

**A REVISION OF THE MALESIAN MONOTYPIC GENUS
CHEILOSA BLUME (EUPHORBIACEAE)**

PETER C. VAN WELZEN¹, ROY A. BANKA² & CECILIA D. LEONCITO³

SUMMARY

The West Malesian genus *Cheilosa* Blume has been revised; the variability of the only species, *C. montana* Blume, will be described. *Cheilosa montana* combines the two former species *C. montana* and *C. malayana* (Hook. f.) Airy Shaw. Typical for *Cheilosa* are the presence of glands in the teeth of the leaves; thyrsoid, mainly unbranched, ramiflorous to terminal inflorescences; absence of petals; the presence of a disc; 9 or 10 stamens; 3- (rarely 4)-locular ovaries with one ovule per locule; thick-walled fruits; an aril around the seed; and endosperm. Fascicled hairs are usually present on the lower surface of the leaves, but are caducous. The excluded *C. whiteana* Croizat is provisionally transferred as a new species to *Trigonostemon* by Airy Shaw.

INTRODUCTION

The genus *Cheilosa*, with its type species *C. montana*, were described by Blume (1825) on the basis of Javanese specimens. On the basis of Malayan specimens, Hooker (1888) described *Baliospermum malayanum*, which was later transferred to *Cheilosa* by Airy Shaw (1963). The latter species was said to differ from *C. montana* in the much wider leaf base. Hooker (1887) also published the name *Baccaurea malayana* (Jack) King ex Hook. f., on the basis of a few Malayan specimens and on *Hedycarpus malayanus* Jack. The latter species is a real *Baccaurea*, while the specimens appeared to be *C. montana*. Airy Shaw (1963), using notes of Corner, elegantly showed that *Baccaurea malayana* should be typified by the lost specimen of Jack, the type of *Hedycarpus malayanus*.

Croizat (1942) described *Cheilosa whiteana*, on the basis of a female specimen. This species probably belongs to a different genus, *Trigonostemon* (Airy Shaw, 1983).

The genus *Cheilosa*, together with the genus *Neoscortechinia*, were placed in the 'tribe' Cheiloseae by Airy Shaw (1975). The two genera resemble each other strongly and some authors are of the opinion they should be united. At least until *Neoscortechinia* has been revised the genera will be kept separate, as several differences exist, i.e., *Neoscortechinia* lacks a disc, shows fewer stamens (5 or 6 instead of 9 or 10), and the wall of the fruit is thinner (Airy Shaw, 1975: 19, 68). The latter character is perhaps not distinctive, because the Javanese and Philippine fruits of *Cheilosa* also possess a relatively thin fruit wall.

¹) Rijksherbarium / Hortus Botanicus, P.O. Box 9514, 2300 RA Leiden, The Netherlands.

²) PNG Forest Research Institute, P.O. Box 314, Lae, Papua New Guinea.

³) Man and Biosphere, Queen Avenue, Diliman, Quezon City, Philippines.

INFRASPECIFIC VARIATION OF CHEILOSA MONTANA

Cheilosa montana is very variable. Because of this variability within the genus the difference between *C. montana* and *C. malayana* appeared to be non-existent: the base of the leaves is cuneate not only in Javanese specimens, but also in those of Sumatra and Borneo. Several character states dominate locally, but they can usually be found in other areas too. The leaves in Java are obovate, mainly ovate in the Philippines, and elliptic to obovate in the other areas. Bornean specimens have the largest leaves. Most specimens from the Malay Peninsula have relatively large teeth along the leaves, while in the other areas these are very shallow. The specimens from the Philippines usually show long inflorescences as do several specimens from N Borneo; all other specimens have short inflorescences. The fruits in the Malay Peninsula can be twice the size as those in Java and the Philippines. The wall of the fruit is usually very thick except for the Javanese and Philippine specimens. The variability is summarized below:

	Peninsular Malaysia	Sumatra	Java	Borneo	Philippines
Leaf shape	elliptic to obovate	elliptic to obovate	obovate	elliptic to obovate	ovate to elliptic
Leaf length (cm)	6.8–22	20–23.8	5.6–21	20–32.5	7.3–24.7
Leaf base	emarginate to broadly cuneate	(obtuse to) cuneate	cuneate	emarginate to cuneate	rounded to cuneate
Leaf dentation	usually long	shallow	shallow	shallow	shallow
Inflorescence length (cm)	1.6–5	1–5.2	1.7–6.5	2.5–12	4.3–17
Fruit height (cm)	3.2–5.2	c. 3.5	2.6–3	2.3–4.5	2.2–2.4
Fruit wall thickness (mm)	3.5–6	c. 2	1.5–3.5	3.5–5	1.5–2

CHEILOSA

Cheilosa Blume, Bijdr. (1825) 613; Pax in Engler & Prantl, Nat. Pflanzenfam. 3, 5 (1890) 90; Pax & Hoffm. in Engler, Pflanzenr. IV, 147, 4 (1912) 12; 14 (1919) 50; Backer & Bakh. f., Fl. Java 1 (1963) 496; Whitmore, Tree Fl. Malaya 2 (1973) 77; Airy Shaw, Kew Bull. Add. Ser. 4 (1975) 68; Kew Bull. 36 (1981) 276. — Type species: *C. montana* Blume.

Tree, dioecious. *Branchlets* with relatively wide pith. *Stipules* early caducous. *Leaves* alternate, simple; petiole basally and apically pulvinate; pulvinus often with transverse grooves; blade symmetric, not punctate, without exudate; base cuneate to emarginate; margin dentate to crenate, with abaxially gland in every tooth; apex rounded to obtuse (to acuminate); lower surface with simple and often with fascicled hairs, glabrescent;

venation pinnate, looped at the margin with a vein from every loop to the gland. *Inflorescences* ramiflorous to axillary to terminal, thyrsoid with 1 to several branches per axil; branches flat, usually unbranched; cymules mono- to dichasial, with 1–3 flowers. *Bracts* to the cymules often leaf-like; bracts to the flowers often with two basal extensions as if bracts and bracteoles were united. *Pedicels* elongating in fruit. *Flowers* actinomorphic. *Sepals* 5 (or 6), free, ovate, imbricate, thin to coriaceous, margin often membranous, sericeous, glabrescent, resistant in fruit. *Petals* absent. *Disc* annular, flat, more or less 5-lobed, hirsute, resistant in fruit. *Male flowers* with 9 or 10 stamens in 2 whorls; filament flattened, glabrous; anther basifixed, opening laterally lengthwise, glabrous; connective often slightly elongated; pistillode with (2 or) 3 (or 4) free, hirsute remnants of the carpels. *Female* flowers without stamens; ovary 3- (to seldom 4-)locular; 1 ovule per locule, descending, epitropous, anatropous, subapically attached to column; style short; stigmas 3, spreading outwards, upper surface papillate, apically split apart and recurved. *Fruit* a rhagma, ovoid (to globular), slightly triangular in transverse section, outside smooth, tomentose, inside smooth, glabrous; column left after dehiscence; mesocarp woody, cork-like in appearance; septa complete. *Seeds* 1–3 per fruit, ovoid with a convex abaxial surface and a V-shaped, almost flat adaxial surface, both surfaces with longitudinal keel in the centre; aril surrounding seed completely, adnate to seed; endosperm present, with a central longitudinal, flat embryo.

Distribution – As the species.

***Cheilosa montana* Blume – Figs. 1, 2**

- Cheilosa montana* Blume, Bijdr. (1825) 614; Pax & Hoffm. in Engler, Pflanzenr. IV, 147, 4 (1912) 12, fig. 3; Moore, J. Bot. Brit. For. 63 (1925) 104; Backer & Bakh. f., Fl. Java 1 (1963) 496; Airy Shaw, Kew Bull. Add. Ser. 4 (1975) 68 (sub *C. malayana*). — Type: *Blume s.n.* (L, holo, sheet no. L 903.155-415; iso in BM, F, L, NSW, P, US, Z), Indonesia, Java.
- Baliospermum malayanum* Hook. f., Fl. Brit. India 5 (1888) 463; Ridley, Fl. Mal. Pen. 3 (1924) 313. — *Scortechinia malayana* Ridley, Fl. Mal. Pen. 5 (1925) 332, in note. — *Cheilosa malayana* Corner ex Airy Shaw, Kew Bull. 16 (1963) 364; Kew Bull. 20 (1966) 49; Whitmore, Tree Fl. Malaya 2 (1973) 77; Airy Shaw, Kew Bull. Add. Ser. 4 (1975) 68; Kew Bull. 36 (1981) 276. — Type: *Maingay KD 1455* (K, holo), Peninsular Malaysia.
- Cheilosa homaliifolia* Merr., Philipp. J. Sci., Bot. 8 (1913) 379; Pax & Hoffm. in Engler, Pflanzenr. IV, 147, 14 (1919) 50; Merr., En. Philipp. 2 (1923) 457. — Type: *Wenzel 147* (PNH, †; iso in A, F, G, MO, NSW, US), Philippines, Leyte, Dagami.
- Cheilosa* spec.: Merr., J. Str. Br. Roy. As. Soc., spec. issue (1921) 346 (*Villamil 31*, n.v., Borneo, Sabah = British North Borneo).
- Cheilosa homaliifolia* Merr. var. *grandifolia* Merr., En. Philipp. 2 (1923) 457. — Type: *BS (Ramos & Edaño) 37282* (PNH, holo, †; iso in K), Philippines, Mindanao, Zamboanga Dist., Malangas.
- Cheilosa montana* Blume var. *longifolia* S. Moore, J. Bot. Brit. For. 63 (1925) 104. — Type: *Forbes 1839* (BM, holo; iso in L), Indonesia, Sumatra, Lampongs, Mt Tengemoes.
- Baccaurea malayana* auct. non King ex Hook. f.: Hook. f., Fl. Brit. India 5 (1887) 374, excl. *Hedycarpus malayanus* Jack; Boerl., Handl. Fl. Ned. Indië 3, 1 (1900) 280, in note; Pax & Hoffm. in Engler, Pflanzenr. IV, 147, 15 (1922) 70; Ridley, Fl. Mal. Pen. 3 (1924) 247; Burkill, Dict. Econ. Prod. Malay Pen. 1 (1935) 279; Corner, Gard. Bull. Str. Settl. 10 (1940) 290 (conclusion). See note in Airy Shaw (1963: 364).



Fig. 1. *Cheilosa montana* Blume. a. Habit, $\times 0.5$; b. male flower, $\times 6$; c. female flower, $\times 6$; d. fruit, $\times 0.5$; e. fruit, showing thick wall and one developed seed, $\times 0.5$; f. seed covered by aril, $\times 0.5$ (a, c: Wenzel 147, MO; b: Wenzel 161, A; d–f: KEP FRI (Whitmore) 4165, L).

Tree, up to 28 m high by 50 cm d.b.h. *Branchlets* rounded, smooth to somewhat rough, glabrescent; flowering twigs 2–11 mm thick. *Stipules* triangular, 1–1.7 by 0.6–0.8 mm, sericeous. *Leaves*: petiole 0.7–8.5 cm long, round to dorsoventrally flattened; blade ovate to obovate, 5.6–32.5 by 2.8–16 cm; base narrowly cuneate to emarginate; margin shallowly (to deeply) laxly dentate to crenate, flat; apex rounded to obtuse (to acuminate), very apex rounded (to mucronulate); upper surface smooth, glabrous; lower surface smooth, simple hairs somewhat sericeous (to hirsute: see note), glabrescent, fascicled hairs usually present especially near midrib; venation with 6–9 pairs of opposite to alternate nerves, tertiary veins partly scalariform, other veins widely reticulate. *Inflorescences*: branches 0.5–17 cm long, sericeous. *Bracts* to cymules elliptic to obovate, 1.4–6 by 0.7–1.8 mm, coriaceous, apex rounded to acute, sericeous on both sides; bracts to the flowers triangular, 0.7–1.5 by 0.4–2 mm, subglabrous to sericeous. *Peduncle* 0.7–2.3 mm long, in fruit up to 8 mm long, short sericeous to glabrescent. *Male flowers* 2.2–3.5 mm in diam.; sepals 1–1.5 by 0.6–1.3 mm; filaments 0.5–2.8 mm long; anthers 0.4–0.8 by 0.3–0.7 mm. *Female flowers* c. 5 mm in diam.; sepals 1.5–3.2 by 1.2–2 mm; ovary ovoid, 2–4 mm high, hirsute; style c. 0.5 mm long, hirsute; stigmas 3, 1.1–1.7 mm long, upper surface glabrous, split part 0.5–1.2 mm long. *Fruits* 1 to 5 per inflorescence branch, 2.2–5.2 by 2–4.3 cm; wall 1.5–6 mm thick. *Seed* 1.5–3.3 by 1.4–2.2 by 0.8–1.3 cm; aril up to 1.5 mm thick; embryo 9.5–19 by 8–15 mm; plumule and radicle 2–4 mm long.

Field notes – Tree, base fluted. Outer bark grey-brown to brown, rather smooth; inner bark orange-brown; slash with the smell of fresh sugar cane; exudate white. Wood white (to yellow). Leaves glossy deep green. Male flowers greenish. Fruits velvety greenish grey; aril outside orange, inside yellow, oily; seed black; cotyledons and endosperm white.

Distribution – Malesia: Malay Peninsula (incl. Singapore), Sumatra, W Java, Borneo, S Philippines.

Habitat & Ecology – Primary and hill forest, swamp forest, along rivers, on ridges. Soil: yellow clay to red sand. Altitude: from 5 up to 1200 m. Flowering: Feb., June–Nov.; fruiting: April–Oct. Some branches are hollow due to insects.

Vernacular names – Malay Peninsula, Selangor: nawe, jahakah. Sumatra, Palembang area: betih rawang. Borneo, around Balikpapan: kepajang hutan, ketapi danau.

Note – *Burley, Tukirin et al.* 2478 (Borneo) and *BS 37282* (Philippines) show subhirsute leaves. All other specimens are subglabrous or slightly sericeous.

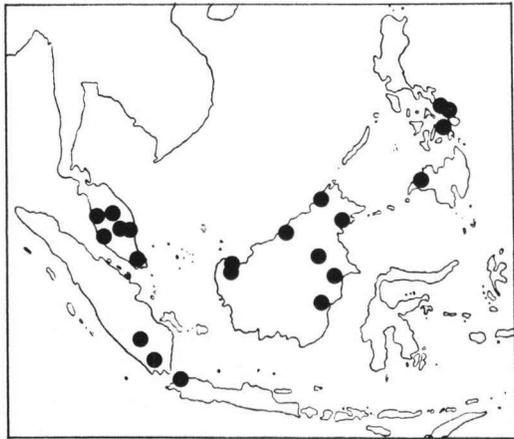


Fig. 2. Distribution of *Cheilosa montana* Blume.

EXCLUDED SPECIES

Cheilosa whiteana Croizat, J. Arnold Arbor. 23 (1942) 507; Airy Shaw, Kew Bull. 16 (1963) 365, in note. — Type: *FB (Curran) 17733* (A, holo), Philippines, Luzon, Prov. of Pampanga, Mt Arayat = *Trigonostemon whiteanus* (Croizat) Airy Shaw, Kew Bull. 38 (1983) 68.

Note — The species is known only from the type specimen. The latter possesses only a few withered female flowers. The species differs from *Cheilosa* in that it has two basal glands on the upper surface of the leaf-blade (absent in *Cheilosa*), petals (absent in *Cheilosa*), and stigmas which are only slightly split (deeply split in *Cheilosa*). The leaves also show a rather strongly trinerved leaf base. The transfer to *Trigonostemon* is still doubtful, because strongly ovate, crenate leaves are rare in this genus.

REFERENCES

- Airy Shaw, H.K. 1963. Notes on Malaysian and other Asiatic Euphorbiaceae. Kew Bull. 16: 364–365.
 Airy Shaw, H.K. 1975. The Euphorbiaceae of Borneo. Kew Bull. Add. Series 4: 19, 68.
 Airy Shaw, H.K. 1983. New combinations in Philippine Euphorbiaceae. Kew Bull. 38: 68.
 Blume, C.L. 1825. Bijdragen tot de Flora van Nederlandsch Indië: 613, 614. Batavia.
 Croizat, L. 1942. New and critical Euphorbiaceae from the tropical Far East. J. Arnold Arbor. 23: 507.
 Hooker, J.D. 1887. The Flora of British India 5: 374; 1888: 463. London.

IDENTIFICATION LIST

Material of *Cheilosa montana* Blume studied:

Blume 224; 2017 — Bogor Botanical Garden VIII.F.26; IX.A.4 — Boschproefstation T. 729 — BS 24373; 35170; 37282 — Burley, Tukirin et al. 2478 — CF 2266 — Endert 3624; 3626; 4807 — FB 17733 — Forbes 355; 1839 — Haviland & Hose 3231 — KEP 16069 — KEP FRI 4165; 20765 — King's collector 5841; 6223 — Koorders 24199; 24496; 33288; 40120; 40127 — Kostermans 4334; 4390; 4571; S 3 — Leighton 24 — Maingay 1363; 1455 — Ramos 1664 — Richards 1442 — SAN 17406; 113512 — SF 249; 1664; 32341; 34985; 35170 — Thorenaar 57. T. 1.P.91 — Wenzel 147; 161; 647 — Zollinger 1550.

ACKNOWLEDGEMENTS

We are grateful to the organisations which helped to organise the fourth 'SE Asian regional training course on plant taxonomy', i.e. UNESCO/MAB, LIPI, Puslitbang Biologi, Herbarium Bogoriense, Rijksherbarium/Hortus Botanicus, and the Office for International Cooperation, Leiden University. We would like to thank the lecturers, Dedi Darnaedi, Kuswata Kartawinata, Sivarajan, Hubert Turner, Rugayah, Uway Warsita, Rochadi Abdulhadi, Harry Wiradinata, and Rusdy Nasution.

We thank Dr. P. Baas and Dr. M.C. Roos for their critical reading of the manuscript. The excellent drawing was made by Mr. J.H. van Os.