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PAPUASICYOS, A NEW GENUS OF CUCURBITACEAE

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SUMMARY

A new monotypic genus from New Guinea is described. Its pollen matches that of the Cucurbitoideae–Melothrieae, except for its small size.

Key words: Cucurbitaceae, *Papuasicyos*, new genus, pollen, SE Asia.

INTRODUCTION

Detailed examination of the isotype specimen (the holotype is lost) of *Melothria papuana*, described from just the type, and the discovery of a few recently collected additional specimens, resulted in the discovery of a new genus, here named *Papuasicyos*. Its relatively small, striate-reticulate pollen is quite distinctive. *Papuasicyos* is a monotypic genus, endemic to New Guinea. The variation in the limited number of specimens available, especially in the size and shape of the sepals, suggests the possibility of two species. More collections of this widespread but obviously overlooked plant are needed to clarify the number of species.

POLLEN MORPHOLOGY — Fig. 1a, b

The pollen of *Papuasicyos papuana* (*Docters van Leeuwen 9873*) is small (31 by 32 μm, P/E = 0.97), 3-colporate, with long colpi and small elliptic endopores, and striate-reticulate.

The subdivision of the Cucurbitaceae into subfamilies Cucurbitoideae and Zanonioideae is well-supported by pollen morphology (Marticorena, 1963; Jeffrey, 1964; Khunwasi, 1998). Pollen of the Zanonioideae is uniform: 3-colpor(oid)ate, usually small (up to 40 μm) and striate, sometimes (*Alsomitra*, *Bolbostemma*, and *Gerradanthus*) larger (up to 52 μm) and/or perforate or reticulate (Alyoshina, 1971; Van der Ham, 1999). Pollen of the Cucurbitoideae is much more diverse: usually larger than 40 μm, with various aperture and ornamentation types. Pollen of the Melothrieae, in which tribe the new genus *Papuasicyos* should be placed according to macromorphological evidence, is always larger than 40 μm and usually reticulate or perforate, rarely verrucate or striate. More or less striate pollen occurs in *Dactyliandra welwitschii*: (striato-)

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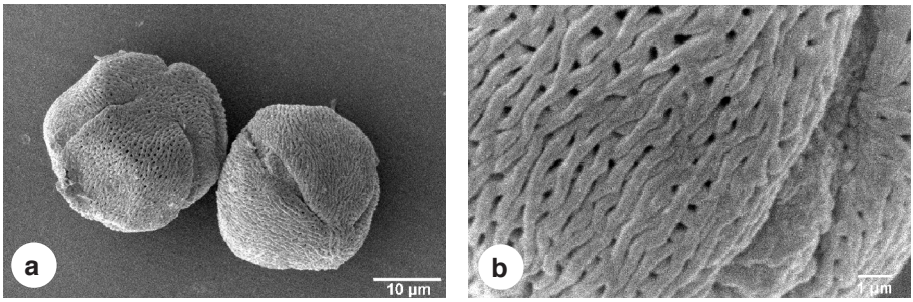


Fig. 1. *Papuasicyos papuana* (Cogn.) Duyfjes. Pollen (*Docters van Leeuwen 9873*; unacetolysed). a. Equatorial view (left) and polar view (right); b. detail of striate-reticulate ornamentation.

reticulate and *Kedrostis hirtella*: striato-reticulate (Khunwasi, 1998). Further, striate pollen is found in the Cucurbitoideae only in *Peponium* of the Trichosantheae (all 3 species studied by Khunwasi, 1998). However, the pollen of all these species (all from Africa) is much larger than that of *Papuasicyos*: 73 by 63 µm (*D. welwitschii*), 91 by 95 µm (*K. hirtella*) and 90–98 by 92–102 µm (*Peponium* spp.), while *Papuasicyos* pollen measures only 31 by 32 µm. This means that *Papuasicyos* pollen matches that of the Cucurbitoideae–Melothrieae, except for its small size, which would fit the Zanonioideae better (e.g. Khunwasi, 1998; Van der Ham, 1999).

Papuasicyos Duyfjes, *gen. nov.*

> Scandens monoecia cirrhis simplicibus. Probractea deest. Flores masculi in racemis pedunculatis, receptaculi tubo vadoso, corolla expansa c. 10 mm diam., petalis luteis, staminibus 3 liberis, filamentis brevibus, antheris omnibus thecis duabus sigmoideis. Flores feminei solitarii longe pedicellati, stigmatis lobis pinniforme divisis. Semina foveolata. — Typus: *Papuasicyos papuana* (Cogn.) Duyfjes.

Small climber, monoecious. *Leaves* simple, unlobed. *Tendrils* simple. *Probract* absent. *Male inflorescence* a simple pedunculate raceme. *Male flowers*: pedicel short, receptacle-tube bowl-shaped, expanded corolla 10(–15) mm across, petals entire, imbricate, free, pale yellow; stamens 3, free, inserted c. halfway up the receptacle-tube; filaments short, anthers all 2-thecous, free, appressed into a subglobose head, thecae sigmoid, connective broad; disc absent or minute. *Female flowers*: solitary, not associated with male inflorescence; pedicel long; ovary oblong, ovules many, horizontal; perianth as in male; staminodes 3, inserted near the throat of the receptacle-tube; disc obscure or absent; style conspicuous with feather-like divided stigma. *Fruit* berry-like, ellipsoid-oblong, rather small, fruiting pedicel slender. *Seeds* many, subellipsoid, foveolate, margin narrow.

One species in New Guinea.

Papuasicyos papuana (Cogn.) Duyfjes, *comb. nov.* — Fig. 2, 3

Melothria papuana Cogn. (1887) 355; (1916) 92; Harms (1925) 152. — Type: *Bäuerlen 328* (holo B†; iso MEL), Papua New Guinea (Strickland River).

Subperennial climber, c. 6 m long, with minute sparse appressed grey hairs 0.1 mm long, glabrescent; monoecious; roots unknown; leafy twig 2–4 mm in diameter, 3–5-grooved. *Leaves*: petiole 1–2 cm long; blade membranous, green on drying, glabrescent except for minute hairs on nerves, adaxially densely set with small cystoliths, ovate (-oblong), unlobed, 4–15 by 1.5–9.5 cm, base rounded, truncate, or shallowly cordate, apex acute-acuminate, mucronate, margin entire or occasionally with an odd tooth at base, glands absent; basal nerves 3–5(–7). *Tendrils* simple. *Male inflorescence*: a solitary pedunculate delicate 10(–20)-flowered raceme, 5–8 cm long, with minute papillose glands and appressed hairs, glabrescent; peduncle 1–4 cm long; flowers rather irregularly inserted, bracts absent. *Male flowers*: pedicel 3–8 mm long, sparsely hairy, inconspicuously articulated c. 0.5 mm below apex; *receptacle-tube* c. 2 by 3.5 mm, outside subglabrous, inside pilose; *sepals* long triangular or elliptic, 0.5–2 by 0.3–2 mm, apex acute or ± rounded, very minutely mucronate, margin minutely fringed;

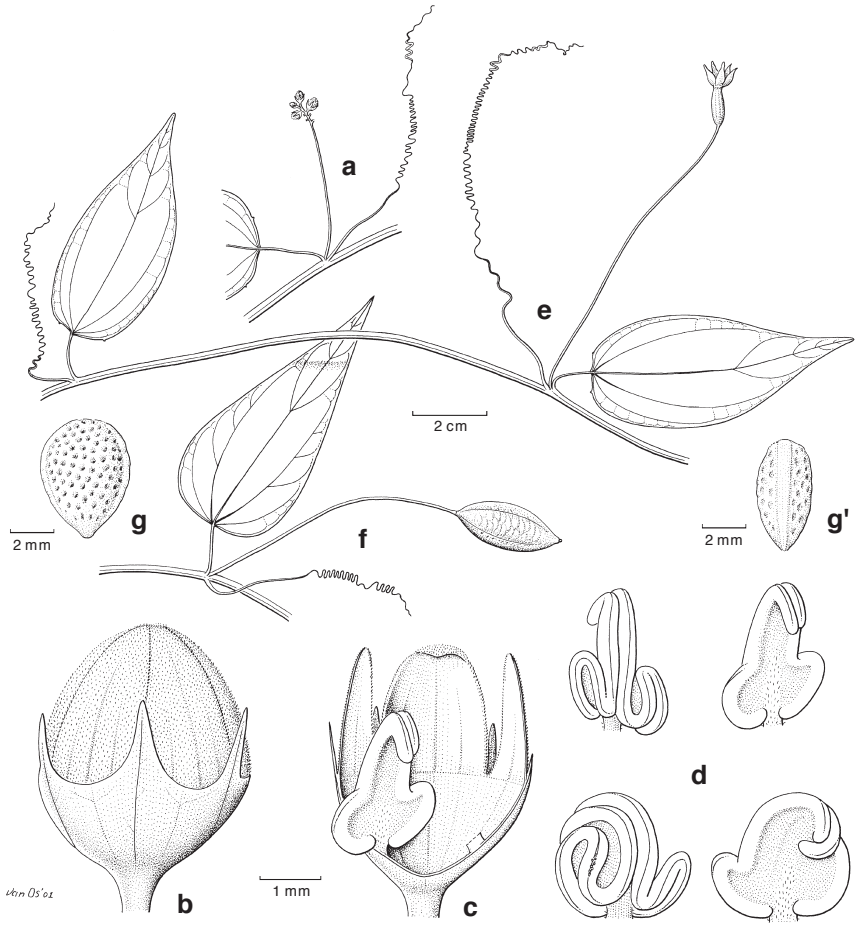


Fig. 2. *Papuasicyos papuana* (Cogn.) Duyfjes. a. Male inflorescence; b. nearly mature male flower bud; c. nearly mature male flower bud, opened, showing position of stamens (disc absent); d. stamens; e. portion of branch with a female flower; f. fruit; g, g'. seed (all: *Bäuerlen 328*).

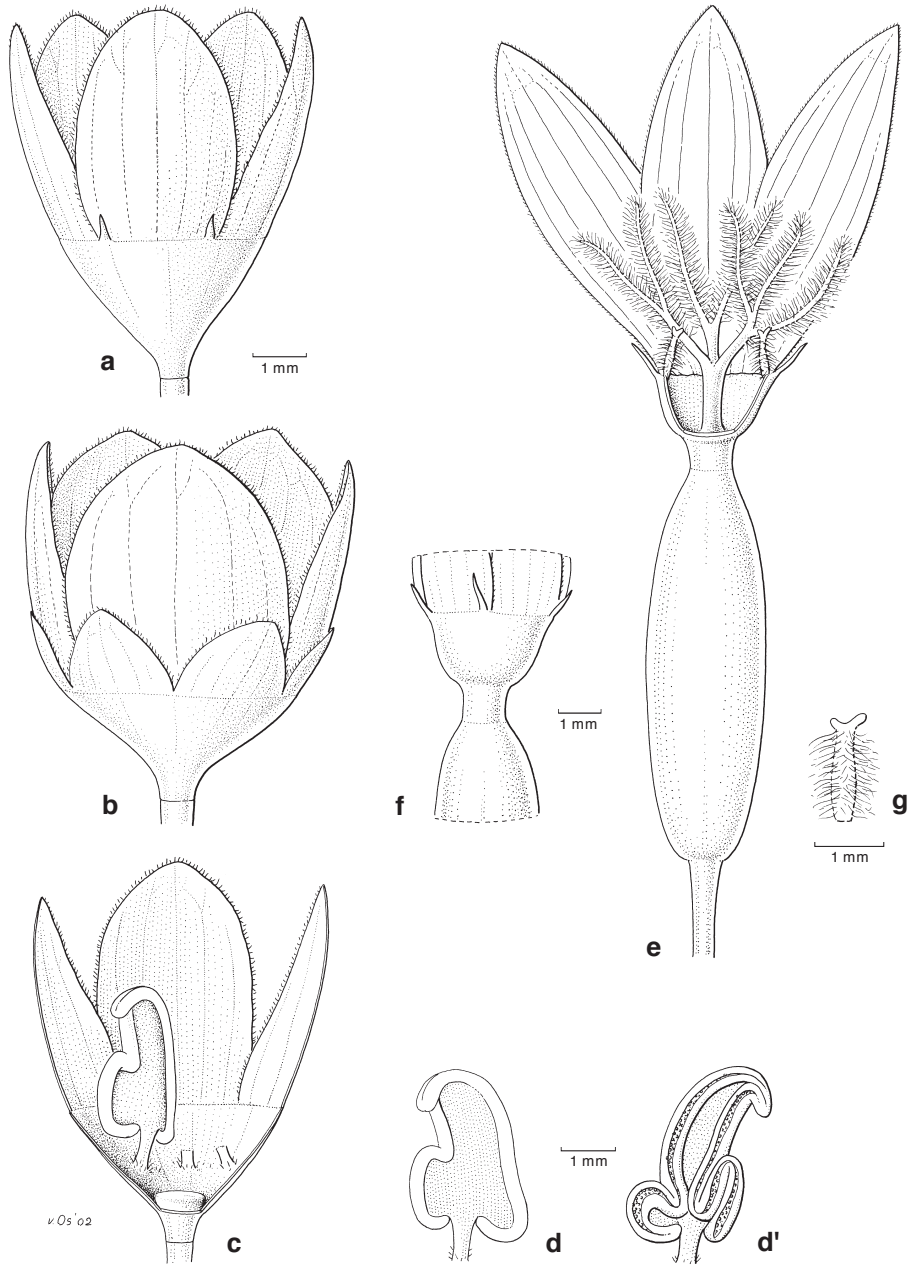


Fig. 3. *Papuasicyos papuana* (Cogn.) Duyfjes. a. Male flower, sepals small; b. male flower, sepals broad, large; c. male flower (half-schematic, pilosity omitted), opened, showing position of stamens and minute disc?; d, d'. stamens; e. female flower (somewhat schematic), opened, note staminodes; f. female receptacle-tube and sepals; g. staminode (a, c–d': *Docters van Leeuwen 9873*; b: *Ridsdale NGF 30335*; e–g: *Bäuerlen 328*).

petals imbricate, ovate-elliptic, 5–6.5 by 3–3.5(–5) mm, 3–5(–7)-veined, pilose (hairs 0.2–0.3 mm long), apex subacute or rounded, margin fimbriate; *filaments* c. 1 mm long, with pale shaggy hairs at base, inserted c. halfway up the receptacle; *anthers* all 2-thecous, closely appressed into a nearly globose head c. 3.5 by 4.5 mm, thecae narrow, sigmoid, ± bilateral-symmetrical at the edges of broad rather flat connective (Fig. 2, 3); pollen: see above; disc absent or minute. *Female flowers*: solitary on the leafy nodes, (sub)glabrous; pedicel 4–10 cm long, c. 0.5 mm thick; ovary oblong, c. 10 by 2.5(–3) mm, apex narrowed into a neck c. 1 mm long; *receptacle-tube* bowl-shaped, c. 1.5 by 2.5(–3) mm, at throat hairy inside; *sepals* lanceolate-linear, 1–1.5 by c. 0.3 mm; *petals* as in male flower, ± short-pubescent, oblong, c. 10 mm long, 5-veined; staminodes 3, inserted slightly below receptacle throat, terete, c. 1 mm long, densely fine-hairy, with hairs 0.5(–1) mm long, at apex with one or two minute transversal glabrous thickenings; receptacle below the insertion of the staminodes inside faintly thickened (disc?); *style* c. 1.5 by 0.5 mm, (sub)glabrous, *stigma* 3-branched, with each branch 4–4.5 mm long, once (or twice) forked, wholly conspicuously densely (glandular?) hairy, with hairs c. 1 mm long. *Fruit* solitary, ellipsoid-oblong, narrowed at both ends, 2–2.6 by 0.9–1.2 cm, smooth, juicy; fruiting pedicel slender, 4–10 cm long, glabrous; *seeds* c. 40, in dry fruits visible and pressed into the transparent pericarp, ovoid-ellipsoid, c. 5 by 3.5 by 1–2 mm, (light) brown, foveolate.

Distribution — New Guinea, north and south of the Main Range: Indonesia (West Papua) and Papua New Guinea; known from 5 collections.

Habitat & Ecology — Lowland swamp forest, river banks; 0–500 m altitude. Flowering and fruiting: June to December.

Note — The sepals in the few male flowers available for study are remarkably different: those of *Docters van Leeuwen 9873* (West New Guinea) are narrow and only c. 0.5 mm long; those of *Ridsdale NGF 30335* (E Papua New Guinea) are broad and rounded and c. 2 mm long; those of the other 3 collections are ± intermediate. In *Docters van Leeuwen 9873* possibly a small depressed central disc is present, but this cannot be determined with certainty; however, a disc is absent in the other specimens.

Affinities — Superficially *Papuasicyos* resembles genera like *Melothria* and *Zehneria*; the latter genus occurs in the Old World and is readily distinct in having smaller flowers, 3-lobed undivided stigma, free anthers with straight or curved thecae. *Melothria* is confined to the New World, and has two stamens with anthers 2-thecous, and one stamen 1-thecous. *Papuasicyos* has comparatively larger flowers, the male flower with the anthers entangled into a dense head, the thecae strongly sigmoid, and the female flowers with a conspicuous stigma: 3-branched, each branch forked and feather-like divided into threads. In the survey of Malesian genera (De Wilde & Duyfjes, 1997) *Papuasicyos* would key out near genera like *Baijiania* and *Thladiantha*, which are quite different technically. Surprisingly it would go with the recently published *Borneosicyos* W.J. de Wilde (Rugayah & De Wilde, 1998: 224). *Papuasicyos* and *Borneosicyos* have the same sized male flowers and the characteristic compact anther heads with similar sigmoid thecae in common, but differ in the characters mentioned in Table 1.

Collections:

West Papua: *Docters van Leeuwen 9873* (male fl.; Memberano River, Albatros Bivak; BO). — Papua New Guinea: *Simaga UT 1815* (male fl.; near Madang; A, K, L, LAE); *Ridsdale NGF 30335* (male fl., female fl., immature fruit; Morobe Distr.; LAE); *Carr 12633* (fruit; Koitaki; BM, L, SING); *Bäuerlen 328* (male fl. buds, female fl.; Strickland River; MEL, type).

Table 1. Character differences between *Borneosicyos* and *Papuasicyos*.

	Borneosicyos	*Papuasicyos*
flowers	dioecious	monoecious
probract	present	absent
male inflorescence	paniculate	racemose
3 anthers	two 2-thecous, one 1-thecous	all 2-thecous
connective	broad, thick	very broad, thin
stigma	with 3 thick lobes	3-branched, each branch (twice) forked, feather-like divided
fruit	exocarp coriaceous	exocarp thin (fruit juicy)
seeds	few, smooth	many, foveolate
cystoliths on leaf blade	absent	present
glands on leaf blade	present	absent
pollen	tetrads, microreticulate-gemmate	monads, striate

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REFERENCES

Alyoshina, L.A. 1971. Palynological data on the systematics and phylogeny of the family Cucurbitaceae Juss. In: L.A. Kuprianova & M.S. Jakovlev (eds.), Pollen morphology – Cucurbitaceae, Thymelaeaceae, Cornaceae. Academy of Sciences of the USSR, Komarov Botanical Institute, Leningrad: 5–103.

Cogniaux, C.A. 1887. Descriptions de quelques Cucurbitacées nouvelles. Bull. Acad. Roy. Sci. Belgique, Cl. Sci., sér. 3, tome 14: 346–364.

Cogniaux, C.A. 1916. Cucurbitaceae–Fevilleae et Melothrieae. In: A. Engler, Pflanzenreich 66, iv.275.1: 1–277. Engelmann, Leipzig.

De Wilde, W.J.J.O. & B.E.E. Duyfjes. 1997. On the Cucurbitaceae of Malesia. In: J. Dransfield, M.J.E. Coode & D.A. Simpson (eds.), Plant diversity in Malesia III. Proceedings of the third international Flora Malesiana Symposium 1995: 103–110. Continental Printing, Belgium.

Rugayah & W.J.J.O. de Wilde. 1998. New taxa in Malesian Cucurbitaceae. Reinwardtia 11, 3: 215–225.

Harms, H. 1925. Die Cucurbitaceen Papuasiens. In: C. Lauterbach, Beiträge zur Flora von Papuasien. XIII. Bot. Jahrb. Syst. 60: 150–161.

Jeffrey, C. 1964. A note on pollen morphology in Cucurbitaceae. Kew Bull. 17: 473–477.

Khunwasi, C. 1998. Palynology of the Cucurbitaceae. Dissertation Naturwissenschaftlichen Fakultät der Leopold-Franzens-Universität, Innsbruck.

Marticorena, C. 1963. Material para una monografía de la morfología del polen de Cucurbitaceae. Grana Palynologica 4: 78–91.

Van der Ham, R.W.J.M. 1999. Pollen morphology of Bayabusua (Cucurbitaceae) and its allies. Sandakania 13: 17–22.