

Two New Species of *Symplocos* Jacq. (Symplocaceae) from Minas Gerais, Brazil

João L. M. Aranha Filho¹, Peter W. Fritsch², Frank Almeda², and Angela Borges Martins³

¹ Programa de Pós-Graduação em Biologia Vegetal, Departamento de Botânica, Instituto de Biologia, Universidade Estadual de Campinas, Cidade Universitária “Zeferino Vaz”, Barão Geraldo, Caixa Postal 6109, Campinas-São Paulo, CEP:13084–971, Brazil; Email: guapitoaranha@yahoo.com.br.

² Department of Botany, California Academy of Sciences, 875 Howard Street, San Francisco, California 94103–3009; Email: pfritsch@calacademy.org, falmeda@calacademy.org;

³ Departamento de Botânica, Instituto de Biologia, Universidade Estadual de Campinas, Cidade Universitária “Zeferino Vaz”, Barão Geraldo, Caixa Postal 6109, Campinas-São Paulo, CEP:13084–971, Brazil; Email: amartins@unicamp.br.

Symplocos candelabra and *S. microstyla*, two new species of *Symplocos* section *Neosymplocos*, are described on the basis of field and herbarium studies. Both species appear to be narrow endemics of “campo rupestre” (rocky field) habitats in Minas Gerais, Brazil. *Symplocos candelabra* from Serra do Cipó is distinguished by its openly branched candelabra-like habit, rigid orbicular or suborbicular leaves and densely hirsute distal internodes. *Symplocos microstyla* from Serra do Caraça is recognized by its tomentose upper branches and bracts, solitary, axillary flowers, minute style and unusually small fruit. Descriptions, illustrations, discussions of diagnostic characters, and comparisons with closest relatives are provided.

Resumo

Symplocos candelabra e *S. microstyla*, duas novas espécies de *Symplocos* seção *Neosymplocos*, são aqui descritas baseadas em estudos de campo e herbário. Ambas espécies, provavelmente, são endêmicas restritas de campo rupestre em Minas Gerais, Brasil. *Symplocos candelabra* encontrada na Serra do Cipó é caracterizada por seu hábito candelabroforme ramificado abertamente, folhas rígidas, orbiculares ou suborbiculares e internós distais densamente hirsutos. *Symplocos microstyla* da Serra do Caraça é reconhecida por seus ramos superiores e brácteas tomentosos, flores solitárias e axilares, estilete minúsculo e seus frutos pequenos pouco usuais. Descrições, ilustrações, discussões dos caracteres diagnósticos e comparações com as possíveis espécies próximas são aqui feitas.

Symplocos Jacq., the sole genus of Symplocaceae, comprises ca. 300 species of woody flowering plants distributed throughout tropical and subtropical regions of the Americas, southern and eastern Asia, Australia, and the East Indies, with several species extending into the temperate zones of North America and Eastern Asia (Wood and Channell 1960; Almeda 1982; Ståhl 1995; Kelly and Almeda 2002). Species of *Symplocos* are trees or shrubs with alternate, simple, exstipulate leaves; axillary (rarely terminal), and usually multi-flowered inflorescences; monoclinal or rarely diclinal, actinomorphic flowers; a gamosepalous calyx and corolla; an androecium with usually numerous, epipetalous bi- or multiseriate or fasciculate stamens with globose to ellipsoid anther

sacs; a two- to five-carpellate inferior ovary; an undivided style; one to four unitegmic ovules per locule; and a drupaceous fruit crowned by the persistent calyx (Nooteboom 1975; Cronquist 1981; Bidá 1995). This combination of characters is unique among members of order Ericales (*sensu* Angiosperm Phylogeny Group 1998, 2003) and the monophyly of *Symplocos* has been strongly supported with molecular phylogenetic evidence (Soejima and Nagamasu 2004; Wang et al. 2004; Fritsch et al., in press). Most species occur in undisturbed humid tropical montane forests (Kriebel and Zamora 2004; Wang et al. 2004) and many are narrow endemics (i.e., *S. glaberrima* Gontsch. and *S. angulata* Brand) that are threatened with extinction through habitat destruction.

The most recent comprehensive infrageneric classification of *Symplocos* (Brand 1901) recognizes four subgenera, one of which (subgenus *Microsymplocos* Brand) is disjunct between the Greater Antilles (section *Urbaniocharis* Brand with eight species [P.W. Fritsch and F. Almeda, in prep.]) and south and southeastern Brazil (section *Neosymplocos* Brand with ca. 13 species). This subgenus is characterized by a sulcate leaf midvein adaxially, fasciculate inflorescences, small monoclinal flowers, corolla lobes united only at the base, monadelphous stamens, and claviform filaments connate only at the base (Brand 1901). Although molecular phylogenetic evidence rejects the monophyly of subgenus *Microsymplocos*, its two sections are strongly supported as monophyletic (Wang et al. 2004; Fritsch et al., in press). Section *Neosymplocos* is distinguished from section *Urbaniocharis* by pubescent (versus glabrous) filaments (a unique feature and likely synapomorphy for the section *Symplocos*). The species of section *Neosymplocos* are largely centered in primary montane habitats in the Mata Atlântica of Brazil.

As prelude to a revision of *Symplocos* section *Neosymplocos* (Aranha Filho et al., in prep.), we describe two new species of *Symplocos* section *Neosymplocos*. Both species are endemic to “campo rupestre” (rocky field) habitat on the Cadeia do Espinhaço. Descriptions are based on herbarium specimens and observations of living plants in their natural habitat made during a field trip to southeastern Brazil during November, 2004 by the first three authors.

SPECIES DESCRIPTIONS

Symplocos candelabra Aranha, P.W. Fritsch, and Almeda, sp. nov.

Figs. 1–3.

TYPE.— BRAZIL. **Minas Gerais:** Serra do Cipó, Município Santana do Riacho, 6 km S of the turnoff to Morro do Pilar on the road to Conceição do Mato Dentro, campo rupestre at 1350 m, 19°15'40.7"S, 43°31'59.0"W, 22 Nov. 2004, F. Almeda, P.W. Fritsch, J.L.M. Aranha Filho & R. Belinello 8910 (holotype: UEC!; isotype: CAS!).

Frutex rigidissimus, glaberrimus, candelabriformis, sparse ramosus, solum ramuli apicales dense hirsuti tandem glabri, quase sessilifolius. Folia rigidissima, integra vel rarissime serrulata, coriaceae, orbicularia vel quasi orbicularia, basis cordata vel quasi cordata; laminae 1.1–5 cm longae × 0.9–3.5 cm latae, subtus strigosae ubi junioria, glabrae ubi vetustae. Flores 5 (–6–7)meri, 1–5 in quoque nodo, axillares, 5–8.5 mm longi; calycis lobi ciliati, glabri, rarissime cum indumento; corolla alba rarissime sparce ciliata; bractaeae plerumque dense pilosae. Fructus ignotus.

Openly branched rigid shrub ca. 1 m tall. Branchlets terete, vaguely striate, densely ferrugineous-hirsute, commonly glabrescent with trichomes 2–5 mm long; internodes 0.2–1 cm long. Vegetative buds densely ferrugineous-hirsute. Young petioles ferrugineous-hirsute, usually glabrescent; young leaf blades glabrous adaxially, densely white-strigose abaxially, soon ferrugineous-strigose, trichomes 1.5–3.5 mm long, usually glabrescent, margin entire or rarely serrate, revolute, marginal glands present on distal $\frac{3}{4}$, often early caducous, the apical gland often caducous; mature

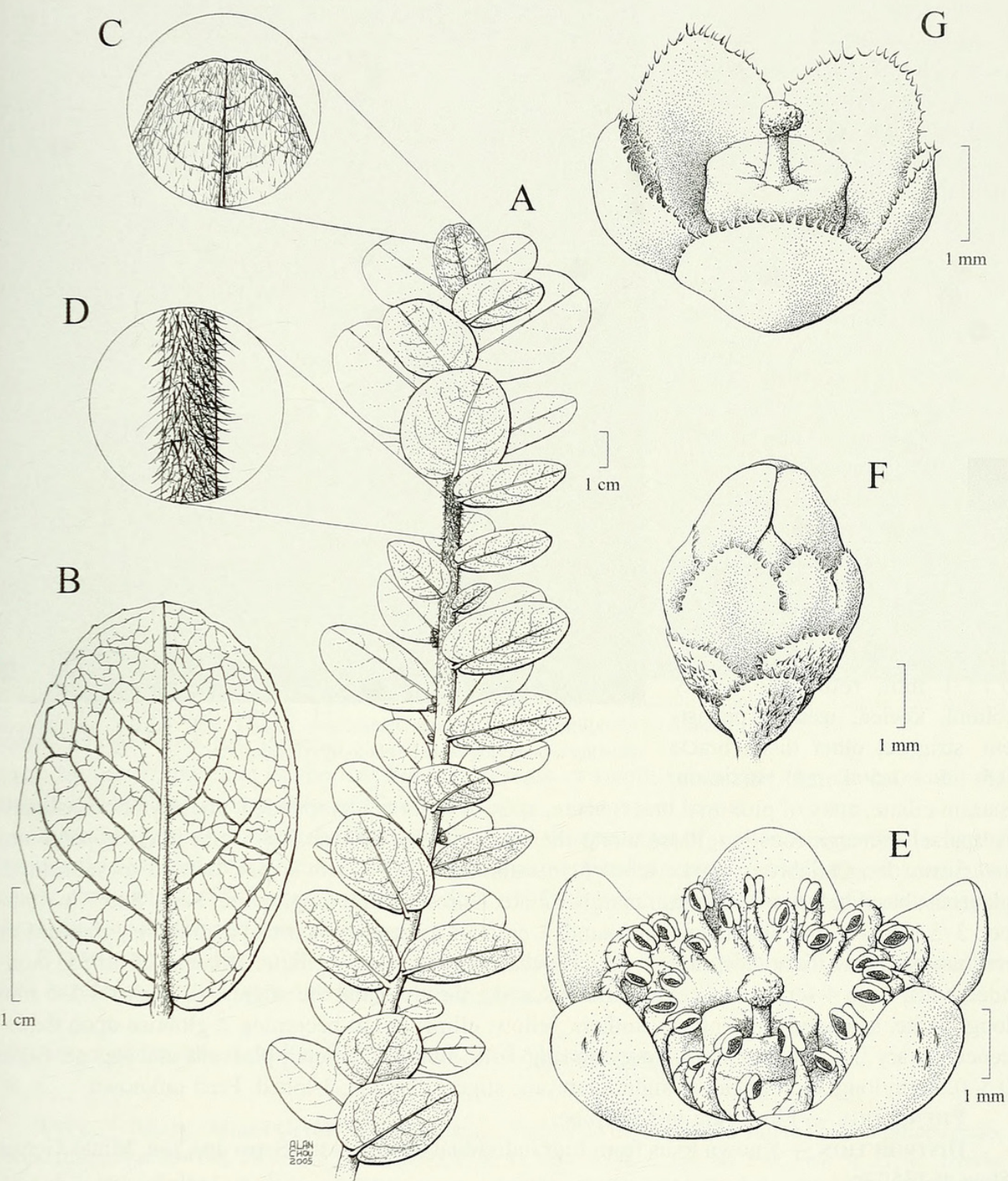


FIGURE 1. *Symplocos candelabra* Aranha, P.W. Fritsch, and Almeda. A. habit; B. representative leaf (abaxial surface); C. leaf apex enlargement showing abaxial indument; D. cauline internode enlargement showing indument; E. flowers at anthesis with androecium opened outward to show ovary apex, style, and stigma; F. flower bud and subtending bracts; G. flower with corolla and androecium removed. (A-D from *A.B. Joly & J. Semir CFSC 3685*; E-G from *Almeda et al. 8910*).

petioles 1–3 mm long, often glabrous or sparsely ferrugineous-hirsute, adaxially flattened, abaxially \pm rounded, mature leaf blades $1.1\text{--}5 \times 0.9\text{--}3.5$ cm, orbicular or suborbicular, coriaceous, abaxially usually glabrous or sparsely hirsute, trichomes ferrugineous at the blade base and white distally or completely white throughout, to 3.5 mm long, base often cordate or rarely subcordate, margin revolute, entire or occasionally serrulate along the distal half, glands often present but sparse, the apical gland or its scar present or wanting, apex obtuse-truncate. Inflorescences 0.5–1 cm long, fasciculate, 1- to 5-flowered, axillary, bracts 6 to 12, first and second basal bracts $1\text{--}2 \times 0.75\text{--}1$ mm, rotund to nearly rotund, keeled, usually persistent, strigose, other distal bracts $0.5\text{--}1.5 \times 1.5\text{--}4$ mm, persistent, margin ciliate, apex of proximal bracts acute, apex of basal bracts rounded, densely or occasionally sparsely ferrugineous-strigillose along the median vein. Flower 5–8.5 mm long; hypanthium 1–1.5 mm long, glabrous; calyx lobes 5 in number, $1.5\text{--}2 \times 1.5\text{--}2$ mm, deltoid to subrotund, glabrous, basal halves overlapping, margin ciliate. Corolla 5 mm long, white, lobes 5 to 7 in number, $3\text{--}5 \times 1.5\text{--}3$ mm, obovate to subrotund, \pm erect to somewhat incurved at anthesis, glabrous or rarely with a few trichomes, margin entire, occasionally sparsely ciliate. Stamens 25 to 35, monadelphous, 2- to 4-seriate, exceeding and obscuring the style and the stigma; filaments 0.5–5 mm long, white, sparsely white-pilose, anthers yellow, ellipsoid but becoming \pm globose upon dehiscence. Ovary inferior, 3-septate. Epigynic ring 1–1.5 mm in diameter, glabrous and rugose. Style 0.5–0.7 mm long, cylindrical, straight, glabrous; stigma capitate, 3-lobed. Fruit unknown.

PHENOLOGY.— Flowering in November.

DISTRIBUTION.— Known to us from four individual plants on the Serra do Cipó, Minas Gerais State at 1350 m.

PARATYPES.— **BRAZIL. Minas Gerais:** Município de Santana do Riacho, Km 132 along the road from Belo Horizonte to Conceição do Mato Dentro, 4 Nov. 1972, *A.B. Joly & J. Semir* CFSC 3685 (K!, UEC!); Município de Jaboticatubas, Km 132 along the road Lagoa Santa – Conceição do Mato Dentro – Diamantina, 16 to 24 Feb. 1973, *M. Sazima & J. Semir* CFSC 3891 (UEC!).

DISCUSSION.— Brand (1901) described *Symplocos angulata* Brand based on *P. Claussen* 174 (K specimen only) and *A.F.M. Glaziou* 15189 (Minas Gerais: Serra do Caraça, Morro [Pico] do Inficionado in 14 June 1884). Bidá (1995) expanded the concept of *S. angulata* to include several specimens collected on Serra do Cipó, but the plants from these two areas are sufficiently dis-



FIGURE 2. *Symplocos candelabra* Aranha, P.W. Fritsch, and Almeda showing a flowering branch (photo by Almeda).

tinct to warrant the recognition of the Serra do Cipó plants as a new species. *Symplocos candelabra* is a sparse openly branched shrub ca. 1 m tall with long terminal branches and slightly striate internodes, whereas *S. angulata* is reportedly a small tree (Brand 1901) usually with short terminal branches and strongly longitudinal ridges. The unusual growth form of *S. candelabra* is otherwise unknown within *Symplocos* section *Neosymplocos*, and may well be unique in the genus. *Symplocos candelabra* also has ferrugineous-hirsute upper branchlets (vs. tawny-tomentose) and ferrugineous-strigose young leaf blades abaxially (vs. tawny-tomentose). The mature leaves are orbicular to suborbicular (vs. usually obovate) and nearly to completely glabrous (vs. tomentose). Moreover, the base of the leaf blade is cordate or rarely subcordate (vs. cuneate) and the corolla is white (vs. reportedly rose [Brand 1901]).

Symplocos candelabra can be distinguished from other species of section *Neosymplocos* by the combination of candelabra habit, ferrugineous-hirsute upper branchlets, orbicular or suborbicular leaves, short petioles (1–3 mm), and leaf blades (1.1–5 × 0.9–3.5 cm) that are ferrugineous-strigose abaxially with cordate or subcordate bases.

ETYMOLOGY.—The epithet for this species is derived from “candelabrum,” Latin for candlestick in reference to its open upwardly arching branches.

***Symplocos microstyla* Aranha, P.W. Fritsch, and Almeda, sp. nov.**

Fig. 4.

TYPE.—BRAZIL. **Minas Gerais:** Serra do Caraça, Parque do Caraça on the trail to Pico do Inficionado, campo rupestre at 1941 m, 20°08'8.6"S, 43°27'25.1"W, 18 Nov. 2004, F. Almeda, P.W. Fritsch, J.L.M. Aranha Filho & R. Belinello 8878 (holotype: UEC!; isotypes: BHCBI, CAS!, ESA!, K!, MO!, NY!, SP!, SPF!, US!).

Arbuscula glaberrima solum ramuli apicales tomentosi tandem glabri, medium sursum ramosissimi. Petioli juniores tomentosi, veteres glabri et brevissimi. Folia rigida, integra, coriacea; laminae 0.5–3.5 cm longae × 0.3–1.6 cm latae, subtus tomentosae ubi junioria semper sine glandulis marginalibus, glabrae ubi vetustae. Flores 5–meri, solitarii, axillares, 3–4 mm longi; calycis lobi plerumque quasi deltoidei, ciliati, trichomatibus ornati; corolla pallide viridis; stamina 0.5–1.1 mm longa; bracteae dense pilosae. Fructus levis, brevissimus, 2–4 mm longus × 1–3 mm latus, globosus plerumque, viridis ubi immaturus, purpurascens ubi maturus.

Tree ca. 3 m tall, much-branched from the middle upward. Branchlets subquadrangular, dense-



FIGURE 3. *Symplocos candelabra* Aranha, P.W. Fritsch, and Almeda showing habit and habitat (photo by Almeda).

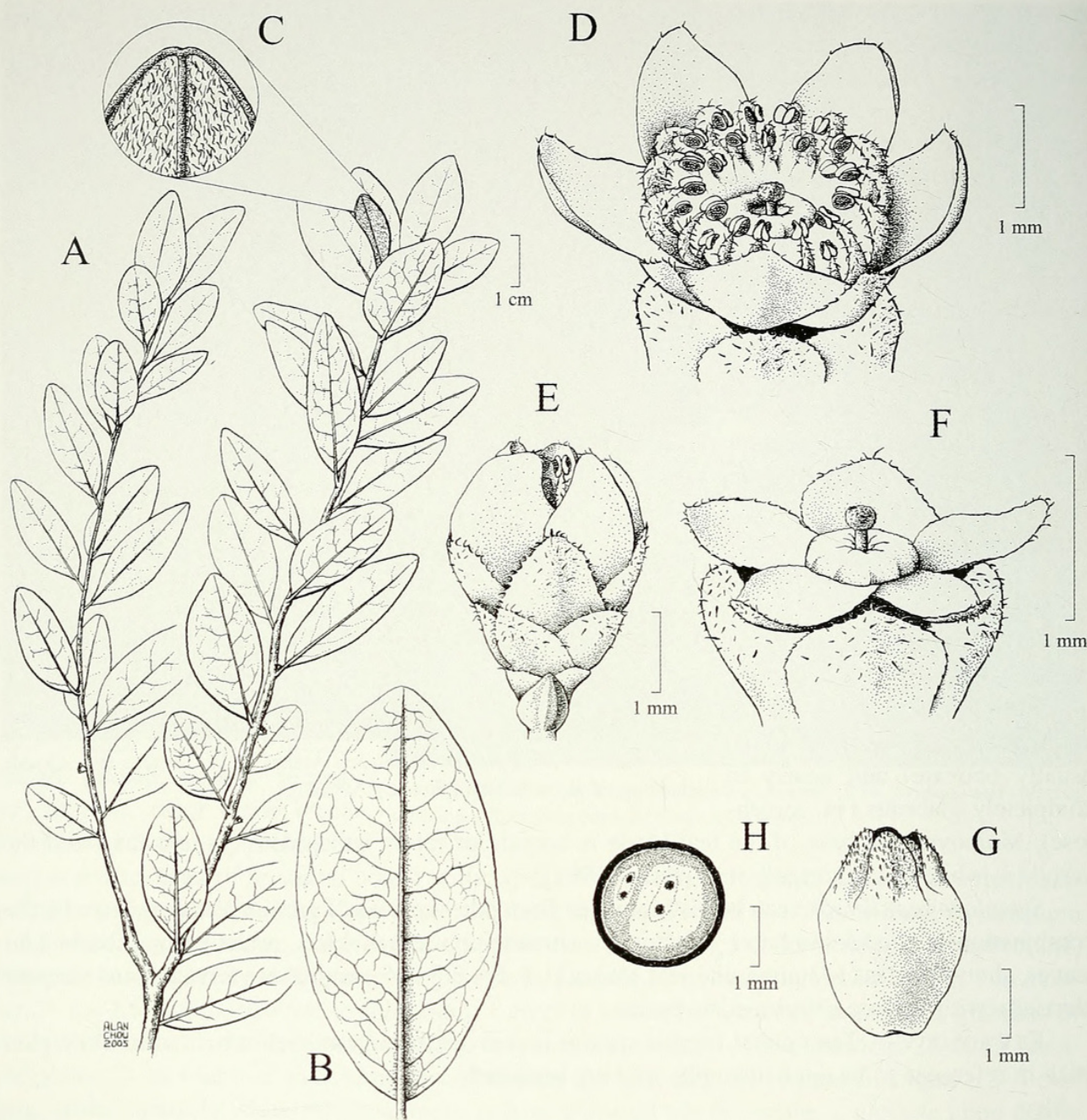


FIGURE 4. *Symplocos microstylis* Aranha, P.W. Fritsch, and Almeda. A. habit; B. representative leaf (abaxial surface); C. leaf apex enlargement showing abaxial indument; D. flower at anthesis with androecium opened outward to show ovary apex, style, and stigma; E. flower bud and subtending bracts; F. flower with corolla and androecium removed; G. fruit with persistent calyx; H. fruit in cross-section. (A-H from Almeda *et al.* 8878).

ly golden yellow-tomentose, often glabrescent, trichomes 0.5–2 mm long; internodes 0.3–1.2 cm long. Vegetative buds densely golden yellow-tomentose. Young petioles densely tomentose, often glabrescent; young leaf blades glabrous adaxially, densely golden yellow-tomentose abaxially with trichomes 0.5–2.5 mm long, often glabrescent, margin entire, revolute, glands lacking, apical gland or its scar usually present; mature petioles 1–4 mm long, adaxially concave, abaxially \pm rounded; mature leaf blades 0.5–3.5 \times 0.3–1.6 cm, elliptic, oblong, obovate, oval, or rarely rotund, coriaceous, adaxially glabrous, abaxially glabrous or sparsely golden yellow-tomentose with trichomes to 0.5–1.5 mm long, base cuneate, subrounded, or rarely rounded, margin revolute, entire, glands

lacking, apical gland or its scar present or wanting, apex obtuse, retuse, or rarely subacute. Inflorescences 3.5–5 mm long with a solitary axillary flower, bracts 7 to 15, first and second basal bracts $1\text{--}1.5 \times 0.5\text{--}0.75$ mm, deltoid or nearly so, keeled, usually persistent, densely or occasionally sparsely golden yellow-tomentose, other distal bracts $0.8\text{--}1.5 \times 1\text{--}2$ mm, persistent, margin ciliate, apex of proximal bracts obtuse, apex of distal bracts rounded, densely or rarely sparsely golden yellow-tomentose along the median vein. Flower 3–4 mm long, sessile; hypanthium 0.4–0.5 mm long, glabrous; calyx lobes 5 in number, $0.5\text{--}1 \times 0.6\text{--}0.8$ mm, nearly deltoid or rarely weakly rotund, sparsely to densely golden yellow-tomentose along the median vein, less often glabrous, weakly overlapping at the base, margin ciliate. Corolla pale green, lobes 5 in number, $1.5\text{--}2 \times 0.8\text{--}1$ mm, elliptic to oval, \pm erect to somewhat incurved at anthesis, glabrous, margin sparsely ciliate or rarely glabrous. Stamens 25–30(–35), monadelphous, 2- to 4-seriate, the longer ones exceeding and obscuring the style; filaments 0.5–1.1 mm long, white, densely white-pilose; anthers yellow, ellipsoid but becoming \pm globose upon dehiscence. Ovary inferior, 3-septate. Epigynic ring 0.5–0.7 mm in diameter, glabrous and rugose. Style ca. 0.1 mm long, cylindrical, straight and glabrous; stigma capitate, 3-lobed. Fruit $2\text{--}4 \times 1\text{--}3$ mm, 2(–3) locular, purplish black at maturity, globose or occasionally ellipsoid or ovoid, calyx lobes persistent, lying above the epigynic ring but not tightly appressed to it. Seeds $2\text{--}3 \times 0.5\text{--}1$ mm, one per locule, two locules fertile but only one of which develops a plump embryo.

PHENOLOGY.— Fruiting in November. Flowering in November (but flowering nearly over).

DISTRIBUTION.— Known to us from two individual plants on Pico do Inficcionado, Serra do Caraça, Minas Gerais State at 1941 m.

PARATYPE.— BRAZIL. **Minas Gerais:** vicinity of Rio de Janeiro and d'Ouro Preto, 1883–84, *A.F.M. Glaziou 15202* (K!).

DISCUSSION.— In his worldwide revision of Symplocaceae, Brand (1901) described *Symplocos organensis* Brand based on *A.F.M. Glaziou 15202* (Minas Gerais: Serra do Caraça Morro [Pico] do Inficcionado, unknown date), and *Glaziou 3641* (probably 8 October 1869), 6023 (probably 8 August or October 1872 at Pedra Açú) and 17130 (unknown date) from Rio de Janeiro, Serra dos Órgãos. Despite the presence of trichomes on the young leaves of *Glaziou 15202*, Brand included this specimen within *S. organensis* even though he described the leaves of this species as glabrous. Bidá (1995), in his revision of the Brazilian species of *Symplocos*, noted this discrepancy and excluded *Glaziou 15202* from *S. organensis*. Because this collection is sterile and does not match any other species of *Symplocos*, Bidá provided no identification for it.

Almeda et al. 8878, the type collection of *Symplocos microstyla*, matches *Glaziou 15202* in all vegetative respects. The availability of both flowers and fruit allows us to conclude that these two collections represent an undescribed species. In leaf shape and size *S. microstyla* matches *S. organensis*. It differs from this species, however, in the following characters: young leaf blades densely tomentose abaxially, not along the margin (vs. glabrous except for a few sparse marginal trichomes proximally and usually near the apical foliar gland), eglandular (vs. usually glandular on the young leaves and uncommon on the mature leaves); upper branches, branchlets, and bracts tomentose (vs. glabrous); flowers 3–4 mm long (vs. 5–11 mm long), calyx tomentose or rarely glabrous (vs. glabrous); calyx lobes $0.5\text{--}1 \times 0.6\text{--}0.8$ mm (vs. $1.5\text{--}2 \times 1\text{--}1.5$ mm), deltoid or nearly deltoid (vs. rotund or nearly so); corolla pale green (vs. lavender proximally, white distally), lobes $1.5\text{--}2 \times 0.8\text{--}1$ mm (vs. $2.7\text{--}3.5 \times 1.7\text{--}2$ mm), \pm erect to somewhat incurved at anthesis (vs. spreading); the longest filaments 0.9–1.1 mm long (vs. 1.8–2 mm long), obscuring the style (vs. not obscuring the style); style ca. 0.1 mm long (vs. 0.8–1 mm long), epigynic ring 0.5–0.7 mm in diameter (vs. 1–1.5 mm in diameter); fruit $2\text{--}4 \times 1\text{--}3$ mm (vs. $7\text{--}12 \times 5\text{--}7$ mm); persistent calyx lobes lying above the epigynic ring but not tightly appressed to it (vs. tightly appressed to the epigynic ring).

ynic ring). They also occur in different habitats, with *S. microstyla* in campo rupestre and *S. orgaensis* in elfin forest.

Symplocos microstyla can be distinguished from other species of section *Neosymplocos* by the combination of leaf blade size ($0.5\text{--}3.5 \times 0.3\text{--}1.6$ cm), densely golden yellow-tomentose abaxial leaf surfaces, lack of glands on the leaf margin, solitary flowers 3–4 mm long, nearly sessile stigma (ca. 0.1 mm long), and small ($2\text{--}4 \times 1\text{--}3$ mm), globose to less often ellipsoid or ovoid fruit.

ETYMOLOGY.— The epithet for this species is Latin for “minute style,” in reference to its short style and nearly sessile stigma.

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