NEW TAXA OF *SOLANUM* (SOLANACEAE) FROM BRAZIL, COLOMBIA, CENTRAL AMERICA, AND VENEZUELA[1]

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ABSTRACT

Following morphological and taxonomic studies for a revision of *Solanum* sect. *Lepidotum*, 10 new taxa are described, not all of them in sect. *Lepidotum*: *Solanum caldense* (Brazil), *S. carautae* (Brazil); *S. davidsei* (Venezuela); *S. hatschbachii* (Brazil), *S. lepidotum* var. *lepidiochlamys* (Colombia), *S. lepidotum* var. *trianae* (Colombia), *S. oliveirae* (Brazil), *S. pereirae* (Brazil), *S. sooretamum* (Brazil), and *S. steyermarkii* (Guatemala).

A taxonomic revision of *Solanum* sect. *Lepidotum* has revealed the new species and varieties described in this paper. The morphological studies of various features of trichomes, the indumentum of the abaxial leaf surfaces, and the structure of the inflorescences as well as the realignment of the group into subsections and a new section are being published elsewhere (Carvalho & Machado, in press; Carvalho & Shepherd, in press).

Nine of the ten new taxa fall into two groups.

Section *Lepidotum* sensu strictu is identified by a suite of characters: (1) indumentum appressed-lepidote with a golden or argenteous appearance, formed of peltate and peltate-stellate trichomes; (2) inflorescence short and simple, cymose or cymose-dichotomous with a scorpioid rachis; (3) corolla campanulate-stellate; (4) flowers with pedicels articulated on the inflorescence branches; (5) anthers subsessile, oblong with large apical anterior pores and dehiscing tardily by longitudinal slits; (6) leaves geminate, discolorous with golden or argenteous indumentum on the abaxial surface. These features are shown by the new taxa *Solanum carautae*, *S. davidsei*, *S. hatschbachii*, *S. lepidotum* var. *lepidiochlamys*, *S. lepidotum* var. *trianae*, and *S. steyermarkii*.

A second group of new species shares several features: (1) indumentum lepidote-tomentose or lepidote-floccose formed of trichomes with long and ornamented stalks having lateral expansions; (2) macroscopic chaffy laminate or fringed trichomes present on branches, inflorescence, and sometimes outside the wall of the calyx; (3) inflorescence robust, short-stalked, cymose-dichotomous and with erect and pendulous rachis; (4) leaves covered by indumentum of yellowish or whitish coloration on the abaxial surface; (5) fruit globose, totally enclosed in the accrescent calyx. This group includes the new species *Solanum caldense*, *S. oliveirae*, and *S. pereirae*.

A final species, *Solanum sooretamum*, is more closely allied to *S. vellozianum* Dunal.

1. Solanum caldense Carvalho, sp. nov. TYPE: Brazil. Minas Gerais: Municipality of Caldas, 1845, *J. F. Widgren s.n.* (holotype, R ex herb. Imp. Brasil. Regnellium Mus. Bot. Stockholm). Figures 1, 8, 9, 14A, B.

Arbuscula ramis fistulosis, novellis albidis denseque floccosis pilis stellato-pedicellatis atque paleaceo-fimbriatis, brevibus mollisque. Folia ovata vel ovato-lanceolata, apice obtusa rotundataque, basi parvum attenuata, 90–110 mm lata et 170–220 mm longa, sicciata castanea, supra glabra aut glabrescentia, subtus dense lepidoto-tomentosa trichomis stellatis vel porrecto-stellatis; petiolus ad 25 mm longitudine. Inflorescentia multiflora, pendula, robusta, crassa, 90–150 mm longa, ramos rectis 60–110 mm

[1] Part of a doctoral thesis by L. d'A. Freire de Carvalho (1988). Gratitude is extended to Carlos T. Rizzini, botanist of the Botanical Garden of Rio de Janeiro, and to Pe. Clemente J. Steffen of the University of Vale do Rio dos Sinos, São Leopoldo, Estado do Rio Grande do Sul, for the Latin diagnoses, and to the curators of national (CEPEC, HB, RB, UB) and foreign (BH, F, G, K, MO, NY, P, S, W) herbaria for lending important material, including nomenclatural types. A special acknowledgment is made to W. G. D'Arcy for critical review of the English manuscript and for other help and suggestions.

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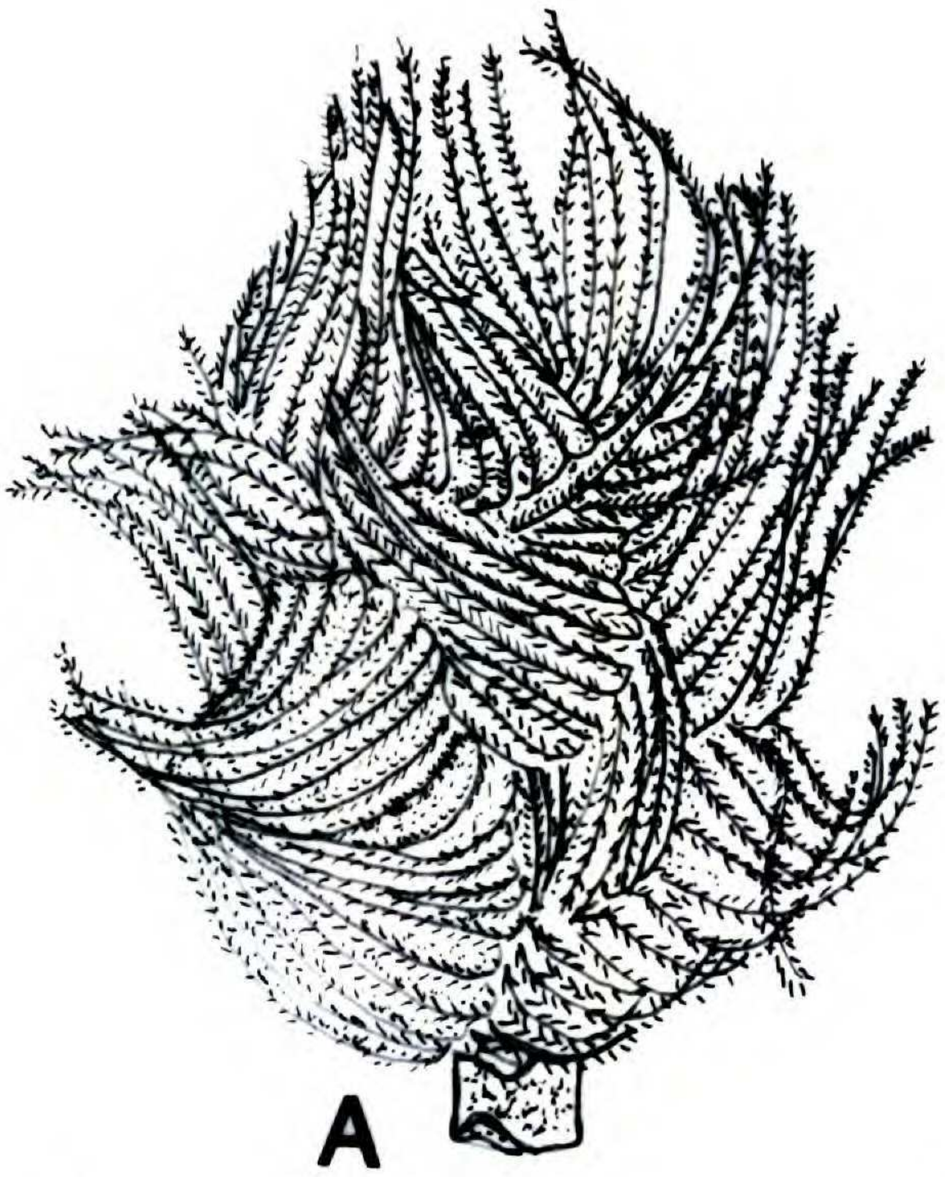

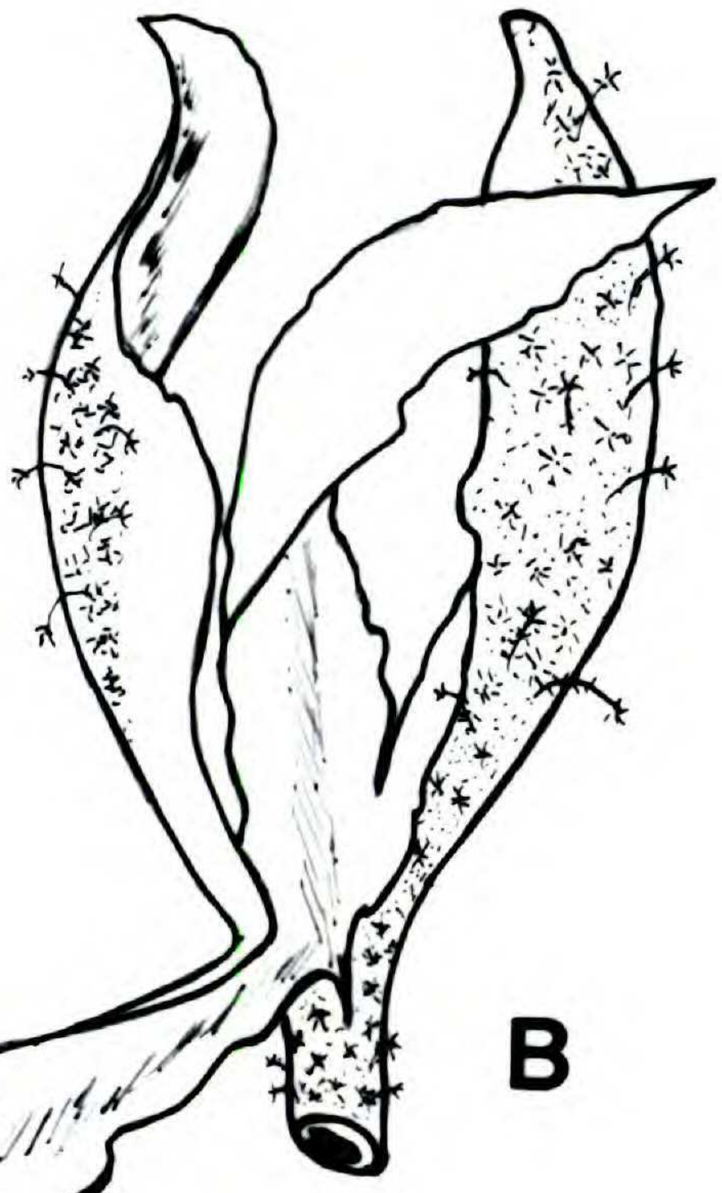

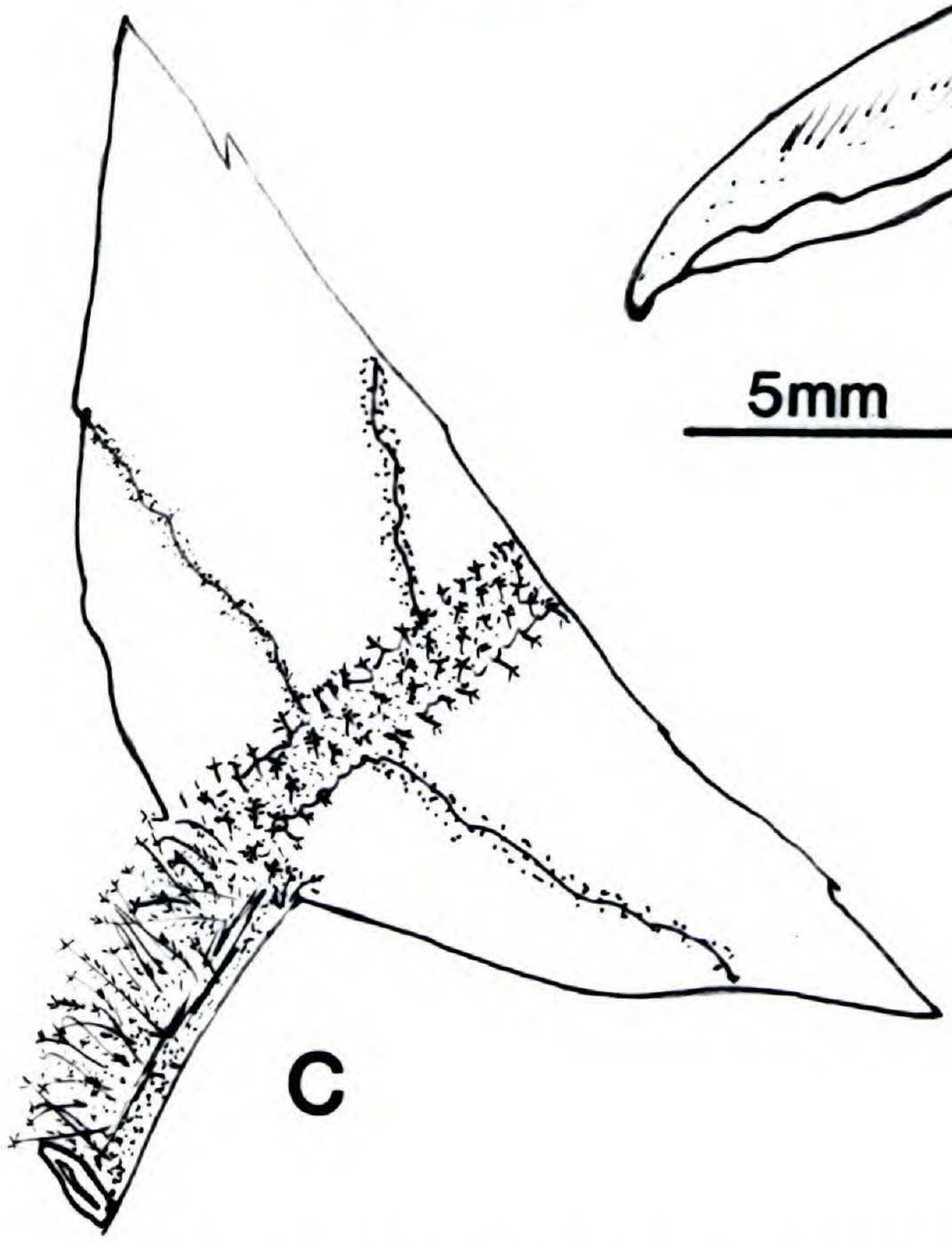

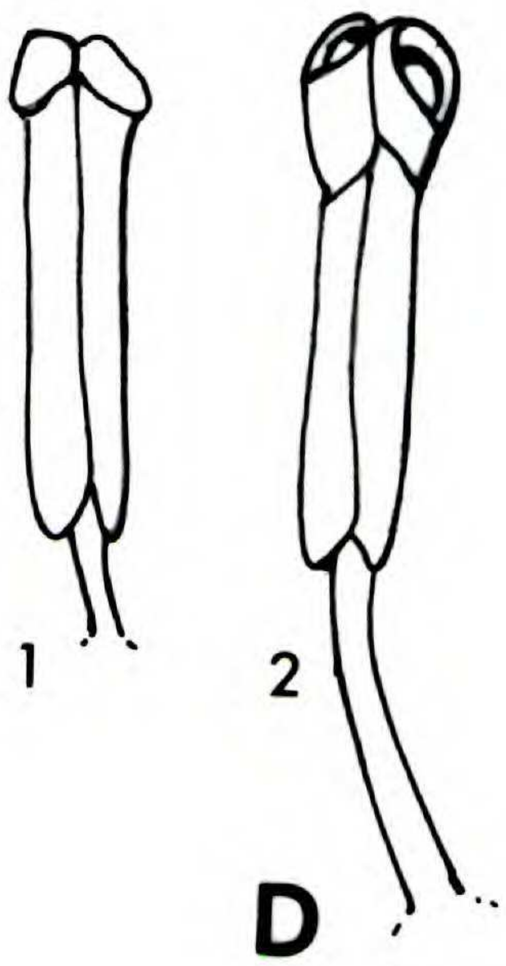

FIGURE 1. *Solanum caldense* (from *Widgren s.n.*, 1845, R).—A. Bud oblong, densely tomentose outside.—B. Corolla campanulate-stellate, densely tomentose with long-pedicellate stellate trichomes.—C. Petiole and leaf base, the petiole densely tomentose with stellate-stalked trichomes.—D. Anthers linear, the filament elongate. (1) Dorsal (abaxial) face. (2) Ventral (adaxial) face.

longis, racemosa, pedunculo 20–35 mm longo instructa. Flores globosi pubescentesque. Calyx urceolatus, externe tomentosus pilis dendriticis. Fructus haud vidi.

Small trees with fistulose branches; indumentum whitish or yellowish, densely floccose on young branches, the trichomes stellate-pedicellate, dendritic or paleaceous(chaffy)-fringed, short and soft. Leaves solitary, oblong to oblong-lanceolate, 17–22 cm long and 9–11 cm wide, glabrate above with stellate-pedicellate or rarely porrect-stellate trichomes on the main veins, densely lepidote-tomentose beneath with stellate-pedicellate ornamented trichomes, central cells present, 47–60 μm diam., 8–9(–12) radial cells 20–34 μm long, free

portion 17–32 μm; petiole ca. 2.5 cm long, densely tomentose with stellate-pedicellate trichomes. Inflorescence short pedunculate, ca. 2–3.5 cm long, extra-axillary, robust, congested, 9–15 cm long, cymose-dichotomous of about 80 flowers in series rather than glomerules, rachis straight, 6–11 cm long, densely floccose with stellate-pedicellate, dendritic and fimbriate-paleaceous trichomes; peduncle straight, 2–3.5 cm long. Flowers with buds oblong, sessile; calyx urceolate, ca. 1.6 cm long, densely tomentose outside, the lobes equal, acute, ca. 4 mm long; corolla campanulate-stellate, 2 cm long with short tube and evident vascularization, densely tomentose with long-pedicellate stellate and dendritic trichomes inside; anthers linear, ca. 5 mm long. Fruits unknown.

Paratype: BRAZIL. MINAS GERAIS: Municipality of Caldas, 1 Feb. 1876 (fl), *H. Masén 4295* (R).

Distribution and habitat. During 1841–1876 the region of Caldas in the state of Minas Gerais hosted a vegetation classified as broad-leaved tropical forest. *Solanum caldense* occurred there at that time together with *Solanum cernuum*; a more recent collection has not been seen. The flowers appear in February.

Affinity. *Solanum caldense* is similar to *Solanum pachinatum* Dunal with respect to the stellate-pedicellate, dendritic and chaffy-fringed soft trichomes, which are somewhat united like the tuft-forming, densely floccose indumentum on the branches, inflorescences, and on lower parts of the petiole It is distinguished principally by the erect, long rachis with flowers in series and by the urceolate calyx.

The species is named after the locality of Caldas, where the species was first found.

2. Solanum carautae Carvalho, sp. nov. TYPE: Brazil. Rio de Janeiro: Municipality of Parati, Parati–Mirim, 8 Dec. 1976 (fl, fr), *D. Araujo, M. D. Vianna, R. F. Oliveira & P. J. P. Carauta 1421* (holotype, GUA). Figures 2, 3D–G, 14C.

Frutex vel arbor indumento lepidoto-adpresso, trichomatibus peltatis rariusve peltato-stellatis. Folia geminata, fere conformia, membranacea, late lanceolata, 70–140 mm longa et 42–50 mm lata, indumento argenteo vel obscure cinereo pilisque peltatis in facie superiore, subtus peltatis et peltato-stellatis sparsique. Inflorescentia cymosa vel dichotoma usque ad 6.5 mm longa, pedunculo 2–3.5 mm longo, rachi brevi scorpioidea pauciflora (floribus ad 10). Fructus globosus, ad 0.9 mm diametro, calyce accrescente involucrato, indumento adpresse lepidoto ornatus.

Shrubs or trees 3–6 m tall, young branches slightly striate and angulate, the indumentum sparsely lepidote, silvery and somewhat dark with peltate trichomes. Leaves sparse, geminate, the larger leaves membranaceous, broadly lanceolate, 7–14 cm long and 4.2–5 cm wide, apically long-acuminate, almost falcate, basally attenuate, slightly asymmetric, the margin slightly inrolled, secondary veins 10–18, prominent beneath, camptodromous, discolorous, the pubescence argenteous or greenish beneath, appressed-lepidote with peltate trichomes and peltate-stellate trichomes with 8–20 radial cells, sparsely pubescent above; the smaller leaves similar but only 7 cm long; petiole ca. 1 cm long. Inflorescences opposite the leaves or extra-axillary, erect, a dichotomous cyme of ca. 15 flowers, ca. 6.5 cm long, the rachis scorpioid, 1.5–2 cm long, appressed-lepidote, the peduncle 2–3.5 cm long. Flowers with pedicels ca. 1 cm long; calyx campanulate, 2.4 mm long, the lobes acute, 1–2 mm long, appressed-lepidote outside; corolla white, rotate-stellate, 1.2 cm long and 2.5 cm diam., the lobes lanceolate, 8 mm long; anthers oblong, subsessile, 4–5 mm long, 1 mm wide, the filaments 0.50 mm free. Berry globose, ca. 9 mm diam.; fruiting pedicels erect with dense, peltate and peltate-stellate indumentum; fruiting calyx accrescent to cover most of berry, ca. 1.2 cm long, the lobes lanceolate, sparsely pubescent with peltate trichomes.

Paratype. BRAZIL. RIO DE JANEIRO: Municipality of Angra dos Reis, Ilha Grande, road to Palmas beach, 20 Apr. 1980 (fl), *M. R. V. Barbosa 31* (GUA).

Distribution and habitat. The species is a heliophyte from Atlantic forest and sandbank (restinga) of the Municipalities of Angra do Reis and Parati in the state of Rio de Janeiro.

In the "restinga" the species was observed in flower and fruit in December, and no significant variation was noticed in individuals of this shrubby plant formation.

Solanum carautae is related to *S. swartzianum* and especially to its subsp. *argyrophyllum* (Dunal) Carv., a taxon also occurring in the southern Brazilian forests of the states of Rio de Janeiro, Espírito Santo, and frequently in Minas Gerais and Bahia. It differs in its dark or silvery indumentum, its broadly lanceolate, long-acuminate leaves, which may grow to 14 cm long and have a membranaceous texture, and in its long-stalked inflorescence with scorpioid rachis.

This epithet honors botanist Pedro J. P. Carauta, researcher of the Fundação Estadual de Meio Am-

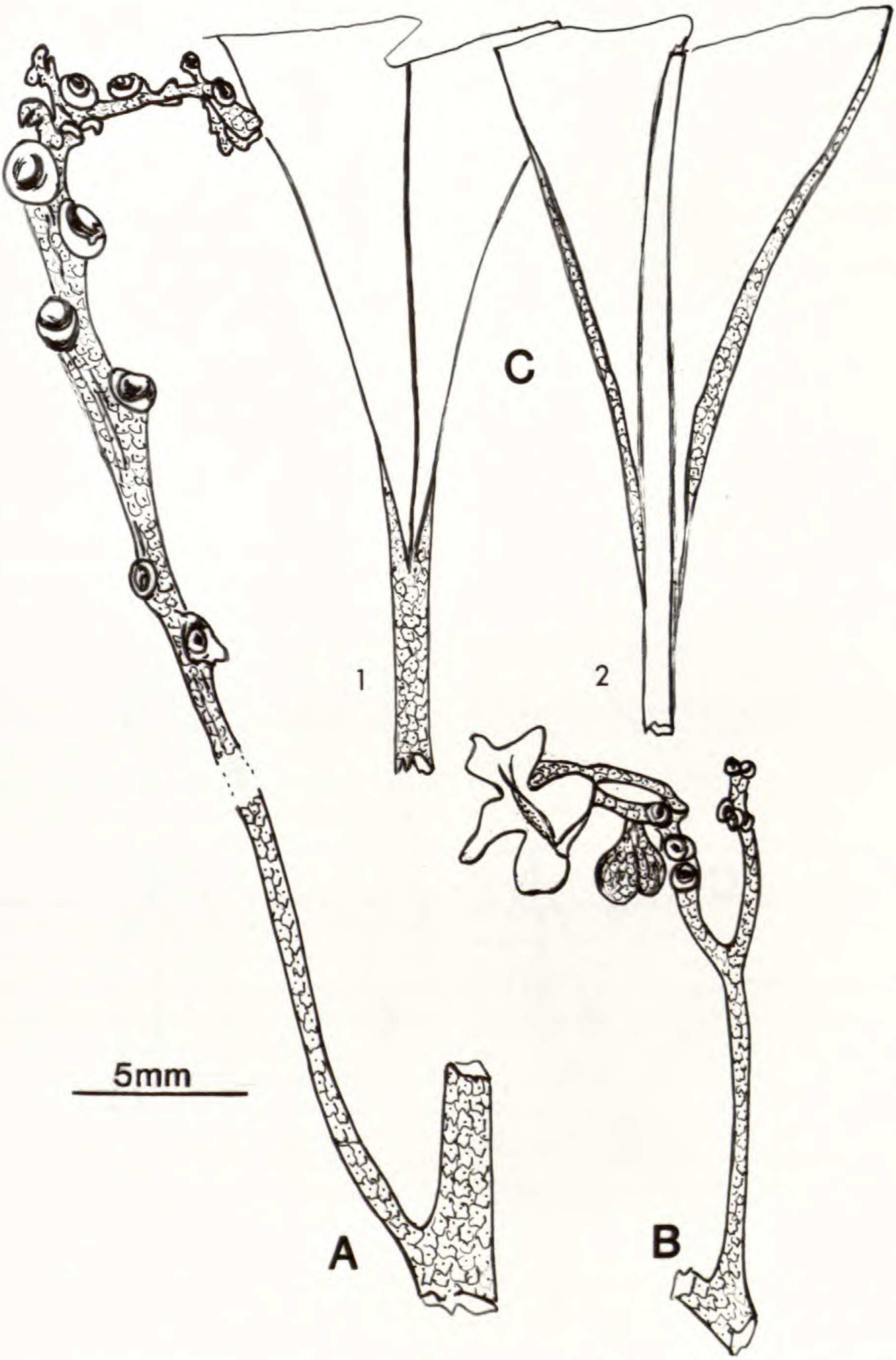

FIGURE 2. *Solanum carautae* (from *Araujo et al. 1421* GUA).—A, B. Cymose and dichotomous-cymose inflorescences, the rachis with a scorpioid cicatrice of pedicel articulations.—C. Attenuate leaf bases. (1) Ventral view. (2) Dorsal view.

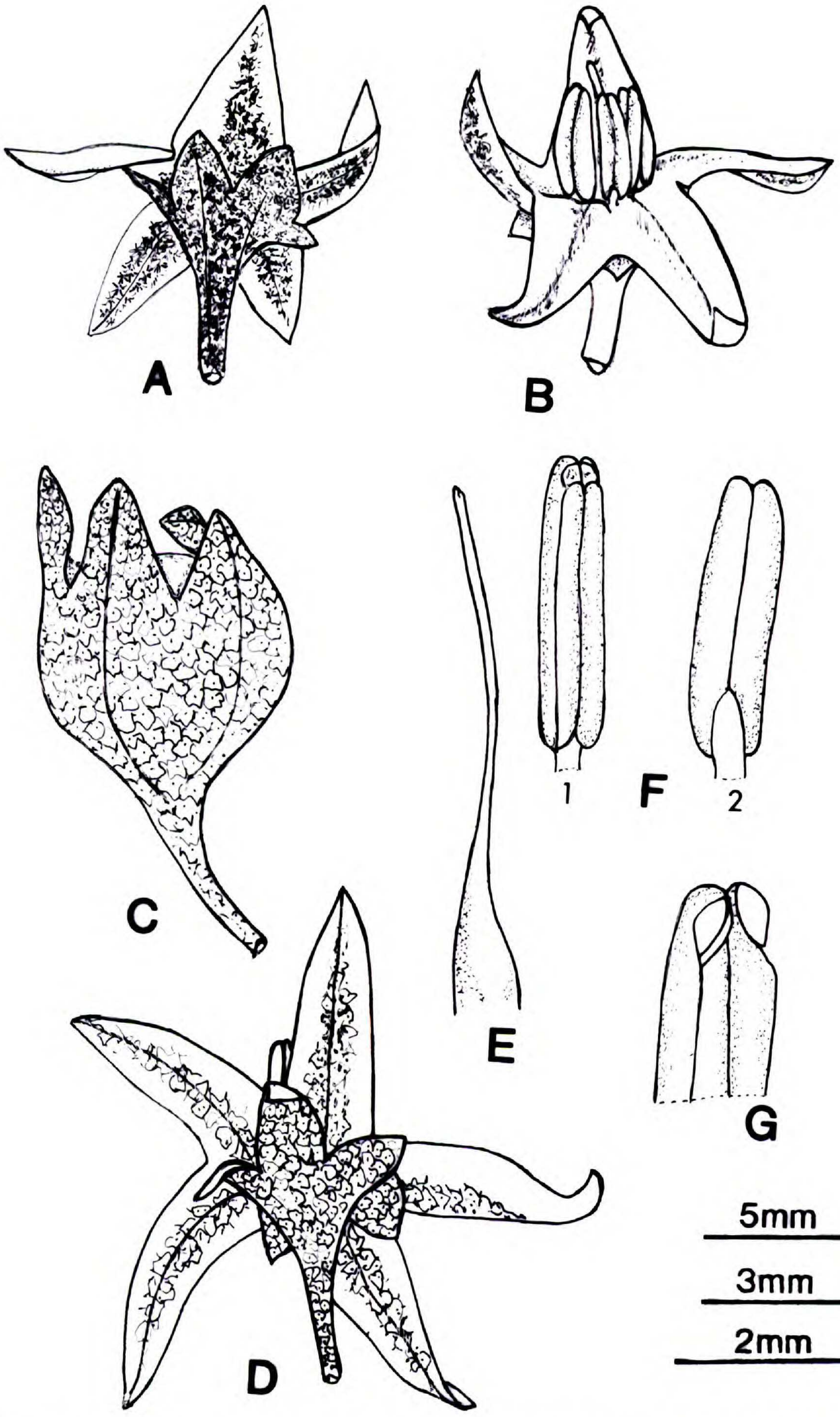

FIGURE 3. *Solanum carautae* and *Solanum hatschbachii*. A–C. *Solanum hatschbachii* (from *Hatschbach 26837* BH).—A. Open flower showing the lanceolate calyx lobes.—B. Open flower showing stamen placement.—C. Fruit, the calyx covers most of the berry. D–G. *Solanum carautae* (from *Araujo et al. 1421* GUA).—D. Open flower showing the campanulate calyx and rotate-stellate corolla with lanceolate lobes.—E. Gynoecium.—F. Stamens with oblong, subsessile anthers. (1) Ventral face. (2) Dorsal face.—G. Anther apex.

biente, Departamento de Conservação Ambiental, Rio de Janeiro (FEEMA), and one of the collectors of the type specimen.

3. Solanum davidsei Carvalho, sp. nov. TYPE: Venezuela. Bolívar: La Gran Sabana, Km 145 along hwy., 2 km S of La Ciudadella, 3 Dec. 1973 (fl, fr), *G. Davidse 4716* (holotype, MO; isotype, VEN). Figures 4, 14D.

Frutex 1.5 cm altus, indumento aurantiaco lepidoto-adpresso pilis peltatis rariusque peltato-stellatis formato, rami flexuosi, internodiis usque ad 1–5 mm longitudine. Folia geminata, inaequalia sparsa late lanceolata, apice longe cuspidata, basi acuta asymmetrica, ad 80 mm longa et 2–3 mm lata; petiolus ca. 1–2 mm longus. Inflorescentia pauciflora, in cymis simplicibus disposita, erecta, rachi valde reducta, prope 3–5; corolla alba campanulato-stellata, laciniis longe lanceolatis. Fructus calyce ampliato inclusus.

Shrubs to 1.5 m tall, the appressed-lepidote indumentum of peltate trichomes showing an intense golden color; young branches flexible and plane. Leaves unequal-geminate, sparse on branches, the internodes 1.5 cm long, the large blades broadly lanceolate, 3.5–8 cm long and 1.8–3.2 cm wide, the apex long-cuspidate or long-acuminate, the base acute, asymmetric, the margin inrolled, discolorous, glabrate or sparsely appressed-lepidote, above appressed-lepidote with peltate and peltate-stellate trichomes 35–44 μm diam. with 33–37 radial cells 16–22 μm long, secondary veins 13–15, camptodromous; smaller leaves ca. 3 cm long and 1.2 cm wide; petioles ca. 1.2 cm long, canaliculate, appressed-lepidote. Inflorescence extra-axillary, erect, ca. 5 cm long, simple cymes of 3–5 flowers with a short rachis; peduncle ca. 2.6 cm long, terete. Flowers with the pedicel terete, basally articulated, ca. 1 cm long; calyx campanulate ca. 4 mm long, the lobes acute, ca. 2 mm long, indumentum appressed-lepidote on both surfaces; corolla white, campanulate-stellate, ca. 1.5 cm long, ca. 2 cm diam., the lobes long-lanceolate, ca. 8 mm long, indumentum appressed-lepidote outside; anthers ca. 4 mm long, equal, oblong, subsessile; style with the stigmatic region spatulate. Berry globose; calyx accrescent and covering most of the berry; seeds flattened-reniform, ca. 2 mm long, 2 mm wide.

Paratype. VENEZUELA. BOLÍVAR: la Gran Sabana, 49 km W of intersection of main road to Sta. Elena and road to Cabanayen, hillside with savanna on upper slope, forest in gallery, 1,360 m, *Davidse 4752* (MO).

Distribution and habitat. This new species is indigenous to the Gran Sabana region of southern Venezuela at an elevation of ca. 1,300 m. It was found growing with dominant Gramineae of the genera *Echinolaena*, *Paspalum*, and *Trachypogon*.

Affinity. *Solanum davidsei* is closely related to *Solanum swartzianum* and especially to its subsp. *chrysophyllum* (Dunal) Carv. from Brazil and Venezuela. The two species share an intense golden appressed-lepidote indumentum and few-flowered inflorescences. *Solanum davidsei* differs from *Solanum swartzianum* subsp. *chrysophyllum* in its broadly lanceolate, long-cuspidate leaves, which occur sparsely along the flexuous branches, and in the long-pedunculate reduced rachis of the inflorescence.

4. Solanum hatschbachii Carvalho, sp. nov. TYPE: Brazil. Paraná: Municipality Bocaiuva do Sul, Sumidouro, 6 July 1971 (fl), *G. Hatschbach 26837* (holotype, BH). Figures 3A–C, 15A.

Frutex indumento lepidoto-adpresso pilis peltatis et peltato-stellatis, 17–45 cellulis radiatis interdum apiculatis constitutis. Folia geminata, inaequalia, chartacea, anguste lanceolata, ad 100 mm longa et 2.7 mm lata usque, supra indumento argenteo vel cinereo vestita subtusque glabra. Inflorescentia cymosa aut subdichotoma sive pseudo-corymbosa, usque ad 2.5 mm longa, breviter pedunculata pedunculo 1.5 mm longo rhachi scorpioidea pauciflora (floribus ad 10). Fructus incognitus.

Shrubs to 2 m tall, young branches terete and striate, indumentum argenteous or greenish, lepidote-appressed with peltate trichomes. Leaves geminate, unequal, sparse on the branches; larger leaf blades chartaceous, lanceolate, 7–10 cm long × 2–2.7 cm wide, apically acuminate, basally acute and somewhat asymmetric, the margin entire to revolute, 10–18 secondary veins prominent on the dorsal surface, camptodromous, discolorous, indumentum appressed-lepidote with peltate and peltate-stellate trichomes on the dorsal surface, glabrous above; smaller leaves to 3.5 cm long, apically obtuse. Inflorescences opposite the leaves or extra-axillary, erect, ca. 2.5 cm long, simple cymes or subdichotomous to somewhat pseudocorymbiform with ca. 10 flowers, rachis scorpioid, elongate, appressed-lepidote; peduncle short, ca. 1.5 cm long. Flowers with the pedicel articulate, to 3 mm long; buds globose; calyx campanulate, ca. 6 mm long, the lobes acute, to 4 mm long, corolla white, rotate-stellate, ca. 1.5 cm long and 2 cm diam., the lobes lanceolate, to 9 mm long, indumentum appressed-lepidote, the outside of the calyx and the corolla with peltate trichomes and their venation formed of 5 median and 10 weak laterals, hardly ramified, acropetally anastomosing; anthers equal, oblong,

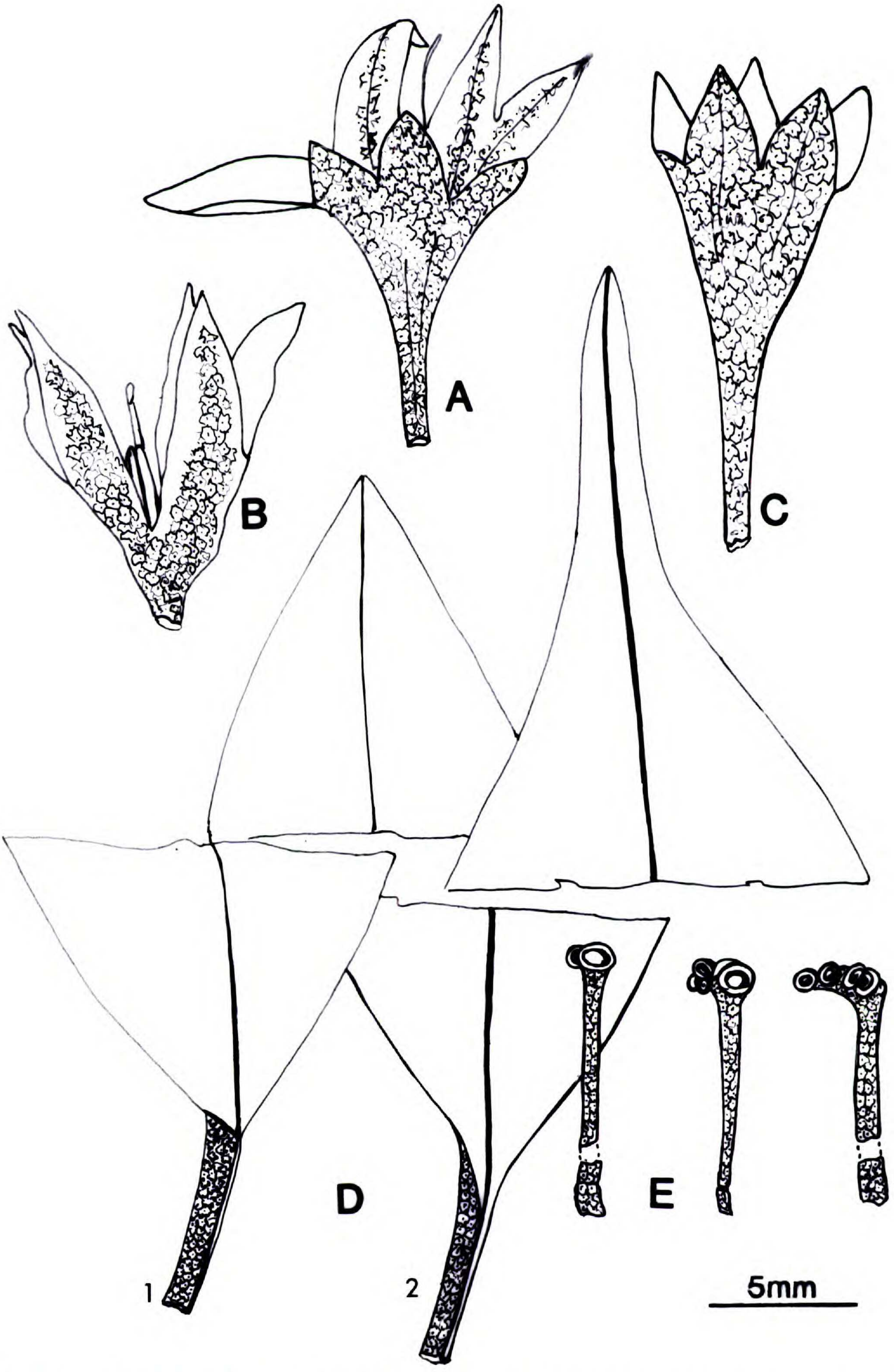

FIGURE 4. *Solanum davidsei* (from *Davidse 4716* MO).—A. Open flower showing the campanulate calyx, the campanulate-stellate corolla, and the long style.—B. Corolla showing the long-lanceolate lobes and appressed-lepidote

ca. 5 mm long, connivent, subsessile. Fruit unknown.

Paratype. BRAZIL. PARANÁ: Municipality Bocaiuva do Sul, Jaguariaíva, 10 May 1914 (fl), *P. Dusén s.n.* (S).

Distribution and habitat. This species occurs in the state of Paraná in the municipalities of Jaguariaíva and Sumidouro. The botanist P. Dusén collected it in primary forest, and Hatschbach collected it in secondary formation. Flowering, still with leaf branches, is in May and July.

Affinity. *Solanum hatschbachii* approaches *Solanum swartzianum* Roem. & Schult., especially its var. *Swartzianum*, but is distinguished by its lanceolate leaves up to 2.5 cm wide and by its leafy habit with leaves regularly spaced.

This epithet honors the collector, botanist Gert Hatschbach, from "Museu Botanico Municipal" of the Curitiba state of Paraná, a great connoisseur of the plant life of this region.

5. Solanum lepidotum var. **lepidiochlamys** Bitter ex Carvalho, var. nov. TYPE: Colombia: Cordillera Occidental, 1,900 m, 9 Sep. 1899 (fl), *E. Langlassé 58* (holotype, G; isotype, P, fragment, F). Figures 10, 15B.

Solanum lepidotum subsp. *lepidiochlamys* Bitt. mss. in sched. herb, Genève (G), nomen ined.

Arbuscula indumento adpresse lepidoto aurantiaco vestita trichomatibusque peltatis atque peltato-stellatis. Folia geminata, magnitudine formaque inaequalia, lanceolata, ca. 6 cm longa et 3 cm lata, apice recta vel falcata, basi obtusa aut decurrentia, leviter asymmetrica, margine integra et revoluta. Inflorescentia multiflora, erecta, laxa rachi scorpioidea. Fructus haud vidi.

Small trees to 3 m tall, indumentum appressed-lepidote, golden or rarely argenteous with peltate and rare peltate-stellate trichomes. Leaves geminate, unequal in size and form, the larger leaves chartaceous, lanceolate, 5.3–10 cm long and 1.5–3 cm wide, apically acuminate, straight or falcate, basally obtuse, decurrent, somewhat asymmetric, the margin entire to revolute, the indumentum appressed-lepidote above, glabrescent beneath, peltate and peltate-stellate, the trichomes, 30–47 μm diam. with 27–33 radial cells, 18–25 μm long, the free portion 2–7 μm. Inflorescence long-stalked, 5–6.5 cm long, erect, cymose-dichotomous of about 100 flowers, straight or scorpioid at the end of the rachis, ca. 2.5 cm long; peduncle ca. 30 cm long. Flowers as in the typical subspecies. Fruit unknown.

Paratypes. COLOMBIA. ANTIOQUIA: Angelopsis La Camelia, 1,800 m, 22 Jan. 1928 (fl), *Toro 884* (NY), *Mayor 401* (Z). CAUCA: El Tambo, 1,700 m, 22 July 1938 (fl), *Sneidern 1495* (S); Chisquio, Finca dos Derrumbos, 1,700 m, 3 Apr. 1949 (fl), *Asplund 10716* (NY, S); Hague, 3 Sep. 1844 (fl), *Goudot s.n.* (BM, F, MO, NY, S). VALLE: near River Calí, Pichinché, 1,700 m, 1946, *Duque-Jaramillo 3935* (NY).

Distribution and habitat. This plant grows exclusively in Colombia at 1,700–1,900 m altitude in the same place as *Solanum lepidotum* Dunal var. *lepidotum*. Flowering is in September.

Affinity. *Solanum lepidotum* var. *lepidochlamys* differs from the typical taxon, *Solanum lepidotum* Dunal var. *lepidotum*, by the lanceolate form of the leaves and the densely leafy branches.

The name of this taxon alludes to the plant's lepidote indumentum.

6. Solanum lepidotum var. **trianae** Carvalho, var. nov. TYPE: Colombia. Province Quindío: 1,800 m altitude (Nouvelle–Genade), between 1851 and 1857, *J. Triana s.n.*, Voyage de J. Triana, 1851–1857 (fl) (holotype, P; isotypes, BR, G. NY, W). Figure 15C.

Arbusculo indumento argenteo adpresse lepidoto pilis peltatis ornato. Folia solitaria et geminata inaequalia sparsa membranacea lanceolata ad oblongo lanceolata, usque ad 150 mm longa et 4.5 mm lata apice cuspidata vulgo falcata, basi obtusa margine integra trichomatibus peltatis ca. 47 μm diametro, cellulis radialibus fere ommino coalitis; petiolus ad 10 mm longus. Fructus desunt.

Trees, indumentum appressed-lepidote argenteous of peltate trichomes. Leaves sparse, solitary or geminate on young branches, unequal in size and form, the larger leaves membranaceous, from lanceolate to oblong-lanceolate, to 15 cm long and 4.5 cm wide, apically cuspidate to reflexed (falcate), basally obtuse, margin entire, trichomes peltate, ca. 47 μm diam., with ca. 35 radial cells almost totally connected; petioles ca. 1 cm long. Flowers as in the typical subspecies. Fruit unknown.

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indumentum outside.—C. Accrescent calyx covering most of the young berry.—D. Examples of leaf bases and apices. (1) Apex acute and base acuminate. (2) Apex long-cuspidate and base acute and asymmetrical.—E. Inflorescence, simple cymes with a short rachis and terete peduncle.

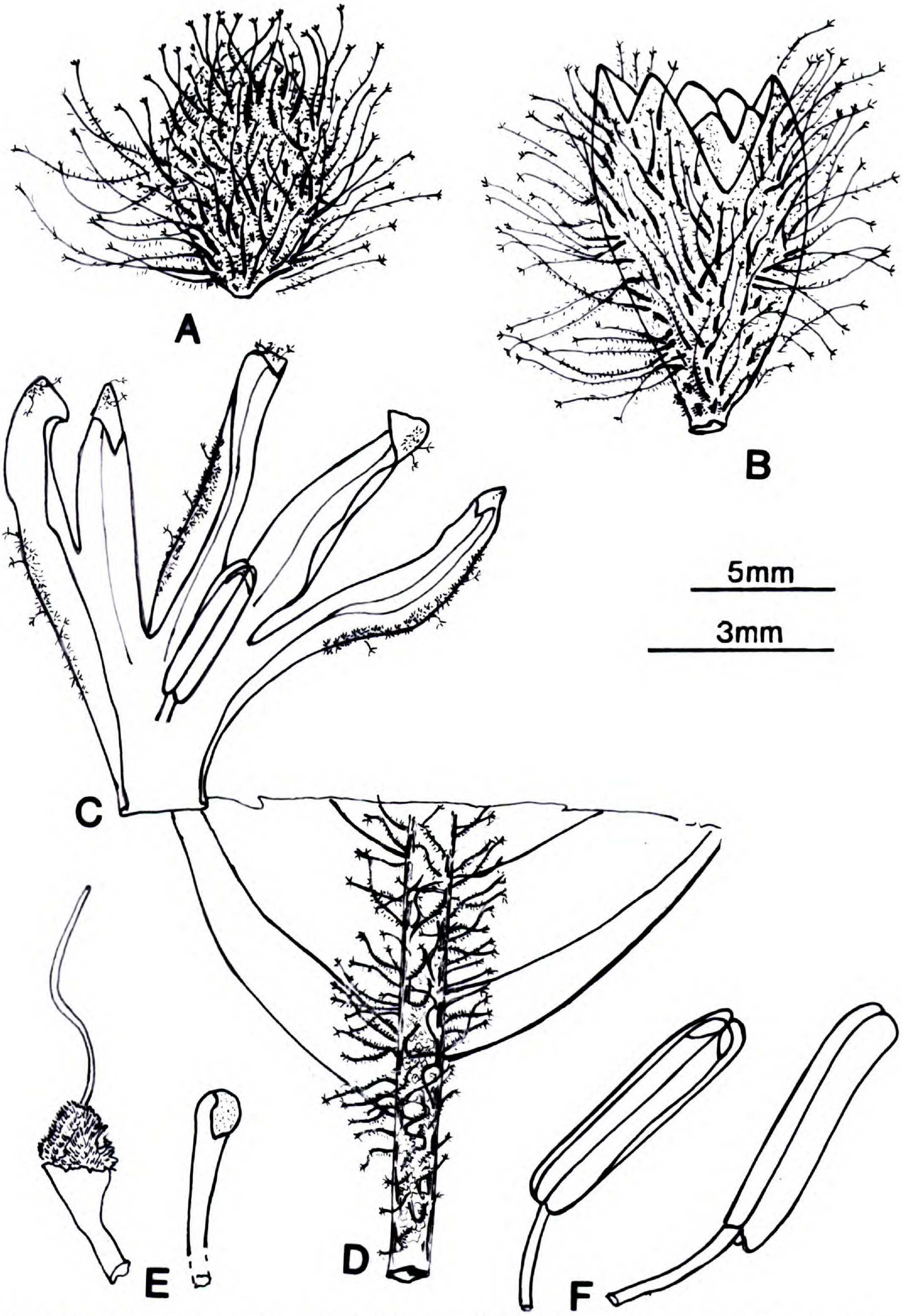


FIGURE 5. *Solanum oliveirae* (from *R. F. de Oliveira et al. 455* GUA).—A. Flower bud.—B. Flowering calyx.—C. Corolla, campanulate-stellate.—D. Leaf base and petiole apex.—E. Gynoecium showing ovary pubescence and demarcated stigmatic region.—F. Anthers, linear with elongate filaments.

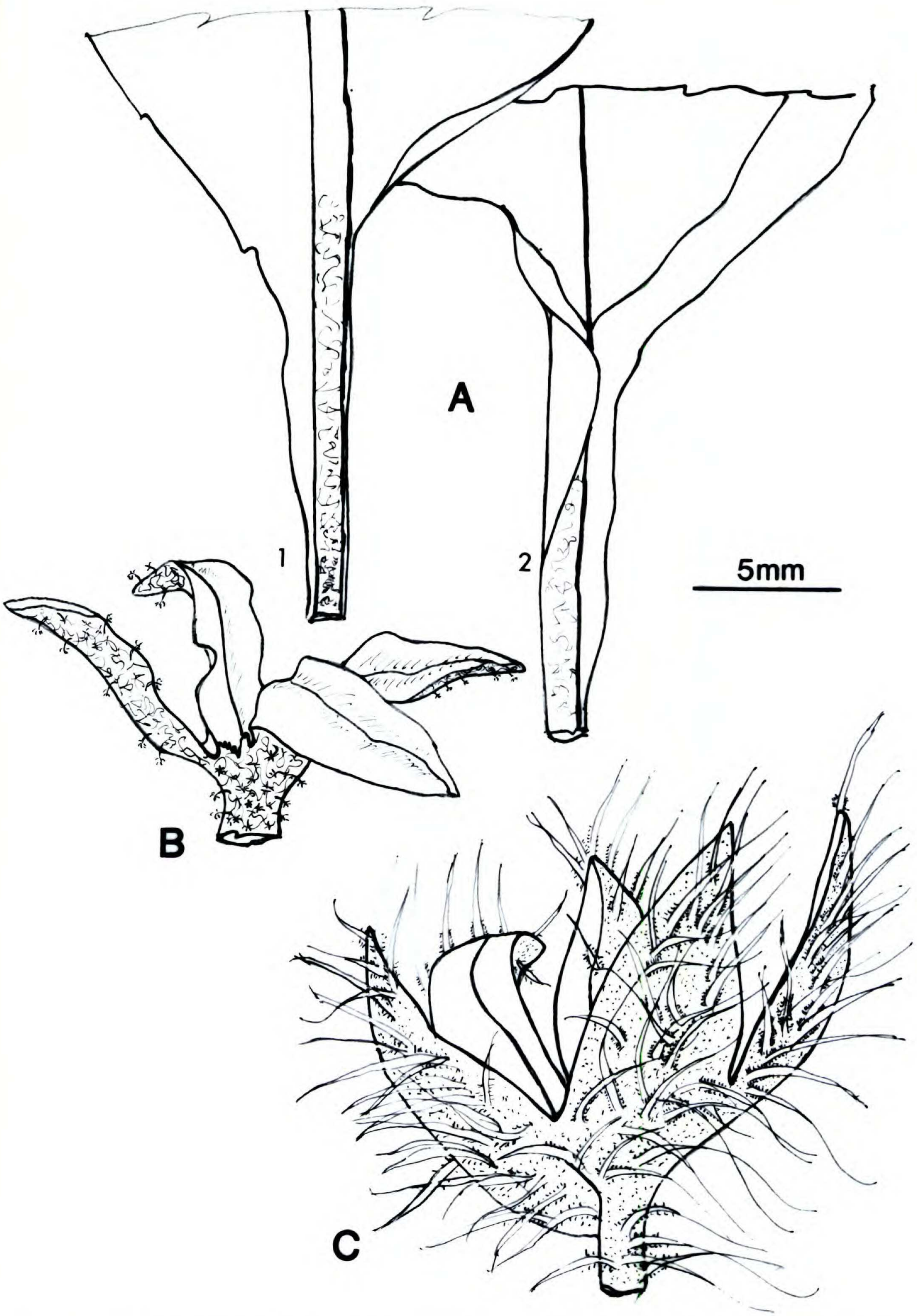


FIGURE 6. *Solanum pereirae* (from *E. Pereira 1270* RB).—A. Leaf bases. (1) Dorsal view. (2) Ventral view.—B. Corolla, campanulate-stellate.—C. Calyx, campanulate with paleaceous-laminate or fringed trichomes.

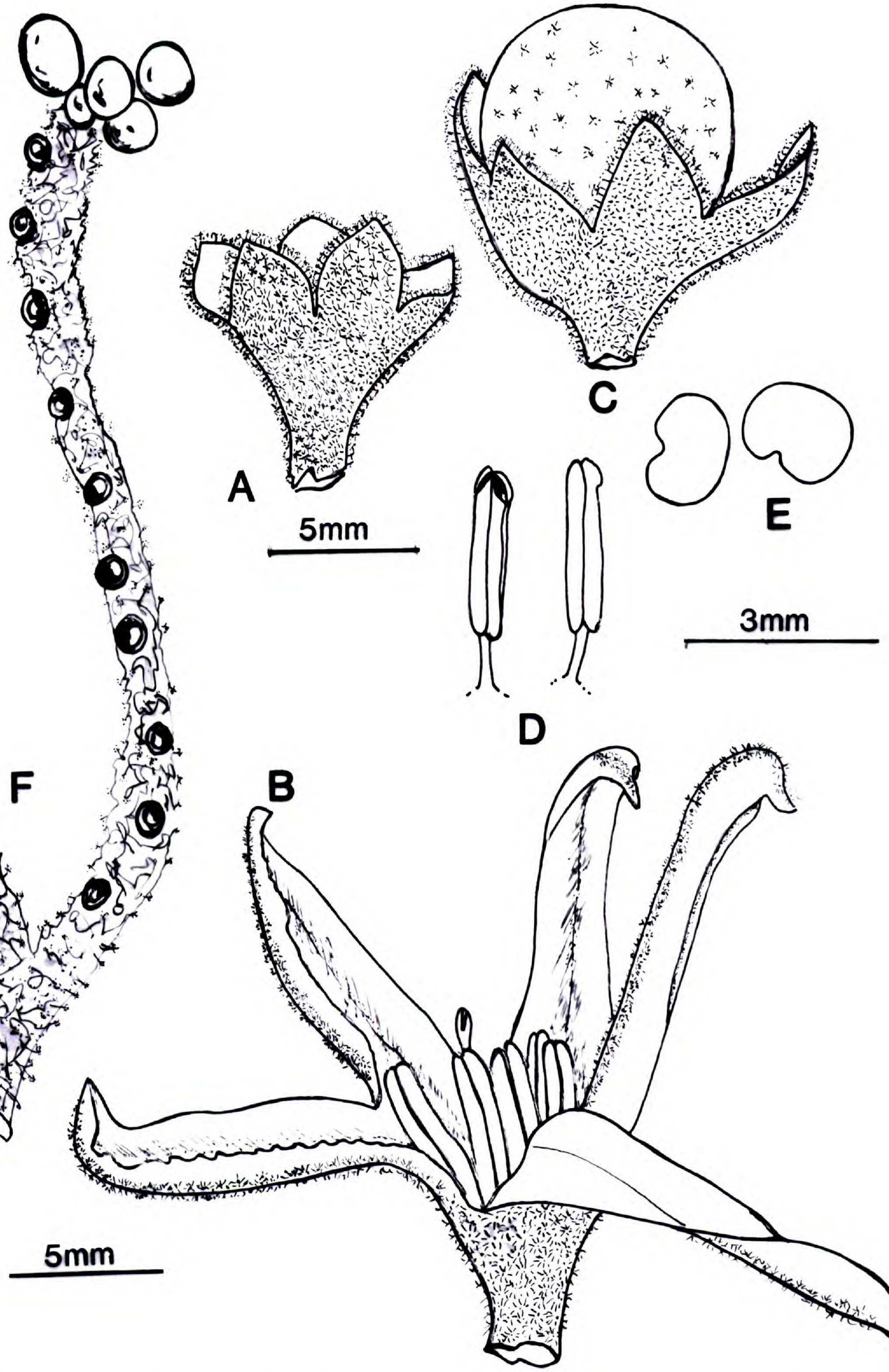


FIGURE 7. *Solanum sooretamum* (from *R. P. Belem 1534* UB).—A. Calyx, densely floccose with stellate trichomes.—B. Open corolla, campanulate-stellate with stamens and style.—C. Fruit, a globose berry partly covered by the enlarged calyx.—D. Anthers, linear with short filaments.—E. Seeds.—F. Scorpioid inflorescence branch with cicatrice of pedicel articulations.

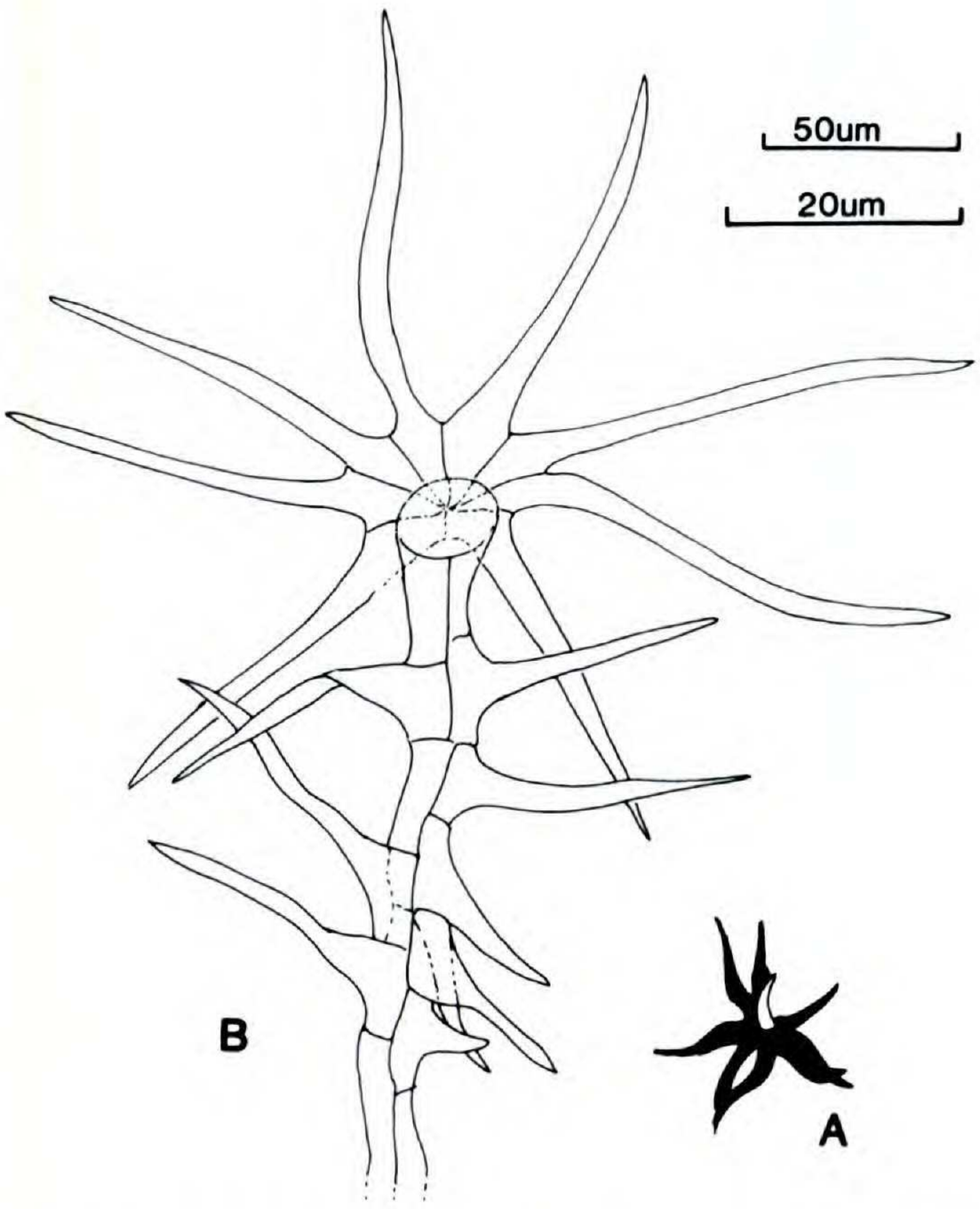


FIGURE 8. *Solanum caldense* (from *Widgren s.n.* R). — A. General view of stellate-pedicellate trichomes (50 μm scale). — B. Structure of stellate-trichome showing long stalk with lateral expansions.

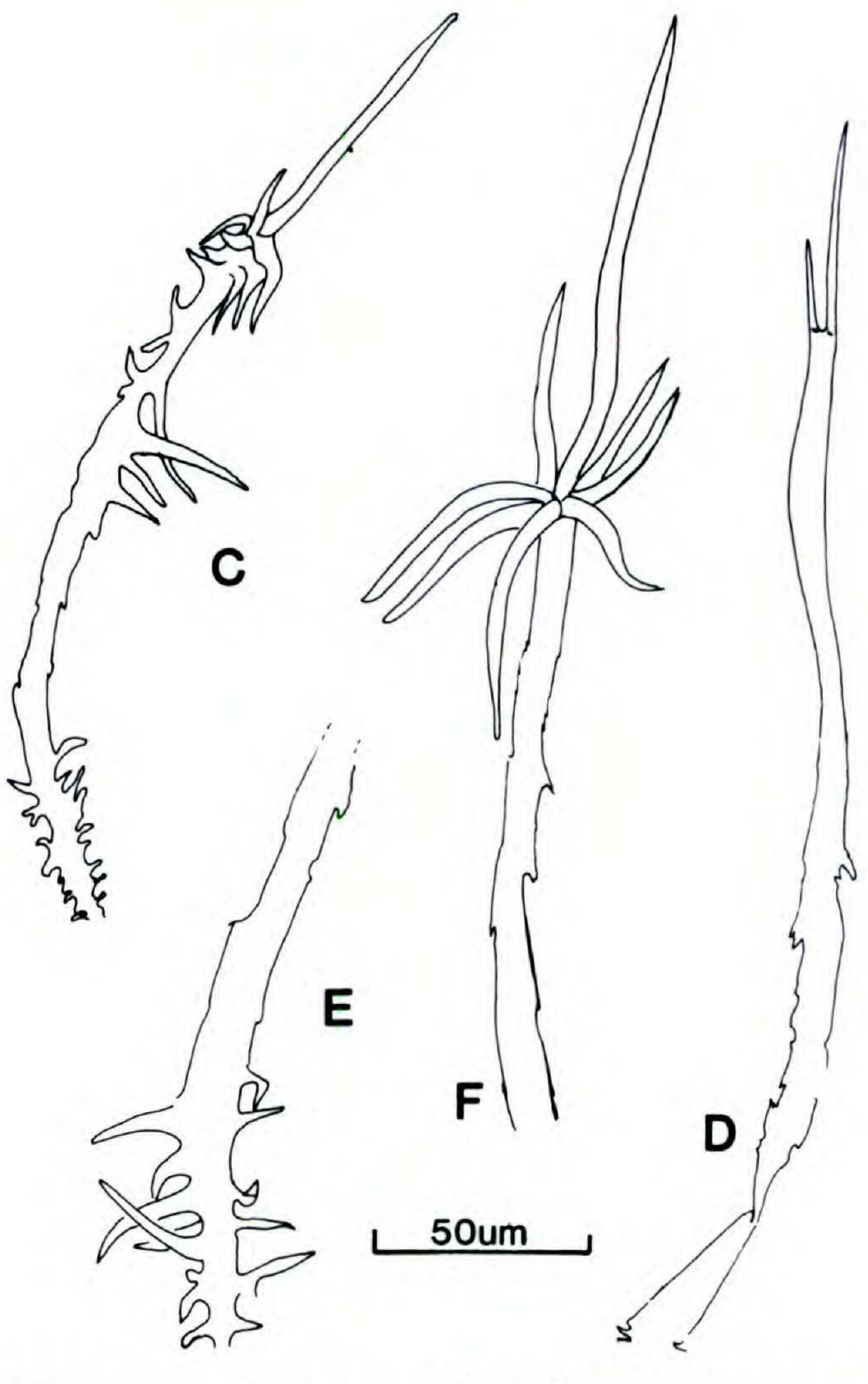


FIGURE 9. *Solanum caldense* (from *Widgren s.n.*, R). — C–F. Paleaceous-fimbriate trichomes; fringed-chaffy, stellate with a central cell, and ornamented pedicel (50 μm scale).

Distribution and habitat. The J. Triana collection was distributed to various herbaria (BR, G, NY, P, W) without indication of collection locality and sometimes with mention of only the country and altitude. This plant grows at 500–1,500 m on Quindío in the department of Huila, and it is known only by the type collection. Time of flowering is unknown.

Affinity. *Solanum lepidotum* var. *trianae* differs from the typical taxon in its argenteous indumentum, which is formed of large diameter peltate trichomes with radial cells almost totally connected and also in having a lanceolate to oblong-lanceolate leaf blade up to 15 cm long and 4.5 cm wide.

The epithet honors botanist J. Triana, collector of the type specimen.

7. Solanum oliveirae Carvalho, sp. nov. TYPE: Brazil. Rio de Janeiro: Varre–Sai, 4 Sep. 1984 (fl), *R. F. de Oliveira et al. 455* (holotype, GUA). Figures 5, 11, 16A.

Frutex ramis rigidis dense floccoso-paleaceis castaneis, pilis paleaceo-fimbriatis et dentriticis rariusve paleaceo-laminaribus vel stellatis. Folia solitaria, magna, oblonga, basi angustata, apice obtuso plus minusque emarginata, 160–260 mm longa et 90–110 mm lata, supra glabrescentia, scabra, pilis stellatis, infra pallidiora, cinerascentia, dense lepidoto-tomentosa, pilis stellatis raris ornata secundum nervos; petiolus ca. 30 mm longus. Inflorescentia extra-axillaris, cymosa dichotoma, ramis rectis, singulis ramis floribus prope 30, indumento densissimo floccoso-paleaceo castaneo vestita ab omni parte, pilis paleaceo-laminaribus atque fimbriatis brevibus flores non cingentibus. Flores lutei. Calyx urceolatus vel late tubulosus, strigosus. Bacca globosa, calyce ampliato inclusa.

Shrub 2–6 m tall with rigid or fistulose branches, the indumentum whitish or yellowish, densely floccose, chaffy-fringed of dendritic and rarely chaffy-laminate and stellate trichomes with multicellular pedicels. Leaves solitary, oblong, 16–26 cm long and 9–11 cm wide, apically obtuse to obtuse-emarginate, basally obtuse, glabrescent above with stellate pedicellate trichomes bearing an apiculate central cell 66–72 μm diam., (5–)8 radial cells, 30–39 μm long and the free portion 25–36 μm; densely lepidote-tomentose beneath with stellate trichomes 35–44 μm diam. having 14–16(–17) radial horizontal cells, 16–21 μm long, the free portion 10–16 μm long, short-stalked, ornamented with a small apiculate central cell, rarely with soft, hyaline stellate trichomes that have ca. 20 radial cells and multiseriate pedicels on the main veins; secondary

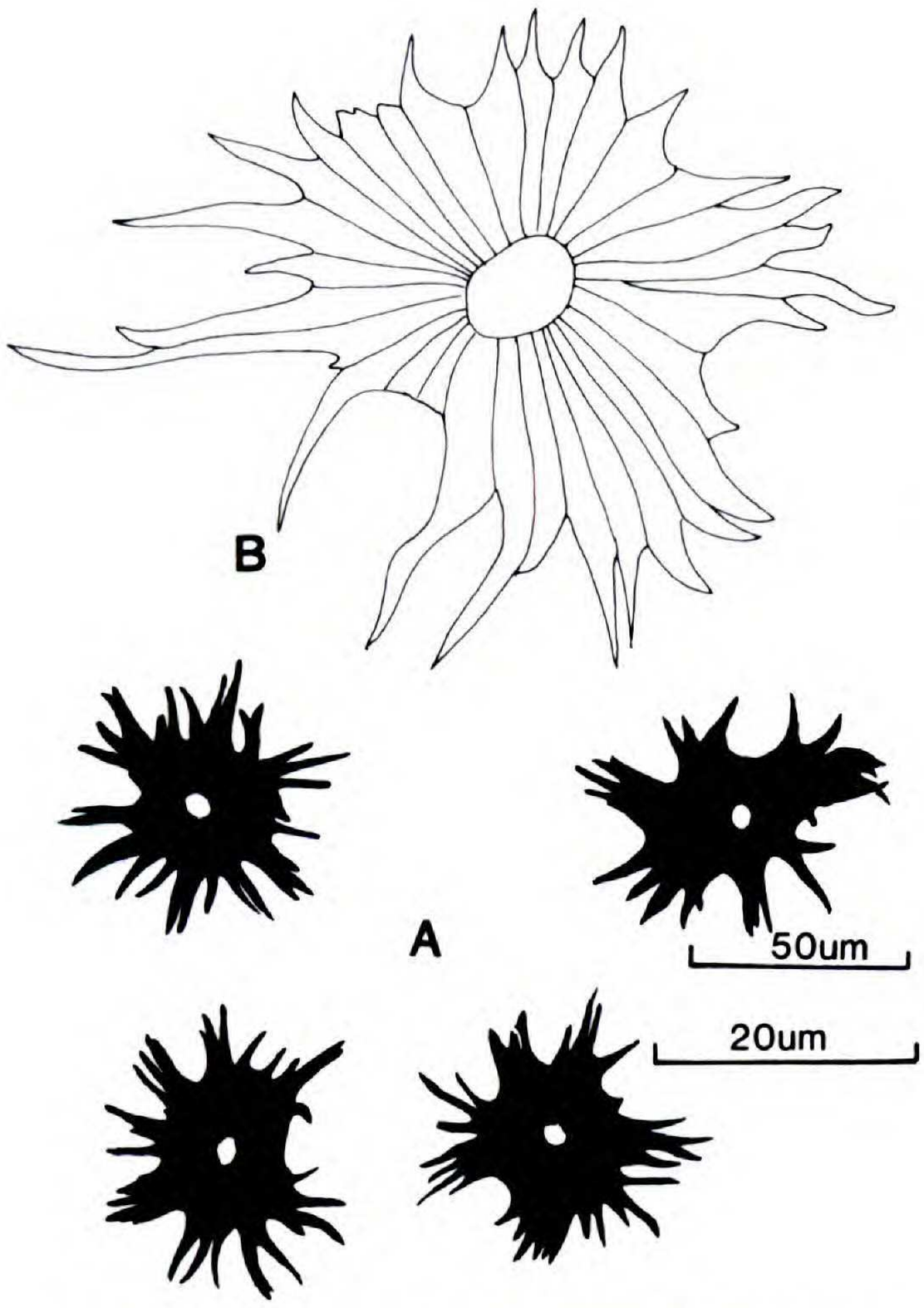


FIGURE 10. *Solanum lepidotum* var. *lepidiochlamys* (from *Langlassé 58* G).—A. General view of stellate trichomes (50 μm scale).—B. Structure of the trichome (20 μm scale).

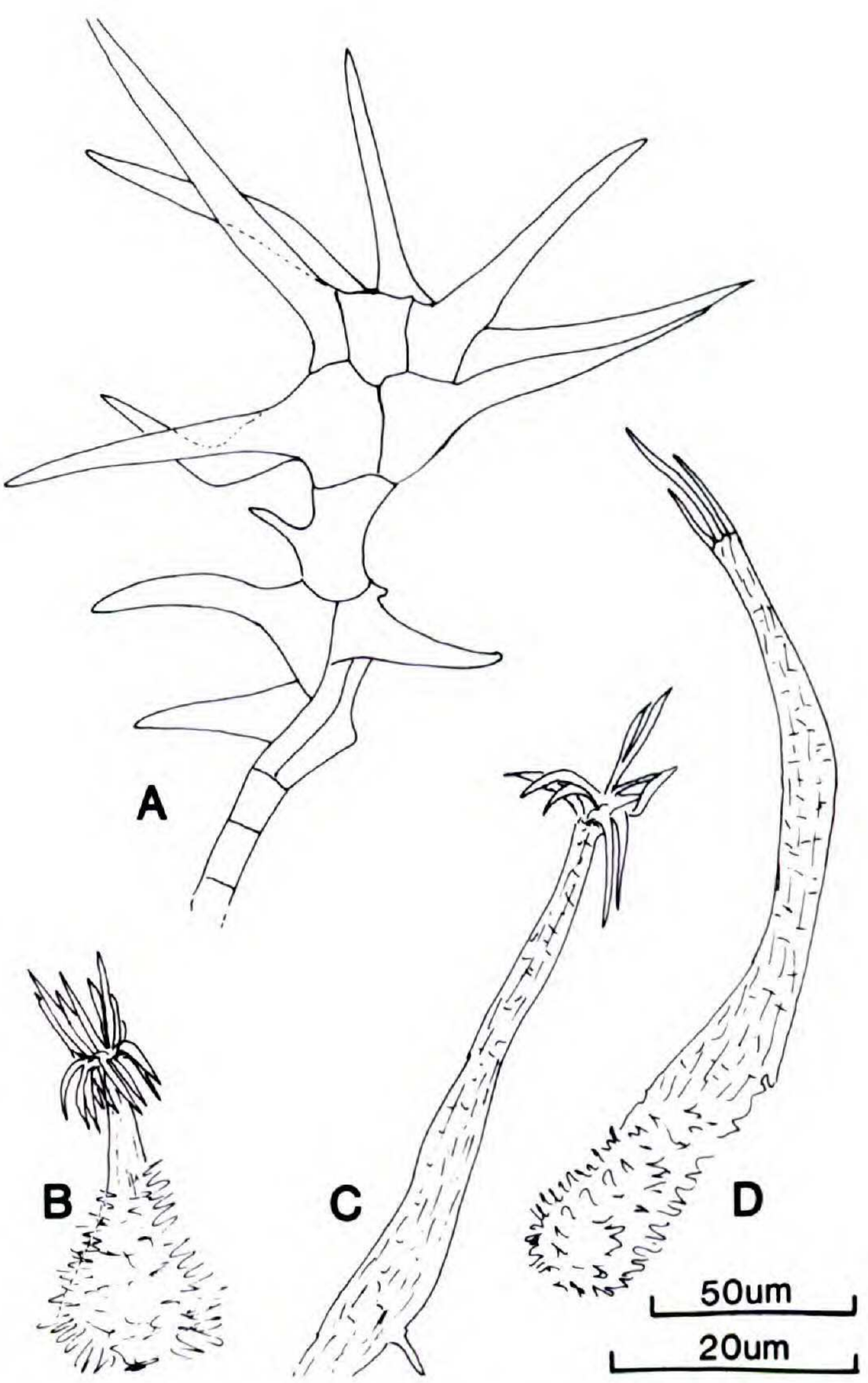


FIGURE 11. *Solanum oliveirae* (from *R. F. de Oliveira et al. 455* GUA).—A. Structure of dendritic trichome with uniseriate pedicel (20 μm scale).—B–D. Paleaceous-laminar trichomes, the apical cells tufted and the base ornamented (50 μm scale).

veins 15–18; petiole 1.2–5 cm long, densely floccose-chaffy, laminate and fringed-chaffy (laminate), and dendritic trichomes. Inflorescence extra-axillary, pedunculate, robust, congested, 14–17 cm long, cymose-dichotomous of about 30 flowers in series rather than glomerules, the straight rachis densely floccose, paleaceous, with short-laminate and fimbriate trichomes that do not involve the flowers; peduncle straight, ca. 3 cm long, chaffy-laminate. Flower buds oblong, 5–6 mm long; pedicels ca. 3 mm long; calyx urceolate or broadly tubular, longer than 1 cm, strigose, chaffy-fringed outside, short, rigid, the lobes equal, acute, ca. 2 mm long; corolla campanulate-stellate, ca. 2.5 cm long, the lobes equal, ca. 1.5 cm long, the tube short, ca. 3 mm long, pubescent outside with stellate trichomes having ca. 8 radial cells, and also trichomes with ca. 8 radial cells that are rarely stellate multiseriate; anthers linear, ca. 6 mm long, subsessile; style ca. 1.4 cm long, the stigmatic region demarcated by papillae. Berry globose, ca. 1 cm diam., enclosed in the expanded calyx.

Paratypes. BRAZIL. Without other locality, *Regnell III 977* (fl, fr) (S). ESPÍRITO SANTO: Mimoso, 1916, *Souza Brito 149* (fl) (R). RIO DE JANEIRO: Cacimbas near River Itabapaoana, Sep. 1909, *Sampaio 906* (R); fields, Bonsucesso farm, Mar. 1918, *Sampaio 2864* (R); Petrópolis, Serra da Estrela, *Riedel 14123* (fl) (NY). SÃO PAULO: Reserva do Parque Estadual das Fontes do Ipiranga, 3 Feb. 1983 (fl, fr), *Macedo 13* (SP).

Distribution and habitat. The yellow flowers, which are infrequent in this group, were indicated only for the holotype, collected in the state of Rio de Janeiro. Plants flower in February, March, and September. The species has been collected only in tropical humid forest in the states of Espírito Santo and Rio de Janeiro.

Affinity. *Solanum oliveirae* is distinguished from the similar *Solanum cernuum* by length of the chaffy-laminate indumentum of the inflorescence, which is shorter than the flowers so that the flowers are evident. The strigose aspect of the chaffy-laminate covering on the outside of the calyx, the short and floccose pubescence types on stems and branches, as well as the shape and con-

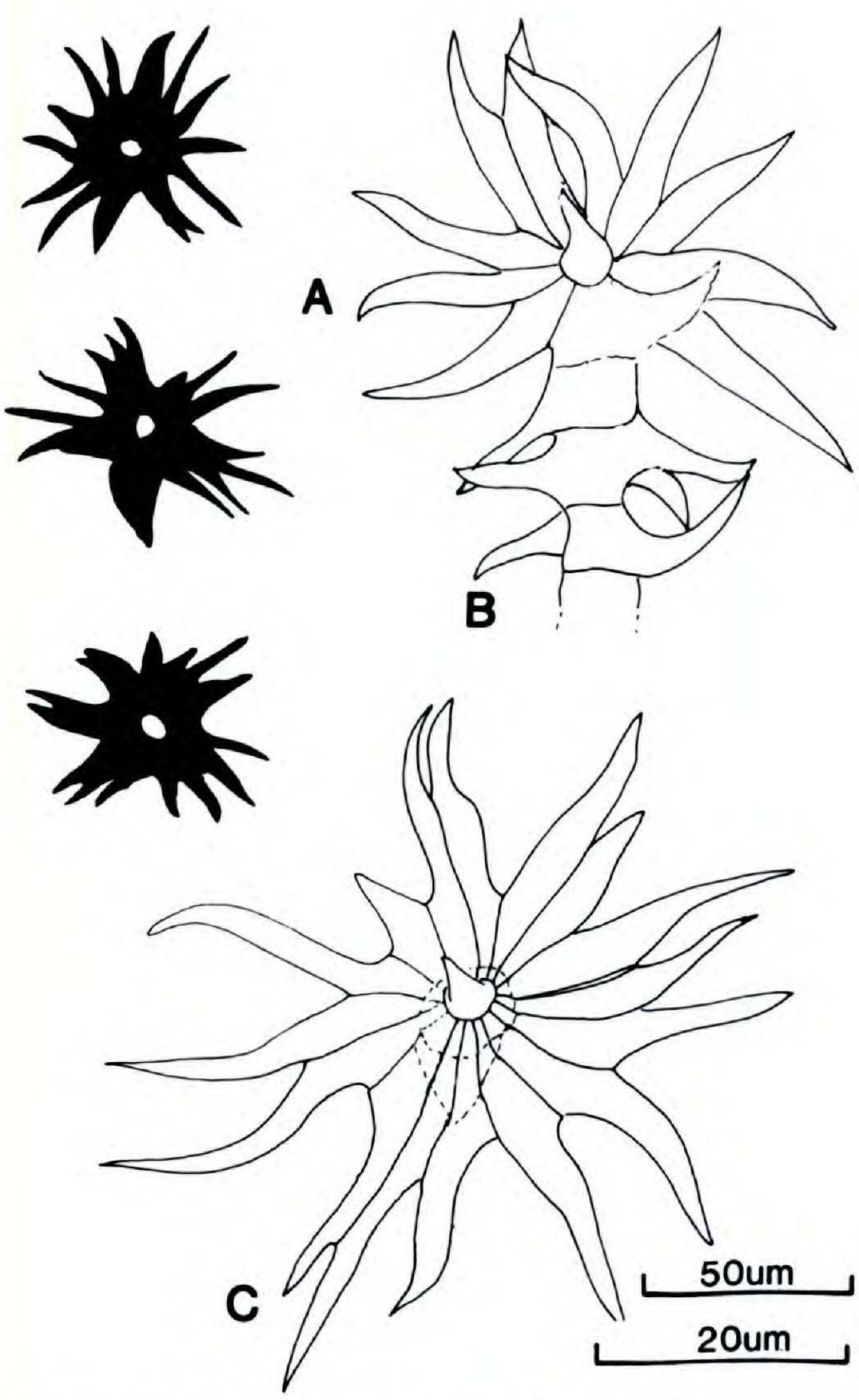


FIGURE 12. *Solanum pereirae* (from *E. Pereira 1270* RB).—A. General view of peltate trichomes (50 μm scale).—B. Structure of peltate trichome (20 μm scale).—C. Structure of peltate-stellate trichome (20 μm scale).

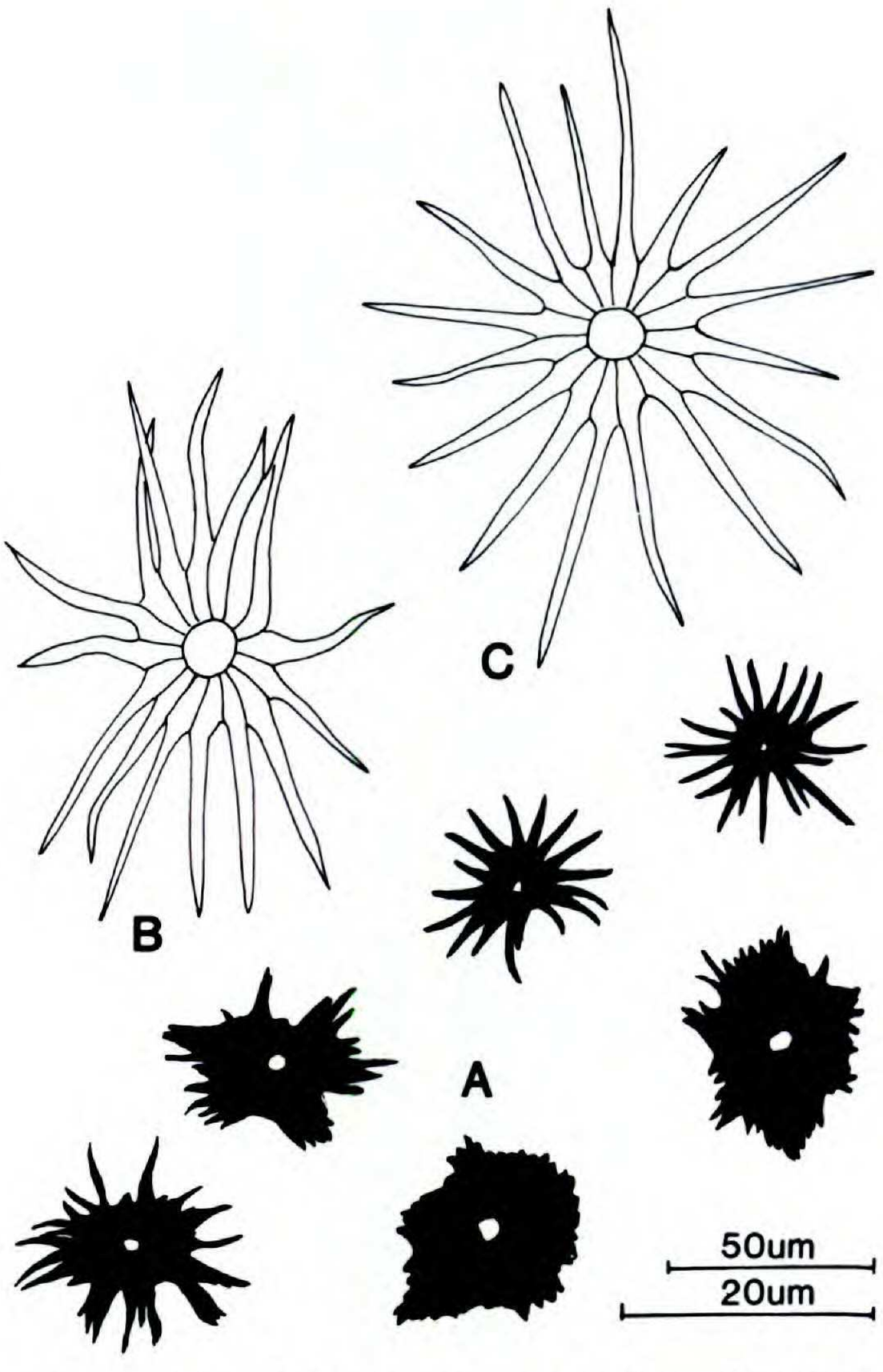


FIGURE 13. *Solanum steyermarkii* (from *J. A. Steyermark 33825* F).—A. General views of peltate and peltate-stellate trichomes (50 μm scale).—B. Structure of peltate trichome (20 μm scale).—C. Structure of peltate-stellate trichome (20 μm scale).

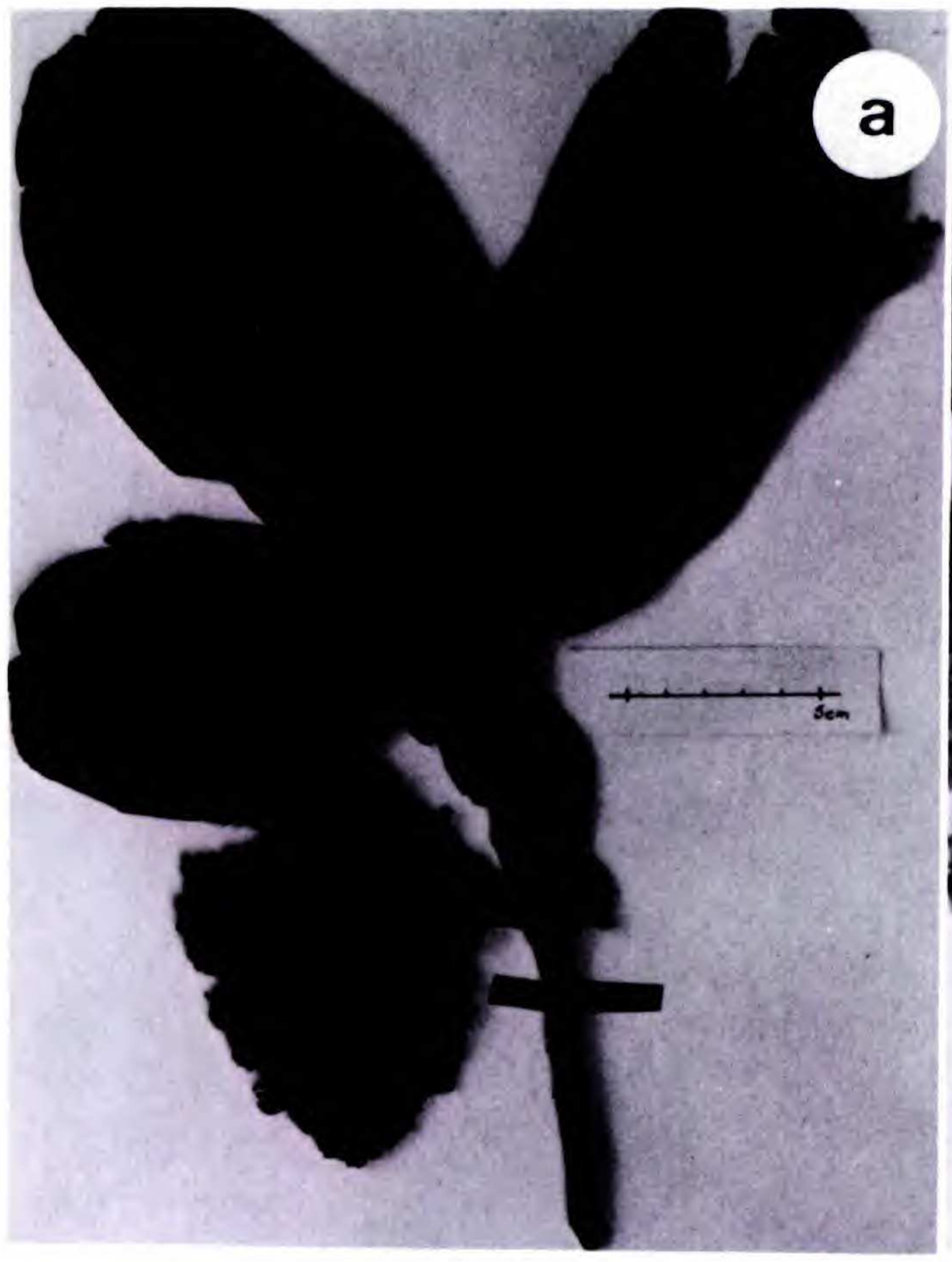
sistency of the leaves, are the main distinctions of this species.

The epithet honors botanist Ronaldo F. Oliveira, Fundação Estadual de Engenharia do Meio Ambiente, Departamento de Conservação Ambiental, Rio de Janeiro (FEEMA), a member of the group that collected the type specimen.

8. Solanum pereirae Carvalho, sp. nov. TYPE: Brazil. Rio de Janeiro: Municipality of Santa Maria Madalena, Tamandaré, 18 Mar. 1955 (fl), *E. Pereira 1270* (holotype, RB). Figures 6, 12, 16B, C.

Arbuscula ramis rigidis aut fistulosis, novellis subangulosis, dense floccoso-castaneis trichomatibus elongatis paleaceis, laminaribus fimbriatisque, dendriticis, rarissime stellato-peltatis pedicelis multicelullaribus. Folia solitaria magna, lanceolata ad late lanceolata, in facie superiore glabra, in inferiore squamosa sive squamato-tomentosa, castanea, pilis peltato-stellatis, porrecto-stellatis supra nervum medium insertis; petiolus floccoso-tomentosus, trichomatibus stellatis pedicellatisque, dentriticis raro fimbriatis. Flores cymosi, congesti, extra axillares cymis 1–3 ramosis, ramis pendulis; trichomata longa laminacea; pedunculus cymarum pubescens. Calyx campanulatus, extus paleaceus, pilis stellatis aut fimbriatis vestitus. Fructus ignotus.

Shrub 3–3.5 tall, young branches plane, indumentum brownish, appressed-lepidote with peltate-stellate trichomes having a multicellular pedicel. Leaves solitary, lanceolate to broadly lanceolate, 14–40 cm long and 6.5–12(–20) cm wide, apically acuminate, basally obtuse-rotund to asymmetric; glabrescent above, densely appressed-lepidote beneath with peltate-stellate trichomes, 35–39 μm diam. with 15–16 radial cells, 15–17 μm long, the free portion 7–13 μm, the central cell apiculate, also with chaffy-fringed trichomes that are rarely peltate-multiseriate; secondary veins 14–20; petiole 1.5–4 cm long, appressed-lepidote, the stellate trichomes with ornamented long stalks. Inflorescence robust, extra-axillary, pedunculate, 8–20 cm long, cymose-dichotomous, flowers in series, rarely congested, the rachis straight, 3–4-branched, ca. 6 cm long, densely paleaceous, with long, laminate



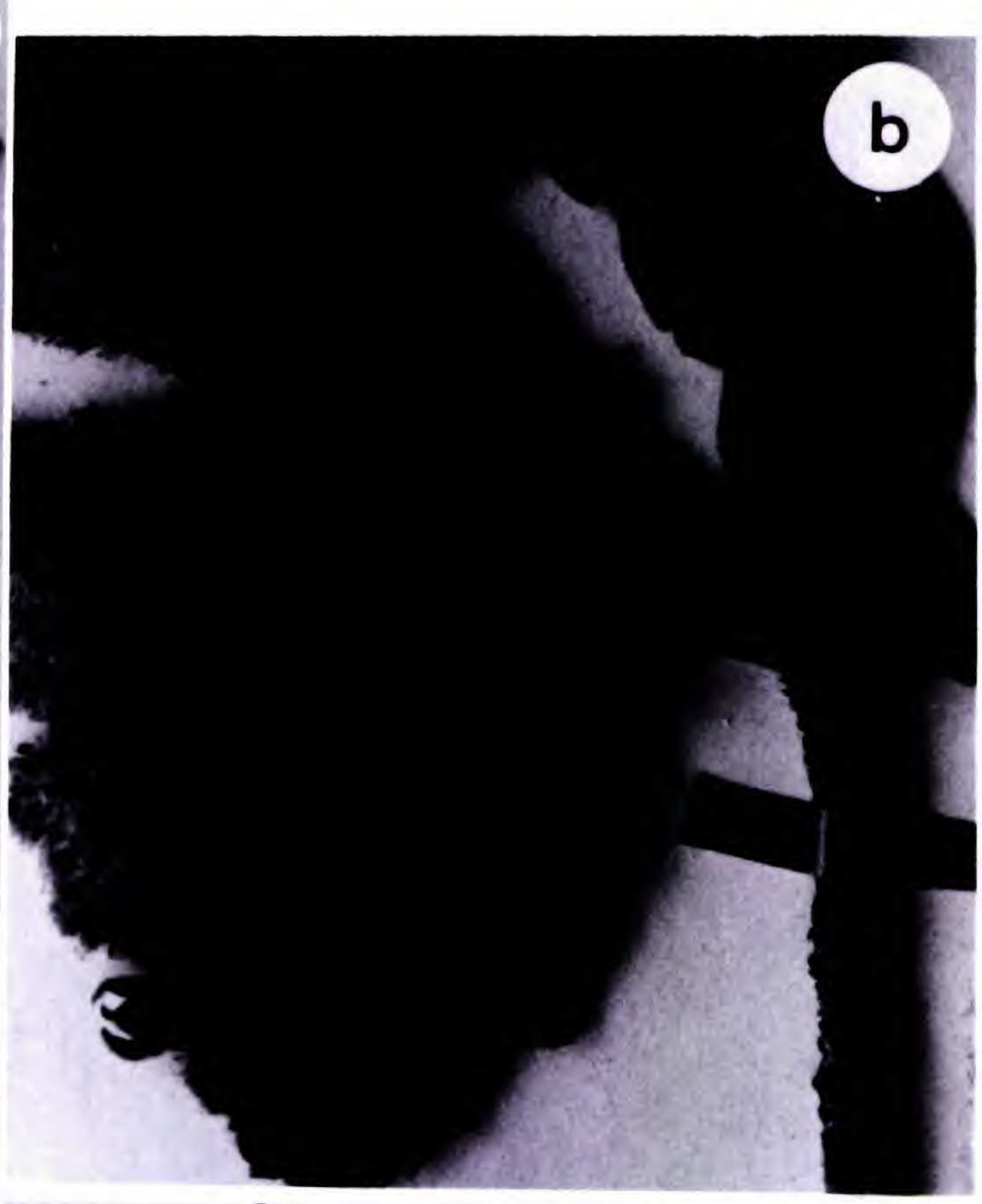


FIGURE 14. *Solanum caldense*, *S. carautae*, and *S. davidsei*. a, b. *Solanum caldense* (from *Widgren s.n.* R).—a. Habit.—b. Portion of cymose-dichotomous inflorescence with straight rachis.—c. *Solanum carautae*. Habit with flower and fruit.—d. *S. davidsei*. Habit with flowers and fruit.

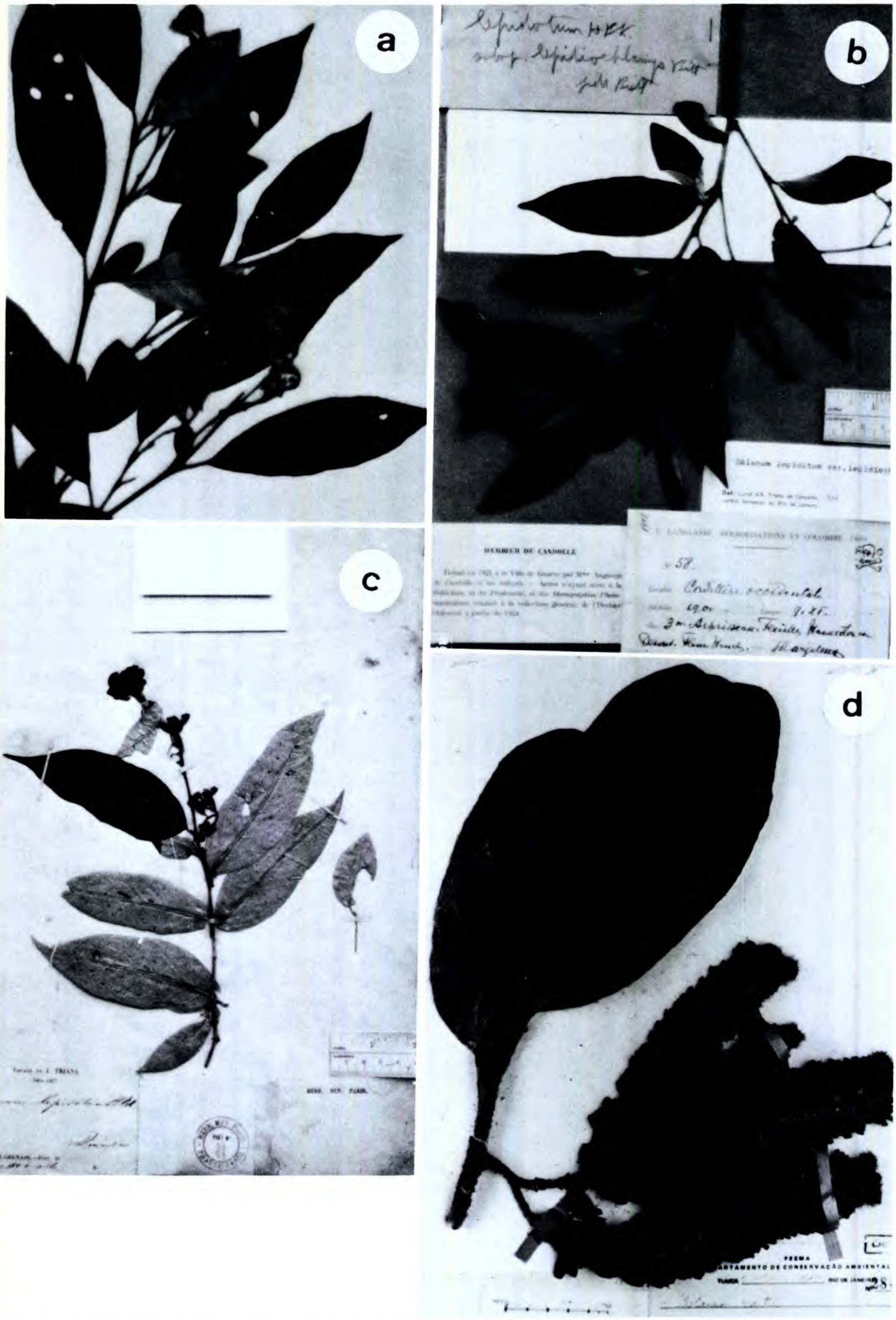


FIGURE 15. *Solanum hatschbachii*, *S. lepidotum* var. *lepidiochlamys*, *S. lepidotum* var. *trianae*, and *S. oliveirae*.—a. *Solanum hatschbachii* (from *Hatschbach 26837* BH). Habit with flowers.—b. *Solanum lepidotum* var. *lepidiochlamys* (from *Langlassé 58* G). Habit with flowers.—c. *Solanum lepidotum* var. *trianae* (from *Triana s.n.* P). Habit with flowers.—d. *Solanum oliveirae* (from *Oliveira et al. 455* GUA). Habit with cymose-dichotomous flowering.

trichomes enveloping the flowers; peduncle ca. 3 cm long, chaffy-laminate. Flowers with buds oblong, 2–4 mm long; pedicel ca. 3 mm long; calyx campanulate, ca. 2 cm long, pubescent with stellate trichomes with ornamented stalks and paleaceous-laciniate or fringed trichomes outside, the lobes ca. 7 mm long; corolla campanulate-stellate, ca. 2 cm long, ca. 2 cm diam., with trichomes with ornamented stalks, the lobes ca. 1 cm long; anthers linear, ca. 3 mm long, subsessile, the filaments ca. 1 mm long; ovary globose, tomentose, ca. 9 cm long. Fruit unknown.

Paratypes. BRAZIL. ESPÍRITO SANTO: near Domingos Martins, S. Miguel, 8 Feb. 1973 (fl), *Hatschbach 31386* (BH, C, R). PERNAMBUCO: May 1978 (fl), *Burle-Max s.n.* (RB). RIO DE JANEIRO: Municipality of Santa Maria Madalena, *Lisboa s.n.* (fl) (RB); farm Mater Bem, 18 Feb. 1981 (fl), *G. Martinelli et al. 7610* (K, MO, RB); *Martinelli et al. 7610* (fl) (K, MO, RB); 24 Nov. 1977 (fl), *Mautone 449* (RB); road to Pedra da Agulha, 7 Mar. 1978 (fl), *M. C. Viana et al. s.n.* (GUA, HB); Serra de Estrela, 14 May 1864, 22 June 1873, *Glaziou 1077, 6658* (fl) (both P).

Distribution and habitat. This plant grows in the forested parts of the city of Santa Maria Madalena, flowering in February and March.

Affinity. *Solanum pereirae* is similar to *Solanum cernuum* but differs in its long chaffy-laminate trichomes, which are present only on the branches of the inflorescence. It is also suggestive of *Solanum vellozianum* because of the brownish appressed-lepidote tomentum of the leaf undersides.

The epithet honors Edmundo Pereira, researcher at the Botanical Garden of Rio de Janeiro, collector of the type specimen, a great student of the plant life of Brazil, and a teacher of systematic botany.

9. Solanum sooretamum Carvalho, sp. nov. TYPE: Brazil. Espírito Santo: Forest Reserve of Sooretama, 9 Aug. 1965 (fl), *R. P. Belem 1534* (holotype, UB; isotype, CEPEC). Figures 7, 17A, B.

Arbuscula ramis rigidis aut fistulosis juventude subangulatis, castaneis, tomentosis vel floccosis trichomatibus stellatis pedicellis longis lateraliter expansis, dentriticis fimbriatisve. Folia lanceolata, basi leviter cuneata, 100–430 mm longa et 50–160 mm lata, supra glabra vel glabrescentia subtusque dense lepidoto-tomentosa colore castaneo imbuta; petiolus 13–40 mm longus. Inflorescentia cimoso-corymbosa, multiflora, longius pedunculata, erecta, floccosa pilis stellatis pedicellatis lateraliter excrecentibis ornatis; rachis apicem versus scorpioidea. Flores subsessiles. Calyx campanulatus, extus floccoso-stellatus, 59 mm longus. Corolla ad 9 mm longa et ca. 20 mm diametro. Bacca globosa puberula, laciniis calycis inaequalibus paullo supra medium circumvallata.

Small tree to 6 m tall, young branches ca. 6 cm diam., subangulate, striate and fistular, indumentum brownish, appressed-lepidote and lepidote-tomentose to densely floccose, peltate-stellate, trichomes large, dendritic and chaffy-fringed, with an apiculate central cell and a long or short pedicel with lateral projections. Leaves solitary, not geminate, lanceolate, 10–43 cm long and 5–16 cm wide, apically acute or sometimes attenuate at both ends, basally cuneate, the margin entire, secondary veins 16–40, prominent beneath, camptodromous, discolorous; brownish above, glabrate; beneath densely lepidote-tomentose with peltate-stellate trichomes, 41–46 μm diam. having 16–17 radial cells 15–20 μm long, the free portion 9–14 μm long; petiole lepidote-floccose, 1.3–4 cm long. Inflorescence erect, extra-axillary, opposite the leaves or pseudoterminal, corymbiform cymes ca. 10–35 cm long, with scorpioid branches up to 3rd order, rachis elongate, ca. 6 cm long, scorpioid at the ends, each with more than 50 flowers; tomentose to densely floccose, with stellate trichomes having lateral expansions on the long stalks and with large fringed-chaffy trichomes; peduncle erect, terete to flattened-angulate, to 9–15 cm long. Flowers with the buds oblong, 4 mm long; pedicel obsolete or short, basally articulated; calyx campanulate, to 9 mm long, densely floccose with stellate trichomes outside; pedicel articulate subsessile; corolla white, campanulate-stellate, to 1.5 long and 2 cm diam., the lobes lanceolate, to 9 mm long, floccose; anthers linear to linear-oblong, ca. 4 mm long, equal, the filaments ca. 1 mm long. Berries globose, ca. 1 cm diam., the fruit walls with sparse peltate-stellate trichomes, partly covered by the enlarged calyx; seeds ca. 23, 4–5 mm long, the testa little-ornamented, striate-reticulate. Sclerocytes (stone cells) globose or somewhat deltoid geminate, ca. 2 mm long, slightly rugose on the surface, adherent inside the wall fruit apex.

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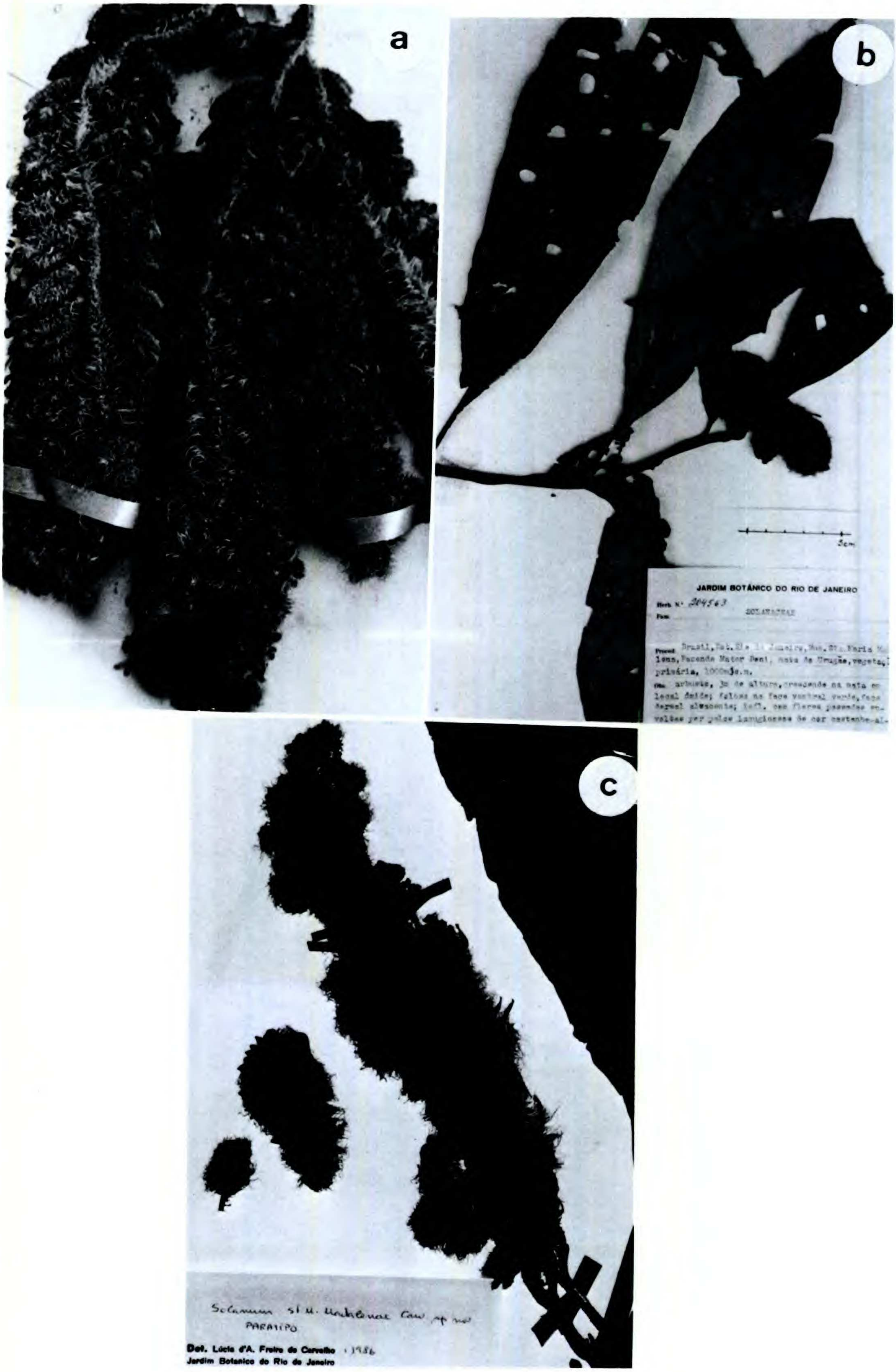
FIGURE 16. *Solanum oliveirae* and *S. pereirae.*—a. *Solanum oliveirae* (from *R. F. de Oliveira et al. 455* GUA). b, c. *Solanum pereirae* (from *E. Pereira 1270* RB).—b. Habit.—c. Portion of cymose-dichotomous flowering with straight rachis.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Jardim Botanico do Rio de Janeiro

FIGURE 17. *Solanum sooretamum* and *S. steyermarkii*. a, b. *Solanum sooretamum* (from *R. P. Belem 1534* US).—a. Habit with flowers.—b. Portion of cymose-dichotomous flowering with scorpioid rachis.—c. *Solanum steyermarkii* (from *J. A. Steyermark 35389* F). Fruiting branch.

Paratypes. BRAZIL. BAHIA: Municipality of Porto Seguro, km 19 on road to Vera Cruz and Vale Verde, 4 Apr. 1979 (fl, fr), *Mattos Silva et al. 349* (CEPEC, RB); Porto Seguro, Estação Ecológica Pau-Brasil, 4 Feb. 1972 (fl), *Eupunino 206* (CEPEC, NY); Santa Cruz Cabrália, 22 Mar. 1978 (fl), *Mori et al. 9823* (CEPEC); Conceição da Barra, 13 Nov. 1968, *Almeida 232* (CEPEC, RB). ESPÍRITO SANTO: Linhares, Reserva Florestal da Companhia Vale do Rio Doce, 17 Jan. 1975 (fl), *Peixoto et al. 406* (RB); Lagoa Central, 100–200 m, 30 Aug. 1973 (fl, fr), *Sucre et al. 10136* (RB). SÃO PAULO: Serra da Bocaina, Parque Nacional da Bocaina near River Jacu Pintado, 10 Feb. 1959 (fl, fr), *Pabst 4754* (HB); Ribeirão Rico, 28 July 1921, *Edwal 2568* (SP).

Distribution and habitat. *Solanum sooretamum* occurs in the state of Espírito Santo in the forest reserves of Sooretama and of Companhia Vale do Rio Doce, and also in the state of Bahia in the municipality of Porto Seguro in a forest known as "mata de Tabuleiro," which is still primary although disturbed enough to produce vigorous plants of this taxon. It also occurs in the state of São Paulo in the Parque Nacional de Bocaina.

Affinity. *Solanum sooretamum* is distinguished from *Solanum vellozianum* by the length of the inflorescence and by the lepidote-floccose indumentum with stellate long-pedicellate trichomes, which occurs on the abaxial surfaces of leaves and on branches. The geminate, globose sclerocytes are evident up into the apex of the fruit wall.

The epithet testifies to the plant's occurrence in the forest reserve of Sooretama.

10. Solanum steyermarkii Carvalho, sp. nov. TYPE: Guatemala. Dept. Quezaltenango: after volcano Santa Maria, between property Pirineos and Los Positos, 1,300–1,500 m, 8 Jan. 1940 (fl), *J. A. Steyermark 33825* (holotype, F). Figures 13, 17C.

Arbuscula ramis teretibus rigidis cum pedunculis, cymis, pedicelis, calyce et corolla extus adpresso-lepidotis argenteisque. Folia solitaria aut geminata in ramis novellis, falcata oblongo-lanceolate vel ovato-lanceolata apex longuiscule cuspidata, basi asymmetrica, margine integra vel leviter sinuata 50–180 mm longa et 20–75 mm lata, supra glabriuscula infra argentea, pilis peltato-stellatis cellulis radialibus ad tertiam partem connatis raro peltata. Flores parvi cymosi conferti pedicellati pubescentes oblongiquae. Cymae subopposititifoliae multiflorae subdichotomae erectae pedunculate. Bacca globosa glabriuscula, calyce non ampliato, ornata; seminis testa reticulata.

Trees 2–35 m tall and 5–10 m diam., branches terete, leafy, indumentum argenteous lepidote with peltate-stellate and rare peltate trichomes. Leaves solitary on young branches, membranaceous or nearly so, oblong-lanceolate to ovate-lanceolate, falcate, 5–18 cm long and 2–7 cm wide, apically reflexed, cuspidate to long-cuspidate, basally obtuse, slightly decurrent, slightly asymmetric, margin entire to sinuate; glabrescent above with sparsely peltate-stellate trichomes, densely lepidote beneath with peltate-stellate or rarely peltate trichomes 24–30 μm diam. having 15–19 radial cells, 9–12 μm long, the free portion 0.1–0.2 μm, at least ⅓ connected; 6–10 secondary veins prominent on the dorsal surface, camptodromous; petiole 0.4–1.3 cm long. Inflorescence subopposite the leaves, erect, 6–10 cm long, cymose-subdichotomous of about 50–100 flowers, rachis scorpioid, long-pedunculate, ca. 6 cm long. Flower buds oblong, 1–3 mm long; pedicels 3–4 mm long; calyx campanulate, 2 mm long, the lobes acute, to 1 mm long; corolla rotate-stellate, 4 mm long, the lobes acute, ca. 2 mm long; anthers ca. 1 mm long; ovary apically tomentose, the style curved. Berry globose, glabrescent, ca. 9 mm diam.; calyx persistent but not accrescent; seeds reniform with reticulate testa.

Paratypes. GUATEMALA. DEPT. SUCHITEPÉQUEZ: after Volcán Zunil, near property Las Nubes, 500–800 m, 2 Feb. 1940 (fr), *J. A. Steyermark 35389* (F). ALTA VERAPAZ: 210–250 m, between Hacienda Yaxcabnal along Río Icvolay and Río Apia, 13 Mar. 1942 (fr), *Steyermark 45027* (F). HUEHUETENANGO: between Ixcan and Río Ixcan, Cerro de los Cuchamatanes, 23 July 1942 *Steyermark 49220* (fr), (F). QUEZALTENANGO: near San Franscisco Miramar, Apr. 1905 (fl), *Pittier 72* (F); between Finca Pirineos and Patzulin, 1,200–1,400 m, 9 Feb. 1941 (fl), *Standley 86809* (F); between Santa Maria de Jesus and Calahuahe, 1,300–1,400 m, 5 Jan. 1940 (fl), *Steyermark 33504* (F). SAN MARCOS: Barranco Eminencia between San Marcos and San Rafael, 2,500–2,700 m, 6 Feb. 1961 (fl), *Standley 86234* (F). HONDURAS. Without other locality, 7 May 1934 (fl, fr), *Schipp 8-677* (F, S). MEXICO. CHIAPAS: June 1913, (fl) *Purpus 6958, 7010* (both F). PANAMA. BOCAS DEL TORO: Buena Vista, 1,500 m, 1 Mar. 1928 (fl, fr), *Cooper 620* (S); canal area, Barro Colorado Island, *Croat 11320* (MO), *Foster 1711* (MO); *Wetmore 200* (MO); Río Mendoza, *Nee 14031* (MO). COCLÉ: El Valle de Antón, Cerro Pilón, 2,000 m, 15 Aug. 1967 (fl), *Dwyer 7927, 7956* (both MO); 200–700 m (fl), *Dwyer 13955* (MO). DARIÉN: Cerro Tacarcuna, 1,500 m, 2 Feb. 1975, *Gentry 14107* (COL). PANAMA: Cerro Azul, 2,000 m, 17 July 1962, *Dwyer 2064* (MO); Goofy Lake, 1,800 m, 16 Aug. 1967 (fr), *Dwyer 8046* (COL, MO); El Llano, 25 July 1972 (fl), *D'Arcy et al. 6045* (MO); 26 Mar. 1975, *Dressler 4941* (MO). VENEZUELA. Colonia Tovar, 1854–1855, *Fendler 2609* (GOET, MO). COLOMBIA. CAUCA: Cordillera Central between Tacuejó and El Palo, 1,450–1,700 m, 21 Dec. 1944 (fl), *Cuatrecasas 19601* (F). CUNDINAMARCA: Mesistas del Colegio, Quebrada de Santa Marta, 1,240 m, 3 Mar. 1940, *Cuatrecasas 8225* (F). CHOCÓ: Alto de Limón, Río Sucio, 4 July 1976 (fr), *Forero et al. 1827* (COL, MO). HUILA: Quindío, 1,800 m, 1851–1857 (fl), *Triana* (BR, NY, P, W). VALLE: Cordillera Occidental between Marina and La Margarita,

4 Nov. 1944 (fl, fr), *Cuatrecasas* (F); Alto de Dinde between Cartago and Alaclá, 1,200–1,260 m, 16 Dec. 1946 (fl, fr), *Cuatrecasas 22886* (F). ECUADOR. LOS RÍOS: Sto. Domingo, *Dodson et al. s.n.* (fr) (MO). PERU. MADRE DE DIOS: near Manú, 10–11 Aug. 1974 (fl, fr), *Foster et al. 3210* (MO).

Distribution and habitat. This plant ranges from Guatemala to Peru and Venezuela at elevations from 500 to 2,700 m. Specimens have flowers and fruits in January and February.

Affinity. This species is similar to *Solanum lepidotum* but is distinguished by the indumentum always argenteous colored and constituted of peltate-stellate trichomes with radial cells, which are at least one-third connected, by the falcate, membranaceous leaves, and by the many-flowered, congested inflorescence.

The epithet is in homage to the late J. A. Steyermark, botanist at the Missouri Botanical Garden, a great connoisseur of the plant life of this region.

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