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# The genus *Symplocos* (Symplocaceae) in Bolivia

BERTIL STÅHL

## RESUMEN

STÅHL, B. (1994). El género *Symplocos* (Symplocaceae) en Bolivia. *Candollea* 49: 369-388. En inglés, resúmenes en español y en inglés.

Se presenta una revisión taxonómica del género *Symplocos* en Bolivia. Se reconocen 15 especies, de las cuales *S. debilis*, *S. denticulata*, *S. polyphylla* y *S. robusta* se describen como nuevas para la ciencia. Además se propone una nueva combinación: *S. subcuneata*. Se presentan descripciones o referencias a descripciones adecuadas, una clave de las especies y listas completas de material estudiado. Se ilustran muchas de las especies.

## ABSTRACT

STÅHL, B. (1994). The genus *Symplocos* (Symplocaceae) in Bolivia. *Candollea* 49: 369-388. In English, Spanish and English abstracts.

The genus *Symplocos* in Bolivia is revised to include 15 species, two of which are unclassified. Four species are described as new, viz. *S. debilis*, *S. denticulata*, *S. polyphylla*, and *S. robusta*, and a new combination, *S. subcuneata*, is made. Full descriptions or references to relevant descriptions are given. A key to the species and full specimen citations are provided. Many taxa are illustrated.

**KEY-WORDS:** *Symplocos* — SYMPLOCACEAE — Bolivia — Andes — Taxonomy.

## Introduction

BRAND (1901), in his monograph for *Das Pflanzenreich*, recognised four species of *Symplocos* in Bolivia, all of which described as new to science. Since then another four species and a variety have been described from the country.

Brand's treatment, which is the first and hitherto only treatment of Bolivian Symplocaceae, was based on a total of eight collections. The family is still poorly collected in the Andes, and for the present account only a little more than 100 collections have been studied, i.e. an average of about seven collections per species. All available material from the following herbaria were consulted: AAU, BM, F, FI (photographs), G, GB, JE, K, L, LPB (photo copies), MO, NY, P, S, US, and W. More than half of these collections have been made during the last two decades. The recent collections, particularly by Stephan Beck and James Solomon, have been of pivotal importance for the present treatment.

This work is the third in a series dealing with the taxonomy of Andean Symplocaceae. The two previous works have treated the family in Ecuador and Peru, respectively (STÅHL, 1991, 1993). The general format of these treatments is followed here. For a preliminary review of the distribution and diversity of Andean Symplocaceae, see STÅHL (1994).

## Taxonomic treatment

Key to the species of *Symplocos* in Bolivia

- 1a. Leaves shorter than 3.5 cm ..... 2
- 1b. At least some leaves longer than 3.5 cm ..... 4
- 2a. Young shoots greyish white, glabrous; leaf blades glabrous, 0.8-2.1 cm wide  
**14. *S. subcuneata***
- 2b. Young shoots brownish to black,  $\pm$  tomentose or strigulose; lower leaf surface  $\pm$  tomentulose or strigulose, if glabrous then leaf blades less than 0.8 cm broad ..... 3
- 3a. Leaf blades to 1.2(-1.5)  $\times$  0.8 cm, usually glabrous, lateral veins invisible or inconspicuous ..... **13. *S. nana***
- 3b. Leaf blades larger than 1.5  $\times$  0.8 cm, lower side  $\pm$  tomentose, lateral veins rather conspicuous ..... **15. *S. polyphylla***
- 4a. Leaves and young shoots glabrous ..... 5
- 4b. Leaves usually  $\pm$  pubescent beneath; young shoots variously pubescent ..... 9
- 5a. Leaves yellowish or light green when dried; filaments  $\pm$  filiform, gradually tapering towards apex, united at base only ..... 6
- 5b. Leaves often  $\pm$  brownish when dried; filaments  $\pm$  ribbon-shaped, usually abruptly constricted at apex, united 1/3 to 1/2 of their length ..... 8
- 6a. Leaves broader than 3 cm, margins entire or sparsely serrulate, upper surface dull  
**3. *S. sp. 1***
- 6b. Leaves less than 3 cm broad, margins entire or distinctly denticulate, upper surface glossy 7
- 7a. Leaf margins denticulate; fruits 10-14 mm long ..... **1. *S. denticulata***
- 7b. Leaf margins entire; fruits 5-6 mm long ..... **2. *S. debilis***
- 8a. Flowers sessile ..... **12. *S. psiloclada***
- 8b. Flowers distinctly pedicellate ..... **11. *S. fimbriata***
- 9a. Flowers solitary or in sessile fascicles of 2-4 ..... 10
- 9b. Inflorescences with usually more than 4 flowers, if fewer then not arranged in fascicles 12
- 10a. Flowers solitary, distinctly pedicellate; leaves sparsely strigulose beneath **11. *S. fimbriata***
- 10b. Flowers 2-4 in sessile fascicles, if solitary then short-pedicellate; leaves densely to sparsely pubescent beneath ..... 11
- 11a. Flowers in fascicles; leaves pilose-strigose beneath ..... **9. *S. hiemalis***
- 11b. Flowers solitary; leaves sparsely strigulose beneath ..... **10. *S. sp. 2***
- 12a. Flowers numerous in dense panicles ..... 13
- 12b. Flowers well-spaced in short racemes or little-branched panicles ..... 14
- 13a. Corolla ca. 5 mm long; petiole 0.6-2 cm long ..... **8. *S. robusta***
- 13b. Corolla ca. 3 mm long; petiole to 0.5 cm long ..... **6. *S. colorata***
- 14a. Corolla longer than 10 mm; leaf blades membranaceous, 6-18 cm long, sparsely strigose beneath ..... **4. *S. arechea***
- 14b. Corolla shorter than 6 mm; leaf blades coriaceous, to 11 cm long, glabrous to densely strigose-pilose beneath ..... 15



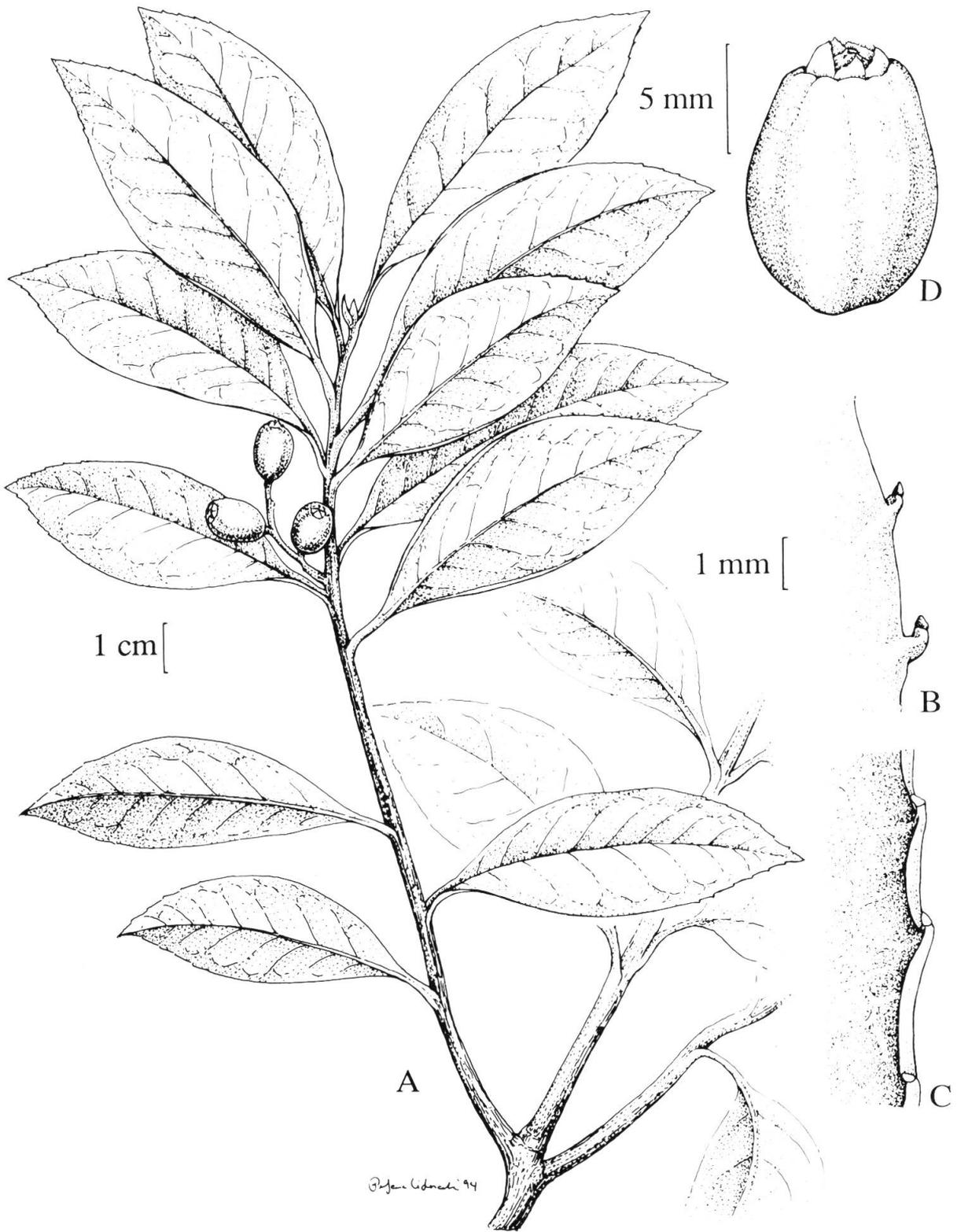


Fig. 1. — *Symplocos denticulata* Stähli  
A, fruiting branch; B, leaf margin, adaxial view; C, leaf margin, abaxial view; D, fruit. A-D, Beck 569 (type).

## 2. *Symplocos debilis* Ståhl, spec. nov.

**Type:** Bolivia, Dept. La Paz: Prov. Larecaja, Copacabana, about 10 km S of Mapiri, 850-950 m, 8 Oct-15 Nov 1939 (fr.), *Krukoff 10991* (holotype, NY; isotypes, G, MO, S, US). (Fig. 2).

Arbor glabra ad 15 alta, surculis juvenibus laevibus, ramulis tenuibus. Folia in sicco viridia vel viridia pallida, supra plus minusve nitida, petiolis 0.4-0.6 cm longis; lamina anguste elliptica vel lanceolata, 4.5-8.5 × 2-2.8 cm, subcoriacea, basi angustata, apice breviter obtuso-acuminato, margine integro, versus basim nonnihil revoluta, costa infra prominenti, supra deplanata, venis lateralibus venulisque inconspicuis. Flores ignoti. Infructescentiae laterales, non ramosae, ad 2 mm longae. Fructus 2-6, uniloculares, ellipsoidei, 5-6 × 3-4 mm, aliquot verrucosi.

Tree to 15 m high, glabrous throughout; young shoots greenish to dark brown, smooth, branchlets thin. Leaves petiolate, green to yellowish green when dried, ± glossy above; blade narrowly elliptic to lanceolate, 4.5-8.5 × 2-2.8 cm, subcoriaceous, base attenuate, apex shortly obtuse-acuminate, margins entire, slightly revolute towards base; midvein prominent beneath, in level with leaf surface above, lateral veins and veinlets inconspicuous; petiole 0.4-0.6 cm long. Flowers not seen. Infructescences lateral, unbranched, to ca. 2 cm long. Fruits 2-6, unilocular, ellipsoid, 5-6 × 3-4 mm, the surface somewhat verrucose.

Among Bolivian *Symplocos*, *S. debilis* is most similar to *S. denticulata*, both of which are members of subgenus *Hopea*. Both species thus have glabrous leaves drying more or less yellowish green, greenish flowers (not yet seen in *S. debilis*) with comparatively delicate perianth lobes, stamens with filiform and largely free filaments, and glabrous, usually greenish fruits. *Symplocos debilis* differs from *S. denticulata* primarily in smaller fruits and entire leaf margins, but gives also a much weaker impression, having thinner petioles and leaf-bearing branches.

Known only from the type collection.

## 3. *Symplocos* sp. 1

Tree, stem at least to 5 cm diam.; young shoots and branchlets brown or greenish, glabrous, smooth. Leaves petiolate, green to light green when dried, glabrous; blade narrowly elliptic to elliptic or oblanceolate, 7-14 × 3-6 cm, coriaceous, base attenuate, apex obtuse, acute, or shortly obtuse-acuminate, margins entire or sparsely serrulate towards apex, somewhat revolute at base; midvein prominent beneath, somewhat impressed above, lateral veins and veinlets inconspicuous; petiole 0.3-0.7 cm, canaliculate. Flowers and fruits not seen.

This species, of which only sterile material is available, belongs to subgenus *Hopea*. In size and shape of the leaves it resembles *S. spruceana* (Miers) Gürke of northern Peru, but that species differs in entire leaf margins. It cannot be excluded that the material represents an unusually large-leaved variant of *S. denticulata*, described in this work, although the leaf margins have not the distinct denticulae of that species and the upper leaf surface is dull rather than glossy. Additional, fertile collections are needed before a positive identification can be made.

*Specimens examined.* — La Paz: Nor Yungas, valley of Río Coroico, Sacramento, 10 km NE of Chuspipata on road to Coroico, 2450 m, 67°48'W, 16°18'S, cloud forest on ridge, 27-29 Jan 1984 (ster.), *Gentry & Solomon 44669, 44781* (MO).

## 4. *Symplocos arechea* L'Hérit., Trans. Linn. Soc. London 1: 176. 1791; Ståhl, Fl. Ecuador 43: 7, fig. 2. 1991. **Type:** Peru, Dept. Huánuco, Cuchero, *Dombey s.n.* (holotype, P).

= *Symplocos castanea* Brand, Repert. Spec. Nov. Regni Veg. 14: 324. 1916. **Type:** Bolivia, Dept. La Paz, Prov. Nor Yungas, Coripati, 26 Apr 1894 (fl.), *Bang 2156* (holotype, B, destroyed; lectotype, NY, selected here; isolectotypes, BM, K, L, MO, NY, US).

= *Symplocos matthewsii* A. DC., Prodr. 8: 250. 1844. **Type:** Peru, Chachapoyas, 1835 (fl.), *Matthews 2016* (holotype, FI-WEBB, photograph seen; isotypes, G, K, P).

For additional synonymy, see STÅHL (1993).



Fig. 2. — *Symplocos debilis* Stähl  
Krukoff 10991 (isotype, S). Inset: fruits.

*Symplocos arechea* is a small to medium-sized tree, easily recognised by its relatively large and thin leaves with mostly serrate margins and sparsely pubescent lower sides. It is also distinguished by rather large, cylindrical to ellipsoid fruits, short axillary racemes with usually less than eight flowers, and a long and narrow corolla (1-1.5 cm long). The species has a rather wide distribution, inhabiting the lower east Andean slopes of Colombia, Ecuador, and Bolivia, and is the only species of *Symplocos* in Bolivia that occurs below 500 m altitude. *Symplocos arechea* appears to be closely related to *S. martinicensis* Jacq. of northern South America and the Caribbean. In fact, future studies may show them to be conspecific.

*Specimens examined.* — **La Paz:** Mapiri Region, San Carlos, 850 m, 9 Feb 1927 (fl.), *Buchtien 1766* (NY, US); Mapiri, 1500 m, Apr 1886 (fr.), *Rusby 2686* (NY). Hda. Simaco on road to Tipuani, 1400 m, Feb 1920 (fl.), *Buchtien 5641* (US). Prov. Murillo, 45.5 km below dam at Lago Zongo, vic. of Cahua hydroelectric plant, 68°01'W, 16°03'S, 1200-1400 m, 23 Dec 1984 (fl.), *Solomon 12970* (MO, NY). Apolo, 1450 m, 17 Apr 1902 (fr.), *Williams 149* (NY, US). Prov. Sud Yungas, 8 km N of Chulumani, ca. 1850 m, 1 Jan 1984 (fl.), *Beck 8762* (S). Prov. Iturrealde, Luisita, 67°15'W, 13°05'S, 180 m, 19 Mar 1984 (fl.), *Haase 330* (S); same locality, 9 Feb 1988 (fl.), *Haase 826* (S). — **Cochabamba:** between Villa Tunari and Puerto Villarroel, near Chimoré, 400 m, 30 Dec 1982 (fl.), *Fernández Casas 7968* (NY).

**5. *Symplocos quitensis* Brand subsp. *boliviana* (Brand) Ståhl, *Candollea* 48: 360. 1993. (Fig. 3).**

≡ *Symplocos boliviana* Brand, *Pflanzenr.* IV.242: 89. 1901. **Type:** Bolivia, without precise locality, no date (fr.), *Bang 1895* (lectotype, NY, selected here; isolectotypes, BM, G, K, MO, NY, US).

≡ *Symplocos flavescens* Rusby, *Bull. New York Bot. Gard.* 4: 407. 1907, non Brand. **Type:** Same as for *Symplocos boliviana* Brand.

Small tree to 8 m, sometimes higher; young shoots and branchlets sparsely to densely strigose, the bark verrucose to almost smooth, brown. Leaves petiolate, brownish when dried; blade broadly elliptic or ovate, 2.5-11 × 1.5-5 cm, coriaceous to cartilaginous, lower surface densely strigose-pilose, sometimes sparsely strigose, the upper glabrous or often puberulous on midvein, base shortly attenuate, truncate, or subcordate, apex shortly obtuse-acuminate, sometimes obtuse or rounded, margins densely glandular-serrulate; midvein prominent beneath, ± impressed above, lateral veins and veinlets usually prominent and verrucose beneath, ± impressed above; petiole 0.3-1.5 cm long, usually canaliculate, strigose. Inflorescences lateral, borne among the foliage, racemes or sometimes little-branched panicles, to 1.5 cm long, rachis usually densely hispid. Bracts 2 or 3, strigulose. Flowers 2-6(-8). Calyx glabrous to strigulose, tube 1-1.5 mm long, lobes very broadly ovate, 1.2-1.7 × 1.5-2.2 mm, margins ciliolate. Corolla white to pink, glabrous, 4.5-5.5 mm long, tube ca. 1.7 mm long, lobes broadly oblong, ca. 3 mm wide, margins inconspicuously ciliolate. Stamens 45-50 in 2(3) rows, tube 1.7-2 mm long, free filaments 0.5-2 × 0.4-0.6 mm, smooth or almost smooth; anthers 0.4 × 0.5 mm. Disc annular, densely puberulous; style ca. 3 mm long, glabrous; stigma capitate or subcapitate, 3-lobed; ovary 3(2)-locular with ca. 3 ovules in each locule. Fruits ampulliform to broadly ovoid, 7-13 × 5.5-7 mm, strigulose when young, glabrescent, smooth or somewhat rugose when dried.

*Symplocos quitensis* subsp. *boliviana* is distinguished by short axillary racemes, mostly rather thick leaves with distinctly serrulate margins and conspicuous veins and veinlets, which on the lower leaf side are more or less verrucose. It differs from subspecies *quitensis* in larger leaves and by having the fruits ovoid-ampulliform rather than cylindrical.

*Symplocos quitensis* has, in contrast to most Andean species of the genus (STÅHL, 1994), a wide distribution; subspecies *quitensis* is distributed from southern Colombia to north-central Peru, subspecies *boliviana* from southern Peru through most of the Bolivian Andes.

*Specimens examined.* — **La Paz:** Nor-Yungas, Unduavi, 3300 m, Nov 1910 (fl.), *Buchtien 2948* (NY, US); Chuspipata, 5 km on road to Unduavi, 3150 m, 2 Apr 1982 (ster.), *Beck 7605* (S); below

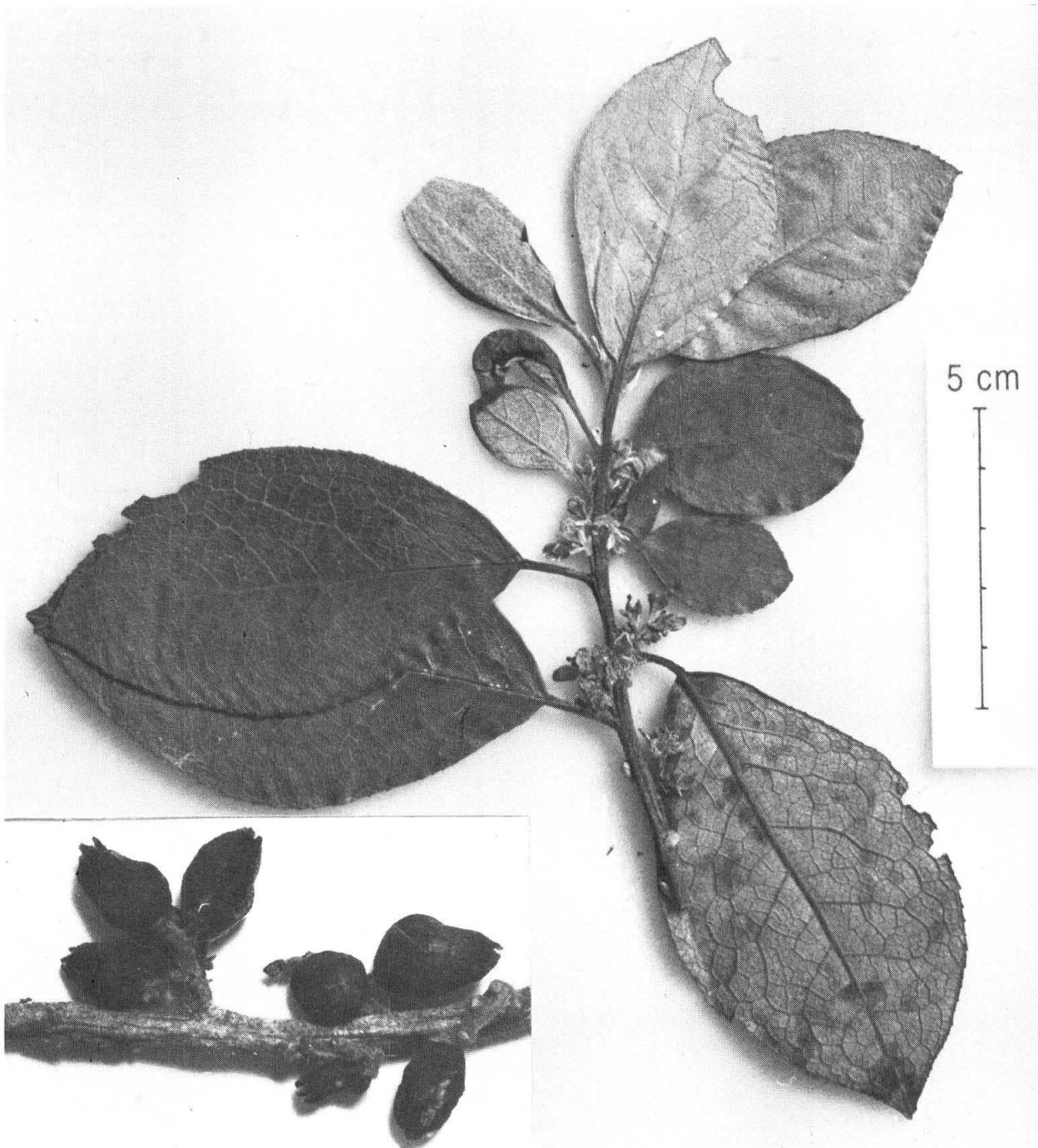


Fig. 3. — *Symplocos quitensis* Brand subsp. *boliviana* (Brand) Ståhl  
Beck 13113 (S). Inset: fruits (Beck 14684, S).

Unduavi, 3450 m, 28 Aug 1988 (fr.), *Beck 14684* (S). 0.7 km E of Cotapata, 67°51'W, 16°18'S, 3250 m, 11 Nov 1987 (fl.), *Solomon 17322* (MO). Prov. Sud Yungas, path from Chojlla to Taquesi, 3550 m, 28 Apr 1990 (fr.), *Beck 18222* (S). Prov. Murillo, Zongo Valley, 21 km below La Cumbre, 3250 m, 11 Dec 1986 (fl.), *Beck 13113* (S); 3.1 km SE of Unduavi bridge on old road, 67°53'W, 16°19'S, 3000 m, 5 Nov 1982 (fl.), *Solomon 8691* (S); 3 km E of Unduavi, 3300-3400 m, 2 Jul 1986 (fr.), *Solomon 15414* (S); Río Zongo Valley, 22.5 km below dam at Lago Zongo, 68°07'W, 16°09'S, 3000 m, 9 Oct 1982 (fr.), *Solomon 8410* (MO, NY). Prov. Inquisivi, 10 km S of Choquetanga, 0.5 km from mouth of Río Calvario, 67°17'W, 16°56'S, 3550-3680 m, 22 Jun 1991 (fr.), *Lewis & Kuno 39097* (S). — **Cochabamba**: 53 km W of Comarapa on Carretera Fundamental 4, 2800 m, 9 Dec 1975 (fl.), *Davidson 3861* (MO). Prov. Carrasco, 6.5 km E of Siberia on road Cochabamba-Santa Cruz, 64°44'W, 17°50'S, 2950 m, 5 Mar 1988 (young fr.), *Solomon & Nee 17917* (S). — **Santa Cruz**: Prov. Caballero, Comarapa, 32 km on road towards Cochabamba, 2500 m, 24 Mar 1981 (ster.), *Beck 6811* (S).

#### 6. *Symplocos colorata* Brand, Pflanzenr. IV.242: 74. 1901.

**Type:** Bolivia, Dept. La Paz, Coroico, 1500-1850 m, Dec 1865 (fl.), *Pearce s.n.* (lectotype, K, selected here).

Tree to 7 m high; young shoots and branchlets tomentulose from brownish red hairs. Leaves short-petiolate or subsessile, brownish green to blackish; blade elliptic to broadly elliptic or oblanceolate to narrowly ovate, 4-12 × 2-6 cm, coriaceous, brownish tomentulose beneath, densely so on veins, glabrous above, except for midvein towards base, base truncate to subcordate, apex obtuse to shortly obtuse-acuminate, sometimes rounded, margins subentire to vaguely glandular-crenulate, plane or somewhat revolute; midvein prominent beneath, slightly impressed above, lateral veins rather conspicuous, veinlets rather inconspicuous; petiole to 0.5 cm long. Inflorescences lateral, borne among or beneath the foliage, fascicles or little-branched panicles, rachis to 3.5 cm long, densely brownish tomentulose. Bracteoles ca. 3, strigulose, ca. 1.5 × 1.5 mm, obtuse at apex. Flowers numerous, arranged in dense, little-branched panicles, condensed at tips of the inflorescence branches. Calyx tube ca. 0.7 mm long, lobes very broadly ovate, ca. 1 × 1 mm, strigulose, margins ciliolate. Corolla white, strigulose on the outside, 3 mm long, lobes broadly oblong, 1.5-2.2 mm wide, margins entire. Stamens 35-40 in 3 rows, filament tube ca. 1 mm long, free filaments 0.5-1.2 × 0.3-0.4 mm, papillose; anthers 0.3 × 0.3 mm. Disc annular, densely strigulose; style 1.2 mm long, glabrous; stigma subcapitate, indistinctly lobed; ovary 3-locular with about 3 ovules in each locule. Fruits very broadly ovoid to subglobose, 6-7 × 5.5-6 mm, black, strigulose towards apex.

*Symplocos colorata* is distinguished primarily by its minute but dense brownish tomentum on branchlets and lower leaf surfaces, subglobose fruits and small flowers. It is very similar to *S. mapiriensis*, which see for differences.

*Specimens examined.* — **La Paz**: Near Coroico, 10 Jul 1894 (fr.), *Bang 2332* (BM, G, K, MO, NY, US); without locality, no date (fr.), *Bang 2331* (US).

#### 7. *Symplocos mapiriensis* Brand, Pflanzenr. IV.242: 74. 1901. **Type:** Bolivia, Dept. La Paz, Mapiri, 850 m, May 1886 (fr.), *Rusby 2685* (lectotype, NY, selected here; isoelectotypes, BM, MO, NY, US). (Fig. 4).

≡ *Symplocos mapirensis* Rusby, Descr. S Amer. Pl. 81. 1920. **Type:** Same as for *Symplocos mapiriensis* Brand.

= *Symplocos colorata* auct. non Brand: Brand, Pflanzenr. IV.242: 74. 1901, p.p.

Tree to 15 m high; young shoots and branchlets strigulose to glabrous, dark to pale brown, the bark greyish to pale brown, smooth. Leaves petiolate, greenish or greenish brown when dried; blade broadly to narrowly elliptic, sometimes obovate or narrowly obovate, 4-11 × 2.2-5 cm, subcoriaceous or coriaceous, the lower side glabrous or (mainly on midvein) sparsely strigulose, the

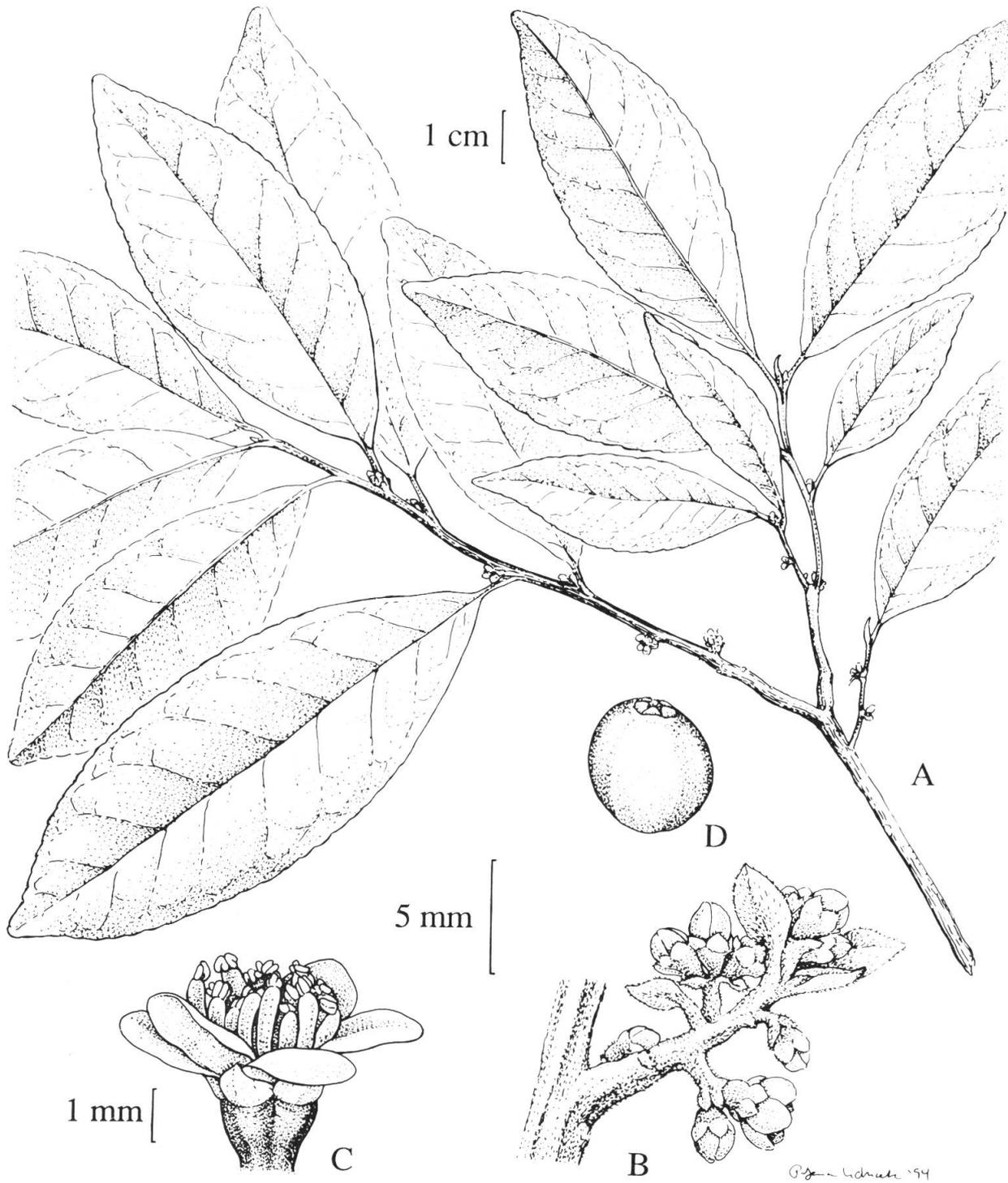


Fig. 4. — *Symplocos mapiriensis* Brand  
 A, branch, flowers in bud; B, inflorescence; C, flower; D, fruit. A, Buchtien 1654; B, C, Feuerer 6716b; D, Rusby 2685.

upper side glabrous, base short-attenuate, rarely truncate, apex shortly obtuse-acuminate, sometimes acute or obtuse, margins entire or vaguely crenulate towards apex, plane or slightly revolute at base, glands inconspicuous; midvein prominent beneath, impressed above, lateral veins and veinlets rather inconspicuous; petiole (0.2-)0.4-1 cm long, subcanaliculate, sparsely strigulose to subglabrous. Inflorescences lateral, borne among the foliage and on branchlets just beneath the leaves, short racemes or little-branched panicles to 1 cm long, rachis strigulose; bracts 3, broadly ovate, 0.7-1.5 × 0.5-1.2 mm, strigulose, at least on keel, margins ciliate. Flowers 3-8(-10). Calyx glabrous, tube 0.7-1.2 mm long, lobes very broadly ovate, 0.5-1 × 1-1.2 mm, margins ciliate. Corolla glabrous, colour unknown, 2.2-3 mm long, tube ca. 0.5 mm long, lobes oblong, 1.2-1.5 mm wide, margins entire. Stamens 30-35 in 2 or 3 rows, tube 0.5-1 mm long, free filaments 0.5-1.5 × 0.3-0.4 mm, papillose or smooth; anthers ca. 0.2 × 0.3 mm. Disc annular, puberulous or glabrous; style 1.2-1.5 mm long, glabrous; stigma subcapitate to truncate, indistinctly 3-lobed. Ovary 3-locular with 3 ovules in each locule. Fruits globose to very broadly ellipsoid, 5-7 × 4.5-6 mm, glabrous, smooth.

*Symplocos mapiriensis* is very similar to *S. colorata*, both in vegetative and reproductive features, and it is possible that they are better treated as varieties of a single species. However, *S. mapiriensis* is distinct from *S. colorata* by virtue of its sparse pubescence on vegetative and reproductive parts (sparsely strigulose to subglabrous), as well as by having the corolla glabrous. The Pearce collection from Huayacana was referred to *S. colorata* by BRAND (1901: 74), but is here included under *S. mapiriensis*.

*Specimens examined.* — **La Paz:** Mapiro Region, San Carlos, near Sarampiuni, 600 m, 21 Dec 1926 (fl.), *Buchtien 1654* (US). Prov. Larecaja, Copacabana, ca. 10 km S of Mapiro, 850-950 m, 8 Oct-15 Nov 1939 (fl.), *Krukoff 11187, 11199* (MO), *11203* (MO, US), *11247* (MO). Prov. Nor Yungas, 13.7 km NW of San Pedro on road through Incahuara-Mejillones, 1500 m, 67°37'W, 15°58'S, 12-14 Feb 1983 (fl.), *Solomon 9511* (S). Prov. Bautista Saavedra, Valle de Carazani, ca. 10 km below Cilij, 2500 m, 7 Nov 1979 (fl.), *Feuerer 6716b* (AAU). Huayacani, 3050 m, May 1866 (fr.), *Pearce s.n.* (K).

### 8. *Symplocos robusta* Ståhl, spec. nov.

**Type:** Bolivia, Dept. La Paz: Prov. Nor Yungas, vic. of Chuspipata, 3050 m, 9 Dec 1983 (fl.), *Beck 8685* (holotype, LPB, photo copy seen; isotype, S). (Fig. 5).

Arbor ad 4 m alta, surculis juvenibus dense ferrugineo-tomentulosus. Folia in sicco brunneola, petiolis 0.6-2 cm longis; lamina obovata vel oblanceolata, 6-14.5 × 3.3-8.5 cm, cartilaginea, basi truncata vel subcordata, apice rotundato vel interdum breviter obtuso-acuminato, margine saltem versus apicem glanduloso-glandulato, versus basim leviter revoluta, pagina inferiore dense tomentosa, costa venis lateralibusque infra prominentibus, supra potius impressis. Inflorescentiae laterales, dense paniculatae vel fasciculatae, sessiles vel pedunculis ad 0.5 cm longis, tomentulosae. Bractae 3, dense tomentulosae-strigosae. Calyx dense tomentulosus, tubo 1.5 mm longo, lobis perlate ovatis, 2.5 × 3 mm. Corolla flavida, extus sparsim strigosa, 5 mm longa, tubo 0.5 mm longo, lobis oblongis vel subquadratis, 3 mm latis, marginibus integris. Stamina 30-35, bifaria, tubo 1 mm longo, filamentis 0.5-2.2 × 0.4-0.7 mm, papillosis, antheris 0.4-0.5 × 0.5 mm. Discus annularis, dense puberulus. Stylus glaber, 0.5 mm longus, stigmatibus truncato, obscure trilobato. Ovarium trilobulare, ovulis in quoque locule 3. Fructus ignotus.

Small tree to 4 m high; young shoots and branchlets densely brownish tomentulose. Leaves petiolate, brownish when dried; blade obovate or broadly oblanceolate, sometimes oblanceolate, 6-14.5 × 3.3-8.5 cm, cartilaginous, densely tomentulose from pale brown hairs beneath, base truncate or subcordate, apex rounded or sometimes shortly obtuse-acuminate, margins glandular-denticulate, at least towards apex, slightly revolute towards base; midvein and lateral veins prominent beneath, somewhat impressed above, veinlets rather inconspicuous, especially above; petiole 0.6-2 cm long, canaliculate, ± tomentulose. Inflorescences lateral, borne among and beneath the foliage, fascicles or condensed panicles, sessile or with a peduncle to 0.5 cm long, densely brownish tomentulose. Bracts 3, inserted just beneath the calyx, broadly ovate, 3-3.5 × 2.5-3 mm, densely

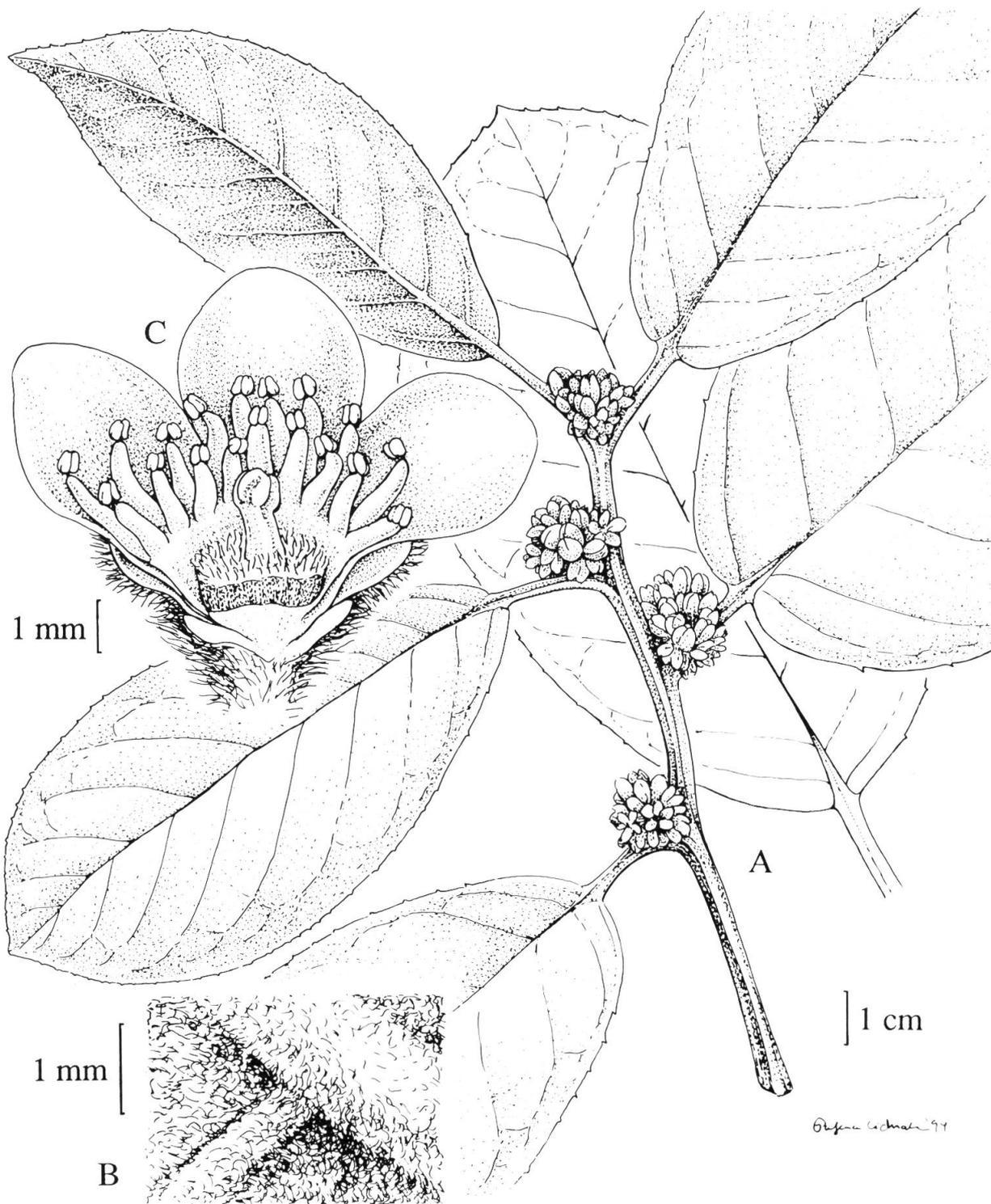


Fig. 5. — *Symplocos robusta* Stahl  
**A**, flowering branch; **B**, leaf underside showing dense indumentum; **C**, flower cut open. **A-C**, Beck 8685 (isotype, S).

tomentulose-strigose. Flowers 10-20. Calyx densely tomentulose-strigose, tube 1.5 mm long, lobes very broadly ovate,  $2.5 \times 3$  mm, margins ciliate. Corolla pale yellow, 5 mm long, sparsely strigose-pilose on the outside, tube 0.5 mm long, lobes broadly oblong to almost square, 3 mm wide, margins entire. Stamens 30-35 in 2 rows, tube 1 mm long, free filaments  $0.5-2.2 \times 0.4-0.7$  mm, papillose; anthers  $0.4-0.5 \times 0.5$  mm. Disc annular, densely puberulous; style glabrous, 0.5 mm long; stigma truncate, indistinctly 3-lobed. Ovary 3-locular with ca. 3 ovules per locule. Fruits not seen.

*Symplocos robusta* is easily recognised because of its large, coarse leaves with prominent abaxial venation and dense brownish indumentum on branchlets, inflorescences, and lower leaf surfaces. It is no doubt closely related to *S. sandemanii* Stähl, recently described from north-central Peru. The latter species is similar in leaf shape and vestiture, but differs by having the corolla strigulose on the outside, inflorescences terminal or subterminal, and the petioles mostly shorter. In leaf shape it is also very similar to *S. patazensis* Mansf., also from north-central Peru, but the flowers of that species are smaller, have more stamens, and are arranged in subterminal panicles. Among Bolivian *Symplocaceae*, *S. robusta* is most similar to *S. colorata*, from which it differs in larger leaves, longer petioles, and larger flowers.

Known only from the type collection.

### 9. *Symplocos hiemalis* Lingelsheim, Repert. Spec. Nov. Regni Veg. 8: 3. 1910.

**Type:** Bolivia, Sud Yungas, Sirupayo near Yanacachi, 2400 m, 18 Dec 1906 (fl.), *Buchtien 534* (lectotype, US, selected here; isolectotype, W; B, destroyed, photo in NY). (Fig. 6).

Tree to at least 6 m high; young shoots and branchlets pilose-tomentose, the bark smooth or somewhat verrucose, light brown to reddish brown. Leaves petiolate, green when dried; blade oblanceolate,  $4-10 \times 1.5-3.8$  cm, membranaceous, pilose-strigose beneath, densely so in young leaves,  $\pm$  strigose above, densely so on midvein, base truncate to attenuate, apex short-acuminate, the acumens 0.3-1 cm long, margins distinctly glandular-serrulate, often slightly revolute towards base; midvein prominent beneath, slightly impressed above, lateral veins and veinlets rather inconspicuous; petiole 0.3-0.7 mm long,  $\pm$  canaliculate, pilose. Inflorescences lateral, borne among the foliage, fasciculate, sessile or with peduncles to 0.7 cm long, peduncles strigose. Bracts 5 or 6, ovate, ca.  $3 \times 3$  mm, strigulose. Flowers 1-4. Calyx glabrous, tube ca. 2 mm long, lobes very broadly ovate,  $2.5-2.7 \times 3.2-3.7$  mm, margins ciliate. Corolla white to pink, glabrous, 12-14 mm long, lobes oblong, 4-5 mm wide, margins vaguely erose. Stamens ca. 80 in 4 rows, tube 5 mm long, free filaments  $1-3 \times 0.4-0.5$  mm, papillose; anthers  $0.4-0.5 \times 0.4$  mm. Disc annular, densely puberulous; style 7-8 mm long, glabrous; stigma capitate, indistinctly 4-lobed. Ovary 5-locular with 1 or 2 ovules in each locule. Fruits ovoid,  $17-20 \times 12-16$  mm, surface strongly irregular, strigulose on style base, other parts glabrous, red when mature, black when dried.

*Symplocos hiemalis* is distinguished by large flowers arranged in axillary fascicles and rather thin leaves with distinctly serrulate margins. In addition, the fruits are large and irregular in shape, indicating that the exocarp must be rather thick and fleshy. Its relationships are obscure, but it is possibly closely related to *S. arechea*, which it resembles in leaf shape and many floral features.

**Specimens examined.** — **La Paz:** Prov. Murillo, 27-33 km N of (below) dam at Lago Zongo,  $68^{\circ}04'W$ ,  $10^{\circ}06'S$ , 2000-2500 m, 27-29 Nov 1982 (fl.), *Solomon 8937, 9019* (S). 29-32 km below (N of) the pass, 2200-2300 m, 14 Feb 1988 (fr.), *Solomon 17845* (S); 11 May 1990 (fr.), *Solomon & al. 19064* (S).

### 10. *Symplocos* sp. 2

Small tree, young shoots sparsely strigulose, the bark smooth, light brown, branchlets greyish. Leaves petiolate, greenish brown when dried; blade oblanceolate,  $4.5-7 \times 1.8-2.4$  cm, subcoriaceous, glabrous or sparsely strigulose beneath and puberulous on midvein above, base attenuate,

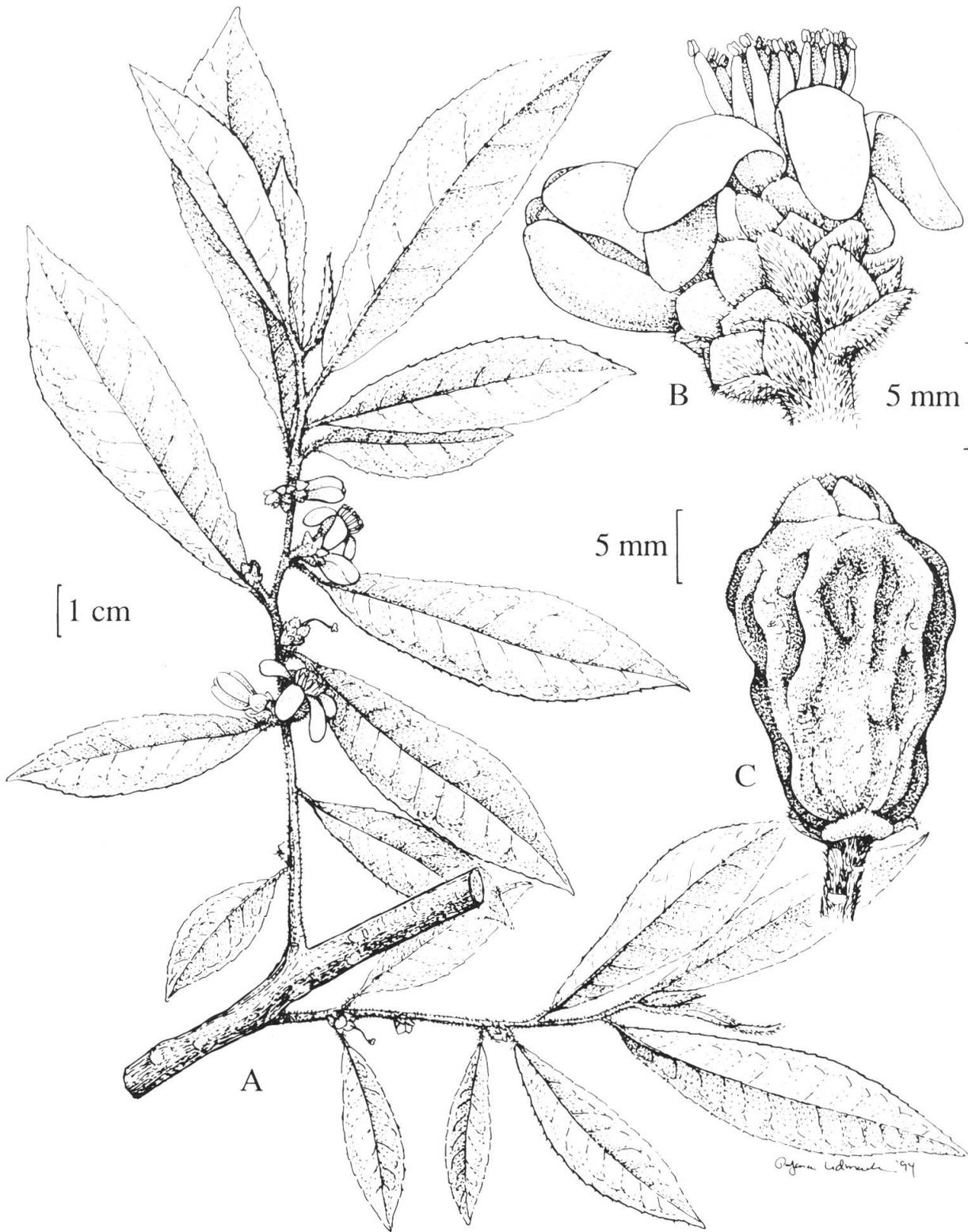


Fig. 6. — *Symplocos hiemalis* Lingelsheim  
A, flowering branch; B, flowers; C, fruit; A, B, Solomon 9019; C, Solomon 17845.

apex shortly obtuse-acuminate, margins glandular-crenulate; midvein prominent beneath, not or only slightly impressed above, lateral veins and veinlets inconspicuous; petiole 0.4-0.8 cm long, plane or subcanaliculate, strigulose. Immature fruits subcylindrical, glabrous, also on style base, 3-locular, solitary in leaf axils among the foliage or just beneath, peduncle 1-3 mm long, strigulose, persistent calyx lobes glabrous, ciliate at margins.

This is evidently an undescribed species, but lacking mature fruits and flowers I refrain from naming it here. The leaves are similar to those of *S. hiemalis*, although the vestiture is much sparser.

*Specimen examined.* — **Santa Cruz:** Prov. Vallegrande, Aguadita, 8 km (by air) S of Khasa Monte on road to Los Sitanos, 64°02'W, 18°47'S, 2350 m, 26 Feb 1989 (immature fr.), *Nee 38443* (NY).

**11. *Symplocos fimbriata* Ståhl, Fl. Ecuador 43: 37, fig. 18B-C. 1991. Type:** Ecuador, Prov. Pichincha, SW slope of Loma Tablarumi, 9 km E of Olmedo on road to Laguna San Marcos, 78°02'W, 00°08'N, 3400-3500 m, 18 Dec 1987 (fl. & fr.), *Molau & Eriksen 2095* (holotype, GB; isotypes, AAU, QCA).

*Symplocos fimbriata* is easily recognised by its coarse and distinctly petiolate leaves with densely glandular-denticulate or serrulate margins, large, solitary flowers borne on long, often reflexed pedicels, and large, ellipsoid fruits. It is distributed from northern Ecuador to northern Bolivia. Material from Ecuador and Peru differs from the Bolivian collections studied here in the generally strigulose lower leaf surfaces (vs. glabrous, although young leaves of the Bolivian material sometimes are sparsely strigulose beneath), but agrees perfectly in reproductive characters. However, with these new collections the distinction between *S. fimbriata* and *S. reflexa* A. DC., which have more or less the same general distributions, has become somewhat obscure.

*Specimens examined.* — **La Paz:** Prov. Nor Yungas, 1.3 km W of Chuspipata on road to Unduavi, 67°50'W, 16°17'S, 3100 m, 17 Jul 1988 (fl.), *Solomon 18679* (S, US); 1.2 km E of Cotapata on road between Unduavi and Chuspipata, 67°50'W, 16°17'S, 3100 m, 26 Jun 1986 (ster.), *Solomon 15367* (S); 1.6 km E of Cotapata, 24 Sep 1986 (fl.), *Solomon 15625* (S); about 30 km below pass on road to Chuspipata, passing Cotapata, 3000 m, 21 Jul 1990 (bud), *Beck 17723* (US). Prov. Inquisivi, along river from Laguna Huara Huarani, 10 km N of Choquetanga, 3500 m, 67°17'W, 16°45'S, 13 Dec 1991 (fr.), *Lewis 40944* (S).

**12. *Symplocos psiloclada* Ståhl, Candollea 48: 379, fig. 13. 1993. Type:** Peru, Dept. Cuzco, Prov. Paucartambo, Jajauna above Challabamba, 3300 m, 20 Jul 1990 (fr.), *Cano 3916* (holotype, F; isotype, GB).

*Symplocos psiloclada*, recently described from southern Peru, is characterized by broadly elliptic and very tough leaves, distinctly denticulate leaf margins, and solitary, sessile and rather large flowers. In the original publication it was also distinguished by having vegetative and reproductive parts glabrous and the leaves subsessile. The sole collection from Bolivia referred to *S. psiloclada* differs from the Peruvian material in distinctly petiolate leaves, puberulous disc, somewhat smaller flowers (6-6.5 vs 7-8 mm), and by having fewer stamens (ca. 90 vs 150-200). Its placement here is therefore tentative, based on a large agreement with the Peruvian material in other features.

*Specimen examined.* — **La Paz:** Prov. Larecaja, along trail from Mapiri to Sorata, between Tararani and Yani, 3000-3500 m, no date (fl.), *Krukoff 11483* (NY).

**13. *Symplocos nana* Brand, Pflanzenr. IV.242: 76. 1901; Ståhl, Fl. Ecuador 43: 44, fig. 20E-F. 1991. Type:** Bolivia: Puitar, 3950 m, Feb 1867, *Pearce s.n.* (K, holotype).

*Symplocos nana* is readily distinguished by the small, comparatively narrow, and coarsely crenate-margined leaves (leaf blades 0.8-1.2 × 0.3-0.6 cm). Compared to the other, small-leaved



Fig. 7. — *Symplocos subcuneata* (Herzog) Stahl  
Steinbach 205.

species of *Symplocos* in Bolivia, the flowers of *S. nana* are usually slightly smaller (corolla 5-7 mm long) than those of *S. subcuneata*, and but larger than those of *S. polyphylla*. For additional differences, see these species.

*Symplocos nana* is distributed from southern Ecuador to northern Bolivia. In Bolivia it is known only from the type collection.

#### 14. *Symplocos subcuneata* (Herzog) Ståhl, *stat. nov.*

≡ *Symplocos parvifolia* Benth. var. *subcuneata* Herzog, Meded. Rijks-Herb. 40: 7. 1921.

**Type:** Bolivia, on ridge above Comarapa, ca. 2600 m, Apr 1911 (fl.), *Herzog 1968* (lectotype, S, selected here; isolectotypes, JE, L, W). (Fig. 7).

Shrub or small tree to 4(-6) m high; young shoots and branchlets glabrous, the bark smooth, greyish white. Leaves petiolate, brownish green when dried, glossy above; blade broadly obovate to subrotund, 0.8-3.5 × 0.8-2.1 cm, coriaceous, glabrous, base truncate or shortly attenuate, apex rounded or obtuse, margins from middle to apex plane, crenulate or sometimes serrulate with 5-10(-15) glandular teeth, from middle to base revolute and entire; lower surface with midvein, lateral veins, and veinlets slightly prominent, upper side with midvein and lateral veins somewhat impressed and channelled; petiole 0.1-0.4 cm long, plane or canaliculate, glabrous. Bracteoles 4, very broadly ovate, ca. 3 × 3.5 mm, the outermost strongly keeled, glabrous or the outermost ciliate on keels, margins ciliate. Flowers solitary, borne in the leaf axils among the foliage, sessile or with pedicels to 2 mm long. Calyx glabrous, tube 1.5-2 mm long, lobes very broadly ovate, 2.2-3.2 × 2.5-3.7 mm, margins ciliate. Corolla white or sometimes pink, glabrous, ca. 7 mm long, lobes oblong, 3.5-4(-5) mm wide, margins entire. Stamens 55-70 in 4 or 5 rows, tube 3-4 mm long, free filaments 0.5-1.5 × 0.5-0.6 mm, papillose or smooth; anthers 0.6 × 0.6-0.7 mm. Disc annular, puberulous; style 3 mm long, glabrous; stigma subcapitate, 3-lobed; ovary 3-locular with 3 ovules in each locule. Fruits cylindrical, ca. 12 × 8 mm, glabrous, smooth.

This species is very similar to *S. theiformis* (L. fil.) Gürke of central and northern Colombia, but differs in greyish white branchlets, puberulous disc, and slightly larger flowers. In leaf shape, it is also similar to *S. parvifolia* Benth. of southern Ecuador and *S. polyphylla* (see below), but is clearly distinguished from these by its glabrous, smooth, and greyish white branchlets.

*Specimens examined.* — **La Paz:** Prov. Murillo, valley of Río Zongo, 23.6 km N of pass, 68°07'W, 16°09'S, 3000 m, 30 Jan 1988 (fl.), *Solomon 17739* (S). Prov. Nor Yungas, 5.6 km W of Cotapata, 67°53'W, 16°17'S, 3300-3500 m, 5 May 1990 (fl. & fr.), *Solomon & al. 18930* (S); 1.2 km E of Cotapata, 67°50'W, 16°17'S, 3200 m, 7 May 1990 (fl.), *Solomon & al. 18993* (S). — **Cochabamba:** Prov. Carrasco, 75.5 km E of Epizana on Carretera Fundamental 4, 2450 m, 21 Nov 1976 (fr.), *Davidson 5110* (MO, NY, US); 0.5 km below La Siberia, 2500 m, 19 May 1966 (fl.), *Steinbach 205* (MO, NY, S, US); 6 km SE of Siberia on road Cochabamba-Santa Cruz, 64°44'W, 17°50'S, 2850 m, 10 Feb 1987 (fl.), *Solomon & Nee 16003* (S); 6.5 km E of Sibiria on road Cochabamba-Santa Cruz, 64°44'W, 17°50'S, 2950 m, 5 Mar 1988 (fl.), *Solomon & Nee 17915* (S). — **Santa Cruz:** Caballero, above Tunal, 30 km NE of El Tambo School, 64°25'W, 17°55'S, 2600 m, 11 Jun 1987 (fl.), *Killeen 2539* (NY). Parque Nacional Amboró, between Estancia Las Abras and Laguna Brava, 2500-3000 m, 64°37'W, 17°48'S, 8-9 May 1992 (fl. & fr.), *Vargas 1300, 1301* (NY). — **Dept. unknown:** Huaycani, 3350 m, May 1866 (fl. & fr.), *Pearce s.n.* (K).

#### 15. *Symplocos polyphylla* Ståhl, *spec. nov.*

**Type:** Bolivia, **Dept. La Paz:** Prov. Nor Yungas, 1.4 km E of Cotapata on road between Unduavi and Chuspipata, 3200 m, 67°50'W, 16°18'S, 17 Jul 1988 (fl. & fr.), *Solomon 18681* (holotype, S). (Fig. 8).

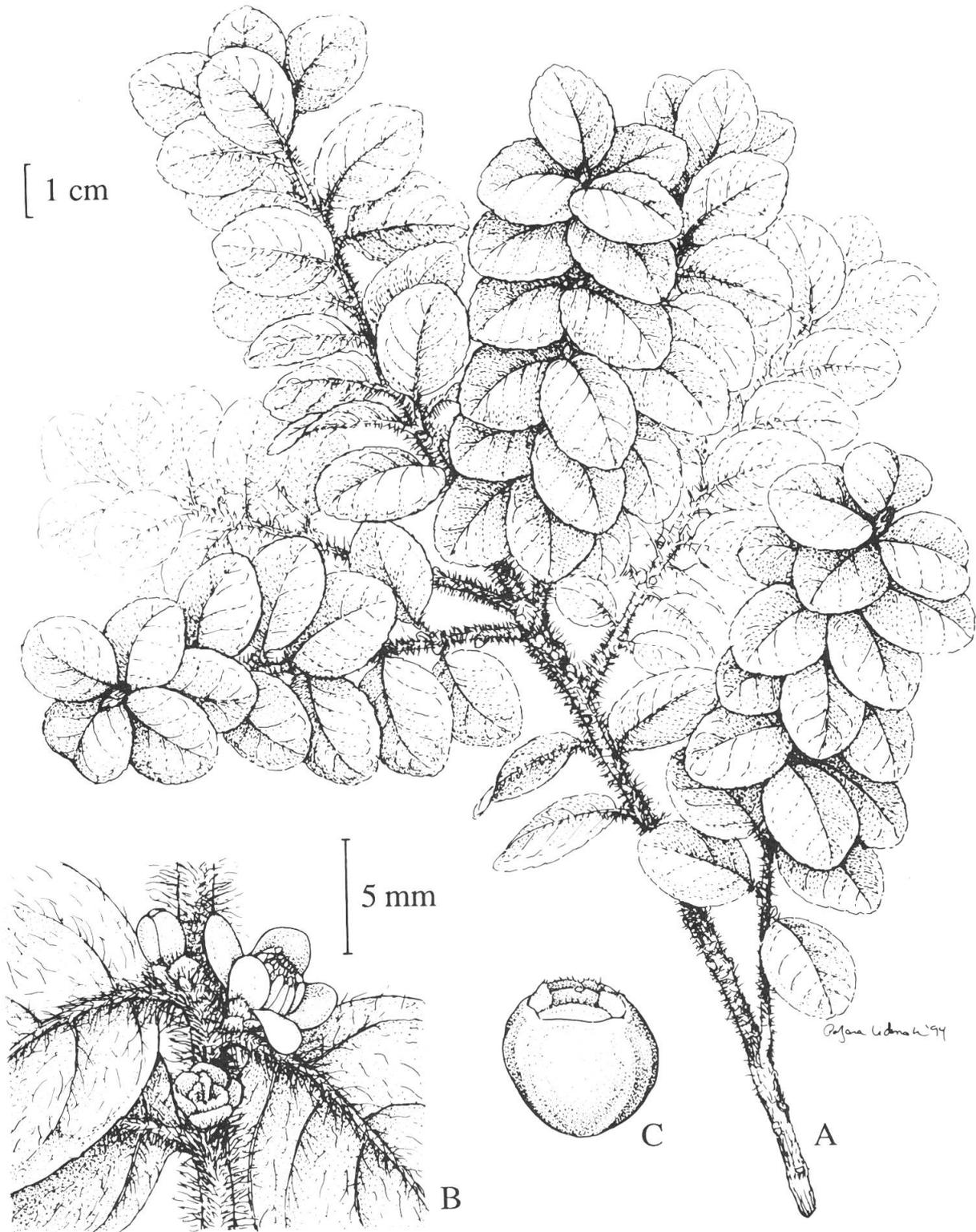


Fig. 8. — *Symplocos polyphylla* Stähl  
**A**, branch; **B**, close up of part of stem showing flowers at different stages, (from top), in bud, at anthesis, post anthesis (with corolla and anthers fallen); **C**, fruit. **A-C**, *Solomon 18681* (holotype, S).

Frutex ad 3 m altus, surculis juvenibus dense tomentosus, verrucosis, brunneis. Folia subsessilia vel petiolis ad 0.1 cm longis; lamina late ovata vel subrotundata, 1.5-2.5 × 1-1.8 cm, coriacea, basi truncata vel cordata, apice rotundato, margine denticulato vel crenulato, glanduloso, parum revoluta, pagina inferiore plus minusve tomentosa-strigosa, pagina superiore omnino glabra vel interdum ad costam versus basim puberula, costa venis lateralibus venulisque infra prominentibus, supra nonnihil impressis vel deplanatis. Flores solitarii, sessiles vel subsessiles. Bractee circiter 4, strigosae. Calyx glaber, tubo 0.5-0.7(-1) mm longo, lobis perlate ovatis, 1.2-1.5 × 1.7-2.2 mm, marginibus ciliatis. Corolla alba, rosea vel lilacina marginibus pallidis, 3.2-4 mm longa, tubo circiter 0.5 mm longo, lobis oblongis, 2-2.5 mm latis, marginibus integris vel sparsim ciliolatis. Stamina 30-35, bivel trifaria, tubo circiter 0.5 mm longo, filamentis liberis 0.5-2 × 0.3-0.5 mm, papillois, antheris 0.3-0.4 × 0.4-0.5 mm. Discus annularis, glaber. Stylus 1.5 mm longus; glaber, stigmatibus subcapitato vel truncato, obscure 3-lobato. Ovarium tri- vel quadriloculare, ovulis in quoque loculo 2 vel 3. Fructus late ellipsoideus vel subglobosus, 4-6.5 × 4-5 mm, glaber.

Shrub to 3 m high; young shoots and branchlets rather densely tomentose from reddish brown hairs, the bark verrucose, brown. Leaves short-petiolate or subsessile, brownish green when dried; blade broadly ovate to subrotund, 1.5-2.5 × 1-1.8 cm, coriaceous, ± tomentose-strigose beneath, glabrous above or sometimes puberulous on midvein towards base, old and mature leaves ± bullate, base truncate or cordate, apex rounded, margins glandular-denticulate to crenulate, somewhat revolute, at least towards base; midvein prominent beneath, slightly impressed above, lateral veins and veinlets prominent beneath, in level with surface or somewhat impressed above; petiole to 0.1 cm long, tomentose. Flowers solitary, sessile or subsessile, bracts ca. 4, strigose. Calyx glabrous, tube 0.5-0.7(-1) mm long, lobes very broadly ovate, 1.2-1.5 × 1.7-2.2 mm, margins ciliate. Corolla white, pink, or deep lilac with pale margins, glabrous, 3.2-4 mm long, tube ca. 0.5 mm long, lobes oblong, 2-2.5 mm wide, margins entire or very sparsely ciliolate. Stamens 30-35 in 2 or 3 rows, tube 1 mm long, free filaments 0.5-2 × 0.3-0.5 mm, distinctly papillose; anthers 0.3-0.4 × 0.4-0.5 mm. Disc annular, glabrous; style 1.5 mm long, glabrous; stigma subcapitate to almost truncate, entire or indistinctly 3-lobed. Ovary 2-4-locular with 2 or 3 ovules in each locule. Fruits broadly ellipsoid or subglobose, 4-6.5 × 4-5 mm, glabrous.

*Symplocos polyphylla* is easily distinguished because of its small and densely set leaves, rather rough, brownish-red indumentum on branches and leaf undersides, and small flowers and fruits which are more or less hidden by the foliage. However, *S. polyphylla* is extremely similar to *S. parvifolia* Benth. of southern Ecuador (BRAND, 1901: fig. 9), particularly in vestiture and leaf shape. *Symplocos polyphylla* differs from that species by having the flowers smaller (corolla 3.2-4 vs. 7-7.5 mm), disc glabrous, and filaments papillose.

*Specimens examined.* — **La Paz:** Prov. Larecacha, along trail from Mapiri to Sorata, between Tararani and Yani, 3000-3500 m, no date (fl.), *Krukoff 11491* (NY). Prov. Nor Yungas, 30 km from top towards Chuspipata, passing Cotapata, 3000 m, 21 Jul 1990 (fl.), *Beck 17716* (S); 0.7 km E of Cotapata, 3250 m, 67°51'W, 16°18'S, 11 Nov 1987 (fl.), *Solomon 17328* (S); 1.2 km E of Cotapata, 3200 m, 67°50'W, 16°17'S, 7 May 1990 (fl. & fr.), *Solomon & al. 18992* (S).

### Excluded taxon

#### *Symplocos theiformis* (L. fil.) Gürke

This species, native to central and northern Colombia, was included in FOSTER's (1958) check-list of Bolivian ferns and flowering plants. The record is evidently based on a misidentification.

### ACKNOWLEDGEMENTS

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