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New Series, No. 8

FIVE NEW SPECIES OF *BRUNFELSIA*  
FROM SOUTH AMERICA (SOLANACEAE)

TIMOTHY PLOWMAN

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### FIVE NEW SPECIES OF *BRUNFELSIA* FROM SOUTH AMERICA (SOLANACEAE)

TIMOTHY PLOWMAN

*Assistant Curator of Vascular Plants*  
*Department of Botany*  
*Field Museum of Natural History*

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Continuing taxonomic studies in the genus *Brunfelsia* have revealed the existence of five previously undescribed species. Although some of these taxa were recognized earlier (Plowman, 1973, 1979), a full assessment of their status was not possible due to insufficient materials available for study. Since many new collections from South America have been received and critical specimens in European and South American herbaria have been discovered, it is now possible to circumscribe correctly the new taxa that are presented herein.

The species of *Brunfelsia* in South America and adjacent eastern Panama, comprising sections *Franciscea* and *Guianenses*, now number 24. Eleven of these have been described within the past decade.

### 1. *Brunfelsia boliviana* Plowman, sp. nov. Sect. *Franciscea*. Figure 1.

Frutex. Cortex tenuis, longitudinaliter rimosus. Ramuli plus minusve villosi, glabrescentes. Folia breviter petiolata, obovata, raro elliptico-obovata, ad apicem rotundata, acumine brevi instructa, margine minute revoluta, basi attenuata, nervis inferioribus villosis exceptis glabrescentia, ad margines ciliato-villosa, firme membranacea vel subcoriacea, nervis lateralibus 4-9 subtus prominulis. Inflorescentia corymbiformis, in ramulis annotinis terminalis, pedunculo breviter ramoso villosa instructa, bracteolata, bracteolis lanceolatis vel cymbiformibus, floribus 6-15, violaceis, speciosis. Pedicellus brevis, glaber vel sparse glanduloso-puberulus. Calyx tubulosus, pentagonalis, in siccis plicatus, glaber vel sparse glanduloso-puberulus, dentibus subaequalibus, ovatis, acuminatis, post anthesin persistens, marcescens. Corollae tubus quam calyx plus minusve duplo longior, limbo patente, lobis subaequalibus, rotundatis. Stamina superiora e tubo parum exserta, stamina inferiora et stigma in tubi parte superiore inclusa. Capsula magna, sicca, subglobosa, pericarpio tenui crustaceo. Semina oblonga vel subreniformia, reticulato-foveolata, brunnescentia.

A *Brunfelsia cuneifolia* foliis apice acuminatis et margine ciliatis obovatis et cymis in ramulis annotinis multifloris et breviter pedunculatis differt.

**Shrub** 1-2 m tall (*vide* Cárdenas). **Bark** on branches thin, yellowish to grayish brown, longitudinally rugose, not exfoliating. **Branchlets** 2-3 mm in diameter, more or less villous, becoming glabrous. **Leaves** scattered along branchlets or crowded at tips of lateral short shoots, short petiolate, blade obovate, rarely elliptic-obovate, apically rounded with a short acumen, the acumen itself blunt to acute, 5-10 mm long, somewhat revolute at margin, basally attenuate, 40-135 mm long, 23-58 mm wide, glabrescent on both surfaces except at the midrib which bears villous and glandular hairs, ciliate-villous on the adaxial surface of the revolute margin, firmly membranaceous or somewhat coriaceous, dull green above, paler, yellowish green beneath, the lateral nerves 4-9, straight, arcuately anastomosing towards the margin, prominent below; petiole 2-6 mm long, more or less villous, more densely so on upper side. **Inflorescence** corymbiform, terminal on last season's branchlets, short pedunculate, branched, with 6-15 flowers. **Peduncle** 5-12 mm long, more or less villous. **Bracteoles** small, lanceolate or cymbiform, 1-4 mm long, sparsely to densely villous especially at margin, caducous. **Flowers** light violet fading to white (*vide* Cárdenas). **Pedicel** short, 2-6 mm long, 1 mm in diameter, scarcely thickened at apex, glabrous or with sparse glandular hairs. **Calyx** tubular, truncate at base, five-angled in cross-section, appearing plicate in pressed specimens, 9-15 mm long, 3-4 mm in diameter, glabrous or with scattered glandular hairs, teeth subequal, 2-4 mm long, ovate, apically short acuminate, the acumen itself blunt and glandular-papillose, fruiting calyx persistent, withering. **Corolla** tube about twice as long as calyx, straight, 21-25 mm long, 2-3 mm in diameter; limb spreading, 18-30 mm in diameter, lobes subequal, rounded, 8-14 mm

long. **Stamens** inserted in upper part of corolla tube; filaments strap-shaped, the longer anterior pair suberect, briefly exerted from mouth of corolla tube, 3 mm long, the shorter posterior pair included, 2 mm long; anthers orbicular-reniform, subequal or the upper pair slightly larger, 1–1.2 mm in diameter. **Ovary** narrowly ovoid, 2–3 mm long, 1.8–2.2 mm in diameter, with about 30 ovules; style incurved at apex, 19 mm long; stigma briefly bifid, 2 mm long. **Capsules** 3–6 per infructescence, dry at maturity, subglobose, 20–25 mm long, 20–25 mm in diameter, smooth, green; pericarp thin, 1–1.5 mm thick, endocarp thin-crustaceous, with 22–28 seeds per capsule. **Seeds** oblong to subreniform, subterete, 5–8 mm long, 2–3 mm in diameter, reticulate-pitted, dark brown. **Embryo** straight, 4 mm long; cotyledons ovate, 1.5 mm long; radicle 2.5 mm long.

*Type*.—BOLIVIA. Dept. Santa Cruz: Prov. de la Cordillera, region of Lagunillas, Cordillera of Incahuasi. Altitude 900 m, "at dry and sandy slopes; shrub 1–2 m; flowers white or light violet; when cattle eat the leaves of this plant (they die." *N.v. bella unión*. August 1934. *M. Cárdenas* 2813 (holotype, F 756420).

*Etymology*.—From Latin *bolivianus*, "Bolivian," referring to the country of origin where the species appears to be endemic.

*Common name*.—*Bella unión*, "beautiful union," referring to the occurrence of both violet and white flowers on the same plant. This name is applied to other brunfelsias in Bolivia.

*Distribution*.—The eastern Andes of southern Bolivia.

*Additional specimens studied*.—BOLIVIA. SANTA CRUZ: Prov. Cordillera, Nov.–Dec. 1845, *Weddell* 3621 (P, 2 sheets), 5 km N. of Yatarenda, 63° 32' W., 19° 12' S., 17 April 1977, *Krapovickas & Schinini* 31476 (CTES, F). CHUQUISACA: mountain above Bartolo, on road from Monteagudo to Sucre, 20° 00' S., 64° 45' W., 5,000 ft, 20 Sept. 1949, *Brooke* 5653 (BM).

*Brunfelsia boliviana* is known from only four collections, all from a relatively small area in the foothills of the Andes in southern Bolivia. The early collection of Weddell in 1845 is labeled merely "Provincia de la Cordillera," referring to the large province in the Department of Santa Cruz. However, Urban (1906) mentions that in the months given, Weddell traveled and collected from Santa Cruz da la Sierra in Santa Cruz south to Sauces (now Monteagudo) in Chuquisaca Department. His collection was probably made near the border between the two departments.

*Brunfelsia boliviana* is most closely related to *B. cuneifolia* J. A. Schmidt, which occurs in southern Brazil from the State of Paraná south to Rio Grande do Sul. Like the present species, it is known from only a few specimens. *Brunfelsia boliviana* differs in both leaf and inflorescence characters as summarized in the following:

Character	<i>B. boliviana</i>	<i>B. cuneifolia</i>
Leaf shape	Obovate to elliptic-obovate	Oblong-obovate to elliptic-lanceolate
Leaf apex	Rounded with a short acumen	Cuneate to blunt
Leaf indument	Villous-ciliate at margin	Glabrous at margin
Location of inflorescence	On last season's growth	On current season's growth
Number of flowers per inflorescence	6–16	1–3
Distribution	Southern Bolivia	Southern Brazil

BRUNFELSIA boliviana Plowman

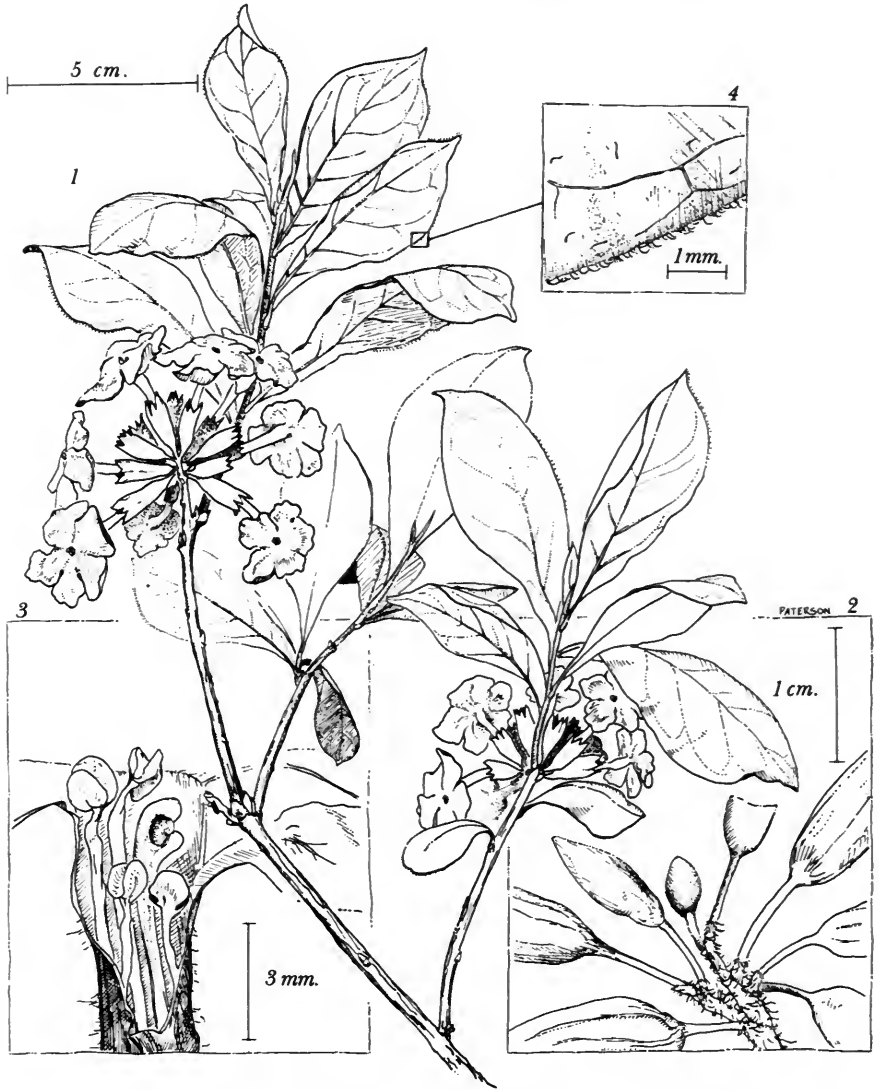


FIG. 1. *Brunfelsia boliviana* Plowman. 1, flowering branch; 2, inflorescence in bud; 3, excised apical portion of corolla tube showing anthers and stigma; 4, leaf margin showing indument. (From Cárdenas 2813.)

The geographical distribution of these two closely related species deserves some comment because it exemplifies further a pattern observed in other *Brunfelsias* in which vicarious species pairs are found in southeastern Brazil and the eastern Bolivian Andes, respectively. These include *B. bonodora* (Vell.) Macbr.—*B. grandiflora* subsp. *schultesii* Plowman and *B. hydrangeiformis* (Pohl) Benth.—*B. mire* Monachino. In addition, disjunct and somewhat distinct populations of *B. uniflora* (Pohl) D. Don, a species primarily of eastern Brazil, have also been found in the Bolivian Andes. In each of these cases, vicarious species or populations are now separated by over 2,000 km in which no intervening populations are known to occur. This phytogeographic pattern has been discussed by Smith (1962) and by Plowman (1979).

Interestingly, the leaves of *B. boliviana* are reputed to be lethal to cattle, a feature that has been reported for other *Brunfelsia* species (Plowman, 1977).

## 2. *Brunfelsia imatacana* Plowman, sp. nov. Sect. *Franciscea*. Figure 2.

Frutex vel arbor parva. Cortex transversaliter et longitudinaliter rimosus. Ramuli cinerascens, pubescentes vel glabrati. Folia in ramulis dispersa, breviter petiolata, oblongo-elliptica vel elliptico-obovata, apice longe vel breviter acuminata, apice ipso acuto vel obtuso, basi cuneata vel angustata, utrinque glabra vel subtus sparsim glanduloso-puberula, firme chartacea vel subcoriacea, nervis lateralibus 5–7, rectis, patentibus. Inflorescentia terminalis, uni- vel biflora, subsessilis, bracteolata, bracteolis caducis, floribus fragrantibus, violaceis ad orificium macula alba instructis, demum albis, pedicellis glabris post anthesin verrucosis. Calyx tubulosus, teres, glaber vel sparsim glanduloso-puberulus, dentibus subaequalibus, ovatis, acuminatis, post anthesin paulo accrescens, campanulatus, coriaceus, lenticellis instructus. Corollae tubus quam calyx duplo longior, limbo patente, lobis subaequalibus, rotundatis. Capsula in calyce accrescente omnino inclusa, sicca, ovoidea vel subglobosa, pericarpio tenui crustaceo. Semina oblongo-ellipsoidea, aliquantum angulata, reticulato-foveolata, brunnescentia.

A *Brunfelsia pauciflora* foliis elliptico-oblongis vel elliptico-obovatis, nervis lateralibus 5–7, floribus fragrantibus 1–2, pedicellis brevioribus, capsula breviori et seminibus 6–10 majoribus differt.

**Shrub** or treelet 3–5 m tall. **Bark** reddish or grayish brown, longitudinally and transversely cracked, shedding in thin flakes. **Branchlets** about 2 mm in diameter, grayish brown, longitudinally cracked, pubescent or glabrate. **Leaves** scattered along branchlets, short petiolate, blade oblong-elliptic or elliptico-obovate, short to long acuminate, the apex itself acute to blunt, cuneate to narrowed at base, 65–150 mm long, 20–65 mm wide, glabrous or sparsely glandular-pubescent beneath, especially at midrib, firmly chartaceous to subcoriaceous, dull dark green above, dull paler green beneath, the lateral nerves 6–10, spreading, straight to somewhat arching, indistinct; petiole 5–10 mm long, 1.5 mm in diameter, pubescent. **Inflorescence** terminal, 1- or 2-flowered, subsessile. **Bracteoles** linear-lanceolate or squamiform, 1–3 mm long, pubescent, caducous. **Flowers** light violet with a white spot at orifice, fading to pure white with age, fragrant with odor resembling jasmine. **Pedicel** 8–9 mm long, 1 mm in diameter, glabrous, becoming thickened, warty in fruit. **Calyx** tubular, terete, 15–21 mm long, 7–10 mm in diameter, glabrous or with scattered glandular hairs, teeth subequal, ovate, acuminate, 4–5 mm long, calyx in fruit 18–25 mm long, campanulate, thickly coriaceous, dotted with lenticels. **Corolla** tube twice as long as calyx, straight, 30–38 mm long, 1–2 mm in diameter, with scattered glandular hairs, orifice 3 mm across, lobes subequal, rounded, 13–23 mm long. **Stamens** inserted in upper part of corolla tube; filaments strap-shaped, 1 mm wide; the longer anterior pair suberect, included in mouth of corolla tube, 5 mm long, the shorter posterior pair 3 mm long; anthers orbicular-reniform, upper pair slightly smaller, 1.5 mm across; lower pair 1.8 mm across. **Ovary** broadly ovoid, 1.8 mm long, 2 mm in diameter, with 7–8 ovules per locule; style 22–23 mm long; stigma briefly bifid, 1.5–2 mm long. **Capsule** dry at maturity and completely enclosed by coriaceous calyx, ovoid to subglobose, 12–17 mm long, 14–16 mm in diameter, smooth, light green, pericarp 0.5 mm thick, crustaceous, containing 6–10 seeds. **Seeds** oblong-ellipsoid, somewhat angular, 6–9 mm long, 2–5 mm in diameter, reticulate-pitted, reddish brown.





FIG. 2. *Brunfelsia inatacama* Plowman. Photograph of flowering branch. (From *Florumani* 1918.)

*Type*.—VENEZUELA. State of Bolívar: About 20 km northeast of Guasipati on road to El Miamo along side road just before Río Cabeza Mala, altitude 200 m, open woodland with white sandy soil. Treelet 4–5 m tall, flowers violet fading pure white with age, odor of jasmine. N.v. *Jazmín del monte*, *Juan de la Calle*. Used for *baños* by healers. 25 Sept. 1968. *T. Plowman 1918* (holotype, F 1813259; isotypes, F 1746565, GH, K, NY, P, UC, US, VEN).

*Etymology*.—From Latin *imatacanus*, referring to the Serranía de Imataca to which the species apparently is confined.

*Common names*.—*Jazmín del monte*, "wild jasmine"; *Juan de la Calle*, "John of the street." The former refers to the jasmine-like fragrance of the flowers.

*Distribution*.—Restricted to the region of the Serranía de Imataca and Serranía de Nuria in the northeastern part of the State of Bolívar, Venezuela.

*Additional specimens studied*.—VENEZUELA. BOLÍVAR: Reserva Forestal de Imataca, along logging road to Campamento Paraíso, 28 km N.E. of Upata, altitude ca. 100 m, 26 Sept. 1968, *Plowman 1919* (ECON, F, GH, K, S, US, VEN); low, flat woodland east of Río Cabeza Mala, 15 km N.E. of Guasipati, on road to Miamo, 2 June 1960, *Steyermark 86244* (US, VEN); Altiplanicie del Nuria, 5 km from Hato de Nuria, east of Miamo, altitude 400 m, 10 Jan. 1961, *Steyermark 88290* (NY, VEN); more or less level forest along pica 105, 40 km south of Tumeremo, east of highway between Tumeremo and El Dorado, 29 km north of El Dorado, altitude 220 m, 23 July 1960, *Steyermark 86574* (NY, US, VEN); Reserva Forestal "La Paragua," márgenes del río Asa, June 1970, *Blanco 826* (F, VEN); El Dorado, cultivated, Aug. 1957, *Trujillo 3488* (MY).

Previously, I considered *Brunfelsia imatacana* to be a subspecies of the related species *B. pauciflora* (Cham. & Schlecht.) Benth. of southeastern Brazil (Plowman, 1973, 1979). Although the two species are superficially similar, *B. imatacana* can be readily distinguished by the leaf shape, number of lateral nerves, fragrant flowers, shorter pedicel, calyx and capsule, and by the smaller number and larger size of the seeds. In addition the two species are widely disjunct by a distance of 3,800 km.

*Brunfelsia imatacana* is endemic in the northeasternmost part of Bolívar state in Venezuela, in the range of low hills known as the Serranía de Imataca and Serranía de Nuria. This area occupies the northern rim of the Venezuelan section of the Guayana Shield. This region has recently been recognized by Steyermark as a distinct phytogeographic unit of the flora of Venezuela. Most of the flora found here represents species of the Guianas at their western limits as well as various eastern Amazonian species at their northeastern limits of dispersal (Steyermark, 1968, 1979). Steyermark (1968) lists 278 plant species known only from the Serranía de Imataca and another 514 species that are restricted to the even more limited area of the Altiplanicie de Nuria. The Imataca region has been documented as a major center of both plant and animal species endemism and has been proposed as a Pleistocene forest refuge area (Prance, 1973; Brown, 1979; Steyermark, 1979).

During the collection of the type material, local guides informed the author that the foliage of *Brunfelsia imatacana* was used by healers (*brujos*) for herbal baths. Although this use of the plant was not observed, bulk samples of roots, stems, and leaves were collected for chemical analysis. The freshly air-dried leaves and stems were sent to Dr. John Leary of the Massachusetts College of Pharmacy for testing. Dr. Leary (personal communication, 1973) reported that

extracts of this material yielded alkaloid-positive precipitates based on six different precipitating agents. In addition he obtained a positive test for phyto-steroids but negative tests for flavonoids, tannins, and saponins. Dried root, stem, and leaf material of this same sample were also sent to Mr. Jan-Erik Lindgren of the Karolinska Institutet, Stockholm, Sweden. Mr. Lindgren (personal communication, 1973) prepared methanol extracts of the samples, which were examined by thin-layer chromatography. He also performed a complete alkaloid extraction on the material, followed by gas and thin-layer chromatography on the extracts. Mr. Lindgren was unable to detect the presence of any alkaloids in the samples. It remains uncertain what, if any, active constituents may be present in this species. However, isolation and identification of the active constituents in other brunfelsias with demonstrated pharmacologic activity have proved to be similarly difficult (Plowman, 1977).

### 3. *Brunfelsia rupestris* Plowman, sp. nov. Sect. *Francisceae*. Figure 3.

Frutex dense ramosus. Folia ad apicem ramulorum subcongesta, breviter petiolata, lanceolata vel oblonga, apice acuta, plerumque obtusa vel emarginata, margine valde revoluta, basi cuneata, superne glabra, nitida, subtus puberula, admodum coriacea, nervis lateralibus 4-5 indistinctis. Inflorescentia in ramulis homotinis terminalis, pedunculo brevi pubescente instructa, floribus violaceis 2-5 (8). Pedicellus glaber. Calyx tubuloso-campanulatus, teres, glaber, dentibus subaequalibus, ovatis, acutis. Corollae tubus glaber, limbo patente, lobis subaequalibus, rotundatis. Capsula in calyce inclusa, ovoidea-globosa, apiculata, laevis.

A *Brunfelsia brasiliensi* foliis congestis, coriaceis, valde revolutis, sparse pubescentibus, nervis lateralibus 4-5 indistinctis, et pedicellis calycibusque glaberrimis differt.

Much-branched shrub 1-2 m tall. **Bark** on branches yellowish to reddish brown, cracked longitudinally and transversely, exfoliating in thin flakes. **Branchlets** about 2 mm in diameter, glabrous or puberulent. **Leaves** usually congested near branch tips, short petiolate, blade lanceolate to oblong, apically acute, sometimes blunt or emarginate, strongly revolute at margin, basally cuneate, 10-40 mm long, 6-17 mm wide, glabrous above, puberulent beneath with short curved glandular or eglandular hairs, thickly coriaceous, shiny, medium green above, dull beneath, drying ochraceous brown, the lateral nerves 4-5, straight, scarcely distinct; petiole 1-3 mm long, glabrous. **Inflorescence** terminal on current season's branchlets, short pedunculate, with 2-5 (8) flowers. **Peduncle** 1-5 mm long, short-branched, the branches articulating with the pedicels, persistent, puberulent. **Bracteoles** linear-lanceolate or cymbiform, 1-6 mm long, sparsely villous, ciliolate at margin, caducous. **Flowers** deep violet with a white "eye" at orifice, fading to lavender with age. **Pedicel** 4-12 mm long, 1-1.5 mm in diameter, glabrous. **Calyx** tubular-campanulate, terete, 10-15 mm long, 3-6 mm in diameter, glabrous, light green, teeth subequal, 2-3 mm long, ovate to triangular, apically acute, the tip itself sometimes blunt or truncate. **Corolla** tube about 1½ times as long as calyx, straight, 15-18 mm long, 1.5-2 mm in diameter, glabrous, orifice 2-3 mm in diameter; limb spreading, slightly thickened at mouth of tube, 15-22 mm in diameter, lobes subequal, rounded, 5-10 mm long. **Stamens** inserted in upper part of corolla tube; filaments strap-shaped, the longer anterior pair apically incurved, included, 2-3 mm long, the shorter posterior pair 1-2 mm long; anthers orbicular-reniform, 1.5 mm in diameter. **Ovary** ovoid, 1.5 mm long; stigma briefly bifid, 1 mm long. **Capsule** enclosed by persistent calyx, ovoid to globose, apiculate at apex, 16 mm long, 14 mm in diameter, smooth, pericarp thin, crustaceous, dry at maturity. **Seeds** oblong-ellipsoid, somewhat angular, 5 mm long, 2.5-3 mm in diameter, reticulate-pitted, brown. **Embryo** straight, 4 mm long; cotyledons ovate, 2 mm long.

*Type*.—BRAZIL. State of Minas Gerais: Estrada Diamantina a Corinto até 20 km. Campo rupestre e cerrado. Arbusto até 2 m, flores roxas. 12 Jan. 1976. G. J. Shepherd, J. B. de Andrade, L. S. Konoshita & J. Y. Tamashiro 3935 (holotype, UEC 11912; isotypes, F 1877095, NY, UEC 11912A).

## BRUNFELSIA

*rupestris*

Plowman



FIG. 3. *Brunfelsia rupestris* Plowman. 1, flowering branch; 2, fruiting branch; 3, excised apical portion of corolla tube showing anthers and stigma. (1 and 3 drawn from Shepherd et al. 3935, 2 from Ferreyra 887.)

*Etymology*.—From Latin *rupestris*, “rock-dwelling, of rocks,” referring to the habitat preference of the species for rocky outcrop areas.

*Distribution*.—Restricted to the “campo rupestre” community in the Serra do Espinhaço, Minas Gerais, Brazil.

*Additional specimens studied*.—**BRAZIL**. MINAS GERAIS: Serra do Espinhaço, Município Diamantina: Guinda, 5 Nov. 1937, Mello Barreto 9479 (F, RB), altitude 1,300 m, 14 Nov. 1971, Hatschbach & Pelanda 27941 (GH); ca. 25 km S.W. of Diamantina on road to Gouveia, altitude 1,300 m, 16 Jan. 1969, Irwin et al. 22077 (F, MO, NY, UB); ca. 12 km S.W. of Diamantina, altitude 1,350 m, 23 Jan. 1969,

*Irwin et al.* 22465 (NY, UB); Serra do Cruzeiro, 5 Nov. 1979, *V. F. Ferreira et al.* 887 (RB).

*Brunfelsia rupestris* is a very distinct species that is restricted to the *campos rupestres* at higher elevations in the Serra do Espinhaço of central Minas Gerais. It is most closely related to and probably derived from the widespread and polymorphic species *B. brasiliensis* (Spreng.) Smith & Downs. *Brunfelsia rupestris* differs in having the leaves more congested, thickly coriaceous, strongly revolute at the margins, sparsely pubescent and with only four to five lateral nerves, and in having glabrous pedicels and calyces.

#### 4. *Brunfelsia burchellii* Plowman, sp. nov. Sect. *Guianenses*. Figure 4.

Frutex. Ramuli glabri, nitidi, ochracei vel brunnei. Folia breviter petiolata, ovata vel ovato-lanceolata, apice acuminata, acumine longo acutissimo saepe falcato instructa, margine ciliolata, basi rotundata vel obtusa, plerumque abrupte acuminata, glabra, nervis lateralibus 5-9, valde arcuatis. Inflorescentia in ramulis hornotinis terminalis, pedunculo brevi instructa, floribus 1-3. Pedicellus glaber vel sparse glanduloso-puberulus. Calyx tubulosus vel tubuloso-campanulatus, sparse glanduloso-puberulus vel glaber, dentibus subaequalibus triangulari-ovatis acutis vel acuminatis. Corollae tubus glaber, limbo patente, lobis subaequalibus, late rotundatis. Fructus seminaque ignota.

A *Brunfelsia guianensi* foliis ovatis acutissime acuminatis basi rotundatis, calycibus tubuloso-campanulatis, pedicellis et calycibus longioribus differt.

**Shrub.** Mature branchlets spreading, 2-3 mm in diameter, with shiny yellowish to dark brownish, longitudinally cracked bark. **Leaves** scattered along stem, short petiolate, blade broadly to narrowly ovate, apically acuminate with a long, pointed, often falcate acumen, minutely ciliate at margin, basally rounded to obtuse, sometimes abruptly acuminate, 70-180 mm long, 30-75 mm wide, glabrous on both sides, firmly membranaceous to chartaceous, medium green above, paler green beneath, dull or somewhat shiny above, dull beneath, the lateral nerves 5-9, strongly arcuate, anastomosing near margin, nerves prominent on lower surface; petiole 1-6 mm long, with a few scattered glandular hairs, glabrescent. **Inflorescence** terminal on current year's branchlets, very briefly pedunculate, with 1-3 flowers. **Peduncle** 1-4 mm long, persistent, sparsely glandular-pubescent, glabrescent. **Bracteoles** 1-3 per flower, linear to lanceolate, apically acuminate, 4-20 mm long, glabrous or villous at nerves and margin, caducous. **Flower** color unknown. **Pedicel** 4-8 mm long, 1 mm in diameter, sparsely glandular-pubescent, glabrescent. **Calyx** tubular or tubular-campanulate, terete, 11-20 mm long, 5-9 mm in diameter, with scattered glandular hairs, glabrescent, striately nerved, teeth unequal, 2-6 mm long, triangular-ovate, apically acute to acuminate, minutely gland-tipped. **Corolla** tube  $1\frac{1}{2}$  to 2 times as long as calyx, straight, 24-28 mm long, 1.5-2 mm in diameter, glabrous or bearing few scattered glandular hairs, orifice 5 mm in diameter; limb spreading, 18-30 mm in diameter, lobes subequal, rounded, overlapping at the lateral margins. **Stamens** inserted in upper part of corolla tube; filaments straplike, 1 mm wide, the longer anterior pair 3.5-6 mm long, apically slightly incurved or suberect, the shorter posterior pair 3-4 mm long; anthers orbicular-reniform, 1 mm in diameter. **Ovary** conical-ovoid, 1.5 mm long; style broadened and incurved at apex, 20-21 mm long; stigma included between pairs of anthers, briefly bifid, 1 mm long, upper lobe slightly larger. **Fruit** and seed unknown.

*Type*.—BRAZIL. State of Goiás: Porto Real (now Porto Nacional), ford of Igarapé, 1828-1830, *W. J. Burchell* 8527 (holotype, P; isotypes, K, L).<sup>1</sup>

*Etymology*.—Named in honor of the collector William John Burchell, British botanist who collected extensively in Brazil in the early 19th century.

*Distribution*.—Basin of the upper Rio Tocantins (Goiás State) and adjacent Maranhão State, Brazil.

<sup>1</sup>All Burchell localities are taken from his itinerary published by L. B. Smith and R. B. Smith, *Phytologia*, 14: 492-506. 1967.



## BRUNFELSIA

*burchellii* Plowman

FIG. 4. *Brunfelsia burchellii* Plowman. Flowering branch. (From Burchell 8527.)

*Additional specimens studied.*—**BRAZIL.** GOIÁS: Porto Real, Porto Real to Igarapé, 1828–1830, Burchell 8415 (L), about village, Burchell 8494 (K), at entrance to village, Burchell 8653 (K); “about the Manga” (cf. Rio dos Mangues, where it meets the Tocantins), Burchell 8752 (GH). MARANHÃO: Island of São Luiz, Estrada do Barreto, Feb.–March 1939, Fróes 11620 (A, F, NY, S, US).

*Brunfelsia burchellii* is known from only a few collections by William J. Burchell in the vicinity of Porto Real (now called Porto Nacional) on the upper Rio Tocantins 150 years ago. Unfortunately, these specimens bear no field data, and the plant has not been recollected in this region. A modern collection by Fróes from São Luiz Island, more than 1,000 km north of Porto Nacional, is tentatively

assigned to *B. burchellii* but lacks mature flowers or fruits and differs somewhat in leaf venation.

*Brunfelsia burchellii* appears to be most closely related to *B. guianensis* Benth. from which it differs by the ovate, acuminate leaves, longer tubular calyx, and the broadly rounded corolla lobes. With *B. guianensis*, *B. burchellii* is provisionally placed in Sect. *Guianenses* based on the gradually dilated and not apically constricted corolla tube.

Two additional collections with ovate acuminate leaves appear to be related to *B. burchellii* but cannot be placed with certainty. One of these, *Ducke s.n.* (RB 18141), was collected at Bragança in Pará and bears small, white, terminal, solitary flowers and immature leaves. The other, *Sucre & da Silva 9204* (F, RB), was collected at Buriti dos Lopes, Piauí, and has rather shiny, thick leaves and immature fruits completely enclosed in persistent, accrescent calyces.

##### 5. *Brunfelsia clandestina* Plowman, sp. nov. Sect. *Guianenses*. Figure 5.

Frutex vel arbor parva. Ramuli glabri, subnitidi, cinerascetes vel obscure brunnei. Folia breviter petiolata, elliptica vel oblongo-lanceolata, rarius lanceolata vel obovata, apice acuta vel acuminata, apice ipso obtusa, basi cuneata vel obtusa, glabra, raro sparse in costis abaxialibus puberulenta, nervis lateralibus 6-8, rectis, divaricatis. Inflorescentia in ramulis hornotinis juvenilibus vel maturis terminalis vel subterminalis, plerumque pedunculo brevi instructa, floribus uni- vel biflora. Pedicellus glaber, post anthesin ad apicem lenticellis verrucosis instructus. Calyx tubulosus vel tubuloso-campanulatus, glaber, dentibus subaequalibus, triangulari-ovatis, apice acutis vel acuminatis, apice ipso minute glanduloso-papilloso, post anthesin persistens, demum nitidus, coriaceus, striato-nervatus. Corollae tubus glaber, raro sparse glanduloso-puberulus, limbo inclinato patente, lobis subaequalibus aliquantum accrescentibus, late obovatis vel rotundatis. Capsula sicca, ovoidea vel subglobosa, apice rotundata, breviter apiculata, laevis, nitida, pericarpio tenui crustaceo. Semina oblongo-reniformia, teretia vel paulo applanata, reticulato-foveolata, obscure brunnea.

A *Brunfelsia martiana* foliis multo minoribus, nervis paucis et inflorescentiis uni- vel bifloris differt.

Shrub or treelet to 6 m tall, trunk to 8 cm in diameter. Bark on trunk and branches yellowish brown, cracking longitudinally and transversely, shedding in thin, irregular flakes. Branchlets 1.5-2 mm in diameter, glabrous, grayish to dark reddish brown, more or less shiny, cracked longitudinally. Leaves short petiolate, the blade elliptic to oblong-lanceolate, rarely lanceolate or obovate, apically acute to acuminate, the apex itself obtuse, basally acute or obtuse, 35-120 mm long, 15-50 mm wide, glabrous or rarely sparsely puberulent on the costa beneath, chartaceous to subcoriaceous, rarely coriaceous, medium green above, somewhat lighter green beneath, shiny on both surfaces, the lateral nerves 6-8, mostly straight, forming an angle of 45-70° with midrib, anastomosing with the arcuate marginal nerve 3-6 mm from margin; petiole 2-6 mm long, glabrous or with scattered glandular hairs. Inflorescence terminal or subterminal on mature or newly formed twigs of current season, with or without a short peduncle, one- or two-flowered. Bracteoles none to 3, linear or cymbiform, truncate at apex, 2-6 mm long, sparsely pubescent or glandular-pubescent, caducous. Flowers white. Pedicel 3-9 mm long, 1 mm in diameter, glabrous, becoming thicker, warty-lenticellate in fruit, to 3 mm in diameter. Calyx tubular or tubular-campanulate, terete, 8-16 mm long, 3-7 mm in diameter, glabrous, light green, membranaceous, teeth subequal, 2-5 mm long, triangular-ovate, apically acute or acuminate, the apex itself blunt and minutely glandular-papillose; calyx in fruit persistent, 11-16 mm long, shiny, coriaceous, striately nerved, tightly enclosing basal half of capsule. Corolla tube 1.5 to 2 times as long as calyx, straight, 18-25 mm long, 1-3 mm in diameter, glabrous, rarely with a few glandular hairs, orifice 3-5 mm across; limb spreading, inclined, 15-26 mm in diameter, lobes subequal, expanding somewhat with age, broadly obovate to rounded, 6-10 mm long. Stamens inserted in upper part of corolla tube; filaments strap-shaped, 0.6-1 mm wide, the longer anterior pair incurved at apex, included, 3-5 mm long, the shorter posterior pair 1.5-3 mm long; anthers orbicular-reniform, 1 mm in diameter.

**Ovary** conical-ovoid, 1–1.5 mm long, 0.8–1.2 mm in diameter, with about 10–12 ovules per locule; style incurved at apex, 16–20 mm long; stigma briefly bifid, upper lobe slightly larger, 1–1.5 mm long. **Capsule** dry at maturity, ovoid to subglobose, apiculate, 13–20 mm long, 13–15 mm in diameter, smooth, shiny, dark green at maturity; pericarp thin, 0.5–1 mm thick, crustaceous, with about 9–15 seeds per capsule. **Seeds** oblong-reniform, terete, or somewhat flattened on one side, 5–7 mm long, 2.5–3 mm in diameter, reticulate-pitted, dark brown. **Embryo** straight, 3–6 mm long; cotyledons ovate to elliptic, 1–2 mm long, radicle 2–4 mm long.

*Type*.—BRAZIL. State of Bahia: Município Itapebí, Fazenda Lombardia, BR 101 ao lado leste. Arbusto de 3 m de altura. Flor branca. Capoeira. 12 Aug. 1971. T. S. dos Santos 1777 (holotype, CEPEC 7086; isotype, F 1849031).

*Etymology*.—From Latin *clandestinus*, "secret" or "hidden," referring to the fact that the species remained unrecognized for over a century owing to its superficial resemblance to *Brunfelsia uniflora*.

*Distribution*.—States of Bahia and Espiritu Santo, Brazil.

*Additional specimens studied*.—BRAZIL. BAHIA: "Prov. Jacobina," 1841, *Blanchet* 3354 (G, LE, W), 1843, *Blanchet s.n.* (C, G, W); "Igreja Velha," 1841, *Blanchet* 3352 (BM, BR, G, P); Serra de Sincorá, Brejão a Iracema, 17 Feb. 1943, *Fróes* 20210 (IAN, NY, US); Município Jaguaquara, Jaguaquara a Apuerama, 4 Oct. 1972, *Pinheiro* 1980 (CEPEC, F, NY); Município Itacaré, Itacaré-Ubaitaba, 14 April 1980, *dos Santos* 689 (CEPEC, F); rodovia BA 654, km 6 ao oeste de Itacaré, approx. 14° 18' S., 39° 02' W., altitude ca. 60 m, 12 April 1980, *Plowman, Mattos Silva & dos Santos* 10066 (CEPEC, F, four duplicates to be distributed), *Plowman, Mattos Silva & dos Santos* 10087 (CEPEC, F, 18 duplicates to be distributed); Município Itambé, Itambé, 24 Nov. 1942, *Fróes* 20067 (IAN, NY); Município Itajú do Colônia, 12 km da estrada em direção a Feirinha ao lado oeste, margem esquerda do Rio Corró, 23 Oct. 1969, *dos Santos* 433 (CEPEC, F); Município Belmonte, Estação Experimental Gregório Bondar, km 58 da rodovia Belmonte/Itapebí, 16 May 1979, *Mattos Silva et al.* 357 (CEPEC); Município Santa Cruz de Cabralia, Reserva Biológica do Pau-Brasil, 18 Sept. 1971, *dos Santos* 1964 (CEPEC, F), cerca de 16 km a oeste de Porto Seguro, 21 March 1978, *Mori et al.* 9775 (CEPEC, F), antiga rodovia que liga a Estação Ecológica de Pau-Brasil a Santa Cruz, 5–7 km ao N.E. da Estação, ca. 12 km ao N.W. de Porto Seguro, 16° 23' S., 39° 8' W., ca. 80–100 m altitude, 5 July 1979, *Mori et al.* 12082 (CEPEC, F, US); Município Guaratinga, rodovia Guaratinga/São Paulinho, km 25, 2 April 1973, *Pinheiro* 2086 (CEPEC, F); without locality, 1857, *Blanchet s.n.* (G, L, LE); without locality or date, *Blanchet* 1455 (F), *Blanchet s.n.* (F, MG, NY). ESPIRITU SANTO: Linhares, Vale do Rio Doce, km 6 da rodovia BR 101, lado sul, 30 Sept. 1971, *dos Santos* 2015 (CEPEC, F, NY).

*Brunfelsia clandestina* was first collected by the Swiss collector Blanchet in the state of Bahia over 100 years ago. Following earlier authors, I originally assigned Blanchet's several collections of the species to *Brunfelsia uniflora* (Pohl) D. Don, although I pointed out certain differences between typical *B. uniflora* and the Blanchet material (Plowman, 1973). These early collections lacked adequate field data and fruiting material. Recently, several excellent collections of *B. clandestina* have been made by the staff at the CEPEC herbarium, Itabuna, Bahia. Accompanied by important field notes, these collections provided the basis for describing the plant as a distinct species of *Brunfelsia* Sect. *Guianenses*.

*Brunfelsia clandestina* superficially resembles several other brunfelsias and may be confused with them. Complete specimens, including field data and flower color, are essential for making positive identifications. *Brunfelsia clandestina* ap-



BRUNFELSIA clandestina Plowman

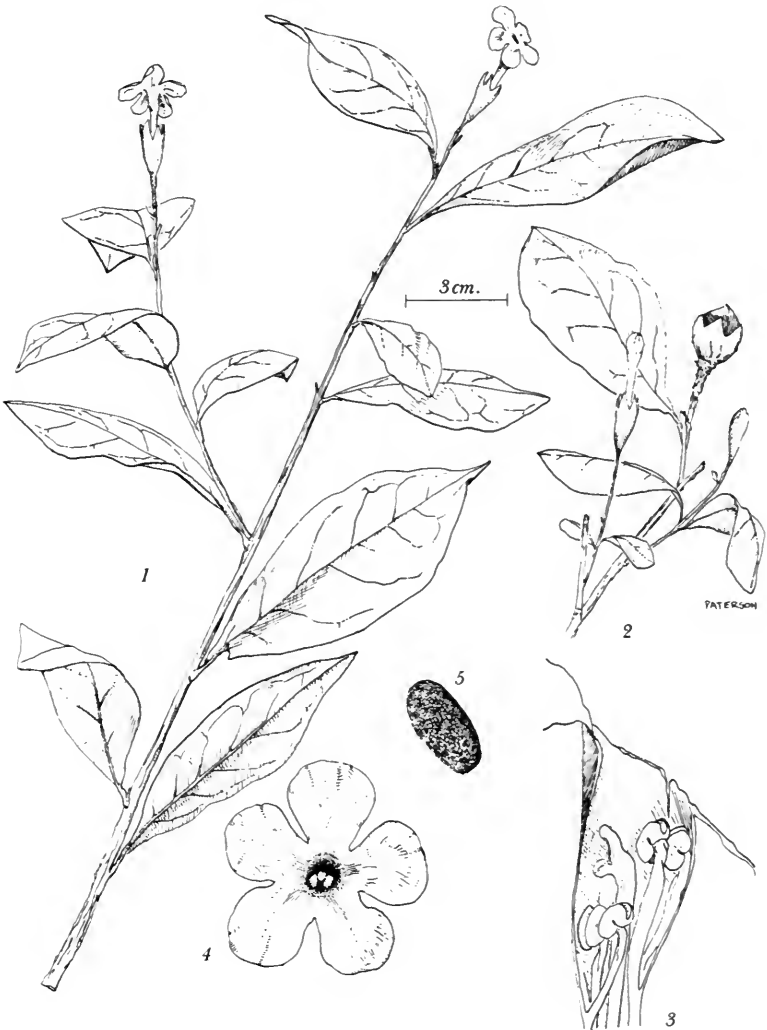


FIG. 5. *Brunfelsia clandestina* Plowman. 1, flowering branch; 2, fruiting branch; 3, excised apical portion of corolla tube showing anthers and stigma; 4, adaxial view of corolla limb; 5, seed. (1 drawn from dos Santos 1777, 2 from Pinheiro 1980, 3 and 4 from Pinheiro 2086 and 5 from dos Santos 1964.)

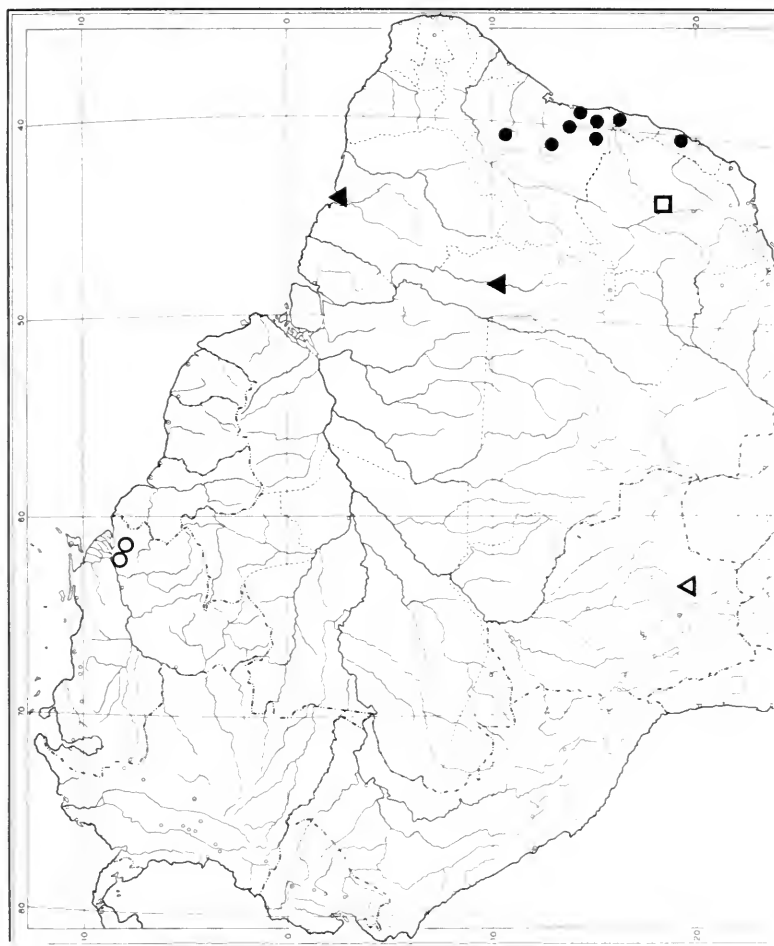


FIG. 6. Geographical distribution of new taxa described: ○ *Brunfelsia inatataca*. ▲ *B. burchellii*. ● *B. claudestina*. □ *B. ripuestris*. △ *B. boliviana*.

pears to be most closely related to *B. martiana* Plowman, a species that also grows in the moist forests of Bahia. *Brunfelsia clandestina* differs in having much smaller leaves with fewer lateral nerves and one- or two-flowered inflorescences that are borne terminally. In dried specimens, *B. clandestina* may also be confused with *B. uniflora*, a species known from Bahia but belonging to a different section of the genus (Sect. *Franciscea*). *Brunfelsia clandestina* differs mainly in having dark brown or reddish brown branchlets, glabrous or nearly glabrous leaves and twigs, and a tubular-campanulate rather than narrowly tubular calyx. The flowers of *B. clandestina* are white; those of *B. uniflora* are violet fading to white with age.

*Brunfelsia clandestina* grows in the moist coastal forests of southern Bahia and Espiritu Santo. Earlier collectors in Bahia also found this species further inland in areas formerly covered with mesophytic forest. Most of these areas have now been converted to pastures (Mori & Mattos Silva, 1979). The last collection in the drier, interior part of Bahia was made in 1943.

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#### LITERATURE CITED

- BROWN, K. S., JR. 1979. *Ecologia Geográfica e Evolução nas Florestas Neotropicais*. Thesis. Instituto de Biologia, Universidade Estadual de Campinas, Campinas, São Paulo, Brazil.
- LEARY, J. 1973. Letter to the author. March 22, 1973.
- LINDGREN, J.-E. 1973. Letter to the author. March 6, 1973.
- MORI, S. A., AND L. A. MATTOS SILVA. 1979. The Herbarium of the "Centro de Pesquisas do Cacau" at Itabuna, Brazil. *Brittonia*, 31: 177-196.

- PLOWMAN, T. 1973. The South American Species of *Brunfelsia* (Solanaceae). Doctoral Dissertation, Harvard University, Cambridge, Mass.
- . 1977. *Brunfelsia* in Ethnomedicine. Bot. Mus. Leaflet. Harvard Univ., 25: 289–320.
- . 1979. The genus *Brunfelsia*: a conspectus of the taxonomy and biogeography, pp. 475–491. In Hawkes, J. G., R. N. Lester, and A. D. Skelding (eds.), *The Biology and Taxonomy of the Solanaceae*. Linnean Society Symposium Series 7, London, Academic Press.
- PRANCE, G. T. 1973. Phylogeographic support for the theory of Pleistocene forest refuges in the Amazon basin, based on evidence from distribution patterns in Caryocaraceae, Chrysobalanaceae, Dichapetalaceae and Lecythidaceae. *Acta Amazonica*, 3: 5–27.
- SMITH, L. B. 1962. Origins of the Flora of Southern Brazil. *Contr. U.S. Natl. Herb.*, 35: 215–249.
- STEYERMARK, J. A. 1968. Contribuciones a la flora de la Sierra de Imataca, Altiplanicie de Nuria y región adyacente del Territorio Federal Delta Amacuro al sur del Río Orinoco. *Acta Bot. Venez.*, 3: 49–175.
- . 1979. Plant refuge and dispersal centers in Venezuela—Their relict and endemic element, pp. 185–221. In Larsen, K., and L. Holm-Nielsen (eds.), *Tropical Botany*. London, Academic Press.
- URBAN, I. 1906. Vitae, itineraque collectorum botanicorum. In von Martius, C. P. F., (ed.), *Flora Brasiliensis*, 1(1): 138.









**Field Museum of Natural History  
Roosevelt Road at Lake Shore Drive  
Chicago, Illinois 60605  
Telephone: (312) 922-9410**









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