

Studies on the flora of the Guianas 14**New taxa and combinations in *Sorocea* (*Moraceae*) and a key to its species**

by C.C. Berg and R.W.A.P. Akkermans

Institute of Systematic Botany, State University of Utrecht, Heidelberglaan 2, Utrecht, the Netherlands

Communicated by Prof. F.A. Stafleu at the meeting of February 25, 1985

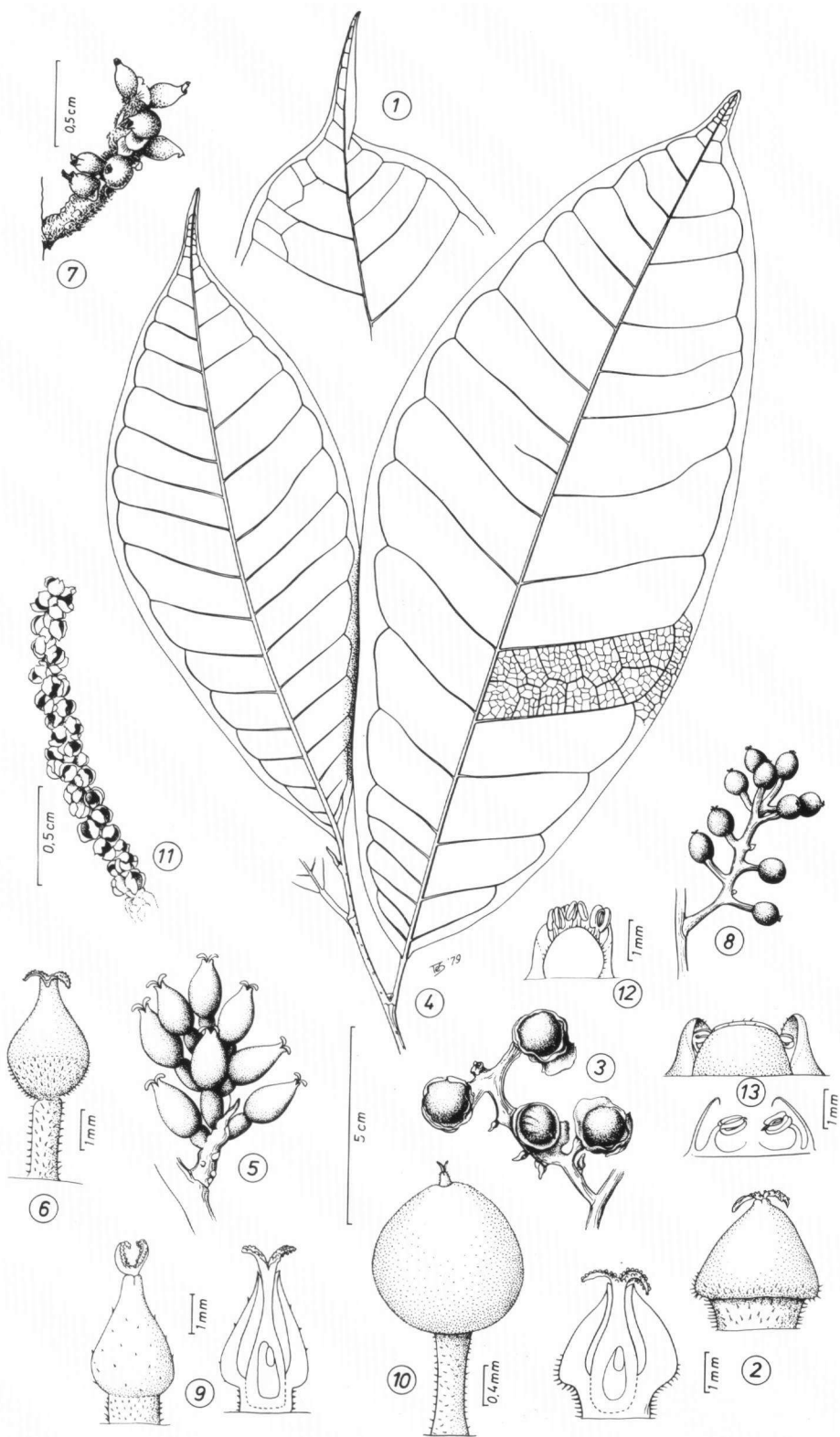
ABSTRACT

The 16 recognized species of *Sorocea* are listed with their synonyms and distribution. Two new taxa are described: *S. steinbachii* C.C. Berg and *S. hirtella* Mildbread ssp. *oligotricha* Akkermans & Berg. Three new combinations are made: *S. muriculata* Miquel ssp. *uaupensis* (Baillon) C.C. Berg, *S. trophoides* W. Burger ssp. *rhodorachis* (Cuatrecasas) C.C. Berg, and *S. sprucei* (Baillon) Macbride ssp. *saxicola* (Hassler) C.C. Berg. A key to the species is presented.

INTRODUCTION

A revision of the genus *Sorocea* was published in 1962 by Burger, Lanjouw and Wessels Boer. This study was an integration of independent revisional work started by Burger and Lanjouw and was, at least partly, a compromise of opinions and concepts. The genus *Sorocea* shows a low degree of morphological differentiation, which causes problems in the selection of the characters serving to delimit the infrageneric taxa and in the designation of their appropriate rank. Both facts cause difficulties in the identification of new material. As numerous new collections with ample field data are becoming available, a new attempt at revising the genus is undertaken in behalf of Flora Neotropica, the planned Flora of the Guianas, and the Flora of Venezuela, the main results of which are presented in this precursory paper.

1. *Sorocea guilleminiana* Gaudichaud, Bot. Voy. Bonite, tab. 74. 1844. Synonyms: *Balanostreblus ilicifolius* Kurz, *S. castaneifolia* Huber, *S. grandifolia* S. Moore, *S. hilariana* (Casaretto) Bureau, *S. houlletiana* Gaudichaud,



S. klotzschiana Baillon, *S. macrogyne* Lanjouw & Wessels Boer, *Trophis hilariana* Casaretto.

Distribution: Amazonia (Brazil, Bolivia, Peru, Colombia) to East Brazil (Pernambuco to Minas Gerais and Rio de Janeiro).

2. *Sorocea bonplandii* (Baillon) W. Burger, Lanjouw & Wessels Boer, *Acta Bot. Neerl.* 11: 465. 1962.

Synonyms: *Pseudosorocea bonplandii* Baillon, *S. ilicifolia* Miquel fo. *laxiflora* Hassler, *S. sylvicola* Chodat, *S. sylvicola* Chodat var. *caaguazuensis* Chodat.

Distribution: Eastern Brazil (Rio de Janeiro to Rio Grande do Sul) through northern Argentina and Paraguay to Bolivia.

3. *Sorocea hilarii* Gaudichaud, *Bot. Voy. Bonite*, tab. 72. 1844.

Synonyms: *S. ilicifolia* Miquel var. *hilarii* (Gaudichaud) Miquel, *S. macrophylla* Gaudichaud, *S. racemosa* Gaudichaud, *S. uriamen* Miquel.

Distribution: Eastern Brazil (Bahia to São Paulo).

4. *Sorocea hirtella* Mildbread, *Notizbl. Bot. Gart. Berlin* 10: 183. 1927.

4.a. *Sorocea hirtella* Mildbread ssp. *hirtella* (Fig. 1.).

Synonym: *S. opima* Macbride.

Leafy twigs brown- to whitish-subhirsute to -hirtellous. Lamina chartaceous to subcoriaceous, margin entire to obscurely dent(icul)ate, above on the midrib minutely puberulous, beneath (rather) densely hirsute to hirtellous or puberulous, at least densely patent-puberulous on the main veins. Fruiting perianth sometimes subsessile and/or densely puberulous to hirtellous.

Distribution: Upper Amazon Basin (Brazil, Peru, Ecuador). (Fig. 5.1).

4.b. *Sorocea hirtella* Mildbread ssp. *oligotricha* Akkermans & Berg subsp. nov. (Fig. 1.).

Recedit a ssp. *hirtella* praecipue indumento paginae inferioris laminae multo rariore brevioraque.

Leafy twigs white, appressed- (to patent-)puberulous. Lamina subcoriaceous to coriaceous, mostly entire, occasionally distinctly dentate, above minutely puberulous on the midrib or glabrous, beneath on the main veins sparsely

Fig. 1. *Sorocea hirtella*. Ssp. *hirtella*: 1, part of a leaf (Prance et al. 24016); 2, pistillate flower (Kayap 611); 3, infructescence (Prance et al. 24016). Ssp. *oligotricha*: 4, leafy twig, 5, young infructescence (Silva 60618); 6, pistillate flower (Pires 343); 7, pistillate inflorescence (Froés 22148); 8, infructescence (Maguire 45945A); 9, pistillate flower, 10, fruiting perianth (Schultes 6171); 11, staminate inflorescence (Pires 248); 12, staminate flower (Croat 20357); 13, staminate flower (Pires 338).

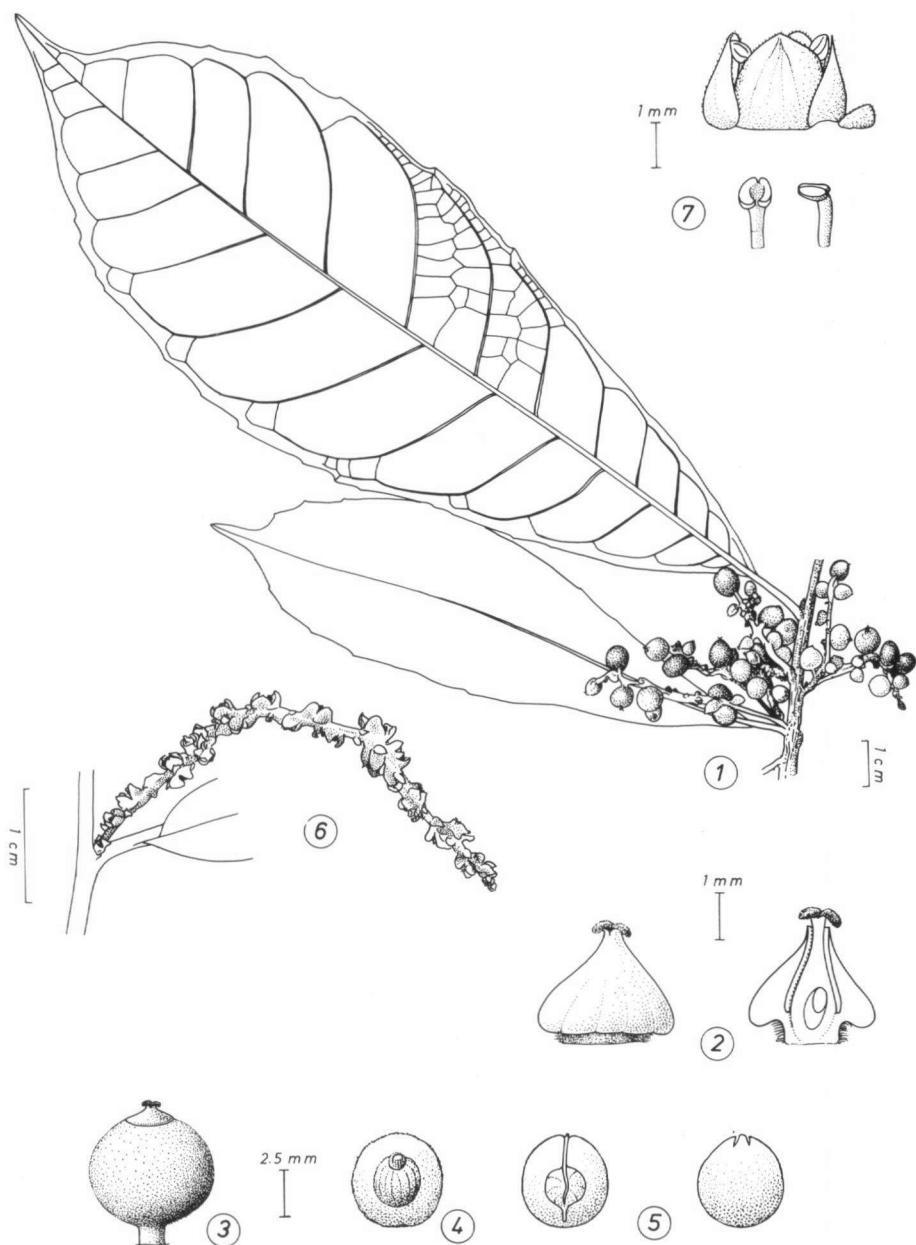


Fig. 2. *Sorocea steinbachii*. 1, leafy twig with infructescence (Foster et al. 5187); 2, pistillate flower, 3, fruiting perianth, 4, seed, 5, embryo (Lleras et al. P.16931); 6, staminate inflorescence (Revilla 845); 7, staminate flower and stamens (Croat 20112).

patent- to appressed-puberulous with hairs of equal length. Fruiting perianth distinctly pedicellate and subglabrous.

Typus: *Krukoff 8157*, Brazil, Amazonas, mun. São Paulo de Olivença, near Palmares, 11 Sep – 26 Oct. 1936 ♀ fl-fr (holotype U; isotypes BM, F, G, GH, K, LE, MICH, MO, NY, US).

Distribution: Upper Amazon Basin (Brazil, Peru, Ecuador, Colombia), extending to the Guiana region (SE. Venezuela and Guyana), also in northern Colombia (Antioquia, Boyacá) and northern Venezuela (Aragua, Carabobo). (Fig. 5.2).

5. *Sorocea steinbachii* C.C. Berg spec. nov. (Fig.2.).

Frutex vel arbor parva. Lamina oblonga vel subovovata (vel oblanceolata), 8-20 × 2.5-6 cm, subcoriacea; margo denticulatus; supra ad costam minute puberula, infra ad venas majores puberula, pilis inaequalibus; venae laterales 9-14-jugae; petiolus 0.6-1.2 cm longus; stipulae 0.2-0.4 cm longae. Inflorescentiae masculae 4-6 cm longae; perianthium ciliolatum. Inflorescentiae pistillatae 2-4 cm longae; flores subsessiles, statu fructifero breviter pedicellatae; perianthium fructiferum subglobosum, 0.5-0.7 cm diam.

Shrubs or trees up to 7 m tall. Leafy twigs 1-3.5 cm thick, sparsely to densely puberulous. Lamina oblong to elliptic (or to lanceolate), 6-31 × 2.5-11.5 cm, mostly broadest above the middle, almost equilateral, subcoriaceous, apex acuminate, base acute to obtuse to rounded, margin obscurely to distinctly dent(icul)ate to subentire; above on the midrib sparsely to rather densely and minutely puberulous, glabrescent, beneath on the main veins very sparsely to rather densely puberulous with hairs of different length; venation above almost plane or the midrib slightly impressed, sometimes also the lateral veins slightly impressed, venation beneath prominent; lateral veins 9-14 pairs, mostly a few to several parallel tertiary veins; petiole 0.6-1.5 cm long, 1.5-2 mm thick, sparsely and minutely puberulous to glabrous; stipules 0.2-0.8 cm long, puberulous to glabrous, caducous. Staminate inflorescences patent to pendulous, (0.5-)2-6(-10) cm long, including the 0.1-0.4 cm long, puberulous peduncle; flowers rather crowded to distant, (rather) broadly adnate to the rachis; perianth 4-parted, ca. 2 mm high, ciliolate; stamens 4, isomorphic or anisomorphic, at anthesis straight (with the anthers more or less perpendicular to the filament) or recurved, filaments 0.5-1.2 mm long, anthers 0.5-0.7 × 0.6-0.8 mm, connective broad. Pistillate inflorescences patent to pendulous, 1-3 cm, in fruit up to 9 cm long; peduncle 0.1-0.5 cm, in fruit up to 0.8 cm long, puberulous; rachis minutely puberulous to glabrous, in fruit carnose (?) and red (?); flowers (5-) ca. 15-40, sessile to shortly pedicellate, in fruit pedicel 0.1-0.3(-0.5) cm, or occasionally up to 1 cm long, up to 3 mm thick, sparsely puberulous; perianth 2-2.5 mm high, 4-lobed, the upper part broadly ovoid, glabrous, the lower part short, densely and minutely puberulous to glabrous, in fruit subglobose (to broadly ovoid or obovoid), 0.5-0.7 × 0.5-0.7 cm, turning from red to black, subapiculate, surface smooth, almost glabrous,

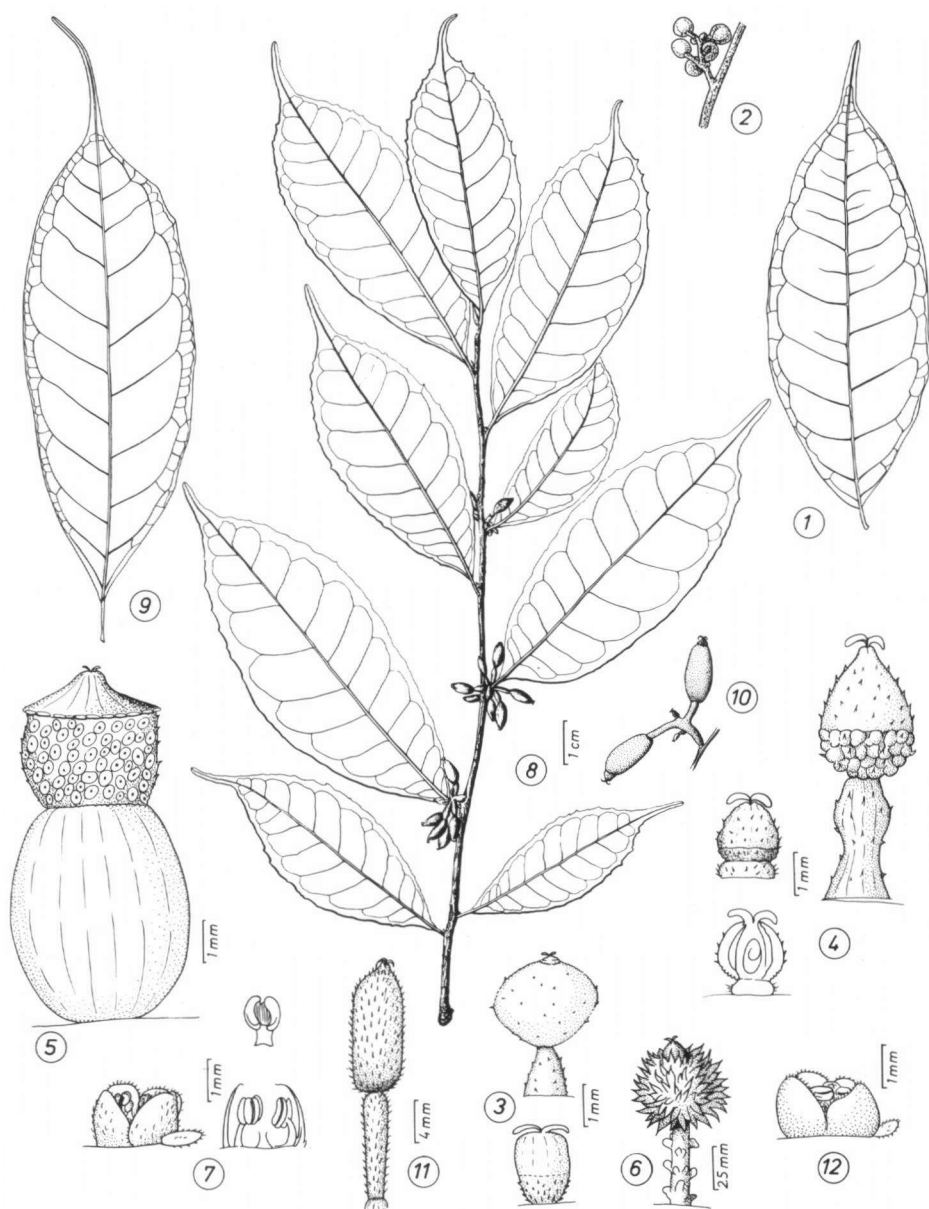


Fig. 3. *Sorocea muriculata*. Ssp. *muriculata*: 1, leaf, 2, infructescence, 3, pistillate flower and fruiting perianth (Berg et al. P.18517); 4, pistillate flower and fruiting perianth (Davidse et al. 16972); 5, fruiting perianth (Froés 21448); 6, fruiting perianth (Schultes et al. 16972); 7, staminate flower (Cardona 1344). Ssp. *uaupensis*: 8, leafy twig with pistillate inflorescences (Aristeguieta et al. 7361); 9, leaf, 10, infructescence, 11, fruiting perianth (Alencar 554); 12, staminate flower (Silva et al. 60808).

sometimes densely puberulous or with rather dense, globose-capitate, pluricellular hairs; stigmas tongue-shaped, 0.4–0.6 mm long, finely papillate.

Typus: *Steinbach 7356bis*, Bolivia, Sante Cruz, prov. Sara, Buenavista, 27 Nov. 1925 ♀ (holotype U; isotypes B, BM, F, G, GH, K, MO, NY).

Paratypus: *Steinbach 7272a*, Bolivia, Santa Cruz, prov. Sara, Buenavista, 6 Oct. 1925 ♂ (holotype U; isotypes B, BM, F, GH, K, MO, NY, Z).

Distribution: Upper Amazon Basin (Bolivia, Brazil, Peru, Ecuador, Colombia) (Fig. 5.3).

6. *Sorocea muriculata* Miquel in Martius, Fl. Bras. 4(1): 113. 1853.

6.a. *Sorocea muriculata* Miquel ssp. *muriculata* (Fig. 3).

Synonyms: *S. amazonica* Miquel, *S. dentata* Huber.

Perianth of the staminate flowers outside glabrous, thus completely glabrous or at most ciliolate. Pistillate flowers 3–12(–20); upper part of the perianth mostly (broadly) ovoid, distinctly broader than the lower part and minutely puberulous to muriculate, the lower part muriculate to pusticulate; fruiting perianth subglobose, ca. 0.5–0.8 × 0.5–0.8 cm, red, (finally) turning black, surface muri(cul)ate, pust(ic)ulate or with more or less irregularly shaped protuberances; pedicel in fruit often strongly swollen and/or of more or less irregular shape.

Distribution: Amazonia (Brazil, Bolivia, Peru, Ecuador, Colombia, Venezuela), extending to the Guiana region (Suriname and eastern Venezuela) (Fig. 5.4).

6.b. *Sorocea muriculata* Miquel ssp. *uaupensis* (Baillon) C.C. Berg stat. et comb. nov. (Fig. 3).

Basionym: *Pseudosorocea uaupensis* Baillon, *Adansonia* 11: 297, 1875.

Synonyms: *S. guayanensis* W. Burger, *S. uaupensis* (Baillon) Macbride.

Perianth of the staminate flower outside minutely puberulous. Pistillate flowers 3–7(–9); upper part of the perianth cylindrical to narrowly ovoid, almost as broad as the lower part, both parts puberulous; fruiting perianth cylindrical, oblongoid or sometimes ellipsoid, 1–1.2 × 0.5–0.6 cm, red, (soon) turning black, apex sometimes curved, surface smooth and puberulous; pedicel in fruit mostly rather slender (1–2 or occasionally up to 4 mm thick), cylindrical and in outline regular.

Distribution: Southern Venezuela and the adjacent part of Brazil (Upper R Negro Basin); probably also in Suriname and French Guiana; see note (Fig. 5.4).

Note: Collections from three localities in Suriname and French Guiana (see Fig. 5.4) match the material of ssp. *uaupensis* in the shape and dimensions of

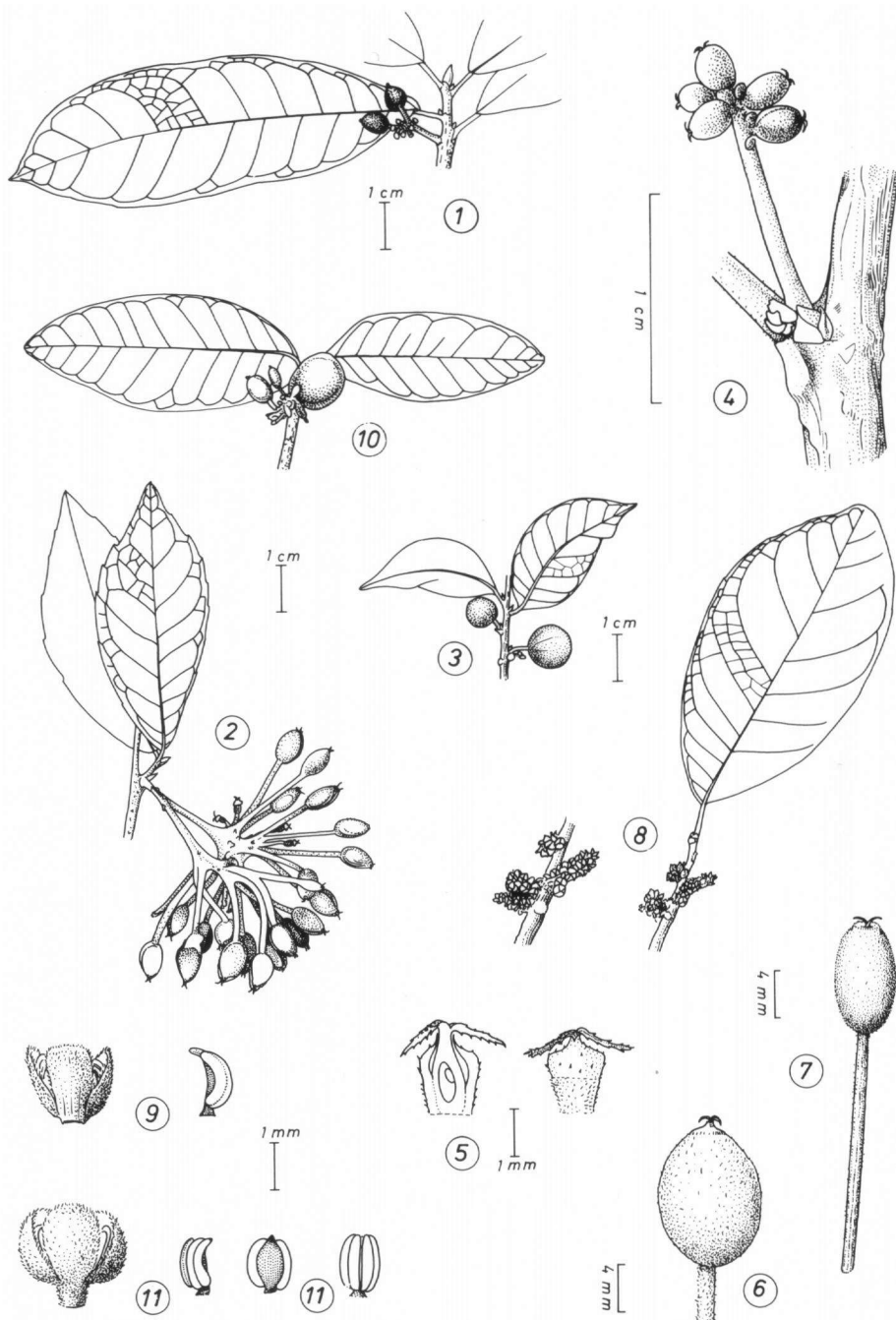


Fig. 4. *Sorocea sprucei*. Ssp. *sprucei*: 1, leafy twig with pistillate inflorescence (Breteler 4333); 2, leafy twig with young infructescence (Plowman 5471); 3, leafy twig with infructescence (Cuatrecasas 15340); 4, pistillate inflorescence, 5, pistillate flower (Steyermark 101957); 6, fruiting perianth (Arnoldo 1104); 7, fruiting perianth (Plowman 5471); 8, leafy twig with staminate inflorescences (Marcano Berti 38-3-77); 9, staminate flower and stamen (Froés 23120). Ssp. *saxicola*: 10, leafy twig with infructescence (Pedersen 1208a); 11, staminate flower and stamens (Hassler 12222).

the fruiting perianth, but differ in the elongate rachis of the pistillate inflorescence. Staminate flowers are not known from Suriname and French Guiana.

7. ***Sorocea briquetii*** Macbride, *Candollea* 4: 311. 1931

Distribution: Amazonian Peru (Loreto, San Martín, Huánuco) and Brazil (Acre).

8. ***Sorocea pileata*** W. Burger, *Acta Bot. Neerl.* 11: 443. 1962.

Distribution: Amazonian Bolivia, Peru (Madre de Dios) and Brazil (Acre).

9. ***Sorocea trophoides*** W. Burger, *Acta Bot. Neerl.* 11: 450. 1962.

9.a. ***Sorocea trophoides*** W. Burger ssp. ***trophoides***

Lamina usually dent(icul)ate; the midrib above puberulous and plane in the leaf acumen.

Distribution: Costa Rica and northern Panama; at altitudes above 1000 m. (Fig. 5.6).

9.b. ***Sorocea trophoides*** W. Burger ssp. ***rhodorachis*** (Cuatrecasas) C.C. Berg stat. et comb. nov.

Basionym: *Sorocea rhodorachis* Cuatrecasas, *Ciencia (México)* 24(5-6): 188. 1966.

Synonym: *S. martineziana* Cuatrecasas.

Lamina (sub)entire; the midrib above glabrous and usually impressed in the leaf acumen.

Distribution: Colombia and Peru; at altitudes above 1000 m. (Fig. 5.6).

10. ***Sorocea pubivena*** Hemsley, *Biol. Centr. Amer. Bot.* 3: 150. 1883.

Synonyms: *Clarisia mollis* Standley, *Trophis macrostachya* Donnell Smith.

Distribution: Northern Panama, Costa Rica and Guatemala.

11. ***Sorocea cufodontisii*** W. Burger, *Acta Bot. Neerl.* 11: 447. 1962, emend. *Fieldiana Bot.* 40: 208. 1977.

Distribution: Costa Rica (Puntarenas) and northern Panama.

12. ***Sorocea faustiana*** Cuatrecasas, *Ciencia (México)* 24(5-6): 185. 1966.

Distribution: Colombia (Pacific coastal region) to southern Panama.

13. ***Sorocea affinis*** Hemsley, *Biol. Centr. Amer. Bot.* 3: 150. 1883.

Distribution: Panama to Colombia (Chocó).

14. ***Sorocea sarcocarpa*** Lanjouw & Wessels Boer, *Acta Bot. Neerl.* 11: 452. 1962.

Distribution: North-western Ecuador.

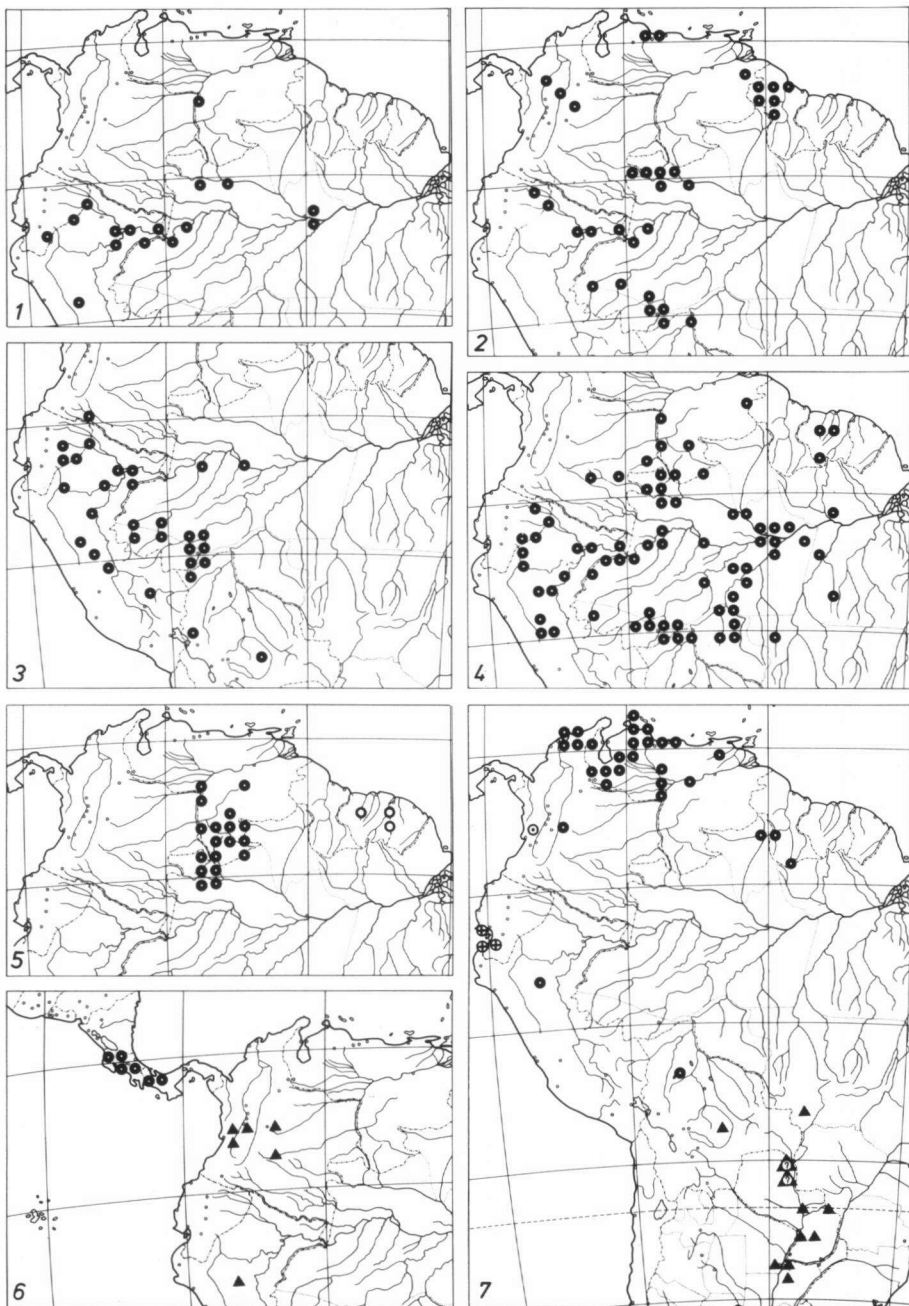


Fig. 5. Distribution of some *Sorocea* species and subspecies. 1, ● *S. hirtella* ssp. *hirtella*; 2, ● *S. hirtella* ssp. *oligotricha*; 3, ● *S. steinbachii*; 4, ● *S. muriculata* ssp. *muriculata*; 5, ● *S. muriculata* ssp. *uaupensis*, ○ with aberrant features; 6, ● *S. trophoides* ssp. *trophoides*, ▲ ssp. *rhodorachis*; 7, ● *S. sprucei* ssp. *sprucei*, ⊕, ⊙ with aberrant features, ▲ ssp. *saxicola*, ▲ with uncertain provenance.

15. *Sorocea sprucei* (Baillon) Macbride, Publ. Field Mus. Bot. 11: 116. 1931.

15.a. *Sorocea sprucei* (Baillon) Macbride ssp. *sprucei* (Fig. 5).

Synonyms: *Guatteria cuspidata* Rusby, *Olmedia virgata* Pittier, *Pseudosorocea sprucei* Baillon, *S. arnoldoi* Lanjou & Wessels Boer.

Lamina up to 16 × 7.5 cm, apex acuminate, occasionally subacute, beneath hirtellous to tomentose to puberulous to hispidulous; beneath the smaller veins (usually) slightly prominent to plane. Staminate inflorescences subcapitate to shortly (up to 1(-1.5) cm long) spicate.

Distribution: Northern Venezuela and Curaçao through Colombia, Ecuador and Peru to Bolivia, and through Guyana to northern Brazil (Roraima) (Fig. 5.7).

Note: Morphological aberrant collections have been made in Colombia (Valle, at 1200 m altitude) and in dry forest in western Ecuador (see Fig. 5.7). As far as collections are known it is uncertain whether two or perhaps even more subspecies should be distinguished.

15.b. *Sorocea sprucei* (Baillon) Macbride ssp. *saxicola* (Hassler) C.C. Berg stat. et comb. nov. (Fig. 5).

Basionym: *Sorocea saxicola* Hassler, Bull. Herb. Boissier, Sér. 2, 7: 11. 1907.

Synonyms: *S. saxicola* Hassler var. *dentata* Hassler, *S. saxicola* Hassler fo. *subcrenata* Hassler, *Trophisomia edulis* Rojas.

Lamina up to 10 × 5.5 cm, apex mostly rounded to obtuse, sometimes subacute to acuminate, beneath hirtellous to tomentose; beneath all veins (strongly) prominent. Staminate inflorescences capitate.

Distribution: Northern Argentina through Paraguay to Bolivia and to western Brazil (Mato Grosso) (Fig. 5.7).

16. *Sorocea duckei* W. Burger, Acta Bot. Neerl. 11: 473. 1962.

Synonym: *Paraclarisia amazonia* Ducke.

Distribution: Upper Amazon Basin (Brazil, Peru, Colombia).

KEY TO THE SPECIES OF *SOROCEA*

1. Lamina scabrous above.

2. Pistillate inflorescences with 1-3 flowers; anthers not apiculate; leaf base mostly (sub)acute (Amazonia) 16. *S. duckei*

2. Pistillate inflorescences with 4-12 flowers; anthers apiculate; leaf base mostly rounded to emarginate (Venezuela to Argentina) 15. *S. sprucei*

1. Lamina smooth above.

3. Leaf margin and/or acumen spinulose.

4. Stigmas 1-2.2 mm long, deflexed; tepals of the staminate flower at anthesis horizontally spreading to deflexed; anthers in outline suborbicular, slightly smaller than the tepals (SE. Brazil, Argentina, Paraguay) 2. *S. bonplandii*

4. Stigmas 0.5-1 mm long, horizontally spreading; tepals of the staminate flower erect at anthesis; anthers in outline ovate or, if suborbicular, then distinctly smaller than the tepals.

5. Anthers in outline ovate (distinctly longer than broad); pistillate inflorescences with peduncles 0.5–1.6 cm long; lamina usually distinctly inequilateral (E. Brazil) 3. *S. hilarii*
5. Anthers in outline suborbicular (nearly as long as broad); pistillate inflorescences with peduncles 0.5–1.5 cm long; lamina usually almost equilateral (E. Brazil to Amazonia) 1. *S. guilleminiana*
3. Neither margin nor acumen spinulose.
 6. Lamina beneath scabrous to scabridulous (Venezuela – Argentina) 1. *S. sprucei*
 6. Lamina beneath smooth.
 7. Lamina beneath subhirsute, hirtellous or (sub)tomentose.
 8. Inflorescences subcapitate (or the staminate ones shortly spicate, up to 1.5 cm long); bracts membranaceous (Venezuela to Argentina) 15. *S. sprucei*
 8. Inflorescences racemose to spicate, the staminate ones at least 2 cm long; bracts subcoriaceous.
 9. Perianth of staminate flowers outside sparsely puberulous; pistillate inflorescences with ca. 15–60(–100) flowers; fruiting perianth ellipsoid; leaf margin usually dentate (Central America) 10. *S. pubivena*
 9. Perianth of staminate flowers ciliolate; pistillate inflorescences with 3–15(–29) flowers; fruiting perianth ovoid to subglobose (Amazonia) 4. *S. hirtella*
 7. Lamina beneath appressed- or patent-puberulous or glabrous.
 10. Inflorescences (sub)capitate (or very shortly spicate); bracts membranaceous; leaf scars prominent 15. *S. sprucei*
 10. Inflorescences distinctly spicate or racemose; bracts subcoriaceous; leaf scars plane.
 11. Lamina above minutely puberulous on the midrib.
 12. Lamina (sub)entire and patent-puberulous beneath.
 13. Perianth of staminate flowers outside puberulous; perianth of pistillate flowers densely puberulous; fruiting perianth ellipsoid, densely puberulous (Central America) 11. *S. cufodontisii*
 13. Perianth of staminate flowers ciliolate; only the lower part of the perianth of pistillate flowers densely puberulous; fruiting perianth normally subglobose to broadly ovoid, sparsely puberulous (South America).
 14. Lamina beneath with hairs of similar length; lateral veins (8–)10–20 (–25) pairs; pistillate inflorescences with 3–15(–20) flowers; fruiting perianth 1–1.7 cm in diameter 4. *S. hirtella*
 14. Lamina beneath with hairs of different length, the longer ones more or less appressed; lateral veins 9–14 pairs; pistillate inflorescences with (5–)15–40 flowers; fruiting perianth 0.5–0.7 cm in diameter 5. *S. steinbachii*
 12. Lamina dentate or denticulate, if (sub)entire, then appressed-puberulous or glabrous beneath.
 15. Lamina (sub)entire, usually coriaceous; perianth of pistillate flowers glabrous, in fruit its surface ruminant; staminate flowers sessile and the perianth outside puberulous (Pacific coastal region of Colombia to southern Panama) 12. *S. faustiana*
 15. Lamina dentate to denticulate, chartaceous to subcoriaceous, if subentire and coriaceous, then the perianth of pistillate flowers (at least in the lower part) densely puberulous, the staminate flowers pedicellate (to subsessile) and/or the perianth ciliolate or glabrous.
 16. Filaments longer than perianth; perianth of pistillate flowers almost glabrous; fruiting perianth 0.8–1 cm in diameter, 1.5–2 cm long pedicellate; at altitudes between (700–)1000 and 2200 m (Costa Rica to Panama) 9. *S. trophoides*
 16. Filaments at most as long as perianth; lower part of the perianth of the pistillate flower densely puberulous or of glabrous, then the

- fruiting perianth 1–1.7 cm in diameter or on pedicels up to 1 cm long; at altitudes up to 900 m.
17. Staminate flowers usually pedicellate (to subsessile), if sessile then the stamens incurved; pistillate flowers usually pedicellate, fruiting perianth densely puberulous (Central America to Pacific coastal region of Colombia)..... *S. affinis*
17. Staminate flowers sessile; stamens recurved; pistillate flowers mostly (sub)sessile, fruiting perianth (very) sparsely puberulous (Amazonia).
18. Lamina beneath with hairs of similar length; lateral veins (8–)10–20(–25) pairs; pistillate inflorescences with 3–15(–20) flowers; fruiting perianth 1–1.7 cm in diameter . *S. hirtella*
18. Lamina beneath with hairs of different length, the longer ones more or less appressed; lateral veins 9–14 pairs; pistillate inflorescence with (5–)15–40 flowers; fruiting perianth 0.5–0.7 cm in diameter. *S. steinbachii*.
11. Lamina above completely glabrous.
19. Filaments longer than the perianth; perianth of the pistillate flower subglabrous, in fruit ca. 1 cm in diameter and on peduncles up to 2 cm long; midrib in the leaf acumen usually impressed; at altitudes between (700–)900 and 2200 m (Colombia to Peru). 9. *S. trophoides*.
19. Filaments shorter than or as long as the perianth; perianth of pistillate flowers puberulous, at least with globose–capitate hairs at its lower part, or, if subglabrous, then the fruiting perianth ellipsoid or at most 0.8 cm in diameter, and on pedicels up to 1 cm long, or, if the perianth is similar to that of *S. trophoides*, then the midrib in the leaf acumen plane; at altitudes up to 900 m.
20. Lamina distinctly inequilateral; staminate flowers pedicellate; anthers ovate in outline; pistillate inflorescences with peduncles 0.5–16 cm long, mostly pendulous (E. Brazil). 3. *S. hilarii*.
20. Lamina usually slightly inequilateral; staminate flowers sessile, or, if pedicellate, then the anthers suborbicular in outline; pistillate inflorescences usually with peduncles up to 0.5 cm (in fruit up to 1.5 cm) long (Amazonia, Pacific coastal region, Central America).
21. Lateral veins usually 10–20 pairs and the lamina mostly (sub)entire; leafy twigs 2.5–6 mm thick, petiole (1–)1.5–2.5 mm thick; fruiting perianth 1–1.7 cm in diameter (Amazonia, Guyana, SE. and N. Venezuela, N. and SE. Colombia). 4. *S. hirtella*.
21. Lateral veins usually 7–12 pairs and the lamina dentate or denticulate, or, if entire, then the leafy twigs 1–3.5 cm thick and the petiole 0.5–1.5 mm thick; fruiting perianth at most 1 cm in diameter.
22. Material with staminate flowers.
23. Flowers pedicellate (Central America and Pacific coastal region of Colombia) 13 *S. affinis*.
23. Flowers sessile.
24. Perianth of staminate flowers outside (sparsely) puberulous.
25. Anthers apiculate.
26. Lamina (usually) with several to many parallel tertiary veins (NW. Ecuador) 14. *S. sarcocarpa*.
26. Lamina without or with a few parallel tertiary veins (Central America to Pacific coastal region of Colombia). 13. *S. affinis*.
25. Anthers not apiculate (northern Amazonia, E. Venezuela and Suriname). 6. *S. muriculata*.
24. Perianth of staminate flowers ciliolate or glabrous.
27. Stamens incurved (northern Amazonia, southern Venezuela and Suriname). 6. *S. muriculata*.

- 27. Stamens recurved or straight and the anthers perpendicular to the filament.
- 28. Petiole 1–1.5 mm thick; leafy twigs 1–2.5 mm thick (Amazonian Peru and Brazil) 7. *S. briquetii*.
- 28. Petiole 2–2.5 mm thick; leafy twigs 2–4(–5) mm thick (Amazonian Peru, Brazil and Bolivia). 8. *S. pileata*.
- 22. Material with pistillate flowers.
- 29. Flowers (shortly) pedicellate.
- 30. Upper part of the perianth distinctly broader than the lower.
- 31. Lamina usually with several to numerous parallel tertiary veins (NW. Ecuador). 14. *S. sarcocarpa*.
- 31. Lamina without or with a few parallel tertiary veins.
- 32. Lower part of perianth densely puberulous (Central America to Pacific coastal region of Colombia). 13. *S. affinis*.
- 32. Lower part of perianth sparsely puberulous to muriculate (Amazonia, southern Venezuela, and Suriname). 6. *S. muriculata*.
- 30. Upper part of perianth nearly as broad as the lower (northern Amazonia, southern Venezuela, Suriname, and French Guiana). 6. *S. muriculata*.
- 29. Flowers sessile.
- 33. Pistillate inflorescences with 3–12(–20) flowers; perianth without or with sparse globose-capitate hairs; fruiting perianth subglobose or, if oblongoid (to ellipsoid), then 1–1.2 × 0.5–0.6 cm (Amazonia, southern Venezuela and Suriname). 6. *S. muriculata*.
- 33. Pistillate inflorescences with 10–40 flowers; perianth, at least the lower part, with dense, globose-capitate hairs; fruiting perianth ellipsoid, 0.8–1.3 × 0.6–1 cm.
- 34. Petiole 1–1.5 mm thick; leafy twigs 1–2.5 mm thick (Amazonian Peru and Brazil). 7. *S. briquetii*.
- 34. Petiole 2–2.5 mm thick; leafy twigs 2–4(–5) mm thick (Amazonian Peru, Brazil, and Bolivia). 8. *S. pileata*.

ACKNOWLEDGEMENTS

The authors are much indebted to Dr. K.U. Kramer (Zürich) for contributing the Latin diagnoses and for correcting the English text. Grants of the Netherlands Foundation for Advancement of Tropical Research (WOTRO) and the Netherlands Organization for Advancement of Pure Research (ZWO) enabled the senior author to collect data for the present study in the field and in various herbaria. The drawings were prepared by Mr. H. Rypkema and Mr. T. Schipper.

REFERENCE

Burger, W.C., J. Lanjouw & J.G. Wessels Boer – The genus *Sorocea* St. Hil. (Morac.), Acta Bot. Neerl. 11: 428–477 (1962).