

***BRACHYSTELMA CILIATUM* (APOCYNACEAE): A NEW RECORD FOR EASTERN GHATS OF ANDHRA PRADESH, INDIA**

RAJA KULLAYISWAMY, S. SANDHYA RANI AND T. PULLAIAH*

Department of Botany, Sri Krishnadevaraya University

Anantapur - 515 003, Andhra Pradesh, India.

**E-mail: pullaiah.thammineni@gmail.com*

Brachystelma R. Br. (Apocynaceae: Asclepiadoideae - Ceropegieae) is an Afro-Asiatic genus, chiefly distributed in South Africa (69 species), South-East Asia and Australia. The genus is represented by 130 species (Meve, 2002, Bruyns, 2009). It has never been revised over its entire geographic range, but Boele & al., (1987) listed 111 species in their checklist and a further 20 species have been described or added ever since. In India, seventeen species (Karthikeyan & al., 2009) are known to occur of which eleven are endemic to India. Seven species of *Brachystelma* were reported from British India (Hooker, 1885). Six species were recorded in Flora of Presidency of Madras (Gamble, 1923). Two species were reported from Andhra Pradesh, *B. glabrum* Hook.f. and *B. volubile* Hook.f. (Pullaiah & Moulali, 1997). Three species of *Brachystelma* were reported from Eastern Ghats - *B. brevitybulatum* (Bedd.) Gamble, *B. glabrum* Hook.f. and *B. volubile* Hook.f. (Pullaiah & al., 2011). *Brachystelma swarupa* (Kishore Kumar & Goyder, 2001) from Karnataka and *Brachystelma pullaiahii* (Rao & al., 2011) from Andhra Pradesh, were added to the list of Indian subcontinent and list of endemic species to south India.

Brachystelma species are mostly small geophytic herbs with compressed, more or less prolate stem tubers inhabiting well-drained grassy slopes or woodlands with soils rich in gravel. These tuberous herbs are often overlooked due to their slender habit and inconspicuous shoots and flowers (Char, 1978).

Most of the species of *Brachystelma* are poorly represented in herbaria, patchily distributed small populations are imperfectly known for taxonomists and their distribution uncertain, consequently most species have been categorized as 'rare' and 'threatened' (Henry & al., 1978, Arekal & Ramakrishna, 1981).

While exploring Thummalapalle Uranium Mining Area, the authors collected plant specimens which later turned out to be *Brachystelma ciliatum* Arekal & Ramakrishna. This is the first report from Eastern Ghats of Andhra Pradesh. A detailed description bracketed key, photographs and illustrations are given here for easy identification (Fig. 1 & Pl. 1)

Key to the related species

- 1a. Flowers 24 - 28 in axillary umbels, initially appearing pedunculate, later flowers are pushed aside by the actively growing main stem and mature 3-4 flowers at a time, sepals 1 mm, corolla glabrous, spotted purplish-brown, ciliate near the rim, corona grooves hairy outside, margin ciliate*B. swarupa*
- 1b. Flowers 4 at each node, axillary, not appearing as above, all flowers mature at a time, sepals 0.5 - 2mm, corolla puberulous or ciliate at apex, corona glabrous(2)
- 2a. Leaves scaly, to 0.5mm, calyx 2mm, corolla puberulous*B. laevigatum*
- 2b. Leaves linear-lanceolate, to 9cm, calyx 0.5mm, corolla ciliate at apex*B. ciliatum*

Brachystelma ciliatum Arekal & Ramakrishna in Curr. Sci. 50 (3): 145 - 146: 1981; Albers & Meve, Ill. Handb. Succ. Pl. (Asclepiadaceae) 2: 30. 2002.

Perennial tuberous herb, tuber brown, subglobose-globose, 4cm across and dorsiventrally compressed, 5.6 × 5.6 × 1.5cm. Shoot erect, up to 30 - 35cm, 1.5 - 2mm in dia., rarely branched, purplish, pubescent, buried part of stem 3 - 4cm, white, glabrous. Leaf scales opposite, 3 - 4 pairs from the base, ovate, c.3 × 2mm, brown puberulent, sessile; leaves opposite is middle of the shoot, 4 - 5 pairs, linear, linear - lanceolate, 5 - 9 × 0.2 - 0.3cm,

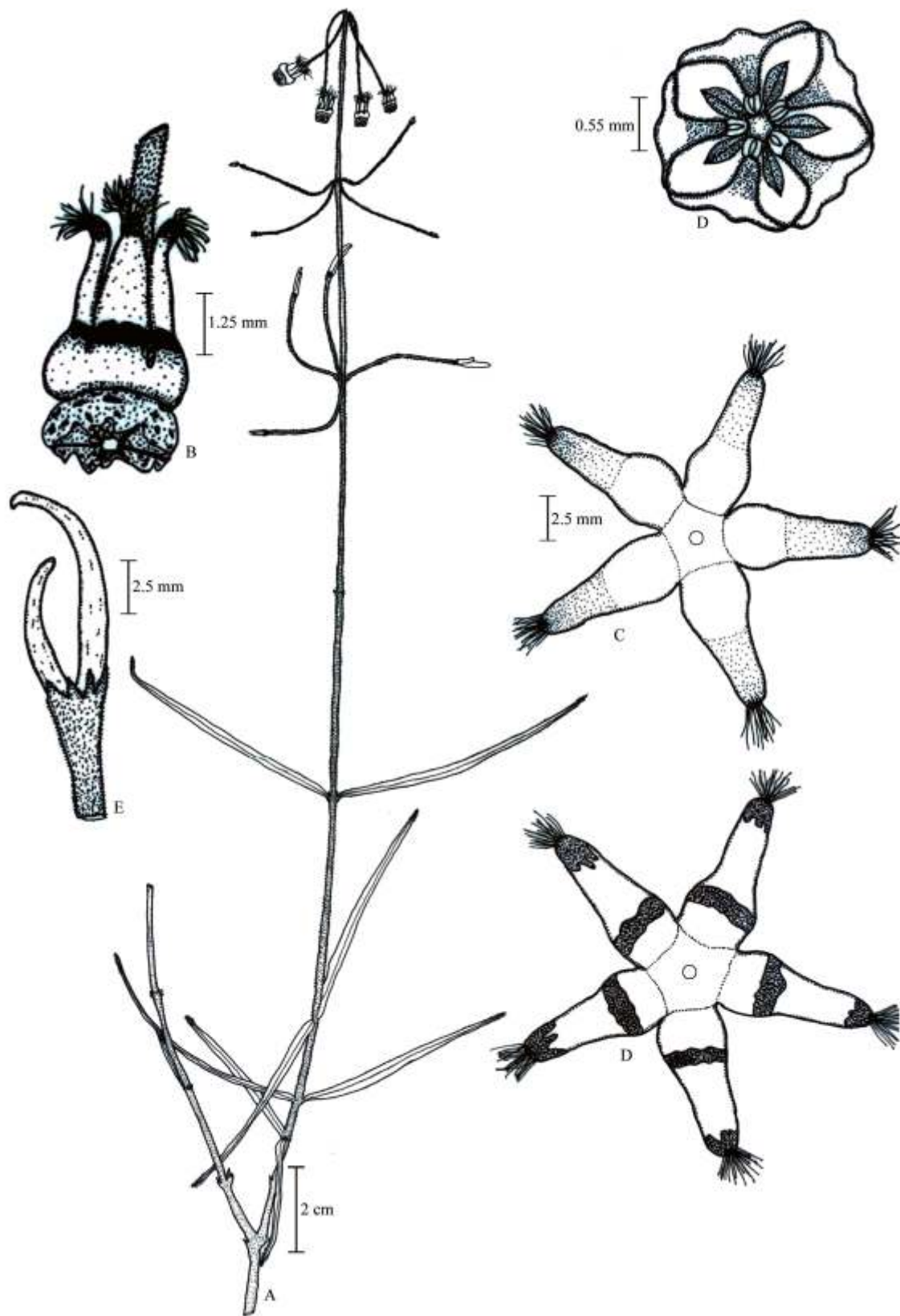


Fig. 1 : *Brachystelma ciliatum* Arekal & Ramakrishna; **A.** Habit, **B.** Flower, **C.** Corolla dorsal view, **D.** Corolla ventral view, **E.** Corona, **F.** Young fruit.



Plate 1 : *Brachystelma ciliatum* Arekal & Ramakrishna; **A.** Habit, **B.** Flower, **C.** Habit with association, **D & E.** Foliar glands, **F.** Young fruit, **G.** Mature fruit, **H.** Persistent fruit layers, **I & J.** Seeds, **K.** Deltoid scales on shoot base, **L & M.** Tubers.

nerves 9 - 12 pairs when young, semi succulent, brown, midrib pubescent beneath, margins entire, acute at base, acuminate at apex, pubescent, sessile with 2 - 3 ovate glands at base, green-pink; epidermal hairs unicellular. Flowers axillary, in 4-flowered umbels, pendulous; pedicels filiform, 3.38 - 3.81 cm long, pubescent, stout and erect in fruits; bracts 4 at each node, each c. 1 mm, ovate, pubescent. Calyx 5-lobed, minute, c. 0.5 mm, connate at base, ovate, pubescent. Corolla 5-lobed, connate at base, lobes oblong to ovate, c. 5×2 mm, glabrous, narrowing at apex with 2 mm long shiny cilia, greenish-yellow, dark pink at apex and middle; tube c. 1 mm long, lobes reflexed when mature. Corona 2 whorled; outer whorl 5-lobed, c. 2.5 mm across, cupular, thin, glabrous, dark pink dotted, 10-lobed at margin; inner whorl 5-lobed, alternate with stamens, ovate - oblong, extended to staminal column; staminal column 5-lobed, yellow, elliptic, winged. Stigma light greenish-yellow, pentagonal, truncate, minute, sticky; pollinarium yellow, 60 μ m across, erect; corpusculum brown. Follicles 1 - 2, linear-lanceolate, $7 - 8 \times 0.2 - 0.3$ cm, light reddish brown, glabrous, unequal, curved at apex when young, acuminate and stronger when mature; seeds 8 - 12, brown, ovate, $7 - 8 \times 2 - 25$ mm, thin; coma white, 2 - 2.5 cm long.

Note : *Brachystelma ciliatum* merged with grasses in vegetative and immature fruit stage. The plant can be recognized easily in the field in flower and in fruit particularly in dehiscence. Leaves lanceolate, glabrous, $5 - 9 \times 0.4 - 0.6$ cm, lateral nerves appeared clearly in gardens. Stomata: Anomocytic stomata, guard cells 5 μ m length, subsidiary cells 4 - 5. Trichomes unicellular or multicellular uni-seriate.

Distribution : Nigidi forest, Thalupula mandal, Anantapur district, Andhra Pradesh; Sonnipally, Kolar District, Karnataka, India. Flowering September, fruiting October.

Habitat : Associated with *Ophioglossum gramineum*, *Heteropogon* sp., *Chrysopogon* sp., etc. in sandy moist places of dry deciduous forests. First author collected 9 tubers with help of local hunter out of 68 individuals in 3 sq. km study area. It occurs only in Nigidi forest in Anantapur district.

Conservation status : As per IUCN Red list (IUCN 2001); it is Vulnerable VU, D 1+2. The extent of occurrence of the species is estimated to be less than 3 sq km that too, in a severely fragmented and degraded habitat while the number of individuals are less than a thousand. The tubers are favored food of several wild animal and this pressure poses a real threat to the species.

Specimens examined : India, Eastern Ghats; Andhra Pradesh, Anantapur, near Kadiri, Thalupula mandal, Nigidi forest, $14^{\circ} 13' 44.5''$ N, $78^{\circ} 11' 56.7''$ 679 m a.s.l, 14.09.2012 *Raja Kullayiswamy* 41870 A - D (SKU, MH & CAL)

Uses : Tuber locally called *Wootakunimmat gadda*, edible and it had been used in preparation of curries, slightly bitter, potato taste when boiled. Local people eat tubers of all species of *Ceropegia* and *Brachystelma* including *Brachystelma ciliatum*.

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REFERENCES

- AREKAL, G. D. AND T. M. RAMAKRISHNA. 1981. A new species of *Brachystelma* (Asclepiadaceae) from India. *Curr. Sci.* 50 (3): 145 - 146.
- BOELE, C., A. C. J. KROESEN AND F. K. A. NOLTEE. 1987. Checklist of *Brachystelma* R. Br., *Ceropegia* L., *Riocreuxia* Decne. and the genera of the Stapelieae s.s. (Asclepiadaceae). International Asclepiad Society.
- BRUYNIS, P. V. 2009. Three new species of *Brachystelma* (Apocynaceae, Asclepiadoideae, Ceropegieae) from South Tropical and Southern Africa. *Novon* 19: 18 - 22.
- CHAR, M. B. S. 1978. A new species of *Brachystelma* R. Br. (Asclepiadaceae) from India. *Curr. Sci.* 47 (24): 965 - 966.
- GAMBLE, J. S. 1923. Flora of the Presidency of Madras. Botanical Survey of India, Calcutta. 2 (v): 851.

- HENRY, A. N., K. VIVEKANANTHAN AND N. C. NAIR. 1978. Rare and threatened flowering plants of South India. *J. Bombay Nat. Hist. Soc.* 75 (3): 684 - 697.
- HOOKE, J. D. 1885. The Flora of British India. 4: 64 - 66. London.
- IUCN 2001. *IUCN Red List Categories*. Prepared by the IUCN Species Survival Commission. IUCN, Gland, Switzerland. <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria>.
- KARTHIKEYAN, S., M. SANJAPPA AND S. MOORTHY. 2009. Asclepiadaceae. Flowering Plants of India: Dicotyledons. 1: 157-184. Botanical Survey of India, Kolkata, India.
- KISHORE KUMAR, K. AND D. J. GOYDER. 2001. *Brachystelma swarupa* (Apocynaceae): a new species from India. *Kew Bull.* 56: 209 - 216.
- MEVE, U. 2002. *Brachystelma*. In: Albers, F. and U. Meve (eds), Illustrated Handbook of Succulent Plants: Asclepiadaceae. 20-46. Springer-Verlag Berlin.
- PULLAIAH, T. AND D. ALI MOULALI. 1997. Flora of Andhra Pradesh (India). 2: 581. Scientific Publishers, Jodhpur.
- PULLAIAH, T., S. SANDHYA RANI AND S. KARUPPUSAMY. 2011. Flora of Eastern Ghats. 4: 90 - 91. Regency Publications, New Delhi.
- RAVI PRASAD RAO, B., K. PRASAD, B. SADASIVAIAH, S. KHADAR BASHA, M.V. SURESH BABU AND P.V. PRASANNA. 2011. A New Species of *Brachystelma* R.Br. (Apocynaceae: Asclepiadoideae - Ceropegieae) from India. *Taiwania* 56(3): 223-226.