

Miscellaneous Cucurbit News III

W.J.J.O. DE WILDE AND B.E.E. DUYFJES

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

Abstract

The miscellaneous notes on Cucurbitaceae comprise: (1) the description of a new species in *Kedrostis* from Peninsular Malaysia; (2) three new combinations in *Neoachmandra* from Africa, five new combinations in *Pilogyne* from New Guinea and the Pacific; and (3) a modern description of *Zehneria baueriana*, from Norfolk Isl., western Pacific.

Introduction

Now that the preliminary studies in Cucurbitaceae for the treatment in Flora Malesiana come to an end, some more corollary results are presented here. Previous miscellaneous notes were published in Reinwardtia in 2007 and 2009. A recent, second collection of a *Kedrostis* in central Peninsular Malaysia, deviating from the widespread *K. bennettii* (Miq.) W.J.de Wilde & Duyfjes, prompted us to recognize a new species. Thus, the following three items are addressed here:

- (1) *Kedrostis monosperma* W.J.de Wilde & Duyfjes, a new species from Peninsular Malaysia.
- (2) New combinations in African *Neoachmandra*, and *Pilogyne* from Malesia and the Pacific.
- (3) Assessment on the morphology of the male flower of *Zehneria baueriana* Endl., the type species of the genus *Zehneria* Endl.

(1) A new species of *Kedrostis* from Peninsular Malaysia.

Kedrostis monosperma W.J.de Wilde & Duyfjes, *sp. nov.*

Kedrostidi bennettii similis, infructescentibus ramosis breviter pedunculatis, fructibus plus gracilibus ovato-oblongis monospermis nitidis (i.s.) differt. –

Typus: Peninsular Malaysia, Pahang, Gunung Benom game reserve, Ulu Krau, 23 Apr 1967, *Rahim Ismail KEP 100114* (holo, KEP; iso, K, L, SING).

Figs. 1, 2.

Climber 5-7 m long, glabrous (except ovary), cystolyths not obvious; monoecious. Tendrils unbranched. **Leaf** petioles 1.5-2 cm long; blade (sub) entire, (broadly) ovate-oblong, 9-13 by 4-7.5 cm, glabrous at both surfaces,



Figure 1. *Kedrostis monosperma* W.J.de Wilde & Duyfjes. A. Female inflorescence with flowers and young fruits; note hairy ovary; B. Infructescence with one ripe fruit. (Both photos taken at Pahang, Ulu Krau, Rezab Hidupan Liar Krau by de Wilde).

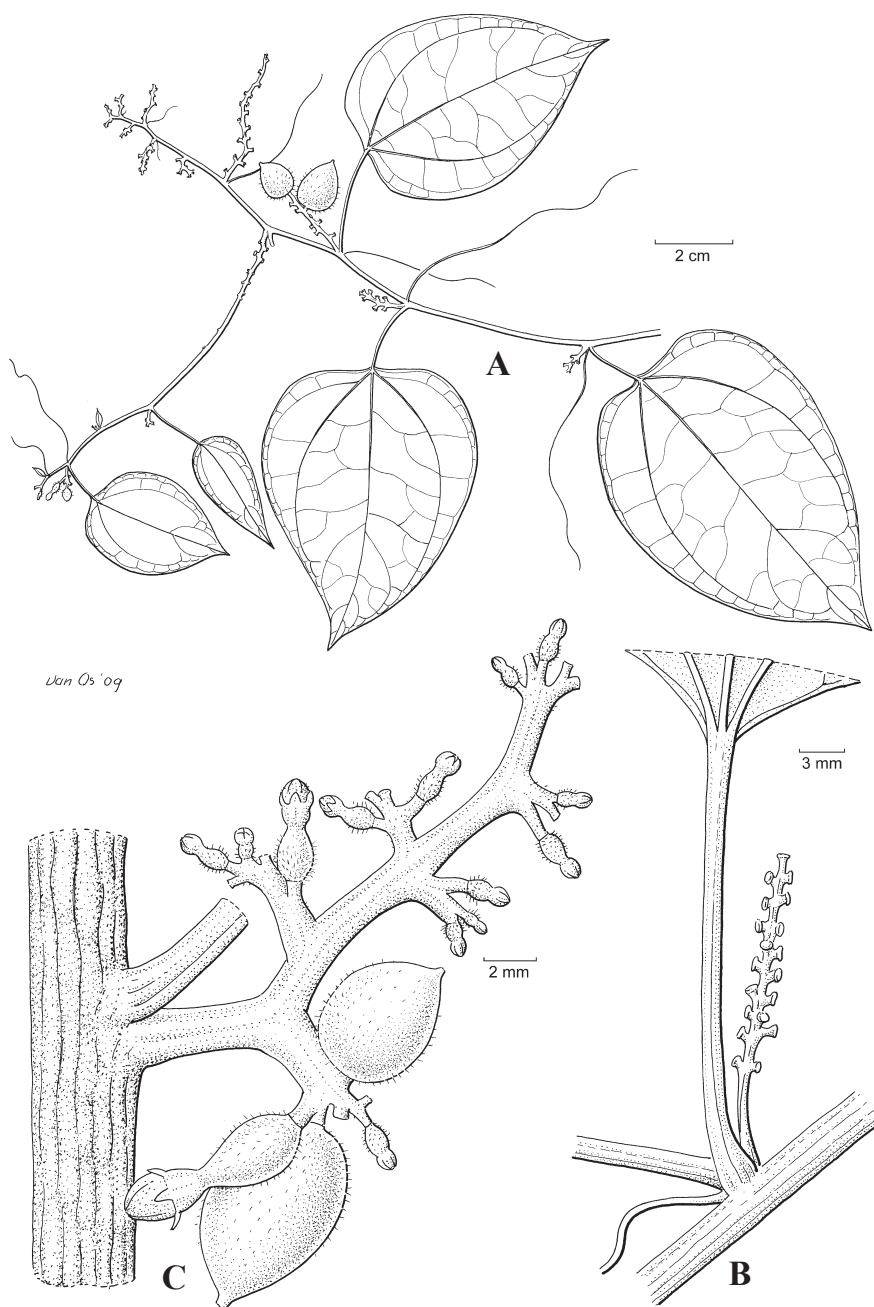


Figure 2. *Kedrostis monosperma* W.J.de Wilde & Duyfjes. A. Apex of branch with female inflorescences with immature and mature fruits; B. Node with male inflorescence (all flowers already fallen off); C. Node with compound female inflorescence with female flower buds and immature fruits. (A & C based on Siti Munirah et al. FRI 65736; B based on Rahim Ismail KEP 100114. All illustrations drawn by Jan van Os).

base \pm rounded or truncate or faintly hastate, margin (sub)entire, apex 1-1.5 cm, acuminate. **Male raceme:** peduncle 2-5 mm long, co-axillary with female inflorescence; raceme spike-like, 10(-15) mm long, 10-20-flowered, flowers \pm densely set. Pedicels of **male flowers** 1-1.5 mm long, persistent; bract lacking; mature flower not known. **Female inflorescence:** an axillary or terminal few-branched short-shoot 10-30 mm long, the branches 5-10 mm long, each with 5(-10) flowers of different stages of development in loose clusters; bracts lacking or minute and caducous, subulate, 0.5 mm long. Pedicels of **female flowers** 1-2 mm long; ovary solid, apparently 2-loculed, each with 1 ovule, ovoid-oblong, 5.5 mm long, *ca* 3 mm wide, base rounded, gradually narrowed to the apex in upper half, sparsely hairy, hairs 0.2 mm long of many serial cells; receptacle-tube 2(-2.5) mm across, inside glabrous; sepals (long) triangular, 0.5-1 mm long; petals imbricate, pale yellow, obovate, *ca* 3 by (1.5-)2 mm, apex broadly rounded, both surfaces papillose hairy, hairs 0.1 mm long; style *ca* 3 mm long, stigmas 2, together 2-2.5 mm wide, each \pm lacerate, papillose; staminodes minute, fleshy, 0.2-0.3 mm long, inserted near receptacle-throat, two paired and one solitary. **Fruits** ripening glossy orange-red, drying glossy, ovate-oblong, *ca* 15 mm long, 10-12 mm wide, glabrous; fruiting pedicel *ca* 2 mm long. **Seed** 1 per fruit, globose, (pale) brown, *ca* 7 mm across, faintly low-margined, smooth.

Other specimens examined: Malaysia, Pahang, Ulu Krau (Rezab Hidupan Liar Krau), N 3° 51' 33.4"; E 102° 12' 22.6", 27 Nov 2008, *Siti Munirah et al.* FRI 65736 (KEP, L).

Distribution: Only known from Peninsular Malaysia, Pahang, Ulu Krau.

Habitat and Ecology: Dense primary lowland forest on hillsides on rich soil, to 214 m altitude; flowering and fruiting in April and November.

Notes. *Kedrostis monosperma* is similar to *K. bennettii*, the latter with a wider distribution in western Malesia, but not known from Peninsular Malaysia. In *K. bennettii* the disposition of the fruit is different, single or few subaxillary to leaves, the fruits are dull on drying, globose or transversely ellipsoid, 1- or 2-seeded, with a longer fruiting pedicel, 5-10 mm long; the male racemes are much longer, to 15 cm long with longer peduncle, 3-7 cm long; the petioles are generally longer, 2-6 cm long. As far as can be judged from the few female flowering collections of *K. monosperma*, the ovary is hairy, the perianth glabrous inside, in *K. bennettii* the ovary is subglabrous and the perianth hairy in the throat.

In *K. monosperma* the older main stem of the liana is *ca* 0.5 cm thick, the bark has whitish corky patches (see Fig. 1).

The collection, *van Balgooy 7551* of *K. bennettii* from Bali (Lesser Sunda Islands), has in the male raceme caducous bracts, 1-3 mm long, in other specimens bracts are absent.

(2) Three new combinations in African *Neoachmandra* and five new combinations in *Pilogyne* from Malesia and the Pacific.

The genus *Neoachmandra* was one of several new genera proposed by De Wilde and Duyfjes (2006), as an outcome of morphological studies in the flowers of a large group of SE Asian species till then generally referred to a large variable genus *Zehneria*. The validity of these genera on molecular grounds is currently tested (Cross *et al.*, in preparation) with a broad sampling of species, including three *Neoachmandra* species from Africa, newly combined below:

Neoachmandra capillacea (Schumach.) W.J.de Wilde & Duyfjes, *comb. nov.*

- **Basionym:** *Bryonia capillacea* Schumach., Beskr. Guin. Pl. (1827) 430. - *Melothria capillacea* (Schumach.) Cogn. in A. & C. DC., Monogr. Phan. 3 (1881) 600; - *Zehneria capillacea* (Schumach.) C. Jeffrey, Kew Bull. 15 (1962) 366. - **Typus:** Ghana, *Thonning* (holo, LE, not seen).

Neoachmandra cordifolia (Hook.f.) W.J.de Wilde & Duyfjes, *comb. nov.*

- **Basionym:** *Melothria cordifolia* Hook.f., Fl. Trop. Afr. [Oliver et al.] 2 (1871) 563. - **Typus:** Gabon, *Mann* (holo, K, not seen).
- **Synonym:** *Zehneria gillettii* (De Wild.) C. Jeffrey, Kew Bull. 15 (1962) 366.

Neoachmandra deltoidea (Schumach.) W.J. de Wilde & Duyfjes, *comb. nov.*

- **Basionym:** *Bryonia deltoidea* Schumach. Beskr. Guin. Pl. (1827) 449. - *Melothria deltoidea* (Schumach.) Benth., Niger Flora [W.J. Hooker] (1849) 368; - *Zehneria hallii* C. Jeffrey, J. W. African Sci. Assoc. 9 (1965) 93, *nom. nov.* [non *Zehneria deltoidea* Miq., Fl. Ned. Ind. 1, 1 (1856) 655 = *Neoachmandra leuocarpa* (Blume) W.J.de Wilde & Duyfjes, Blumea 51 (2006) 23, based on *Bryonia leuocarpa* Blume, Bijdr. Fl. Ned. Ind. (1826) 924]. - **Typus:** Ghana, *Thonning* (holo, C, not seen).

The uncertain taxonomic status of the genus *Zehneria* Endl., based on DNA sequencing of *Z. baueriana*, made us to accept *Zehneria* as a monotypic genus restricted to its type, from Norfolk Isl. and New Caledonia in the western Pacific. There are but a few collections of true *Zehneria* from Norfolk Isl. and New Caledonia (see next item in the present publication).

Five deviating species in *Zehneria* were still kept under *Zehneria*. But since the re-instatement of the genus *Pilogyne* (de Wilde and Duyfjes, 2009), the five taxa now appear better included in *Pilogyne* as well, and the new combinations are made below.

Pilogyne erythrobacca (W.J.de Wilde & Duyfjes) W.J.de Wilde & Duyfjes, *comb. nov.*

- **Basionym:** *Zehneria erythrobacca* W.J.de Wilde & Duyfjes, *Blumea* 51 (2006) 55. – **Typus:** Papua New Guinea, Milne Bay, Menapi, Cape Vogel Peninsula, *Brass* 21720 (holo, L; iso, A).

Pilogyne neocaledonica (W.J. de Wilde & Duyfjes) W.J. de Wilde & Duyfjes, *comb. nov.* - **Basionym:** *Zehneria neocaledonica* W.J. de Wilde & Duyfjes, *Blumea* 51 (2006) 67. – **Typus:** New Caledonia, *Däniker* 3139 (holo, L; iso, Z, not seen).

Pilogyne samoensis (A. Gray) W.J. de Wilde & Duyfjes, *comb. nov.*

– **Basionym:** *Karivia samoensis* A. Gray, U.S. Expl. Exped. Phan. (1854) 643.

– **Lectotypus:** Samoa, without further locality, *US exploring expedition s.n.* (US, barcode US00147706 see Fosberg & Sachet, 1981).

- Homotypic synonyms: *Zehneria grayana* (Cogn.) Fosberg & Sachet, *Smithsonian Contr. Bot.* 47 (1981) 12; W.J. de Wilde & Duyfjes, *Blumea* 51 (2006) 59. - *Melothria grayana* Cogn. in A. & C. DC., *Monogr. Phan.* 3 (1881) 591, p.p., excluding specimens from Tahiti.

Notes: The epithet *samoensis* could not be used at the time by Cogniaux (1881) in *Melothria* because the combination was already preoccupied by *Melothria samoensis* A. Gray, a different species, now *Neoachmandra samoensis* (A. Gray) W.J. de Wilde & Duyfjes.

Pilogyne tahitensis (W.J. de Wilde & Duyfjes) W.J. de Wilde & Duyfjes, *comb. nov.*

– **Basionym:** *Zehneria tahitensis* W.J. de Wilde & Duyfjes, *Blumea* 51 (2006) 76. – **Typus:** Tahiti, *Vesco s.n.*, anno 1847, male (holo, P, barcode P00218593; iso, P, 5 duplicates).

Pilogyne viridifolia (W.J.de Wilde & Duyfjes) W.J.de Wilde & Duyfjes, *comb. nov.*

– **Basionym:** *Zehneria viridifolia* W.J.de Wilde & Duyfjes, *Blumea* 51 (2006) 77. – **Typus:** Papua New Guinea, Milne Bay, Biniguni Camp, Gwariu River, *Brass* 23914 (holo, A; iso, CANB, L).

(3) Assessment on the morphology of the male flower of *Zehneria baueriana* Endl., the type species of the genus *Zehneria* Endl.

The genus *Zehneria* was described by Endlicher (1833), with a single species, *Z. baueriana* from Norfolk Island, but the generic name became commonly used for a large number of small-flowered species of the Old World (Jeffrey, 1962). De Wilde and Duyfjes (2006) recognized within the large genus *Zehneria* some smaller genera for SE Asia, i.e., *Neoachmandra*, *Scopellaria*, *Urceodiscus*, and *Zehneria*. Currently, the validity of these genera has been tested molecularly (Cross *et al.*, in preparation), and preliminary results indicate that *Neoachmandra* and *Zehneria* (in the restricted sense, as defined by De Wilde and Duyfjes, 2006) could only be partly held up, because DNA sequencing of *Z. baueriana* (as well as of some related species in the Pacific) revealed two different clones, one clone belonging to *Zehneria* as newly defined, the other to *Neoachmandra*, rendering *Zehneria* paraphyletic, and indicating that *Z. baueriana* could be of hybrid origin.

Zehneria baueriana is a local endemic of Norfolk Island and New Caledonia, represented in herbaria by only few collections. Its original description (Endlicher, 1833, 1838 with good figures) is only in Latin. The only other description of the species, also in Latin, is by Cogniaux (1881), under the name *Melothria baueriana*, but this latter was mixed up with material from two different species: *Zehneria grayana* (Cogn.) Fosberg & Sacht, and *Z. guamensis* (Merr.) Fosberg. Therefore, a more recent good collection of *Z. baueriana* made in 1967 (*Hoogland 11220*) from the type locality, with ample male flowering and fruiting elements, offered the opportunity to present an accurate description, at the same time, assessing some ambiguities in Endlicher's original description. Also, it appeared that the species could not be readily identified with our key (De Wilde and Duyfjes, 2006).

At present the true state of certain characters of *Z. baueriana*, now needed for an understanding of the genus *Zehneria* in the restricted sense, notably characters of the male inflorescence, and the place of insertion of the stamens in the receptacle tube in male flowers, is assessed in order to contrast these to those resembling species from the Malesian area (De Wilde and Duyfjes, 2009).

Zehneria baueriana Endl., Prodr. Fl. Norfolk. (1833) 69; W.J.de Wilde & Duyfjes, *Blumea* 51 (2006) 51. - *Melothria baueriana* (Endl.) F.Muell., *Fragm.* (Mueller) (1868) 188; Cogn. in A. & C. DC., *Monogr. Phan.* 3 (1881) 610; in Engl., *Pflanzenr.* 66, 4.275.I (1916) 109. – **Lectotypus:** Norfolk Island, *Bauer* in *Herb. Endlicher s.n.*, male (W; iso B†, K, LE see De Wilde & Duyfjes, 2006). **Figs. 3, 4.**

Branched **climber** 5(-10) m long; **stems** 2-4 mm diam; subglabrous, generally drying brown; dioecious. Pobract oblong-linear, 4-5 mm long. Tendrils unbranched. **Leaf** petioles, 1.5-3.5 cm long; blade ovate, sometimes faintly 3-lobed, 5-10 by 4.5-7.5 cm, base deeply cordate, margin remotely minutely (sometimes irregularly) denticulate, apex acute or broadly acuminate, 2-3 mm mucronate; cystoliths minute. **Inflorescences** in male and female a subsessile many-flowered fascicle, in male 10-20, in female 5-12-flowered, outer flowers oldest, in male sometimes divided into several sub-fascicles, suggesting a reduced leafless short-shoot; common peduncle lacking; bracts lacking; flowers outside glabrous, pedicel with few sparse, short hairs. Pedicels of **male flowers** 2.5-3 mm long; receptacle tube *ca* 3 mm long, 3.5 mm wide, densely long-haired in the throat and upper third inside; sepals *ca* 1 by 0.6 mm, acute; petals ovate, 2(-2.5) by 1.8(-2) mm, subacute, minutely papillose-hairy adaxially; stamens inserted halfway in the receptacle tube, filaments *ca* 1 mm long, glabrous; anthers circular in outline, *ca* 1-1.2 mm across, thecae curved, at apex nearly touching, forming nearly a ring, connective not produced, broad in the middle, thickened, hairy along the thecae; disc depressed, bluntly 3-lobed, *ca* 1.5 mm wide. Pedicels of **female flowers** (after Endlicher) 1-2 mm long; ovary narrowly ovoid(-oblong), much narrowed into a neck to the perianth, 15 mm long, 4 mm wide, neck to 5 mm long, all glabrous; perianth as in male flowers; style long-cylindrical, *ca* 3 mm long, style-arms 3, each *ca* 0.5 mm long, stigmas reniform, 2-lobed, papillose; disc consisting of 3 separate lobes at base of style, *ca* 1 mm long; staminodes inserted *ca.* halfway the receptacle tube, subulate, slender, *ca.* 1 mm long with some coarse hairs at base. **Fruits** 5-10 in a cluster, at first greenish with 5 longitudinal lines and densely scale-like paler flecked (netted), ripening (orange-) red, drying with irregular surface, collapsing over the seeds, oblong, 12-20 mm long, 8-10 mm wide, glabrous; fruiting pedicel 5-7 mm long. **Seeds** 15-30, compressed, elliptic, 4 mm long, (2.5-) 3 mm wide, pale, rather broadly but indistinctly margined, edge rounded, faces not ornamented.

Fieldnotes: Petals pale yellow; fruit red (Endlicher); fruit pale green (Hoogland).

Other specimens examined: Norfolk Isl., *Bauer s.n.*, fruit (W); Norfolk Isl., 28-10-1967, *Hoogland 11220*, 2 sheets, flowers & fruit (CANB). New Caledonia, 27-11-1970, *Guillaumin & Baumann-Bodenheim 8604* (L); *ibid.*, 7-02-1951, *Guillaumin & Baumann-Bodenheim 10315* (L).

Distribution: Norfolk Island, New Caledonia.



Figure 3. Details of two herbarium sheets of *Zehneria baueriana*: upper details of fruit showing one seed; lower details of female inflorescences (based on *Hoogland 11220*, CANB).

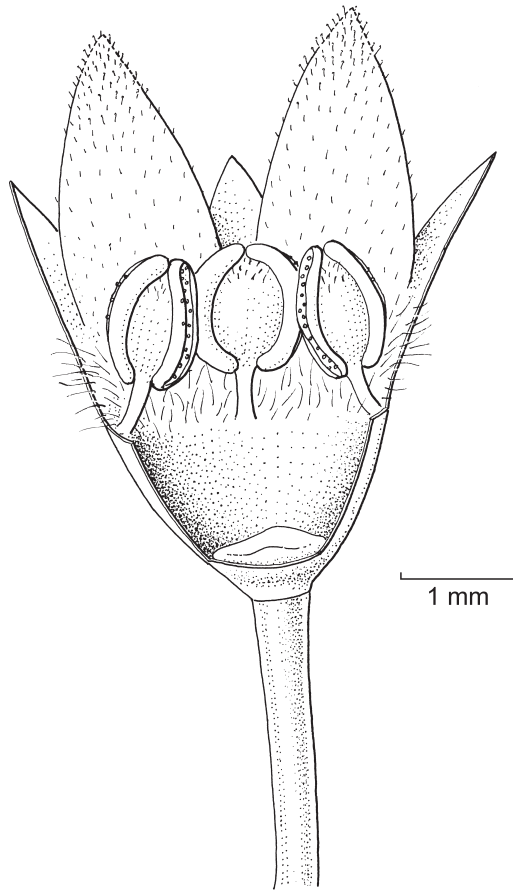


Figure 4. Male flower of *Zehneria baueriana* (based on *Hoogland 11220*; drawn by Jan van Os).

Habitat and Ecology: Forest edges and roadsides, 200-300 m; flowering and fruiting in October.

Notes: The stamens are inserted halfway in the receptacle tube, not towards the apex as written by Endlicher (1833). The filaments are about as long as the anthers, and the stamens are largely included. The anthers are comparatively much larger as depicted by Endlicher (1838). The disc of the male flowers is distinctly 3-lobed, but not consisting of 3 separate globose parts as stated by Endlicher. The disc in the female flower is 3-parted. The corolla was described by Endlicher as fused, but the petals are free.

As described above, the male flowers link up easily with flowers of species of *Zehneria* recognized for SE Asia (De Wilde and Duyfjes, 2006), or later, as *Pilogyne* Schrad. (De Wilde and Duyfjes, 2009). However, for

molecular reasons, the type species of the genus *Zehneria*, i.e., *Z. baueriana*, can better be regarded as separate from *Pilogyne*, and the minor differences between these two genera are primarily in the male inflorescence, pedunculate in *Pilogyne*, fasciculate and not pedunculate in *Zehneria*. This latter condition is also found in *Pilogyne neocaledonica* and *P. erythrobaeca* p.p. (De Wilde and Duyfjes, 2006, fig. 15), but both these species differ considerably in various other characters from *Zehneria baueriana*.

For *Z. baueriana* the stout habit, the 3-parted disc in the female flowers, the lengthwise 5-lined fruits, the yellow or pale yellow petals are unique. Unfortunately, female flowers of *Pilogyne neocaledonica* are unknown as yet. As remarked by De Wilde and Duyfjes (2006, 2009), most of the then under *Zehneria* recognised species in eastern New Guinea and southern Pacific possess characters blurring the clear distinction between *Neochamandra* and *Zehneria* in this area, presumably because these species, like *Z. baueriana*, are (partly) of hybrid origin as well.

Acknowledgements

This research was carried out as part of the Flora of Peninsular Malaysia Project (Project no. 01-04-01-0000 Khas) at the Forest Research Institute Malaysia funded by the Ministry of Science, Technology and Innovation (MOSTI). Material from BM, CANB, K, KEP, L, SING, and W was studied. The permission from the curator of CANB to use a herbarium leaf fragment of *Hoogland 11220* for DNA sequencing is gratefully acknowledged. We thank Ruth Kiew (KEP) for facilitating fieldwork, and also our enthusiastic colleagues in the field, Siti Munirah and Hok Lim Kueh (both KEP), without their help, the second collection of *Kedrostis monosperma* would not have been found. As usual, J.F. Veldkamp (L) translated the description of the new species into Latin, Jan van Os (L) prepared the drawings and Ben Kieft (L) scanned the drawings and prepared the photographic plates. This research also received support from the SYNTHESYS Project which is financed by European Community Research Infrastructure Action under the FP6 "Structuring the European Research Area" Programme.

References

- Cogniaux, C.A. 1881. Cucurbitaceae. In: A. & C. de Candolle, *Monographiae Phanerogamarum Prodrumi* 3: 325-951. Masson, Paris.
- De Wilde, W.J.J.O. and B.E.E. Duyfjes. 2006. Redefinition of *Zehneria* and four new related genera (Cucurbitaceae), with an enumeration of the

Australasian and Pacific species. *Blumea* **51**: 1-81.

De Wilde, W.J.J.O. and B.E.E. Duyfjes. 2007. Miscellaneous South East Asian Cucurbit news. *Reinwardtia* **12, 4**: 267-274.

De Wilde, W.J.J.O. & B.E.E. Duyfjes. 2009. Miscellaneous South East Asian Cucurbit news II. *Reinwardtia* 12: 405-414.

Endlicher, S.L. 1833. *Prodromus Florae Norfolkicae*. Vienna.

Endlicher, S.L. (1837-)1838(-1841). *Iconographia Generum Plantarum*. Vienna.

Jeffrey, C. 1962. Notes on Cucurbitaceae, including a proposed new classification of the family. *Kew Bulletin* **15**: 337-371.