

A revision of the Malagasy endemic genus *Chouxia* Capuron (Sapindaceae)

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ABSTRACT

A taxonomic revision of the Malagasy endemic genus *Chouxia* Capuron (Sapindaceae) is presented. CAPURON (1969) originally recognized a single, highly variable species (*C. sorindeioides*), providing a key to specimens based on indument and leaf size and shape. A careful reevaluation of these and other morphological characters (including leaflet number, venation, and inflorescence structure), and the availability of many new collections, allows the recognition of six species, five of which are described as new. Four of the novelties were known to CAPURON, and the fifth was first collected in 1994. One species occurs in dry deciduous forests in northern Madagascar, whereas all the others are restricted to humid forest in the northeastern part of the island, especially around the Bay of Antongil and N of Sambava. An emended description of the type species is provided to reflect the substantially revised circumscription adopted here.

KEY WORDS

Chouxia,
Sapindaceae,
Madagascar,
endemic,
Capuron.

RÉSUMÉ

Révision du genre *Chouxia* Capuron (Sapindaceae), endémique de Madagascar. Le genre endémique malgache *Chouxia* (Sapindaceae) a été à l'origine décrit par CAPURON (1969) avec une unique espèce très variable (*C. sorindeioides*), description accompagnée d'une clé de détermination conduisant aux échantillons, basée sur la pilosité, ainsi que sur la taille et la forme des feuilles. Un réexamen attentif de ces critères, complété par l'analyse de quelques autres caractères morphologiques (nombre de folioles, nervation, structure de l'inflorescence), et l'apport de nombreuses collections récentes, permettent de reconnaître six espèces dont cinq nouvelles sont décrites ici. Quatre de ces nouveautés étaient connues de CAPURON, la cinquième ayant été récoltée pour la première fois en 1994. Une seule espèce se trouve dans les forêts sèches décidues du N de Madagascar, les autres étant limitées aux forêts humides du NE de l'île, surtout autour de la Baie d'Antongil et au N de Sambava. Une description amendée de l'espèce-type est fournie pour refléter la nouvelle circonscription adoptée ici.

MOTS CLÉS

Chouxia,
Sapindaceae,
Madagascar,
endémique,
Capuron.

After more than 20 years of careful field observations, René CAPURON published his monumental *Révision des Sapindacées de Madagascar et des Comores* (1969), in which he enumerated 108 taxa of Sapindaceae in Madagascar and the Comoro Islands, all of which he had seen as living populations. Among the four new genera and 40 new species described therein, the genus *Chouxia* Capuron with its single species *C. sorindeioides* Capuron has the unusual distinction of being provided with a key to the specimens studied, which groups them according to variation in indument and leaf size and shape. Based upon annotation labels bearing unpublished infraspecific (and, in one case, specific) epithets, CAPURON clearly had struggled with this variation, and had at times considered formally recognizing additional taxa within *Chouxia*. He may well have been influenced to subsume all the variation under a single species by LEENHOUTS'S (1967) similar treatment of *Allophylus* L., which CAPURON (1969) followed for Madagascar, recognizing only the single species *A. cobbe* (L.) Raeusch. with numerous localized "races." A revised treatment of *Allophylus* for Madagascar is currently being prepared by the first two of the present authors.

A reevaluation of the character variation in *Chouxia*, especially in indument, leaf size, leaflet number, shape, and venation, and in inflorescence structure, leads us to describe the following five new species of *Chouxia*. Four of these were known to CAPURON, who had considered recognizing them at infraspecific or specific rank. The fifth new species has only recently come to light from two collections made since 1994. Insofar as this latter species differs from all other *Chouxia* in lacking pseudostipules altogether and possessing leaves with only 2 pairs of leaflets, an expanded generic description is also provided. In general, *Chouxia* can be distinguished from other genera of Malagasy Sapindaceae by its slender, sparsely-branched habit, and trunciflorous, racemose or paniculate inflorescences of pink to light purple flowers with strongly imbricate, persistent sepals, small petals bearing a single scale, usually 8 stamens, and stamen-like staminodia nearly as long as the fertile stamens.

CHOUXIA Capuron

Mém. Mus. Natl. Hist. Nat., sér. B, Bot. 19: 130 (1969).

Sparsely branched shrubs or slender treelets, dioecious. Leaves alternate, paripinnately compound, exstipulate, bearing a pair of bract-like to foliaceous pseudostipules at base of petiole, rarely absent; petiole and petiolules usually distinctly swollen; rachis often prolonged beyond apical pair of leaflets into a short appendage; leaflets 2–14 pairs, opposite to alternate, entire, penninerved with brochidodromous venation, sessile to short-petiolulate. Inflorescences trunciflorous or flagelliflorous from base, branched open pyramidal panicles or unbranched racemes of subsessile to pedunculate cincinni. Sepals 4–6, strongly imbricate, the outer 2 smaller, persistent and reflexed in fruit, pink to purple; petals 5, smaller

than sepals, each bearing a single entire to bilobed scale on upper surface at base; nectary disc annular; stamens 5–10, filaments folded several times in bud, anthers basifixed; staminodia present in female flowers, similar to fertile stamens but slightly smaller; ovary 2- or 3-locular, short-stipitate, ovate to subglobose, style short, bifid or trifold at apex, each branch terminating in a linear stigmatic area; ovule 1 per locule, erect; pistillode present in male flowers. Fruit a 1–3-seeded berry; seeds surrounded by a translucent, fleshy arilode.

TYPE.—*Chouxia sorindeioides* Capuron.

Key to the species of *Chouxia*

1. Plants entirely glabrous except the internal flower parts; pseudostipules absent; leaflets in 2 pairs 1. *C. bijugata*
- 1'. Plants with at least some pubescence on stem, leaves, or inflorescence axes; pseudostipules present, occasionally very small; leaflets in 3–14 pairs 2
2. Pseudostipules 7–16 × 5.3–8 cm; petiole/rachis 1 m or more long; largest leaflets exceeding 35 cm in length 3. *C. macrophylla*
- 2'. Pseudostipules less than 6 × 3.5 cm; petiole/rachis less than 40 cm long; largest leaflets less than 27 cm in length 3
3. Plants densely golden brown pubescent on branch tips, petiole/rachis, and at least on veins on abaxial surface; longest trichomes exceeding 1 mm in length 4. *C. mollis*
- 3'. Plants only sparsely to moderately puberulent, at least on rachis, petiolule, abaxial surface of midrib, or inflorescence axes; trichomes much less than 1 mm in length 4
4. Main inflorescence axes unbranched, or rarely with a single branch at base, erect, 6–14 cm long; leaflets in 7–10 pairs, the largest not exceeding 6.3 × 1.6 cm, the midrib distinctly raised and narrowly keeled adaxially 5. *C. saboureaui*
- 4'. Main inflorescence axes well-branched, pyramidal, horizontal to ascending, 11–55 cm long; leaflets in (3–)4–6(–14) pairs, the largest exceeding 8 × 2.3 cm, the midrib slightly to distinctly raised but not keeled adaxially 5
5. Leaflets in (3–)4(–6–14) pairs, subsessile, usually opposite to subopposite, very rarely alternate, base with an auriculate proximal lobe usually covering the rachis; lower surface green with brownish orange venation in dried material; margins distinctly undulate; pseudostipules orbicular to broadly cordate, as broad as or broader than long 2. *C. borealis*
- 5'. Leaflets in (3–)4(–6–9) pairs, subsessile to distinctly petiolulate, opposite to subopposite to often alternate, base lacking a distinct proximal auricle, the rachis always clearly visible; lower surface rusty brown with venation not distinctly different in color in dried material; margins flat or slightly undulate; pseudostipules ovate to cordate, usually distinctly longer than broad 6. *C. sorindeioides*

1. *Chouxia bijugata* G.E. Schatz, Gercau & Lowry, *sp. nov.*

Haec species a congeneris partibus vegetativis sicut inflorescentiarum axibus glaberrimis, foliis pseudostipulis carentibus atque foliolis bijugatis distinguitur.

TYPE.—Schatz *et al.* 3702, Madagascar, Prov.

Antsiranana, Masoala Peninsula, along N river bank at first rapids of the Anaovandrano River, 15°47'40"S, 50°15'30"E, 10 m, 18 Nov. 1996, fl. (holo-, MO!; iso-, TEF!).

Shrub to slender treelet 2–3 m tall, vegetative parts, inflorescence axes, and external flower

parts completely glabrous, young branches distinctly lenticellate. Leaves with 2 pairs of opposite, elliptic to lanceolate-elliptic leaflets, apical pair 11.5–27.5 × 3.6–9.6 cm, basal pair 5–22.5 × 2–8.5 cm, base obtuse to attenuate, asymmetrical, apex broadly acuminate; major secondary veins 11–13 pairs on apical leaflets, 7–10 pairs on basal leaflets, midrib raised above, prominently raised below, secondaries and tertiaries flat above, slightly raised below; petiolules distinctly swollen, 2–9 mm long; petiole and rachis combined 4.8–14.5 cm long, base distinctly swollen; pseudostipules absent. Inflorescences trunciflorous to the base, unbranched (or rarely with a single basal branch) racemes of sessile cincinni, rachis (4–)7–25 cm long, olive green, cincinni with 2–9 flowers, rachilla obsolete or to 1 mm long; bracts and bracteoles ovate, 0.1–0.3 mm long, minutely crose at apex; pedicels 3–8 mm long, slender, articulated 0.3–1.1 mm from base. Flower buds depressed globose, 2.2–2.8 mm diam. before opening; sepals oblong-elliptic to broadly elliptic, 1.9–2.8 × 1.4–2.3 mm, reflexed at anthesis, thin, nearly hyaline with evident venation, pink to red; petals broadly triangular, 0.6–0.9 × 0.9–1.5 mm, the scale 0.5–0.9 × 0.8–1.1 mm, bilobed ca. half its length, densely white-villous on upper half of inner surface; disc glabrous, 0.8–0.9 mm diam.; male flowers with 7 or 8 stamens, filaments 1.2–1.5 mm long, densely white-villous at base, anthers sagittate, 0.9–1 mm long; pistillode ca. 0.4 mm long, narrowly conic, densely white-hirsute; female flowers with 7 or 8 staminodia, anthers ovoid, sterile; ovary ovoid-globose, ca. 2.5 × 1.6 mm (including subsessile stigmas) at anthesis, golden-villous. Fruit not seen.—Fig. 1.

PARATYPES.—**MADAGASCAR:** *Prov. Antsiranana, Rabajaso et al.* 919, Masoala Peninsula, Beankoraka, 15°57'S, 50°13'E, 14 Nov. 1994, fl., y.fr. (MO, P, TAN).

Chouxia bijugata is known only from near sea level along the lower third of the east coast of the Masoala Peninsula. It is easily distinguished by the absence of pubescence, leaves with only two pairs of leaflets, the absence of pseudostipules, and its erect, mostly unbranched inflorescence.

2. *Chouxia borealis* G.E. Schatz, Gereau & Lowry, *sp. nov.*

Haec species partibus vegetativis parce modiceve pubescentibus foliololis apicalibus 5.5–26.5 cm longis et inflorescentia ramosa C. sorindeioidi maxime similis, sed ab ea foliolis basi lobulo auriculato ad laterem proximalem rhachim plerumque obtecto munitis abaxialiter venatione in sicco brunneo-aurantiaca contra parenchyma viride conspicua atque pseudostipulis orbicularibus reniformibusve distinguitur.

TYPE.—*Lewis et al.* 1113, Madagascar, Prov. Antsiranana, Réserve Spéciale Ankarana, close to Camp des Anglais, 12°54'43"S, 49°06'39"E, 180 m, 18 Feb. 1994, fl. (holo-, MO!; iso-, G!, K!, P!, TAN!, US!, WAG!).

Shrub or small tree to 6 m tall, young branches distinctly lenticellate, initially densely puberulous, glabrescent. Leaves with (3–)4(–6–14) pairs of mostly opposite to occasionally subopposite to rarely alternate, lanceolate to elliptic to oblanceolate leaflets, margins slightly to more often distinctly undulate, sometimes slightly falcate, largest leaflets usually the apical pair, apical pair 5.5–18 × 1.6–5.8 cm, basal pair 2–12.6 × 0.9–4 cm, base obtuse to subcordate, very asymmetrical, usually the proximal half of leaf base auriculate and overlapping rachis, concealing it, and often touching the auriculate proximal lobe of opposite leaflet, rarely the distal half of leaf attenuate, the proximal half rounded, apex acuminate to long-acuminate; major secondary veins 6–15 pairs, prominently raised below, orange-brown and contrasting with the green blade, secondaries and tertiaries flat above, slightly raised below, midrib triangularly raised above, prominently raised and sparsely pubescent beneath; leaflets subsessile, petiolules distinctly swollen, 0.4–1.1 mm long, densely puberulous; petiole and rachis combined 5.5–20 cm long, initially densely puberulous, sometimes glabrescent, apex usually with a short appendage to 2 mm long extending beyond apical pair of leaflets, base distinctly swollen; pseudostipules ovate to orbicular or reniform, 0.6–3 × 0.6–2.1 cm. Inflorescences trunciflorous to the base, 1–5-branched open pyramidal panicles of racemes of short-pedunculate cincinni, axes densely puberulous, principal axis 8–30 cm long, cincinni biramous, each



Fig. 1.—Line drawings of *Chouxia*. A-E, *C. bijugata*: A, leaves; B, inflorescence; C, portion of inflorescence axis; D, flower in bud; E, bud with perianth removed. F-H, *C. macrophylla*: F, leaf with pseudostipules; G, inflorescence; H, cincinnus in bud. A-E, Schatz et al. 3702 (TAN); F-H, Service Forestier (Capuron) 27678 (TEF).

branch producing 3–5 flowers on a rachilla 0.3–1.2 mm long; bracts and bracteoles 0.1–0.3 mm long, deltoid-ovate, ciliolate; pedicels 0.9–1.8 mm long, slender, puberulous, articulated 0–0.3 mm from base. Flower buds depressed globose, 2–2.2 mm diam. before opening; sepals oblong-elliptic, minutely auriculate on both sides at base, ca. 2.3×1.7 mm, reflexed at anthesis, thin, nearly hyaline with evident venation, pink; petals broadly triangular, ca. 0.7×0.9 mm, scale ca. 0.5×0.9 mm, densely tawny-villous on outer surface; disc glabrous, ca. 0.9 mm diam.; male flowers with 5 or 6 stamens, filaments ca. 1.7 mm long, glabrous, anthers ca. 1.1 mm long, sagittate; pistillode ca. 0.4 mm long, conic, densely white-hirsute; female flowers not seen. Fruit not seen.—Fig. 2.

PARATYPES.—MADAGASCAR: *Prov. Antsiranana*, *Cours 5442* (probably = *Humbert 32372*), Dist. Antsiranana, Canton Anivorano Nord, Marovato-Anketraka, Forêt de Misoromalalana, 200 m, 25 Jan. 1960, fr. (MO, P[2]); *Cours 5635* (probably = *Humbert 32750*), Dist. Ambilobe, Montagne d'Andavakafanihy, km 105 de la route d'Ambilobe, 3 Feb. 1960, fl. (P [2]); *Humbert 32372* (probably = *Cours 5442*), forêt d'Ambatomamo au S d'Anivorano Nord, 30 Jan. 1960, fr. (P); *Humbert 32750* (probably = *Cours 5635*), collines et plateaux calcaires de l'Ankarana vers la grotte du Fanihy, 24 Jan.–29 Feb. 1960, fl. (G, K, MO, P); *SF (Capuron) 18719bis*, crête d'Antsahanombary, à l'Est de Mangindrano, piste de Mangindrano à Marofamamo, vers 1.800 m, 28 July 1958, st. (P, TEF); *SF (Capuron) 18975bis*, same locality (TEF); *SF (Capuron) 22024*, forêt d'Analamahitsy, sur basaltes entre Anivorano-Nord et Ambondromifchy, PK 84 de la route Diégo-Ambilobe, 16 Feb. 1962, fl., y.fr. (MO, P[3], TEF); *SF (Capuron) 27344*, vestige de forêt entre Belinta et Ambatrabe, au NW de Vohémar, au S de Maintialaka, 10–18 Dec. 1966, y.fr. (K, MO, P, TEF); *SF (Capuron) 27442*, forêt d'Andaingo, au S de la rivière d'Andripatra, au N de Vohémar, 16 Mar. 1967, fr. (P, TEF); *SF (Capuron) s.n.*, base NW de la Montagne d'Ambre, forêt d'Ankorefo, s.d., st. (P).

Chouxia borealis is distributed in dry deciduous forest in northern Madagascar from Vohémar to Ankarana RS, apparently in association with calcareous substrates. It is easily distinguished by its leaves with usually four pairs of leaflets with a proximal auriculate lobe covering the rachis and often touching the corresponding lobe of the

opposite leaflet, the distinctly undulate margins of the leaflets, and the venation drying brownish orange against a light green lamina. The branched, open pyramidal inflorescences are similar to, but smaller than, those of *C. sorindeioides*. Several unpublished names were ascribed by CAPURON to material of this species, including *C. sorindeioides* var. *auriculata*, *C. sorindeioides* subsp. *auriculata* and *C. sorindeioides* var. *multijuga*.

3. *Chouxia macrophylla* G.E. Schatz, Gereau & Lowry, sp. nov.

Haec species a congeneris pseudostipulis 7–16 × 5.3–8 cm, rhachidi foliari cum petiolo adjecto metrali longioreve atque foliolis majoribus longitudine 35 cm excedentibus distinguitur.

TYPUS.—*SF (Capuron) 27678*, Madagascar, Prov. Antsiranana, versant oriental de l'Ambatobiribiry, au Sud de la Basse Bemarivo, 100–330 m, 9 Apr. 1967, fl. (holo-, P!; iso-, K!, MO[3]!, P [3]!, TEF!).

Large shrub. Leaves with ca. 12 pairs of alternate to sub-opposite, glabrous, elliptic to lanceolate-elliptic leaflets, apical pair 20–40 × 7–9.2 cm, basal pair 13–19.5 × 6.8–7.7 cm, the base obtuse to cuneate, asymmetrical, apex acute to acuminate; major secondary veins 12–16 pairs on apical leaflets, 8–10 pairs on basal leaflets, midrib raised above, prominently raised below, the secondaries and tertiaries flat above, prominently raised below; petiolules distinctly swollen, 5–9 mm long; petiole and rachis combined up to 1 m or more long (fide CAPURON), base not swollen, rachis conspicuously lenticellate; pseudostipules ovate, 7–16 × 5.3–8 cm, base obtuse to truncate, apex short-acuminate, secondary veins 8–10 pairs. Inflorescences trunciflorous, well-branched open, pyramidal panicles of racemes of sessile or subsessile cincinni, axes finely puberulent, principal axis ca. 62.5 cm long, with 8 branches, the first ca. 14 cm from base, ca. 30 cm long, each succeeding branch progressively shorter, cincinni biramous, each branch producing 3 flowers on a rachilla 1.5–1.8 mm long; bracts and bracteoles 0.2–0.4 mm long, deltoid, minutely puberulent; pedicels 2.5–3.5 mm long, slender, finely puberulent, articulated at base.

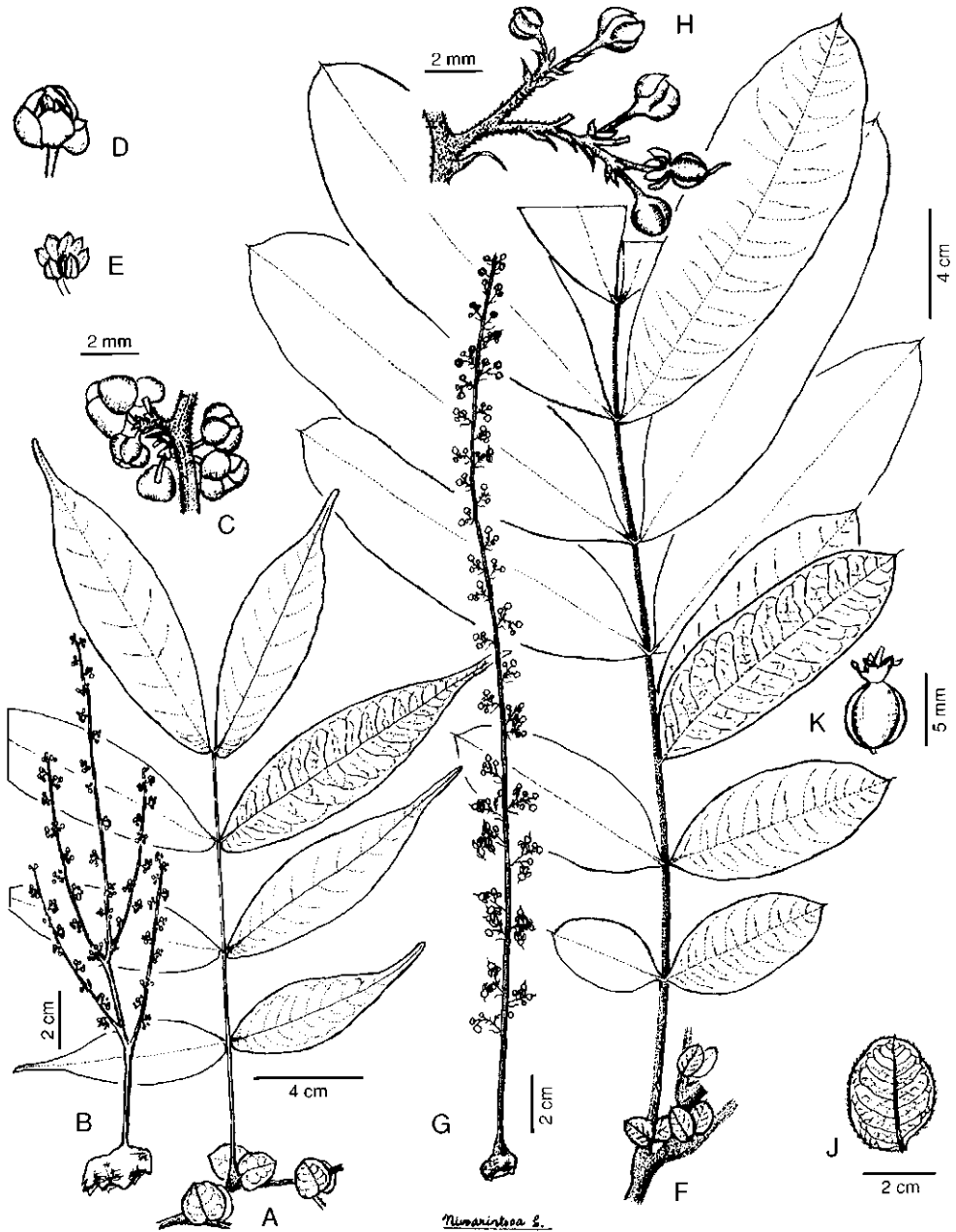


Fig. 2.—Line drawings of *Chouxia*. A-E. *C. borealis*: A, leaf with pseudostipules; B, inflorescence; C, inflorescence axis; D, flower; E, flower with perianth removed. F-K. *C. mollis*: F, leaf with pseudostipules; G, inflorescence; H, cincinnus; J, pseudostipule; K, fruit. A-E. Lewis et al. 1113 (TAN); F-K. Service Forestier (Capuron) 27648 (TEF).

Flower buds depressed globose, 2.3–2.6 mm diam. before opening; open flowers not seen; sepals ovate-orbicular, ca. 2.4×2.1 mm, minutely puberulent without; petals (immature?) oblong-ovate, $0.8\text{--}0.9 \times 0.6\text{--}0.7$ mm, appressed-puberulent without, glabrous within. scale represented by a basal rim ca. 0.1 mm long, villous-ciliate; disc glabrous, ca. 0.6 mm diam.; male flowers with 8 stamens, filaments undeveloped, anthers oblongoid, ca. 1.2 mm long; pistillode linear, ca. 0.5 mm long, densely white-hirsute; female flowers not seen. Fruit not seen.—Fig. 1.

Chouxia macrophylla is known only from the type specimen, collected along the lower Bemarivo River N of Sambava, an area now mostly devoid of forest. It is distinguished by its large pseudostipules and leaves, which according to the collector (CAPURON) may reach 1 m or more in length. The name *C. sorindeioides* fa. *macrophylla* was used by CAPURON to annotate some specimens belonging to this species, but it was never validly published.

4. *Chouxia mollis* G.E. Schatz, Gereau & Lowry, sp. nov.

Haec species a congeneris ramorum apicibus, folii petiolo rhachidi et lamina saltem subtus secus venulas trichomatibus aureo-brunneis longitudine 1 mm excedentibus dense pilosis distinguitur.

TYPE.—*SF* (Capuron) 27648, Madagascar, Prov. Antsiranana, entre Tsaratanana et Analamanara (route de Sambava et Vohémar, entre Nosiarina et Antsirabe-Nord), 30 Mar. 1967, fl., y.fr. (holo-, P!; iso-, P!, TEF!).

Shrub to 6 m tall, branches densely golden-pilose, eventually glabrescent. Leaves with 4–12 pairs of opposite to subopposite to rarely alternate, elliptic to oval to slightly oblanceolate leaflets, largest leaflets toward apex of the rachis, $5.8\text{--}20.8 \times 1.1\text{--}5.7$ cm, basal pair of leaflets $1.3\text{--}10 \times 0.8\text{--}5.1$ cm, base acute to rounded, asymmetrical, apex short-acuminate, acumen 0.5–1(–1.5) cm long, margin slightly undulate; major secondary veins 8–18 pairs, midrib slightly raised above, densely golden-pilose, prominently

raised below, secondaries and tertiaries flat above, slightly raised below; leaflets sessile to subsessile, petiolules slightly swollen, to 1 mm long, densely golden-pilose; petiole and rachis combined 13.5–38.5 cm long, densely golden-pilose, base somewhat swollen; pseudostipules elliptic, $0.4\text{--}3.8 \times 0.3\text{--}2.8$ cm. Inflorescences trunciflorous to flagelliflorous, unbranched to rarely 1–4-branched racemes of sessile or pedunculate cincinni, principal axis 22–183 cm long, golden-pilosulous, peduncles 0–22 mm long, cincinni unbranched and 3–5-flowered with obsolete rachilla or 1–5 times dichotomous with each ultimate branch producing 3–5 flowers on a rachilla 1–3 mm long; bracts and bracteoles 0.5–2.1 mm long, deltoid to linear-lanceolate, pilosulous on back and ciliate at margins; pedicels 1.8–3.5 mm long, articulated 0.7–1.2 mm from base, pilosulous below articulation, glabrous above articulation or more rarely pilosulous. Flower buds depressed globose, 1.8–2.4 mm diam. before opening; sepals orbicular-ovate, $1.8\text{--}2.3 \times 1.5\text{--}2$ mm, minutely ciliolate on margins, glabrous to densely pilosulous on surface without, reflexed at anthesis, firm, with indistinct venation; petals triangular-ovate to broadly triangular, $0.8\text{--}1.5 \times 0.6\text{--}1.1$ mm, scale $0.4\text{--}0.6 \times 0.7\text{--}1$ mm, entire to shallowly bilobed or crose at apex, white-villous-ciliate; disc glabrous, 0.8–1.1 mm diam.; male flowers with 7 stamens, filaments ca. 1.5 mm long, glabrous, anthers 1–1.1 mm long, ellipsoid; pistillode ca. 0.3 mm long, ovoid, glabrous; female flowers with 7 or 8 staminodia, anthers oblongoid, sterile; ovary ovoid, $1.8\text{--}1.9 \times 0.8\text{--}1.5$ mm (including subsessile stigmas, these much elongated in early fruit) at anthesis, glabrous to densely tawny-villous. Fruit not seen.—Fig. 2.

PARATYPES.—MADAGASCAR: *Prov. Antsiranana*, *SF* (Capuron) 24900bis, environs sud d'Antsirabe-Nord, sur la nouvelle route Vohémar-Sambava, 18 or 21 Oct. 1966, st. (P); *SF* (Capuron) 27611, forêt d'Analamateza, au S d'Antsirabe-Nord, 25–27 Mar. 1967, fl. (MO, P[2], TEF); *SF* (Capuron) 27625, environs W d'Anjombalava, entre Nosiarina et Antsirabe-Nord (route Sambava-Vohémar), 28 Mar. 1967, fl. (K, MO, P[2], TEF); *SF* (Capuron) 27629, same locality (K, P, TEF); *SF* (Capuron) 27725, table basaltique d'Ambanitazana, près d'Andrapengy (au N d'Antalaha), 11 Apr. 1967, fl. (K, P[2], TEF).

Chouxia mollis is known only from lowland humid evergreen forest from near Antalaha to north of Sambava, perhaps associated with basaltic substrates. As in the case of *C. macrophylla*, the region where *C. mollis* was collected in the mid-1960s is now mostly devoid of forest, and both species must thus be considered possibly extinct until new collections are made.

Chouxia mollis is distinguished by its dense golden-pilose indument on the vegetative parts and inflorescence axes. Two of the cited collections, SF 27625 and SF 27725, bear dense pubescence on the pedicel above the articulation, the outer surface of the sepals, and the ovary; these parts are glabrous in all other collections of *C. mollis*. SF 27725 is further distinguished by extremely long, flagelliform inflorescences with long-pedunculate, several-times-dichotomous cincinni, and might well be considered a distinct species were it not for SF 27625, which shares the unusual pubescence characters of SF 27725 but bears inflorescences similar to the other collections of *C. mollis*. Evidence is insufficient at this time to recognize any further taxa, and we consider *C. mollis* as here circumscribed to be a single, somewhat variable species. The name *C. sorindeioides* var. *mollis* was used by CAPURON on annotation labels attached to several specimens, but it was never validly published.

5. *Chouxia saboureaui* Capuron ex G.E. Schatz, Gereau & Lowry, *sp. nov.*

Haec species partibus vegetativis parce modiceve pubescentibus et pseudostipulis minus quam 7 × 4 cm metentibus C. boreali et C. sorindeioidi maximi similis, sed ab eis inflorescentia eramosa vel perparce ramosa atque foliolorum usque ad 6.3 × 1.6 cm tantum costa adaxialiter manifeste elevata et anguste carinata distinguitur.

TYPUS.—RN 5285, Madagascar, Prov. Antsiranana, District Antalaha, Canton Ambohitalana, [former] Réserve Naturelle Intégrale N^o 2, Masoala, 11 July 1953, fl. (holo-, P!; iso-, K, MO, P[3]!).

Shrub. Leaves with 7–10 pairs of opposite, glabrous, lanceolate leaflets, largest leaflets toward middle of rachis, 4.6–6.3 × 1.2–1.6 cm, basal pair of leaflets 1.3–3.6 × 0.7–1.5 cm, base obtuse to rounded, strongly asymmetrical, apex long-acuminate, acumen to 1.3 cm long, margin

slightly undulate; major secondary veins 8–12 pairs, midrib raised and narrowly keeled above, prominently raised below, secondaries and tertiaries flat above, slightly raised below; leaflets sessile or with distinctly swollen petiolules to 1.1 mm long and densely puberulous; petiole and rachis combined 11.6–22.3 cm long, densely puberulous, base distinctly swollen; pseudostipules 0.25–0.41 × 0.18–0.25 cm, elliptic. Inflorescences trunciflorous to the base, unbranched (or rarely with a single basal branch) racemes of sessile or subsessile cincinni, rachis 8–13 cm long, densely puberulous; cincinni with 4–12 flowers, rachilla 3–7 mm long; bracts and bractcoles narrowly deltoid, 0.2–0.7 mm long, densely puberulous; pedicels 1–2 mm long, densely puberulous, articulated 0.3–0.6 mm from base. Flower buds depressed globose, 1.7–1.9 mm diam. before opening; open flowers not seen; sepals ovate-orbicular, ca. 1.4 × 1.4 mm, medially hirsutulous without; (very immature) petals ca. 0.3 × 0.3 mm, scale densely villous-ciliate; disc glabrous, ca. 0.5 mm diam.; male flower with 8 stamens, filaments undeveloped, glabrous in bud, anthers oblongoid, ca. 1 mm long; pistillode ca. 0.3 mm long, linear, densely white-hirsute; female flowers not seen. Fruit not seen.—Fig. 3.

In August 1956, CAPURON annotated the two sheets in the Paris herbarium as "*Chouxia Saboureaui* R. Capuron", but then inexplicably failed to include either the collection or any mention of the provisional name in his 1969 treatment of the genus, despite the fact that the specimens were undoubtedly the basis for parts 13 (leaf) and 14 (inflorescences) in plate 34 of CAPURON (1969).

Chouxia saboureaui is known only from the type collection made in 1953 from the former Réserve Intégrale Naturelle N^o 2 (Masoala), a portion of which is now included in the new Parc National Masoala. It is therefore quite possible that *C. saboureaui* remains extant (in contrast with *C. macrophylla* and *C. mollis*), and it should be urgently sought. The species epithet was chosen by CAPURON to honor P. SABOUREAU, who instigated and guided the series of invaluable RN (*Réserves Naturelles*) collections.

Vernacular name: Somotrozoma.

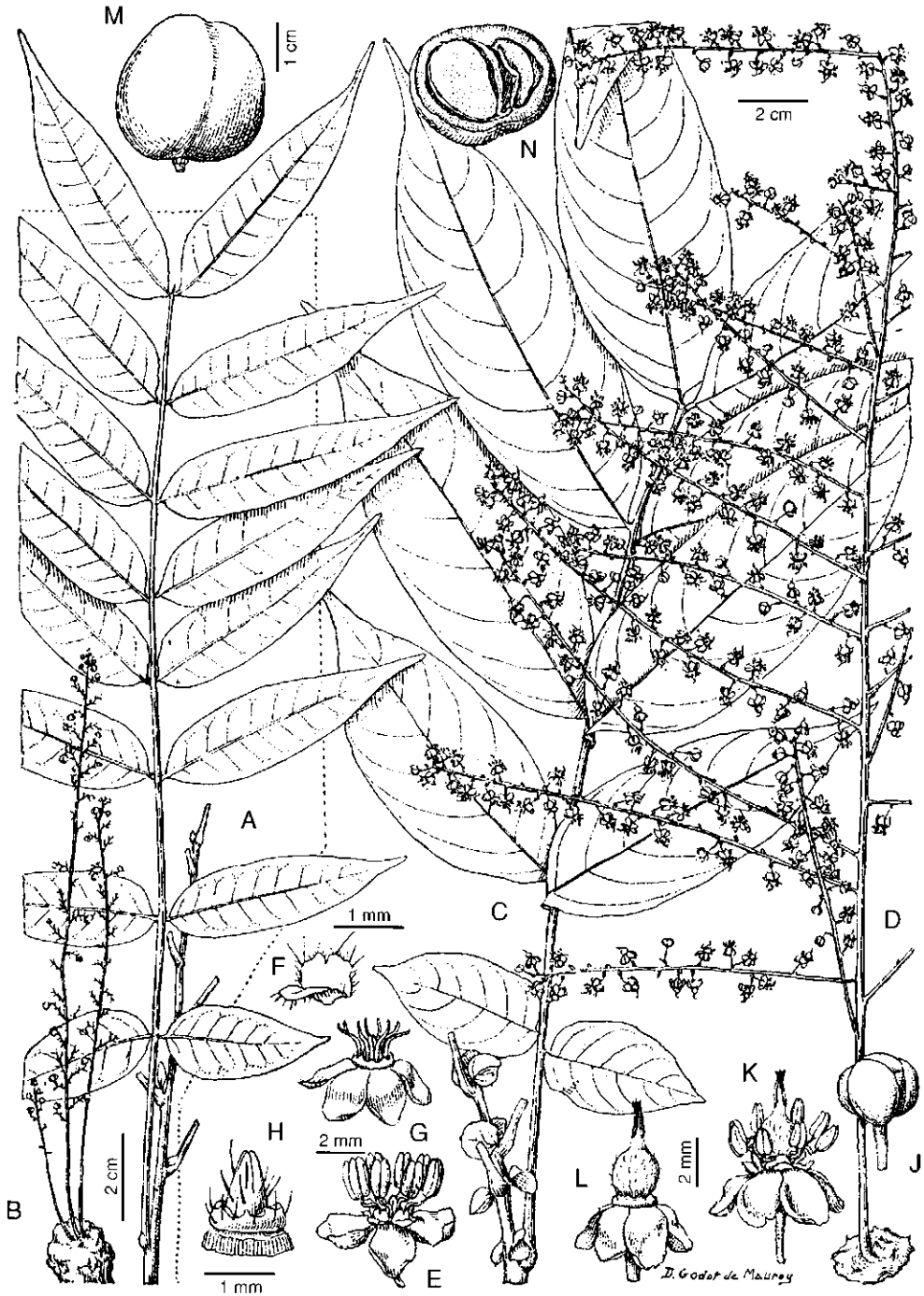


Fig. 3.—Line drawings of *Chouxia*. A-B, *C. saboureaui*: A, leaf; B, inflorescence. C-N, *C. sorindeioides*: C, branch with leaf, leaf bases and pseudostipules; D, inflorescence; E, male flower at anthesis; F, petal with scale; G, calyx, disk and filaments; H, disk and pistillode; J, flower bud; K, female flower; L, female flower with corolla and staminodes removed; M, fruit; N, transverse section of fruit. Reproduced from CAPJON (Mém. Mus. Natl. Hist. Nat., sér. B. Bot. 19 : pl. 34, 1969).

6. *Chouxia sorindeioides* Capuron emend.

G.E. Schatz, Gereau & Lowry

Mém. Mus. Natl. Hist. Nat., sér. B, Bot. 19: 130, pl. 34 (1969).—Type: *SF* (*Capuron*) 8759, Madagascar, Prov. Antsiranana, environs du col d'Ambatondradama, piste Maroantsetra-Antalaha au N de la presqu'île Masoala, vers 500 m, 22 Dec. 1953, fl. (holo-, P!; iso-, K!, MO!, P[2]!).

Shrub or slender treelet to 8 m tall. Leaves with (3)–4–6(–9) pairs of opposite to often alternate, elliptic to lanceolate-elliptic leaflets, apical pair 8.5–26.5 × 2.3–9.2 cm, basal pair 2.9–22.5 × 1.5–8.3 cm, base attenuate to rounded, apex long-acuminate; major secondary veins 11–14 pairs on apical leaflets, 5–9 pairs on basal leaflets, midrib raised and glabrous to densely puberulous above, prominently raised and densely puberulous beneath, glabrescent beneath except usually toward base, secondaries and tertiaries slightly raised to flat or rarely slightly sunken above, slightly raised beneath; petiolules distinctly swollen, 1–5 mm long, densely puberulous; petiole and rachis combined 8.5–42 cm long, apex usually bearing an appendage to 3 mm long, base distinctly swollen, densely puberulous initially, glabrescent; pseudostipules ovate to orbicular-cordate, usually longer than broad, 0.3–6 × 0.3–3.6 cm. Inflorescences trunciflorous to the base, pendulous to horizontal or slightly ascending, 3–24-branched (the branches progressively shorter and poorly defined toward apex), open, pyramidal panicles of sessile or short-pedunculate cincinni, rarely unbranched, axes puberulous, principal axis 11–55 cm long; cincinni with 1–5 flowers, rachilla obsolete (or rarely some cincinni in same inflorescence biramous with each branch producing 3–5 flowers on a rachilla 2–3 mm long); bracts and bracteoles deltoid to linear-lanceolate, 0.4–1.2 mm long, ciliate, subglabrous to densely puberulous on surface; pedicels 1.2–3.8 mm long, puberulous, articulated 0–0.6 mm from base. Flower buds depressed globose, 2.1–2.9 mm diam. before opening; sepals orbicular-ovate, 2–2.3 × 1.8–2.4 mm, minutely ciliolate on margins, subglabrous to puberulous on surface without, reflexed at anthesis, purple; petals ovate to broadly triangular, 0.7–1.2 ×

0.9–1.1 mm, scale 0.4–0.6 × 0.6–1.1 mm, entire to erose or shallowly bilobed at apex, densely white-villous without on upper half; disc glabrous, 0.6–1.3 mm diam.; male flowers with 7 or 8 stamens, filaments glabrous or sparsely white-villous near base, 1.3–1.5 mm long, anthers ellipsoid, 1.2–1.5 mm long; pistillode 0.5–0.7 mm long, narrowly conic, sparsely to densely white- or tawny-hirsute; female flowers with 7 or 8 staminodia, anthers ellipsoid, sterile; ovary ovoid-orbicular, ca. 2.1–2.5 × 1.2–1.4 mm (including short style) at anthesis, subglabrous to sparsely white- or tawny-hirsute. Fruit globose or somewhat asymmetrical by abortion of 1 or 2 locules, 2.5–3 cm length and diam. at maturity, purple, glabrous, surface drying verrucose-roughened; seed ellipsoid, flattened, ca. 2 × 1.5 × 0.5 cm when 1 or 2 developed, smaller, curved, and more trigonous when 3 developed.—Fig. 3.

ADDITIONAL MATERIAL EXAMINED.—**MADAGASCAR:** *Prov. Antsiranana, Rasoavimbaboaka* 670, Marojejy RNI, 14°36'10"S, 49°39'50"E, 692–759 m, 2–8 May 1995, fl. (MO, P, TAN); *Ravelonarivo & Rabesonina* 695, Anjanaharibe-Sud RS, 14°38'30"S, 49°25'30"E, 1235 m, 23 Mar. 1995, fr. (MO, P, TEF!); *SF* (*Capuron*) 8760, environs du col d'Ambatondradama, piste Maroantsetra-Antalaha au N de la presqu'île Masoala, vers 500 m, 22 Dec. 1953, fl. (K, MO[2], P[4], TEF!); *SF* (*Capuron*) 27767, environs du Cap-Est, au sud d'Antalaha, 19–21 Apr. 1967, fr. (MO, P). *Prov. Toamasina, Carlson* 246, Nosy Mangabe RS, 15°30'S, 49°46'E, 0–330 m, 21 May 1990, st. (MO); *Lowry et al.* 4099, Masoala Peninsula, along Ampanga River, ca. 5 km S of Hiiraka, 300 m, 13 Oct. 1986, fl. (MO, P, TAN); *Lowry et al.* 4182, forested slopes S of Ambanizana, 15°38'S, 49°58'E, 200 m, 18 Oct. 1986, fl. (MO, P, TAN); *M. Nicoll & Schatz* 603, Nosy Mangabe RS, 15°30'S, 49°47'E, 215 m, 22 Apr. 1987, fr. (MO, P, TAN); *Perrier de la Bathie* 6306, bassin de la riv. Simiane [Simianona?], Sep. 1912, fl., P[3]; *Schatz et al.* 1670, Nosy Mangabe RS, 15°30'S, 49°47'E, 14 Oct. 1987, fl. (MO); *Schatz et al.* 1845, same locality, 8 Feb. 1988, fl. (MO, P); *Schatz & Gentry* 1995, same locality, 13–23 Apr. 1988, fl. (MO, P); *Schatz & Gentry* 2171, same locality, 13–23 Apr. 1988, st. (MO, TAN); *Schatz & Gentry* 2242, same locality, st. (MO, TAN); *Schatz* 2624, same locality, 23–28 Feb. 1989, fr. (MO, P[2], TAN); *Schatz et al.*, 3331, 1–3 km S of Ambanizana, 15°39'S, 49°58'E, 0–10 m, 29 Oct. 1992, fl. (MO, P, QRS, TAN); *SF* (*Capuron*) 8709, environs de la Baie d'Antongil, Massif de l'Ambohitstondroina de Mahalevona, crête vers 800 m, Dec. 1953, fl. (G[2], K[2], MO[2], P [5], TEF); *SF* (*Capuron*) 8981, envi-

rons de la baie d'Antongil: bassin de la Fanenehana, massif de l'Androrona, vers 600 m, Feb. 1954, fl. (MO, P[3], TEF); *SF (Capuron) 22862*, colline latéritique à l'ouest de Nantoraka (au SW de Maroantsetra), 5 Nov. 1963, fl. (P[2], TEF); *SF (Capuron) 27513*, forêt d'Analafiana, au N de la basse Manambery (au SW de Vohémar), 11 Mar. 1967, fr. (K); *SF (Capuron) 27572*, forêt d'Analamateza, au S d'Antsirabe Nord, 27 Mar. 1967, fl. (P[2]); *Vasey & Behasy 193*, Andranobe watershed, Masoala Peninsula, 15°40'24"S, 49°57'51"E, 110-260 m, 30 Nov. 1994, fr. (MO, P, TEF); *Zjhra & Hutcheon 137*, Masoala Peninsula, E of research station at Andranobe, 15°39'30"S, 49°57'30"E, 500-600 m, 7 Feb. 1992, fr. (K, MO, P, TAN).

As here emended, *C. sorindeioides* is distributed from the Simianona River located northwest of Soanierana Ivongo to the Forêt d'Analafiana S-SW of Vohémar, with the majority of collections from the Bay of Antongil region. It is characterized by sparse puberulence on the petiole/rachis, leaflets that dry rusty-brown, the venation not distinctly differently colored than the lamina, and lack a proximal auricle, and an open, branched, pyramidal panicle inflorescence. White-fronted brown lemurs (*Lemur fulvus albifrons*) have been observed on Nosy Mangabe RS eating the fruit (GES pers. obs.).

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