

Rediscovery of *Heterostemma beddomei* (Apocynaceae, Asclepiadoideae) after its type collection in India over more than 150 years ago

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Abstract: *Heterostemma beddomei* (Hook.f.) Swarupan. & Mangaly (Apocynaceae) is an endemic species, known only from a drawing by R.H. Beddome. It has been rediscovered away from the type locality from the Amrabad Tiger Reserve (Nagarkurnool district) of Telangana after a lapse of more than 150 years. A detailed description with colour photographs are provided with an updated key to the species belonging to the sect. *Oianthus* in India.

Keywords: Asclepiadoideae, Ceropegieae, Eastern Ghats, sect. *Oianthus*.

Introduction

The genus *Heterostemma* Wight & Arn. is distributed from tropical and sub-tropical Asia to the South West Pacific and includes 47 species (POWO, 2023). In India, it is represented by 11 species (Swarupanandan *et al.*, 1989; Karthikeyan *et al.*, 2009; Agnihotri *et al.*, 2019), of which nine are endemic to India. The species show highly restricted distributions in India and many species are only known from their type localities. Swarupanandan *et al.* (1989) recognized two sections in the genus based on the nature of the corolla, those with rotated flowers were placed under sect. *Heterostemma* and those bearing urceolate to globose flowers in sect. *Oianthus* Swarupan. & Sasidh. In India, six species belong to the sect. *Heterostemma* (*H. alatum* Wight, *H. barikianum* P.Agnihotri, D.Husain, P.Katiyar, D.Sahoo, Rodda & T.Husain, *H. dalzellii* Hook.f., *H. stellatum* Hook.f., *H. tanjorensis* Wight & Arn. and *H. wallichii* Wight & Arn.). The sect. *Oianthus* is restricted to peninsular India and Thailand

(Swarupanandan *et al.*, 1989; Kidyoo, 2019), and represented by six species, of which five are endemic to India (*H. beddomei* (Hook.f.) Swarupan. & Mangaly, *H. deccanense* (Talbot) Swarupan. & Mangaly, *H. disciflorum* (Hook.f.) Swarupan. & Mangaly, *H. urceolatum* Dalzell and *H. vasudevianii* Swarupan. & Mangaly).

During recent floristic explorations in the southern Eastern Ghats of the Amrabad Tiger Reserve of Telangana state (2018–2021), the authors collected specimens of *Heterostemma* with depressed globose flowers in a dry deciduous forest. Based on the morphological studies and relevant literature (Hooker, 1883; Swarupanandan *et al.*, 1989; Jagtap & Singh, 1999; Karthikeyan *et al.*, 2009; Rodda, 2016), it was revealed that the authors were having difficulty fixing its identity with the available literature. The specimens were eventually identified as *H. beddomei* with the assistance of Dr. M. Rodda (Singapore Botanic Garden, Singapore). Hooker (1883) recognized three species under the genus *Oianthus* Benth. (*O. beddomei* Hook.f., *O. disciflorus* Hook.f., *O. urceolatus* (Dalzell) Benth.). Hooker (*l.c.*) had stated that these species are “abnormal forms of *Heterostemma*” and later they were transferred to *Heterostemma* by Swarupanandan *et al.* (1989). Of these, two species have been recollected in India after the type collection, *i.e.*, *H. disciflorum* from Andhra Pradesh (Swarupanandan *et al.*, 1989) and *H. urceolatum* from Maharashtra and Goa (Dalavi *et al.*, 2020). However, *H. beddomei*, was only known from an illustration by R.H. Beddome and after the description of the species Hooker (*l.c.*) had written, “described from an excellent drawing, Col. Beddome having lost his specimen”. The present

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collection of this taxon is the first after the type collection by Beddome in the year 1862, more than 150 years ago which is lost. The description available in the literature is inadequate because no specimens are available for detailed study and is mostly based on an illustration. A detailed description based on freshly collected specimens is provided here along with a photo plate.

Materials and Methods

Materials of this species were collected during floristic explorations in the southern Eastern Ghats in the Amrabad Tiger Reserve of Telangana state (2018–2021). The morphological characteristics of leaves and flowers were observed under a trinocular stereo zoom microscope (Labline, India) affixed with a digital camera (Ecocosmos510B, India). Voucher specimens were deposited at BSID, CAL, and TBGH (herbarium acronym after Thiers, updated continuously).

Taxonomic Treatment

Heterostemma beddomei (Hook.f.) Swarupan. & Mangaly, Bot. J. Linn. Soc. 101(2): 254. 1989. *Oianthus beddomei* Hook.f., Fl. Brit. India 4(10): 49. 1883. *Lectotype* (designated by Rodda, 2016): INDIA, Kerala (Mysore state, 1862), Wyanad district, Beigoor forests (Begur Reserve Forest), 04.08.1862, *ex Beddome s.n.* (K, drawing). **Fig. 1**

Twining vine, about 3 m long, with milky white latex in all vegetative parts. Roots wiry, branched. Stem slender, cylindrical, pubescent and/or with two opposite longitudinal lines of hairs. Leaves decussate, chartaceous when dry; lamina ovate or broadly or narrowly ovate-lanceolate or ovate-cordate, 6–14 × 2–6 cm, apex acuminate, base cordate or obtuse, 3–7-nerved from base, ciliolate along margins, veins pubescent or not, glabrous; petiole 1.5–3.5 cm long, grooved, sparsely pubescent on grooves or glabrous. Inflorescence extra-axillary, umbellate cymes; cymes initially single (peduncle 4–6 mm long, pubescent) and later 2–4 cymes borne along the rachis (rachis 1–2.5 cm long, pubescent); each cyme 4–12 (20–30)-flowered; pedicels 3–4.3 mm long, pubescent or with one or two longitudinal lines of hairs present. Bracts minute, triangular, deciduous. Calyx lobes connate at base, tube 0.2–0.4 mm long; lobes ovate or triangular or ovate-lanceolate, 1–1.5 × 0.6–1 mm, apex obtuse. Corolla

depressed globose, disciform, 9–9.6 mm in diam., white or yellowish-white or dark pink, hairy on inner surface and glabrous or rarely pubescent on outer surface; tube 7–8 mm long; lobes short, broadly triangular, 1.8–2.3 × 1.9–2.1 mm, fleshy, apex obtuse and slightly recurved. Gynostegium sessile, cupular in outline, 4–4.8 mm in diam. Staminal corona lobes 5, inserted at the base of the stamens, erect, connate at the base, fleshy, dark pink or yellow, reniform, 1.9–2.2 mm long, 2–2.3 mm wide, apex spreading and sparsely crenate on margins; pollinaria 5, erect; pollinium ovoid or ellipsoid, *c.* 0.2 × *c.* 0.14 mm mm, yellow, with sub-apical germination crest, attached to the short and hyaline caudicles, laterally slightly above the base; corpusculum oblong, reddish brown. Ovary ovoid, 2–2.5 mm long, glabrous; stigma conical or pentagonal. Follicles 2, diverging, terete, 6–14 cm long, tapering towards apex. Seeds many, broadly ovate to orbicular, 8–10 mm in diam.; coma silky white.

Flowering & fruiting: Flowering from September to October and fruiting from late September to December.

Habitat: It grows in blackish-red soils of dry deciduous forests at elevations between 500–900 m.

Distribution: Endemic to South India.

Specimens examined: INDIA, **Telangana**, Nagarkurnool district, Amrabad Tiger Reserve, Lingala area, about 550 m, 03.09.2018, *B. Sadasivaiah & A. Ramakrishna* 3549 (CAL, TBGH); Amrabad Tiger Reserve, Mannanur range, Pullayapally, about 860 m, 12.12.2020, *B. Sadasivaiah & A. Ramakrishna* 4325 (TBGH); Mannanur range, Gundam base camp, about 840 m, 23.10.2021, *K. Prasad* 5253 (BSID).

Conservation status: *Heterostemma beddomei* is a narrow endemic species, hitherto known only from Kerala and doubtfully from Karnataka (Jagtap & Singh, 1999). In India, many publications focussing on threatened species do not include this species, and it has not been given any conservation status (Henry *et al.*, 1979; Jain & Sastry, 1984; Nayar & Sastry, 1987, 1988, 1990; Rao *et al.*, 2003). This species was first collected by Beddome in 1862, and the present collections are made in 2018, 2020 and 2021. The time gap between these collections

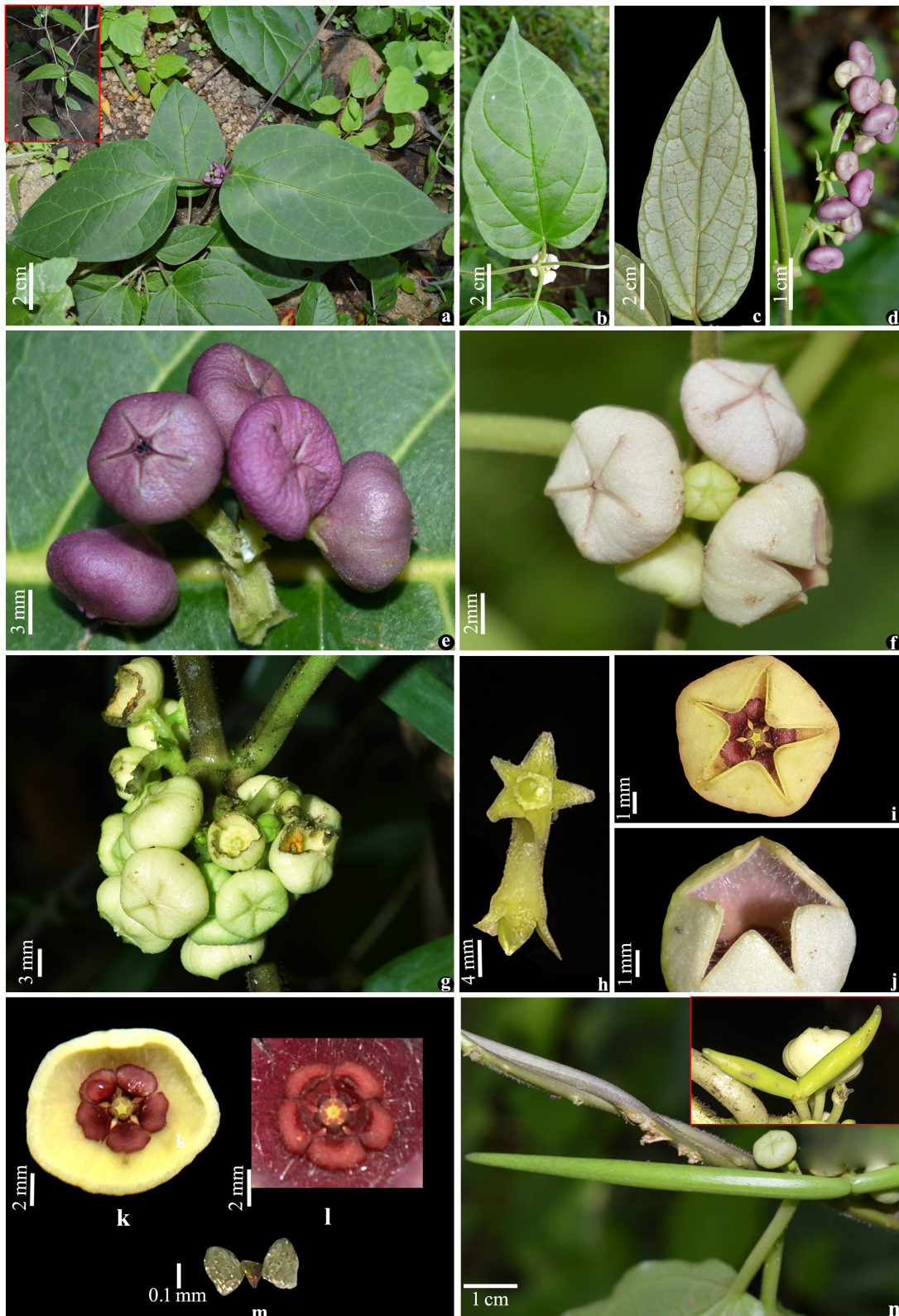


Fig. 1. *Heterostemma beddomei* (Hook.f.) Swarupan. & Mangaly: **a.** Habit; **b.** Leaf–dorsal side; **c.** Leaf–ventral side; **d.** Umbellate cymes borne along peduncle with dark pink flowers; **e.** Umbels with dark pink flowers; **f.** Umbels with whitish flowers; **g.** Umbels with yellowish-white flowers; **h.** Calyx; **i.** Corolla; **j.** Corolla showing hairs on inner surface; **k & l.** Corona; **m.** Pollinium; **n.** Follicles (from *B. Sadasivaiah & A. Ramakrishna* 3549, *B. Sadasivaiah & A. Ramakrishna* 4325 & *Prasad* 5253; photos by K. Prasad & B. Sadasivaiah).

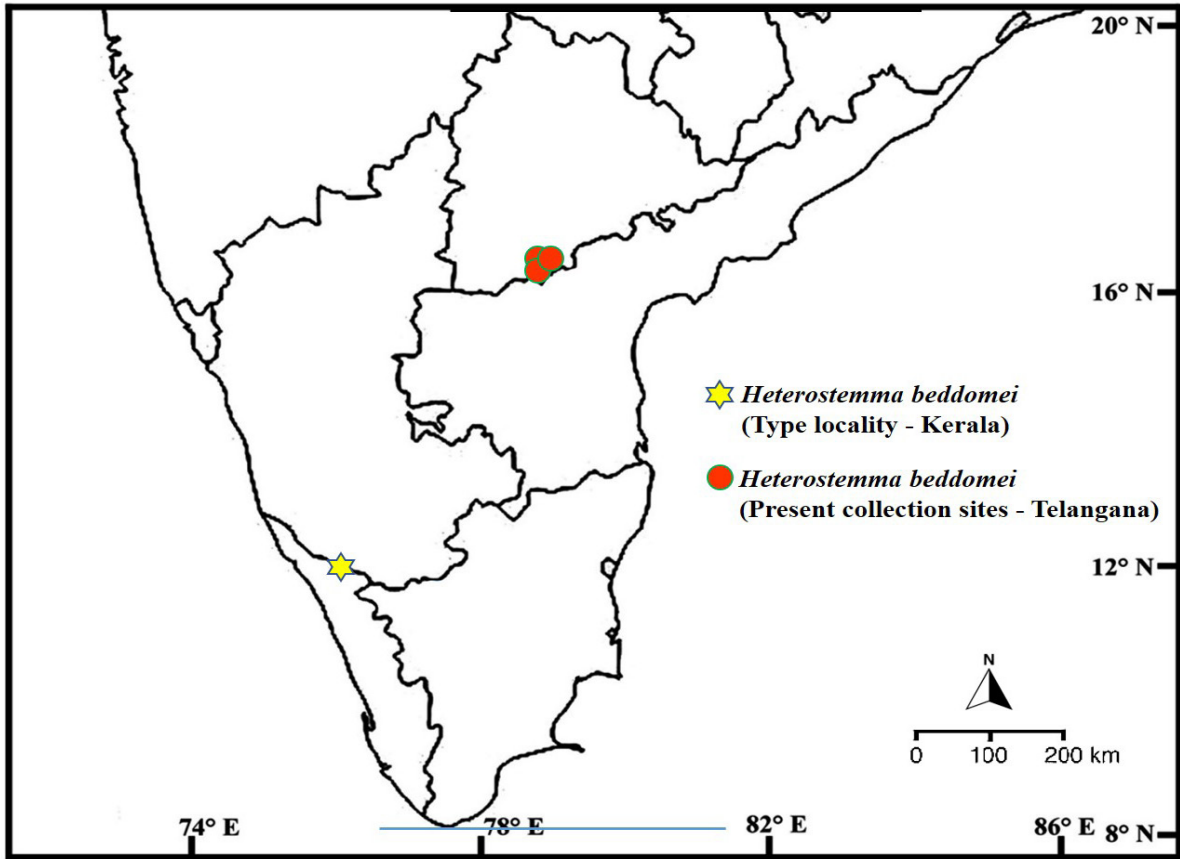


Fig. 2. Known locations of *Heterostemma beddomei* (Hook.f.) Swarupan. & Mangaly in South India (Kerala & Telangana states).

is more than 150 years from its first collection and it is now recorded in four restricted locations in the Eastern Ghats (Telangana) and Western Ghats (Kerala). In the present study, we have noticed more than 100 individuals of *Heterostemma beddomei*, occurring in three nearby locations in the Eastern Ghats of the Amrabad Tiger Reserve and further explorations in the earlier documented locations are necessary to ascertain the extend of its extant populations. Currently, as per the IUCN guidelines (IUCN, 2022), the species is assessed here as ‘Data Deficient’ (DD).

Notes: No herbarium material of *Heterostemma beddomei* exists, and the only extant original material is a drawing by Beddome (K). The drawing, which gives scanty information and does not depict all the characters, leads to misidentifications of the species. *Heterostemma beddomei* is very similar to *H. disciflorum*, having common morphological characters: twining habit, corolla lobes short and triangular without any inner appendages. However, *H. beddomei* has ovate or broadly or narrowly ovate-

lanceolate or ovate-cordate leaves with acuminate apex and cordate or obtuse base (*vs.* elliptic-oblong to ovate-oblong, sub-acute apex, sub-cordate base in *H. disciflorum*), calyx lobes ovate-lanceolate, ovate or triangular (*vs.* oblong), and corolla inner surface hairy (*vs.* glabrous).

Key to species of *Heterostemma* sect. *Oianthus* in India

- 1. Corolla discoid or depressed globose or vertically compressed globose 2
- 1. Corolla urceolate or tubular 4
- 2. Corona lobes with inner appendages
..... *H. vasudevani*
- 2. Corona lobes without inner appendages 3
- 3. Leaves ovate or broadly or narrowly ovate-lanceolate or ovate-cordate; corolla hairy inside *H. beddomei*
- 3. Leaves elliptic-oblong to ovate-oblong; corolla glabrous *H. disciflorum*

4. Corolla tubular or rarely ovoid-urceolate; corona lobes rounded at apex.....*H. deccanense*
4. Corolla perfectly urceolate; corona lobes 3-toothed at apex..... *H. urceolatum*

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