

Zyzyura, a new genus of Eupatorieae (Asteraceae) from Belize

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Abstract

A new Genus, *Zyzyura* is named to accommodate *Fleischmannia mayana* Pruski that has an eximbricate involucre, a high-conical receptacle, a corolla with a slender base closely investing the style and with a broadly campanulate limb, enlarged elongate cells in the carpopodium, short and broad distally protruding cells in the corolla lobes, and broad rounded anther appendages.

Keywords

Zyzyura, New Genus, *Fleischmannia*, Eupatorieae, Belize

Introduction

The recent description of *Fleischmannia mayana* Pruski (Pruski and Clase 2012) (Figs. 1, 2) was based on material of a procumbent epilithic herb from the western slope of Victoria Peak in the Cockscomb Range of the Maya Mountains in Belize. The type specimen includes four segments of prostrate stems with ascending flowering branches and accompanying photos of the plants in the field. Details of the plants that are visible are essentially consistent throughout. In the initial study by Pruski and Clase (2012), using a manuscript key to the Eupatorieae of Mesoamerica (Robinson in press), the species was identified as a member of the genus *Fleischmannia*, and it was described in that genus. Now the type specimen has been subjected to a more intense study by the

present authors, and a number of characteristics have been seen that preclude a position in *Fleischmannia* (King and Robinson 1987, Robinson 2001).

The concept of *Fleischmannia* Sch.Bip. has been well established since the redefinition of the limits of the genus (King and Robinson 1966, 1970) and in subsequent studies (King and Robinson 1972, 1974, 1975, 1978, 1991, Robinson 2001, 2011). The concept is now based on more than 90 species showing great uniformity in floral characteristics.

Four characteristics of *Fleischmannia mayana* are inconsistent with the characters that define *Fleischmannia* or even its only recognized close relative, *Sartorina* R.M.King & H.Rob. (1987).

The involucre of the Belize species is eximbricate with mostly 2 series of equal, obovate bracts with broadly rounded tips (Fig. 2C). While *Fleischmannia* often has the superficial appearance of being eximbricate, an appearance allowed for in many keys (King and Robinson 1987), it is always actually subimbricate with the involucral bracts in more than two series.

The receptacle of the Belize species is highly conical as seen in two heads in which the receptacle shows without dissection (Fig. 1C), while that of *Fleischmannia* is plane to scarcely convex.

The corolla has a basal tube closely investing the style and an abruptly expanded campanulate limb, differing from consistently funnelform shape in *Fleischmannia*.

The carpopodium of the Belize plant has enlarged and elongate cells (Fig. 1F), a feature different from the smaller subquadrate cells in *Fleischmannia*.

There are a few more subtle distinctions from *Fleischmannia*:

The anther thecae are very short, and the apical anther appendages are slightly broader than long (Fig. 1E).

The cells of the corolla lobes are shorter and broader than those of *Fleischmannia* (Fig. 1D)

The pappus bristles are ca. ten in number and separated at the base (Fig. 2), a feature true of some *Fleischmannia*, but the bristles of the pappus are broad at the base unlike those in the *Fleischmannia* species which have five or ten non-contiguous bristles.

A few features are similar to those of *Fleischmannia*: the cells of the corolla lobes project at their distal ends on both surfaces of the lobes (Fig. 1D), the anther collars are very narrow and strongly transversely annulated, though the annulations do not completely obscure the crosswalls of the cells in the collars, the cells of the carpopodium have reasonably thick walls, and the style bases are neither enlarged nor papillose.

The most striking feature of the new genus is the high-conical and fistulose receptacle (Fig. 1C). How this structure functions is hard to determine, since there is no evidence of raised central florets in the flowering heads on the holotype. Careful examination of the photographs, however, shows a central cluster of corolla-like material and a possible exposed tip of receptacle in the center of the cluster (Fig. 1B). It seems possible that florets never fully develop on the distal part of the receptacle.

The position of the Belize species in the Eupatorieae is not resolved. Although a number of features are shared with *Fleischmannia*, and the two may have some phylo-

genetic relationship, the distinction of the species from anything in *Fleischmannia* is now certain. Furthermore, the new genus, cannot be placed in any of the other genera presently recognized in the tribe. It is particularly notable that few members of the Eupatorieae have a highly conical receptacle: *Isocarpha* R. Br. in which the receptacle is paleate, and *Praxelis* Cass, and *Eupatoriopsis* Hieron., both members of the subtribe Praxelinae, that have completely deciduous involucral bracts. The latter two also have 3-costate or obcompressed achenes.

In the general key to all the Eupatorieae genera in King and Robinson (1987) the new genus runs to couplet 137 on the basis of the articulated bases of the involucral bracts, the more than five florets in the capitula, the symmetrical corollas of the capitula, the well-developed apical anther appendage, the three to five-ribbed prismatic cypselae, the pappus of ten, subequal capillary, non-plumose, persistent bristles, the persistent involucre, the pedunculate capitula, the epaleate receptacles and the leaves subtending the peduncles not in pseudowhorls. Of the three genera in couplet 137, *Ageratina* Spach, *Gymnocondylus* R.M.King & H.Rob. & *Fleischmannia*, all differ from the new genus by their plane or slightly convex receptacles. The first two differ by their expanded style bases, and *Fleischmannia* differs as indicated above. Because of these characteristics and because of the generally distinctive aspect of the specimen, the species is placed here in another new genus of the Eupatorieae which we name *Zyzyura*.

Taxonomic treatments

Zyzyura H. Rob. & Pruski, gen nov.

urn:lsid:ipni.org:names:77124260-1

<http://species-id.net/wiki/Zyzyura>

Differs from *Fleischmannia* by the conical and fistulose receptacle, the eximbricate rather ‘Pquierian’ involucre, the slender-based corolla with broadly campanulate limb, and elongate cells of the carpopodium.

Type. *Fleischmannia mayana* Pruski.

Description. Decumbent epilithic herbs rooting at proximal nodes, prostrate portions 5–20 cm long, with short internodes, mostly glabrous, ascending portions 15–30 cm tall, with few small hairs, with long basal internodes; stems narrowly fistulose. Leaves (Fig. 1A) opposite, petioles mostly 3–5 mm; blades deltate in outline, mostly 4–7 mm long and wide, 3-7-lobed with sinuses 1/3-1/2 to midvein, basal margin truncate or subtruncate, triplinervate at base, margins of lobes often slightly notched, sparsely pilose adaxially, paler and hairless with crowded glandular dots abaxially. Inflorescence (Fig. 1B) terminal on ascending portions, ascending parts not branched below, distally loosely branching with 3–10 capitula, with few minute opposite to subopposite bracteoles; peduncles mostly 0.5–1.8 cm long. Capitula discoid, broadly hemispherical, to 7 mm high and wide; involucres (Fig. 1C) eximbricate; bracts c. 16

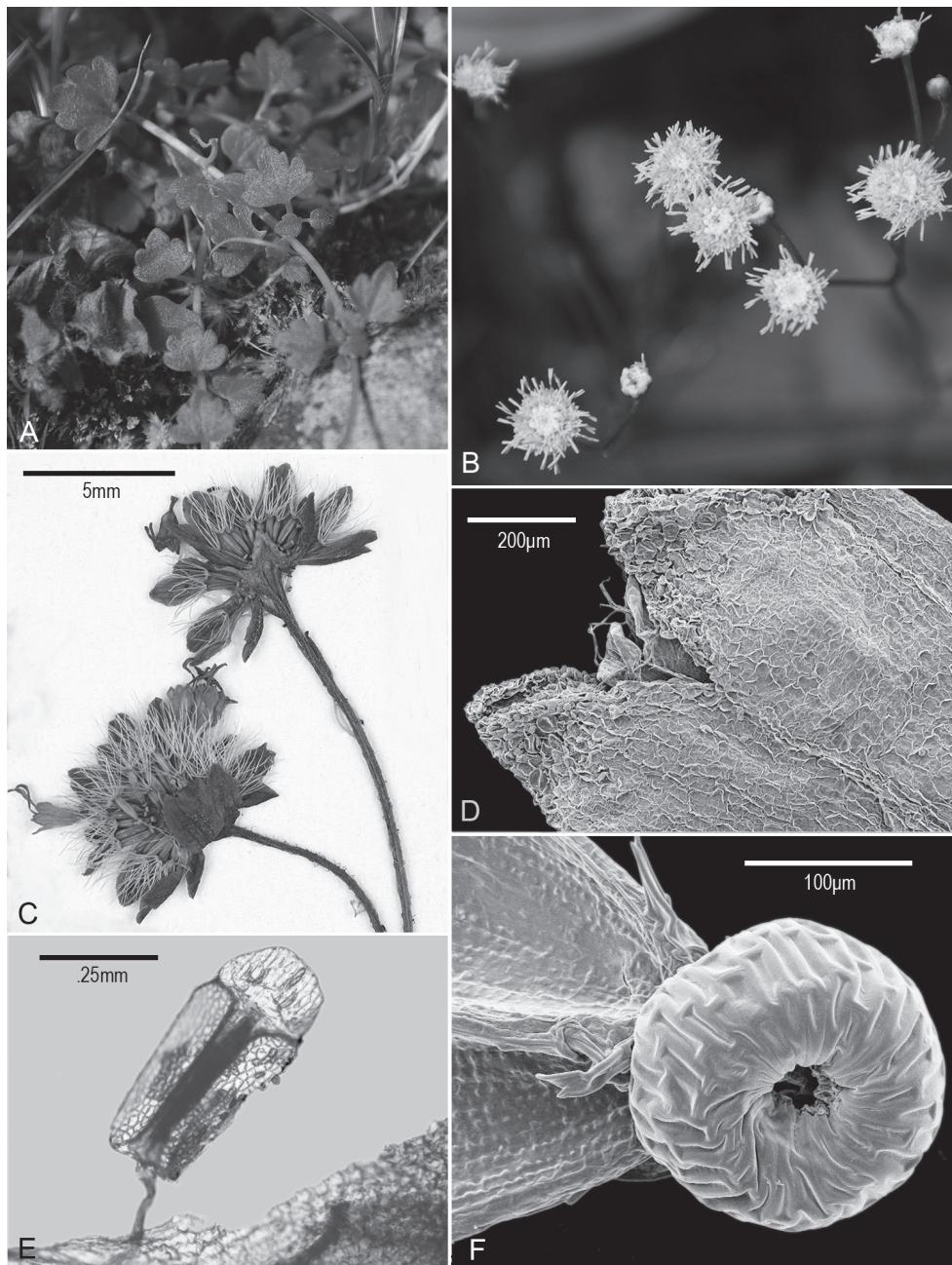


Figure 1. *Zzyzura mayana* (Pruski) H. Rob. & Pruski, **A** Prostrate portion of living plants showing lobed leaves **B** Capitula on erect flowering branches of living plant showing denser floral material near centers of capitula **C** Capitula of pressed specimen, lower capitulum showing eximbricate involucral bracts, upper head split, showing conical fistulose receptacle, upper capitulum also showing loose corolla **D** SEM of corolla lobes showing surfaces with protruding cells **E** Anther showing short theca and broad apical appendage **F** SEM micrograph of carpodium showing elongate cells. (All from Brewer & Pau 3349)

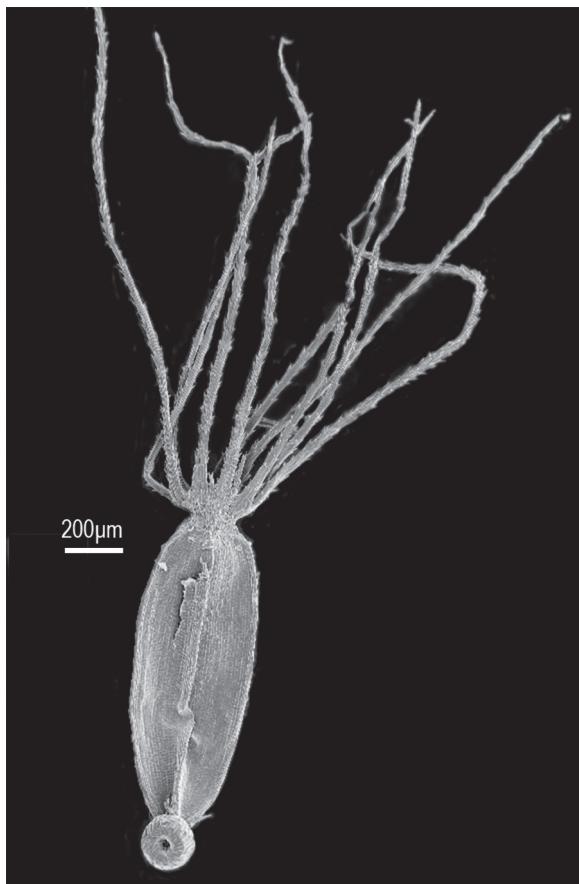


Figure 2. *Zyzyura mayana*, cypsela showing pappus of c. 10 non-contiguous bristles. (From Brewer & Pau 3349)

in mostly 2 series, subequal, obovate, with obtuse to rounded tips, chartaceous-becoming more scariosus distally, bicostate proximally, few shorter outer bracts, scarcely spreading at maturity, essentially glabrous; receptacle (Fig. 1C) high-conical, fistulose, epaleate, without evidence of fully developed florets born on distal part. Florets 20–23; corollas white, 2.2–2.3 mm long, mostly glabrous, sparse glandular dots on lobes, immediate base dilated, thickly ribbed, narrowed to a slender tube closely investing the style, limb abruptly ampliate, campanulate, lobes (Fig. 1D) deltate, with intermarginal ribs, cells projecting at distal ends on inner and outer surface; anther collars slender, with numerous annular thickenings that do not completely obscure transverse cell walls; anther thecae (Fig. 1E) c. 0.5 mm long; apical appendage slightly broader than long. Style base without expanded node, papillae or hairs, style appendages thickened, densely papillose. Cypselae (Fig. 2) 1.2–1.3 mm long, somewhat fusiform, 3–5 costate, with few scabrae on ribs; carpopodium (Fig. 1F) broadened, with distinct projecting upper rim, cells enlarged and elongate with moderately thickened walls; pappus inis-

ate (Fig. 2) with c. 10 persistent capillary bristles, reaching to approximately the base of corolla lobes, broadened but not contiguous at base, scabridulous, narrowed to apex. Pollen c. 18 µm in diam. in fluid.

Distribution. The genus contains only the single species that may be endemic to the type locality in the Maya Mountains of the Cockscomb range in Belize.

Ecology. Cited as epilithic.

Etymology. Contrived name (no meaning).

Specimens examined. *Zyzyura mayana* (Pruski) H. Rob. & Pruski, comb. nov. (IPNI ID: urn:lsid:ipni.org:names:77124264-1), *basionym*: *Fleischmannia mayana* Pruski in Pruski and Clase, Phytoneuron 2012-32: 6. 2012. Presently known only from Victoria Peak in the Cockscomb range of the Maya Mountains in Belize (Brewer & Pau 3349, holotype MO).

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***Murdannia saddlepeakensis* (Commelinaceae) – a new species from Andaman and Nicobar Islands, India**

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Abstract

Murdannia saddlepeakensis (Commelinaceae), a new species from the Andaman and Nicobar Islands, India, is described and illustrated. The new species is remarkable for its narrowly linear leaves, two fertile stamens, single seeded locule and scorbiculate seeds.

Keywords

Commelinaceae, *Murdannia saddlepeakensis*, new species, Andaman and Nicobar Islands, India

Introduction

The genus *Murdannia* is represented by 54 species (Govaerts and Faden 2004), of which 27 taxa are reported from India (modified after Karthikeyan et al. 1989). Three new taxa viz., *M. fadeniana* Nampy & Joby (Nampy and Joby 2003), *M. satheeshiana* Joby et al. (Joby et al. 2011) and *M. brownii* Nandikar & Gurav (Nandikar and Gurav 2011) have been described during the last decade. In addition, *M. striatipetala* Faden has been rediscovered from India (Nandikar et al. 2011). The Western Ghats of India

alone comprises twenty-two species and serve as a major centre of diversification for *Murdannia*.

The Andaman and Nicobar Islands harbour luxuriant lowland rainforests besides wetlands, mangroves and coral reefs. The floral elements of these Islands often show close affinity with that of Indonesia, Malaysia, Myanmar, Thailand and Sri Lanka. Saddle Peak National Park which is located in the North Andaman Islands harbours unique stunted evergreen vegetation that is found only in restricted localities of the Andaman Islands (Rao 1986).

During a recent botanical excursion, we came across an interesting specimen of *Murdannia* in an open scrub forest of Saddle Peak National Park. The specimens were collected and critically studied. It was found that the specimens did not match any of the known species of the genus and hence have been described and illustrated here as a novelty. In addition, a key for *Murdannia* species of Andaman and Nicobar Islands and some other species similar to *M. saddlepeakensis* has been provided to facilitate identification.

Taxonomic treatment

Murdannia saddlepeakensis M.V.Ramana & Nandikar, sp. nov.

urn:lsid:ipni.org:names:77124862-1

http://species-id.net/wiki/Murdannia_saddlepeakensis

Figs 1, 2

Type. India. North Andaman: Saddle Peak National Park, open scrub forests (Fig. 1-A), 13°09'N, 93°01'E, at 508 m, 18 November 2011, M.V.Ramana 0550 (holotype: CAL; isotypes: US, BSI, SUK, PBL).

Description. Erect, 40–60 cm high, glabrous perennial with a basal rosette of leaves (Fig. 1-B); roots fibrous, 2–4 cm long and 2 mm in diam. Leaves rosette, sheaths 0.5–1 cm long, lamina narrowly linear, 20–60 cm long, 0.4–0.8 cm wide, apex acuminate, base rounded merged into the sheath, margins entire; caudine leaves with sheaths 0.2–2 cm long, glabrous, narrowly lanceolate to linear, 1–25 cm long, 0.2–0.5 mm wide, base rounded, apex acute to acuminate, glabrous, margin entire, often scabrid; flowering shoot terminal in the basal rosette, erect, 20–40 cm long, unbranched or rarely branched from apically reduced caudine leaves (a bract). Inflorescence terminal and axillary (from uppermost foliaceous bract) of peduncled cincinni (Fig. 2-B); peduncles 2–7 cm long, glabrous, cincinni to 2 cm long, few flowered, bracteoles 5 mm long, caducous. Flowers bisexual (Fig. 1-C; Fig. 2-C,D), c. 1.5 cm wide, opening 1230–1600 hr; pedicels (2–) 3–5 mm long (not declinate in capsule); sepals elliptic to oblong elliptic, 5–6 mm long, pale white to green; petals ovate to obovate, lilac to pale lavender; stamens 2 (Fig. 2E), filaments densely bearded, (3–) 4 mm long, anthers elliptic, c. 1 mm long; staminodes 3 (Fig. 2G), antepetalous with glabrous to sparsely bearded filaments, antherodes tri-lobed, yellow; one rudimentary stamen, antisepalous

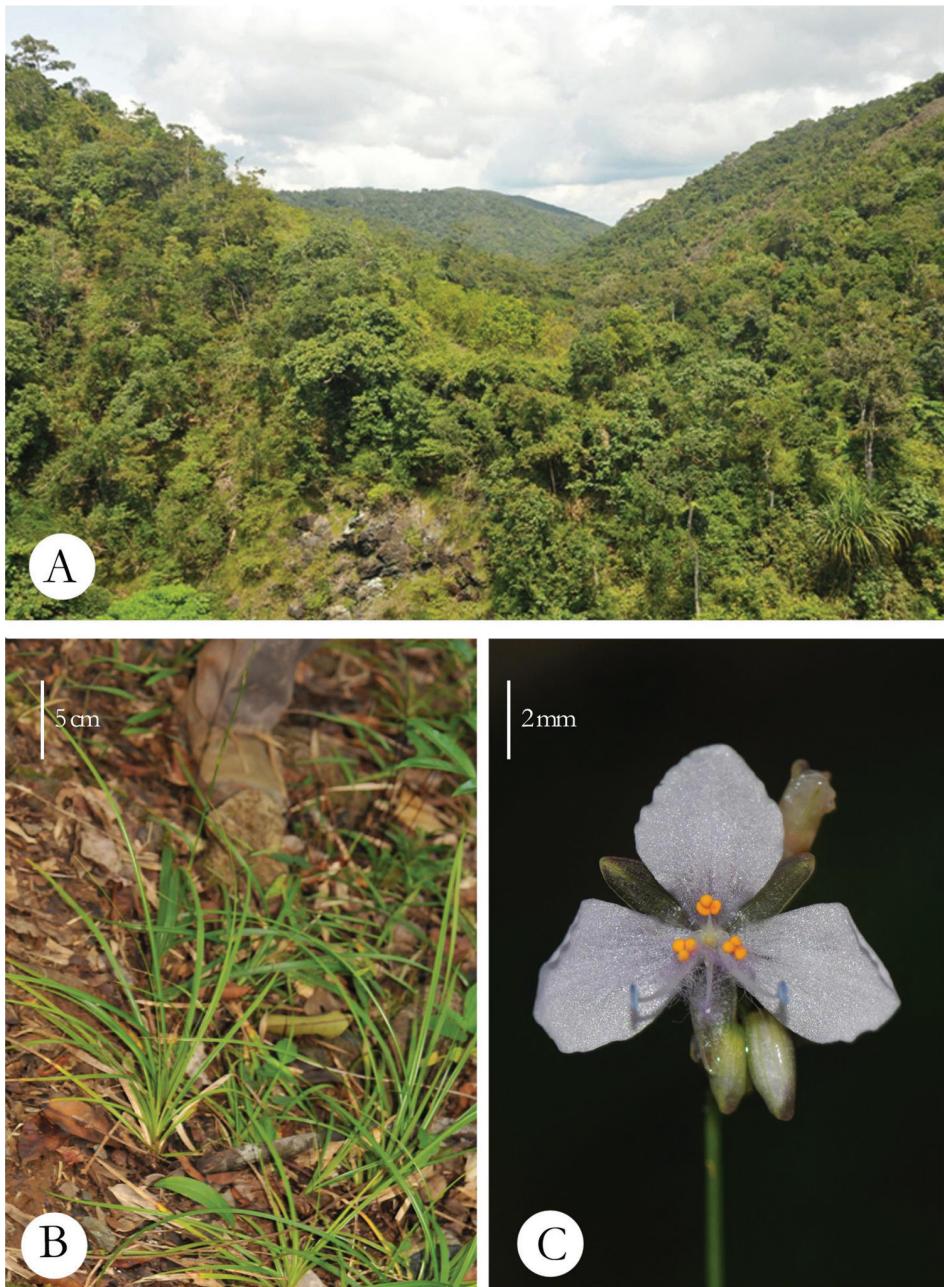


Figure 1. *Murdannia saddlepeakensis* **A** Habitat (a view of Saddle Peak National Park) **B** Habit **C** Flower, ventral view.

(Fig. 2F) with densely bearded filament ending with sterile knob; ovary glabrous; style recurved towards staminodes, (3–)4 mm long; stigma simple. Capsule subglobose, 4–5 mm long, 3 mm wide, locules 1-seeded. Seeds (Fig. 2J, K) elliptic or rarely ovoid,

2.5–5 mm long, 1.5–3 mm wide, testa scorbiculate on all surfaces, the depressions often partially uniting on the dorsal surface, forming a little larger, irregular depressions, dark brown, hilum linear or oblong-linear, embryotega dorsal-semidorsal, farinose sparsely in all depressions and around the embryotega.

Distribution. *Murdannia saddlepeakensis* is so far only known from Saddle Peak National Park, North Andaman Islands, India.

Ecology. It grows in an open scrub forest in rocky situations at an elevation of 508 m. The common associates are *Sonerila andamanensis* Staph & King (Melastomataceae), *Ophiorrhiza mungos* L. (Rubiaceae) and *Gomphostemma javanicum* (Blume) Benth. (Lamiaceae). It was observed flowering and fruiting from October to February.

Etymology. *Murdannia saddlepeakensis* is named after the type locality Saddle Peak National Park. It is the highest peak of the entire archipelago, reaching an altitude of 732 m.

Conservation status. *Murdannia saddlepeakensis* was collected only once from the Saddle Peak National Park (North Andaman Islands). At this site c. 25 individuals in an open scrub forest in rocky situations were observed and hence it is assumed to be rare. However, larger part of the National Park is unexplored due to human inaccessibility. Therefore, the species can be accessed as “Data Deficient” (DD), using the criteria of IUCN (2001).

Discussion. *Murdannia saddlepeakensis* belongs to the group *Terminatae* G. Brückn. (173: 1830) [Inflorescence terminal, many-flowered, the main shoot and lateral flowering shoots few to several, shortened, completely tufted]. In India, series *Terminatae* is represented by eight species viz. *M. dimorpha* G. Brückn., *M. divergens* (C.B. Clarke) G. Brückn., *M. hookeri* (C.B. Clarke) G. Brückn., *M. japonica* (Thunb.) Faden, *M. gigantea* (Vahl) G. Brückn., *M. loriformis* (Hassk.) R.S. Rao & Kammathy, *M. nudiflora* (L.) Brenan and *M. simplex* (Vahl) Brenan (modified after Brückn. 1930). The first four species have more than two seeds per locule and rest four have two seeds per locule while *M. saddlepeakensis* has single seed per locule.

Murdannia saddlepeakensis closely resembles *M. simplex* but can be easily distinguished by its narrow linear leaves, terminal flowering shoot in the basal rosette, glabrous leaf sheaths, single seeded locule, elliptic seed with scorbiculate surface. In addition, *M. saddlepeakensis* is restricted to northern Andaman Island whereas *M. simplex* is much more wide spread in Tropical Africa and Asia. *M. gigantea* with a terminal flowering shoot also is similar to *M. saddlepeakensis* but differs in having thick, fibrous roots, broad leaves, three stamens and seeds with dorsal embryotega. *M. saddlepeakensis* can also be mistaken for the widespread *M. loriformis* in general. However, the presence of erect, terminal flowering shoot and scorbiculate, single seeded locule along with anthesis by noon supports its distinctness.

Pandey and Diwakar (2008) recorded five species of *Murdannia* from Andaman & Nicobar Islands namely *Murdannia crocea* (Griff.) Faden subsp. *crocea*, *M. gigantea* (Vahl) G. Brückn., *M. nudiflora* (L.) Brenan, *M. spirata* (L.) G. Brückn. and *M. vaginata* (L.) G. Brückn. The occurrence of *Murdannia crocea* (Griff.) Faden subsp. *crocea* from Andaman seems to be erroneous as the screening of herbarium specimens at Kew

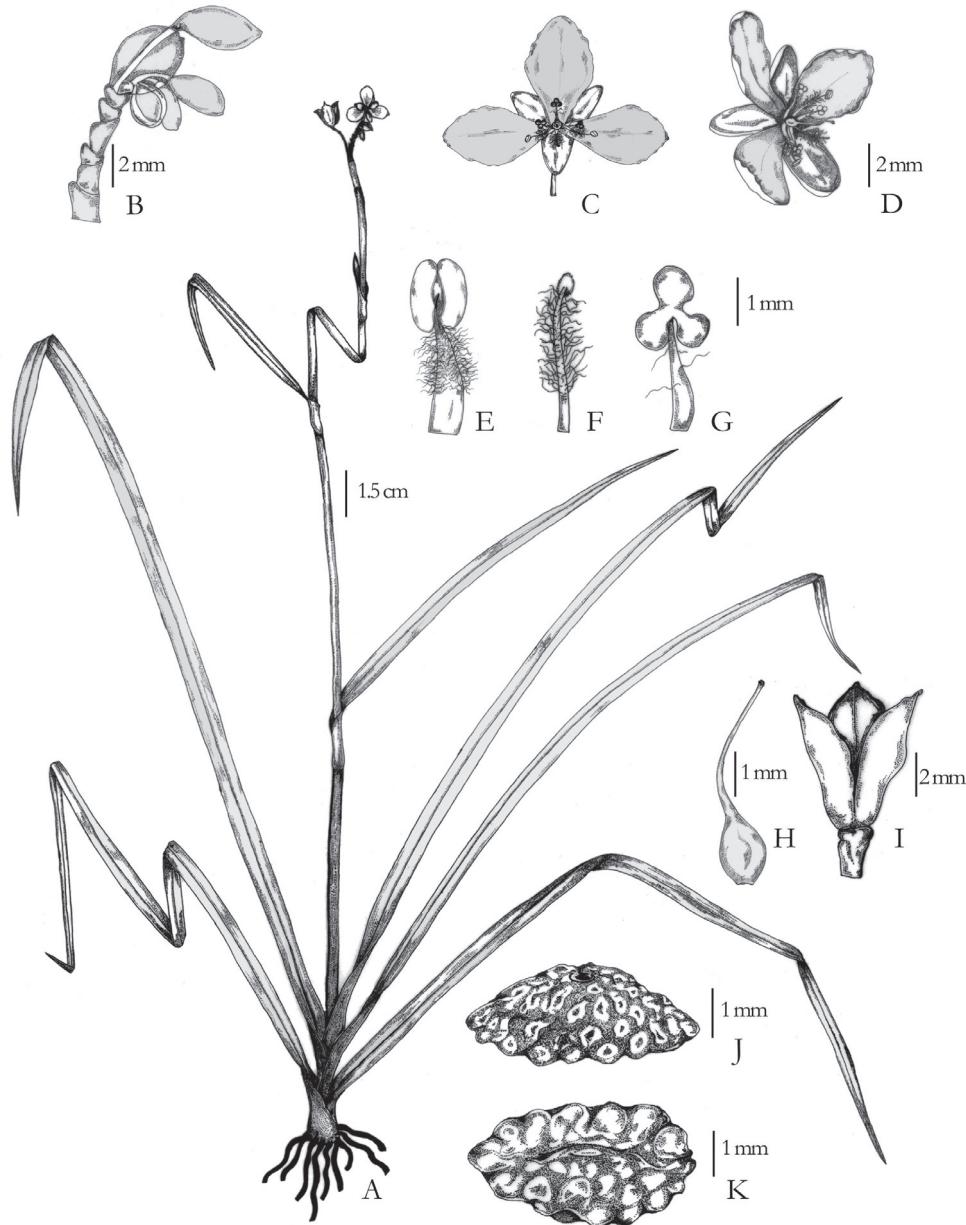


Figure 2. *Murdannia saddlepeakensis* **A** Habit **B** Inflorescence **C** Flower, ventral view **D** Flower, lateral view **E** Stamen **F** Rudimentary stamen **G** Staminode **H** Pistil **I** Capsule **J** Seed, lateral view **K** Seed, ventral view. All from *M V Ramana 0550*. Drawn by Mayur Nandikar

have revealed that *M. crocea* subsp. *crocea* is known only from Myanmar, Tenasserim [Herb. Helper 5497 (K!)]. No one has reported this species till from India after Helper's collection. A key for the species of the genus *Murdannia* in Andaman and Nicobar

Islands and closely related taxa of the new species is given below to facilitate identification (modified after Faden 2000).

1	Plants with basal rosette leaves	2
—	Plants without basal rosette leaves.....	5
2	Rosette leaves 0.4–0.8 cm wide; capsule subglobose; locule one seeded.....	
— <i>M. saddlepeakensis</i>	
—	Rosette leaves (0.5–) 0.8–1.5 cm wide; capsule ovoid to ellipsoid; locule two seeded.....	3
3	Flowering shoots terminal in the rosette; seeds ovoid to ellipsoid, 2.5–4 × 2–2.5 mm, hilum linear.....	<i>M. gigantea</i>
—	Flowering shoots lateral in the rosette; seeds ovoid to obovoid, 1.6–2 × 1.5 mm, hilum linear to oblong	4
4	Pedicels 3–5 mm long; seeds 1.5–2 mm long; flowers 12–15 mm wide, opening after noon	<i>M. simplex</i>
—	Pedicels 2–3 mm long; seeds 1.4–1.8 mm long; flowers 9–12 mm wide, fading by noon	<i>M. loriformis</i>
5	Leaves subtending inflorescence bract-like; capsule globose; locule one seeded	<i>M. vaginata</i>
—	Leaves not subtending inflorescence bract-like; capsule ovoid to obovoid or elliptic; locule more than 2 seeded	6
6	Leaves linear-lanceolate to linear-oblong; seeds 2 per locule	<i>M. nudiflora</i>
—	Leaves lanceolate to ovate; seeds 3–7 per locule.....	<i>M. spirata</i>

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A revised circumscription for the Blakeeae (Melastomataceae) with associated nomenclatural adjustments

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Abstract

Systematic investigations and phylogenetic analyses of the Blakeeae (Melastomataceae) have indicated that *Topoea* should be synonymized under *Blakeea*, and *Huilaea* under *Chalybea*. Presented here is a detailed description of the Blakeeae, a key to its two accepted genera, and a listing of 62 new combinations, including 3 new names, necessitated by the transfer of *Topoea* as follows: *B. acuminata* (Wurdack) Penneys & Judd, **comb. nov.**, *B. adscendens* (E.Cotton & Matezki) Penneys & Judd, **comb. nov.**, *B. albertiae* (Wurdack) Penneys & Almeda, **comb. nov.**, *B. amplifolia* (Almeda) Penneys & Almeda, **comb. nov.**, *B. arboricola* (Almeda) Penneys & Almeda, **comb. nov.**, *B. asplundii* (Wurdack) Penneys & Judd, **comb. nov.**, *B. barbata* (Gleason) Penneys & Judd, **comb. nov.**, *B. brenesii* (Standl.) Penneys & Almeda, **comb. nov.**, *B. brevibractea* (Gleason) Penneys & Judd, **comb. nov.**, *B. bullata* (E.Cotton & Matezki) Penneys & Judd, **comb. nov.**, *B. calcarata* (L.Uribe) Penneys & Judd, **comb. nov.**, *B. calophylla* (Almeda) Penneys & Almeda, **comb. nov.**, *B. calycularis* (Naudin) Penneys & Almeda, **comb. nov.**, *B. castanedae* (Wurdack) Penneys & Judd, **comb. nov.**, *B. clavata* (Triana) Penneys & Judd, **nom. nov.**, *B. cordata* (Gleason) Penneys & Almeda, **comb. nov.**, *B. cuprina* Penneys & Judd, **nom. nov.**, *B. cutucuensis* (Wurdack) Penneys & Judd, **comb. nov.**, *B. dimorphophylla* (Almeda) Penneys & Almeda, **comb. nov.**, *B. discolor* (Hochr.) Penneys & Judd, **comb. nov.**, *B. dodsonorum* (Wurdack) Penneys & Almeda, **comb. nov.**, *B. eplingii* (Wurdack) Penneys & Judd, **comb. nov.**, *B. ferruginea* (Gleason) Penneys & Judd, **comb. nov.**, *B. fragrantissima* (Almeda) Penneys & Almeda, **comb. nov.**, *B. gerardoana* (Almeda) Penneys & Almeda, **comb. nov.**, *B. glaberrima* (Triana) Penneys & Judd, **comb. nov.**, *B. henripiettieri* (Cogn.) Penneys & Almeda, **comb. et nom. nov.**, *B. hexandra* (Almeda) Penneys & Almeda, **comb. nov.**, *B. horologica* Penneys & Judd, **nom. nov.**, *B. induta* (Markgr.) Penneys & Judd, **comb. nov.**, *B. inflata* (Triana) Penneys & Judd, **comb. nov.**, *B. insignis* (Triana) Penneys & Judd, **comb. nov.**, *B. intricata* (Almeda) Penneys & Almeda, **comb. nov.**, *B. killipii* (Wurdack) Penneys & Judd, **comb. nov.**, *B. lenti* (Almeda) Penneys & Almeda, **comb. nov.**, *B.*

longiloba (Wurdack) Penneys & Judd, **comb. nov.**, *B. longisepala* (Gleason) Penneys & Judd, **comb. nov.**, *B. macbrydei* (Wurdack) Penneys & Judd, **comb. nov.**, *B. maguirei* (Wurdack) Penneys & Judd, **comb. nov.**, *B. maurofernandeziana* (Cogn.) Penneys & Almeda, **comb. nov.**, *B. mcphersonii* (Almeda) Penneys & Almeda, **comb. nov.**, *B. modica* (Wurdack) Penneys & Judd, **comb. nov.**, *B. mortoniana* (Wurdack) Penneys & Judd, **comb. nov.**, *B. muricata* (Lozano) Penneys & Judd, **comb. nov.**, *B. pascoensis* (Wurdack) Penneys & Judd, **comb. nov.**, *B. pluvialis* (Standl.) Penneys & Almeda, **comb. nov.**, *B. sessilifolia* (Triana) Penneys & Judd, **comb. nov.**, *B. setosa* (Triana) Penneys & Judd, **comb. nov.**, *B. standleyi* (L.O.Williams) Penneys & Almeda, **comb. nov.**, *B. stephanochaeta* (Naudin) Penneys & Judd, **comb. nov.**, *B. steyermarkii* (Wurdack) Penneys & Judd, **comb. nov.**, *B. suaveolens* (Almeda) Penneys & Almeda, **comb. nov.**, *B. subbarbata* (Wurdack) Penneys & Judd, **comb. nov.**, *B. subscabrula* (Triana) Penneys & Judd, **comb. nov.**, *B. subsessiliflora* (Wurdack) Penneys & Judd, **comb. nov.**, *B. superba* (Naudin) Penneys & Judd, **comb. nov.**, *B. tetramera* (Almeda) Penneys & Almeda, **comb. nov.**, *B. tetroici* (Wurdack) Penneys & Judd, **comb. nov.**, *B. toachiensis* (Wurdack) Penneys & Judd, **comb. nov.**, *B. trianae* (Cogn.) Penneys & Judd, **comb. nov.**, *B. verrucosa* (Wurdack) Penneys & Judd, **comb. nov.**, *B. watsonii* (Cogn.) Penneys & Almeda, **comb. nov.**.

Keywords

Blakeeae, *Blakea*; *Chalybea*, *Huilaea*, Melastomataceae, Neotropics, nomenclature, *Topoebea*

Introduction

Melastomataceae Juss., with approximately 5000 species and 190 genera (Stevens 2001–), is one of the ten largest families of angiosperms. The tribe Blakeeae Bentham & Hooker is strictly Neotropical, with centers of diversity in the “megadiverse” Choco-Andean region of South America and the mountains of Costa Rica and Panama, though the species range from Chiapas, Mexico, to the Amazon of Bolivia and Brazil, to French Guiana. Three additional species are found in the West Indies. Members of this tribe are notable for their often large, showy flowers that attract a diversity of pollinators including bees, birds, bats, and rodents (Lumer 1980). Mites and ants live in mutualistic associations in leaf and stem domatia of many Blakeeae (Penneys and Judd 2011). Numerous species in this tribe have great horticultural potential, are relatively easy to grow in temperate zone greenhouses, but are rarely cultivated.

The Blakeeae, as historically circumscribed, comprises nearly 200 species in two genera, *Blakea* L. and *Topoebea* Aubl. However, morphological, molecular, and combined phylogenetic analyses (Penneys et al. 2004; Penneys 2007; Penneys and Judd 2010, 2011, in press) have necessitated adjustments in the circumscription of the Blakeeae. Morphological characters pertaining to the androecium that have been used as a basis for separating these two genera have proven to be homoplasious and of limited taxonomic value (Penneys 2007, Penneys and Judd 2011, Penneys and Judd, in press). Recognition of *Topoebea* renders both that genus and *Blakea* polyphyletic, thus *Topoebea* is here relegated to synonymy under *Blakea*. According to Cogniaux (1891), the filaments in *Blakea* are thick, while in *Topoebea* they are filiform. The latter character state was found in only three species of *Topoebea*, and even the generotype, *T. parasitica* Aubl., was not one of them. The anthers of *Blakea* have been said (Cogniaux 1891,

Almeda 2000a) to be laterally compressed, while those of *Topoebea* are rounded. Close examination of *Topoebea* anthers proves that they are also laterally flattened, though since the anthers are generally more subulate, this fact is less apparent than in *Blakea* (Penney 2007, Penney and Judd 2011). Morphological characters synapomorphic for an expanded *Blakea* include the prevalent but not exclusively hemiepiphytic habit; axillary, nonramified truncate monotelic synflorescences, flowers subtended by two pairs of decussate bracts, external calyx teeth lacking, flowers zygomorphic due to the declinate androecium, and anthers laterally compressed (Penney and Judd 2011).

Chalybea Naudin and *Huilaea* Wurdack, were formerly placed in the Miconiaeae (Naudin 1852, Triana 1871, Wurdack 1957, Judd and Skean 1991), presumably on the basis of their having berry fruits. Morphological and molecular phylogenetic analyses demonstrate that the two genera properly belong in the Blakeeae, forming a clade with ten species sister to *Blakea* (Penney et al. 2004, Penney 2007, Penney and Judd 2010, Penney and Judd 2011, Penney and Judd, in press, Morales-P. 2010, Morales-P. and Penney 2010, Morales-P. et al., submitted). *Chalybea* has been found to be nested within *Huilaea* (Morales-P. 2010, Morales-P. and Penney 2010, Penney and Judd 2010, Morales-P. et al., submitted), thus the species in the latter genus will be transferred (Morales-P. 2010, Morales-P. et al., in prep) to *Chalybea*, which has nomenclatural priority. The inclusion of *Chalybea* in the Blakeeae necessitates an expansion of the recognized morphological variation within the tribe (see below). The expanded *Chalybea* has numerous morphological synapomorphies including the terrestrial, arborescent habit, pinwheel acarodomatia in the vein axils, truncate monotelic synflorescences with elongate peduncles (Mora-Osejo 1966), actinomorphic, pseudocampanulate flowers subtended by a single pair of narrow bracteoles, lenticellate hypanthia, anthers laterally rounded and relatively short compared to the filament length, inferior ovaries, styles not immersed in a crown, and yellowish-green fruits with thick and leathery exocarps.

In this paper, we present a revised description of the Blakeeae, a key to *Blakea* and *Chalybea* with diagnoses of each, and an enumeration of the new names and combinations necessitated by the transfer of *Topoebea* to *Blakea*.

Taxonomy and nomenclature

Blakeeae Benth. & Hook. f., Gen. Pl. 1: 727, 735. 1867. Type genus: *Blakea* P.Browne.

Pyxidantheae Triana, Bull. Congr. Int. Bot. Amsterdam. 457. 1865. Type genus: *Pyxidanthus* Naudin.

Remarks. Evergreen shrubs, trees, or lianas, growing as terrestrials, hemiepiphytes, or epiphytes, with variable indumentum, the hairs sparsely to densely distributed, unicellular or multicellular, variously smooth to roughened to barbellate, furfuraceous-granulose, eglan-dular, or sessile to short- to long-stalked globular glandular, setae slender to stoutly conic,

occasionally apically fimbriate. Twigs rectangular, square, quadrate, to terete in cross-section, sometimes formicarial with hollow or apically inflated internodes and subnodal entrance holes. Stipules absent, interpetiolar and ± coriaceous, or layered and membranaceous. Petioles terete, canaliculate, to winged; leaves opposite, decussate, nearly sessile to petiolate, equal to anisophyllous, then the smaller leaf sometimes deciduous; blade chartaceous to coriaceous, flat to verrucose, frequently drooping and vivid yellow to scarlet when senescent, the apex acute, to broadly rounded, often abruptly short to long acuminate, the base acute, to rounded, to cordate, rarely subpeltate or decurrent along petiole margins, the margin plane to revolute, entire to toothed; venation acrodromous, basal to plinerved, with prominent midvein and 2 to 7 pairs of secondary veins (including a pair of weak, submarginal veins), tertiary veins numerous and striolate to widely spaced, subperpendicular to midvein; adaxial surface usually glabrescent, but sometimes with persistent hairs (as above), the veins variously flat to impressed; abaxial surface light to dark green or tan, essentially glabrous to densely pubescent with various hair types (as above), the midvein and major secondary veins raised, minor secondary veins, tertiary veins and higher order veins flat to raised; acarodomatia frequently present in primary-axillary vein axils, formed by hair tufts, coalesced veins, or membranes, or rarely a foliose flap of tissue partially encircling the adaxial apex of the petiole (*B. austin-smithii*, *B. chlorantha*). Inflorescences axillary in distal nodes, simple or compound cyme (*Chalybea*) or solitary to fasciculate (*Blakea*), bracts and bracteoles caducous (*Chalybea*) or persistent (*Blakea*), each flower subtended by a single pair (*Chalybea*) or two (very rarely three) pairs (*Blakea*) of bracteoles, the bracteoles obscure to foliaceous, membranaceous to coriaceous, free to completely connate, appressed to hypanthium or spreading, linear to elliptic to oblate, entire to remotely denticulate, with pubescence as above. Flowers perfect, 6-merous (4-merous in *Blakea tetramera*), mostly showy, actinomorphic to zygomorphic as a result of the declinate androecium (*Blakea*), frequently with pleasantly sweet to musky fragrance (*Blakea*), rarely nectariferous, the stomatal nectaries located on the anther connective appendages. Hypanthium narrowly to broadly globose, cylindrical to conical, terete to costate, the outer surface glabrous or with pubescence (as above), when present, hairs usually denser proximally, the inner surface glabrous or rarely glandular-pubescent, obscurely to prominently ridged, the apices of the ridges not to distinctly projecting around style base. External calyx teeth, when present, (4–) 6 (absent in calyptrate species), distinct, with apex acuminate to acute, or reduced to blunt thickenings; internal calyx lobes (4–) 6 (absent in calyptrate species), valvate or rarely imbricate, the lobes merely inconspicuous tubercles, to narrowly to broadly triangular, truncate, lanceolate, to orbicular, rarely with a large flap of tissue elaborated from the apical and distal portion of the calyx lobe, then tightly held to the underside of the lobe (*B. bocatorena* ined., *B. calycosa*, *B. tuberculata*), the margin entire, often callose-thickened, in fruit, the lobes sometimes becoming colorful, sometimes inrolled; calyx tube glabrous inside. Petals (4–) 6, rarely containing druse crystals, imbricate in bud, orbiculate, ovate, elliptic, obovate, to rhombic, frequently widely so, sometimes clawed, symmetrical or oblique, reflexed, rotate, or pseudocampanulate, white, cream, pink, lavender, magenta, red, or green, the apex acute, obtuse, rounded, truncate, to emarginate; margin entire to minutely erose; both surfaces usually glabrous, rarely sparsely pubescent. Stamens 12 (6 and antesepalous

in the hexandrous *Blakea* clade; 8 in *B. tetramera*), incurved in bud, isomorphic or rarely subequal with central stamens slightly larger than those at perimeter of cycle (*Blakea*); filaments in cross section nearly flat dorsally, usually with an obscure to prominent ventral keel and laterally narrowed (rarely cylindrical), white, cream, pink, or lavender; anthers white, cream, yellow, bluish, lavender, to deep purple, free or connate, laterally rounded to flattened, anther sacs somewhat to deeply separated ventrally, linear to obtuse, opening by one or two pores, the pores sometimes confluent, dorsally to ventrally positioned; dorsal basal anther connective appendages smooth to rugose, mostly modified blunt knobs, parallel longitudinal ridges, triangular spurs (sometimes two present), or caudate. Ovary (2–) 4–6 (–12)–loculate, inferior to superior, apically glabrous or rarely glandular-pubescent, smooth to ridged, unadorned or with circumstyilar, short- to long-acute projections, ± rectangular flanges, or rarely with ascending, radiating, elongate appendages (*B. glandulosa*, *B. hirsuta*); placentation axile to deeply intruded axile, the ovules numerous, anatropous; style elongate (bluntly clavate in *B. princeps*), terete, cylindrical, slightly swollen suprabasally, or tapered, glabrous or glandular-pubescent, white, cream, pink, or lavender; stigma truncate to capitate, rarely obscurely lobed and concave (mostly in *Chalybea*). Berries ± globose to elliptical, greenish when immature, becoming yellowish-green, pale greenish-white, red, lavender, orange, or deep purple at maturity, glabrous to pubescent (as above), the exocarp thin to leathery, fairly dry and unpalatable to juicy, sweet, and highly comestible (especially *Chalybea*). Seeds numerous, pyramidal to ovoid, testa smooth to sculpted.

Distribution: Mexico (Chiapas) to Bolivia and Brazil; Jamaica, Lesser Antilles. The Pacific slopes of the Cordillera Occidental, Colombia represent the center of specific and morphological diversity. Occurring from sea level to ca. 3000 meters.

Key to the genera of Blakeeae:

- 1a Flowers solitary or fasciculate, each flower subtended by two (three) pairs of expanded (rarely lanceolate), persistent, decussate bracts.....*Blakea*
- 1b Flowers in simple or compound cymes, each flower subtended by a single pair of lanceolate, cauducous bracts*Chalybea*

***Chalybea* Naudin, Ann. Sci. Nat., Bot. sér. 3 16: 99. 1851. Type: *Chalybea corymbifera* Naudin, Ann. Sci. Nat., Bot. sér. 3 16: 100. 1851. TYPE. COLOMBIA. Santander: Pamplona, La Baja, ca. 3000 m, Dec 1846, Funck & Schlim 1312 (holotype: P!, photos at NY!, US!; isotypes: BM!, BR! (2 sheets), G!, photos of G sheet at NY!, US!).**

<http://species-id.net/wiki/Chalybea>

***Huilaea* Wurdack, Brittonia 9: 106. 1957. Type: *Huilaea penduliflora* Wurdack, Brittonia 9: 106. 1957. TYPE. COLOMBIA. Huila: Cordillera Oriental, wet temperate forest of deep moist canyon near camp on north side of Río Venadito, 25 km SE of La Bodega, 2450 m, 1 Dec 1944, E.Little 9101 (holotype: US!; isotypes: COL!, NY!).**

Remarks. Phylogenetic analyses (Morales-P. 2010, Morales-P. et al., submitted, Penneys and Judd 2010) indicate that *Chalybea* and *Huilaea* form a strongly-supported clade. However, as *Chalybea* is nested within *Huilaea*, species belonging to the latter genus must be transferred because *Chalybea* has nomenclatural priority. *Chalybea* has been distinguished from *Huilaea* by having inflorescences with 21–39 flowers (vs. 3–17 in *Huilaea*), the flowers 13–20 mm long (vs. 45–55 mm long), the hypanthium 7–10 mm long and 8–10 mm wide (vs. 13–31 mm long x 11–19 mm wide), the petals 12–14 mm long and 5–7 mm wide (vs. 26–44 mm long x 10–22 mm wide), and white to cream or green, sometimes pink-tinged apically (vs. pink to red, paler inside), the anthers 3–4 mm long (vs. 7–10 mm long), and the style 10–12 mm long (vs. 22–33 mm long).

Chalybea includes ten described species of small, South American trees: seven endemic to Colombia, two to Ecuador, and one to Peru. All are found in the Andes, except one species that is restricted to the Sierra Nevada de Santa Marta, Colombia.

For more information on the systematics of *Chalybea* (and *Huilaea*), see Lozano-Contreras, G. and N. Ruiz-R. (1996), Morales-P. and González (2005), Morales-P. (2010), Morales-P. and Penneys (2010), and Morales-P. et al. (submitted).

***Blakea* P.Browne, Civ. Nat. Hist. Jamaica 323. tab. 35. 1756. Type:** *Blakea trinervia* L., Syst. Nat. ed. 10: 1044. 1759. TYPE. JAMAICA. P.Browne s.n. (holotype: LINN-612.1!).

<http://species-id.net/wiki/Blakea>

***Topoea* Aubl., Hist. Pl. Guiane 1: 476. 1775. Type:** *Topoea parasitica* Aubl., Hist. Pl. Guiane 1: 476. 1775. TYPE. FRENCH GUIANA. Aublet s.n. (holotype: BM!).

***Valdesia* Ruiz & Pav., Fl. Peruv. Prodr. 67. 1794. Type:** *Valdesia repens* Ruiz & Pav., Syst. Veg. Fl. Peruv. Chil. 121. 1798. TYPE. PERU. Ruiz & Pav. s.n. (holotype: B (destroyed), photos at MO!, US!).

***Pyxidanthus* Naudin, Ann. Sci. Nat. Bot. ser 3 18: 150. 1852. Type:** *Pyxidanthus schlimii* Naudin, Ann. Sci. Nat., Bot. sér. 3 18: 151. 1852. TYPE. VENEZUELA.

Trujillo, Funk & Schlim 738 (holotype: G; (fragment), photos at MO!, US!; isotypes: BM!, BR!, MPPU!).

***Amaraboya* Linden, Illustr. Hort. 34: 15. 1887. Type:** *Amaraboya princeps* Linden, Illustr. Hort. 34: 15. 1887. (lectotype, designated here: pl. IV of the protologue).

Remarks. *Blakea* is characterized by solitary or fasciculate axillary inflorescences, and flowers subtended by two (rarely three) pairs of decussate, (usually) expanded, subtending bracts. Additionally, *Blakea* may usually be distinguished from *Chalybea* by the species often being hemiepiphytic or epiphytic, mostly with rotate corollas, anthers that are usually laterally flattened and often connate and/or deflexed, with the connective appendages generally better developed and of diverse morphology, and many *Blakea* species have ovaries that are not entirely inferior, often possessing stylar collars. Cladistic analyses (Penneys et al, 2004, Penneys 2007, Penneys and Judd 2011, in press) have

provided conclusive evidence that the recognition *Topoeba* renders both that genus and *Blakea* polyphyletic, thus *Topoeba* is here relegated to synonymy under *Blakea*.

Blakea comprises approximately 180 species distributed from Mexico (Chiapas) to Bolivia and Brazil, with two species in Jamaica and one in the Lesser Antilles.

Formal nomenclatural transfers to *Blakea* are made below for 62 species of *Topoeba* that were not treated by earlier workers who made similar new combinations (e.g., Don 1823, Macbride 1941). Three of these include new specific epithets for names already occupied in *Blakea*.

Important references concerning the systematics of *Blakea* include (Almeda 1990, 2000a, 2000b, 2001a, 2001b, 2009, Gleason 1945, Wurdack 1973, 1980, Penneys 2007, Penneys and Judd 2011, in press).

Nomenclatural changes:

***Blakea acuminata* (Wurdack) Penneys & Judd, comb. nov.** Basionym: *Topoeba acuminata* Wurdack, Phytologia 52: 69. 1982. TYPE. ECUADOR. Pastaza: in remnants of primary rain forest at Tarqui 5 km south of Puyo, ca. 850 m, 8 Mar 1980, G.Harling & L.Anderson 17058 (holotype: GB; isotype: US!). IPNI ID: urn:lsid:ipni.org:names:77124962-1

***Blakea adscendens* (E.Cotton & Matezki) Penneys & Judd, comb. nov.** Basionym: *Topoeba adscendens* E. Cotton & Matezki, Brittonia 55: 76. 2003. TYPE. ECUADOR. Zamora-Chinchipe: San Francisco Research Station, ca. 30 km from the city of Loja on hwy. toward Zamora, 2050 m, 03°58'18"S, 79°04'44"W, 2 Dec 2000, S.Matezki 344 (holotype: AAU; isotypes: LOJA!, MO!, NY!, QCNE!, UBT). IPNI ID: urn:lsid:ipni.org:names:77124963-1

***Blakea albertiae* (Wurdack) Penneys & Almeda, comb. nov.** Basionym: *Topoeba albertiae* Wurdack, Phytologia 55: 146. 1984. TYPE. COLOMBIA. Antioquia: Fincas Montepinar and Las Palmas, Vereda Quebrada Larga, Municipio Guatapé at the line with Municipio San Rafael, 1800 m, 4 Sep 1982, L.Albert de Escobar et al. 2278 (holotype: HUA; isotypes: COL!, JUAM!, US!). IPNI ID: urn:lsid:ipni.org:names:77124964-1

***Blakea amplifolia* (Almeda) Penneys & Almeda, comb. nov.** Basionym: *Topoeba amplifolia* Almeda, Proc. Calif. Acad. Sci., ser. 4, 52: 518. 2001. TYPE. COSTA RICA. Limón: Cantón de Talamanca, Bratsi, Amubri, Alto Lari, Kivut. Afluente innominado del Río Lari, margen izquierdo, 1200 m, 09°23'25"N, 83°04'25"W, 21 Mar 1992, G.Herrera 5407 (holotype: CAS!; isotypes: CR!, INB!, MO!). IPNI ID: urn:lsid:ipni.org:names:77124965-1

***Blakea arboricola* (Almeda) Penneys & Almeda, comb. nov.** Basionym: *Topoeba arboricola* Almeda, Proc. Calif. Acad. Sci., ser. 4, 52: 98. 2000. TYPE. PANAMA. Bocas del Toro/Chiriquí border: windswept cloud forest on slopes and valleys of the Cerro Colorado region, 1450 m, 27 Jan 1989, F.Almeda et al. 6456 (holotype: CAS!; isotypes: MO!, PMA!). IPNI ID: urn:lsid:ipni.org:names:77124966-1

***Blakea asplundii* (Wurdack) Penneys & Judd, comb. nov.** Basionym: *Topoea asplundii* Wurdack, Phytologia, 29: 149. 1974. TYPE. ECUADOR. Napo: collected between Tena and Napo, 5 Jan 1940, E.Asplund 10254 (holotype: S; isotypes: BR!, LL!, NY!). IPNI ID: urn:lsid:ipni.org:names:77124967-1

***Blakea barbata* (Gleason) Penneys & Judd, comb. nov.** Basionym: *Topoea barbata* Gleason, Bull. Torrey Bot. Club 72: 393. 1945. TYPE. COLOMBIA. Valle del Cauca: collected at Barco, on the Pacific coast, Río Cajambre, 5–80 m, J.Cuatrecasas 17215 (holotype: NY!; isotypes: COL!, F!). IPNI ID: urn:lsid:ipni.org:names:77124968-1

***Blakea brenesii* (Standl.) Penneys & Almeda, comb. nov.** Basionym: *Topoea brenesii* Standl., Publ. Field Mus. Nat. Hist., Bot. Ser. 18: 842. 1938. TYPE. COSTA RICA. Alajuela: La Palma de San Ramón, 1250 m, Mar 1929, A.Brenes 6732 (holotype: F!; isotypes: CR, NY!). IPNI ID: urn:lsid:ipni.org:names:77124969-1

***Blakea brevibractea* (Gleason) Penneys & Judd, comb. nov.** Basionym: *Topoea brevibractea* Gleason, Brittonia 2: 326. 1937. TYPE. ECUADOR. Cotopaxi [as León]: collected near Hacienda Solento, Santa Rosa, Canton Pajili, 1000 m, Y.Mexia 6683 (holotype: NY!; isotypes: CAS!, F!, K!, US!). IPNI ID: urn:lsid:ipni.org:names:77124970-1

***Blakea bullata* (E.Cotton & Matezki) Penneys & Judd, comb. nov.** Basionym: *Topoea bullata* E. Cotton & Matezki, Brittonia 55: 78. 2003. TYPE. ECUADOR. Zamora-Chinchipe: San Francisco Biological Station, ca. 30 km from the city of Loja on hwy. toward Zamora, 2100 m, 03°58'18"S, 79°04'44"W, 5 Sept 2001, S.Matezki 396 (holotype: AAU; isotypes: LOJA!, MO!, NY!, QCNE!, UBT). IPNI ID: urn:lsid:ipni.org:names:77124971-1

***Blakea calcarata* (L.Uribe) Penneys & Judd, comb. nov.** Basionym: *Topoea calcarata* L.Uribe, Caldasia 11: 89. 1971. TYPE. COLOMBIA. Chocó: Arusi, 17 Feb 1947, O.Haught 5579 (holotype: COL!; isotypes: NY!, US!). IPNI ID: urn:lsid:ipni.org:names:77124972-1

***Blakea calophylla* (Almeda) Penneys & Almeda, comb. nov.** Basionym: *Topoea calophylla* Almeda, Proc. Calif. Acad. Sci 43: 281. 1984. TYPE. PANAMA. Veraguas: 5 mi. W of Santa Fé on road past Escuela Agricola Alto Piedra on Pacific side of divide, 800–1200 m, 18 Mar 1973, T.Croat 23000 (holotype: CAS!; isotypes: MEXU, MO!, PMA!, US!). IPNI ID: urn:lsid:ipni.org:names:77124973-1

***Blakea calycularis* (Naudin) Penneys & Almeda, comb. nov.** Basionym: *Topoea calycularis* Naudin, Ann. Sci. Nat., Bot., sér. 3,: 149. 1852. TYPE. MEXICO. Chiapas. Zuluzuchiapas, April, J.Linden 650 (holotype: P!; isotypes: BR!, K!). IPNI ID: urn:lsid:ipni.org:names:77124975-1

***Blakea castanedae* (Wurdack) Penneys & Judd, comb. nov.** Basionym: *Topoea castanedae* Wurdack, Phytologia 7: 244. 1960. TYPE. COLOMBIA. Nariño: La Guayacana, Tumaco, 27 June 1951, R.Castañeda 2939 (holotype: NY!; isotype: F!). IPNI ID: urn:lsid:ipni.org:names:77124974-1

***Blakea clavata* (Triana) Penneys & Judd, nom. nov.** Basionym: *Topoea gracilis* Triana, Trans. Linn. Soc. 28: 150. 1871 [1872]. TYPE. COLOMBIA. Nariño:

Barbacoas, 400 m, 1854–1857, J.Triana 4085b (holotype: BM!). The specific epithet is preempted by *Blakea gracilis* Hemsl., Diag. Pl. Nov. 13. 1878. The new specific epithet is from the Latin *clavata*, meaning club, in reference to the club-shaped, formicarial internodes. IPNI ID: urn:lsid:ipni.org:names:77124977-1

***Blakea cordata* (Gleason) Penneys & Almeda, comb. nov.** Basionym: *Topoebea cordata* Gleason, Phytologia 3: 354. 1950. **TYPE. PANAMA.** Coclé: Cerro Pajita, hills north of El Valle de Antón, 1000–1200 m, 7 Feb 1947, P.Allen & D.Allen 4178 (holotype: NY!; isotype: MO!). IPNI ID: urn:lsid:ipni.org:names:77124978-1

***Blakea cuprina* Penneys & Judd, nom. nov.** Basionym: *Topoebea glabrescens* Triana, Trans. Linn. Soc. 28: 149. 1871 [1872]. **TYPE. COLOMBIA.** Nariño: Barba-coas, 900 m, May 1853, J.Triana 4100 (holotype: BM!; isotype: COL!). The specific epithet is preempted by *Blakea glabrescens* Benth., Bot. Voy. Sulph. 94. 1844. The new specific epithet for this species is derived from the Latin *cuprina*, meaning copper, in reference to the dense, coppery pubescence on the abaxial leaf surfaces. IPNI ID: urn:lsid:ipni.org:names:77124979-1

***Blakea cutucuensis* (Wurdack) Penneys & Judd, comb. nov.** Basionym: *Topoebea cutucuensis* Wurdack, Mem. New York Bot. Gard. 16: 45. 1967. **TYPE. ECUADOR.** Morona-Santiago/Zamora-Chinchipe: ridge ascending into central Cutucú, 770 m, 17 Nov–5 Dec 1944, W.Camp E-1129 (holotype: US!; isotype: NY!). IPNI ID: urn:lsid:ipni.org:names:77124980-1

***Blakea dimorphophylla* (Almeda) Penneys & Almeda, comb. nov.** Basionym: *Topoebea dimorphophylla* Almeda, Proc. Calif. Acad. Sci., ser. 4, 52: 523. 2001. **TYPE. COSTA RICA.** Heredia: along Río Peje about 0.5 km SW of back end of Vargas property; approximately in the area where an imaginary line drawn between Mag-sasay (colonia penal) and Puerto Viejo de Sarapiquí would cross the Río Peje, 20 Feb 1982, B.Hammel 11217 (holotype: CAS!; isotypes: CR, DUKE, F!, INB!, MO!, NY!, US!). IPNI ID: urn:lsid:ipni.org:names:77124981-1

***Blakea discolor* (Hochr.) Penneys & Judd, comb. nov.** Basionym: *Topoebea discolor* Hochr., Bull. New York Bot. Gard 6: 282. 1910. **TYPE. COLOMBIA.** Antioquia: Truando, 1857, Schott XII (holotype: NY!). IPNI ID: urn:lsid:ipni.org:names:77124982-1

***Blakea dodsonorum* (Wurdack) Penneys & Almeda, comb. nov.** Basionym: *Topoebea dodsonorum* Wurdack, Phytologia 38: 304. 1978. **TYPE. ECUADOR.** Pichincha-Los Ríos border: in cloud forest along ridge line near La Centinella at Km 12 on road from Patricia Pilar to Flor de Mayo, Montaña de Ila, 600 m, 16 July–11 Aug 1977, C.Dodson & H.Dodson 6752 (holotype: US!; isotypes: MO!, SEL!). IPNI ID: urn:lsid:ipni.org:names:77124983-1

***Blakea eplingii* (Wurdack) Penneys & Judd, comb. nov.** Basionym: *Topoebea eplingii* Wurdack, Phytologia 29: 151. 1974. **TYPE. ECUADOR.** Esmeraldas: primary rain forest at Tobar Donoso, junction of Río San Juan and Río Camumbi, 150 m, 01°10'N, 78°31'W, 25 July 1966, C.Jativa & C.Epling 1123 (holotype: US!; isotypes: NY!, US!). IPNI ID: urn:lsid:ipni.org:names:77124984-1

***Blakea ferruginea* (Gleason) Penneys & Judd, comb. nov.** Basionym: *Topoebea ferruginea* Gleason, Bull. Torrey Bot. Club 58: 434. 1931. **TYPE. VENEZUELA. AMAZONAS:** Camp Woods, Savanna Hills, Summit of Mount Duida, 1350 m, Aug 1928–Apr 1929, G.Tate 850 (holotype: NY!; isotype: US!). IPNI ID: urn:lsid:ipni.org:names:77124985-1

***Blakea fragrantissima* (Almeda) Penneys & Almeda, comb. nov.** Basionym: *Topoebea fragrantissima* Almeda, Proc. Calif. Acad. Sci. 46: 318. 1990. **TYPE. PANAMA. CHIRIQUÍ:** vicinity of Fortuna Dam, along trail across valley of Río Hornito, 1100–1250 m, 12 Mar 1988, F.Almeda et al. 6086 (holotype: CAS!; isotypes: CR, F!, MO!, PMA!, TEX!, US!). IPNI ID: urn:lsid:ipni.org:names:77124986-1

***Blakea gerardoana* (Almeda) Penneys & Almeda, comb. nov.** Basionym: *Topoebea gerardoana* Almeda, Proc. Calif. Acad. Sci., ser. 4, 52: 527. 2001. **TYPE. COSTA RICA. LIMÓN:** Cordillera de Talamanca between Quebrada Kuisa and Rio Lari, 2100 m, 09°20'25"N, 83°13'45"W, 17 Mar 1993, G.Herrera 5914 (holotype: CAS!; isotypes: CR, INB!, MO!). IPNI ID: urn:lsid:ipni.org:names:77124987-1

***Blakea glaberrima* (Triana) Penneys & Judd, comb. nov.** Basionym: *Topoebea glaberrima* Triana, Trans. Linn. Soc. 28: 150. 1871. **TYPE. COLOMBIA. CHOCÓ:** La Cueva, 1200 m, May 1853, J.Triana 4090 (holotype: BM!; isotypes: COL!, G-DC!; K!, Pl!). IPNI ID: urn:lsid:ipni.org:names:77124992-1

***Blakea henripittieri* (Cogn.) Penneys & Almeda, comb. et nom. nov.** Basionym: *Topoebea pittieri* Cogn., Monogr. Phan 7: 1088. 1891. **TYPE. COSTA RICA.** La Palma, 1550 m, 18 Dec 1888, H.Pittier 706 (holotype: BR!; isotypes: BR!, CR!). The specific epithet is preempted by *Blakea pittieri* Cogn., Monogr. Phan 7: 1080. 1891, which itself is a synonym of *Blakea grandiflora* Hemsl., Diag. Pl. Nov. Mex. ic. 1: 13. 1878. IPNI ID: urn:lsid:ipni.org:names:77124988-1

***Blakea hexandra* (Almeda) Penneys & Almeda, comb. nov.** Basionym: *Topoebea hexandra* Almeda, Proc. Calif. Acad. Sci. 46: 320. 1990. **TYPE. PANAMA. PANAMÁ:** Cerro Jefe, along summit road and along trail into the Chagres Valley, ca. 900 m, 19 Feb 1988, F.Almeda et al. 5837 (holotype: CAS!; isotypes: CR, DUKE, F!, MO!, NY!, PMA!, TEX!, US!). IPNI ID: urn:lsid:ipni.org:names:77124989-1

***Blakea horologica* Penneys & Judd, nom. nov.** Basionym: *Topoebea caudata* Wurdack, Phytologia 48: 251. 1981. **TYPE. ECUADOR.** Carchi: near El Pailon ca. 45 km below Maldonado along path to Tobar Donoso, 800 m, 26 Nov 1979, M.Madison & L.Besse 6991 (holotype: US!; isotype: SEL!). The specific epithet is preempted by *Blakea caudata* Triana, Trans. Linn. Soc. 28: 148. 1871 [1872]. The new specific epithet is derived from the Latin horologium, meaning hourglass, in reference to the shape of the mature fruits that are distinctly constricted above the ovary. IPNI ID: urn:lsid:ipni.org:names:77124976-1

***Blakea induta* (Markgr.) Penneys & Judd, comb. nov.** Basionym: *Topoebea induta* Markgr., Notizblatt Bot. Gart. Berlin-Dahlem 15: 382. 1941. **TYPE. ECUADOR. PASTAZA:** Mera, Rio Tigre, 12 Dec 1938, H.Schultze-Rhonhof 3089 (holotype: B, destroyed). IPNI ID: urn:lsid:ipni.org:names:77124990-1

***Blakea inflata* (Triana) Penneys & Judd, comb. nov.** Basionym: *Topoeba inflata* Triana, Trans. Linn. Soc. 28: 150. 1871 [1872]. TYPE. COLOMBIA. Nariño: inter Tuquerres et Barbacoas, May 1853, J.Triana 4085 (holotype: BM!; isotype: P!). IPNI ID: urn:lsid:ipni.org:names:77124991-1

***Blakea insignis* (Triana) Penneys & Judd, comb. nov.** Basionym: *Topoeba insignis* Triana, Trans. Linn. Soc. 28: 150. 1871 [1872]. TYPE. COLOMBIA. Nariño: El Paramo inter Tuquerres et Barbacoas, 1100 m, May 1853, J.Triana 4088 (holotype: BM!). IPNI ID: urn:lsid:ipni.org:names:77124993-1

***Blakea intricata* (Almeda) Penneys & Almeda, comb. nov.** Basionym: *Topoeba intricata* Almeda, Brittonia, 53: 157. 2001. TYPE. COSTA RICA. Cartago: Hwy. #224 on property of ICE hydroelectric plant (now Tapantí National Park) ca. 20–24 km E of the church in Orosí, 1500–1800 m, 5 Jan 1974, F.Almeda et al. 2366 (holotype: CAS!; isotypes: BM!, CR, DUKE, INB!, MEXU, MO!, NY!). IPNI ID: urn:lsid:ipni.org:names:77124994-1

***Blakea killipii* (Wurdack) Penneys & Judd, comb. nov.** Basionym: *Topoeba killipii* Wurdack, Phytologia 6: 7. 1957. TYPE. COLOMBIA. Valle del Cauca: Buena-ventura Bay, 13 Apr 1939, E.Killip 34982 (holotype: NY!; isotypes: COL!, US!). IPNI ID: urn:lsid:ipni.org:names:77124995-1

***Blakea lentii* (Almeda) Penneys & Almeda, comb. nov.** Basionym: *Topoeba lentii* Almeda, Brittonia 53: 160. 2001. TYPE. COSTA RICA. Cartago: 3 km E of Cachí, beside Río Naranjo, 1300 m, 11 Jul 1971, R.Lent 2000 (holotype: MO!; isotypes: BM!, CR, DUKE, F!, G, PMA!, US!). IPNI ID: urn:lsid:ipni.org:names:77124996-1

***Blakea longiloba* (Wurdack) Penneys & Judd, comb. nov.** Basionym: *Topoeba longiloba* Wurdack, Phytologia 6: 8. 1957. TYPE. COLOMBIA. Putumayo: alta cuenca del río Putumayo en el Valle de Sibundoy, bosque paramero en el filo de la Cordillera, La Cabaña, 2800 m, 2 Jan 1941, J.Cuatrecasas 11632 (holotype: F!; isotypes: COL!, P!, US!). IPNI ID: urn:lsid:ipni.org:names:77124997-1

***Blakea longisepala* (Gleason) Penneys & Judd, comb. nov.** Basionym: *Topoeba longisepala* Gleason, Bull. Torrey Bot. Club 72: 392. 1945. TYPE. COLOMBIA. Valle del Cauca: Barco, Pacific coast, 5–80 m, 21–30 Apr 1944, J.Cuatrecasas 16975 (holotype: NY!; isotypes: F!, COL!). IPNI ID: urn:lsid:ipni.org:names:77124998-1

***Blakea macbrydei* (Wurdack) Penneys & Judd, comb. nov.** Basionym: *Topoeba macbrydei* Wurdack, Phytologia 43: 354. 1979. TYPE. ECUADOR. Morona-Santiago: in cloud forest about one hour by trail from base camp at headwaters of Río Piuntza overlooking Río Zamora, NW range of Cordillera del Cóndor, 1850 m, 5 Jan 1972, B.MacBryde 963 (holotype: US!; isotypes: NY!, QCA!). IPNI ID: urn:lsid:ipni.org:names:77124999-1

***Blakea maguirei* (Wurdack) Penneys & Judd, comb. nov.** Basionym: *Topoeba maguirei* Wurdack, Mem. N. Y. Bot. Gard 16: 43. 1967. TYPE. ECUADOR. Guayas: 54 miles east of Guayaquil, 540 m, 23 Sep 1959, B.Maguire & C.Maguire 44262 (holotype: US!; isotypes: COL!, NY!, US!). IPNI ID: urn:lsid:ipni.org:names:77125000-1

***Blakea maurofernandeziana* (Cogn.) Penneys & Almeda, comb. nov.** Basionym:

Topoeba maurofernandeziana Cogn., Monogr. Phan 7: 1193. 1891. **TYPE. COSTA RICA. Cartago:** Forêts de Juan Viñas, 25 Jan 1890, A.Tonduz 1844 (holotype: BR!; isotypes: CR, G!). IPNI ID: urn:lsid:ipni.org:names:77125001-1

***Blakea mcpheeonii* (Almeda) Penneys & Almeda, comb. nov.** Basionym: *Topoeba mcpheeonii* Almeda, Brittonia 53: 163. 2001. **TYPE. PANAMA. San Blas:** San Blas boundary trail on Llano-Cartí road, ca. 350 m, 09°15'N, 79°00'W, 27 Jan 1986, G.McPherson & M.Merello 8176 (holotype: CAS!; isotypes: BM!, CR, EAP!, MEXU, MO!, PMA!, US!). IPNI ID: urn:lsid:ipni.org:names:77125002-1

***Blakea modica* (Wurdack) Penneys & Judd, comb. nov.** Basionym: *Topoeba modica* Wurdack, Phytologia 48: 251. 1981. **TYPE. ECUADOR. Carchi:** El Pailon, ca.

45 km below Maldonado along a foot path to Tobar Donoso, 800 m, 28 Nov 1979, M.Madison & L.Besse 7095 (holotype: SEL!; isotypes: QCA!, US!). IPNI ID: urn:lsid:ipni.org:names:77125003-1

***Blakea mortoniiana* (Wurdack) Penneys & Judd, comb. nov.** Basionym: *Topoeba mortoniiana* Wurdack, Phytologia 21: 129. 1971. **TYPE. COLOMBIA. Nariño:** wet

cloud forest 7 km north of Altaquer along road to Barbacoas, 1250 m, 17 Oct 1969, B.Maguire & C.Maguire 61846 (holotype: NY (2 sheets)!; isotypes: COL!, K!, US!). IPNI ID: urn:lsid:ipni.org:names:77125004-1

***Blakea muricata* (Lozano) Penneys & Judd, comb. nov.** Basionym: *Topoeba muricata* Lozano, Rev. Acad. Colomb. Cienc. Exact. 88: 342. 1999. **TYPE. COLOMBIA. Cauca:** Parque Nacional Natural Munchique, El Tambo, corregimiento La Romelia, camino al Observatorio, 2000 m, 1 Feb 1995, G.Lozano-C. et al. 6800 (holotype: COL!). IPNI ID: urn:lsid:ipni.org:names:77125005-1

***Blakea pascoensis* (Wurdack) Penneys & Judd, comb. nov.** Basionym: *Topoeba pascoensis* Wurdack, Brittonia 40: 14. 1988. **TYPE. PERU. Pasco:** shrubby vegeta-

tion on ridge, trail to Chuchurras-Palcazu, headwaters of Río Tunqui, Prov. Oaxapampa, 1900 m, 10°14'S, 75°28'W, R.Foster et al. 7745 (holotype: US!; isotypes: F!, MO!, NY!, TEX!). IPNI ID: urn:lsid:ipni.org:names:77125006-1

***Blakea pluvialis* (Standl.) Penneys & Almeda, comb. nov.** Basionym: *Topoeba pluvialis* Standl., Publ. Field Mus. Nat. Hist., Bot. Ser. 22: 162. 1940. **TYPE.**

PANAMA. Darién: Rain forest, crest of Cana-Cuasi trail, Chepigana District, 1200 m, 15 Mar 1940, M.Terry & R.Terry 1560 (holotype: F!; isotypes: BKL!, MO!). IPNI ID: urn:lsid:ipni.org:names:77125007-1

***Blakea sessilifolia* (Triana) Penneys & Judd, comb. nov.** Basionym: *Topoeba sessilifolia* Triana, Trans. Linn. Soc. 28: 150. 1871 [1872]. **TYPE. COLOMBIA. Chocó:**

J.Triana s.n. (holotype: BM!). IPNI ID: urn:lsid:ipni.org:names:77125008-1

***Blakea setosa* (Triana) Penneys & Judd, comb. nov.** Basionym: *Topoeba setosa* Triana,

Trans. Linn. Soc. 28: 149. 1871 [1872]. **TYPE. COLOMBIA. Nariño:** El Paramo inter Tuquerres et Barbacoas, 1100 m, May 1853, J.Triana 4093 (holotype: BM!; isotypes: COL!, K!, P!). IPNI ID: urn:lsid:ipni.org:names:77125009-1

***Blakea standleyi* (L.O.Williams) Penneys & Almeda, comb. nov.** Basionym: *Topoeba standleyi* L.O. Williams, Fieldiana: Bot 29: 583. 1963. **TYPE. GUATEMALA.**

Baja Verapaz: dry rocky hills in forest of pine and oak, north of Santa Rosa, 30 Mar 1939, P.Standley 69709 (holotype: F!; isotype: NY!). IPNI ID: urn:lsid:ipni.org:names:77125010-1

***Blakea stephanochaeta* (Naudin) Penneys & Judd, comb. nov.** Basionym: *Topoebea stephanochaeta* Naudin, Ann. Sci. Nat. Bot. 3: 148. 1852. **TYPE. COLOMBIA.** Portochuelo, 1844, J.Goudot s.n. (holotype: P!; isotype: BR!). IPNI ID: urn:lsid:ipni.org:names:77125011-1

***Blakea steyermarkii* (Wurdack) Penneys & Judd, comb. nov.** Basionym: *Topoebea steyermarkii* Wurdack, Act. Bot. Venez 1: 56. 1966. **TYPE. VENEZUELA. Sucre:** cloud forest on top of Cerro Patao, north of Puerto de Hierro and northeast of Güiria, Península de Paria, 1020 m, 19 Jul 1962, J.Steyermark & G.Agostini 91084 (holotype: US!; isotypes: F!, NY!, VEN!). IPNI ID: urn:lsid:ipni.org:names:77125012-1

***Blakea suaveolens* (Almeda) Penneys & Almeda, comb. nov.** Basionym: *Topoebea suaveolens* Almeda, Proc. Calif. Acad. Sci 46: 323. 1990. **TYPE. PANAMA. Veraguas:** along trail to summit of Cerro Tute about 1/2 mile above the Escuela Agric平ura Alto Piedra near Santa Fé , 900–1100 m, 29 Jan 1989, F.Almeda et al. 6484 (holotype: CAS!; isotypes: AAU, BM!, BR!, CR, DUKE, F!, MEXU, MICH, MO!, NY!, PMA!, TEX!, US!). IPNI ID: urn:lsid:ipni.org:names:77125013-1

***Blakea subbarbata* (Wurdack) Penneys & Judd, comb. nov.** Basionym: *Topoebea subbarbata* Wurdack, Phytologia 6: 9. 1957. **TYPE. COLOMBIA. Valle del Cauca:** monte La Guarida, filo de la cordillera sobre La Carbonera (entre Las Brisas y Albán), Cordillera Occidental, vertiente occidental, 1950–2000 m, 17 Oct 1946, J.Cuatrecasas 22197 (holotype: NY!; isotypes: BC!, F!, P!, U!, US!). IPNI ID: urn:lsid:ipni.org:names:77125014-1

***Blakea subscabrula* (Triana) Penneys & Judd, comb. nov.** Basionym: *Topoebea subscabrula* Triana, Trans. Linn. Soc. 28: 150. 1871 [1872]. **TYPE. COLOMBIA. Nariño:** in sylvis umbrosis inter Tuquerres et Barbacoas, 275–830 m, May 1853, J.Triana 4084 (holotype: BM!; isotypes: COL!). IPNI ID: urn:lsid:ipni.org:names:77125015-1

***Blakea subsessiliflora* (Wurdack) Penneys & Judd, comb. nov.** Basionym: *Topoebea subsessiliflora* Wurdack, Phytologia 6: 10. 1957. **TYPE. COLOMBIA. Valle del Cauca:** Costa del Pacífico, río Cajambre, Barco, 5–80 m, 21–30 April 1944, J.Cuatrecasas 17191 (holotype: NY!; isotypes: CAS!, F!, NY!, US!). IPNI ID: urn:lsid:ipni.org:names:77125016-1

***Blakea superba* (Naudin) Penneys & Judd, comb. nov.** Basionym: *Topoebea superba* Naudin, Ann. Sci. Nat. Bot. 3: 147. 1852. **TYPE. COLOMBIA.** Combayma, 1844, J.Goudot s.n. (holotype: P!). IPNI ID: urn:lsid:ipni.org:names:77125017-1

***Blakea tetramera* (Almeda) Penneys & Almeda, comb. nov.** Basionym: *Topoebea tetramera* Almeda, Proc. Calif. Acad. Sci., ser. 4, 52: 543. 2001. **TYPE. PANAMA. Veraguas:** headwaters of Río Caloveborita ca. 15 km past Escuela Agrícola Alto Piedra above Santa Fé, on the Atlantic watershed, 500 m, 16 May 1981, K.Sytsma & L.Anderson 4758 (holotype: CAS!; isotypes: MO!, PMA!). IPNI ID: urn:lsid:ipni.org:names:77125018-1

***Blakea tetroici* (Wurdack) Penneys & Judd, comb. nov.** Basionym: *Topoebea tetroici* Wurdack, Phytologia 6: 10. 1957. TYPE. COLOMBIA. Valle del Cauca: Cordillera Occidental, vertiente occidental, hoyo del río Díguia, Rio San Juan, abajo de Queremal a la derecha del río entre km. 52 y 53, 1300–1500 m, 19, 24, 27 Mar 1947, J.Cuatrecasas 23877 (holotype: F!; isotypes: P!, US!). IPNI ID: urn:lsid:ipni.org:names:77125019-1

***Blakea toachiensis* (Wurdack) Penneys & Judd, comb. nov.** Basionym: *Topoebea toachiensis* Wurdack, Phytologia 38: 306. 1978. TYPE. ECUADOR. Pichincha: in virgin forest along Río Toachi near Santo Domingo, 700 m, 18 Jul 1963, C.Játiva & C.Epling 536 (holotype: US!; isotypes: CAS!, JEPS!, NY!, S, UC!). IPNI ID: urn:lsid:ipni.org:names:77125020-1

***Blakea trianae* (Cogn.) Penneys & Judd, comb. nov.** Basionym: *Topoebea trianae* Cogn., Monogr. Phan 7: 1083. 1891. TYPE. COLOMBIA. Nariño: Barbacoas, 200 m, Apr 1853, J.Triana 4099 (holotype: G-DC!; isotypes: BM!, BR!, COL!, E!, K!, NY!, P!). IPNI ID: urn:lsid:ipni.org:names:77125021-1

***Blakea verrucosa* (Wurdack) Penneys & Judd, comb. nov.** Basionym: *Topoebea verrucosa* Wurdack, Phytologia 38: 303. 1978. TYPE. ECUADOR. Morona-Santiago: Cordillera de Cutucú, western slopes, along a trail from Legroño to Yaupi, 2000 m, 02°46'S, 78°06'W, Nov 1976, M.Madison et al. 3566 (holotype: US!; isotype: US!). IPNI ID: urn:lsid:ipni.org:names:77125022-1

***Blakea watsonii* (Cogn.) Penneys & Almeda, comb. nov.** Basionym: *Topoebea watsonii* Cogn., Monogr. Phan. 7: 1089. 1891. TYPE. GUATEMALA. Izabal: Hills on Chocon River, 11 Mar 1885, S.Watson 94/211 (holotype: BR). IPNI ID: urn:lsid:ipni.org:names:77125023-1

Probable synonyms not transferred:

Topoebea cuspidata Gleason, *T. floribunda* Gleason, *T. pubescens* Gleason, *T. rhodantha* L.Uribe, *T. rupicola* Hoehne are probably synonyms of *B. parasitica* (Aubl.) D. Don, and so as to not contribute nomenclatural clutter, new combinations will not be made until their status has been confirmed. Likewise, *T. reducta* Gleason is likely a synonym of *Blakea alternifolia* (Gleason) Gleason and will not be transferred until further study.

Ambiguous name:

Topoebea andreana Cogn. is not transferred at this time. This name is occupied by *Blakea andreana* Cogn. The species is poorly known, but was compared to *T. subscabrula* Triana by Cogniaux (1887), and to *T. grandiflora* Wurdack by Wurdack (1957). Study of the type is needed before a new combination can be proposed.

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New and existing combinations in Palaeotropical *Phlegmariurus* (Lycopodiaceae) and lectotypification of the type species *Phlegmariurus phlegmaria* (L.) T.Sen & U.Sen.

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Abstract

The genus *Phlegmariurus* Holub is recognised more widely than originally proposed and is circumscribed to include both Neotropic and Palaeotropic epiphytic and terrestrial species of Huperzioid Lycopodiaceae that have isotomous shoots, lack bulbils in their sporophyllous shoots and have spores with convex lateral margins and foveolate-fossulate sculpture restricted to their distal surfaces. New combinations with *Phlegmariurus* are proposed for 81 species and existing combinations identified for 33 species originating from the Palaeotropics. This installs a generic circumscription that is consistent between the Neotropics and Palaeotropics. A lectotype is designated for the type species of the genus, *Phlegmariurus phlegmaria* (L.) T.Sen & U.Sen.

Keywords

Lycopodiaceae, Huperzia, Phlegmariurus, Lycopodium, Lycopodiophyta

Introduction

The Lycopodiaceae is a globally distributed family of homosporous Lycopodiophytes in which the species exhibit shoot-forms associated with their habitat. Early classifications of this family usually included all of the species, irrespective of their shoot-form, together in the large and polymorphic genus *Lycopodium* L. One exception was the small and morphologically divergent Australian and New Zealand pygmy-clubmoss *Phylloglossum drummondii* Kunze which was historically placed in a genus of its own. Multiple genera and subfamilies corresponding with the different shoot-forms, gametophyte and spore types were recognised following multi-character systematic studies on the family (Bruce 1976, Holub 1964, Øllgaard 1975, 1979, 1987, 1989a, Wagner and Beitel 1992, Wilce 1972). Until recently, the most widely adopted of these classifications was the four-genus classification of Øllgaard (1987) which recognised *Lycopodium* L., *Lycopodiella* Holub, *Huperzia* Bernh. and *Phylloglossum* Kunze and was supported by a comprehensive nomenclatural index (Øllgaard 1989a).

Recent molecular phylogenetic investigations of the family and new morphological observations present a hypothesis that the relationship between *Phylloglossum drummondii* and *Huperzia* is equivocal and that the genus *Huperzia sensu* Øllgaard (1987) is paraphyletic or at best weakly supported (Christenhusz et al. 2011, Ji et al. 2008, Whittier 2006, Whittier and Braggins 1992, 2000, Whittier and Storchova 2007, Wikström and Kenrick 1997, Wikström and Kenrick 2000, 2001, Wikström et al. 1999, Yatsentyuk et al. 2001). A monophyletic *Huperzia* Bernh. is obtained if *Phylloglossum drummondii* is included within it *sensu* Christenhusz et al. (2011). This classification produces a *Huperzia* *sens. lat.* that is morphologically heterogeneous and is not supported by synapomorphies that can be readily identified in the field. It also does not reflect the ancient divergence times between the Huperzioid clades of Lycopodiaceae (Wikström and Kenrick 2001).

An alternative classification is to circumscribe *Huperzia* Bernh. narrowly *sensu* Wagner & Beitel (1992) to include only the wholly terrestrial species with erect shoots bearing gemmae in sporophyll axils and spores that are triangular in polar view with concave lateral margins, truncate corners and foveolate-fossulate sculpture on both proximal and distal surfaces and to recognise a sister genus, *Phlegmariurus* Holub, that is broadened to include all Palaeotropical and Neotropical species with erect or pendulous sporophyllous shoots that lack gemmae and that have spores with convex lateral margins and foveolate-fossulate sculpture restricted to their distal surface. This circumscription of *Phlegmariurus* includes a broad spectrum of both epiphytic and non-epiphytic species primarily from the tropical and subtropical regions globally. The necessary generic combinations with *Phlegmariurus* Holub were recently proposed for the Neotropical species (Øllgaard 2012a, b) but many necessary combinations do not exist among the Palaeotropical species. We propose these transfers so that *Phlegmariurus* Holub may be considered monophyletic.

Species exhibiting the characteristic features of *Phlegmariurus* were identified from the examination of 121 type specimens (including images) for species previously com-

bined with *Lycopodium* L., *Huperzia* Holub and *Urostachys* Herter and from characters described in these species protogues. Species level relationships within Palaeotropical *Phlegmariurus* are poorly understood and their circumscriptions require a thorough molecular and morphological review. It is apparent that there are more species names than there are species, and following a review of type materials we propose a number of new synonyms for species we have studied closely. Molecular evidence suggests that form homoplasy is common, especially among tropical rainforest epiphytes (Wikström et al. 1999). This suggests that morphologically similar species may not always be closely related. We have taken a more conservative approach to synonymisation for the *P. phlegmaria* (L.) T.Sen & U.Sen species complex as we consider this to be complex that is rich in species rather than being a remarkably heterogeneous species.

Lecotypification of *Phlegmariurus phlegmaria* (L.) T.Sen & U.Sen

Epiphytic Lycopodiaceae were first discovered by European botanists in the East Indies in the late 1600s. Several species were described and illustrated in:

- Breyne (1678) *Exoticarum Plantarum Centuria Prima* (tab. 92 n.v.)
- Rheede et al. (1703) *Hortus Indicus Malabaricus* XII (p. 27, tab. 14!)
- Rumph (1741) *Herbarium Amboinense* (VI p. 91, tab. 41, fig. 1!)
- Dillen (1741) *Historia Muscorum* (p. 450 tab. 61 fig 5, A, B & C.!)
- Dillen (1741) *Historia Muscorum* (p. 450 tab. 61 fig 5, D & E.!)
- Linné (1743) *Flora Zeylanica* number 386 (P. Hermann herb. vol. 4. p. 5!)

Linné described *Lycopodium phlegmaria* in *Species Plantarum* in 1753 and cited Dillen (1741 p. 450 tab. 61 fig 5), Linné (1743 p. 183 no. 386 & P. Hermann specimen vol. 4 p. 5), Breyne (1678 tab. 92), and Rheede et al. (1703p. 27, tab. 14) in his protologue. Based on the limited material available, Linné obviously regarded all of these illustrations, and the P. Hermann specimen, as belonging to the same species. His brief description could be applied to almost any heterophyllous epiphytic species in the genus *Phlegmariurus*. Subsequently, the figures and P. Hermann specimen cited by Linné have been recognised as representing multiple species. In accordance with ICBN (2006) Div. 2, Chapt. 2, Sect. 2 Art. 9.9 a lectotype may be selected to restrict the type of the taxon *L. phlegmaria* L. to one species (McNeill et al. 2006).

Øllgaard (1989) indicated that Dillen tab. 61 fig. 5 A, B & C was eligible for selection as lectotype but did not designate it. The illustrations of Dillen tab. 61 fig. 5 ABCDE are based on two separate illustrations reproduced from earlier publications. Dillen tab. 61 fig. 5. A, B & C is reproduced from Rheede et al. (1703 XII p. 27, tab. 14) but Dillen tab. 61 fig. 5. D & E is reproduced from Breyne (1678 tab. 92). In 1810, Willdenow described *L. mirabilis* (Willd.) Holub for Dillen tab. 61 fig. 5 D & E (i.e. the Breyne illustration) but retained the reference to Dillen tab. 61 fig. 5 A, B & C (i.e. the Rheede et al. illustration) for *L. phlegmaria* L. even though the epithet

phlegmaria was introduced by Breyne (1678). In 1832, *Lycopodium phyllanthum* Hook. & Arn. was described from new material (Pacific origin) which is in our opinion conspecific with the P. Hermann specimen (Indo-Asian origin). In the interest of conserving nomenclatural stability we believe that Dillen fig. 5, A, B & C. (1741) is the most suitable lectotype because it exhibits characters present in the diagnosis (in accordance with ICBN 2006 Div. 2, Chap. 2, Sect. 2, Art. 9.12.) and most closely accords with *L. phlegmaria* as it is regarded today (in accordance with ICBN 2006 Div. 2, Chapt. 2, Sect. 2 Art. 9 Recommendation 9.A.5.y) (McNeill et al. 2006).

Taxonomy

- Phlegmariurus afromontanus* (Pic.Serm.) A.R.Field & Bostock comb. nov.** Basionym: *Huperzia afromontana* Pic.Serm., Webbia 27:394. 1972. Type: Burundi. J.Lewalle 3468 (holo: FI! [FI3002]). IPNI ID: urn:lsid:ipni.org:names:77125024-1
- P. aloifolius* (Hook. & Grev.) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium aloifolium* Hook. & Grev., Icon. Filic. 2:233. 1831. Synonym: *Huperzia aloifolia* (Hook. & Grev.) Trevis., Atti Soc. Ital. Sci. Nat. 17: 248. 1874. Type: India. N.Wallich 129 (holo: K). IPNI ID: urn:lsid:ipni.org:names:77125026-1
- P. balansae* (Herter) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium balansae* Herter, Bot. Jahrb. Syst. 43: Beibl. 98:51. 1909. Synonym: *Huperzia balansae* (Herter) Holub, Geobot. Phytotax. 20(1): 71. 1985. Type: New Caledonia M.Balansa 688 (syn: P! [P523007, P523008, P523009]); New Caledonia. Poméry s.n. (syn: P! [P523010]). IPNI ID: urn:lsid:ipni.org:names:77125028-1
- P. bampsianus* (Pic.Serm.) A.R.Field & Bostock comb. nov.** Basionym: *Huperzia bampsiana* Pic.Serm., Bull. Jard. Bot. Natl. Belg. 55(1-2): 193. 1985. Type: Rwanda. J.P.Bamps 2964 (holo: LG; iso: P! [P462093], FI! [FI3007]). IPNI ID: urn:lsid:ipni.org:names:77125029-1
- P. banayanicus* (Herter) A.R.Field & Bostock comb. nov.** Basionym: *Urostachys banayanicus* Herter, Bot. Arch. 3:17. 1923. Synonym: *Huperzia banayanica* (Herter) Holub, Geobot. Phytotax. 20(1): 71. 1985. Type: Philippines. H.M.Curran 8003 (syn: P! [P5239029]); Philippines. E.B.Copeland 1450 (syn: P! [P523926]); Philippines. A.D.Elmer 9498 (syn: P! [P523019]); Philippines. F.W.Foxworthy 2449 (syn: P! [P523018]). IPNI ID: urn:lsid:ipni.org:names:77125031-1
- P. bolanicus* (Rosenst.) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium bolanicum* Rosenst., Repert. Spec. Nov. Regni Veg. 12:181 1913. Synonym: *Huperzia bolanica* (Rosenst.) Holub, Geobot. Phytotax. 20(1): 71. 1985. Type: Papua New Guinea. C.Keysser B32. Heterotypic synonyms: *Urostachys kayseri* Herter ex Nessel, Revista Sudamer. Bot. 6:156. 1940; *Huperzia kayseri* (Herter ex Nessel) Holub Folia Geobot. Phytotax. 20(1): 74. 1985. Type: New Guinea. C.Keysser s.n. (holo: B [B112944]). IPNI ID: urn:lsid:ipni.org:names:77125033-1
- P. brachystachys* (Baker) A.R.Field & Bostock comb. nov.** Basionym: *L. dacrydoides* Baker. var. *brachystachys* Baker, Handb. Fern-Allies 18. 1887. Synonym: *Huperzia*

brachystachys (Baker) Pic.Serm., Webbia 23: 162. 1968. Type: Cameroon. *G.Mann 2041*(holo: K!). IPNI ID: urn:lsid:ipni.org:names:77125034-1

***P. brassii* (Copel.) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium brassii* Copel., J. Arnold Arbor. 10:174 1929. Synonym: *Huperzia brassii* (Copel.) Holub, Geobot. Phytotax. 20(1): 71. 1985. Type: Papua New Guinea. *L.J.Brass 1521* (holo: UC! [UC377989], iso: BRI! [AQ521250]). IPNI ID: urn:lsid:ipni.org:names:77125036-1

***P. cancellatus* (Spring) Ching, Acta Bot. Yunn. 4:122. 1982.** Basionym: *Lycopodium cancellatum* Spring, Mém. Acad. Roy. Sci. Belg. 24: 27. 1849. Type: Bhutan. *W.Griffith 162* (holo: K).

***P. carinatus* (Desv. ex Poir.) Ching, Acta Bot. Yunn. 4:120. 1982.** Basionym: *Lycopodium carinatum* Desv. ex Poir., Encycl. suppl. 3:555 1813. Synonyms: *Huperzia carinata* (Desv. ex Poir.) Trevis., Atti Soc. Ital. Sci. Nat. 17(2) 1874. Type: Sri Lanka. *Jussieu 639* (holo: P!, iso: B!). Heterotypic synonyms: *Lycopodium acrostachyum* Hook. & Grev., Icon Filic. 2:t 181 (1831). Type: Singapore, *N.Wallich 117* (holo: P!). *Lycopodium albescens* Bailey, Queensl. Dept. Agric. Brisbane Bot. Bull. 14:16. 1896; *Huperzia albescens* (F.M.Bailey) Holub, Geobot. Phytotax. 20(1): 70. 1985. Type: Australia ex New Guinea. *M.Sutter ex Capt. Michael s.n.* (holo: BRI! [AQ258306], iso: K) *Lycopodium laxum* C.Presl, Reliq. Haenk. 1:83. 1825; *Huperzia laxa* (C.Presl) Trevis., Atti Soc. Ital. Sci. Nat. 17: 247. 1874; *Phlegmariurus laxus* (C.Presl.) Satou, Hikobia 12(3):268. 1997. Type: Philippines. *Haenke s.n.* (iso: K). *Lycopodium pendulum* Roxb.; Calcutta J. Nat. Hist. 4. 472 (1844). Type: *C. Smith s.n.* from Amboina (lecto: BR *fide* Morton (1974) Contr. U.S. Natl. Herb. 38: 283-396.). *Lycopodium struthioloides* C.Presl, Reliq. Haenk. 1: 82. 1830; *Huperzia struthioloides* (C.Presl) Rothm., Feddes Repert. Spec. Nov. Regni Veg. 54: 61. 1944. Type: Philippines. *Haenke s.n.* (holo: PRC). *Lycopodium vanikorense* Copel., J. Arnold. Arbor. 12:49. 1931; *Huperzia vanikorensis* (Copel.) Holub, Folia Geobot. Phytotax. 20:77. 1985. Type: Vanikoro [Vanuatu]. *S.F.Kajewski 521* (holo: UC! [UC422661], iso: GH, K, MICH, MO! [MO22133], US).

***P. cavifolius* (C.Chr.) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium cavifolium* C.Chr., Dansk Bot. Ark. 7:190. 1932. Synonym: *Huperzia cavifolia* (C.Chr.) Tardieu, Adansonia sér. 2, 10: 18. 1970. Type: Madagascar. *H.Perrier 8273* (holo: BM, iso: P! [P46639], K! [K351220]). *Urostachys smithianus* Nessel, Repert. Spec. Nov. Regni Veg. 36:185. 1934; *Huperzia smithiana* (Nessel) Holub, Geobot. Phytotax. 20(1): 76. 1985. Type: Mauritius: *s.c. s.n.* (syn: BONN-Nessel). IPNI ID: urn:lsid:ipni.org:names:77125038-1

***P. coralium* (Spring) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium coralium* Spring in Miquel, Pl. Jungh. 3: 273. 1854. Synonym: *Huperzia coralium* (Spring) Holub, Folia Geobot. Phytotax. 20(1): 71. 1985. Type: Java [Indonesia]. *Junguhn 291* (holo: LG, iso: P). IPNI ID: urn:lsid:ipni.org:names:77125040-1

***P. creber* (Alderw.) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium crebrum* Alderw., Bull. Jard. Bot. Buitenzorg ser. 2, 24:4. 1917. Synonym: *Huperzia crebra* (Alderw.) Holub, Geobot. Phytotax. 20(1) 71. 1985. Type: New

Guinea. *A.A.Pulle* 907 (syn: BM, BO, BONN, K, L, U). IPNI ID: urn:lsid:ipni.org:names:77125042-1

***P. cryptomerinus* (Maxim.) Satou Hikobia** 12 (3): 268. 1997. Basionym: *Lycopodium cryptomerinum* Maxim., Bull. Acad. Sci. St.Petersb. 15: 231. 1870. Synonym: *Huperzia cryptomerina* (Maxim) R.D.Dixit, J. Bombay Nat. Hist. Soc. 77(3): 541. 1980 [1981]. Type: Japan. *Maximowicz s.n.*

***P. cunninghamioides* (Hayata) Ching, Acta Bot. Yunnan.** 4(2): 120. 1982. Basionym: *Lycopodium cunninghamioides* Hayata, Ic. pl. formos. 4: 131. 1914. Synonym: *Huperzia cunninghamioides* (Hayata) Holub, Geobot. Phytotax. 20(1): 72. 1985. Type: Taiwan. *T.Soma* 1 (holo: TI).

***P. curiosus* (Herter) A.R.Field & Bostock comb. nov.** Basionym: *Urostachys curiosus* Herter, Notul. Syst. 15:355. 1958. Synonym: *Huperzia curiosa* (Herter) Tardieu, Adansonia sér. 2, 10: 18. 1970. Type: Madagascar. *H.Humbert* 23478 (holo: P! [P46637]). IPNI ID: urn:lsid:ipni.org:names:77125044-1

***P. dacrydiodoides* (Baker) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium dacrydiodoides* Baker, Handb. fern-allies 17-18. 1887. Synonyms: *Huperzia dacrydiodoides* (Baker) Pic.Serm., Webbia 23: 162. 1968. 1968. Type: Natal. *J.Buchanan* s.n. (lecto: K! [K351207] designated by Pichi Sermolli 1986: 7). IPNI ID: urn:lsid:ipni.org:names:77125045-1

***P. dalhousieanus* (Spring) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium dalhousieanus* Spring, Mem. Acad. Roy. Belg. 24: 25. 1849. Synonym: *Huperzia dalhousieana* (Spring) Trevis., Atti Soc. Ital. Sci. Nat. 17(2) 1874. Type: Penang [Malaysia]. *Lady Dalhousie* 36 (holo: K! [3960/59]). Heterotypic synonyms: Based on a morphological comparison of living and herbarium specimens from Indonesia, Malaysia, Papua New Guinea, Australia and Fiji we consider the following taxa to belong to the same widespread but extremely scarce species: *Lycopodium caudifolium* Alderw., Bull. Jard. Bot. Buitenzorg, ser. 2, 1:14. 1911; *Urostachys caudifolius* (Alderw.) Herter ex Nessel, Bärlappgewächse 185. 1939; *Huperzia caudifolia* (Alderw.) Holub, Folia Geobot. Phytotax. 20(1): 71. 1985. Type: Borneo [Malaysia]. *A.W.Nieuwenhuis* 317 (holo: BO! [BO185337], iso: L). *Lycopodium clarae* Bailey, Queensl. Dept. Agric. Brisbane Bot. Bull. 7. 1893; *Urostachys clarae* (F.M.Bailey) Herter ex Nessel, Bärlappgewächse 185. 1939; *Huperzia clarae* (F.M.Bailey) Holub, Geobot. Phytotax. 20(1): 71. 1985. Type: Australia. *E.Cowley* 29 (holo: BRI! [AQ24829]). *Lycopodium glaucum* Cesati, Ann. Acc. Sc. Fis. et. Mat. Napoli VII, 35 (1876); *Urostachys glaucus* (Cesati) Herter, Revista Sudamer. Bot. 8: 86 (1949); Type: Malaysia. *O.Beccari* (holo: FI! [FI11821]). *Lycopodium magnificum* Brownlie, Nova Hedwigia Beih., 55 (Pterid. Fl. Fiji) 22. 1977; *Huperzia magnifica* (Brownlie) Holub, Folia Geobot. Phytotax. 26(1): 92. 1991. Type: Fiji. *Fiji Dept. Agr.* 18070 (holo: CHR! [CHR341159]). *Lycopodium ingens* Gepp ex Nessel, Bärlappgewächse 185 (1939) nom. nud.; Type: Sogori, New Guinea. *H.O.Forbes* s.n. (holo?: BM! [BM1038045]). IPNI ID: urn:lsid:ipni.org:names:77125047-1

- P. delbrueckii (Herter) A.R.Field & Bostock comb. nov.** Basionym: *Urostachys delbrueckii* Herter, Bot. Arch. 3:19. 1923. Synonyms: *Huperzia delbrueckii* (Herter) Holub, Geobot. Phytotax. 20(1): 72. 1985. Type: Philippines. E.A.Mearns & W.J.Hutchinson 4654 (holo: NY! [NY127344], iso: MICH! [MICH1191095], P! [P01220906, P01220907], US! [US134352]). IPNI ID: urn:lsid:ipni.org:names:77125049-1
- P. dielsii (Herter) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium dielsii* Herter, Bot. Jahrb. Syst. 54:229. 1916. Synonym: *Huperzia dielsii* (Herter) Holub, Geobot. Phytotax. 20(1): 72. 1985. Type: New Guinea. Ledermann 11318 (syn: B, BM); R.Schlechter 19085 (syn: B! [B2112382] BONN-Nessel). IPNI ID: urn:lsid:ipni.org:names:77125051-1
- P. durus (Pic.Serm.) A.R.Field & Bostock comb. nov.** Basionym: *Huperzia dura* Pic. Serm., Webbia 27: 392. 1973. Type: Kenya. R.B.Faden et al. 70/180 (holo: FI! [FI3008], iso: EA! [EA2516, EA2517], iso: K! [K351206]). IPNI ID: urn:lsid:ipni.org:names:77125052-1
- P. ellenbeckii (Nessel) A.R.Field & Bostock comb. nov.** Basionym: *Urostachys ellenbeckii* Nessel, Repert. Spec. Nov. Regni Veg.. 36:188, t. 175. 1934. Synonym: *Huperzia ellenbeckii* (Nessel) Pic.Serm., Webbia 23: 162. 1968. Type: Ethiopia. Ellenbeck s.n. (lecto: BONN-Nessel 544 p.p. designated by Pichi Sermolli 1968: 162). IPNI ID: urn:lsid:ipni.org:names:77125054-1
- P. elmeri (Herter) A.R.Field & Bostock comb. nov.** Basionym: *Urostachys elmeri* Herter, Bot. Arch. 3:16. 1923. Synonym: *Huperzia elmeri* (Herter) Holub, Geobot. Phytotax. 20(1): 72. 1985. Type: Philippines. A.D.Elmer 6411 (isosyn: P! [P01220901]); J.Bermejos 372 (isosyn: P! [P01220903]); H.M.Curran 3906 (isosyn: P! [P01220905]); E.D.Merrill 5923 (isosyn: P! [P01220902]). IPNI ID: urn:lsid:ipni.org:names:77125056-1
- P. fargesii (Herter) Ching, Acta Bot. Yunn. 4:125. 1982.** Basionym: *Lycopodium fargesii* Herter, Bot. Jahrb. Syst. 43: Beibl. 98: 48. 1909. Synonyms: *Huperzia fargesii* (Herter) Holub, Folia Geobot. Phytotax. 20(1): 72. 1985; *Urostachys fargesii* (Herter) Herter ex Nessel, Bärlappgewächse 137. 1939. Type: China. P.G.Farges s.n. (holo: P! [P01234387], iso: MO! [MO255690]).
- P. filiformis (Sw.) W.H.Wagner, Contr. Univ. Michigan Herb. 20:242. 1995.** Basionym: *Lycopodium filiforme* Sw., J. Bot. (Schrader) 2: 114. 1800 [1801]; Synonyms: *Urostachys filiformis* (Sw.) Herter, Index. Lyc. 61. 1949; *Huperzia filiformis* (Sw.) Holub, Folia Geobot. Phytotax 20:72 (1985); Type: "Insulae Sandwich oceanici pacifici" [Tahiti] in Syn. Fil. 1806. Heterotypic synonyms: *Lycopodium setaceum* Lam., Encycl. (Lamarck) 3(2): 653. 1792. *Huperzia setacea* (Hamilt. ex D. Don) Trevis., Atti Soc. Ital. Sci. Nat. 17:248. 1874. Type: Réunion. *Commerson* s.n. (holo: P! [P46612], iso: P! [P583966]). *Lycopodium polytrichoides* Kaulf., Enum. Filic. 6. 1824; *Huperzia polytrichoides* (Kaulf.) Trevis., Atti Soc. Ital. Sci. Nat. 17(2) 1874. Type: Sandwich Islands [Hawaii], *Chamisso* s.n. (lecto: B designated by Nessel 1939: 30). *Lycopodium verticillatum* L.f., Suppl. pl. 448. 1782; *Huperzia ver-*

ticillata (L.f.) Rothm., Feddes Repert. Spec. Nov. Regni Veg. 54: 60. 1944. Type: Réunion. *P.Sonnerat per A.Thouin* (holo: SBT! [SBT12294]).

***P. flagellaceus* (Kuhn) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium flagellaceum* Kuhn, Forschungsr. Gazelle 4:15. 1889. Synonym: *Huperzia flagellacea* (Kuhn) Holub, Geobot. Phytotax. 20(1): 72. 1985. Type: New Guinea. *Nauman s.n.* (holo: B! [B112446], iso: BM). Note: Some authors have considered this taxon to share affinities with *P. varius* but we consider that it is closer to *P. brassii* (Copel.) A.R.Field & Bostock and the relationship between the two needs investigating. IPNI ID: urn:lsid:ipni.org:names:77125058-1

***P. foliosus* (Copel.) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium foliosum* Copel., Bernice P. Bishop Mus. Bull. 59:7, t.1. 1929. Synonym: *Huperzia foliosa* (Copel.) Holub, Geobot. Phytotax. 20(1): 72. 1985. Type: *H.E.Parks 20651*(holo: UC! [UC351029], iso: BISH! [BISH1000366]). IPNI ID: urn:lsid:ipni.org:names:77125060-1

***P. fordii* (Baker) Ching, Acta Bot. Yunn. 4:126. 1982.** Basionym: *Lycopodium fordii* Baker, Handb. Fern-Allies 17. 1887. Synonym: *Huperzia fordii* (Baker) R.D.Dixit Census Indian Pteridophytes 7. 1984. Type: China. *Ford 4* (holo: K).

***P. gagnepainianus* (Herter) A.R.Field & Bostock comb. nov.** Basionym: *Urostachys gagnepainianus* Herter, Revista Sudamer. Bot. 8:23. 1949. Synonym: *Huperzia gagnepainiana* (Herter) Tardieu, Adansonia sér. 2, 10: 18. 1970. Type: Madagascar. *H.Perrier 15405* (lecto: P! [P226738] designated by Tardieu (1971: 20)). IPNI ID: urn:lsid:ipni.org:names:77125062-1

***P. giganteus* (Herter) A.R.Field & Bostock comb. nov.** Basionym: *Urostachys giganteus* Herter ex Nessel, Bärlappgewächse 124. 1939. Synonym: *Huperzia gigantea* (Herter) Holub, Geobot. Phytotax. 20(1): 73. 1985. Type: Philippines. *E.A.Mearns & Hutchinson 1277* (iso: ?); New Guinea. *MacGregor 3945* (iso: ?). IPNI ID: urn:lsid:ipni.org:names:77125064-1

***P. gnidioides* (L.f.) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium gnidioides* L.f., Suppl. pl. 448. 1782. Synonym: *Huperzia gnidioides* (L.f) Trevis., Atti Soc. Ital. Sci. Nat. 17:247. 1874. Type: Mauritius. *P.Sonnerat per A.Thouin s.n.* (holo: P). Heterotypic synonyms: *Urostachys helmii* Nessel, Repert. Spec. Nov. Regni Veg. 36:186. 1934; *Huperzia helmii* (Nessel) Holub, Geobot. Phytotax. 20(1): 73. 1985. Type: “Insel Greymouth 1885” (lecto: BONN-Nessel designated Øllgaard 1989: 92). IPNI ID: urn:lsid:ipni.org:names:77125065-1

***P. goebelii* (Nessel) A.R.Field & Bostock comb. nov.** Basionym: *Urostachys goebelii* Nessel, Repert. Spec. Nov. Regni Veg. 36:188, t.175. 1934. Synonym: *Huperzia goebelii* (Nessel) Holub, Geobot. Phytotax. 20(1): 73. 1985. Type: West-Sumatra [Indonesia] *Goebel s.n.* (isosyn: UC! [UC413367], BONN-Nessel!); Kwala Relai [Malaysia]. *M.Haniff & M.Nur 10225* (isosyn: BM! [BM1038044]). Heterotypic synonyms: *Urostachys heroldii* Herter ex Nessel, Revista Sudamer. Bot. 6:167. 1940. Synonym: *Huperzia heroldii* (Nessel) Holub, Geobot. Phytotax. 20(1): 73. 1985. Type: Borneo [Malaysia]. *Hallier* (holo: P?). IPNI ID: urn:lsid:ipni.org:names:77125067-1

***P. guandongensis* Ching, Acta Bot. Yunnan. 4(2):123. 1982.** Type: China. S.P.Ko 51291 (holo: PE).

***P. gunturensis* (Alderw.) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium gunturense* Alderw., Bull. Jard. Bot. Buitenzorg ser. 2, 1:14. 1911. Synonym: *Huperzia gunturensis* (Alderw.) Holub, Folia Geobot. Phytotax. 20(1): 73. 1985. Type: Indonesia. A.E.Kerkhoven 15 (holo: BO [BO1826257]). IPNI ID: urn:lsid:ipni.org:names:77125069-1

***P. hamiltonii* (Spreng.) Á.Löve & D.Löve, Taxon 26(2-3):324. 1977.** Basionym: *Lycopodium hamiltonii* Spreng., Syst. veg. 5: 429. 1828. Type: Nepal. *J.Buchanan s.n.* (holo: BM).

***P. harmsii* (Nessel) A.R.Field & Bostock comb. nov.** Basionym: *Urostachys harmsii* Herter ex Nessel, Revista Sudamer. Bot. 6: 166. 1940. Synonym: *Huperzia harmsii* (Herter ex Nessel) Holub, Geobot. Phytotax. 20(1): 73. 1985. Type: Caroline Islands [Micronesia] R.Kanehira 1316 (iso: NY! [NY127353], US [US1917849]). IPNI ID: urn:lsid:ipni.org:names:77125071-1

***P. hellwigii* (Warb.) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium hellwigii* Warb., Monsunia, 1:97. 1898. Synonym: *Huperzia hellwigii* (O.Warb.) Holub, Geobot. Phytotax. 20(1): 73. 1985. Type: Papua New Guinea. *F.Hellwig* 349 (holo: B! [B112544], iso: BONN-Nessel). IPNI ID: urn:lsid:ipni.org:names:77125073-1

***P. henryi* (Baker) Ching, Acta Bot. Yunnan. 4(2):125 1982.** Basionym: *Lycopodium henryi* Baker, Kew Bull. 1906:15. 1906. Type: China. *Henry* 11551 (holo: K).

***P. hillianus* (Nessel) A.R.Field & Bostock comb. nov.** Basionym: *Urostachys hillianus* Nessel, Repert. Spec. Nov. Regni Veg. 36:16. 1934. Synonym: *Huperzia hilliana* (Nessel) Holub, Geobot. Phytotax. 20(1): 73. 1985. Type: India. *H.C.Levinge s.n.* (holo: K, iso: BONN-Nessel). IPNI ID: urn:lsid:ipni.org:names:77125075-1

***P. holstii* (Hieron.) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium holstii* Hieron. in Engler, Pflanzenw. Ost-Afrikas C:90. 1985. Synonyms: *Huperzia holstii* (Hieron.) Pic.Serm., Webbia 23: 163. 1968. Type: Usambara [Tanzania]. *C.Holst* 8814 (holo: B! [B112586], iso: K! [K351205], P! [P466630], BM! [BM785226]). IPNI ID: urn:lsid:ipni.org:names:77125077-1

***P. horizontalis* (Nessel) A.R.Field & Bostock comb. nov.** Basionym: *Urostachys horizontalis* Nessel, Bärlappgewächse 225. 1939. Synonym: *Huperzia horizontalis* (Herter ex Nessel) Holub, Geobot. Phytotax. 20(1): 73. 1985. Type: Borneo [Malaysia]. *A.W.Nieuwenhuis* 311 (iso: L! [L57351], BONN-Nessel). IPNI ID: urn:lsid:ipni.org:names:77125079-1

***P. humbertii* (Nessel) A.R.Field & Bostock comb. nov.** Basionym: *Urostachys humbertii* Nessel, Repert. Sp. Nov. Regni Veg. 48:170. 1940. Type: Madagascar. *J.Kiese s.n.* (holo: BONN-Nessel). IPNI ID: urn:lsid:ipni.org:names:77125546-1

***P. humbertii-henrici* (Herter) A.R.Field & Bostock comb. nov.** Basionym: *Urostachys humbertii-henrici* Herter, Revista Sudamer. Bot. 8:23. 1949. Synonym: *Huperzia humbertii-henrici* (Herter) Tardieu, Adansonia sér. 2, 10: 18. 1970. Type: Madagascar. *H.Humbert* 12224 (isolecto: P! [P466628, P466627, P466629] designated by Tardieu 1971: 29). IPNI ID: urn:lsid:ipni.org:names:77125081-1

- P. jaegeri (Herter) A.R.Field & Bostock comb. nov.** Basionym: *Urostachys jaegeri* Herter, Revista Sudamer. Bot. 8:24. 1949. Synonym: *Huperzia jaegeri* (Herter) Pic.Serm., Webbia 23: 163. 1968. Type: Sierra Leone. *Jaeger* 1522 (holo: P! [P466622]). IPNI ID: urn:lsid:ipni.org:names:77125083-1
- P. juniperistachyus (Hayata) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium juniperistachyum* Hayata, Ic. Pl. Formos. 4:132. 1914. Synonym: *Huperzia juniperistachya* (Hayata) Holub, Geobot. Phytotax. 20(1): 74. 1985. Type: Taiwan. *Kawakami & Nakahara* 787 (holo: TI). IPNI ID: urn:lsid:ipni.org:names:77125085-1
- P. lauterbachii (E.Pritz. ex Schumann & Lauterb.) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium lauterbachii* E.Pritz. ex Schumann & Lauterb., Südsee 149. 1900. Synonym: *Huperzia lauterbachii* (E.Pritz.) Holub, Geobot. Phytotax. 20(1): 74. 1985. Type: New Guinea. *C.A.G.Lauterbach* 3174 (holo: B, iso: BONN-Nessel). IPNI ID: urn:lsid:ipni.org:names:77125087-1
- P. lecomteanus (Nessel) A.R.Field & Bostock comb. nov.** Basionym: *Urostachys lecomteanus* Nessel, Repert Spec. Nov. Regni Veg. 36(12-15):187. 1934. Synonyms: *Huperzia lecomteana* (Nessel) Holub, Geobot. Phytotax. 20(1): 74. 1985. Type: Madagascar. (holo: BONN-Nessel 492). IPNI ID: urn:lsid:ipni.org:names:77125089-1
- P. ledermannii (Herter) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium ledermannii* Herter, Bot. Jahrb. Syst. 54:232. 1916. Synonym: *Huperzia ledermannii* (Herter) Holub, Geobot. Phytotax. 20(1): 74. 1985. Type: New Guinea. *C.Keyser* 199 (iso: SUNIV!, B! [B113004]). IPNI ID: urn:lsid:ipni.org:names:77125091-1
- P. lockyeri (D.L.Jones & B.Gray), A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium lockyeri* D.L.Jones & B. Gray, Austrobaileya 2:126. 1985. Synonym: *Huperzia lockyeri* (D.L.Jones & B.Gray) Holub, Geobot. Phytotax. 26(1): 92. 1991. Type: Australia. *B.Gray* 3541 (holo: QRS! [QRS77021]). IPNI ID: urn:lsid:ipni.org:names:77125092-1
- P. longus (Copel.), A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium longum* Copel., Philipp. J. Sci. 60:100, t.3. 1936. Type: Solomon Islands. *S.F.Kajewski* 1953 (holo: PHN destroyed, iso: BM! [BM16725], MICH! [MICH1287171]). IPNI ID: urn:lsid:ipni.org:names:77125094-1
- P. lonyangensis C.Y.Ma, Bull. Bot. Res., Harbin 10(3):58. 1990.** Type: China. *C.Y.Ma* 3246 (holo: AMMS).
- P. macgregorii (Baker) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium macgregorii* Baker, J. Bot. 28: 109. 1890. Synonym: *Huperzia macgregorii* (Baker) Holub, Geobot. Phytotax. 20(1): 74. 1985. Type: New Guinea. *W.MacGregor* 68 (holo: K!, iso: BM! [BM1038027, BM1038028]). Heterotypic synonyms: *Lycopodium versteegii* Alderw., Bull. Jard. Bot. Buitenzorg, ser. 2, 24:4. 1917; *Huperzia versteegii* (Alderw.) Holub, Geobot. Phytotax. 20(1): 77. 1985. Type: (holo: New Guinea. *G.M.Vertseeg* 2510 (holo: U! [U7449])). *Urostachys whartoniensis* Nessel, Repert. Spec. Nov. Regni Veg. 38:62. 1935. *Huperzia whartoniensis* (Nessel) Holub, Geobot. Phytotax. 20(1): 78. 1985. Type: Papua New Guinea. *L.J.Brass*

4729 (iso: NY! [NY127367], iso: BRI! [AQ24833]). IPNI ID: urn:lsid:ipni.org:names:77125096-1

***P. macrostachys* (Hook. ex Spring) N.C.Nair & S.R.Ghosh, J. Econ. Taxon. Bot.**

12(1):194. 1988. Synonyms: *Huperzia macrostachys* (Hook. ex Spring) Holub, Geobot. Phytotax. 20(1): 74. 1985. Type: India. *F.Adams s.n.* (syn: K). Sri Lanka. *Walker s.n.* (syn: K).

***P. mannii* (Hillebr.) W.H.Wagner, Contr. Univ. Michigan Herb. 20:241 1995.** Basionym: *Lycopodium phlegmaria* var. *mannii* Hillebr., Fl. Hawaiian Isl. 645. 1888. Type: Hawaii. *H.Mann & W.T.Brigham 506* (iso: BISH! [BISH1005485], MO! [MO22681]).

***P. marsupiformis* (D.L.Jones & B.Gray) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium marsupiforme* D.L.Jones & B.Gray, Austrobaileya 2:128. 1985. Synonym: *Huperzia marsupiformis* (D.L.Jones & B.Gray) Holub, Geobot. Phytotax. 26(1): 92. 1991. Type: Australia. *B.Gray 3841* (holo: BRI! [AQ419317], CNS! [QRS78343]). IPNI ID: urn:lsid:ipni.org:names:77125098-1

***P. megastachyus* (Baker) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium megastachyum* Baker, J. Linn. Soc. Bot. 21:454. 1885. Synonym: *Huperzia megastachya* (Baker) Tardieu, Adansonia sér. 2, 10: 18. 1970. Type: Madagascar. *R.Baron 2840* (holo: K! [K351218, K351219]). IPNI ID: urn:lsid:ipni.org:names:77125100-1

***P. merrillii* (Herter) A.R.Field & Bostock comb. nov.** Basionym: *Urostachys merrillii* Herter, Bot. Arch. 3:15. 1923. Synonym: *Huperzia merrillii* (Herter) Holub, Geobot. Phytotax. 20(1): 74. 1985. Type: Philippines. *E.D.Merrill 965* (iso: UC! [UC1096474], U! [U7444], MICH! [MICH1191096]). IPNI ID: urn:lsid:ipni.org:names:77125103-1

***P. milbraedii* (Herter) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium milbraedii* Herter, Hedwigia 49:90. 1909. Synonym: *Huperzia milbraedii* (Herter) Pic.Serm., Webbia 23:163. 1968. Type: Cameroon. *Milbraed 3449* (holo: B). IPNI ID: urn:lsid:ipni.org:names:77125104-1

***P. mingcheensis* Ching, Acta Bot. Yunnan. 4(2): 125. 1982.** Synonym: *Huperzia mingcheensis* (Ching) Holub, Folia Geobot. Phytotax. 20: 74. 1985. Type: China. *P.S.Chiou 2069* (holo: PE). See recent note on the nomenclature of this species (Zhang 2012).

***P. minutifolius* (Alderw.) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium coralium* var. *minutifolium* Alderw., Malayan fern allies 44. 1915. Synonyms: *Huperzia minutifolia* (Alderw.) Holub, Folia Geobot. Phytotax 20(1): 74. 1985. Type: New Guinea. *Ruchmat s.n.* (holo: L). IPNI ID: urn:lsid:ipni.org:names:77125106-1

***P. multifarius* (Alderw.) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium multifarium* Alderw., Bull. Jard. Bot. Buitenzorg, ser. 3, 5:226. 1922. Synonym: *Huperzia multifaria* (Alderw.) Holub, Folia Geobot. Phytotax. 20(1): 75. 1985. Type: Ternate [Moluccas, Indonesia]. *V.M.A.Beguin 1329* (holo: BO [BO186327]). IPNI ID: urn:lsid:ipni.org:names:77125108-1

***P. myrtifolius* (G.Forst.) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium myrtifolium* G.Forst., Flora Insulae Australiae Prodromus. 1786. Synonym: *Hu-*

- perzia myrtifolia* (G.Forst.) Holub, Geobot. Phytotax. 20(1): 75. 1985. Type: New Caledonia. *G.Forster s.n.* (iso: P-Luerss., UPS-Thunb). IPNI ID: urn:lsid:ipni.org:names:77125109-1
- P. nanus* C.Y.Ma, Bull. Bot. Res., Harbin 10(3):58. 1990.** Type: China. *C.Y.Ma* 3274 (holo: AMMS).
- P. neocaledonicus* (Nessel) A.R.Field & Bostock comb. nov.** Basionym: *Urostachys neocaledonicus* Nessel, Repert. Spec. Nov. Regni Veg. 36:187. 1934. Synonym: *Huperzia neocaledonica* (Nessel) Holub, Geobot. Phytotax. 20(1): 75. 1985. Type: New Caledonia. *E.Viellard* (lecto: BONN-Nessel designated Øllgaard 1989: 96). IPNI ID: urn:lsid:ipni.org:names:77125110-1
- P. nilagiricus* (Spring) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium nilagiricum* Spring, Bull. Acad. Roy. Sci. Belg. 8:517. 1841. Synonym: *Huperzia nilagirica* (Spring) Dixit, J. Bombay Nat. Hist. Soc. 77(3):541. 1981. Type: India. Perrottet (holo: G-Deless.). IPNI ID: urn:lsid:ipni.org:names:77125112-1
- P. nummulariifolius* (Blume) Ching, Acta Bot. Yunnan. 4(2):125. 1982.** Basionym: *Lycopodium nummulariifolium* Blume, Enum. pl. Javae 2: 263. 1828. Synonym: *Huperzia nummulariifolia* (Blume) Chambers, Jermy & Crabbe, Brit. Fern Gaz. 10: 176. 1971. Type: Java. *C.L.Blume s.n.* (isolecto: L! [L57363]).
- P. nutans* (Brack.) W.H.Wagner Contr. Univ. Michigan Herb. 20:241. 1995.** Synonym: *Huperzia nutans* (Brack.) Rothm., Feddes Repert. 54: 62. 1944. Type: Hawaii. *Wilkes 10* (holo: US, iso: BISH! [BISH1005484]).
- P. nylamensis* (Ching & S.K.Wu) H.S.Kung & Li Bing Zhang, Acta Phytotax. Sin. 37(1):52. 1999.**
- P. obtusifolius* (P.Beauv.) A.R.Field & Bostock comb. nov.** Basionym: *Lepidotis obtusifolia* P.Beauv., Prodr. Aethéogam. 109. 1805. Synonym: *Huperzia obtusifolia* (P.Beauv.) Rothm., Feddes Repert. 54:61. 1944. Type: Réunion. *J.B.G.M. Bory de St. Vincent* (holo: P! [P466623], iso: B-Wild! [B-W19344]). Heterotypic synonyms: *Lycopodium pachyphyllum* Kuhn ex Herter, Bot. Jahrb. Syst. 43: Beibl. 98:51. 1909; *Huperzia pachyphyllea* (Kuhn) Holub, Geobot. Phytotax. 20(1): 75. 1985. Type: Madagascar. *J.M.Hildebrandt* 4141 (holo: B! [B85521], iso: B! [B8522], P! [P466624, P466625, P46626]). IPNI ID: urn:lsid:ipni.org:names:77125167-1
- P. oceanianus* (Herter) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium oceanianum* Herter, Bot. Jahrb. Syst. 43: Beibl. 98:52. 1909. Synonym: *Huperzia oceaniana* (Herter) Holub, Folia Geobot. Phytotax. 20:75. 1985. Type: New Hebrides [Vanuatu] s.c. s.n. (syn: P). IPNI ID: urn:lsid:ipni.org:names:77125114-1
- P. oltmannsii* (Herter ex Nessel) A.R.Field & Bostock comb. nov.** Basionym: *Urostachys oltmannsii* Herter ex Nessel [Bärlapgewächse 231. 1939, nom. inval.] Revista Sudamer. Bot. 6: 168. 1940. Synonym: *Huperzia oltmannsii* (Herter ex Nessel) Holub, Geobot. Phytotax. 20(1): 75. 1985. Type: Tahiti. *J.McGillivray* 1331. IPNI ID: urn:lsid:ipni.org:names:77125115-1
- P. ophioglossoides* (Lam.) A.R.Field & Bostock comb. nov.** Basionym: *Lycopodium ophioglossoides* Lam., Encycl. (Lamarck) 3:646. 1789. Synonym: *Huperzia ophioglossoides* (Lam.) Rothm., Feddes Repert. 54:62. 1944. Type: Mauritius. *Commer-*

son s.n. (holo: P-Lam). Note: Molecular phylogenetic evidence indicates that this Palaeotropical species belongs to a Neotropical radiation of *Phlegmariurus*. IPNI ID: urn:lsid:ipni.org:names:77125118-1

- P. ovatifolius* (Ching) W.M.Chu ex H.S.Kung & Li Bing Zhang, Acta Phytotax. Sin. 37(1):52 (1999).** Basionym: *Huperzia ovatifolia* Ching, Acta Bot. Yunnanica 3: 298. 1981. Type: China. *Yunnan Complex Exped. 1504* (holo: PE).
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 Synonym: *Huperzia subulifolia* (Wall. ex Hook & Grev.) Trevis., Atti Soc. Ital. Sci.
 Nat. 17: 248. 1874. Type: Nepal. *N.Wallich* s.n. (holo: K).

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The Cucurbitaceae of India: Accepted names, synonyms, geographic distribution, and information on images and DNA sequences

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Abstract

The most recent critical checklists of the Cucurbitaceae of India are 30 years old. Since then, botanical exploration, online availability of specimen images and taxonomic literature, and molecular-phylogenetic studies have led to modified taxon boundaries and geographic ranges. We present a checklist of the Cucurbitaceae of India that treats 400 relevant names and provides information on the collecting locations and herbaria for all types. We accept 94 species (10 of them endemic) in 31 genera. For accepted species, we provide their geographic distribution inside and outside India, links to online images of herbarium or living specimens, and information on publicly available DNA sequences to highlight gaps in the current understanding of Indian cucurbit diversity. Of the 94 species, 79% have DNA sequences in GenBank, albeit rarely from Indian material. The most species-rich genera are *Trichosanthes* with 22 species, *Cucumis* with 11 (all but two wild), *Momordica* with 8, and *Zehneria* with 5. From an evolutionary point of view, India is of special interest because it harbors a wide range of lineages, many of them relatively old and phylogenetically isolated. Phytogeographically, the north eastern and peninsular regions are richest in species, while the Jammu Kashmir and Himachal regions have few Cucurbitaceae. Our checklist probably underestimates the true diversity of Indian Cucurbitaceae, but should help focus efforts towards the least known species and regions.

Keywords

Conservation, revised generic boundaries, *Cucumis* wild species, India's phytogeographic regions, Cucurbitaceae tribal classification, *Trichosanthes*

Introduction

Jeffrey's (1980) and Chakravarty's (1982) checklists of the Cucurbitaceae of India are now more than three decades old. Over this time, knowledge of the family's representatives on the Indian continent has grown considerably through botanical exploration, the additions of Naithani (1990), new treatments for Thailand (De Wilde and Duyfjes, 2008a) and China (Lu et al., 2011), and revisionary work on genera, such as *Trichosanthes* (De Boer and Thulin, 2012) and *Coccinia* (Holstein in press). Added to this, the online availability of taxonomic literature and specimen images, and molecular-phylogenetic studies clarifying natural clade boundaries (e.g., Kocyan et al. 2007; Schaefer et al. 2009; Sebastian et al. 2011; De Boer et al. 2012), have led to many taxonomic and nomenclatural changes. Updating the two checklists of Indian Cucurbitaceae was therefore timely, especially since the Cucurbitaceae include several of the World's most important vegetables, such as melon (*Cucumis melo*), cucumber (*C. sativus*), watermelon (*Citrullus lanatus*), pumpkin and squash (*Cucurbita* spp.), and bitter gourd (*Momordica charantia*). Having a current list that is linked with molecular data and images may help focus phylogenetic and floristic research on undercollected species, and potentially strengthen conservation efforts.

Here we present a checklist of the Cucurbitaceae of India that treats just over 400 relevant taxon names. For each accepted species, we provide (i) type information including collecting location and herbaria, (ii) synonyms and their types, (iii) information on geographic range inside and outside India, (iv) links to online images of herbarium or living specimens, and (v) brief information on whether or not DNA sequences are available in GenBank at the National Center for Biological Information (<http://www.ncbi.nlm.nih.gov>), with citation of relevant studies. DNA sequences today are essential; they help in the quick identification of sterile material via characteristic sequence motifs or “barcoding” (an Asia-focussed example is Li et al., 2011) and are required for evolutionary and biogeographic studies (e.g., Sebastian et al., 2011, De Boer et al., 2012). Even DNA sequences not coming from Indian material can help place the Indian species in context and to recognize if Indian material differs from African or Chinese material going by the same name.

Materials and methods

Names that have been applied to Indian Cucurbitaceae were taken from Jeffrey (1980, 1981), Chakravarty (1982), and an unpublished compilation provided by Peter Raven (the Missouri Botanical Garden, St. Louis) and Kanchi Gandhi (Harvard University Herbaria, Boston). We also checked floras of neighboring or near-by countries, especially Naithani (1990), the *Flora of China* treatment (Lu et al., 2011), and numerous publications by De Wilde and Duyfjes (cited in our reference list). Information on the types (collector and location) of the 400 names was obtained from protogues, most of them available online. For nomenclatural types from India, we updated the

state in which the respective specimen was collected to agree with modern administrative units. Taxonomic or nomenclatural synonyms were obtained by checking relevant post-1980 treatments (cited under the respective genus or species).

Distributions within India (by state) and outside India (by country or continent) were taken mostly from Chakravarty (1946, 1959, 1982), up-dated from floristic treatments, such as Lu et al. (2011) and the work of De Wilde and Duyfjes (e.g., 2004a, b, 2006a, b, c, 2007a, b, 2008a, 2010, and as cited below). The links to images lead to type specimen images from various herbaria or the efloraofindia website (<https://sites.google.com/site/efloraofindia/>). This website has been created for documenting the flora of India and currently has a database of 7500 species and over one million pictures at its e-group links. For each accepted species or relevant synonyms we checked GenBank (<http://www.ncbi.nlm.nih.gov>) for sequences and the published studies they are related to.

Results and discussion

Comparison with the two 1980s checklists and main causes of name changes

Applying recent taxonomic changes resulted in the acceptance of 94 species. This is almost unchanged from the species number listed in previous checklists (Jeffrey, 1980: 90 species; Chakravarty, 1982: 100 species). A species no longer included is *Zehneria wallichii* from central Myanmar. Newly added species include *Trichosanthes khasiana* and *T. quinquangulata*. Compared to 1980, generic concepts have changed considerably, with many species names having been moved, especially in the genera *Cucumis* and *Zehneria*, and formerly monotypic genera having been merged (Schaefer and Renner, 2011b). Genera no longer accepted are *Biswarea* (= *Herpetospermum*), *Cucumella* (= *Cucumis*), *Dicoelospermum* (= *Cucumis*), *Edgaria* (= *Herpetospermum*), *Gymnopetalum* (= *Trichosanthes*), *Mukia* (= *Cucumis*), *Neoluffa* (= *Siraitia*), *Praecitrullus* (= *Benincasa*), and *Sechium* (= *Sicyos*). All these changes are based on molecular-phylogenetic results, cited under the respective species. *Melothria* in its modern circumscription is confined to the New World and does not occur in India. Its two Indian species have been moved to *Cucumis* and *Solena*.

Compared to other tropical regions of the size of India, for example, Brazil, the addition of new species records over the past 30 years has lagged behind. We suspect that many species new for India are awaiting discovery in the field and in yet unidentified herbarium material. Since Indian herbaria are reluctant to send out loans, their material probably is understudied.

Natives, endemics, cultivated species, and status of DNA sequencing

Of the species of Cucurbitaceae in India, at least nine are introduced cultivated vegetables from Central and South America or Africa (*Citrullus lanatus*, *Cyclanthera pedata*, *Kedrostis foetidissima*, *Sicyos edulis*, and five species of *Cucurbita*). Of the native species,

ten are endemic: *Cucumis indicus* (Kerala, Maharashtra), *C. ritchiei* (Karnataka, Kerala, Maharashtra, Punjab, Tamil Nadu), *C. setosus* (Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan), *C. silentvalleyi* (Kerala), *Momordica sahyadrica* (Kerala), *Solenia amplexicaulis* (Tamil Nadu, Karnataka, Kerala), *Trichosanthes anaimalaiensis* (Andaman and Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Karnataka, Kerala, Maharashtra, Tamil Nadu, Tripura), *Trichosanthes khasiana*, *Zehneria hookeriana* (Tamil Nadu), and *Z. maysorensis* (Kerala). Clearly, Kerala is the state with the highest number of endemics, followed by Tamil Nadu. The most species-rich Cucurbitaceae genera in India are *Trichosanthes* with 22 species, *Cucumis* with 11 (all but two wild), *Momordica* 8, and *Zehneria* with 5.

While 86 native species, including just ten endemics, may not be large numbers, India harbors an exceptional range of tribes as seen in Fig. 1, which shows the placement of the native Indian genera on a Cucurbitaceae family tree with the family's current tribal classification (Schaefer and Renner, 2011b). Many of the Indian species, such as *Actinostemma*, *Gynostemma*, *Hemsleya*, *Indofevillea*, *Momordica* and *Siraitia* belong to old and phylogenetically isolated lineages. This is known because 79% of the Cucurbitaceae species occurring in India have been sequenced for one or more genetic markers. Cucumber and melon, which originate in India, both have had their genomes completely sequenced (Huang et al., 2009; García-Mas et al., 2012), and many have been included in family-wide phylogenetic analyses (Kocyan et al., 2007; Schaefer et al., 2009; Schaefer and Renner, 2011b). The currently 20 species without any DNA sequences in GenBank may be found by searching our checklist for “no published sequences available.”

Floristic distribution within India and disjunctions between Africa and India

The highest number of species is known from the northeast and peninsular India (Kerala, Karnataka, Tamil Nadu, Andhra Pradesh), the lowest from the Jammu Kashmir and Himachal regions of Western Himalaya. Especially interesting from a phytogeographic standpoint are species ranging from Africa to India, such as *Coccinia grandis*, *Blastania cerasiformis*, *Corallocarpus conoocarpus*, *C. epigaeus*, *C. schimperi*, *Cucumis prophetarum*, *Dactyliandra welwitschii*, *Luffa echinata*, *Momordica cymbalaria*, and *Zehneria thwaitesii*. The genera *Diplocyclos* and *Kedrostis* also both have species in East Africa and India, but apparently not individual species spanning both continents. These disjunctions would be interesting to study with molecular methods, which might allow inferring arrival times in India.

Conclusion

One of the great technical advances of recent years that are positively affecting taxonomy is the easy exchange of photos. Even simple snap shots of living plants (and cer-

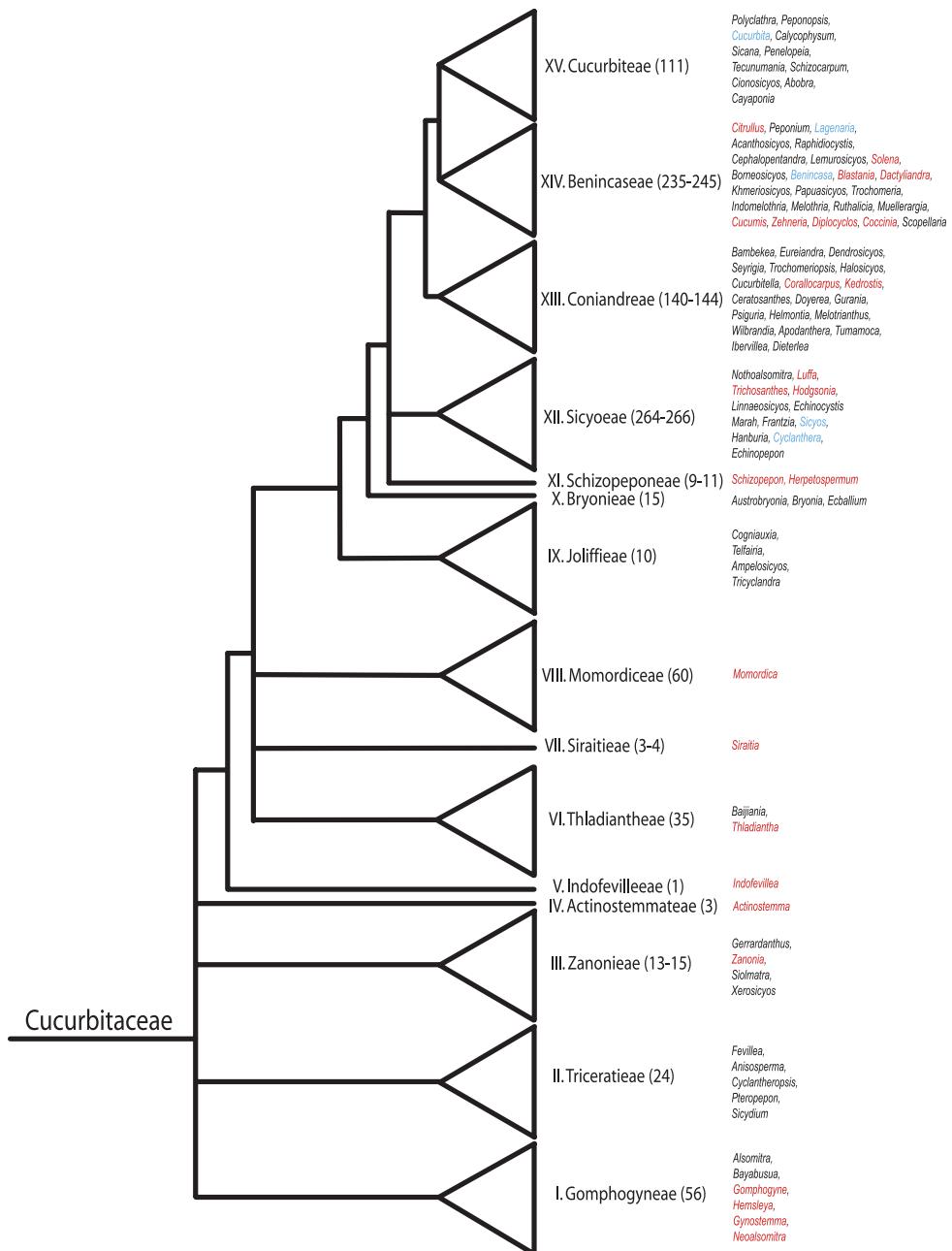


Figure 1. Tribal classification of the Cucurbitaceae with native Indian genera highlighted in red, cultivated ones in blue. Modified from Schaefer and Renner (2011a, b).

tainly type images) greatly facilitate deciding the identity of a particular plant, and we hope that our links to the efloraofindia (<https://sites.google.com/site/efloraofindia/>) will prove useful. The greatest caveat concerning our checklist is that the geographic

Table I. Genera and species of Cucurbitaceae in India (94 total)

Genera	Number of species
<i>Actinostemma</i>	1
<i>Benincasa</i>	2
<i>Blastania</i>	2
<i>Bryonia</i>	2
<i>Citrullus</i>	2
<i>Coccinia</i>	1
<i>Corallocarpus</i>	3
<i>Cucumis</i>	11
<i>Cucurbita</i>	5 (all cultivated)
<i>Cyclanthera</i>	1
<i>Dactyliandra</i>	1
<i>Diplocyclos</i>	1
<i>Gomphogyne</i>	1
<i>Gynostemma</i>	1
<i>Hemsleya</i>	1
<i>Herpetospermum</i>	3
<i>Hodgsonia</i>	1
<i>Indofevillea</i>	1
<i>Kedrostis</i>	2
<i>Lagenaria</i>	1
<i>Luffa</i>	4
<i>Momordica</i>	8
<i>Neoalsomitra</i>	1
<i>Schizopepon</i>	3
<i>Sicyos</i>	1
<i>Siraitia</i>	1
<i>Solena</i>	3
<i>Thladiantha</i>	2
<i>Trichosanthes</i>	22
<i>Zanonia</i>	1
<i>Zehneria</i>	5

range information inside India is not directly based on specimens, but is more or less copied from Chakravarty (1982) and thus surely incomplete. It is to be hoped that the digitization of Indian material in the future will help achieve a deeper study of the Cucurbitaceae of India.

Checklist

1. *Actinostemma tenerum* Griff., J. Asiat. Soc. Bengal 23(7): 643–644. 1854.

Syntypes: India, Meghalaya, Khasia Hills, *Griffith* 2523 (K, W); India, Sadiya, upper Assam, also on Khasia Hills, *T.E. Cantor* s.n. (K).

Distribution in India: Arunachal Pradesh, Assam, Bihar, Meghalaya, Mizoram, Uttar Pradesh, West Bengal.

Distribution outside India: Bangladesh, Vietnam, Laos, Cambodia, Russia, China, Taiwan, Korea, and Japan (Schaefer and Renner, 2011a).

Images: *Griffith* syntype: <http://herbarium.univie.ac.at/database/detail.php?ID=63181>
<http://apps.kew.org/herbcat/getImage.do?imageBarcode=K000742924>

GenBank: Sequences from Kocyan et al. (2007), e.g., DQ491007, DQ469135.

Comments: *Actinostemma* comprises two other species, both in China. Based on genetic data, this is an isolated ancient lineage (Schaefer and Renner, 2011a, b; see also our Fig. 1). Ali Khan (2002) discusses the species' occurrence in Uttar Pradesh.

2. *Benincasa fistulosa* (Stocks) H.Schaef. & S.S.Renner, Taxon 60: 133. 2011.

Citrullus fistulosus Stocks, Hooker's J. Bot. Kew Gard. Misc. 3: 74, t. 3. 1851.

Citrullus vulgaris Schrad. ex Eckl. & Zeyh. var. *fistulosus* (Stocks) J.L.Stewart, Punjab Pl. 96. 1869.

Praecitrullus fistulosus (Stocks) Pangalo, Bot. Zhurn. S.S.S.R. 29: 203. 1944.

Colocynthis citrullus (L.) Kuntze var. *fistulosus* (Stocks) Chakrav., Rec. Bot. Surv. India 17(1): 116. 1959.

Citrullus lanatus (Thunb.) Matsum. & Nakai var. *fistulosus* (J.L.Steward) Babu, Herb. Fl. Dehra Dun 194. 1977, invalid name because Babu erred in the basionym he cited.

Citrullus lanatus (Thunb.) Matsum. & Nakai var. *fistulosus* (Stocks) Chakrav., Fasc. Fl. India 11: 23. 1982, nom. illeg. isonym.

Type: Pakistan [India], Kurrachee, Sind, 1 Sep. 1850, *Stocks* s.n. (K).

Distribution in India: Punjab, Rajasthan, Uttar Pradesh.

Distribution outside India: Introduced (?) in tropical Africa.

GenBank: Sequences from Dane and Lang (2004) and Kocyan et al. (2007), e.g., DQ536719, DQ648185, AY522525.

Comments: Cultivated in India and Pakistan as a vegetable. The origin of *Benincasa fistulosa* is unclear, and the species is currently only known in cultivation.

3. *Benincasa hispida* (Thunb.) Cogn. in A. & C. DC., Monog. Phan. 3: 513. 1881.

Cucurbita hispida Thunb., Nov. Acta Regiae Soc. Sci. Upsal. 4: 38. 1783.

Benincasa pruriens (Parkinson) W.J.de Wilde & Duyfjes forma *hispida* (Thunb.) W.J.de Wilde & Duyfjes, Sandakania 17: 47. 2008.

Type: Japan, *Thunberg* 22775 (UPS, IDC microfiche). *Benincasa cerifera* Savi, Bibliot. Ital. (Milan) 9: 158–165, f. a-g. 1818.

Type: China, cult. in the Pisa botanical garden (herbarium?).

Distribution in India: Cultivated in tropical and subtropical regions of India.

Distribution outside India: Pakistan. India, Pakistan, Malaya, Eastern Australia, Polynesia, China & Japan. Wild origin unclear.

Images: <http://plants.usda.gov/java/profile?symbol=BENI3>

Efloraofindia at <https://sites.google.com/site/efloraofindia/species/a---l/cl/cucurbitaceae/benincasa/benincasa-hispida>

GenBank: Sequences from Kocyan et al. (2007), e.g., DQ282075, DQ282074.

Comments: *Benincasa* comprises only the two species that occur in India (Schaefer and Renner, 2011a; see our Fig. 1 for the phylogenetic position of the tribe Benincaseae). Nicolson and Fosberg (2003) have argued that the name *Benincasa hispida* (Thunb.) Cogn. does not need to be replaced by *Cucurbita pruriens* Parkinson (J. Voy. South Seas 44 (1773), while De Wilde and Duyfjes (2008b) maintain that the oldest available name for this species is *C. pruriens*, hence *Benincasa pruriens* (Parkinson) W.J. de Wilde & Duyfjes.

4. *Blastania cerasiformis* (Stocks) A.Meeuse, Bothalia 8: 12. 1962.

Ctenolepis cerasiformis (Stocks) Hook.f., Fl. Trop. Afr. 2: 558. 1871.

Bryonia fimbristipula Fenzl ex Stocks, Hooker's J. Bot. Kew Gard. Misc. 4: 149. 1852, nom. inval. pro syn. of *Zehneria cerasiformis* Stocks

Blastania fimbristipula Kotschy & Peyr., Pl. Tinn. 15. t. 7. 1867.

Melothria fimbristipula (Kotschy & Peyr.) G. Roberty, Bull. I.F.A.N., Ser. 16:795. 1954.

Zehneria cerasiformis Stocks, Hooker's J. Bot. Kew Gard. Misc. 4: 149. 1852.

Syntype: Africa, Sudan, Blue Nile Province, Jebal Arashkol Kotschy 205 (CAL 2 sheets, photos available from SSR, K); Pakistan, Stocks 29 (K).

Distribution in India: Wild on wastelands in Gujarat.

Distribution outside India: Old World tropics from Mauritania & Senegal east to Pakistan and in E. Africa south to Transvaal.

Image: http://www.zimbabweflora.co.zw/speciesdata/species.php?species_id=157060

GenBank: Sequences from Kocyan et al. (2007), e.g., DQ535797, DQ536803.

Comment: The genus name *Blastania* Kotschy et Peyritsch was published in July 1867 (the full publication is online at the Biodiversity Heritage Library) and has priority over *Ctenolepis* J. D. Hooker in Bentham et J. D. Hooker, Gen. 1: 832. Sep 1867.

Jeffrey (1980) and Chakravarty (1982) both list *B. cerasiformis* (under *Ctenolepis*) in their checklists, but we have not seen Indian specimens.

5. *Blastania garcinii* (Burm.f.) Cogn. in A. & C. DC., Monogr. Phan. 3: 629. 1881.

Ctenolepis garcinii (Burm.f.) Benth. & Hook.f., Gen. Pl. 1(3): 832. 1867.

Bryonia garcinii (Burm.f.) Willd., Sp. Pl. 4(1): 623. 1805 (as *garcini*).

Sicyos garcinii Burm. f., Fl. Ind. 211 (err. typ. 311). 1768.

Type: India, Tamil Nadu, Chennai (formerly Madras), Tuticorin, *Garcin s.n.* (G) fide Jeffrey, 1980.

Distribution in India: Andhra Pradesh, Delhi, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh.

Distribution outside India: Sri Lanka.

Image: Nothing reliable found.

GenBank: No published sequences available.

Comments: *Blastania* includes *B. cerasiformis* from India and west to tropical Africa, *B. garcinii* from India and Sri Lanka, and a third species in Madagascar.

6. *Bryonia aspera* Steven ex Ledeb., Fl. Ross. 2:140. 1843.

Lectotype: Northern Caucasus, Narzan, *Bieberstein* (LE), designated by Jeffrey (1969).

Distribution in India: NW India: Jammu (Upper Chenab Valley), Himachal Pradesh (Chamba, Lahul-spiti).

Distribution outside India: Turkey, Iran, Georgia, Armenia, Azerbaijan, Turkmenistan, Northern Afghanistan, Pakistan.

Image: Nothing reliable found.

GenBank: Sequences from Volz and Renner (2009), e.g., EU683747, EU683740.

Comment: This was treated as *B. dioica* Jacq. by Chakravarty (1982), but that species does not occur as far east as India, ranging instead from Spain south to Algeria and Morocco, Sardinia, Corsica, and the Greek Peninsula and east to mid-Poland; a distribution map with all species of *Bryonia* is provided by Volz and Renner (2009).

7. *Bryonia monoica* Aitch. & Hemsl., Trans. Linn. Soc. London, Bot. 3(1): 65. 1888.

Type: Afghanistan, Badghis, *Aitchison* 339 (CAL photo available from SSR, K).

Distribution in India: Probably near the Pakistani border.

Distribution outside India: Kazakhstan, Uzbekistan, Kirgizstan, Turkmenistan, Afghanistan, Iran, Pakistan.

Image: Nothing reliable found.

GenBank: Sequences from Volz and Renner (2009), e.g., EU096421, EU096419.

Comment: Chakravarty (1982) treated this under the name *B. multiflora* Boiss. & Heldr., but that species occurs instead in Turkey, Iran, Iraq and Syria (Jeffrey, 1969; Volz and Renner, 2009).

8. *Citrullus colocynthis* (L.) Schrad., Linnaea 12: 414. 1838. *Cucumis colocynthis* L., Sp. Pl. 2: 1011. 1753.

Colocynthis vulgaris Schrad., Ind. Sem. 1:fig. 99. 1950.

Type: Not designated.

Distribution in India: Andhra Pradesh, Assam, Bihar, Jahrkhand, Delhi, Goa, Gujarat, Karnataka, Kerala, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh.

Distribution outside India: Afghanistan, Myanmar, Pakistan, Sri Lanka, west to the Sahara (Lybia) and Sahel region.

Images: See efloraof India at <https://sites.google.com/site/efloraofindia/species/a--l/cl/cucurbitaceae/citrullus/citrullus-colocynthis>

GenBank: Sequences from Kocyan et al. (2007), e.g., DQ536649, DQ535791.

Comments: *Citrullus colocynthis*, or colocynth, is a perennial growing wild on sandy soils in deserts areas in Western and Central India. Many authors have treated Herb. Linn. No. 1152.1 (LINN) as the type. However, this collection lacks the relevant *Species Plantarum* number and was a post-1753 addition to the herbarium; it is not original material for the name (Jarvis, 2007).

9. *Citrullus lanatus* (Thunb.) Matsum. & Nakai, Cat. Sem. & Spor. Hort. Bot. Univ. Imp. Tokyo 1916: 30. 1920 (“1916”).

Momordica lanata Thunb., Prodr. Pl. Cap. 13. 1794.

Type: South Africa, Cape Province, *Thunberg s.n.* (UPS).

Cucurbita citrullus L., Sp. Pl. 2: 1010. 1753.

Type: “Habitat in Apulia, Calabria, Sicilia”; lectotype not designated.

Citrullus vulgaris Schrad. ex Eckl. & Zeyh., Enum. Pl. Afric. Austral. 2: 279. 1836.

Type: Not known fide De Wilde and Duyfjes (2010).

Distribution in India: Andaman & Nicobar Islands, Assam, Bihar, Jahrkhand, Delhi, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, Uttarakhand, West Bengal.

Distribution outside India: Nepal, Pakistan; native to tropical Africa.

Images: The Thunberg holotype can be seen here: <http://130.238.83.220/botanik/browserecord.php?-action=browse&-recid=371376>

<http://www.flowersofindia.net/catalog/slides/Watermelon.html>

See also efloraofindia at <https://sites.google.com/site/efloraofindia/species/a--l/cl/cucurbitaceae/citrullus/citrullus-lanatus>

GenBank: Several hundred sequences.

Comments: The watermelon was probably domesticated in northern Africa (Wasylkowa and van der Veen, 2004). The extent of its native range is unclear.

10. *Coccinia grandis* (L.) Voigt, Hort. Suburb. Calcutt. 59. 1845.

Bryonia grandis L., Mant. Pl. 126. 1767.

Type: India, without location, Herb. Linn. No. 1153.2 (LINN).

Bryonia alceifolia [sphalm. *alceaefolia*] Willd. in Rottler, Neue Schriften d. Ges. Naturf. Freunde Berlin 4: 223. 1803.

Type: India, Tamil Nadu, Tiruchinapally [Tiruchirappalli], Nov. 1793, *Rottler s.n.* (K).

Coccinia indica Wight & Arn., Prodr. Fl. Ind. Orient. 1: 347. 1834, nom. superfl. & illeg. for *Bryonia grandis* L.

Coccinia wightiana M.Roem., Syn. Pepon.: 93. 1846.

Syntypes: India, Chennai, *Wallich Cat. 6711a* [D.Klein, B.Heyne or J.P.Rottler] in Herb. Madras s.n. (Paralectotype: E00174668); Nepalry, *Wallich Cat. 6711b* and *6711e*, *R.Wight 1124* (Paralectotype: E00174667); Negapatam, *R.Wight 1124* (Lectotype, designated by Holstein, 2012: E00174666); *R.Wight 1124* (Paralectotype: NY, digital image).

Coccinia cordifolia (L.) Cogn. var. *wightiana* (M.Roem.) Cogn. in A. & C. DC., Monogr. Phan. 3: 531. 1881.

Coccinia grandis (L.) Voigt var. *wightiana* (M.Roem.) Greb. in R. Mansfeld & J. Schultze-Motel, Verz. Landwirtsch. u. Gaertn. Kulturpfl. 2: 929. 1986.

Cephalandra indica Naudin var. *palmata* C.B. Clarke, Fl. Brit. India 2: 621. 1879, nom. & stat. nov.

Distribution in India: Distributed in plains of India, ascending c. 300 m in Peninsular India; Andaman & Nicobar Islands, Andhra Pradesh, Assam, Bihar, Jharkhand, Goa, Gujarat, Himachal Pradesh, Karnataka, Kerala, Lakshadweep, Madhya Pradesh, Chhattisgarh, Maharashtra, Manipur, Odisha, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, Uttarakhand, West Bengal.

Distribution outside India: Africa, China, Japan, Malesia, Myanmar, Pakistan, Sri Lanka.

Images: <http://www.flowersofindia.net/catalog/slides/Ivy%20Gourd.html>

<http://apps.kew.org/herbcat/getImage.do?imageBarcode=K000742794>

Efloraofindia at <https://sites.google.com/site/efloraofindia/species/a---l/cl/cucurbitaceae/coccinia/coccinia-grandis>

GenBank: Sequences from Holstein and Renner (2011), e.g., HQ608245, HQ608458.

Comments: The genus *Coccinia* has 35 species, all but *C. grandis* in Africa south of the Sahara (Holstein, in press). In India, *C. grandis* has been used in traditional medicine for hundreds of years (Nadkarni and Nadkarni, 1976; Ramachandran and Subramaniam, 1983).

11. *Corallocarpus conocarpus* (Dalzell & A.Gibson) Hook.f. ex C.B. Clarke, Fl. Brit. India 2: 628. 1879 (as *conocarpa*).

Aechmandra conoarpa Dalzell & A.Gibson, Bombay Fl. 100. 1861.

Type: India, Maharashtra, Bombay, Gujurat near Malpor and Gundar, *Dalzell* 39 (K).

Distribution in India: Gujarat, Karnataka, Maharashtra, Rajasthan, Tamil Nadu.

Distribution outside India: Pakistan (fide the *Flora of Pakistan*, <http://www.tropicos.org/Name/50326465?projectId=32>, the species occurs also in Central Africa)

Image: <http://apps.kew.org/herbcat/detailsQuery.do?imageId=375483&pageCode=3&presentPage=3&queryId=4&sessionId=CE49DA6B1178914C12C060C6D319E224&barcode=K000592620>

GenBank: No published sequences available.

Comments: *Corallocarpus* has two species in Madagascar, eight in Africa (Schaefer and Renner, 2011a), and three that supposedly range from India to tropical East Africa. Chakravarty (1982) accepted four species for India, *C. conoarpa*, *C. epigaeus*, *C. gracilipes*, and *C. palmatus*, while Jeffrey (1980) considered the latter two names synonyms of *C. epigaeus* as do we, but also accepted *C. schimperi* for India.

12. *Corallocarpus epigaeus* (Rottler) Benth. & Hook.f. ex C.B. Clarke, Fl. Brit. India 2: 628. 1879 (as *epigaea*).

Bryonia epigaea Rottler, Neue Schriften d. Ges. Naturf. Freunde Berlin 4: 212. 1803.

Aechmandra epigaea (Rottler) Arn., J. Bot. 3: 274. 1841.

Rhynchoscarpa epigaea (Rottler) Naudin, Ann. Sci. Nat., Bot. sér. 4, 16: 178. 1862. Syn-types: Peninsular India, *Klein* 395 & 771 (B-W), *Rottler* 3531 (HBG), *Rottler* (K).

Rhynchoscarpa epigaea var. *gracilipes* Naudin, Ann. Sci. Nat., Bot. sér. 4, 16: 179. 1862. *Corallocarpus gracilipes* (Naudin) Cogn. in A. & C. DC., Monogr. Phan. 3: 656. 1881. Type: India, *J. Lepine* (P).

Corallocarpus palmatus Cogn. in A. & C. DC., Monogr. Phan. 3: 648. 1881.

Type: India, Gujarat [Gujerat] near Malpor and Gundar, *Dalzell* s.n. (K).

Further synonyms are listed in Jeffrey (1967).

Distribution in India: Andhra Pradesh, Assam, Bihar, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal.

Distribution outside India: Baluchistan, Pakistan, Sri Lanka; tropical East Africa, Sudan.

Image: <http://www.arkive.org/corallocarpus/corallocarpus-epigaeus/image-G117835.html>

Efloraofindia at <https://sites.google.com/site/efloraofindia/species/a---l/cl/cucurbitaceae/corallocarpus/corallocarpus-epigaeus>

GenBank: AM981182 from an unpublished paper.

Comments: The species is used as an anthelmintic (Chopra et al., 1956).

13. *Corallocarpus schimperi* (Naudin) Hook.f., Fl. Trop. Afr. 2: 567. 1871.

Rhynchoscarpa schimperi Naudin, Ann. Sc. Nat., sér. 4, 16: 180. 1862.

Type: Ethiopia, Sera-Walqua, *Schimper* 413 (P).

Corallocarpus velutinus (Dalzell & A.Gibson) Hook.f. ex C.B. Clarke, Fl. Brit. India 2(6): 628. 1879.

Aechmandra velutina Dalzell & A.Gibson, Bombay Fl. 200. 1861.

Type: W. Pakistan, *Dalzell* 41 (K).

Corallocarpus courbonii (Naudin) Cogn. A. & C. in DC. Monogr. Phan. 3: 655. 1881.

Type: A plant cultivated in Paris from seeds sent from Ethiopia, *A. Courbon* 334 (P P00346198, <http://plants.jstor.org/search?plantName=Rhynchoscarpa%20courbonii>).

Distribution in India: Unclear.

Distribution outside India: Pakistan and tropical East Africa and Arabia

Image: See *Flora of Pakistan*: <http://www.tropicos.org/Name/9201617?projectid=32>

GenBank: No published sequences available.

Comments: The supposed three species of *Corallocarpus* in India are in urgent need of taxonomic study.

14. *Cucumis hystrix* Chakrav., J. Bombay Nat. Hist. Soc. 50(4): 896. pl. 6. 1952.

Type: India, Meghalaya [earlier in Assam], Garo Hills, Tura Mountain, alt. 3000 ft; November 1929; *N.E. Parry* 859 (K).

Cucumis muriculatus Chakrav., J. Bombay Nat. Hist. Soc. 50(4): 896. 1952.

Type: Myanmar, Ruby Mines District, Oct. 1912, *J. H. Lace* 6325 (E), here synonymized by Kirkbride (1993).

Distribution in India: Arunachal Pradesh, Assam, Meghalaya, Mizoram.

Distribution outside India: Myanmar, N and W Thailand, SW China.

Image: <http://apps.kew.org/herbcat/getImage.do?imageBarcode=K000742801>

http://ts-den.aluka.org/fsi/img/size1/alukaplant/e/phase_01/e0000/e00301190.jpg

GenBank: Sequences from Renner et al. (2007), Sebastian et al. (2010), and many others, e.g., HM597016, HM597017.

Comments: Based on molecular data, *Cucumis* has about 25 species in Asia and Australia. *Cucumis hystrix* is the closest wild relative of the cucumber, *Cucumis sativus* (Sebastian et al., 2010).

15. *Cucumis indicus* Ghebretinsae & Thulin, Novon 17(2): 177. 2007.

Melothria ritchiei Chakrav., J. Bombay Nat. Hist. Soc. 50(4): 898, fig. A–K. 1952.

Cucumella ritchiei (Chakrav.) C. Jeffrey, Kew Bull. 19: 215. 1965, non *Cucumis ritchiei* (C.B. Clarke) Ghebretinsae & Thulin.

Type: India, Maharashtra, Bombay Presidency, Savantvadi State, Ram Ghat, *D. Ritchie* 67 (BM, E; <http://plants.jstor.org/specimen/e00187895>).

Distribution in India: Kerala, Maharashtra (Naithani, 1990). **Endemic.**

Image: http://ts-den.aluka.org/fsi/img/size2/alukaplant/e/phase_01/e0005/e00187895.jpg

GenBank: Sequences from Sebastian et al. (2010), e.g., HM597078, HM596966.

Comments: Molecular phylogenetic data show that the former genus *Dicaelospermum*, with the species *D. ritchiei* C.B. Clarke (1879), is nested inside *Cucumis*. The resulting nomenclatural transfer meant that the epithet “*ritchiei*” is occupied within the genus. A replacement name therefore became necessary with the transfer of *Melothria ritchiei* to *Cucumis*.

16. *Cucumis javanicus* (Miq.) Ghebretinsae & Thulin, Novon 17(2): 177. 2007.

Karivia javanica Miq., Fl. Ned. Ind. 1: 661. 1855.

Mukia javanica (Miq.) C. Jeffrey in Hooker's Icon. Pl. 37: 3, pl. 3661. 1969.

Melothria javanica (Miq.) Panigrahi & Misra, J. Econ. Tax. Bot. 5: 416. 1984.

Type: Java, *T. Horsfield* s.n. (BM, K, U).

Melothria assamica Chakrav., J. Bombay Nat. Hist. Soc. 50(4): 897. 1952.

Type: India, Assam, Cachar, *R. L. Keenan* s. n. (K).

Melothria assamica Chakrav. var. *scabra* Chakrav., J. Bombay. Nat. Hist. Soc. 50(4): 898. 1952.

Melothria javanica (Miq.) Panigrahi & Misra var. *scabra* (Chakrav.) Naithani, Flowering Plants of India, Nepal & Bhutan 179. 1990.

Type: India, Assam, Goalpara, Chirang Duar, Dec. 1890, *King's collector* s.n. (CAL, 2 sheets, photos available from SSR).

Distribution in India: Assam.

Distribution outside India: Java, China, and Thailand.

GenBank: Sequences from Renner et al. (2007) and Sebastian et al. (2010), e.g., HM597079, EF174484.

Comment: De Wilde and Duyfjes (2006a) synonymized *Melothria assamica* under *Cucumis javanicus*, which they treated as *Mukia javanica*, a genus that based on molecular data, however, is deeply nested inside *Cucumis*.

17. *Cucumis leiospermus* (Wight & Arn.) Ghebretinsae & Thulin, Novon 17(2): 177. 2007.

Bryonia leiosperma Wight & Arn., Prodr. Fl. Ind. Orient. 1: 345. 1834.

Mukia leiosperma (Wight & Arn.) Arn., Madras J. Lit. Sci. 12: 50. 1840.

Melothria leiosperma (Wight & Arn.) Cogn. in A. & C. DC., Monogr. Phan. 3: 622. 1881.

Syntypes: India, Tamil Nadu, Dindygul Hills, *Wallich Cat. no. 6708* (K); Chennai, Palni Hills, *R. Wight 1112* (BR, K). The Wallich specimen was chosen as lectotype by Jeffrey (1969).

Distribution in India: Andhra Pradesh, Assam, Karnataka, Madhya Pradesh, Maharashtra, Manipur, Rajasthan, Sikkim, Tamil Nadu.

Distribution outside India: Sri Lanka.

Photos by A. Pandey: http://farm8.staticflickr.com/7273/7859393808_2314892118_m.jpg
http://farm9.staticflickr.com/8307/7859413918_cff80f25db_m.jpg

GenBank: Sequences from Sebastian et al. (2010), e.g., HM597080, HM596911.

Comments: An understudied relative of the cucumber and melon.

18. *Cucumis maderaspatanus* L., Sp. Pl. 2: 1012. 1753.

Mukia maderaspatana (L.) M.Roem., Fam. Nat. Syn. Monogr. 2: 47. 1846

Melothria maderaspatana (L.) Cogn. in A. & C. DC., Monogr. Phan. 3: 623. 1881.

Type: India, "Cucumis Maderaspatensis fructu minimo" in Plukenet, *Phytographia t. 170. f. 2.* 1692. Typotype Herb. Sloane 95: 201 (BM-SL), designated by Meeuse, *Bothalia* 8: 14. 1962.

Bryonia cordifolia L., Sp. Pl. 2: 1012. 1753.

Coccinia cordifolia (L.) Cogn. in A. & C. DC., Monogr. Phan. 3: 623. 1881.

Type: "Habitat in Zeylonia," Lectotype: Herb. Hermann 2: 22, No. 354 (BM-000621582), designated by Jeffrey (1967).

Bryonia scabrella L.f., Suppl. Pl. 424. 1782 ("1781").

Mukia scabrella (L.f.) Arn., J. Bot. 3: 276. 1841.

Type: Northwest India, *Royle s.n.* (K, CAL photo available from SSR).

Distribution in India: Andhra Pradesh, Arunachal Pradesh, Bihar, Delhi, Gujarat, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Mizoram, Rajasthan, Tamil Nadu, Tripura.

Distribution outside India: Bhutan, China, Myanmar, Nepal, Pakistan, Sri Lanka.

Images: Efloraofindia at <https://sites.google.com/site/efloraofindia/species/a---l/cl/cucurbitaceae/mukia/cucumis-maderaspatanus>

<http://www.flowersofindia.net/catalog/slides/Madras%20Pea%20Pumpkin.html>

Flora of Pakistan: <http://www.tropicos.org/Name/9200868?projectid=32>

GenBank: Many sequences from Kocyan et al. (2007), Sebastian et al. (2010), and other studies.

19. *Cucumis melo* L., Sp. Pl. 2: 1011. 1753.

Lectotype: Herb. Linn. No. 1152.8 (LINN), designated by Meeuse, Bothalia 8: 61. 1962.
Bryonia callosa Rottler, Neue Schriften der Ges. Naturf. Freunde Berlin 4: 210. 1803.
Cucumis callosus (Rottler) Cogn. in Engl. Pflanzenr. IV. 275, 2: 129. 1924.

Type: India, Tamil Nadu, Deccan, *Rottler s.n.* (K?). Note: Rottler was a missionary in the Danish Settlement at Tranquebar (150 miles south of Madras) in the years after 1768.

Cucumis pubescens Willd., Sp. Pl., ed. 4(1): 614. 1805.

Type: Plant cultivated at Berlin; *C.L. Willdenow s.n.* (B-W, IDC microfiche 7440, specimen number 18048).

Cucumis momordica Roxb. Fl. Ind. 3: 720. 1832.

Type: India, *W. Roxburgh s.n.* (K?).

Cucumis trigonus Roxb., Fl. Ind. 3: 722. 1832.

Lectotype: India, *W. Roxburgh s.n.* (K), designated by Kirkbride, Biosyst. Monogr. *Cucumis* 115. 1993.

Cucumis melo var. *pubescens* (Willd.) Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 46(2): 103. 1877.

Cucumis melo var. *culta* Kurz., J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 46(2): 102. 1877.

Cucumis melo var. *agrestis* Naudin, Ann. Sci. Nat., Bot. sér. 4, 11: 73. 1859.

Lectotype: India, Union Territory, Puducherry [Pondicherry]: seeds sent by Jules Lépeire (plants cultiv. at Musée d'Histoire Naturelle, Paris); 1859; *Naudin s.n.* (P), designated by J.H. Kirkbride in Biosyst. Monogr. Gen. *Cucumis* 81. 1993.

Cucumis melo ssp. *agrestis* (Naudin) Pangalo in Zhukovsky, La Turquie agricole 534. 1933.

Cucumis melo forma *agrestis* (Naudin) W.J.de Wilde & Duyfjes, Sandakania 17: 55. 2008.

Distribution in India: Andhra Pradesh, Assam, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh.

Distribution outside India: Widely cultivated.

Images: See efloraofindia <http://www.flowersofindia.net/catalog/slides/Wild%20Melon.html>

Type: <http://apps.kew.org/herbcat/getImage.do?imageBarcode=K000634447>

<http://apps.kew.org/herbcat/getImage.do?imageBarcode=K000794987>

<http://apps.kew.org/herbcat/getImage.do?imageBarcode=K000742804>

GenBank: Numerous sequences from the three plant organellar genomes.

Comments: Sequences representing *C. callosus*, *C. pubescens*, and *C. trigonus* all cluster with *C. melo* (Sebastian et al., 2010) and likely present wild progenitors of domesticated *C. melo*. Jeffrey (1980) preferred to list *C. trigonus* as a separate species, and Chakravarty (1982) mentions two further varieties, *Cucumis melo* var. *momordica* Duthie & Fullar and var. *utilissima* Duthie & Fullar. Without specimens, these varieties cannot be assessed.

20. *Cucumis prophetarum* L., Cent. I. Pl. 33. 1755.

Type: Arabia, *D. Hasselquist*. Lectotype: Herb. Linn. No. 1152.4 (LINN), designated by Jeffrey (1962).

Distribution in India: Andhra Pradesh, Goa, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Tamil Nadu.

Distribution outside India: Pakistan to North Africa.

Images: See efloraofindia at <https://sites.google.com/site/efloraofindia/species/a---l/cl/cucurbitaceae/cucumis/cucumis-prophetarum>

Flora of Pakistan <http://www.tropicos.org/Name/9200833?projectid=32>

GenBank: Sequences from Renner et al. (2007) and Sebastian et al. (2010), e.g., DQ785879, DQ785837.

21. *Cucumis ritchiei* (C.B. Clarke) Ghebretinsae & Thulin, Novon 17(2): 178. 2007.

Dicoelospermum ritchiei C.B. Clarke, Fl. Brit. India 2: 630. 1879.

Mukia ritchiei (C.B. Clarke) W.J.de Wilde & Duyfjes, Thai Forest Bull., Bot. 34: 45. 2006.

Type: India, Karnataka, Bombay Presidency, Belgaum, *D. Ritchie* 316 (K).

Distribution in India: Karnataka, Kerala, Maharashtra, Punjab, Tamil Nadu. **Endemic.**

Photos taken at Fort Panhala in Kolhapur District: http://farm9.staticflickr.com/8305/7859345614_e613f0019d_m.jpg

http://farm9.staticflickr.com/8284/7859384216_f591b5418d_m.jpg

GenBank: Sequences from Kocyan et al. (2007) and Sebastian et al. (2010), e.g., DQ536546, HM597095.

Comments: Molecular phylogenetic data show that the former genus *Dicaelospermum* is embedded among the Asian species of *Cucumis*.

22. *Cucumis sativus* L., Sp. Pl. 2: 1012. 1753.

Lectotype: Herb. Burser 17: 97 (UPS), designated by ten Pas et al., Taxon 34: 290. f. 1–3. 1985.

Cucumis sativus var. *sikkimensis* Hook.f., Bot. Mag. 102: t. 6206. 1876.

Type: Commonly cultivated in the Eastern Himalaya Mountains, 1848; *Hooker s.n.*

Cucumis hardwickii Royle, Ill. Bot. Himal. Mts. 220. t. 47. 1835.

Type: Northwestern India, *J.F. Royle s.n.* (LIV).

Cucumis sativus L. forma *hardwickii* (Royle) W.J.de Wilde & Duyfjes, Sandakania 17: 58. 2008.

Distribution in India: All evidence points to northern India (Ganges region) as the place where wild cucumbers were first cultivated and where wild populations still

occur (Sebastian et al., 2010). Wild cucumbers can be distinguished from cultivated (feral) forms by their extremely bitter fruits.

Distribution outside India: Bhutan, China, Myanmar, Nepal, Thailand.

Image: <http://www.flowersofindia.net/catalog/slides/Cucumber.html>

GenBank: The genomes of three domesticated lines of cucumber have been sequenced, the American pickling cucumber, a Polish line, and a Chinese line (Huang et al., 2009).

Comments: The wild progenitors of domesticated cucumber still occur in India (Sebastian et al., 2010).

23. *Cucumis setosus* Cogn. in A. & C. DC., Monogr. Phan. 3: 491. 1881.

Type: India, Karnataka, Western Ghats, Belgaum, *Ritchie* 321 (E, K).

Distribution in India: Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan.

Endemic.

Photos by Suresh Jagtap, taken near Purandhar fort:

http://farm9.staticflickr.com/8443/7859357598_fd99ecd49b_m.jpg

http://farm9.staticflickr.com/8304/7859369892_28668e0fd2_m.jpg

GenBank: Sequences from Sebastian et al. (2010), e.g., HM597106, HM596985.

Comments: A distinct species.

24. *Cucumis silentvalleyi* (Manilal, T. Sabu & P. J. Mathew) Ghebretinsae & Thulin, Novon 17: 178. 2007.

Cucumella silentvalleyi Manilal, T. Sabu & P. J. Mathew, Acta Bot. Indica 13: 283. 1985. (as *silentvalleyii*)

Type: India, Kerala, Palghat Distr., Silent Valley, Poochapara, alt. 1370 m, 20 Oct. 1982, *T. Sabu* SV10662 (K, MH not seen).

Distribution in India: Kerala. **Endemic.**

Image: Photos taken near the type locality by Natalia Filipowicz, available from SSR.

GenBank: Sequences from Sebastian et al. (2010), e.g., HM597038, HM596931.

Comments: This species is one of c. 25 Asian and Australian species of *Cucumis* (Sebastian et al., 2010).

25. *Cucurbita argyrosperma* C.Huber, Cat. Graines 8. 1867.

Type: A cultivated plant.

Cucurbita mixta Pangalo, Bull. Applied Bot., Leningrad 1929-30, 23(3): 264. 1930.

Type: Mexico, Guatemala.

Distribution in India: Cultivated?

Distribution outside India: Native to Mesoamerica, widely cultivated.

Image: Many images can be found online of plants grown outside India.

GenBank: Many sequences from Sanjur et al. (2002) and further studies.

Comment: Jeffrey (1980) included this species (as *C. mixta*) in his checklist of Indian Cucurbitaceae, but it is unclear to what extent it is cultivated in India today.

26. *Cucurbita ficifolia* Bouché, Verh. Vereins Beford. Gartenbaues Königl. Preuss. Staaten 12: 205. 1837.

Type: So far unknown.

Distribution in India: Meghalaya (Naithani, 1990). Cultivated.

Distribution outside India: Native to Mesoamerica or northern South America, widely cultivated.

Image: See efloraofindia at <https://sites.google.com/site/efloraofindia/species/a---l/cl/cucurbitaceae/cucurbita/cucurbita-ficifolia>

GenBank: Sequences from Sanjur et al. (2002) and Kocyan et al. (2007), e.g., HQ438599, DQ536665.

Comments: *Cucurbita* has about 15 wild species in tropical and subtropical America (M. Nee, New York Botanical Garden, pers. comm., Feb. 2010) and five domesticated ones cultivated worldwide (*C. argyrosperma*, *C. ficifolia*, *C. maxima*, *C. moschata*, and *C. pepo*).

27. *Cucurbita maxima* Duchesne, Essai Hist. Nat. Courges 7, 12. 1786.

Type: From a cultivated plant (not found); neotype: Melo-pepo fructa albo Tournefort Inst. 1: 106. T. 34 1700.

Cucurbita maxima var. *badagarensis* Mudaliar, J. Bombay Nat. Hist. Soc. 49: 242. 1950.

Type: India, Malbar District, cultivated, collector unknown, Madras Herbarium No. 93177 and 93178 (MH).

Distribution in India: Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Goa, Gujarat, Himachal Pradesh, Karnataka, Kerala (Naithani, 1990), Madhya Pradesh, Maharashtra, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, Uttarakhand.

Distribution outside India: Native to Central America.

Image: efloraofindia at <https://sites.google.com/site/efloraofindia/species/a---l/cl/cucurbitaceae/cucurbita/cucurbita-maxima>

GenBank: Numerous sequences from the three plant organellar genomes.

Comments: Winter squash is cultivated throughout India.

28. *Cucurbita moschata* (Duchesne ex Lam.) Duchesne, Essai Hist. Nat. Courges 7. 1786.

Cucurbita pepo var. *moschata* Duchesne ex Lam., Encycl. 2: 152. 1786.

Type: “M. Duchesne presume que cette gourge est la même que le cucurbita major rotunda, flore luteo, folia aspero de G.B. Pin 312 qui est le Cucurbita India rotunda de Dalechampe (Lugd. 616).”

Distribution in India: Arunachal Pradesh, Assam, Bihar, Delhi, Goa, Himachal Pradesh, Kerala, Madhya Pradesh, Maharashtra, Manipur, Mizoram, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh.

Distribution outside India: Native to Central or South America.

Image: See efloraofindia at <https://sites.google.com/site/efloraofindia/species/a---l/cl/cucurbitaceae/cucurbita/cucurbita-moschata>

GenBank: Numerous sequences from the three plant organellar genomes.

29. *Cucurbita pepo* L., Sp. Pl. 2: 1010. 1753.

Lectotype: Herb. Linn. No. 1151.4 (LINN), designated by Keraudren-Aymonin in Aubréville & Leroy (ed.), Fl. Cambodge Laos Viêt-Nam 15: 105. 1975.

Distribution in India: Arunachal Pradesh, Assam, Bihar, Delhi, Goa, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Mizoram, Punjab, Tamil Nadu, Tripura, Uttar Pradesh. Cultivated.

Distribution outside India: Native to Central or South America.

Image: <http://www.flowersofindia.net/catalog/slides/Pumpkin.html>

GenBank: Numerous sequences from the three plant organellar genomes.

Comments: See Barrie (Taxon 55: 795–796. 2006) for a history of this name. Chakravarty (1982) also mentions the varieties var. *melopepo* Alef. and var. *ovigera* Alef.; we are unsure about their validity.

30. *Cyclanthera pedata* (L.) Schrad., Index Seminum, Gottingen 1831: 2. 1831; emend in Linnaea 8(Litt.): 22–27. 1833.

Momordica pedata L., Sp. Pl. 2: 1009. 1753.

Lectotype: Peru, “Momordica fructu striato, Laevi, vulgo Caigua” in Feuillée, J. Obs., 2: 754. t. 41. 1714, designated by Jeffrey in Kew Bull. 34: 796. 1980.

Distribution in India: Cultivated in northern India.

Distribution outside India: Native to South America; cultivated also in Bhutan.

Image: See efloraofindia at <https://sites.google.com/site/efloraofindia/species/a---l/cl/cucurbitaceae/cyclanthera/cyclanthera-pedata>

GenBank: Sequences from Decker-Walters et al. (2004), e.g., AY396221, AJ748597.

Comments: *Cyclanthera* has c. 40 species in the Southwestern USA, Mexico, Central and South America, one species on the Galapagos archipelago (Schaefer and Renner, 2011a).

31. *Dactyliandra welwitschii* Hook.f., Fl. Trop. Afr. 2: 557. 1871.

Ctenolepis welwitschii (Hook.f.) Jafri, Fl. Karachi 327 (1966)

Type: Lower Guinea, sandy thickets in Luanda, *Welwitsch* 832 (BM).

Distribution in India: Gujarat, Haryana, Rajasthan (fide Chakravarty, 1982).

Distribution outside India: Southwest Africa (Namibia, Angola); coastal West Pakistan (Karachi; Khatoon, 2006).

Image: Nothing reliable found online.

GenBank: Sequences from Kocyan et al. (2007) and Schaefer and Renner (2011b), e.g., HQ201973, DQ535750.

Comments: The genus *Dactyliandra* has two African species of which one, *D. welwitschii*, also occurs in India and Pakistan (Bhandari and Singh, 1964; Khatoon, 2006), apparently as a natural introduction since the species has no known uses and is not cultivated.

32. *Diplocyclos palmatus* (L.) C. Jeffrey, Kew Bull. 15(3): 325. 1962.

Bryonia palmata L., Sp. Pl. 2: 1012. 1753, excl. syn.

Coccinia palmata M.Roem. Synopsis peponiferarum 93. 1846.

Lectotype: Sri Lanka, Herb. Hermann 2: 58, No. 353 (BM-000621700), designated by Jeffrey (1962).

Diplocyclos palmatus var. *walkeri* (Chakrav.) Babu, Herb. Fl. Dehra Dun 198. 1977.

Bryonopsis laciniosa (L.) Naudin var. *walkeri* Chakrav., Bot. Surv. India 17(1): 183 (1959).

Type: Sri Lanka, *Walker* s.n. (E).

Distribution in India: Andhra Pradesh, Arunachal Pradesh, Bihar, Jharkhand, Goa, Gujarat, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Chhattisgarh, Maharashtra, Manipur, Rajasthan (Naithani, 1990), Tamil Nadu, Tripura, Uttar Pradesh.

Distribution outside India: Bhutan, China, Nepal, Pakistan, Thailand, South Japan, Sri Lanka, Philippines, Indonesia, Peninsular Malaysia, Papua New Guinea, NE Australia.

Images: See efloraofindia at <https://sites.google.com/site/efloraofindia/species/a---l/cl/cucurbitaceae/diplocyclos/diplocyclos-palmatus>

Flora of Pakistan: <http://www.tropicos.org/Name/9201644?projectid=32>

GenBank: Sequences from Kocyan et al. (2007) and Holstein and Renner (2011), e.g., DQ536671, DQ536769.

Comments: The other three species of *Diplocyclos* occur in tropical Africa. The name *Bryonopsis laciniosa* (L.) Naudin refers to a species that does not occur in India (see *Misapplied names and species erroneously or doubtfully recorded from India*).

33. *Gomphogyne cissiformis* Griff., Account Bot. Coll. Cantor 26, pl. 4: 1–7. 1845.
emend, J. Asiat. Soc. Bengal 23(7): 645. 1854.

Type: Himalaya Range, *Edgeworth* 88 (neotype K), designated by Keraudren-Aymonin (1975)

Gomphogyne cissiformis var. *villosa* Cogn in A. & C. DC., Monogr. Phan. 3: 925. 1881.

Gomphogyne cissiformis forma *villosa* (Cogn.) Mizush., J. Jap. Bot. 41: 259. 1966.

Type: India, Sikkim, *Hooker* s.n., 2 Oct. 1843 (K).

Distribution in India: Arunachal Pradesh, Himachal Pradesh, Mizoram, Sikkim, Uttar Pradesh, West Bengal.

Distribution outside India: Nepal, Bhutan, China (Yunnan).

Image: Nothing reliable found online.

GenBank: Sequences from Schaefer et al. (2009), e.g., EU436354.

Comments: The genus *Gomphogyne* has at least two species, *G. cissiformis* Griff. and *G. nepalensis* W.J.de Wilde & Duyfjes (De Wilde et al., 2007). A third species, *G. cirromitrata* W.J.de Wilde & Duyfjes, based on molecular data, belongs in *Hemsleya* (as *H. cirromitrata* (W.J.de Wilde & Duyfjes) H. Schaeff. & S.S. Renner; Schaefer and Renner, 2011b).

34. *Gynostemma pentaphyllum* (Thunb.) Makino, Bot. Mag. (Tokyo) 16: 179. 1902.

Vitis pentaphylla Thunb., Syst. Veg., ed. 14: 244. 1784.

Type: Japan, *Thunberg* 5858 (UPS).

Gynostemma pedatum Blume, Bijdr. Fl. Ned. Ind. 1: 23. 1825 (as *pedata*).

Lectotype: Java, Tjanjor & Krawang, *Blume* 1429 (L, barcode L0588327), designated by De Wilde and Duyfjes, Blumea 52(2): 271. 2007.

Gynostemma simplicifolium Blume, Bijdr. Fl. Ned. Ind. 1: 24. 1825 (as *simplicifolia*).

Gynostemma pentaphyllum forma *simplicifolium* (Blume) W.J.de Wilde & Duyfjes, Blumea 52(2): 271. 2007.

Lectotype: Java, Mt Krawang, *Blume* 1493 (L, barcode L0588361), designated by De Wilde and Duyfjes, Blumea 52(2): 271. 2007.

Gynostemma laxum (Wall.) Cogn. in A. & C. DC., Monogr. Phan. 3: 914. 1881 (as *laxa*).

Zanonia laxa Wall., Pl. Asiat. Rar. 2: 29. 1831.

Type: Bangladesh [India], Silhet; *Wallich Cat.* 3727 A-B (K, K-W, BM).

(Further synonyms are listed in De Wilde and Duyfjes, 2007.)

Distribution in India: Cultivated in Arunachal Pradesh, Assam, Himachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal.

Distribution outside India: Bangladesh, Bhutan, China, Myanmar, Sri Lanka.

Image: Many images of this frequently cultivated species are found online.

GenBank: Sequences from Zhang et al. (2006), Chen et al. (2010) and other studies.

Comments: The species is used to make herbal teas. Its natural range is currently unclear.

The genus *Gynostemma* has some ten species, all in Asia (Schaefer and Renner, 2011a).

35. *Hemsleya macrocarpa* (Cogn.) C. Y. Wu ex C. Jeffrey, Kew Bull. 36: 739. 1982.

Gomphogyne macrocarpa Cogn. in Engl. Pflanzenr. IV. 275, 1 (Heft 66): 40. 1916.

Holotype: India, Manipur, Laimatak, alt. 1300 m, November 1907, A. Meebold 6522 (Wroclaw University, Poland: BRSL, not seen).

Distribution in India: Assam, Arunachal Pradesh, Manipur, Nagaland (Naithani, 1990).

Distribution outside India: China (Yunnan).

Image: Nothing reliable found online.

GenBank: Sequences from Li et al. (2010) and Li et al. (2011), e.g., JF976573, JN044854.

Comments: *Hemsleya* is thought to comprise 30 species mostly in China, a few in Indochina and East Malesia (Schaefer and Renner, 2011a). Further synonyms of *H. macrocarpa* are listed in Lu et al. (2011).

36. *Herpetospermum darjeelingense* (C.B. Clarke) H.Schaef. & S.S.Renner, Taxon 60(1): 134. 2011.

Edgaria darjeelingensis C.B. Clarke, J. Linn. Soc. 15: 114. 1876.

Type: India, West Bengal, Darjeeling, 1 Oct 1875, C.B. Clarke 26857 (CAL photo available from SSR, K).

Edgaria darjeelingensis var. *clarkeana* S. N. Biswas, J. Econ. Taxon. Bot. 18(1): 173, f. A-1-6. 1994 (as *clarkiana*).

Type: India, West Bengal, Darjeeling, alt. 2100 m, 9 Sep. 1875, Griffith s.n. (K).

Distribution in India: Arunachal Pradesh, Sikkim, West Bengal.

Distribution outside India: Bhutan, Nepal, China (Xizang).

Image: See above, photo of type collection.

GenBank: Sequences from Kocyan et al. (2007), e.g., DQ536550.

Comments: The genus *Herpetospermum* has three species in India, Myanmar, Nepal, Tibet, and China (Yunnan). In the herbarium, *H. darjeelingense* can be confused with *H. pedunculosum*, from which it is distinguished by its narrow and glabrous calyx-tube with filiform lobes (Chakravarty, 1982).

37. *Herpetospermum pedunculosum* (Ser.) Baill. Hist. Pl. 8:445. 1885.

Bryonia pedunculosa Ser., Prodr. 3: 306. 1828.

Isotypes: Nepal, Wallich s.n. (G-DC, K), Wallich 6761 (K-W).

Distribution in India: Arunachal Pradesh, Assam, Himachal Pradesh, Manipur, Meghalaya, Nagaland, Sikkim, Uttar Pradesh, West Bengal.

Distribution outside India: Bhutan, Nepal, China.

Images: efloraofindia at <https://sites.google.com/site/efloraofindia/species/a---l/cl/cucurbitaceae/herpetospermum/herpetospermum-pedunculosum>
<http://www.flowersofindia.net/catalog/slides/Beej%20Karela.html>

GenBank: Sequences from Schaefer and Renner (2011) and Li et al. (2011), e.g., JN044888, JF941910.

Comments: The *Flora of British India* (Clarke, 1879) lists the name *Herpetospermum caudigerum* Wall. ex C.B. Clarke, but that is an illegitimate name for *Bryonia pedunculosa* Ser.

38. *Herpetospermum tonglense* (C.B. Clarke) H. Schaeff. & S.S. Renner, Taxon 60(2): 615 (2011c).

Warea tonglensis C.B. Clarke in J. Linn. Soc., Bot. 15: 129. 1876.

Biswarea tonglensis (C.B. Clarke) Cogn. in A. & C. DC., Monogr. Phan. 3: 403. 1881.

Type: India, West Bengal, Darjeeling, Rungbee, *C.B. Clarke 12183A* (K).

Distribution in India: Assam, Manipur, Sikkim, West Bengal, Eastern Himalayan ranges

Distribution outside India: China, Nepal, Myanmar.

Image: Nothing reliable found online.

GenBank: Sequences from Kocyan et al. (2007), e.g., JQ933236, DQ536637.

Comments: Based on plastid and nuclear gene topologies, this species is the sister species to *H. pedunculosum*, and Schaefer and Renner (2011a, b) therefore merged the monotypic genus *Biswarea* with *Herpetospermum*.

39. *Hodgsonia heteroclita* (Roxb.) Hook.f. & Thomson, Proc. Linn. Soc. London 2: 257. 1854 (“1855”).

Trichosanthes heteroclita Roxb., Fl. Ind. 3: 705-707. 1832.

Type: Bangladesh [India, Bengal] *W. Roxburgh s.n.* (K) “Native of the eastern parts of Bengal. From Silhet Mr. Robert Keith Dick, the Judge of that district, sent plants to the botanic garden in 1805.”

Distribution in India: Arunachal Pradesh, Assam, Meghalaya, Sikkim, Tripura, West Bengal.

Distribution outside India: Bangladesh, Bhutan, Cambodia, Laos, Myanmar, Thailand, Vietnam.

Image: See efloraofindia at <https://sites.google.com/site/efloraofindia/species/a---l/cl/cucurbitaceae/hodgsonia/hodgsonia-macrocarpa>

GenBank: Sequences from Schaefer and Renner (2011b) and De Boer et al. (2012), e.g., HE661403, HQ201981.

Comment: Jeffrey (1980) considered *H. heteroclita* a synonym of *H. macrocarpa* (Blume) Cogn. (see under misapplied names and species erroneously or doubtfully recorded from India), while De Wilde and Duyfjes (2001) recognize two species.

40. *Indofeveillea khasiana* Chatterjee, Kew Bull. 2(2): 121. f.1-7. 1948 (“1947”).

Type: India, Meghalaya [Assam], Khasia Hills, 1886, *G.Mann s.n.* (CAL, 2 sheets, photos available from SSR).

Distribution in India: Arunachal Pradesh, Assam, Meghalaya.

Distribution outside India: Bhutan, Tibet.

Image: See efloraofindia at <https://sites.google.com/site/efloraofindia/species/a---l/cl/cucurbitaceae/indofeveillea-khasiana/indofeveillea-khasiana>

GenBank: Sequences from Schaefer and Renner (2011b), e.g., DQ501256, HQ201983.

Comments: Based on molecular data, *I. khasiana* represents an isolated ancient lineage of Cucurbitaceae (Schaefer and Renner, 2011a; our Fig. 1).

41. *Kedrostis courtallensis* (Arn.) C. Jeffrey, Kew Bull. 15: 353. 1962.

Bryonopsis courtallensis Arn., J. Bot. 3: 274. 1841.

Type: Sri Lanka, *Wight 1147* (K).

Cerasiocarpum zeylanicum (Thwaites) C.B. Clarke, Fl. Brit. India 2: 629. 1879.

Aechmandra zeylanica Thwaites, Enum. Pl. Zeyl. 2: 125. 1859.

Type: Sri Lanka, *Thwaites 3002* (CAL, 2 sheets, photos available from SSR), 3500 (CAL, 2 sheets, K).

Cerasiocarpum bennettii (Miq.) Cogn. in A. & C. DC., Monogr. Phan. 3: 729. 1881.

Kedrostis bennettii (Miq.) W.J.de Wilde & Duyfjes, Reinwardtia 12(2): 130. 2004.

Bryonopsis bennettii Miq., Fl. Ned. Ind. 1: 657. 1855.

Type: Java, in Banjoemas door, *T. Horsfield s.n.* (K, U).

Distribution in India: Andhra Pradesh, Karnataka, Kerala, Maharashtra, Tamil Nadu.

Distribution outside India: Myanmar, Sri Lanka.

Image: Nothing reliable found online.

GenBank: No published sequences available.

Comments: The genus *Kedrostis* comprises about 20 species in tropical and subtropical Africa and Arabia, six species in Madagascar, and perhaps four in India, Sri Lanka, and West Malesia (De Wilde and Duyfjes, 2004a; Schaefer and Renner, 2011a).

42. *Kedrostis foetidissima* (Jacq.) Cogn. in A. & C. DC., Monogr. Phan. 3: 634. 1881.

Trichosanthes foetidissima Jacq., Collectanea 2: 841. 1788.

Type: West Africa, plant cultivated in Vienna and depicted in Jacq. , Collectanea 4. 1790, pl. 624.

Bryonia rostrata Rottler, Neue Schriften der Ges. Naturf. Freunde Berlin 4: 212. 1803.

Aechmandra rostrata (Rottler) Arn., J. Bot. 3: 274. 1841.

Rynchosarpa rostrata (Rottler) Naudin, Ann. Sci. Nat., Bot. sér. 4,16: 177. 1862.

Kedrostis rostrata (Rottler) Cogn. in A. & C. DC., Monogr. Phan. 3: 636. 1881.

Type: India, Tamil Nadu, Nandaradah, *Rottler 766* (B-W, K).

Distribution in India: Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Tamil Nadu. Cultivated.

Distribution outside India: A West African species cultivated in India, Bangladesh, Myanmar, Pakistan, Sri Lanka.

Image: For a detailed description and links to images see <http://plants.jstor.org/flora-ftea001850>

GenBank: Sequences from a plant from Benin (Africa): AM981179, AM981180.

Comments: Fruits and leaves are used as a vegetable, and the roots (and fruits) also medicinally.

43. *Lagenaria siceraria* (Molina) Standl., Publ. Field Mus. Nat. Hist. Chicago, Bot. Ser. 3: 435. 1930.

Cucurbita siceraria Molina, Sag. Stor. Nat. Chili 133. 1782.

Type: Chile, *Molina s.n.* (lost), lectotype: LINN-1151.1

Cucurbita lagenaria L., Sp. Pl. 2: 1010. 1753.

Type: America, Herb. Linn. No. 1151.1 (LINN), designated by Jeffrey (1967).

Distribution in India: Cultivated throughout India.

Distribution outside India: Native of tropical Africa.

Image: See efloraofindia at <https://sites.google.com/site/efloraofindia/species/a---l/cl/cucurbitaceae/lagenaria/lagenaria-siceraria> and <http://www.flowersofindia.net/catalog/slides/Bottle%20Gourd.html>

GenBank: Hundreds of sequences from the three plant organellar genomes.

Comments: The bottle gourd is a native of tropical Africa and is cultivated throughout the tropics (further information and references see Schaefer and Renner, 2011a).

44. *Luffa acutangula* (L.) Roxb. Hort. Beng. 70. 1814.

Cucumis acutangulus L., Sp. Pl. 2: 1011. 1753.

Type: "Habitat in Tataria, China." Type not designated.

Luffa amara Roxb., Fl. Ind. 3: 715. 1832.

Luffa acutangula var. *amara* (Roxb.) C.B. Clarke, Fl. Brit. India 2: 615. 1879.

Luffa acutangula forma *amara* (Roxb.) W.J.de Wilde & Duyfjes, Sandakania 17: 68. 2008.

Lectotype: India, Ic. Roxb. 460 (K) designated by Jeffrey (1980).

Luffa hermaphrodita Singh & Bhandari, Baileya 11(4): 136, Fig. 13. 1964.

Type: India, Rajasthan, cultivated at Botanical Gardens, Jaswant College, Jodhpur from seeds collected at Agra by D. Singh, 20 Aug. 1962, *Bhandari 1527A* (CAL photo available from SSR).

Cucurbita umbellata Willd., Sp. Pl., ed. 4(1): 608. 1805.

Luffa umbellata (Willd.) M.Roem., Fam. Nat. Syn. Monogr. 2: 63. 1846.

Syntypes: East India, *Klein* 769 (B-W 18033) and *Klein s.n.* (K) fide Jeffrey (1992).

Luffa kleinii Wight & Arn., Prodr. Fl. Ind. Orient. 1: 344. 1834.

Type: India, Kreala, Travancore, Mirittupadu, *Klein s.n.* (K?).

Distribution in India: Native and cultivated throughout India.

Distribution outside India: Cultivated worldwide.

Image: See efloraofindia at <https://sites.google.com/site/efloraofindia/species/a--l/cl/cucurbitaceae/luffa/luffa-acutangula>

<http://www.flickr.com/photos/83425416@N02/7649353846/in/photostream>

GenBank: Sequences from Kocyan et al. (2007), e.g., HE661305, HE661476.

Comments: The genus *Luffa* has eight species, three in the Neotropics, one in Australia, and four in Africa and Asia. The Indian species are discussed in Pandey et al. (2006). Jeffrey (1980) and later authors treated Herb. Linn. No. 1152/7 (LINN) as the (lecto)type. However, this collection lacks the relevant *Species Plantarum* number and was a post-1753 addition to the herbarium (Jarvis, 2007).

45. *Luffa cylindrica* (L.) M.Roem., Fam. Nat. Syn. Monogr. 2: 63. 1846.

Momordica cylindrica L., Sp. Pl. 2: 1009. 1753.

Type: Sri Lanka and China. Lectotype: Herb. Linn. No. 1150.9 (LINN), designated by Wunderlin in Ann. Missouri Bot. Gard. 65: 329. 1978.

Luffa aegyptiaca Mill., Gard. Dict., ed. 8. Luffa no. 1. 1768.

Type: Presumably a cultivated plant (Jeffrey, 1962). Lectotype: *Pepo indicus reticulatus eminibus nigris* Herm., Hort. Acad. Lugd.-Bat. Cat.: 482 (1687), designated by Jeffrey (1992).

Luffa sylvestris Miq., Fl. Ned. Ind. 1: 666. 1855.

Luffa cylindrica (L.) M.Roem. var. *minor* Chakrav., nom. nud. (CAL photo available from SSR).

Luffa aegyptiaca forma *sylvestris* (Miq.) W.J.de Wilde & Duyfjes, Sandakania 17: 70. 2008.

Type: "Petola silvestris" in Rumph., Herb. Amboin. 5, p. 409, t. 150. 1746.

Distribution in India: Native and cultivated throughout India.

Distribution outside India: From India to Egypt and Sudan; cultivated widely.

Image: <http://www.flowersofindia.net/catalog/slides/Sponge%20Gourd.html>

GenBank: Sequences from Sebastian et al. (2012) and numerous other sequences from unvouchered material, some under *L. cylindrica*, others under *L. aegyptiaca*.

Comments: There has been considerable discussion on whether the correct name for this species is *L. cylindrica* or *L. aegyptiaca*. The former view was held by Jeffrey (1980), while the latter was adopted by Schubert (Taxon, 24: 174, 1975) and Heiser and Schilling (Biotropica 20(3): 185-191, 1988). Nicolson and colleagues (1988) discuss the issue and prefer *L. aegyptiaca*.

46. *Luffa echinata* Roxb., Fl. Ind. 3: 716. 1832.

Lectotype: India, Coromandel, Ic. Roxb. 1694 (K), designated by Jeffrey (1980).

Luffa echinata var. *longistyla* C.B. Clarke, Fl. Brit. India 2: 615. 1879.

Type: India, M.P. Edgeworth 3018 (K).

Distribution in India: Assam, Bihar, Gujarat, Himachal Pradesh, Madhya Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal.

Distribution outside India: Wild from Egypt to Niger and maybe further to the West (H. Schaefer, pers. comm., Dec. 2012).

Images: efloraofindia at <https://sites.google.com/site/efloraofindia/species/a---l/cl/cucurbitaceae/luffa/luffa-echinata>

<http://www.flickr.com/photos/83425416@N02/7648878220/in/photostream/>

<http://www.flickr.com/photos/83425416@N02/7649327834/in/photostream>

<http://www.flickr.com/photos/83425416@N02/7649413904/in/photostream>

GenBank: Sequences from Decker-Walters et al. (2004) and Schaefer et al. (2009), e.g., HE661478, EU436357.

47. *Luffa graveolens* Roxb., Fl. Ind. 3: 716. 1832.

Type: Jharkhand (earlier a part of Bihar State) “A native of the Rajmahl hills, from thence the seeds were brought to the botanical garden, where the plants blossom during the rainy season, and the seed ripens about three months afterwards.” Lectotype: Ic. Roxb. 1693 (K), designated by Jeffrey (1980).

Distribution in India: Bihar, Maharashtra, Sikkim, Uttar Pradesh.

Distribution outside India: Nepal.

Image: Photos available upon request from A. Pandey or SSR.

GenBank: Sequences from Decker-Walters et al. (2004) and Schaefer et al. (2009), e.g., HE661308, EU436358.

Comments: The application of this name to Australian material was erroneous (Telford et al., 2011). The flowers of *L. graveolens* are yellow, while those of *L. echinata* are white.

48. *Momordica balsamina* L., Sp. Pl. 2: 1009. 1753.

Type: “Habitat in India,” plant cultivated at Hartekamp, The Netherlands. Lectotype: Herb. Linn. No. 1150.1 (LINN), designated by Meeuse in Bothalia 8: 49. 1962.

Distribution in India: Cultivated in Gujarat, Haryana, Rajasthan?

Distribution outside India: Native in the dry savannas of Southernmost Africa and the northern margin of the tropical belt (H. Schaefer, pers. comm., Dec. 2012).

Naturalized in parts of tropical Asia, the Americas and most of the Pacific islands.

Image: Flora of Pakistan: http://www.mobot.org/mobot/PakistanImages/154-Cucurbitaceae/Momordica_balsamina.jpg

GenBank: Sequences from Schaefer and Renner (2010), e.g., HM367595, GQ163349.
 Comments: *Momordica* has about 60 species in tropical and subtropical Africa, Arabia, (sub) tropical Asia, Malesia and Northeastern Australia (Schaefer and Renner, 2010, 2011a).

49. *Momordica charantia* L., Sp. Pl. 2: 1009. 1753.

Type: "Habitat in India." Lectotype: Herb. Clifford: 451, *Momordica* 2 (BM-000647445), designated by Jeffrey (1967).

Momordica charantia L. var. *muricata* (Willd.) Chakrav., Fasc. Fl. India 11: 92. 1982.

Momordica muricata Willd., Sp. Pl., ed. 4(1): 602. 1805.

Type: "Habitat in India Orientali," Plate 10 in Rheede Hort. Mal. Ind. 8. 1688.

Distribution in India: Large fruited forms cultivated all over India as vegetable; small wild forms occur in forest pockets in the Western and Eastern Ghats, Chhattisgarh (Bastar), Jharkhand and all over Central and South India (Joseph and Antony, 2010).

Distribution outside India: Native in tropical and subtropical Africa, naturalized in parts of tropical Asia.

Image: efloraofindia at <https://sites.google.com/site/efloraofindia/species/a---l/cl/cucurbitaceae/momordica/momordica-charantia>

<http://www.flowersofindia.net/catalog/slides/Bitter%20Gourd.html>

GenBank: Sequences from Schaefer and Renner (2010) and Liao et al. (2012), e.g., DQ501269, HE585488.

50. *Momordica cochinchinensis* (Lour.) Spreng., Syst. Veg., ed. 16, 3: 14. 1826.

Muricia cochinchinensis Lour., Fl. Cochinch. 2: 596. 1790.

Type: Vietnam, Loureiro s.n. (BM, <http://plants.jstor.org/specimen/bm000944651>).

Momordica macrophylla Gage, Rec. Bot. Surv. India 3: 61. 1908.

Type: Myanmar (Burma), Mergui, April 1911, A. Meebold s.n. (CAL?).

Distribution in India: Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Bihar, Karnataka, Manipur, Nagaland, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal.

Distribution outside India: Native from India in the West to New Guinea/Australia in the Southeast.

Image: efloraofindia at <https://sites.google.com/site/efloraofindia/species/a---l/cl/cucurbitaceae/momordica/momordica-cochinchinensis> and

<http://www.flowersofindia.net/catalog/slides/Chinese%20Cucumber.html>

GenBank: Sequences from Schaefer and Renner (2010), e.g., GQ163379, GQ163256.

Comments: Jeffrey (1980; 2001) and De Wilde and Duyfjes (2002) have synonymized *M. macrophylla* under *M. cochinchinensis*.

51. *Momordica cymbalaria* Fenzl ex Naudin, Ann. Sci. Nat., Bot., Sér. 4, 12: 134. 1859.

Type: Africa, Sudan, Kordofan, Mt. Arasch Cool (Arashkol), 9 Oct. 1839, *Kotschy* 147 (CAL, 2 sheets, photos available from SSR).

Momordica tuberosa (Roxb.) Cogn. in A. & C. DC., Monogr. Phan. 3: 454. 1881, nom. illeg., non Dennst. 1818.

Luffa tuberosa Roxb., Fl. Ind. 3: 717. 1832.

Lectotype: India, Ic. Roxb. 461 (K), designated by Jeffrey (1980).

Distribution in India: Andhra Pradesh, Karnataka, Madhya Pradesh, Maharashtra, and Tamil Nadu (fide Parvathi and Kumar, 2002).

Distribution outside India: North and East Africa.

Image: See http://en.wikipedia.org/wiki/Momordica_cymbalaria#cite_note-dist-1.

GenBank: An ITS sequence from an Indian specimen, Karuppusamy 28631 from Andhra Pradesh (Ali et al., 2009; GQ183046), is available and is identical to sequences from Africa (Schaefer and Renner, 2010).

Comments: We disagree with John and Antony (2010) that Jeffrey's (1980) synonymization of *Luffa tuberosa* with the African *Momordica cymbalaria* is erroneous. Likely introduced to Asia as a vegetable and medicinal plant (Lokesha and Vasudeva, 2001).

52. *Momordica denudata* (Thwaites) C.B. Clarke, Fl. Brit. India 2: 618. 1879.

Momordica dioica Roxb. ex Willd. var. *denudata* Thwaites, Enum. Pl. Zeyl. 2: 126. 1859.

Type: Sri Lanka, *Thwaites* 1615 (K, CAL photo available from SSR, PDA).

Distribution in India: Gujarat, Maharashtra, Karnataka, Kerala (Chakravarty, 1982).

Distribution outside India: Sri Lanka.

Image: Several of the type specimens can be found online.

GenBank: Schaefer and Renner (2010) generated sequences from *Thwaites* 28 (K), collected in Sri Lanka, e.g., GQ163385, GQ163262.

Comments: Joseph and Antony (2010) doubt that Chakravarty (1982) is correct in considering *M. denudata* distinct from *M. dioica*, while De Wilde and Duyfjes (2002) also consider *M. denudata* as distinct.

53. *Momordica dioica* Roxb. ex Willd., Sp. Pl., ed. 4(1): 605. 1805.

Type: East India; *Klein* 768 (B-Willdenow 18027).

Distribution in India: Joseph and Antony (2010) consider *M. dioica* sensu stricto restricted to the Deccan plateau and Central India.

Distribution outside India: Bangladesh, China, Myanmar, Nepal, Pakistan.

Image: efloraofindia at <https://sites.google.com/site/efloraofindia/species/a---l/cl/cu-curbitaceae/momordica/momordica-dioica> also Flora of Pakistan.

GenBank: Sequences from Schaefer and Renner (2010), e.g., GQ163389, GQ163387.

54. *Momordica sabyadrica* Kattuk. & V.T. Antony, Nordic J. Bot. 24(5): 541, Fig. 1. 2007.

Type: India, Kerala, Thrissur District: NH-47, Thrissur-Palakkad road at Erumbupalam, outskirts of Peechi-Vazhani wildlife sanctuary, December 23, 2003, *Joseph John Kattukunnel* 4822 (CAL labeled as holotype, photo available from SSR).

Distribution in India: Kerala. **Endemic.**

Image: The species is illustrated in the original publication.

GenBank: No published sequences available.

Comments: Based on morphology, this appears to be a hybrid (H. Schafer, pers. comm. 2009). Kattuk. is the standard form of the author Joseph John Kattukunnel, who has revised Indian *Momordica* (Joseph and Antony, 2010). The holotype bears the collection number 4833, not 133 as given in the protologue.

55. *Momordica subangulata* Blume, Bijdr. Fl. Ned. Ind. 15: 928. 1826.

Type: Java, Mt. Salak, *Blume* 769 (L).

Momordica subangulata subsp. *renigera* (Wall. ex G. Don) W.J.de Wilde, Bot. Zhurn. (Moscow & Leningrad) 87(3): 147. 2002.

Momordica renigera Wall. ex G. Don, Gen. Hist. 3: 36. 1834.

Type: Myanmar, Pome hills, *Wallich Cat.* 6743 (K?).

Distribution in India: Karnataka, Kerala, Maharashtra, Meghalaya, Sikkim, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mezoram, Nagaland, Sikkim, Tripura, West Bengal.

Distribution outside India: China, Bangladesh, Indonesia (Java, Sumatra), Laos, Peninsular Malaysia, Myanmar, Thailand, Vietnam.

Image: Nothing reliable found online.

GenBank: Sequences from Schaefer and Renner (2010), e.g., GQ163451, GQ163332.

Comments: Molecular data are needed to confirm that the name *Momordica renigera* described from Myanmar really applies to material from Java and India.

56. *Neoalsomitra clavigera* (Wall.) Hutch., Ann. Bot. (Oxford), ser. 2,6: 101. 1942.

Zanonia clavigera Wall., Pl. Asiat. Rar. 2: 28. t. 133. 1831.

Alsomittra clavigera (Wall.) M.Roem., Fam. Nat. Syn. Monogr. 2: 118. 1846, nom. nud.

Type: Bangladesh, Sylhet, *Wallich Cat.* 3725A (K).

Neoalsomitra clavigera (Wall.) Hutch. var. *hookeri* (C.B. Clarke) Chakrav., Rec. Bot. Surv. India 17(1): 197. 1959.

Type: Bangladesh, Sylhet, *Freire De Silva* 203 (K-W, BM).

Gynostemma integrifoliolum Cogn. in A. & C. DC., Monogr. Phan. 3: 916. 1881. [as *integrifoliola*]

Alsomitra integrifoliola (Cogn.) Hayata, J. College Science, Imperial Univ. Tokyo 30(1): 121. 1911.

Neoalsomitra integrifoliola (Cogn.) Hutch., Ann. Bot. 6: 99. 1942

Syntypes: The Philippines, Luzon, Cuming 767 (G-DC), Calanony, Cuming 517 (G-BOISS).

Alsomitra pubigera Prain, J. As. Soc. Bengal, Pt. 2, Nat. Hist. 67: 292. 1898

Type: Myanmar, Mt. Kachin, King's collector (herbarium?).

Distribution in India: Arunachal Pradesh, Assam, Haryana, Himachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, Sikkim, Punjab, Uttar Pradesh, West Bengal.

Distribution outside India: Bangladesh, Bhutan, Myanmar, S China (especially Yunnan and Hainan), Vietnam, Laos, Cambodia, N Sumatra, the Philippines, east to NE Australia (Queensland) and the Pacific (Solomon Island and east to Fiji); absent from the tropical everwet rain forests of Java and Borneo.

Image: Many photos of this large-fruited and large-seeded species can be found online.

GenBank: Sequences from Kocyan et al. (2007), e.g., DQ536573, DQ535830.

Comments: *Neoalsomitra* has 11 further species in Malesia, S China, New Guinea, Australia, and Fiji (De Wilde and Duyfjes, 2003; Schaefer and Renner, 2011a). Its phylogenetic position can be seen in Fig. 1.

57. *Schizopepon bicirrhosus* (C.B. Clarke) C. Jeffrey, Kew Bull. 34(4): 802. 1980.

Melothria bicirrhosa C.B. Clarke, Fl. Brit. India 2: 627. 1879.

Type: Myanmar (Burma), Griffith 2522 (K).

Schizopepon wardii Chakrav., J. Bombay Nat. Hist. Soc. 50(4): 900, pl. 6. 1952.

Type: Assam, Delei Valley, alt. 11000 ft, Rhododendron-Conifer Forest, open Gullies facing north; August 23, 1928, F. Kingdon Ward 8667 (K).

Distribution in India: Northeast India (Meghalaya, Manipur).

Distribution outside India: China (S. Xizang), Myanmar.

Image: Nothing reliable found online.

GenBank: No published sequences available.

Comments: The synonymization of *S. wardii* here follows Jeffrey (1980) and Lu et al. (2011). Chakravarty (1982) instead accepted *S. wardii* and wrote that it had “affinity towards *S. macranthus* Handel-Mazzetti, but differs in the following characters: (i) leaves not lobed (ii) pedicels longer and (iii) connective produced beyond the loculi.” Besides its four species listed here, *Schizopepon* has another five species in Russia, China, and Japan (Schaefer and Renner, 2011a; Lu et al., 2011).

58. *Schizopepon longipes* Gagnep., Bull. Mus. Natl. Hist. Nat. 24(5): 378. 1918.

Type: China, Sechuan, near Ta-tsien-lou, Mussot s.n. (P).

Distribution in India: Northeast India.

Distribution outside India: China (S. Xizang), Myanmar.

Image: Nothing reliable found online.

GenBank: No published sequences available.

Comment: The *Flora of Bhutan* (2(1): 260. 1991) records this species from Bhutan and Darjeeling in West Bengal. Jeffrey (1980, 1982) changed his mind about Indian material that he first identified as *S. dioicus* Cogn., but later as *S. longipes*.

59. *Schizopepon macranthus* Handel-Mazzetti, Symb. Sin. 7(4): 1064. 1936.

Type: China, Sichuan, Muli, Lijiacun, 2850-3000 m, 23 July 1915

Handel-Mazzetti 7153 (B, destroyed?).

Distribution in India: Possibly Northeast India.

Distribution outside India: China (W Sichuan and NW Yunnan).

Image: Nothing reliable found online.

GenBank: No published sequences available.

Comment: Jeffrey (1980) does not mention this species, while Chakravarty (1982) discusses its similarity to *S. wardii*, here considered a synonym of *S. bicirrhosus*. The *Flora of China* (Lu et al., 2011), recognizes it as a distinct species.

60. *Sicyos edulis* Jacq., Enum. Syst. Pl. 32. 1760.

Sechium edule (Jacq.) Sw., Fl. Ind. Occid. 2(2): 1150. 1800.

Type: "In insulis Caribaeis vicinaque Americes continente detexit novas."

Sechium americanum Poir., Encycl. (Lamarck) 7: 50. 1806.

Type: "Cette planté croît naturellement à la Jamaïque, où on la cultive aussi à cause de ses fruits que l'on mange, & qui s'emploient dans les ragouts."

Distribution in India: Cultivated throughout India.

Distribution outside India: Native to Mexico, cultivated throughout the tropics.

Image: <http://www.flowersofindia.net/catalog/slides/Chaco.html>

GenBank: Sebastian et al. (2012) and numerous other sequences.

Comments: Molecular data show that *Sechium* is embedded within the genus *Sicyos* (Sebastian et al., 2012).

61. *Siraitia sikkimensis* (Chakrav.) C. Jeffrey, Kew Bull. 36(4): 737. 1982.

Neoluffa sikkimensis Chakrav., J. Bombay Nat. Hist. Soc. 50(4): 895, pl. 3. 1952.

Type: India, Sikkim Himalaya, near Sittong, alt. 1500 ft, 12 May 1876, G. King s.n.
(CAL, 3 sheets, photos available from SSR)

Distribution in India: Sikkim, West Bengal.

Distribution outside India: China (S Yunnan).

Image: Nothing reliable found online.

GenBank: No published sequences available.

Comments: The genus *Siraitia* has five species, four in India, Indonesia, Peninsular Malaysia, Thailand, South and Southwest China, and one Southern Tanzania and Southeast Nigeria (Schaefer and Renner, 2011a, b). The cucurbitane-type triterpene glycoside constituents of *S. grosvenorii* are the source of plant-derived sweeteners.

62. *Solena amplexicaulis* (Lam.) Gandhi in Saldanha & Nicolson, Fl. Hassan Distr. 179. 1976.

Bryonia amplexicaulis Lam., Encycl. 1: 496. 1785.

Karivia amplexicaulis (Lam.) Arn., J. Bot. 3: 275. 1841.

Melothria amplexicaulis (Lam.) Cogn. in A. & C. DC., Monogr. Phan. 3: 621. 1881.

Type: S India, Sonnerat s.n. (P-LAM).

Distribution in India: Tamil Nadu, Karnataka, Kerala. **Endemic.**

Images: efloraofindia at <https://sites.google.com/site/efloraofindia/species/a---l/cl/cucurbitaceae/solena/solena-amplexicaulis>

GenBank: Sequences from Chen et al. (2010), e.g., GQ436395, GQ435029.

Comments: Following De Wilde and Duyfjes (2004c), *Solena* comprises three or four species while in the past, only one species, *S. amplexicaulis*, was recognized, which supposedly ranged from NE Afghanistan through India and Sri Lanka. Based on several vegetative and reproductive differences, De Wilde and Duyfjes instead recognize *S. amplexicaulus* from South India, *S. umbellata* from South India and Sri Lanka, and *S. heterophylla* with two subspecies, one from NE Afghanistan eastward, the other in N India and east to China. The *Flora of China* (Lu et al., 2011) follows this treatment.

63. *Solena heterophylla* Lour., Fl. Cochinch. 2: 514. 1790.

subsp. **heterophylla**

Melothria heterophylla (Lour.) Cogn. in A. & C. DC., Monogr. Phan. 3: 618. 1881.

Type: Vietnam, Loureiro s.n. (BM <http://plants.jstor.org/specimen/bm000944657>).

Bryonia rheedei Blume, Bijdr. Fl. Ned. Ind. 15: 925. 1826

Karivia rheedei (Blume) M.Roem., Fam. Nat. Syn. Monogr. 2: 45. 1846

Type: Java, Blume s.n. (L, Barcode: L0127474).

Bryonia sagittata Blume, Bijdr. Fl. Ned. Ind. 15: 925. 1826.

Type: Java, Blume s.n. (L, Barcode: L0127475).

Melothria ovata Cogn. in Engl. Pflanzenr. IV. 275, 1 (Heft 66): 114. 1916.

Type: India, Sikkim, near Labdah, 650 m a.s.l., Aug. 1884, collector unknown (G-BOISS).

Distribution in India: Widely distributed all over India (Chakravarty, 1982).

Distribution outside India: NE Afghanistan, Indonesia (Java), Peninsular Malaysia, Myanmar, Nepal, Thailand, Vietnam (Lu et al., 2011).

GenBank: Sequences from Kocyan et al. (2007), e.g., DQ536737, DQ536870.

Comments: See under *S. amplexicaulis*.

subsp. **napaulensis** (Ser.) W.J.de Wilde & Duyfjes, Blumea 49(1): 75. 2004.

Bryonia napaulensis Ser., Prodr. 3: 307. 1828.

Zehneria umbellata (Klein ex Willd.) Thwaites var. *napaulensis* (Ser.) C.B. Clarke, Fl.

Brit. India 2: 625. 1879.

Type: Nepal, *Wallich s.n.* (G).

Distribution in India: Western Himalaya (Garhwal, Kumaon hills, Uttarakhand).

Distribution outside India: China (Yunnan), Myanmar, Nepal (Lu et al., 2011).

GenBank: No published sequences available.

Comments: See under *S. amplexicaulis*.

64. *Solena umbellata* (Willd.) W.J. de Wilde & Duyfjes, Blumea 49(1): 77. 2004.

Bryonia umbellata Willd., Sp. Pl., ed. 4(1): 618. 1805.

Momordica umbellata (Willd.) Roxb., Hort. Bengal. 79. 1832.

Karivia umbellata (Willd.) Arn., J. Bot. 3: 275. 1841.

Zehneria umbellata (Willd.) Thwaites, Enum. Pl. Zeyl. 2: 125. 1859.

Type: South India, *J. G. Klein 765* (lecto B-W), designated by De Wilde and Duyfjes (2004).

Melothria angulata Chakrav., J. Bombay Nat. Hist. Soc. 50(4): 899. 1952.

Zehneria angulata (Chakrav.) J. L. Ellis, Bull. Bot. Surv. India 9(1-4): 8. 1968 ("1967").

Solena angulata (Chakrav.) Babu, Herb. Fl. Dehra Dun 203. 1977.

Type: South India, Gomata, alt. 5500 ft, *Malcolmpeeth 81* (CAL photo available from SSR).

Distribution in India: Goa, Karnataka, Kerala, Tamil Nadu.

Distribution outside India: Sri Lanka.

Image: Nothing reliable found online.

GenBank: No published sequences available.

Comments: The genus *Melothria* is restricted to tropical Central and South America, where it has about 12 species (Schaefer and Renner, 2011a). Based on molecular data, the Asian species formerly assigned to *Melothria* belong in *Cucumis*, *Solena*, and other genera. For the number of species of *Solena* see comment under *S. amplexicaulis*.

65. *Thladiantha hookeri* C.B. Clarke, Fl. Brit. India 2(6): 631. 1879.

Syntypes: India, Meghalaya [Assam], *Griffith s.n.* (K). Khasia Hills, alt. 4000–6000 ft; *J.D. Hooker & Thomson s.n.* (CAL photo available from SSR, K). Myrung and Nunklow, *J.D. Hooker & Thomson s.n.* (K).

Thladiantha hookeri C.B. Clarke var. *palmatifolia* Chakrav., Notes Roy. Bot. Gard. Edinburgh 20(48): 122. 1948.

Type: India, Manipur [Assam], Kala Naga Hills, *Watt 7306* (E).

Hemsleya trifoliolata Cogn., Repert. Spec. Nov. Regni Veg. 6(15/20): 304. 1909.

Thladiantha hookeri forma *trifoliolata* (Cogn.) Chakrav., Notes Roy. Bot. Gard.

Edinburgh 20: 122. 1948 = *Thladiantha hookeri* var. *irregularis* Chakrav., Fasc. Fl. India 11: 104. 1982, nom. nov.

Type: China, Yunnan, A. *Henry* 12295D (Z).

Thladiantha pentadactyla Cogn. in Engl. Pflanzren. IV. 275, 1 (Heft 66): 52. 1916.

Type: China, Yunnan, alt. 1700 m, A. *Henry* 12295D (B), same type as previous name.

Thladiantha heptadactyla Cogn. in Engl. Pflanzren. IV. 275, 1 (Heft 66): 52. 1916.

Type: China, Yunnan, Lou Kong, alt. 2800m, May 1886, *Delavay* s.n. (P).

Distribution in India: Assam, Manipur, Meghalaya, Nagaland.

Distribution outside India: China (Yunnan), Bhutan, Laos, Myanmar, Thailand, Vietnam.

Image: <http://apps.kew.org/herbcat/getImage.do?imageBarcode=K000036903>

GenBank: Sequences from Kocyan et al. (2007) and Li et al. (2011), e.g., JF978932, DQ536601.

Comments: *Thladiantha* has c. 30 species in China, Taiwan, Tibet, India, Korea, Japan, Thailand, Vietnam, Indonesia, Philippines, and New Guinea.

66. *Thladiantha cordifolia* (Blume) Cogn. in A. & C. DC., Monogr. Phan. 3: 424. 1881. *Luffa cordifolia* Blume, Bijdr. Fl. Ned. Ind. 15: 929. 1826.

Type: Java, Blume 1464, fruit (lectotype L, barcode L0001624, designated by De Wille & Duyfjes (2006); isotype L; CAL has two sheets without collection numbers).

Thladiantha calcarata (Wall.) C.B. Clarke, J. Linn. Soc., Bot. 15: 126. 1876, nom. nud.

Momordica calcarata Colebr. ex Wall., Cat. No. 6740. 1832, nom. nud.

Thladiantha calcarata (Wall.) C.B. Clarke [nom. nud.] var. *subglabra* Cogn. in A. & C. DC., Monogr. Phan. 3: 424. 1881. (Listed as “*Thladiantha cordifolia* (Blume) Cogn. var. *subglabra* Cogn.” by Chakravarty, 1982.)

Type: India, Meghalaya, Khasia, 1300 m, *J.D. Hooker & T. Thomson* 1 (CAL 2 sheets, photos available from SSR, K).

Distribution in India: Andhra Pradesh, Arunachal Pradesh, Assam, Manipur, Meghalaya, Nagaland, Sikkim, Tamil Nadu, Tripura, West Bengal.

Distribution outside India: Nepal, China (Guangdong, Guangxi, Sichuan, Yunnan), Indonesia (Java, Sumatra), Laos, Peninsular Malaysia, Myanmar, Thailand, Vietnam.

Image: efloraofindia at <https://sites.google.com/site/efloraofindia/species/a---l/cl/cucurbitaceae/thladiantha/thladiantha-cordifolia>

GenBank: Sequences from Schaefer and Renner (2010) and Li et al. (2011), e.g., JF978906, GQ163340.

Comments: Further synonymy are given in Lu et al. (2011).

67. *Trichosanthes anaimalaiensis* Bedd., Madras J. Lit. Sci. 3,1: 47. 1864.

Type: India, Tamil Nadu, Anaimalai Mts., *Beddome* 3234 (BM <http://plants.jstor.org/specimen/bm000885793>)

Trichosanthes bracteata (Lam.) Voigt var. *tomentosa* (C.B. Clarke) Chakrav., Rec. Bot. Surv. India 17(1): 47. 1959, nom. illeg., because its type, *Abdul Khalil s.n.* (CAL photo available from SSR) from Myanmar, Southern Shan State, Indine, is a syn-type of *T. burmensis* Kundu (see under *T. rubriflos*).

Trichosanthes palmata L. var. *tomentosa* Heyne ex C.B. Clarke, Fl. Brit. India 2(6): 607. 1879.

Syntypes: India, Deccan Peninsular Mountains; *Wight no. 1134* (HBG online at JSTOR), *1136 partly*, *G. Thomson s.n.*; Sri Lanka, alt. 2600 ft, *Gardner s.n.* (K).

Distribution in India: Andaman & Nicobar Islands (Naithani, 1990), Andhra Pradesh, Arunachal Pradesh, Karnataka, Kerala, Maharashtra, Tamil Nadu, Tripura. **Endemic**.

Image: Nothing reliable found online.

GenBank: No published sequences available.

68. *Trichosanthes bracteata* (Lam.) Voigt, Hort. Suburb. Calcutt. 58. 1845.

Modecca bracteata Lam., Encycl. 4: 210. 1797.

Type: India, *Sonnerat s.n.* (P-LAM).

Distribution in India: Peninsular India, Khasia Hills, Dehra Doon, Bengal.

Distribution outside India: China (Guizhou), Nepal (? see comments).

Image: Nothing reliable found online.

GenBank: Sequences from De Boer et al. (2012) from Indian material, e.g., HE661317, HE661484.

Comments: Jeffrey (1980) and Lu et al. (2011) treat *T. bracteata* as a synonym of *T. tricuspidata*, which ranges from China (Guizhou), Peninsular Malaysia, Nepal, Thailand, to Vietnam, while Chakravarty (1982) recognized *T. bracteata* with two varieties, var. *bracteata* from throughout India, Myanmar, China, and Australia, and var. *tomentosa* (an illegitimate name here treated under *T. anaimalaiensis*) on the Andaman and Nicobar islands, and in Arunachal Pradesh, Karnataka, Kerala, Maharashtra, Tamil Nadu, Tripura, as well as Myanmar and Java. Another species concept is that of De Wilde and Duyfjes (2008a, 2010).

69. *Trichosanthes cordata* Roxb. Fl. Ind. 3: 703 1832.

Type: Bangladesh, mouth of the river Meghna, *Wallich Cat. No. 6686A* (K, CAL).

Trichosanthes macrosiphon Kurz, J. Asiatic. Soc. Bengal, Pt. 2, Nat. Hist. 41: 308. 1872.

Type: Myanmar, Tenasserim, *W.S. Kurz* (CAL, no image seen).

Distribution in India: Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, Uttarakhand, West Bengal

Distribution outside India: Bangladesh, Bhutan, China, Myanmar, Nepal.

Image: Nothing reliable found online.

GenBank: No published sequences available.

Comments: C.B. Clarke (1879: 608) synonymized *T. macrosiphon* under *T. cordata* Roxb. because the protologue does not contain anything uniquely distinctive compared to the protologue of *T. cordata*. The personal herbarium of Wilhelm Sulpiz Kurz is at CAL, but that we have not received the requested type image.

70. *Trichosanthes costata* Bl., Bijdr. Fl. Ned. Ind. 15: 933. 1826.

Type: Java, *Blume s.n.* (L, barcode L0589632), designated by De Wilde and Duyfjes (2006).

Gymnopetalum chinense (Lour.) Merr., Philipp. J. Sci. 15: 256. 1919.

Euonymus chinensis Lour., Fl. Cochinch. 1: 156. 1790 (as *Evonymus*).

Type: Untraced. Neotype: South China, *Levine 1705* (holotype A, designated by De Wilde and Duyfjes, 2008b).

Tripodantha cochinchinensis (Lour.) M.Roem., Fam. Nat. Syn. Monogr. 2: 48. 1846.

Gymnopetalum cochinchinense (Lour.) Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 40: 57. 1871.

Bryonia cochinchinensis Lour., Fl. Cochinch. 2: 595. 1790.

Type: Vietnam, *Loureiro 595*(BM, <http://plants.jstor.org/specimen/viewer/bm000944642>).

Momordica tubiflora Roxb., Fl. Ind. 3: 711. 1832.

Scotanthus tubiflorus (Roxb.) Naudin, Ann. Sci. Nat., Bot. sér. 4, 16: 172, f. 3. 1862, nom. superfl.

Type: India, *Wallich Cat. 6749* (K).

Gymnopetalum quinquelobum Miq., Fl. Ned. Ind. 1: 681. 1855.

Type: Java, Soerakarta, *T. Horsfield s.n.* (BM image seen)

Gymnopetalum heterophyllum Kurz, J. Bot. 13: 326. 1875.

Type: Kamorta Island (part of the Nicobar Islands); *Wallich Cat. 6711* (K).

Distribution in India: Andaman & Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Manipur, Meghalaya, Sikkim, Tripura, Uttar Pradesh, West Bengal.

Distribution outside India: China, Java, Myanmar, Sri Lanka, Vietnam.

Images: Photos available upon request from A. Pandey or SSR.

GenBank: Schaefer et al. (2008), most sequences under the name *Gymnopetalum chinense*, e.g., HE661294, HQ201978.

Comments: Based on molecular data, *Gymnopetalum chinense* belongs in the genus *Trichosanthes* (De Boer et al., 2012; contra De Wilde and Duyfjes, 2006c). In *Trichosanthes*, however, the epithet *chinense* is already occupied by *Trichosanthes chinensis* Ser. (1828). The second name in line of priority would be *G. cochinchinensis*, based on the basionym *Bryonia cochinchinensis*. However, the combination *T. cochinchinensis* (Lour.) M.Roem. (based on *T. cucumerina* Lour.) blocks that transfer, too. The third available name is *T. costata* Blume, and this name must be used for *Gymnopetalum chinense* if the species is placed in *Trichosanthes* (De Boer and Thulin, 2012).

71. *Trichosanthes cucumerina* L., Sp. Pl. 2: 1008. 1753.

Lectotype: India, Kerala, “Padavalam” in Rheede, Hort. Malab. 8: 29. t. 15. 1688, designated by Keraudren-Aymonin in Aubréville & Leroy (ed.), Fl. Cambodge Laos Viêt-Nam 15: 91. 1975.

Trichosanthes anguina L., Sp. Pl. 2: 1008. 1753.

Lectotype: China, “Anguina Sinensis, flore albo, elegantissimo, capillamentis tenuisimis ornato, fructu longo intorto, sub initium ex albo, & viridi variegato, per maturitatem prorsus rubro” in Micheli, Nov. Pl. Gen. 12. t. 9. 1729, designated by Jeffrey in Jarvis & al. (ed.), Regnum Veg. 127: 95. 1993.

Cucumis anginus L., Sp. Pl., ed. 10. 2: 1279. 1759.

Type: “Habitat [in India.], Sp. Pl., ed. 2, 2: 1438. 1763.” Lectotype: “Petola Anguina” in Rumphius, Herb. Amboin. 5: 407. t. 148, 1747, designated by Merrill in Interpret. Rumph. Herb. Amb. 494. 1917.

Trichosanthes pachyrrhachis Kundu, J. Bot. 77: 9. 1939.

Syntypes: Northwest India, 1844, M.P. Edgeworth 63 (K), Mangalor, 1847, R.F. Hohenacker (herbarium?), synonymized here by Chakravarty (1959) and Jeffrey (1980).

Trichosanthes brevibracteata Kundu, J. Bot. 77: 10. 1939.

Paratypes (Art. 9.4): India, Karnal, Punjab, 1885-1888, J.R. Drummond 25031 (herbarium?), Ahmedabad, July 1920, L.J. Sedgwick (herbarium?), NW India, Thomson s.n. (herbarium?); synonymized here by Chakravarty (1959) and Jeffrey (1980).

Trichosanthes brevibracteata Kundu var. *sublobata* Kundu, J. Bot. 77: 11. 1939.

Type: India, Nagpur-Wardha, C.P., Sep. 2012, Haines (K).

Trichosanthes brevibracteata Kundu var. *longirostrata* Kundu, J. Bot. 77: 11. 1939.

Type: Myanmar, 15 Aug. 1908, J. H. Lace 6335 (K).

Distribution in India: Native and cultivated throughout India.

Distribution outside India: Sri Lanka and tropical China through Malesia into W, N, and NE Australia.

Image: <http://www.flowersofindia.net/catalog/slides/Snake%20Gourd.html>

<http://apps.kew.org/herbcat/getImage.do?imageBarcode=K000742697>

<http://apps.kew.org/herbcat/getImage.do?imageBarcode=K000742699>

GenBank: Sequences from Schaefer and Renner (2011b) and De Boer et al. (2012), e.g., HE661410, HE661486.

Comments: Widely cultivated for its edible fruits (Duyfjes and Pruesapan, 2004). In 1959, Chakravarty synonymized *T. pachyrrhachis* Kundu and

T. brevibracteata Kundu under *T. cucumerina*, but his 1982 checklist omitted both names.

72. *Trichosanthes cucumeroides* (Ser.) Maxim., Franch. & Sav. Enum. Pl. Jap. 1: 172. 1873.

Bryonia cucumeroides Ser., Prodr. 3: 308. 1828.

Trichosanthes ovigera subsp. *cucumeroides* (Ser.) C. Jeffrey, Mansfeld's Encycl. 3: 1528. (6: 2825). 2001.

Type: "Patria ignotus, Seringe manuscript" perhaps a Wallich specimen (herbarium?).
Trichosanthes dicaelosperma C.B. Clarke, Fl. Brit. India 2: 609. 1879.

Trichosanthes cucumeroides var. *dicaelosperma* (C.B. Clarke) S. K. Chen, Bull. Bot. Res., Harbin 5(2): 118. 1985.

Syntypes: India, Sikkim, J.D. Hooker s.n. (K), Khasia Mts., *Hooker & Thomson* (CAL photos available from SSR, K).

Distribution inside India: Meghalaya, Sikkim, Uttar Pradesh, West Bengal.

Distribution outside India: Guangxi, SE Xizang.

Image: Many images of this much-cultivated species can be found online.

GenBank: Several sequences, e.g., HQ829602, HQ829602.

Comment: Jeffrey (in Lu et al., 2011) prefers to treat *T. cucumeroides* as a synonym of *T. pilosa* Lour. (Fl. Cochinch. 2: 588. 1790). In his 1980 checklist, he does not list *T. cucumeroides* and treats *T. dicaelosperma* as a synonym of *T. ovigera*. Lu et al. (2011) instead recognize *T. cucumeroides*, with *T. dicaelosperma* as one of its varieties.

73. *Trichosanthes dioica* Roxb., Fl. Ind. 3: 701. 1832.

Type: India, West Bengal, "It is much cultivated by the natives about Calcutta, during the rains." Ic. Roxb. Lectotype?

Trichosanthes dioica Roxb. var. *sagittifolia* Chakrav., Rec. Bot. Surv. India 17(1): 55. 1959.

Type: Northwest India, without precise locality, *cult.* (*Stewart* 1228) (E).

Distribution in India: Arunachal Pradesh, Assam, Bihar, Delhi, Himachal Pradesh, Jammu & Kashmir, Meghalaya, Punjab, Rajasthan, Uttar Pradesh, West Bengal
Distribution outside India: Bangladesh, Myanmar, Nepal, Pakistan, Sri Lanka.

Image: efloraofindia at <https://sites.google.com/site/efloraofindia/species/a---l/cl/cu-curbitaceae/trichosanthes/trichosanthes-dioica>

GenBank: Sequences from Ali, Pandey, and Lee (2009) and De Boer et al. (2012), e.g., GQ240881, HE661322.

Comments: The female gametophytes were studied by Pandey et al. (1997, 2003) and pollen germination behavior by Kumari et al. (2009). The synonymization of var. *sagittifolia* follows Jeffrey (1980).

74. *Trichosanthes dunniana* H. Lév., Repert. Spec. Nov. Regni Veg. 10: 148. 1911.

Type: China, Guizhou, *Esquirol* 726, (E, K).

Trichosanthes majuscula (C.B. Clarke) Kundu, J. Bot. 77: 12. 1939.

Trichosanthes multiloba Miq. var. *majuscula* C.B. Clarke, Fl. Brit. India 2(6): 608. 1879.

Trichosanthes wallichiana (Ser.) Wight var. *majuscula* (C.B. Clarke) Cogn. in A. & C. DC., Monog. Phan. 3: 369. 1881.

Type: India, Meghalaya, Khasia Hills, alt. 4000 ft., *J.D. Hooker & Thomson s.n.* (*Herb. Ind. Or. Trichosanthes sp. 7*) (K).

Trichosanthes prazeri Kundu, J. Bombay Nat. Hist. Soc. 43(2): 378. 1942.

Type: Upper Myanmar, May 1888, Khoni, *J.C. Prazer s.n.* (CAL, 3 sheets, photos available from SSR).

Distribution in India: Minimally Meghalaya.

Distribution outside India: China, Myanmar, Thailand.

Image: Some of the type specimens can be found online.

GenBank: Several sequences.e.g., HQ829503, HQ829605.

Comments: The acceptance of *T. dunniana* for India and the synonymization of *T. majuscula* follow Jeffrey (1982). Chakravarty (1959) recognized *Trichosanthes majuscula*, saying that the species required further examination. The leaves are larger than in *T. wallichiana* proper; otherwise it closely agrees with that species.

75. *Trichosanthes kerrii* Craib, Bull. Misc. Inform. Kew. 1914: 7. 1914.

Type: North Thailand, *Kerr* 2454 (BM, K).

Trichosanthes tomentosa Chakrav., J. Bombay Nat. Hist. Soc. 50(4): 894, f. 45. 1952.

Type: India, Nagaland, Kohima and Naga Hill, alt. 4500 ft; 22 May 1895; *Watt* 11640 (CAL, 3 sheets, photos available from SSR).

Distribution in India: Nagaland, Mongsemdi Naga hills (Chakravarty, 1982).

Distribution outside India: China (SW Yunnan), Laos, N Thailand, N Vietnam.

Image: See type images.

GenBank: Sequences from Schaefer et al. (2008) and De Boer et al. (2012), e.g., HE661333, HE661498.

Comments: Jeffrey (1982), Duyfjes and Pruesapan (2004), and Lu et al. (2011) all list *T. tomentosa* as a synonym of *T. kerrii*.

76. *Trichosanthes khasiana* Kundu, J. Bot. 77: 11. 1939.

Type: India, Meghalaya, Khasia Hills, Hooker & Thomson (K, <http://apps.kew.org/herbcat/getImage.do?imageBarcode=K000102020>)

Distribution in India: Meghalaya.

Distribution outside India: **Endemic**.

Image: Nothing found online other than the type image.

GenBank: No published sequences available.

Comments: Jeffrey (1982) and De Boer and Thulin (2012) recognize this species as distinct.

77. *Trichosanthes lepiniana* (Naudin) Cogn. in A. & C. DC., Monogr. Phan. 3: 377. 1881.

Involucraria lepiniana Naudin in Huber, Cat. 11. 1868.

Syntypes?: India, Union Territory, Pondicherry, *J. Lepine s.n.* (P <http://plants.jstor.org/specimen/bm000900967>); Sikkim, *J.D. Hooker & Thomson 14* (K, P).

Distribution in India: Union Territory.

Distribution outside India: Unclear, see comments.

Image: Nothing found online other than the type image.

GenBank: Sequences from De Boer et al. (2012) from Nepalese and Chinese material, e.g., HE661507, HE661341.

Comments: Jeffrey (1980) initially considered *T. lepiniana* a synonym of *T. tricuspidata*, but he later (1982) recognized it as a separate species, as did Chakravarty (1982).

78. *Trichosanthes lobata* Roxb., Fl. Ind. 3: 703. 1832.

Type: India, “This plant grows in hedges, and among bushes.” *Roxburgh 992* (K)

Trichosanthes perrottetiana Cogn. in A. & C. DC., Monogr. Phan. 3: 362. 1881.

Type: India, Union Territory, Pondicherry, *Perrottet 256* (G-BOISS, W).

Distribution in India: Andhra Pradesh, Karnataka, Kerala, Puducherry, Tamil Nadu, Uttar Pradesh, West Bengal.

Distribution outside India: China.

Image: Nothing found online.

GenBank: No published sequences available.

Comments: Chakravarty (1982) recognizes both *T. lobata* and *T. perrottetiana*, while Jeffrey (1980) synonoymizes *T. perrottetiana* (and also *T. villosula*) under *T. lobata*. We have followed Lu et al. (2011) in maintaining *T. villosula* separate.

79. *Trichosanthes nervifolia* L., Sp. Pl. 2: 1008. 1753.

Lectotype: India, Kerala, Tota-piri, in Rheede, Hort. Malab. 8: 33, t. 17. 1688, designated by Majumdar & Bakshi in Taxon 28: 354. 1979.

Trichosanthes cuspidata Lam., Encycl. 1: 190. 1783.

Type: India, Rheede, Hort. Malab. 8; 31, t. 16.

Distribution in India: Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Goa, Karnataka, Kerala, Madhya Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal.

Distribution outside India: Sri Lanka.

Image: Nothing found online.

GenBank: Sequences from De Boer et al. (2012) from Sri Lankan material, e.g., HE661514, HE661350.

80. *Trichosanthes ovigera* Blume, Bijdr. Fl. Ned. Ind. 15: 934. 1826.

Type: Java, Gunung Salak, *Blume s.n.* (L barcodes L0130442, L0130439, P).

Trichosanthes ovigera Blume var. *sikkimensis* Kundu, J. Bombay. Nat. Hist. Soc. 43(3): 383. 1942.

Type: India, Selim, Sikkim, 1000 feet, Oct. 1884, *C.B. Clarke* (CAL). Other cited sheets: India, Rungtung, Sikkim Dec. 1876, *A.B.* (King's Collector) (CAL); Sikkim, 5000 feet, 23 Sep. 1875, *G. King* (CAL?); Runjeet, Darjeeling, Sep. 1884, *C.B. Clarke* (CAL); Kobo, Abor Expedition, Assam. Dec. 1911, *J.H. Burkhill* 37420 (K).

Trichosanthes horsfieldii Miq., Fl. Ned. Ind. 1: 677. 1855.

Type: Java, Priangan, *T. Horsfield* 15 (BM, K, U).

Trichosanthes himalensis C.B. Clarke, Fl. Brit. India 2(6): 608. 1879.

Type: India, Sikkim, alt. 2000-5000 ft, from Yoksun to the plains; *J.D. Hooker, C.B. Clarke s.n.* (K).

Trichosanthes himalensis var. *glabrior* C.B. Clarke, Fl. Brit. India 2(6): 608. 1879.

Type: India, Meghalaya, Khasia, alt. 4000 ft, *Trichosanthes sp.* 9 in *J.D. Hooker & T. Thomson s.n.* (K).

Trichosanthes himalensis var. *indivisa* Chakrav., Rec. Bot. Surv. India 17(1): 51. 1959, nom. illeg. Sikkim, 3500 feet, 11 Dec. 1877, *G. King* (CAL, photo available from SSR)

Trichosanthes himalensis var. *sikkimensis* (Kundu) Thoth., Bull. Bot. Surv. India 2(1&2): 169. 1960.

Distribution in India: Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Meghalaya, Sikkim, Tripura, Uttar Pradesh, West Bengal.

Distribution outside India: Australia, Bangladesh, China, Japan, Java, Myanmar, Nepal.

Image: A few of the type specimens can be found online.

GenBank: Sequences from Kocyan et al. (2007) and Schaefer et al. (2008) from Japanese and Australian material, e.g., DQ536604, DQ536875.

Comments: The list of synonyms of *T. ovigera* follows Jeffrey (1980) except for *T. dicaelosperma*, which he also synonymizes here, while we have followed Lu et al. (2011) who consider *T. dicaelosperma* one of the varieties of *T. cucumeroides*. Lu et al. (2011) and De Wilde and Duyfjes (2008a, b) both consider *T. ovigera* a synonym of *T. pilosa*. Morphological and molecular work is needed to clarify species boundaries in *Trichosanthes*.

81. *Trichosanthes rubriflos* Thorel ex Cayla, Bull. Mus. Natl. Hist. Nat. 14: 170. 1908.

Trichosanthes pubera Blume subsp. *rubriflos* (Thorel ex Cayla) Duyfjes & Pruesapan, Thai Forest Bull., Bot. 32: 94. 2004.

Lectotype: Cambodia, Stung-streng, *Thorel* 2126 (K, P), designated by Keraudren (1975).

Trichosanthes burmensis Kundu, J. Bombay Nat. Hist. Soc. 43(2): 381. 1942.
Syntypes: Upper Myanmar, Southern Shan State, Indine, 1893, *Abdul Khalil s.n.* (CAL, 3 sheets, photos available from SSR), Pegu, W.S. Kurz 1062 (CAL, no image seen).

Distribution in India: Unknown.

Distribution outside India: China, Myanmar, Cambodia, Thailand.

GenBank: Sequences from De Boer et al. (2012) based on material from Thailand, mostly under *T. pubera* subsp. *rubriflos*, e.g., HE661533, HE661451.

Comments: In his 1980 checklist of the Indian Cucurbitaceae, Jeffrey recognized *T. rubriflos* with two doubtful synonyms, *T. prazeri* Kundu and *T. burmensis* Kundu, but in 1982, he moved *T. prazeri* into the synonymy of *T. dunniana*. Chakravarty (1959, 1982) also listed *T. rubriflos* for India, but kept *T. majuscula* and *T. prazeri* separate, and considered *T. burmensis* a synonym of *T. bracteata*, which is in error. Duyfjes and Pruesapan (2004) considered *T. rubriflos* a subspecies of *T. pubera* Blume, described from Java. According to the *Trichosanthes* expert Hugo De Boer (pers. comm. 24 Oct. 2012), the holotype of *T. burmensis*, *Abdul Khalil s.n.*, resembles material of *T. rubriflos* from Thailand, and the label notes that the flowers are red. Another form of *Trichosanthes* described by Kundu, *T. burmensis* var. *alba* Kundu is a synonym of *T. tricuspidata* (see below).

82. *Trichosanthes quinquangulata* A. Gray, U.S. Expl. Exped., Phan. 1: 645. 1854.

Type: Philippines, Mangsee, *Wilkes s. n.* 1842/2 (US).

Distribution in India: Andaman Islands (voucher: L. Rasingam 17583, PBL).

Distribution outside India: South China, Myanmar, Thailand, Vietnam, Cambodia, Laos, Peninsular Malaysia, Singapore, Indonesia (Sumatra, Borneo, Java, Moluccas, New Guinea (West Papua and Papua New Guinea, Philippines.

Image: Nothing reliable found online.

GenBank: Sequences from De Boer et al. (2012), e.g., HE661535, HE661375.

Comment: The occurrence of this species on the Andaman Islands is a discovery of Rasingam (2012).

83. *Trichosanthes scabra* Lour., Fl. Cochinch. 2: 589. 1790.

Gymnopetalum scabrum (Lour.) W.J.de Wilde & Duyfjes, Reinwardtia 12: 268. 2008.

Type: Vietnam, Annam, *Poilane* 11322 (neotype P; isoneotype L), designated by De Wilde and Duyfjes (2008b).

Cucumis integrifolius Roxb., Fl. Ind. 3: 724. 1832.

Gymnopetalum integrifolium (Roxb.) Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 40: 58. 1871.

Trichosanthes integrifolia (Roxb.) Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 46: 99. 1877.

Type: Myanmar (Burma), *Wallich Cat.* 6730 (K-W).

Gymnopetalum integrifolium (Roxb.) Kurz var. *pectinatum* W.J.de Wilde & Duyfjes, Blumea 51: 287. 2006.

Gymnopetalum scabrum (Lour.) W.J.de Wilde & Duyfjes var. *pectinatum* (W.J. de Wilde & Duyfjes) W.J.de Wilde & Duyfjes, Reinwardtia 12: 268. 2008.

Trichosanthes scabra Lour. var. *pectinata* (W.J.de Wilde & Duyfjes) H.J.De Boer, Phytokeys 12: 30. 2012.

Type: Java, Indonesia, *W.J. de Wilde and Duyfjes* 21692 (L).

Gymnopetalum penicaudii Gagnep. (1918) Bull. Mus. Natl. Hist. Nat. 24: 374.

Gymnopetalum scabrum (Lour.) W.J.de Wilde & Duyfjes var. *penicaudii* (Gagnep.) W.J.de Wilde & Duyfjes, Reinwardtia 12: 268. 2008.

Trichosanthes scabra Lour. var. *penicaudii* (Gagnep.) H.J.De Boer, Phytokeys 12: 30. 2012.

Type: China, Hainan *Pénicaud* 43 (lectotype P).

Distribution in India: The range of this species is unclear.

Distribution outside India: China, Cambodia, Indonesia, Laos, Peninsular Malaysia, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam (fide Lu et al., 2011).

Image: Some of the type specimens can be found online.

GenBank: Sequences from Kocyan et al. (2007) and De Boer et al. (2012) from Chinese and Thai material, all under *Gymnopetalum scabrum*, e.g., HE661469., HE661297.

Comments: The synonymizations for the most part follow Lu et al. (2011), except for the recently published varieties whose status needs further evaluation.

84. *Trichosanthes tricuspidata* Lour., Fl. Cochinch. 2: 589. 1790.

Type: Vietnam, *Loureiro s.n.* (not at BM fide John Hunnex, 23 Aug 2012; herbarium ?).

Trichosanthes tricuspidata Lour. var. *strigosa* Mitra & Bandyop., J. Bombay. Nat. Hist. Soc. 96(2): 374. 1998.

Type: India, West Bengal, Coochbehar (Jamalda), 22 Aug. 1995, S. *Bandyopadhyay* 2904 (not seen).

Trichosanthes palmata Roxb., Fl. Ind. 3: 704. 1832, non L., 1753, nom. illeg.

Trichosanthes burmensis Kundu var. *alba* Kundu, J. Bombay. Nat. Hist. Soc. 43(3): 382. 1942. Type: Upper Myanmar, Maymyo, July 1888, *Badul Khan* (*King's Collector*) 130 (CAL).

Distribution in India: West Bengal?

Distribution outside India: Myanmar, Thailand, Vietnam.

Image: <http://www.flowersofindia.net/catalog/slides/Indrayan.html>

GenBank: Sequences from De Boer et al. (2012) from two Thai specimens that appear to represent different species: HE661459, HE661544.

Comments: Duyfjes and Pruesapan (2004) doubt the occurrence of *T. tricuspidata* in India. According to them, the species only occurs in Myanmar, Thailand and Vietnam, West Malaysia, and east to the Moluccas. Fide Hugo De Boer (pers. comm.).

24 Oct. 2012), the type of *T. burmensis* var. *alba* Kundu resembles material of *T. tricuspidata* subsp. *tricuspidata* from Thailand. The collection label states that the flowers were white, which also matches *T. tricuspidata*.

85. *Trichosanthes truncata* C.B. Clarke, Fl. Brit. India 2(6): 608. 1879.

Syntypes: India, Meghalaya, alt. 1000 ft, *J.D. Hooker s.n.* Khasia Hills, alt. 4000 ft, (Cherra Coal-pit), *J.D. Hooker & Thomson s.n.*, 1188 (CAL photo available from SSR, K), Darjeeling, 10 March 1871, *C.B. Clarke 13973B* (CAL photo available from SSR, K).

Trichosanthes ovata Cogn. in A. & C. DC., Monogr. Phan. 3: 365. 1881.

Type: India, Sikkim, *Thomson s.n.* (L, LE).

Distribution in India: Andhra Pradesh, Arunachal Pradesh, Assam, Meghalaya, Sikkim, West Bengal.

Distribution outside India: Bangladesh, Bhutan, China, Thailand, Vietnam.

Image: Nothing reliable found online.

GenBank: Sequences from De Boer et al. (2012), e.g., HE661547, HE661461.

Comments: Further synonymous names listed by Lu et al. (2011).

Comments: The synonymization of *T. ovata* follows Jeffrey (1980, 1982).

86. *Trichosanthes tubiflora* (Wight & Arn.) H.J. De Boer, Phytokeys 12: 29. 2012.

Bryonia tubiflora Wight & Arn., Prodr. Fl. Ind. Orient. 1: 347. 1834.

Gymnopetalum tubiflorum (Wight & Arn.) Cogn. in A. & C. DC., Monogr. Phan. 3: 388. 1881.

Type: Sri Lanka, Trincomalee, 1 Feb. 1796, *Rottler s.n.* ex Herb. Klein in Herb. Wight Cat. 1118 (K, E).

Gymnopetalum wightii Arn., Madras J. Lit. Sci. 12: 52. 1840 and J. Bot. 3: 278. 1841.

Type: Sri Lanka, *Wight 1146* (K).

Distribution in India: Kerala.

Distribution outside India: Sri Lanka.

Image: A photo of the flowers is included in De Boer et al. (2010).

GenBank: No published sequences available.

Comments: Based on molecular data, this is close to *T. dioica*, not the other species formerly placed in the genus *Gymnopetalum*.

87. *Trichosanthes villosula* Cogn. in A. & C. DC., Monogr. Phan. 3: 362. 1881.

Type: India, Tamilnadu, near Mt. Nilgiri, *Hohenacker 1507* (G-BOISS, P, K).

Trichosanthes villosula Cogn. var. *nilgirrensis* Kundu, J. Bombay Nat. Hist. Soc. 43(3): 375. 1942.

Type: India, Kerala, Coonoor, Nilgiris, alt. 6000 ft., Nov. 1884, *J.S. Gamble 15733* (CAL photo available from SSR).

Distribution in India: Andhra Pradesh, Assam, Karnataka, Kerala, Nagaland, Tamil Nadu, West Bengal.

Distribution outside India: Bangladesh, China.

Image: Nothing reliable found online.

GenBank: No published sequences available.

Comments: Jeffrey (1980) placed *T. villosula* under *T. lobata*; we here follow the more recent treatment by Lu et al. (2011) in maintaining *T. villosula* as separate.

88. *Trichosanthes wallichiana* (Ser.) Wight, Madras J. Lit. Sci. 12: 52. 1840.

Involucraria wallichiana Ser., Mém. Soc. Phys. Genéve 3(1): 25, 31. t. 5. 1825.

Type: Nepal, Wallich s.n. (G-DC).

Trichosanthes palmata L. var. *scotanthus* C.B. Clarke, Fl. Brit. India 2(6): 607. 1879, nom. nud.

Trichosanthes bracteata (Lam.) Voigt var. *scotanthus* (C.B. Clarke) Handel-Mazzetti, Symb. Sin. 7(4): 1065. 1936.

Type: Eastern India, Sonnerat s.n. (P).

Distribution in India: Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Manipur, Meghalaya, Nagaland, Sikkim, Tripura, West Bengal

Distribution outside India: Nepal, China (Guangdong, Guangxi, Guizhou, Xizang, Yunnan).

Image: Nothing reliable found online.

GenBank: No published sequences available.

Comments: Chakravarty (1982) writes that *T. wallichiana* is “very closely allied to *T. bracteata* (Lam.) Voigt from which it can be separated by the membranous leaves with black-dotted glands at the base.”

89. *Zanonia indica* L., Sp. Pl., ed. 2. 2: 1457. 1763.

Type: India, Kerala, Malabar. Lectotype: “Penar-valli mas” in Rheede, Hort. Malab. 8: 39. t. 49, 1688, designated by Keraudren-Aymonin in Aubréville & Leroy (ed.), Fl. Cambodge Laos Viêt-Nam 15: 18. 1975.

Zanonia indica L. var. *pubescens* Cogn. in A. & C. DC., Monogr. Phan. 3: 927. 1881.

Syntypes: India, Himalaya and East Bengal, *Griffith* 2521 (K, P). Java, *Blume* s.n. (Herb. Lung. Bat., P). Borneo, *Korthals* s.n. (Herb. Lung. Bat.), Bangarmassing, *J. Motley* 804 et 920 (K).

Distribution in India: Andaman and Nicobar Islands, Assam, Goa, Karnataka, Kerala, Maharashtra, Meghalaya, Sikkim, Tamil Nadu, West Bengal.

Distribution outside India: Sri Lanka, S China, Indochina, through Malesia east to New Guinea.

Image: See De Wilde and Duyfjes (2007a).

GenBank: Sequences from Schaefer et al. (2009), e.g., EU436396, EU436345.

Comments: De Wilde and Duyfjes (2007a) discuss the species' unusual morphology.

90. *Zehneria bodinieri* (H. Lév.) W.J.de Wilde & Duyfjes, Thai Forest Bull., Bot. 32: 17. 2004.

Melothria bodinieri H. Lév., Fl. Kouy-Tchéou 112. 1914.

Pilogyne bodinieri (H. Lév.) W.J.de Wilde & Duyfjes, Reinwardtia 12(5): 410. 2009.

Lectotype designated by De Wilde & Duyfjes (2004b): China, Guangzhou, Kouyan, Bodinier 1957 (E, P).

Melothria perpusilla (Blume) Cogn. var. *subtruncata* Cogn. in A. & C. DC., Monog. Phan. 3: 608. 1881.

Syntypes: India, *Wight* 1151 (CAL image available from SSR; K, LE, W), Sri Lanka, *Thwaites* 1613 (BR, CAL image available from SSR, G, K, LE, P).

Distribution in India: Karnataka, Kerala, Tamil Nadu, also North India.

Distribution outside India: China, Myanmar, Sri Lanka, Sumatra, Malaysia, Sabah also Thailand, Vietnam, Cambodia, Laos, Vietnam, Peninsular Malaysia, Philippines (Palawan)

Image: Nothing reliable found online.

GenBank: Sequences from Kocyan et al. (2007) and Schaefer and Renner (2011b), e.g., DQ536614, HQ202008.

Comments: The synonymization of *Melothria perpusilla* (Blume) Cogn. var. *subtruncata* Cogn. follows Wilde and Duyfjes (2006). Jeffrey (1980), on the other hand, considers this name a synonym of *Zehneria maysorensis*.

91. *Zehneria hookeriana* (Wight & Arn.) Arn., J. Bot. 275. 1841.

Bryonia hookeriana Wight & Arn., Prodr. Fl. Ind. Orient. 1: 345. 1834.

Type: South India, *Wight* Cat. no. 1117 (K).

Distribution in India: South India, Tamil Nadu. **Endemic**.

Image: <http://apps.kew.org/herbcat/getImage.do?imageBarcode=K000036887>

GenBank: No published sequences available.

Comments: Endemic to India fide De Wilde and Duyfjes (2006).

92. *Zehneria japonica* (Thunb.) H.Y. Liu, Bull. Natl. Mus. Nat. Sci. (Taichung) 1: 40. 1989.

Bryonia japonica Thunb., Syst. Veg., ed. 14, 870. 1784.

- Melothria japonica* (Thunb.) Cogn. in A. & C. DC., Monogr. Phan. 3: 599. 1881.
Neoachmandra japonica (Thunb.) W.J. de Wilde & Duyfjes, Blumea 51(1): 22. 2006.
 Type: Japan, Nagasaki, Thunberg (UPS-THUNB 22826).
Neoachmandra indica (Lour.) W.J. de Wilde & Duyfjes, Blumea 51(1): 21. 2006.
Zehneria indica (Lour.) Keraudren-Aymonin in Aubréville & Leroy (ed.), Fl. Cambodge Laos Viêt-Nam 15: 52. 1975.
Aechmandra indica (Lour.) Arn., Hook. Journ. Bot. 3: 274. 1841
Melothria indica Lour., Fl. Cochinch. 1: 35. 1790.
 Type: Vietnam, Tourane, Loureiro s.n. (not found in BM fide J. Hunnex, 6 Sep. 2012, contra de Wilde and Duyfjes, Thai. Bull. 2004), neotype *Squires 14* (BM), designated by Jeffrey (1980).
Bryonia leucocarpa Blume, Bijdr. Fl. Ned. Ind. 15: 924. 1826.
Melothria leucocarpa (Blume) Cogn. in A. & C. DC., Monogr. Phan. 3: 601. 1881.
Neoachmandra leucocarpa (Blume) W.J.de Wilde & Duyfjes, Blumea 51(1): 23. 2006
 Lectotype: Java, Blume s.n. (L, barcode L0130099).
Melothria leucocarpa (Blume) Cogn. var. *triloba* (C.B. Clarke) Chakrav., Chakrav., Rec. Bot. Surv. India 17(1): 154. 1959.
 Lectotype: India, Wallich Cat. No. 6707 (K-W).
Melothria odorata C.B. Clarke, Fl. Brit. India 2(6): 626. 1879.
Neoachmandra odorata (C.B. Clarke) W.J.de Wilde & Duyfjes, Blumea 51(1): 27. 2006.
 Syntypes: India, Hamilton in Wallich Cat. 6706A,B,C (herbarium), as *Bryonia odorata* Buch.-Ham. Northwest Himalaya; *Royle* s.n. (herbarium), "Throughout the plain of East Bengal, common, and ascending the hills to 700ft alt."
Melothria odorata C.B. Clarke var. *triloba* C.B. Clarke, Fl. Brit. India 2(6): 626. 1879.
Melothria zehnerioides Haines, J. Proc. Asiat. Soc. Bengal 15: 315. 1920.
 Type: N India, Haines 4510 (herbarium?).

Distribution in India: Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Meghalaya, Nagaland, Punjab, Sikkim, Uttar Pradesh, Uttarakhand, West Bengal.

Distribution outside India: Thailand, China, Japan; Indonesia (Java, Sumatra).

Image: Nothing reliable found online.

GenBank: Sequences from Kocyan et al. (2007), as *Neoachmandra japonica*, e.g., DQ536753, DQ648192.

Comments: De Wilde and Duyfjes (2006b) have a very different concept of *Zehneria japonica* than does Jeffrey (most recently in Lu et al., 2011, Flora of China). They consider *Neoachmandra indica*, *Neoachmandra leucocarpa*, and *Neoachmandra odorata* separate species. They also provide a key and color photos of many *Zehneria* species. Molecular-phylogenetic work is needed to resolve the status of these various entities.

93. *Zehneria maysorensis* (Wight & Arn.) Arn., J. Bot. 3: 275. 1841.

Pilogyne maysorensis (Wight & Arn.) W.J.de Wilde & Duyfjes, Reinwardtia 12(5): 410. 2009.

Bryonia maysorensis Wight & Arn., Prodr. Fl. Ind. Orient. 1: 345. 1834.

Lectotype: South India, *Wight* 1116 (K, P), designated by de Wilde and Duyfjes (2006b).

Zehneria maysorensis (Wight & Arn.) Arn. var. *umbellata* (Chakrav.) Kumari, Fl. Tamil Nadu Ind., Ser. 1: 175. 1983.

Melothria mucronata (Blume) Cogn. var. *umbellata* Chakrav., Rec. Bot. Surv. India 17(1): 150. 1959.

Syntypes: Peninsular India, Lower Pulneys, 1600 m, Sep., *Rodriguez* 1955 (CAL 2 sheets, photos available from SSR), *Wight* (CAL, photo available from SSR).

Zehneria maysorensis (Wight & Arn.) Arn. var. *oblonga* V.P.Prasad & M.Prasad J. Econ. Taxon. Bot. 17(2): 471. 1993.

Type: India, Kerala State, Idukki District, Lower camp to Kumily area, 26 Dec. 1974, *K. Vivekananthan* 45710 (MH).

Distribution in India: Andhra Pradesh, Karnataka, Kerala, Maharashtra, Meghalaya, Tamil Nadu. **Endemic**.

Image: <http://apps.kew.org/herbcat/getImage.do?imageBarcode=K000742778>

GenBank: No published sequences available.

Comment: De Wilde and Duyfjes (2004b) suggest that *Zehneria mucronata* (Blume) Miq., which is based on a Blume collection from Java (L) and widespread in Southeast Asia and Malesia, may be the same as *Z. maysorensis*, in which case it would be the older name.

94. *Zehneria thwaitesii* (Schweinf.) C. Jeffrey, Kew Bull. 15: 371. 1962.

Cucumella thwaitesii (Schweinf.) M.R. Almeida, Fl. Maharashtra 2: 314. 1998.

Melothria thwaitesii Schweinf., Reliq. Kotschy. 44, t. 29. 1868.

Lectotype: Sri Lanka, *Thwaites* CP 2581 (K, BM, P, W) designated by de Wilde and Duyfjes (2004b).

Melothria zeylanica C.B. Clarke in Hook. f., Fl. Brit. Ind. 2: 626 (1879), nom. inval.

Bryonia deltoidea Arn., Pugill.: 19 (1836), nom illeg., non Schumach., 1827 = *Melothria deltoidea* (Arn.) Thwaites, Enum.: 124 (1859) nom. illegit., non (Schumach.)

Benth. 1849. = *Neoachmandra deltoidea* (Arn.) W.J.de Wilde & Duyfjes, Blumea 51(1): 18 (79). 2006. Material: Sri Lanka, *Walker* 273 (K).

Distribution in India: Kerala.

Distribution outside India: Africa, Madagascar, Sri Lanka (Wilde and Duyfjes, 2006).

Image: Nothing reliable found.

GenBank: Unpublished sequences from Asian material of *Neoachmandra deltoidea* (EF065485) and African material of *Zehneria thwaitesii* (AM981145).

Comment: C.B. Clarke (1879) applied the invalid name *Melothria zeylanica* to this species. De Wilde and Duyfjes (2006) treat *Zehneria thwaitesii* under *Neoachmandra deltoidea*. Molecular data are needed to clarify the genus boundaries of *Zehneria*.

Misapplied names and species erroneously or doubtfully recorded from India:

***Bryonia dioica* Jacq.**

Comment: The distribution range given for *B. dioica* by Chakravarty (1982) "Afghanistan, Iran, Iraq, Tropical Africa, Syria, Palestine" is based on an exceedingly broad concept of this species. A narrower circumscription (Jeffrey, 1969) is supported by nuclear and plastid molecular data (Volz and Renner, 2009). *Bryonia dioica* then occurs from Spain throughout Eurasia south to Algeria and Morocco, Sardinia, Corsica, and the Greek Peninsula and east to mid-Poland; a distribution map is shown in Volz and Renner (2009).

***Bryonia multiflora* Boiss. & Heldr.**

Comment: Listed by Chakravarty (1982) based on misidentification of *B. monoica* (see under that species).

***Cayaponia laciniosa* (L.) C. Jeffrey, Kew Bull. 15(3): 346. 1962.**

Bryonopsis laciniosa (L.) Naudin, Ann. Sci. Nat., Bot. sér. 5: 6. 1866.

Bryonia laciniosa L., Sp. Pl. 2: 1013. 1753. Type: "Habitat in Zeylona." (Country assignment in error). Lectotype: Cultivated in the Netherlands, Hartekamp in 1736–1737, Herb. Clifford: 452, *Bryonia* 1 (BM-000647451), designated by Jeffrey (1962).

Comment from M. Nee, New York Botanical Garden, pers. comm. to S. Renner in 2010: In 1962, Jeffrey thought that *C. laciniosa* was the correct name for *C. racemosa* (Mill.) Cogn. By 1971, however, he decided that *C. laciniosa* was a local Jamaican endemic. The fullest description would be from Hort. Cliff. 452 based on living plants that Linnaeus saw; Linnaeus erroneously equated syntypes of this plant with literature of a different genus and species from Asia.

***Citrullus ecirrhosus* Cogn., Verh. Bot. Vereins Prov. Brandenburg 30:151. 1888.**

Colocynthis ecirrhosus (Cogn.) Chakrav., Science & Culture 15: 32. 1949.

This species is from Africa and not a synonym of *Benincasa fistulosa*.

***Hemsleya graciliflora* (Harms) Cogn. in Engl. Pflanzenr. IV. 275, 1 (Heft 66): 24, f. 7A–H. 1916.**

Alsomitra graciliflora Harms, Bot. Jahrb. Syst. 29(5): 602. 1901.

Syntypes: China, W Wenchuan, Niangtzuling, *BvR* 3134, 3136, Hubei, Henry 4452, Sichuan, Wenchuan, Niangziling; *von Rosthorn* 3134, 3136 (B, destroyed in WWII)

Comment: Accepted for India by Chakravarty (1982), while Jeffrey (1980) states that records for India are based on misidentifications of *Gomphogyne macrocarpa* (*Hemsleya macrocarpa*).

Hodgsonia macrocarpa (Blume) Cogn. in A. & C. DC., Monogr. Phan. 3: 349. 1881.

Trichosanthes macrocarpa Blume, Bijdr. Fl. Ned. Ind. 15: 935. 1826.

Type: Java, Mt. Salak, *Blume s.n.* (L.).

Trichosanthes listeri Chakrav., J. Bombay Nat. Hist. Soc. 50(4): 895, pl. 2. 1952.

Type: Bangladesh [Bengal], Chittagong Hill Tracts, Burkul, March 4, 1876, *Lister 349* as to the flowers (CAL photo available from SSR). As Jeffrey (1982) noted, the type is a mixed collection, the flowers coming from *Hodgsonia macrocarpa* (now *H. heteroclita*), the shoot from *Thladiantha cordifolia*. Jeffrey designated the flowers as the lectotype.

Comment: *Hodgsonia* has two species, *H. macrocarpa* in Java, and *H. heteroclita* in Northeast India, Bhutan, South China, Myanmar, Laos, Cambodia, Vietnam, Thailand, and Peninsular Malaysia. Jeffrey's (1980) and Chakravarty's (1982) listing of this name for India is based on a broader species concept, in which *H. heteroclita* was part of *H. macrocarpa* (De Wilde and Duyfjes, 2001).

Trichosanthes thwaitesii Cogn. in A. & C. DC., Monogr. Phan. 3: 387. 1881, nom. illegit.

Zanonia heterosperma Wall., Pl. Asiat. Rar. 2: 29. 1831.

Gomphogyne heterosperma (Wall.) Kurz, J. Asiat. Soc. Bengal 46: 105. 1877.

Alsomitra heterosperma (Wall.) M.Roem., Syn. Monogr. 2: 118. 1846.

Hemsleya heterosperma (Wall.) C. Jeffrey, Kew Bull. 36: 739. 1982.

Type: Myanmar (Burma), Ava, Mt. Taong Daong, *Wallich 1038* (K-W 3728).

Comment: Listed by Jeffrey (1982) as occurring in India, but according to De Wilde et al. (2007), the species is restricted to East Myanmar and Thailand.

Zehneria perpusilla (Blume) Bole & M.R. Almeida, J. Bombay Nat. Hist. Soc. 79(2): 315. 1983.

Melothria perpusilla (Blume) Cogn. in A. & C. DC., Monogr. Phan. 3: 607. 1881.

Cucurbita perpusilla Blume, Cat. Gew. Buitenzorg (Blume) 105. 1823.

Lectotype: Java, *Blume s.n.* (L, barcode L0048312).

Comment: According to De Wilde and Duyfjes (2006), this Javanese species does not occur in India.

Zehneria wallichii (C.B. Clarke) C. Jeffrey, Kew Bull. 34(4): 802. 1980.

Neoachmandra wallichii (C.B. Clarke) W. J.de Wilde & Duyfjes, Blumea 51(1): 32. 2006.

Melothria wallichii C.B. Clarke, Fl. Brit. India 2: 626. 1879.

Type: Myanmar, Pyay (formerly Prome), *Wallich 6706D* (K-W).

This species, included in Jeffrey's (1980) Indian checklist, was collected in the center of Myanmar and appears not to occur in India. Chakravarty (1982) does not mention the name.

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Appendix

Names treated in this checklist

Accepted names for species occurring in India are set in bold, species only mentioned in comments are shown in non-bold, and synonymized names in italics.

Actinostemma tenerum Griff.

Aechmandra conocarpa Dalzell & A.Gibson

Aechmandra epigaea (Rottler) Arn.

Aechmandra indica (Lour.) Arn.

Aechmandra rostrata (Rottler) Arn.

Aechmandra velutina Dalzell & A.Gibson

Aechmandra zeylanica Thwaites

Alsomitra clavigera (Wall.) M.Roem., nom. nud.

Alsomitra graciliflora Harms

Alsomitra heterosperma (Wall.) M.Roem.

Alsomitra integrifoliola (Cogniaux) Hayata

Alsomitra pubigera Prain

Benincasa cerifera Savi

Benincasa fistulosa (Stocks) H. Schaeff. & S.S. Renner

Benincasa hispida (Thunb.) Cogn.

Benincasa pruriens (Parkinson) W.J.de Wilde & Duyfjes L. forma *hispida* (Thunb.) W.J.deWilde & Duyfjes

Biswarea tonglensis (C.B. Clarke) Cogn.

Blastania cerasiformis (Stocks) A. Meeuse

Blastania fimbristipula Kotschy & Peyr.

Blastania garcinii (Burm.f.) Cogn.

Bryonia alceifolia Willd.

Bryonia amplexicaulis Lam.

Bryonia aspera Steven ex Ledeb.

Bryonia callosa Rottler

Bryonia cochinchinensis Lour.

Bryonia cordifolia L.

Bryonia cucumeroides Ser.

Bryonia deltoidea Arn., nom. illeg.

Bryonia dioica Jacq.

Bryonia epigaea Rottler

Bryonia fimbriatipula Fenzl ex Stocks, nom. inval.

Bryonia garcinii (Burm.f.) Willd.

Bryonia grandis L.

Bryonia hookeriana Wight & Arn.

Bryonia japonica Thunb.

Bryonia laciniosa L.

Bryonia leiosperma Wight & Arn.

Bryonia leucocarpa Blume

Bryonia maysorensis Wight & Arn.

Bryonia monoica Aitch. & Hemsl.

Bryonia multiflora Boiss. & Heldr.

Bryonia napaulensis Ser.

Bryonia palmata L.

Bryonia pedunculosa Ser.

Bryonia rheedei Blume

Bryonia rostrata Willd.

Bryonia sagittata Blume

Bryonia scabrella L.f.

Bryonia tubiflora Wight & Arn.

Bryonia umbellata Willd.

Bryonopsis bennettii Miq.

Bryonopsis courtallensis Arn.

Bryonopsis laciniosa (L.) Naudin

Bryonopsis laciniosa (L.) Naudin var. *walkeri* Chakrav.

Cayaporia laciniosa (L.) C. Jeffrey

Cephalandra indica Naudin var. *palmata* C.B. Clarke, nom. superfl.

Cerasiocarpum bennettii (Miq.) Cogn.

Cerasiocarpum zeylanicum (Thwaites) C.B. Clarke

Citrullus colocynthis (L.) Schrad.

Citrullus fistulosus Stocks

Citrullus vulgaris Schrad. ex Eckl. & Zeyh. var. *fistulosus* (Stocks) J. L. Stewart

Citrullus lanatus (Thunb.) Matsum. & Nakai

Citrullus lanatus (Thunb.) Matsum. & Nakai var. *fistulosus* (Steward) Babu, nom. inval.

Citrullus lanatus (Thunb.) Matsum. & Nakai var. *fistulosus* (Stocks) Chakrav., nom. illeg.

- Citrullus vulgaris* Schrad. ex Eckl. & Zeyh.
Coccinia cordifolia (L.) Cogn.
Coccinia cordifolia (L.) Cogn. var. *wightiana* (M.Roem.) Cogn.
Coccinia grandis (L.) Voigt
Coccinia grandis (L.) Voigt var. *wightiana* (M.Roem.) Greb.
Coccinia indica Wight & Arn., nom. superfl., nom. illeg.
Coccinia palmata M.Roem.
Coccinia wightiana M.Roem.
Colocynthis citrullus (L.) Kuntze var. *fistulosus* (Stocks) Chakrav.
Colocynthis ecirrhosus (Cogn.) Chakrav.
Colocynthis vulgaris Schrad.
Corallocarpus conocarpus (Dalzell & A.Gibson) Hook.f. ex C.B. Clarke
Corallocarpus courbonii (Naudin) Cogn.
Corallocarpus epigaeus (Rottler) Benth. & Hook.f. ex C.B. Clarke
Corallocarpus gracilipes (Naudin) Cogn.
Corallocarpus palmatus Cogn.
Corallocarpus schimperi (Naudin) Hook.f.
Corallocarpus velutinus (Dalzell & A. Gibson) Hook.f. ex C.B. Clarke
Ctenolepis cerasiformis (Stocks) Hook.f.,
Ctenolepis garcinii (Burm.f.) Benth. & Hook.f.
Ctenolepis welwitschii (Hook.f.) Jafri
Cucumella ritchiei (Chakrav.) C. Jeffrey
Cucumella silentvalleyi Manilal, T. Sabu & P. J. Mathew
Cucumella thwaitesii (Schweinf.) M.R. Almeida
Cucumis acutangulus L.
Cucumis anguinus L.
Cucumis callosus (Rottler) Cogn.
Cucumis colocynthis L.
Cucumis hardwickii Royle
Cucumis hystrix Chakrav.
Cucumis indicus Ghebretinsae & Thulin
Cucumis integrifolius Roxb.
Cucumis javanicus (Miq.) Ghebretinsae & Thulin
Cucumis leiospermus (Wight & Arn.) Ghebretinsae & Thulin
Cucumis maderaspatanus L.
Cucumis melo L.
Cucumis melo L. forma *agrestis* (Naudin) W.J.de Wilde & Duyfjes
Cucumis melo L. subsp. *agrestis* (Naudin) Pangalo
Cucumis melo L. var. *agrestis* Naudin
Cucumis melo L. var. *culta* Kurz
Cucumis melo L. var. *momordica* Duthie & Fullar
Cucumis melo L. var. *pubescens* (Willd.) Kurz
Cucumis melo L. var. *utilissima* Duthie & Fullar

Cucumis momordica Roxb.

Cucumis muriculatus Chakrav.

Cucumis prophetarum L.

Cucumis pubescens Willd.

Cucumis ritchiei (C.B. Clarke) Ghebretinsae & Thulin

Cucumis sativus L.

Cucumis sativus L. forma *hardwickii* (Royle) W.J.de Wilde & Duyfjes

Cucumis sativus L. var. *sikkimensis* Hook.f.

Cucumis setosus Cogn.

Cucumis silentvalleyi (Manilal, T. Sabu & P.J. Mathew) Ghebretinsae & Thulin

Cucumis trigonus Roxb.

Cucurbita argyrosperma C.Huber

Cucurbita citrullus L.

Cucurbita ficifolia Bouché

Cucurbita hispida Thunb.

Cucurbita lagenaria L.

Cucurbita maxima Duchesne

Cucurbita maxima Duchesne var. *badagarensis* Mudaliar

Cucurbita mixta Pangalo

Cucurbita moschata (Duchesne ex Lam.) Duchesne

Cucurbita pepo L.

Cucurbita pepo L. var. *melopepo* Alef.

Cucurbita pepo L. var. *moschata* Duchesne ex Lam.

Cucurbita pepo L. var. *ovigera* Alef.

Cucurbita perpusilla Blume

Cucurbita siceraria Molina

Cucurbita umbellata Willd.

Cyclanthera pedata (L.) Schrad.

Dactyliandra welwitschii Hook.f.

Dicaelospermum ritchiei C.B. Clarke

Diplocyclos palmatus (L.) C. Jeffrey

Diplocyclos palmatus (L.) C. Jeffrey var. *walkeri* (Chakrav.) Babu

Edgaria darjeelingensis C.B. Clarke

Edgaria darjeelingensis C.B. Clarke var. *clarkeana* S. N. Biswas

Euonymus chinensis Lour.

Gomphogyne cirromitrata W.J.de Wilde & Duyfjes

Gomphogyne cissiformis Griff.

Gomphogyne cissiformis Griff. forma *villosa* (Cogn.) Mizush.

Gomphogyne cissiformis Griff. var. *villosa* Cogn.

Gomphogyne heterosperma (Wall.) Kurz

Gomphogyne macrocarpa Cogn.

Gomphogyne nepalensis W.J.de Wilde & Duyfjes

Gymnopetalum chinense (Lour.) Merr.

- Gymnopetalum cochinchinense* (Lour.) Kurz
Gymnopetalum heterophyllum Kurz
Gymnopetalum integrifolium (Roxb.) Kurz
Gymnopetalum integrifolium (Roxb.) Kurz var. *pectinatum* W.J.de Wilde & Duyfjes
Gymnopetalum penicaudii Gagnep.
Gymnopetalum quinquelobum Miq.
Gymnopetalum scabrum (Lour.) W.J.de Wilde & Duyfjes
Gymnopetalum scabrum (Lour.) W.J.de Wilde & Duyfjes var. *pectinatum* (W.J. de Wilde & Duyfjes) W.J.de Wilde & Duyfjes
Gymnopetalum scabrum (Lour.) W.J.de Wilde & Duyfjes var. *penicaudii* (Gagnep.) W.J.de Wilde & Duyfjes
Gymnopetalum tubiflorum (Wight & Arn.) Cogn.
Gymnopetalum wightii Arn.
Gynostemma integrifoliolum Cogn.
Gynostemma laxum (Wall.) Cogn.
Gynostemma pedatum Blume
Gynostemma pentaphyllum (Thunb.) Makino
Gynostemma pentaphyllum (Thunb.) Makino forma *simplicifolium* (Blume) W.J.de Wilde & Duyfjes
Gynostemma simplicifolium Blume
Hemsleya cirromitratra (W.J.de Wilde & Duyfjes) H. Schaeff. & S.S.Renner
Hemsleya graciliflora (Harms) Cogn.
Hemsleya heterosperma (Wall.) C. Jeffrey
Hemsleya macrocarpa (Cogn.) C. Y. Wu ex C. Jeffrey
Hemsleya trifoliolata Cogn.
Herpetospermum caudigerum Wall. ex C.B. Clarke, nom. illeg.
Herpetospermum darjeelingense (C.B. Clarke) H.Schaeff. & S.S.Renner
Herpetospermum pedunculosum (Ser.) Baill.
Herpetospermum tonglense (C.B. Clarke) H. Schaeff. & S.S. Renner
Hodgsonia heteroclita (Roxb.) Hook.f. & Thomson
Hodgsonia macrocarpa (Blume) Cogn.
Indofeveillea khasiana Chatterjee
Involucaria lepiniana Naudin
Involucaria wallichiana Ser.
Karivia amplexicaulis (Lam.) Arn.
Karivia javanica Miq.
Karivia rheedei (Blume) M.Roem.
Karivia umbellata (Willd.) Arn.
Kedrostis bennettii (Miq.) W.J.de Wilde & Duyfjes
Kedrostis courtallensis (Arn.) C. Jeffrey
Kedrostis foetidissima (Jacq.) Cogn.
Kedrostis rostrata (Willd.) Cogn.
Lagenaria siceraria (Molina) Standl.

Luffa acutangula (L.) Roxb.*Luffa acutangula* (L.) Roxb. var. *amara* (Roxb.) C.B. Clarke*Luffa acutangula* (L.) Roxb. forma *amara* (Roxb.) W.J.de Wilde & Duyfjes*Luffa aegyptiaca* Mill.*Luffa aegyptiaca* Mill. forma *sylvestris* (Miq.) W.J.de Wilde & Duyfjes*Luffa amara* Roxb.*Luffa cordifolia* Blume**Luffa cylindrica** (L.) M.Roem.*Luffa cylindrica* (L.) M.Roem. var. *minor* Chakrav., nom. nud.**Luffa echinata** Roxb.*Luffa echinata* Roxb. var. *longistyla* C.B. Clarke**Luffa graveolens** Roxb.*Luffa hermaphrodita* Singh & Bhandari*Luffa kleinii* Wight & Arn.*Luffa sylvestris* Miq.*Luffa tuberosa* Roxb.*Luffa umbellata* (Willd.) M.Roem.*Melothria amplexicaulis* (Lam.) Cogn.*Melothria angulata* Chakrav.*Melothria assamica* Chakrav.*Melothria assamica* Chakrav. var. *scabra* Chakrav.*Melothria bicirrhosa* C.B. Clarke*Melothria bodinieri* H. Lév.*Melothria deltoidea* (Arn.) Thwaites, nom. illeg.*Melothria fimbriatipula* (Kotschy & Peyr.) G. Roberty*Melothria heterophylla* (Lour.) Cogn.*Melothria indica* Lour.*Melothria japonica* (Thunb.) Cogn.*Melothria javanica* (Miq.) Panigrahi & Misra*Melothria javanica* (Miq.) Panigrahi & Misra var. *scabra* (Chakrav.) Naithani*Melothria leiosperma* (Wight & Arn.) Cogn.*Melothria leucocarpa* (Blume) Cogn.*Melothria leucocarpa* (Blume) Cogn. var. *triloba* (C.B. Clarke) Chakrav.*Melothria maderaspatana* (L.) Cogn.*Melothria mucronata* (Blume) Cogn. var. *umbellata* Chakrav.*Melothria odorata* C.B. Clarke*Melothria odorata* C.B. Clarke var. *triloba* C.B. Clarke*Melothria ovata* Cogn.*Melothria perpusilla* (Blume) Cogn.*Melothria perpusilla* (Blume) Cogn. var. *subtruncata* Cogn.*Melothria ritchiei* Chakrav.*Melothria thwaitesii* Schweinf.*Melothria wallichii* C.B. Clarke

Melothria zehnerioides Haines

Melothria zeylanica Koen. ex Wight & Arn., nom. inval.

Modecca bracteata Lam.

Momordica balsamina L.

Momordica calcarata Colebr. ex Wall., nom. nud.

Momordica charantia L.

Momordica charantia L. var. *muricata* (Willd.) Chakrav.

Momordica cochinchinensis (Lour.) Spreng.

Momordica cylindrica L.

Momordica cymbalaria Fenzl ex Naudin

Momordica denudata (Thwaites) C.B. Clarke

Momordica dioica Roxb. ex Willd.

Momordica dioica Roxb. ex Willd. var. *denudata* Thwaites

Momordica lanata Thunb.

Momordica macrophylla Gage

Momordica muricata Willd.

Momordica pedata L.

Momordica renigera Wall. ex G. Don

Momordica sahyadrica Kattuk. & V.T.Antony

Momordica subangulata Blume

Momordica subangulata Blume subsp. *renigera* (Wall. ex G. Don) W.J.de Wilde

Momordica tuberosa (Roxb.) Cogn.

Momordica tubiflora Roxb.

Momordica umbellata (Willd.) Roxb.

Mukia javanica (Miq.) C. Jeffrey

Mukia leiosperma (Wight & Arn.) Arn.

Mukia maderaspatana (L.) M.Roem.

Mukia ritchiei (C.B. Clarke) W.J.de Wilde & Duyfjes

Mukia scabrella (L.f.) Arn.

Muricia cochinchinensis Lour.

Neoachmandra deltoidea (Arn.) W.J.de Wilde & Duyfjes

Neoachmandra indica (Lour.) W.J.de Wilde & Duyfjes

Neoachmandra japonica (Thunb.) W.J.de Wilde & Duyfjes

Neoachmandra leucocarpa (Blume) W.J.de Wilde & Duyfjes

Neoachmandra odorata (C.B. Clarke) W.J.de Wilde & Duyfjes

Neoachmandra wallichii (C.B. Clarke) W.J.de Wilde & Duyfjes

Neoalsomitra clavigera (Wall.) Hutch.

Neoalsomitra clavigera (Wall.) Hutch. var. *hookeri* (C.B. Clarke) Chakrav.

Neoalsomitra integrifoliola (Cogniaux) Hutchinson

Neoluffa sikkimensis Chakrav.

Pilogyne bodinieri (H. Lév.) W.J.de Wilde & Duyfjes

Pilogyne maysorensis (Wight & Arn.) W.J.de Wilde & Duyfjes

Praecitrullus fistulosus (Stocks) Pangalo

- Rhynchocarpa epigaea* (Rottler) Naudin
Rhynchocarpa epigaea (Rottler) Naudin var. *gracilipes* Naudin
Rhynchocarpa schimperi Naudin
Rynchocarpa rostrata (Rottler) Naudin
Schizopepon bicirrhosus (C.B. Clarke) C. Jeffrey
Schizopepon longipes Gagnep.
Schizopepon macranthus Handel-Mazzetti
Schizopepon wardii Chakrav.
Scotanthus tubiflorus (Roxb.) Naudin
Sechium americanum Poir.
Sechium edule (Jacq.) Sw.
Siraitia sikkimensis (Chakrav.) C. Jeffrey
Sicyos edulis Jacq.
Sicyos garcinii Burm.f.
Solena amplexicaulis (Lam.) Gandhi
Solena angulata (Chakrav.) Babu
Solena heterophylla Lour. subsp. **heterophylla**
Solena heterophylla Lour. subsp. **napaulensis** (Ser.) W.J.de Wilde & Duyfjes
Solena umbellata (Willd.) W.J. de Wilde & Duyfjes
Thladiantha calcarata C.B. Clarke var. *subglabra* Cogn.
Thladiantha calcarata C.B. Clarke, nom. nud.
Thladiantha cordifolia (Blume) Cogn.
Thladiantha heptadactyla Cogn.
Thladiantha hookeri C.B. Clarke
Thladiantha hookeri C.B. Clarke var. *irregularis* Chakrav.
Thladiantha hookeri C.B. Clarke var. *palmatifolia* Chakrav.
Thladiantha hookeri C.B. Clarke forma *trifoliolata* (Cogn.) Chakrav.
Thladiantha pentadactyla Cogn.
Trichosanthes anguina L.
Trichosanthes anaimalaiensis Bedd.
Trichosanthes bracteata (Lam.) Voigt
Trichosanthes bracteata (Lam.) Voigt var. *scotanthus* (C.B. Clarke) Handel-Mazzetti
Trichosanthes bracteata (Lam.) Voigt var. *tomentosa* (C.B. Clarke) Chakrav., nom. illeg.
Trichosanthes brevibracteata Kundu
Trichosanthes brevibracteata Kundu var. *longirostrata* Kundu
Trichosanthes brevibracteata Kundu var. *sublobata* Kundu
Trichosanthes burmensis Kundu
Trichosanthes burmensis Kundu var. *alba* Kundu
Trichosanthes chinensis Ser.
Trichosanthes cordata Roxb.
Trichosanthes costata Bl.
Trichosanthes cucumerina L.
Trichosanthes cucumeroides (Ser.) Maxim.

- Trichosanthes cucumeroides* (Ser.) Maxim. var. *dicaelosperma* (C.B. Clarke) S. K. Chen
Trichosanthes cuspidata Lam.
Trichosanthes dicaelosperma C.B. Clarke
Trichosanthes dioica Roxb.
Trichosanthes dioica Roxb. var. *sagittifolia* Chakrav.
Trichosanthes dunniana H. Lév.
Trichosanthes foetidissima Jacq.
Trichosanthes heteroclita Roxb.
Trichosanthes himalensis C.B. Clarke
Trichosanthes himalensis C.B. Clarke var. *glabrior* C.B. Clarke
Trichosanthes himalensis C.B. Clarke var. *himalensis*
Trichosanthes himalensis C.B. Clarke var. *indivisa* Chakrav., nom. illeg.
Trichosanthes himalensis C.B. Clarke var. *sikkimensis* (Kundu) Thoth.
Trichosanthes horsfieldii Miq.
Trichosanthes integrifolia (Roxb.) Kurz
Trichosanthes kerrii Craib
Trichosanthes khasiana Kundu
Trichosanthes lepiniana (Naudin) Cogn.
Trichosanthes listeri Chakrav.
Trichosanthes lobata Roxb.
Trichosanthes macrocarpa Blume
Trichosanthes macrosiphon Kurz
Trichosanthes majuscula (C.B. Clarke) Kundu
Trichosanthes multiloba Miq. var. *majuscula* C.B. Clarke
Trichosanthes nervifolia L.
Trichosanthes ovata Cogn.
Trichosanthes ovigera Blume
Trichosanthes ovigera Blume var. *sikkimensis* Kundu
Trichosanthes ovigera Blume subsp. *cucumeroides* (Ser.) C. Jeffrey
Trichosanthes pachyrrhachis Kundu
Trichosanthes palmata L. var. *scotanthus* C.B. Clarke, nom. nud.
Trichosanthes palmata L. var. *tomentosa* Heyne ex C.B. Clarke
Trichosanthes palmata Roxb., nom. illeg.
Trichosanthes perrottetiana Cogn.
Trichosanthes pilosa Lour.
Trichosanthes prazeri Kundu
Trichosanthes pubera Blume subsp. *rubriflos* (Thorel ex Cayla) Duyfjes & Pruesapan
Trichosanthes quinquangulata A. Gray
Trichosanthes rubriflos Thorel ex Cayla
Trichosanthes scabra Lour.
Trichosanthes scabra Lour. var. *pectinata* (W.J.de Wilde & Duyfjes) H.J.De Boer
Trichosanthes scabra Lour. var. *penicaudii* (Gagnep.) H.J.De Boer
Trichosanthes thwaitesii Cogn.

Trichosanthes tomentosa Chakrav.

Trichosanthes tricuspidata Lour.

Trichosanthes tricuspidata Lour. var. *strigosa* Mitra & Bandyop.

Trichosanthes truncata C.B. Clarke

Trichosanthes tubiflora (Wight & Arn.) H.J.De Boer

Trichosanthes villosula Cogn.

Trichosanthes villosula Cogn. var. *nilgirrensis* Kundu

Trichosanthes wallichiana (Ser.) Wight

Trichosanthes wallichiana (Ser.) Wight var. *majuscula* (C.B. Clarke) Cogn.

Tripodanthera cochinchinensis (Lour.) M.Roem.

Vitis pentaphylla Thunb.

Warea tonglensis C.B. Clarke

Zanonia clavigera Wall.

Zanonia heterosperma Wall.

Zanonia indica L.

Zanonia indica L. var. *pubescens* Cogn.

Zanonia laxa Wall.

Zehneria angulata (Chakrav.) J. L. Ellis

Zehneria bodinieri (H. Lév.) W.J.de Wilde & Duyfjes

Zehneria cerasiformis Stocks

Zehneria hookeriana (Wight & Arn.) Arn.

Zehneria indica (Lour.) Keraudren-Aymonin

Zehneria japonica (Thunb.) H.Y. Liu

Zehneria maysorensis (Wight & Arn.) Arn.

Zehneria maysorensis (Wight & Arn.) Arn. var. *oblonga* V.P.Prasad & M.Prasad

Zehneria maysorensis (Wight & Arn.) Arn. var. *umbellata* (Chakrav.) Kumari

Zehneria mucronata (Blume) Miq.

Zehneria perpusilla (Blume) Bole & M.R. Almeida

Zehneria thwaitesii (Schweinf.) C. Jeffrey

Zehneria umbellata (Klein ex Willd.) Thwaites

Zehneria umbellata (Klein ex Willd.) Thwaites var. *nepaulensis* (Ser.) C.B. Clarke

Zehneria wallichii (C.B. Clarke) C. Jeffrey