

## KHMERIOSICYOS, A NEW MONOTYPIC GENUS OF CUCURBITACEAE FROM CAMBODIA

W.J.J.O. DE WILDE<sup>1</sup>, B.E.E. DUYFJES & R.W.J.M. VAN DER HAM<sup>2</sup>

Nationaal Herbarium Nederland, Universiteit Leiden branch,  
P.O. Box 9514, 2300 RA Leiden, The Netherlands

### SUMMARY

A new monotypic genus from Cambodia is described. The genus is defined by a unique combination of characters and has distinct pollen features. The only species is *Khmeriosicyos harmandii* W.J. de Wilde & Duyfjes.

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

### INTRODUCTION

Two sheets of an unidentified collection referred to Cucurbitaceae in the Paris Herbarium appeared to represent an undescribed genus in the family. The material, *Harmand* in herbarium *Pierre 4350*, is rather inadequate, but contains at close inspection sufficient details on the habit of the plant, the male and female inflorescences, the male flowers, fruit and seeds, and pollen to reveal its identity.

***Khmeriosicyos* W.J. de Wilde & Duyfjes, *gen. nov.***

A generis monotypicis similibus e.g. *Borneosicyo*, *Papuasicyo*, *Nothoalsomitra* foliis et cirrhis simplicibus, probractea distincta, floribus monoeciis, floribus masculinis in racemo pedunculato, receptaculi tubo vadoso staminibus ad medium insertis, duabus antheribus bithecis una monotheca, thecis sigmoideis connectivo lato membranaceo differt. — Typus: *Khmeriosicyos harmandii* W.J. de Wilde & Duyfjes.

Small climber, monoecious. *Leaves* simple, deeply lobed, scabrous. *Tendrils* simple. *Probract* obvious, glandular. *Male inflorescences* peduncled, racemose. *Male flowers*: receptacle-tube bowl-shaped, shallow; expanded corolla c. 15 mm in diameter; petals entire, imbricate, free; stamens 3, free, inserted about halfway in the receptacle-tube; filaments short, anthers two 2-thecous, one 1-thecous, thecae sigmoid, connective broad, membranous; disc absent. *Fruit* solitary or occasionally with male inflorescence, ellipsoid, c. 3 cm long, pulpy, scabrous. *Seeds* numerous, compressed, elliptic, c. 9 by 5 mm, base truncate, margin broad, crenulate, faces nearly smooth.

Distribution — One species in Cambodia.

---

1) Corresponding author; e-mail: dewilde@nhn.leidenuniv.nl.  
2) Pollen morphology.

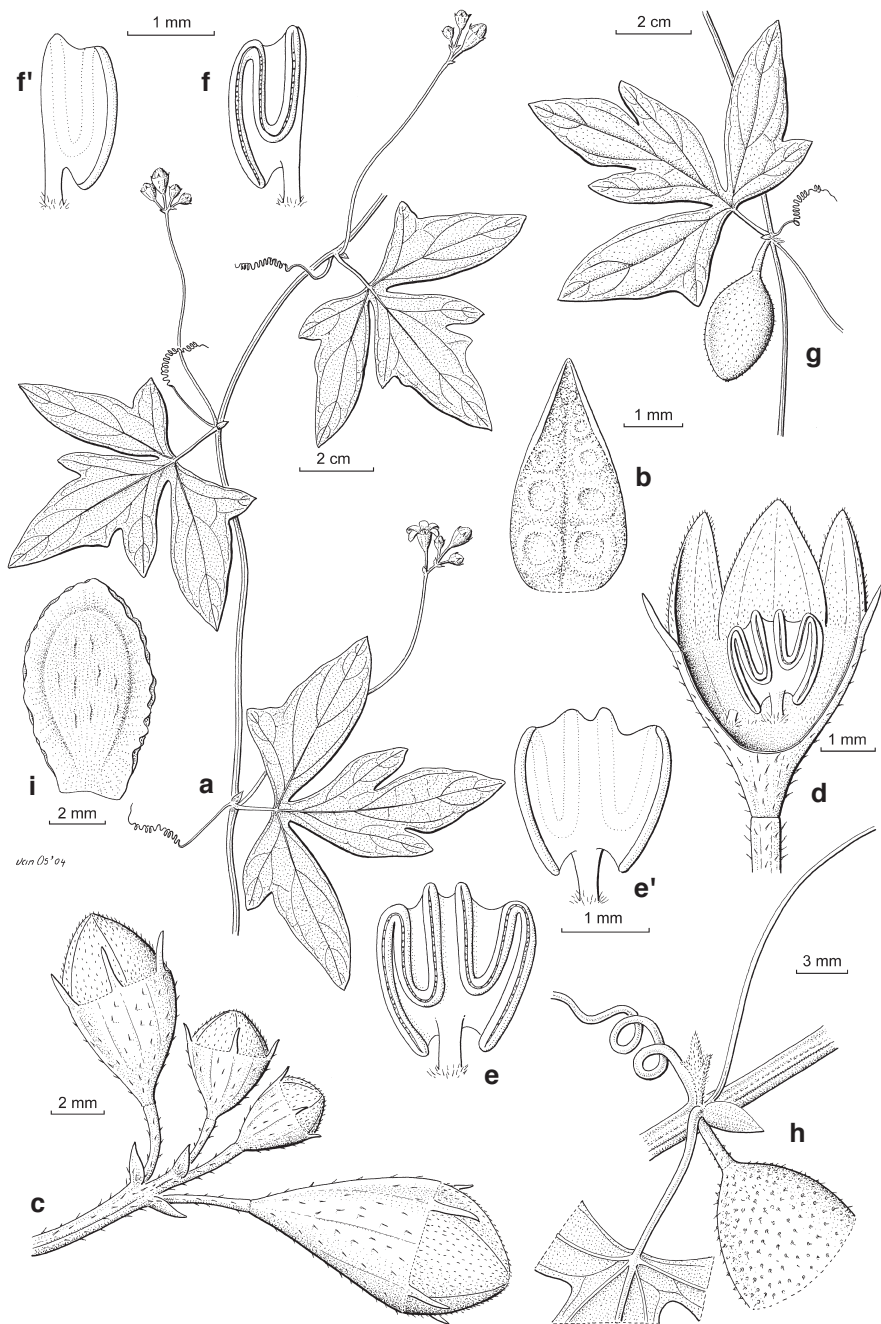


Fig. 1. *Khmeriosicyos harmandii* W.J. de Wilde & Duyfjes. a. Habit of twig with male inflorescences; b. probract; c. apex of male inflorescence; d. opened mature male bud; e, e', f, f'. stamens, seen from inside and outside, respectively; g. node with fruit; h. ditto, enlarged, showing persistent probract; i. seed (all: *Harmand* in herb. *Pierre* 4350).

**Khmeriosicyos harmandii** W.J. de Wilde & Duyfjes, *spec. nov.* — Fig. 1

Parva scandens, folia profunde lobata, flores racemosi, fructus solitarius scaber, semina multa plana ellipsoidea basi truncata, margine crenulato. — Typus: *Harmand* in herb. *Pierre 4350* (P; iso P), Cambodia.

Low herbaceous climber, possibly with tuberous root; monoecious; sparsely scabrous hairy; leafy stem c. 2 mm diameter. *Probract* conspicuous, coriaceous, narrowly ovate, 2–5 mm long, acute, with several conspicuous glands. *Leaves*: blade simple, sub-orbicular in outline, 6–7 by 6–8 cm, deeply 3(–5)-lobed nearly to the base (to 4/5–9/10), (sub)membranous, green on drying, base shallowly broadly cordate, apex acute, slightly mucronate, margin entire or shallowly lobulate 0.5–1 cm deep, scabrous on both surfaces; without glands; basal nerves (3–)5; mid-lobe ovate-rhomboid, 5–5 by 3–3.5 cm; petiole 1–1.5 cm long, scabrous hairy. *Male inflorescences*: simple, a slenderly peduncled short raceme, solitary or co-axillary to a previously flowering female flower; peduncle 4–8 cm long, 0.5 mm thick, glabrescent; raceme 0.5–1 cm long, 5–10-flowered; bracts linear, 1(–2) mm long, appressed-hairy. *Male flowers*: pedicel short, 3–6 mm long, sparsely hairy, inconspicuously articulated at apex; receptacle tube bowl-shaped, 3–4(–5) by 3–5 mm, 5-ribbed, the ribs sparsely scabrous-hairy, glabrous inside; sepals long-triangular or linear, 1.5–2 mm long, (scabrous) hairy; petals imbricate, ovate-elliptic, 6(–8) mm long, minutely hairy, presumably (pale) yellow; stamens 3, inserted about halfway the tube, filaments 0.5(–1) mm long, glabrous but finely pale hairy at base, anthers two 2-theous, one 1-theous, free, appressed into a subglobose head, c. 2.5 mm diam., thecae slender, strongly sigmoid, connective broad, thin; pollen: see below; disc absent. *Female flowers* not known. *Fruit* solitary or co-axillary to later developing male inflorescence, pulpy with thin exocarp, ellipsoid, c. 3 by 2 cm, scabrous all over, base ± tapered, apex subacute; fruiting pedicel c. 10 by 2(–3) mm, scabrous. *Seeds* numerous, bright brown, much compressed, elliptic, 8.5–9 by 4.5–5 mm, base truncate, apex subacute, margin broad, 1–1.5 mm broad, with grooved double-edged crenulate-tuberculate margin, faces finely grooved, nearly smooth.

*Distribution* — Endemic to Cambodia; the single collection made at Prea Can, presumably in Preah Vihear Prov., N Cambodia, but exact locality unknown. Little has been published on the botanical itineraries of Harmand (Gagnepain, 1943).

*Habitat & Ecology* — Unknown; flowering and fruiting in September.

*Notes* — 1. In the Australasian region *Khmeriosicyos* resembles three other, geographically widely separated monotypic genera, viz. *Borneosicyos* (Borneo), *Papuasicyos* (Papua New Guinea) and *Nothoalsomitra* (SE Queensland), especially by: 1) similar male flowers with 3 free stamens, with the anthers free but connivent into a globose synandrium; 2) slender and strongly sigmoid thecae; and 3) broad and thin connectives (Telford, 1982; Duyfjes et al., 2003; De Wilde et al., in press). All 4 genera belong in the subfamily Cucurbitaceae. The differences between the genera are summarized in Table 1.

2. In the three keys to the genera presented by Keraudren-Aymonin (1975) in the Flora for Cambodia, Laos & Vietnam, the present new genus easily shows up beside the manifestly unrelated genus *Diplocyclos*.

3. Unfortunately, female flowers are unknown in *Khmeriosicyos*, eliminating the usually good discriminating characters of the shape of the stigma-lobes.

Table 1.

	<i>Khmeriosicyos</i>	<i>Borneosicyos</i>	<i>Papuasicyos</i>	<i>Nothoalsomitra</i>
Distribution	Cambodia	Sarawak, Sabah	Papua New Guinea	SE Queensland
Leaves	deeply lobed	unlobed	unlobed	3-foliolate
Leaf surface	scabrous	(sub)glabrous	(sub)glabrous	glabrous
Probract	conspicuous	small	absent	absent
Tendrils	simple	simple	simple	2-branched
Inflorescence	simple	compound	simple	simple or forked
Flowers	monoecious	dioecious	monoecious	dioecious
Receptacle-tube	shallow	shallow	shallow	deep
Insertion of stamens in receptacle-tube	c. halfway	c. halfway	c. halfway	at apex
Relative length of filaments	short	short	short	comparatively long
Anthers	two 2-theous, one 1-theous	two 2-theous, one 1- or 1.5-theous	all three 2-theous	two 2-theous, one 1-theous
Stigma-lobes	unknown	much branched	forked and feather-like	spreading, flexuose
Staminodes	unknown	absent	3	3
Fruit	c. 3 by 2 cm, scabrous	8–10 by 4–4.5 cm, glabrous	2–2.6 by 0.9–1.2 cm, glabrous	8–12 by 4–5 cm, glabrous
Fruiting pedicel	medium, c. 1 by 0.2(–0.3) cm	slender, 3.5–5 by c. 0.1 cm	slender, 4–10 by c. 0.1 cm	medium, 3–4 by 0.2(–0.3) cm
Seed	8.5–9 by 4.5–5 mm, compressed, nearly smooth	c. 10 by 8–9 by c. 4 mm, subglobose, smooth	5 by 3.5 by 1–2 mm, ± compressed, foveolate	11–13 by 7–9 mm, ± compressed, smooth
Pollen	large	tetrads	small	large

4. It is noted here, that in the description of *Nothoalsomitra* (Telford, 1982) the male flower is wrongly described and figured. The receptacle-tube is long and deep, not shallow, and the stamens are inserted at the mouth (not at the bottom) of the receptacle-tube. Furthermore, the staminodes in the female flowers (not seen by us) are described as 3 in number in the Latin diagnosis, and as 5 in the description; presumably the number actually is 3.

#### POLLEN MORPHOLOGY — Fig. 2a–d

The pollen of *Khmeriosicyos harmandii* is large (52 by 51  $\mu\text{m}$ , P/E = 1.02), 3-colporate. The apertures are long deep colpi with  $\pm$  circular costate endopores (6–7  $\mu\text{m}$  in diameter). The exine is 2–3  $\mu\text{m}$  thick, and consists of a thin nexine (no endosculpture), a distinct columellate infratectum that thins towards the apertures, and a reticulate tectum with distinct  $\pm$  scabrate zones (margos) along the apertures.

The subdivision of the Cucurbitaceae into the subfamilies Cucurbitaceae 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  $\mu\text{m}$ ) and striate, sometimes (*Alsomitra*, *Bolbostemma*, *Gerradanthus*) larger (up to 52  $\mu\text{m}$ ) and/or perforate or reticulate (Alyoshina, 1971; Van der Ham,

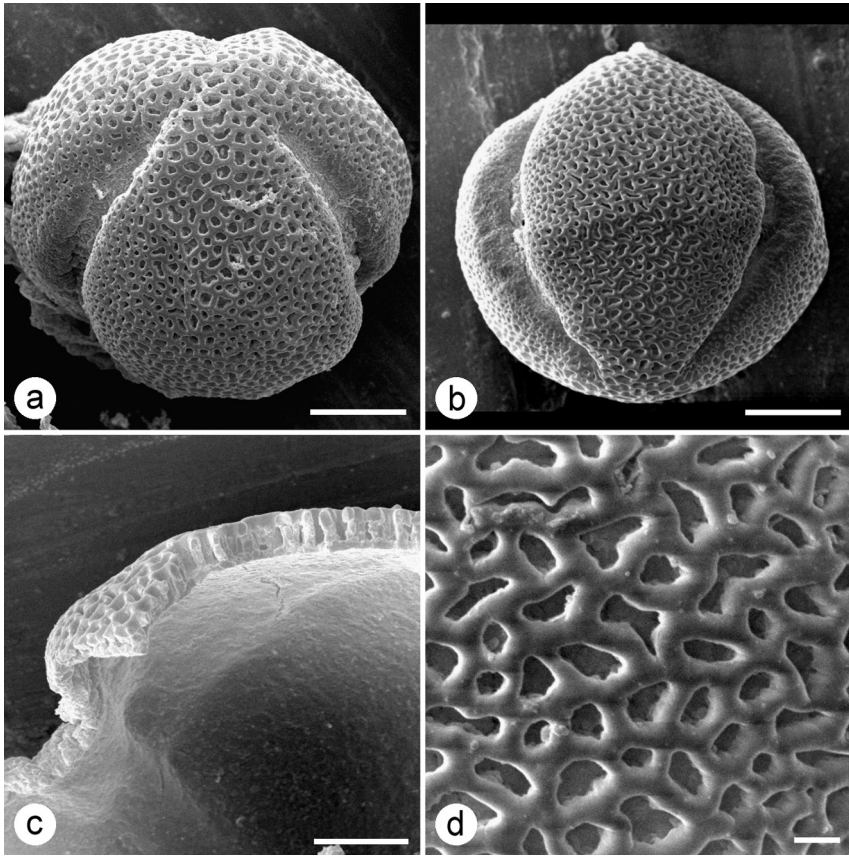


Fig. 2. *Khmeriosicyos harmandii* W.J. de Wilde & Duyfjes. Pollen (*Harmand* in herb. *Pierre 4350*; acetolysed). a. Oblique polar view; b. equatorial view; c. cross section of exine; d. detail showing ornamentation. Scale bars: a, b = 10  $\mu\text{m}$ ; c = 5  $\mu\text{m}$ ; d = 1  $\mu\text{m}$ .

1999). Pollen of the Cucurbitoideae is much more diverse: usually larger than 40  $\mu\text{m}$ , with various aperture and ornamentation types.

Macromorphologically, *Khmeriosicyos harmandii* more or less resembles the monotypic genera *Borneosicyos* (Sarawak, Sabah), *Nothoalsomitra* (SE Queensland) and *Papuasicyos* (Papua New Guinea). The pollen of *Khmeriosicyos harmandii* is most like that of *Nothoalsomitra*, being similarly sized and shaped, 3-colporate with long deep colpi, distinctly columellate, and reticulate with distinct margos. The pollen of *Borneosicyos* deviates considerably (united in tetrads), while that of *Papuasicyos* is much smaller, shallowly colporate, striate-reticulate and without margos (Duyfjes et al., 2003; Van der Ham & Van Heuven, 2003; De Wilde et al., in press).

*Nothoalsomitra* is a member of the tribe Benincaseae. Pollen morphologically, this tribe is heterogeneous. Khunwasi (1998) distinguished six groups. *Nothoalsomitra* was placed in group I, together with *Acanthosicyos*, *Bambekea*, *Coccinia*, *Eureiandra*, *Raphidiocystis* and *Ruthalicia*, on the basis of their 3-colporate pollen with long (deep) colpi, reticulate ornamentation and distinct margos.

## ACKNOWLEDGEMENTS

We acknowledge the perpetual hospitality and co-operation received at the Paris Herbarium. We thank Bertie Joan van Heuven for preparation and photography of the pollen, Jan van Os for preparing the beautiful drawing made from the not really attractive-looking type specimens, and Jan Frits Veldkamp for translating the diagnosis into Latin.

## 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*: 5–103. Academy of Sciences of the USSR, Komarov Botanical Institute, Leningrad.
- De Wilde, W.J.J.O., B.E.E. Duyfjes & R.W.J.M. van der Ham. In press. *Borneosicyos simplex* (Cucurbitaceae) a veritable rare plant peculiar of Kinabalu Park. *Sabah Parks Nature Journal*.
- Duyfjes, B.E.E., R.W.J.M. van der Ham & W.J.J.O. de Wilde. 2003. *Papuasicycos*, a new genus of Cucurbitaceae. *Blumea* 48: 123–128.
- Gagnepain, F. 1943. Introduction. *Fl. Gén. Indoch. Tome préliminaire*: 42, carte 1. Masson & Cie., Paris.
- Jeffrey, C. 1964. A note on pollen morphology in Cucurbitaceae. *Kew Bull.* 17: 473–477.
- Keraudren-Aymonin, M. 1975. Cucurbitacées. In: A. Aubréville & J.-F. Leroy (eds.), *Flore du Cambodge, du Laos et du Viêt-nam* 15: 1–114. Mus. Nation. d'Hist. Nat. Paris.
- Khunwasi, C. 1998. Palynology of the Cucurbitaceae. Dissertation Naturwissenschaftlichen Fakultät der Leopold-Franzens-Universität, Innsbruck.
- Martcorena, C. 1963. Material para una monografía de la morfología del polen de Cucurbitaceae. *Grana Palynologica* 4: 78–91.
- Telford, I.R. 1982. Cucurbitaceae. *Fl. Austr.* 8: 158–198, 205.
- Van der Ham, R.W.J.M. 1999. Pollen morphology of *Bayabusia* (Cucurbitaceae) and its allies. *Sandakania* 13: 17–22.
- Van der Ham, R.W.J.M. & B.J. van Heuven. 2003. A new pollen type in Old World Cucurbitaceae. *Grana* 42: 88–90.