunes 7660'* **2a**; *Martius 2976* **2a**, *2977* **2a**, *20464* **2a**; *Matuda 1477 p.p.*[1] **2a**, *16610* **2a**, *17822* **2a**; *Maxon 4795* **2a**; *McDaniel & Rimachi 17622'* **2a**, *26563'* **2a**, *26603'* **2a**; *McDowell 3282'* **2a**; *McVaugh 15707* **2a**; *Meave 1277'* **2a**; *Melo 597'* **2a**; *Mendonca 1014'* **2a**; *Mexía 6077'* **2a**, *6181'* **2a**, *6369'* **2a**, *6471 p.p.*[1] **2a**; *Miranda 6762* **2a**; *Mitchell 75* **2a**; *Molina R. 1807* **2a**, *5603* **2a**, *6667* **2a**; *Molina & Molina 25719* **2a**; *Molina et al. 18242* F **2a**; *Montgomery 18'* **2a**; *Morales 3542* **2a**, *3867* **2a**, *4015* **2a**, *4181* **2a**; *Moran 29* **2a**; *Moreno 14654A* **2a**, *23825'* **2a**, *23969'* **2a**, *25421'* **2a**; *Moreno & Sandino 14651'* **2a**; *Mori & Gracie 21969'* **2a**; *Mori & Souza 17619'* **2a**; *Mori et al. 17241'* **2a**, *20400'* **2a**, *21029'* **2a**; *Morillo & Liesner 9000'* **2a**.

Nee 24741' **2a**, *34287'* **2a**, *37060'* **2a**; *Nee & Mori 4049'* **2a**; *Nee & Taylor 29338'* **2a**; *Nee & Tyson 10898'* **2a**; *Neill 260'* **2a**, *3693'* **2a**, *4037'* **2a**, *4583'* **2a**, *7135'* **2a**, *7139'* **2a**, *8719'* **2a**, *9187'* **2a**, *9661'* **2a**, *9902'* **2a**; *Neill & Zaruma 7047'* **2a**; *Neill et al. 8331'* **2a**; *Nelson 2098'* **2a**, *7141'* **2a**; *Nelson & Romero 4495'* **2a**, *4634'* **2a**; *Nelson & Vargas 2706'* **2a**; *Neto et al. 125'* **2a**; *Nijenhuis 642'* **2a**; *Núñez 6010'* **2a**, *6895'* **2a**, *12101'* **2a**, *12732'* **2a**, *13813'* **2a**, *14011'* **2a**, *14025'* **2a**; *Núñez et al. 8019'* **2a**, *10823'* **2a**, *11049'* **2a**.

Oldeman 1733 **2a**, *2304'* **2a**, *B-1236'* **2a**, *B-3607* **2a**, *B-4195'* **2a**, *T-223'* **2a**, *T-647'* **2a**, *T-736'* **2a**; *Oldeman & Sastre 114'* **2a**, *126'* **2a**; *Oliveira 3776'* **2a**, *4181!* **2a**; *Øllgaard et al. 35079'* **2a**; *Opler 602* **2a**, *603* **2a**, *713* **2a**, *804* **2a**, *1613* **2a**, *1718* **2a**, *1877* **2a**, *1882* **2a**; *Ortiz 1097'* **2a**, *2122'* **2a**.

Pabst & Pereira 8364' **1**; *Pacheco 1496* **2a**; *Palacios 2476'* **2a**; *Peixoto 3515* **2a**; *Peixoto et al. 3354'* **2a**, *3515'* **2a**; *Peña 410* **2a**; *Pereira 771'* **2a**; *Pereira & Pabst 9539'* **1**, *9705'* **1**; *Pereira et al. 4291* **2a**; *Perrottet 2851* **2a**; *Philipson et al. 1689* **2a**; *Pickel 884!* **2a**; *Pinesta 4* **2a**; *Pipoly 4445'* **2a**; *Pipoly et al. 14765'* **2a**; *Pires 3891'* **2a**; *Pires & Belem 12210* **2a**; *Pires & Silva 10845* **2a**; *Pires et al. 623'* **2a**, *16837'* **2a**, *50877'* **2a**, *51544* **2a**; *Pittier 2497* **2a**, *5577* **2a**, *6688* **2a**, *7568* **2a**, *12093* **2a**, *12121* **2a**, *12162* **2a**, *12178* **2a**; *Pizziolo 162* **2a**, *271'* **2a**; *Plowman et al. 6943'* **2a**, *9037'* **2a**; *Pontual 46–64* **2a**; *Poveda 1103* **2a**; *Prance & Silva 59085* **2a**; *Prance et al. 1139* **2a**, *2728* **2a**, *3981'* **2a**, *4171* **2a**, *6857'* **2a**, *8131'* **2a**, *8817'* **2a**, *9760'* **2a**, *9770'* **2a**, *10705'* **2a**, *10732'* **2a**, *11073'* **2a**, *11139'* **2a**, *13997'* **2a**, *14022'* **2a**, *15090'* **2a**, *15231'* **2a**, *16318'* **2a**, *24610'* **2a**, *25601'* **2a**, *25781'* **2a**, *25887'* **2a**, *26131'* **2**, *28749'* **2a**, *28820'* **2a**, *P25318'* **2**, *P25601'* **2a**, *P25710'* **2a**, *P25781'* **2a**, *P25887* **2a**; *Prevost 1465'* **2a**; *Prevost & Grenand 2010'* **2a**; *Pulle 391* **2a**, *462 p.p.* **2a**.

Rabelo & Nonato 1389' **2a**; *Rabelo et al. 1837'* **2a**, *2018'* **2a**; *Rambo 45133* **2a**, *45309* **2a**; *Ramírez 208'* **2a**; *Regnell III-48* **2a**; *Reitz & Klein 8110!* **2a**, *8622'* **2a**, *9383* **2a**; *Restrepo 485'* **2a**; *Revilla 465'* **2a**, *500'* **2a**, *511'* **2a**, *604'* **2a**, *615'* **2a**, *720'* **2a**, *731'* **2a**, *774'* **2a**, *786'* **2a**, *799'* **2a**, *1335'* **2a**, *1797'* **2a**, *1803'* **2a**, *1850'* **2a**, *1866'* **2a**, *2012'* **2a**, *2100'* **2a**, *2284'* **2a**; *Ribeiro 450* **2a**, *1573'* **2a**; *Riedel & Langsdorff 179A* **2a**; *Rimachi Y. 688'* **2a**, *4339'* **2a**, *5794'* **2a**, *8175'* **2a**; *Riviere 296'* **2a**; *Robleto 575'* **2a**, *609* **2a**; *Rodrigues 223* **2a**; *Rohr 69* **2a**; *Rombouts 642* **2a**, *821* **2a**; *Romero-Castañeda 1053* **2a**, *2079* **2a**, *2110* **2a**, *2126* **2a**, *2674* **2a**, *6160* **2a**; *Rosa 2463'* **2a**; *Rudas et al. 2023'* **2a**; *Ruiz 1405'* **2a**; *1507'* **2a**; *Ruiz & Jaramillo 1129'* **2a**; *Rusby 485* **2a**; *Rusby & Squires 12'* **2a**; *Rutkis & Foldats 87* **2a**; *Rutkis & Údris K. 986* **2a**, *1033* **2a**.

Saddi 7083 **2a**, *7187* **2a**; *Saddi & de Lamonica-Freire 2859* **2a**; *Saer 443* **2a**; *Sandino 4801'* **2a**; *Santos et al. 202'* **2a**; *dos Santos 352* **2a**; *dos Santos et al. 40'* **2a**, *78'* **2a**, *101'* **2a**, *139'* **2a**, *168'* **2a**, *201'* **2a**, *228'* **2a**, *230'* **2a**, *273'* **2a**, *436'* **2a**; *Sastre 1792'* **2a**, *5965'* **2a**; *Sastre & Echeverry 659'* **2a**; *Saunders 188'* **2a**, *299'* **2a**, *380'* **2a**, *449'* **2a**; *Schipp 347* **2a**, *S-71'* **2a**; *Schmalzel & Schupp 959'* **2a**; *Schultes 3990* **2a**, *5421* **2a**, *5423* **2a**, *5498* **2a**;

Schultes & Cabrera 12825 **2a**, *13242* **2a**, *14942A* **2a**, *16229* **2a**; *Schunke V. 31*' **2a**, *2359* **2a**, *4885* **2a**, *6213* **2a**, *6872*' **2a**, *8500*' **2a**, *12337* **2a**, *12371*' **2a**; *Seemann 400* **2a**; *Sehnem 7995* **2a**; *Seibert 1513* **2a**, *1890*' **2a**, *2010*' **2a**, *3045* **2a**; *Sendulsky 504*' **2a**; *Serv. For. Cayenne 7783* **2a**; *Sessé & Mociño 2393* **2a**, *2399* **2a**, *2405* **2a**; *Seymour 21404* **2a**; *Silva 445* **2a**; *Silva & Hatschbach 789*' **2a**; *da Silva 213* **2a**, *7106*' **2a**; *Skutch 3884* **2a**, *4133* **2a**, *4697* **2a**, *4885* **2a**; *Smith 756*' **2a**, *1645*' **2a**, *3929*' **2a**, *6656* **2a**; *Sobel et al. 4859*' **2a**; *Soeprata 45J* **2a**; *Solomon et al. 8159* **2a**; *Sousa & Magallanes 7263* **2a**; *Sparre 18888* **2a**, *19984* **2a**; *Spruce 2408*' **2a**, *3192*' **2a**; *St. Hilaire B745* **1**; *Standley 19915* **2a**, *40941* **2a**, *55566* **2a**, *56622* **2a**, *60621* **2a**, *87669* **2a**, *89136* **2a**, *89232* **2a**; *Stannard & Arrais 683*' **2a**; *Starry 150*' **2a**; *Steege 366*' **2a**, *550* **2a**; *Stein et al. 3973*' **2a**; *Steinbach 428*' **2a**, *6904*' **2a**; *Stelle 50*' **2a**; *Stergios 10319* **2a**, *10755* **2a**, *11001A* **2a**, *11975* **2a**; *Stergios & Aymard 7633*' **2a**, *7655*' **2a**, *9051*' **2a**, *9189*' **2a**; *Stergios & Delgado 12927* **2a**; *Stergios & Ortega 2453*' **2a**; *Stergios & Taphorn 4845*' **2a**; *Stergios et al. 5091*' **2a**, *6065*' **2a**, *8277*' **2a**, *9892*' **2a**; *Stern et al. 1875* **2a**, *33686*' **2a**; *Stevens 7482*' **2a**, *8007*' **2a**, *8278*' **2a**, *12031*' **2a**, *19954*' **2a**, *23408*' **2a**, *23840* **2a**, *24058* **2a**, *24394* **2a**, *24600* **2a**; *Stevens et al. 18741*' **2a**, *19504*' **2a**, *19707*' **2a**, *24860* **2a**; *Stevenson 3*' **2a**; *Steyermark 38674* **2a**, *44932* **2a**, *61076* **2a**, *61137* **2a**, *61498* **2a**, *87784* **2a**, *89115* **2a**, *90761* **2a**; *Steyermark & Davidse 116252*' **2a**, *116416*' **2a**; *Steyermark & Gibson 95642* **2a**; *Steyermark & Liesner 121012*' **2a**; *Steyermark & Manara 110992*' **2a**; *Steyermark et al. 102023 p.p.* **2a**, *117140*' **2a**, *120660* **2a**, *121402*' **2a**, *122660* **2a**, *123272*' **2a**, *126165*' **2a**, *131912*' **2a**; *Strudwick et al. 3365*' **2a**; *Sucre & Braga 4255*' **2a**; *Sytsma 1948*' **2a**, *3502*' **2a**.

Tahe 230 **2a**; *Tamara Núñez 206* **2a**; *Terborgh 6112*' **2a**; *Thieme 903*' **2a**, *5393* **2a**; *Timaná 745* **2a**, *754* **2a**, *1182* **2a**, *1847* **2a**; *Timaná & Rubio G. 2262* **2a**; *Tonduz 6857* **2a**, *7481* **2a**, *8249* **2a**, *13864* **2a**; *Torres et al. 3066* **2a**; *Triana J. 4124-7* **2a**; *Trujillo 17326* **2a**; *von Tuerckheim 7648* **2a**; *Tulleken 323* **2a**, *402* **2a**, *415* **2a**; *Tun O. 1116* **2a**, *1214*' **2a**, *1274* **2a**, *1885*' **2a**, *1912*' **2a**; *Tunqui 342*' **2a**, *500*' **2a**, *619*' **2a**; *Tutin 1551* **2a**; *Tweedie 1347* **2a**; *Tyson et al. 2941*' **2a**, *3102*' **2a**.

Ubiratan 202' **2a**; *Ugent 75*' **2a**; *Ule 5216* **2a**, *5276* **2a**, *5697* **2a**.

Vargas 539 **2a**; *Vásquez 745*' **2a**, *3848*' **2a**, *10509* **2a**, *10599* **2a**, *11262* **2a**, *11742* **2a**; *Vásquez & Jaramillo 1252*' **2a**, *1542*' **2a**, *3645*' **2a**, *7228* **2a**, *8101*' **2a**, *8489*' **2a**, *9140* **2a**, *9354*' **2a**; *Vazquez et al. V838* **2a**, *V1560* **2a**; *Versteeg 141* **2a**, *267* **2a**; *Villacorta et al. 844*' **2a**; *Vinda 279*' **2a**; *Vogt 817* **2a**.

Wagner 34 **2a**; *Wawra 997* **2a**; *Webster et al. 12048*' **2a**, *12748* **2a**, *16422*' **2a**; *von Wedel 1345 p.p.*' **2a**, *2377* **2a**; *Wendt et al. 2518*' **2a**, *2812*' **2a**, *4016*' **2a**; *Went 557* **2a**; *Wetmore & Abbe 210* **2a**; *Wetmore & Woodworth 1* **2a**, *847* **2a**; *Whitefoord 2599*' **2a**; *Wiggins 10900* **2a**; *Wilbur 3442A*' **2a**; *Williams 263* **2a**, *9747 p.p.* **2a**, *11449* **2a**, *11509*' **2a**, *11562* **2a**, *11604* **2a**, *11788* **2a**, *12619* **2a**, *13656* **2a**, *15185* **2a**, *15212* **2a**, *15673* **2a**, *15743* **2a**, *28484* **2a**; *Williams & Molina 14624* **2a**; *Williams et al. 28484* **2a**; *Woodworth & Vestal 454*' **2a**, *576* **2a**; *Woytkowski 6215*' **2a**, *6301*' **2a**, *7110*' **2a**, *35010*' **2a**, *35164*' **2a**; *Wurdack 225* **2a**; *Wurdack & Adderley 43007* **2a**, *Yuncker et al. 8498* **2a**.

Zarucchi 1261' **2a**.

Index to Scientific Names