

Notes on *Cupaniopsis* (*Sapindaceae*).

1. New species from New Caledonia

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Summary : Among material recently collected in New Caledonia chiefly by H. S. MACKEE and G. MCPHERSON four new species of *Cupaniopsis* have been recognised and are described.

Résumé : Dans le matériel récolté récemment en Nouvelle-Calédonie particulièrement par H. S. MACKEE et G. MCPHERSON, 4 espèces nouvelles de *Cupaniopsis* sont reconnues et décrites ici.

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1. *Cupaniopsis grandiflora* Adema, sp. nov. — Fig. 1, a.

Arbuscula 2-3 m alta, partibus juvenilibus glandulis scutatis obsitis. Folia 4-9-jugata, foliolis obscure vel grosse dentatis. Ramiflora. Flores ut in C. oedipoda autem majores. Discus glaber. Ovarium 3-loculare extus pauce pilosum, intus glabrum.

TYPE : McPherson 3805, Mont Do, 950 m, 6.6.1981 (holo-, MO!).

Treelets 2-3 m high, very young parts with minute glandular scales and short patent hairs, "varnished". Twigs terete, 1.5-5 mm in diameter, smooth, with minute glandular scales and short patent hairs, soon glabrous. Leaves 3-9-jugate; petiole 4.5-16.5 cm, pulvinate \pm terete, semiterete in lower or upper part, glabrous or with scattered scales, sometimes with short patent hairs; rachis 6-28 cm, \pm terete or semiterete, glabrous or with short patent hairs at the attachment of the petiolules, rarely also with scattered scales. Leaflets opposite to alternate, upper ones 8.5-17 \times 1.5-5.5 cm (index 3.25-5.60), widest below, very rarely about the middle, lower ones 4.5-12 \times 1.5-4.5 cm (index 2.30-3.40), widest below the middle, coriaceous, glabrous above and below, rarely with few scattered scales, base oblique, cuneate to rounded, apex obtuse to rounded or acuminate, acumen (2-)5-12 mm, rounded, margin obscurely to grossly dentate in apical part, rarely entire, midrib slightly prominent above, prominent below, nerves (5-)7-12(-15) per side, several of the upper ones ending in a tooth, (3-)10-21 mm apart, at 50°-55° to midrib; petiolule (2-)7-10(-19) mm, pulvinate, grooved above, glabrous or with short patent hairs on and near the pulvinus, sometimes with scattered scales.

Ramiflorous; inflorescences 2-16 cm, unbranched or with short to long branches. Bracts lanceolate to deltoid, 0.4-0.7 \times 0.2-0.5 mm, outside with scales and short hairs, inside glabrous. Pedicels 8-10 mm, articulate at 1/2-3/4. Buds globular, 2.8-4.6 \times 2.8-4.2 mm. Male

flowers : Sepals 5, rarely 6, free, imbricate, broad ovate to orbicular, concave, outer 2 smaller, $1.0-3.2 \times 1.4-2.2$ mm, scarious rim rather wide, innermost $4.2-4.8 \times 3.1-5.3$ mm, scarious rim very wide, out- and inside glabrous, ciliolate with glands. Petals 5, \pm orbicular, irregularly dentate, $4.0-6.7 \times 4.0-6.5$ mm, out- and inside glabrous, ciliolate at base, scales 2, often 2-lobed at apex, with or without crests, $2.4-4.2$ mm, ciliate. Disc complete, glabrous. Stamens 8 (9), exserted, filaments $3.2-5.2$ mm, patently hairy in middle part, anthers $1.2-1.6$ mm, glabrous. Pistillode 3-celled, $0.5-2.4 \times 0.5-1.1$ mm, outside with some hairs in upper part. Female flowers : perianth not much different from that in male flowers. Smaller sepals $2.4-2.6 \times 1.9-2.0$ mm, innermost 5.4×4.1 mm. Petals $5.9-6.2 \times 4.6-5.8$ mm, scales $3.2-3.6$ mm. Filaments of staminodes $2.2-2.4$ mm, anthers $1.6-1.8$ mm, with few hairs. Ovary 3-celled, outside with few hairs, inside glabrous, style 3.6 mm, stigma 1.8 mm, 3-lined. Fruits ellipsoid, 3-angular in cross-section, $26-32 \times 16$ mm, stipe $3-6$ mm, pericarp $1.6-2.0$ mm thick, exocarp glabrous, endocarp glabrous, septum complete. Young seeds almost totally covered by ariloid, cotyledons unequal, superposed.

FIELDNOTES :

a. Ecological notes : Undergrowth of wet forests and maquis, 400-1000 m. Fl. May (-July); fr. November.

b. Additional descriptive notes : Leaves shiny green, usually darker below. Inflorescence axes red or green. Pedicels, flowers and stamens white. Fruit green.

NOTES : Strongly resembling *C. oedipoda* in vegetative parts, especially the leaves. However, these are usually dentate in the present species. Furthermore the new species has larger flowers, and in the male flowers glabrous anthers.

SPECIMENS EXAMINED : MacKee 23736, Pouébo, Ouangati ; MacKee 12583, Contrefort sud de la Table Unio ; Bernardi 9592, Col d'Amieu ; MacKee 12612, Col d'Amieu, Mé Ongué ; Guillaumin & Baumann-Bodenheim 8683, 9024, Mé Améré ; McPherson 2832, 3805 (type) ; Musselman, Delzell & Rich 5416, Mont Do.

2. *Cupaniopsis squamosa* Adema, sp. nov. — Fig. 1, b.

Arbuscula vel frutex 1-2 mm alta, partibus juvenilibus densissime glandulis scutatis obsitis. Folia 1-2 (-3)-jugata, foliolis integerrimis. Inflorescentiae axillares. Capsula parva 10-13 \times 6-9 mm, extus glandulis scutatis obsita apice interdum etiam breviter pilosa, intus tomentosa ad adpresse pilosa. Arilloidia semina obovoidea 2/3 ad fere tota obtegentia.

TYPE : McPherson 6176, Massif de Tiébaghi, ca. 550 m, 21.12.1983 (holo-, MO!; iso-, L!).

Treelets or shrubs 1-2 m high, young parts very densely covered with minute glandular scales, very young parts often "varnished". Twigs terete, 1-2 mm in diameter, smooth to striate, with minute glandular scales. Leaves 1-2(-3)-jugate; petiole 0.5-2.5 cm, pulvinate, semiterete, smooth, sometimes striate, often grooved above at least towards the apex, with scales; rachis 0.5-2.5(-4.5) cm, semiterete, smooth, sometimes striate, grooved above, with

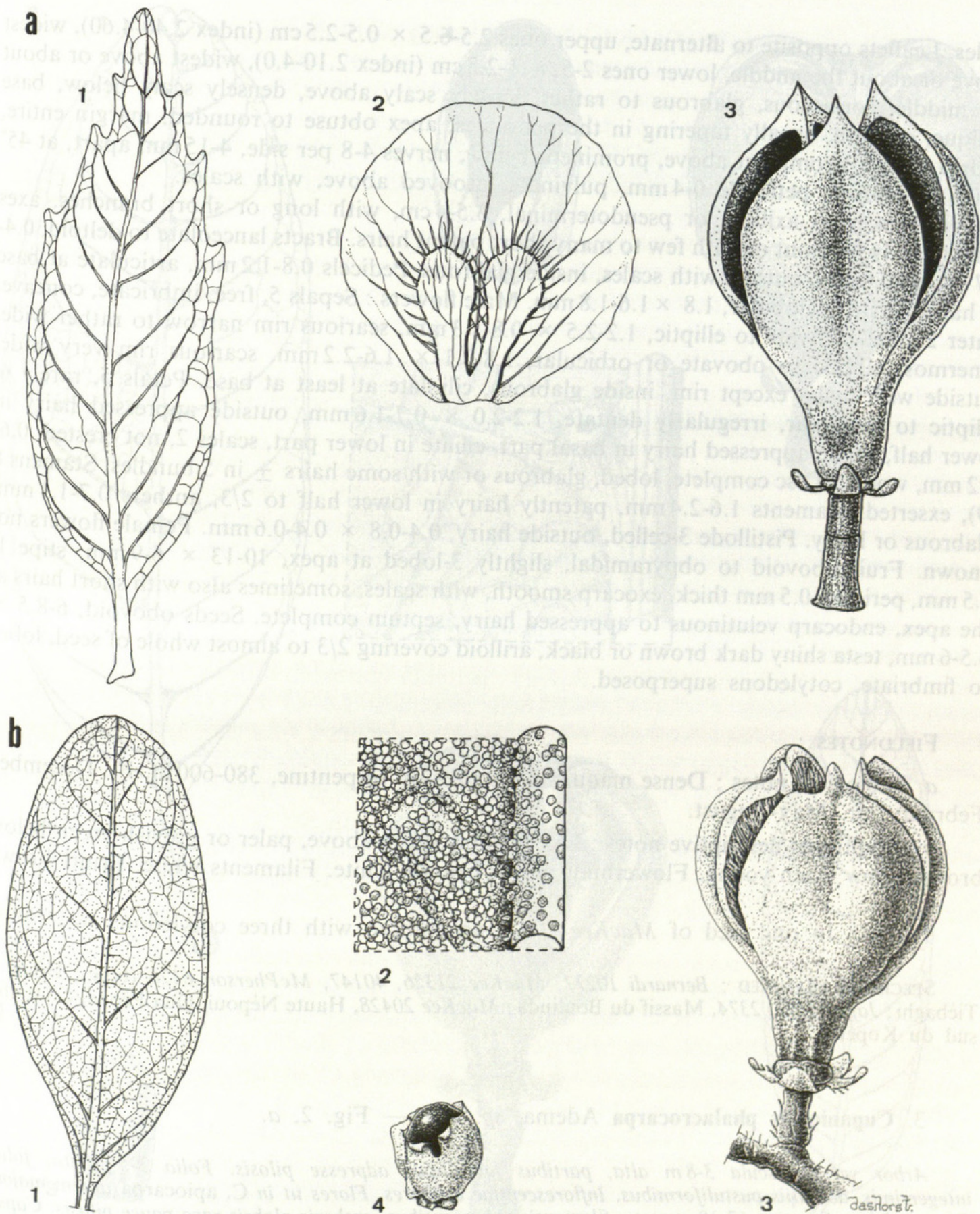


Fig. 1. — a, *Cupaniopsis grandiflora* : 1, leaflet lower side $\times 1$; 2, petal inside $\times 8.4$; 3, fruit $\times 2.1$. (1 and 2 after McPherson 3805, type; 3, after Guillaumin & Baumann-Bodenheim 8683). — b, *Cupaniopsis squamosa* : 1, leaflet lower side $\times 1.4$; 2, *idem*, detail showing the glandular scales $\times 35$; 3, fruit $\times 2.8$; 4, seed $\times 4.2$. (After MacKee 20428).

scales. Leaflets opposite to alternate, upper ones $2.5-6.5 \times 0.5-2.5$ cm (index 2.40-4.60), widest above or about the middle, lower ones $2-5 \times 1-2.5$ cm (index 2.10-4.0), widest above or about the middle, coriaceous, glabrous to rather densely scaly above, densely scaly below, base oblique, cuneate, usually tapering in the petiolules, apex obtuse to rounded, margin entire, midrib slightly prominent above, prominent below, nerves 4-8 per side, 4-15 mm apart, at 45° (-60°) to midrib; petiolule 0-4 mm, pulvinate, grooved above, with scales.

Inflorescences axillary or pseudoterminal, 3.5-4 cm, with long or short branches, axes densely scaly, without or with few to many short patent hairs. Bracts lanceolate to deltoid, $0.4-0.7 \times 0.4-0.6$ mm, outside with scales, inside glabrous. Pedicels 0.8-1.2 mm, articulate at base to halfway. Buds globular, $1.8 \times 1.6-1.8$ mm. Male flowers : Sepals 5, free, imbricate, concave, outer 2 smaller, ovate to elliptic, $1.2-2.5 \times 0.8-1.3$ mm, scarious rim narrow to rather wide, innermost elliptic to obovate or orbicular, $1.8-3.1 \times 1.6-2.2$ mm, scarious rim very wide, outside with scales except rim, inside glabrous, ciliolate at least at base. Petals 5, rarely 6, elliptic to orbicular, irregularly dentate, $1.2-2.0 \times 0.7-1.6$ mm, outside appressed hairy in lower half, inside appressed hairy in basal part, ciliate in lower part, scales 2, not crested, 0.6-1.2 mm, woolly. Disc complete, lobed, glabrous or with some hairs \pm in 5 bundles. Stamens 8 (9), exserted, filaments 1.6-2.4 mm, patently hairy in lower half to $2/3$, anthers 0.7-1.1 mm, glabrous or hairy. Pistillode 3-celled, outside hairy, $0.4-0.8 \times 0.4-0.6$ mm. Female flowers not known. Fruit obovoid to obpyramidal, slightly 3-lobed at apex, $10-13 \times 6-9$ mm, stipe 1-1.5 mm, pericarp 0.5 mm thick, exocarp smooth, with scales, sometimes also with short hairs at the apex, endocarp velutinous to appressed hairy, septum complete. Seeds obovoid, $6-8.5 \times 3.5-6$ mm, testa shiny dark brown or black, ariloid covering $2/3$ to almost whole of seed, lobed to fimbriate, cotyledons superposed.

FIELDNOTES :

a. Ecological notes : Dense maquis-like scrubs on serpentine, 380-600 m. Fl. December-February; fr. May-August.

b. Additional descriptive notes : Leaves shiny green above, paler or greyish green below, brown below when young. Flowerbuds green. Corolla white. Filaments white. Fruits brown.

NOTES : In one seed of *MacKee* 20428 an embryo with three cotyledons was found.

SPECIMENS EXAMINED : *Bernardi* 10277, *MacKee* 21326, 40147, *McPherson* 6176 (type), Dôme de Tiébaghi; *Jaffré* 1235, 2374, Massif du Boulinda; *MacKee* 20428, Haute Népoui, Oua Péoué, Contrefort sud du Kopéto.

3. *Cupaniopsis phalacrocarpa* Adema, sp. nov. — Fig. 2, a.

Arbor vel arbuscula 3-8 m alta, partibus juvenilibus adpresse pilosis. Folia 3-5-jugata, foliolis integerrimis, domatiis pustuliformibus. Inflorescentiae axillares. Flores ut in C. apiocarpa autem majores. Discus glaber. Stamina (7-)8 exserta, filamentis pubescentibus, antheris glabris raro pauce pilosis. Capsula fere globosa ad ellipsoidea, extus glabra vel disperse breviter pilosa, intus adpresse pilosa. Arilloidia semina fere tota obtegentia.

TYPE : *MacKee* 38361, Canala, Chiamoué, 600 m, 29.12.1980 (holo-, P!; iso-, L!).

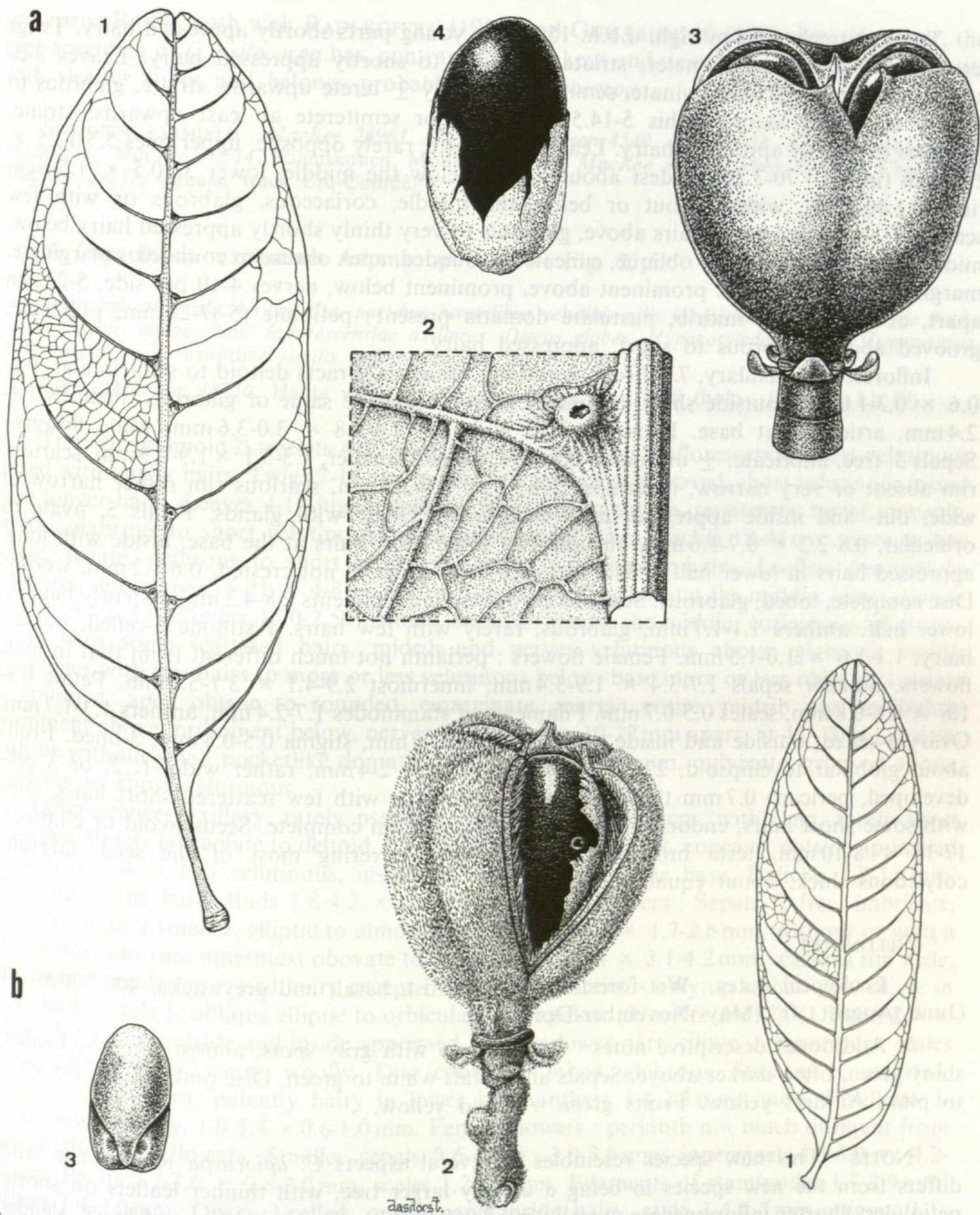


Fig. 2. — a, *Cupaniopsis phalacrocarpa* : 1, leaflet lower side $\times 1.4$; 2, domatium $\times 8.4$; 3, fruit $\times 2.1$; 4, seed $\times 2.1$. (After McPherson 4540). — b, *Cupaniopsis mackeeana* : 1, leaflet lower side $\times 0.35$; 2, fruit $\times 2.1$; 3, embryo $\times 1.4$. (1, after Mackee 18710, type; 2 and 3 after Schmid 2888).

Trees or treelets 3-8 m high, d.b.h. 15-20 cm, young parts shortly appressed hairy. Twigs terete, 1.5-3(-5) mm in diameter, striate, glabrous to shortly appressed hairy. Leaves 3-5-jugate; petiole 3-8.5 cm, pulvinate, semiterete, usually \pm terete upwards, striate, glabrous to shortly appressed hairy; rachis 5-14.5 cm, terete, or semiterete at least upwards, striate, glabrous to shortly appressed hairy. Leaflets alternate, rarely opposite, upper ones $5.5-12.5 \times 2-6.5$ cm (index 1.70-3.20), widest about, rarely below the middle, lower $3-10.5 \times 1.5-6$ cm (index 1.40-2.40), widest about or below the middle, coriaceous, glabrous or with few scattered, short, appressed hairs above, glabrous to very thinly shortly appressed hairy below, midrib a bit denser so, base oblique, cuneate to rounded, apex obtuse to rounded, emarginate, margin entire, midrib not prominent above, prominent below, nerves 4-10 per side, 5-22 mm apart, at $(50^{\circ}-)60^{\circ}$ to midrib, pustulate domatia present; petiolule (5-)7-20 mm, pulvinate, grooved above, glabrous to short, appressed hairy.

Inflorescences axillary, 7.5-19 cm, with long branches. Bracts deltoid to semicircular, $0.2-0.6 \times 0.3-1.0$ mm, outside short, appressed hairy, inside the same or glabrous. Pedicels 1.1-2.4 mm, articulate at base. Buds flattened globular, $2.4-2.8 \times 3.0-3.6$ mm. Male flowers: Sepals 5, free, imbricate, \pm orbicular, concave, outer 2 smaller, $1.3-3.1 \times 1.9-2.9$ mm, scarious rim absent or very narrow, innermost $2.4-3.6 \times 2.9-3.6$ mm, scarious rim rather narrow to wide, out- and inside appressed hairy except rim, ciliate with glands. Petals 5, ovate to orbicular, $0.8-2.2 \times 0.7-1.6$ mm, outside with some short hairs at the base, inside with long, appressed hairs in lower half, ciliate in lower half, scales 2, not crested, $0.6-1.2$ mm, woolly. Disc complete, lobed, glabrous. Stamens (7) 8, exserted, filaments $2.8-4.2$ mm, patently hairy in lower half, anthers $1.1-1.7$ mm, glabrous, rarely with few hairs. Pistillode 3-celled, outside hairy, $1.1-1.6 \times 1.0-1.3$ mm. Female flowers: perianth not much different from that in male flowers. Smaller sepals $1.7-3.4 \times 1.9-3.4$ mm, innermost $2.9-4.1 \times 3.1-5.0$ mm. Petals $0.8-1.6 \times 0.6-0.8$ mm, scales $0.5-0.7$ mm. Filaments of staminodes $1.7-2.4$ mm, anthers $1.3-1.7$ mm. Ovary 3-celled, outside and inside hairy, style $0.8-1.6$ mm, stigma $0.5-0.8$ mm, 3-lined. Fruits about globular to ellipsoid, $22-30 \times 17-20$ mm, stipe 2-4 mm, rather wide, 1, 2, or 3 cells developed, pericarp 0.7 mm thick, exocarp glabrous or with few scattered short hairs, stipe with some short hairs, endocarp appressed hairy, septum complete. Seeds ovoid or ellipsoid, $17-18 \times 8-10$ mm, testa brownish, ariloid thick, covering most of the seed, lacerate, cotyledons thick, about equal, superposed.

FIELDNOTES :

a. Ecological notes : Wet forests on mica schist, basalt and greywacke, 400-700 m. Fl. (June-)August; fr. (May-)November-December.

b. Additional descriptive notes : Bark brown with gray spots, almost smooth. Leaflets shiny green, often darker above. Sepals and petals white to green. Disc pink. Filaments white to pink. Anthers yellow. Fruits green. Ariloid yellow.

NOTES : This new species resembles in several aspects *C. apiocarpa* Radlk. The latter differs from the new species in being a usually larger tree, with thinner leaflets on shorter petiolules, shorter inflorescences, usually smaller flower parts, a hairy disc and hairy, slender-stiped fruits with smaller seeds.

Because of the glabrous fruits fruiting specimens of the new species key out to *C.*

psilocarpa Radlk. both with RADLKOFERS' (1934) and GUILLAUMINS' (1948) key. However, the type specimen of *C. psilocarpa* has, contrary to both keys and descriptions, rather hairy fruits with slender stipes and belongs probably to *C. apiocarpa*.

SPECIMENS EXAMINED : MacKee 28961, 37135, McPherson 4540, 4056, 4058, 4774, Pouébo, Mont Mandjéla; MacKee 40514, Ponérihouen, Mont Aoupinié; MacKee 38361 (type), Canala, Chiamoué; MacKee 29637, Canala, track Ciu-Coindé.

4. **Cupaniopsis mackeeana** Adema, *sp. nov.* — Fig. 2, b.

Arbor vel arbuscula 4-12 m alta, partibus juvenilibus velutinis pilis longioribus immixtis. Folia 4-12-jugata, foliolis integerrimis. Inflorescentiae axillares. Discus glaber. Hypocotyledon pilosa. Cupaniopsis macrocarpae et C. azanthae similis sed in omnibus partibus majoribus.

TYPE : MacKee 18710, Haute vallée de l'Amoa, 300 m, 28.4.1968 (holo-, P!; iso-, L!, P!).

Trees or (palmoid?) treelets 4-12 m high, young parts and inflorescences short velutinous mixed with longer hairs. Twigs 7-14 mm in diameter, striate to grooved, short velutinous mixed with longer hairs. Leaves 4-12-jugate; petiole 10-34 cm, pulvinate, semiterete, terete upwards, striate, glabrous to short velutinous mixed with longer hairs; rachis 18-44 cm, more or less terete, striate, glabrous to short velutinous mixed with longer hairs. Leaflets opposite to alternate, upper ones 15-21 × 4-8 cm (index 2.20-3.30), widest about the middle, lower ones 9-14.5 × 3.5-6.5 cm (index 1.70-2.50), widest about or below the middle, coriaceous, glabrous, rarely with some scattered hairs, midrib and nerves velutinous above, glabrous midrib sometimes with few hairs to more or less velutinous below, base more or less oblique, cuneate to rounded, apex obtuse to rounded, emarginate, margin entire, midrib not or slightly prominent above, prominent below, nerves 7-20 per side, 10-22 mm apart, at 45°-70° to midrib, with or without small pocketlike domatia; petiolule (8-)15-30 mm, pulvinate, grooved above, glabrous to short velutinous.

Inflorescences axillary, rarely pseudoterminal, (6.5-)13.5-53 cm, with long, rarely short branches. Bracts lanceolate to deltoid, 0.5-3.0 × 0.5-1.6 mm, thick, concave, outside appressed hairy to more or less velutinous, inside appressed hairy at the base. Pedicels 1.2-1.4 mm, articulate at the base. Buds 1.8-4.2 × 2.3-4.8 mm. Male flowers : Sepals 5, free, imbricate, concave, outer 2 smaller, elliptic to almost orbicular, 2.8-4.2 × 1.7-2.6 mm, without or with a narrow scarious rim, innermost obovate to orbicular, 3.6-5.4 × 3.1-4.2 mm, scarious rim wide, outside and inside appressed hairy except rim, inside sometimes only up to halfway, ciliate in lower half. Petals 5, oblique elliptic to orbicular, or lingulate (MacKee 26592), (1.1-)1.8-2.4 × (0.3-)1.2-2.2 mm, outside and inside appressed hairy in lower part, ciliate in lower part, scales 2, not crested, 0.8-2.0 mm, woolly. Disc complete, lobed, glabrous. Stamens 8, exserted, filaments 2.3-4.6 mm, patently hairy in lower half, anthers 1.4-2.3 mm, hairy. Pistillode 3-celled, outside hairy, 1.0-1.4 × 0.6-1.0 mm. Female flowers : perianth not much different from that of the male flowers. Smaller sepals 3.6-4.8 × 3.0-3.6 mm, innermost 4.0-6.0 × 4.2-4.8 mm. Petals 2.2-3.6 × 0.8-2.0 mm, scales 1.2-2.5 mm. Filaments of staminodes 1.7-2.9 mm, anthers 1.4-2.0 mm. Ovary 3-celled, outside and inside hairy, style 1.4-2.5 mm, stigma 1.1-1.6 mm, 3-lined. Fruits globular to obovoid, 22-25 × 20-24 mm, stipe 1-2 mm, pericarp 0.8-1.8 mm thick, exocarp smooth, short velutinous, endocarp velutinous to appressed hairy,

septum complete. Seeds ellipsoid, 15-18 × 9-10 mm, testa shiny black, arilloid covering almost the whole of the seed, lacerate, cotyledons equal or unequal, (obliquely) superposed, hypocotyl hairy on the sides.

FIELDNOTES :

a. Ecological notes : Humid forests on greywacke, 30-700 m. Fl. March-June; fr. June, December.

b. Additional descriptive notes : Bark brown, a bit rough. Leaflets glossy dark green above, light to dark green below. Sepals pale green to greenish white. Petals white to pale yellow. Filaments white. Anthers yellow or red. Pistil greenish white to greyish green.

NOTES : Strongly resembling *C. macrocarpa* and *C. azantha*, but usually larger in most parts. The leaflets are never acuminate in the present species. Hairy hypocotyls are a rare phenomenon in *Cupaniopsis*.

MacKee 26592 has rather small sepals and petals, the latter being lingulate in stead of more or less elliptic to orbicular.

I named this species in honour of Dr. H. S. MACKEE, an indefatigable collector of New Caledonia plants. Of *Cupaniopsis* he collected no fewer than 167 specimens, including the types of the present species and *C. phalacrocarpa*.

The vernacular name "Imoinri" has been given to this and several other species of *Cupaniopsis* and to other *Sapindaceae* (MacKee 20894).

SPECIMENS EXAMINED : MacKee 16951, Koumac, Le Cresson; Schmid 2888, Inédété; MacKee 18710 (type), Haute vallée de l'Amoa; MacKee 26582, 26592, 26607, Ponérihouen, pente est du Mont Aoupinié; McPherson 1692, Thy River Valley, 12 km NE of Nouméa.

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