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Afrohybanthus trigonus (Violaceae: Malphigiales): New species from Tamil Nadu, India

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ABSTRACT: *Afrohybanthus trigonus*, a new species described and illustrated from the dryland area of Dindigul district, Tamil Nadu. This species resembles *Afrohybanthus enneaspermus* (L.) Flicker and *Afrohybanthus indicus* S.K.Kamble & B.J.Patil in having an unbranched, prominent, trigonus and glabrous stem, serrulate leaf margin, sepals with hairy, greenish-red midvein, globose-hirsute ovary and ellipsoidal seeds. The detailed description, along with diagnostic characters distinguishing closely allied species, conservation status, and colour photographs, is provided.

KEY WORDS: *Afrohybanthus indicus, Afrohybanthus enneaspermus*, *Hybanthus*, *Pigea*, Taxonomy.

INTRODUCTION

The family Violaceae Batsch includes 25 genera with about 1000-1100 species distributed in tropical and subtropical regions. Members of this family included herbs, shrubs, lianas and trees (Ballard, 2007; Ballard *et al*., 2014; Paula-Souza and Ballard, 2014, Marcussen *et al*., 2022; POWO, 2025). Lianas, shrubs and woody trees are distributed in the New and Old World tropics, while the herbaceous genera are distributed in temperate to montane regions of the world. This family consists of the two largest genera, viz. *Rinorea* Aubl. and *Viola* L. *Afrohybanthus* Flicker have been characterized by their long pedunculate dichasial or solitary inflorescence, unique zygomorphic corolla with the significantly longer anterior petal and differentiated into an abruptly expanded blade and claw with a saccate base, single lunate shield-like gland spanning the two bottom stamens, globose to ellipsoidal ovary, unwinged, subglobose, dark brown seeds (Wahlert *et al*., 2014; Flicker and Ballard, 2015; Forster, 2021). The recent systematic research, including morphological and molecular analysis of *Hybanthus* and *Pigea*, revealed taxonomic reinstatement of several species of *Hybanthus* to *Afrohybanthus* (Ballard *et al*., 2014; Flicker and Ballard, 2015; Forster, 2021; Govaerts *et al*., 2021; POWO, 2025). *Afrohybanthus* is distinguished from *Hybanthus* sensu stricto and the other Old World clade, the South Australian/ South Pacific *Pigea*, by their inflorescence type, corolla zygomorphy, bottom petal base, filament connation, gland number, seed per capsule, seed colour and surface (Flicker and Ballard, 2015). The members of *Afrohybanthus* are characteristically having beautifully coloured flowers and are native to Zimbabwe, Congo, Ghana, India, Australia, Sri Lanka, Namibia, New South Wales, Nigeria, Philippines, Queensland, Saudi Arabia, Yemen and Zambia (Grey-Wilson,1986; POWO, 2025). A total of 18 valid species are reported to be accepted in *Afrohybanthus* (POWO, 2025). In India, 5 species of *Afrohybanthus, A. enneaspermus* (L.) Flicker, *A. indicus* S.K.Kamble & B.J.Patil, *A. stellarioides* (Domin) Flicker, *A. travancoricus* (Bedd.) Flicker and *A. vatsavayae* (C.S.Reddy) U.B.Deshmukh (Banerjee and Pramanik, 1993; Kamble *et al*., 2014, 2016; Flicker and Ballard, 2015; Forster, 2021; Arunraj *et al*., 2024; Wahlert *et al*., 2024; POWO, 2025) have been recognized. From these, *A. travancoricus* (Bedd.) Flicker is endemic to the southern Western Ghats of Kerala and Tamil Nadu, India.

During the floristic exploration of Vedasanthur taluk of Dindigul district, Tamil Nadu, India, the authors collected a small, herbaceous *Afrohybanthus* with a prominent trigonus and glabrous stem, serrulate leaf margin, glabrous pedicel, hairy, greenish with crimson red striped sepal, hirsute ovary and ellipsoidal seeds, which have a close affinity to *A. enneaspermus* and *A. indicus*. After carefully examining the live specimens and analyzing available literature and herbarium specimens, the present collections belong to a hitherto undescribed species. Hence, the specimen collected is described here as a new species with detailed descriptions and photographs based on available living materials.

TAXONOMIC TREATMENT

Afrohybanthus trigonus Ramas., Mohanraj & Anjana, ***sp. nov.*** **Fig. 1**

TYPE: INDIA: Tamil Nadu, Dindigul District, Kanavaai, Vedachandur, 10°652177"N, 77.94716°55'12" E; 245 m elev., 26 Dec., 2024, *A. Mohanraj*, *R. Ramasubbu & K.Kalaiselvan* GUD 384 (holotype MH!, isotype GUD!)

Diagnosis: This species resembles *Afrohybanthus enneaspermus* (L.) Flicker and *A. indicus* S.K.Kamble &

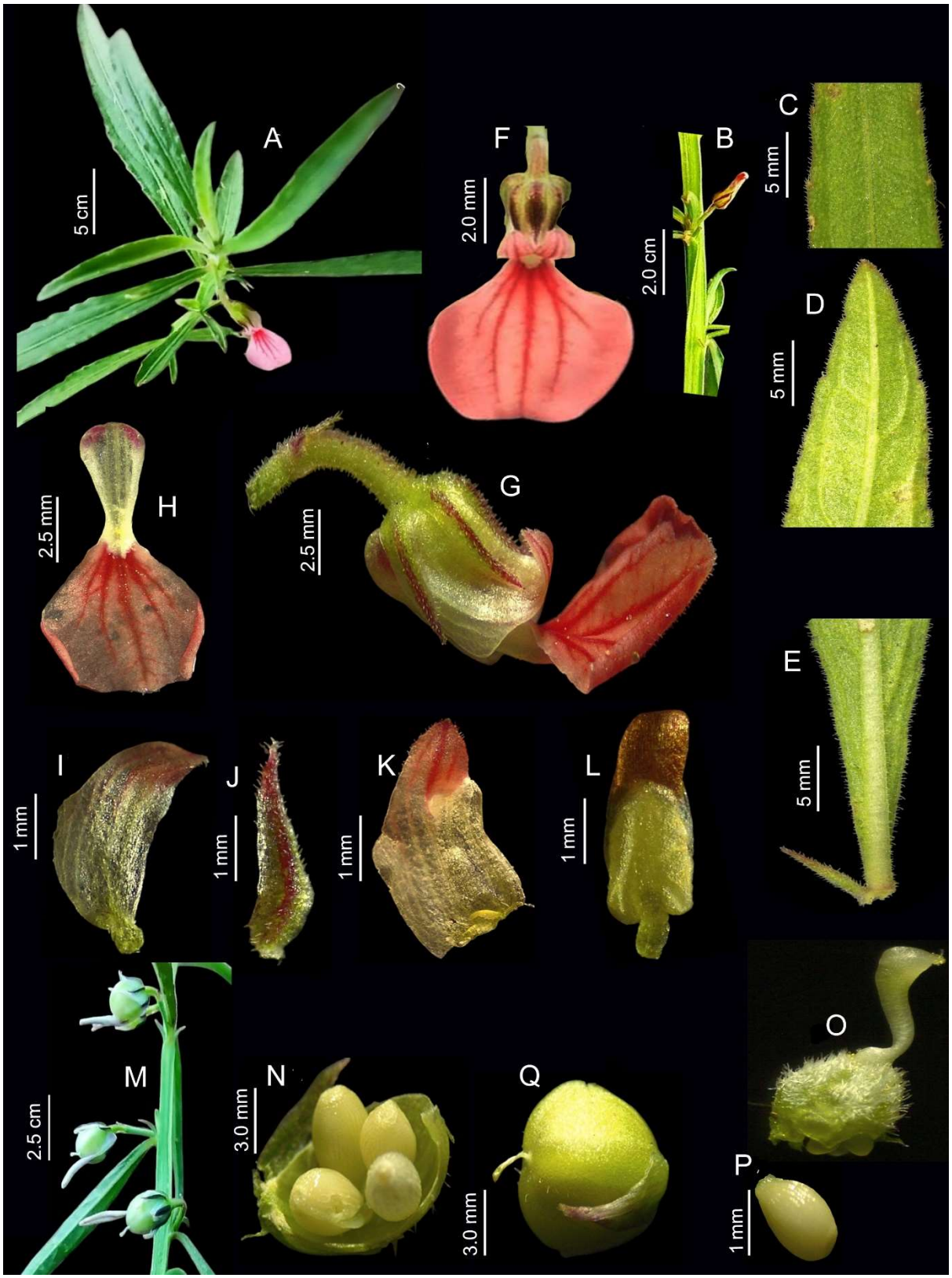

Fig. 1. ***Afrohybanthus trigonus*** Ramas., Mohanraj & Anjana **A.** Adult flowering plant; **B.** trigonus stem; **C.** upper leaf surface; **D.** lower leaf surface; **E.** leaf base with stipule; **F.** flower morphology; front view; **G.** flower morphology; lateral view; **H.** lower petal; **I.** lateral petal; **J.** sepal; **K.** upper petal; **L.** stamen; **M.** fruiting twig; **N.** capsule with fertilized ovules; **O.** hirsute ovule; **P.** capsule with scattered hirsute hairs; **Q.** seed morphology.

Table 1. Comparative vegetative and floral morphology of ***Afrohybanthus enneaspermus, A. indicus*** and ***A. trigonus***

Characters	*A. enneaspermus*	*A. indicus*	*A. trigonus* sp.nov.
Stem	Branched/unbranched, terete, subglabrous to densely pubescent	Branched/unbranched, cylindrical, grooved, pubescent	Unbranched, trigonus, glabrous
Leaf	Linear or linear-lanceolate or oblong-lanceolate, glabrous to pubescent	Linear to lanceolate, pubescent	Linear or linear-lanceolate
Leaf margin	Subentire to crenate/dentate	Entire in the lower few leaves, sparsely serrulate in upper leaves,	Serrulate
Leaf base	Cuneate base, subacute at apex	Cuneate at base, acute at apex	Attenuate at the base, acute at apex
Stipules	Linear-lanceolate to subulate, ciliate along margin, hairs not gland-tipped	triangular, pubescent, ciliate at margin, hairs not gland-tipped	triangular, sparse indumentum on both surfaces, hairs not gland-tipped
Pedicel	Filiform, c. 9 mm, glabrous/pubescent	Filiform, 5-11 mm long	Filiform, 7.3-9.1, pubescent
Sepals	5, lanceolate, subequal, acuminate, bent backwards at apex, glabrous or ciliate	5, linear-lanceolate, acuminate, hyaline, bent backwards at apex, ciliate at margin.	5, ovate-lanceolate, bent forward, opaque, greenish with long crimson strip from base to the tip, hairy, hairs not gland-tipped
Corolla tube	5, unequal, pink/ purple	5, unequal, bright orange	5, unequal, bright red or crimson
Anthers	5, filaments 2 with hairy appendages, anthers connate, glabrous	5, filaments 2 with hairy appendages, anthers connate, glabrous	5, filaments 2 with or without hairy appendages, anthers connate, glabrous
Pistil	4 mm long; style thickened towards tip, ovary globose, glabrous; ovules 6 – 9	5 mm long; stigma spathulate, sub-erect, ovary ovoid, glabrous; ovules 6–12	4 mm long, stigma enlarged, spathulate, ovary globose, pubescent; ovules 5 – 7

B.J.Patil in having an unbranched, prominent, trigonus, glabrous stem, serrulate leaf margin, and glabrous pedicel, sepals with hairy, greenish-red midvein, hirsute ovary and ellipsoidal seeds (Table 1 & Fig.1).

Annual herb, 12–21 cm high; stem dark greenish, erect, 3-angled, twisted, glabrous, base semi-woody. Leaves simple, alternate, crowded at apex, linear or linear-lanceolate, 1.5– 2.0× 0.1– 0.4 cm, attenuate at base, acute at apex, wavy with marginal tooth, ciliate at margins, main nerves and lateral nerves prominent, 8–11 pairs, prominently hirsute below; stipules prominent, triangular, 2–2.6 mm long, sparse indumentum on both surfaces, hairs subsessile, not gland-tipped. Flowers solitary, axillary; pedicel filiform, pubescent, abundant, 7.3-9.1 mm long; bracteoles, 2, triangular, 1.5–1.7 mm long, ciliate along margins. Sepals 5, linear-lanceolate, subequal, 2.3–3.3×0.3–0.5 mm, acuminate, greenish with long crimson red strip from base to the tip, keeled, hairy, hairs not gland-tipped. Petals 5, unequal; upper 2 petals oblong, 3.5–4.3 mm long, pale yellow with crimson or deep red at the tip; lateral 2 falcate, 2.3–3.1 mm long, pale yellow with crimson or deep red at the tip; lower enlarged into a spathulate limb with a claw; limb broader than long, 6–10 mm, bright red or crimson red; claw 4.0–5.3 mm long. Stamens 5, c. 3.0 mm long; filaments free; anterior 2 filaments with hairy appendages; anthers connate, glabrous; connective extended. Pistil 4.3–5.0 mm long; ovary globular, hirsute, covered by long yellowish hairs; style suberect, S-shaped; stigma enlarged, spathulate, ovules 5–7. Capsules trigonus with scattered hirsute hairs, 4–6 mm long, 3-valved, with remnant petals; seeds 4–6, ellipsoid, 2.0–2.5 mm long, longitudinally ribbed, glabrous, pale yellow.

Flowering & Fruiting: September–December (occasionally seen flowers in February).

Etymology: This species has a prominent, deep greenish triangle stem. The specific epithet is named for its trigonus stem morphology.

Distribution and ecology: *Afrohybanthus trigonus* is distributed in the Dindigul and Coimbatore districts of Tamil Nadu, India. The distributional area in Dindigul district has a tropical climate with hot summers and relatively mild winters. This area experiences a distinct monsoon season with heavy rainfall (approx. 930.7 mm), particularly during the months of June to September. Coimbatore district of Tamil Nadu has a tropical wet and dry climate with a pleasant, salubrious climate due to its impact of Palakkad Gap, a geographically unique region. The average annual temperature is recorded at around 25.4°C, and the average annual rainfall is approximately 952 mm. Coimbatore district experiences a wet season from October to December, mostly due to the northeast monsoon.

This species is distributed in dryland areas with dark brown to dark reddish-brown calcareous soils and mild to moderately alkaline soils. This species grows in association with *Indigofera* sp., *Leucas aspera* (Willd.) Link, *Mesosphaerum suaveolens* (L.) Kuntze, *Ocimum tenuiflorum* L., *Rostellularia procumbens* (L.) Nees etc. It is also collected from the agricultural fields near the type locality.

Note: In India, Reddy (2001) described *A. vatsavayae* (C.S.Reddy) U.B.Deshmukh, (=*Hybanthus vatsavayae* C.S.Reddy) with an imprecise image of a fruiting branch without a detailed description and clear illustrations in the protologue. Further, a few other researchers (Ramana *et al*., 2011; Kulkarni *et al*., 2016) have also reported *Afrohybanthus stellarioides* (Domin) Flicker (=*Hybanthus enneaspermus* var. *stellarioides* Domin) from India based on the collections from Andhra Pradesh, Maharashtra and Karnataka of India.

Conservation status: *Afrohybanthus trigonus* is

preliminarily assessed as Endangered in accordance with the IUCN guidelines (IUCN, 2026). The extent of occurrence of this species has been assessed as about 168.662 km, and the area of occupancy was recorded as about 16 km^2 with about >350 individuals. Currently, there are no threats to the habitat recorded.

Key to the species of ***Afrohybanthus*** in India (as per POWO, 2025)

1a. Plant grows as shrub, ≥1m tall ……..… ***A. travancoricus***
1b. Plant grows as herb, ≤ 1 m tall ……..…… 2
2a. Stem trigonus ……..……. ***A. trigonus***
2b. Stem cylindrical ……..…….. 3
3a. Pedicel ≤ 2mm ……..…….. ***A. indicus***
3b. Pedicel ≥ 2mm ……..…….. 4
4a. Sepals yellow, petals shorter than sepals, caduceus …… …….. ***A. vatsavayae***
4b. Sepals greenish, petals longer than sepals, persistent ….. 5
5a. Leaf margin toothed ……... ***A. stellarioides***
5b. Leaf margin not toothed …… ***A. enneaspermus***

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