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Research Article



Recollection of *Trigonostemon viridissimus* var. *chatterjii* (Deb & G.K.Deka) N. P. Balakr. & Chakrab. (Euphorbiaceae) from Meghalaya, India and its conservation status

Anupam Das Talukdar², H.A. Barbhuiya¹, *Dilip Kr. Roy¹, Manabendra Dutta Choudhury², and Bipin Kr. Sinha³

¹Botanical Survey of India, Eastern Regional Centre, Shillong – 793 003, Meghalaya, India

²Department of Life Science & Bioinformatics, Assam University, Silchar-788 011, India

³Industrial Section, Indian Museum, Botanical Survey of India, Kolkata- 700016, India

*dilipbsierc@gmail.com

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Abstract

A rare and endemic variety of *Trigonostemon viridissimus* (Kurz) Airy Shaw is re-collected after 70 years from South Garo Hills district of Meghalaya, India. The field assessment ascertained that the occurrence and population status of this endemic taxon is very rare and low due to continuous decline in area of occupancy for habitat loss as because of various anthropogenic interferences such as primitive method of shifting cultivation called “Jhum cultivation” or “slash-and-burn cultivation”, mining activities, over exploitation of natural resources in the state of Meghalaya. For conservation perception IUCN status of the taxon has been evaluated and a detailed taxonomic description along with photographic illustration is given for easy identification.

INTRODUCTION

The family Euphorbiaceae is represented by 322 genera and 8900 species broadly distributed throughout the world, primarily in the tropics and subtropics, but more poorly represented in temperate regions. In India the family is represented by 70 genera and ca. 410 species (Chakrabarty and Balakrishnan, 2012). The genus *Trigonostemon* Blume is comprises ca. 84 species (The Plant List, 2015) and is distributed throughout tropical Asia and extended up to Southwest Pacific Islands. In India the genus is represented by 7 taxa viz. *T. aurantiacus* (Kurz ex Teijsm. & Binn.) Boetl., *T. nemoralis* Thwaites, *T. semperflorens* (Roxb.) Mull. Arg., *T. villosus* Hook. f. var. *nicobaricus* (Chakrab.) N.P. Balak. & Chakrab., *T. viridissimus*

(Kurz) Airy Shaw var. *viridissimus*, *T. viridissimus* (Kurz) Airy Shaw var. *chatterjii* (Deb & G.K. Deka) Chakrab. & N.P. Balakr., *T. viridissimus* (Kurz) Airy Shaw var. *confertifolius* N.P. Balakr. & N.G. Nair (Chakrabarty and Balakrishnan, 2012). *T. viridissimus* var. *chatterjii* (Deb & G.K.Deka) N.P.Balakr. & Chakrab. was described for the first time by Deb and Deka (1965) as *T. chatterjii* Deb & G.K.Deka, on the basis of a collection made in 1943 by G.K. Deka from Dawki area located in Jaintia Hills District of Meghalaya. Later Balakrishnan & Chakrabarty (1984) reduced the species to a variety of *T. viridissimus* (Kurz) Airy Shaw. The variety *chatterjii* differs from its type variety in having narrow elliptic-lanceolate, serrated, pubescent leaves, with long caudate acuminate apex

tomentose inflorescence and hirsute calyx segments. Whereas in type variety leaves are larger, ovate-lanceolate, entire, glabrous, shortly acuminate at apex, moreover inflorescence and flowers are completely glabrous [see *S. Kurz s.n.* (K-000246872)]. It is worthwhile to mention here that Balakrishnan and Chakrabarty (1984) have separated the var. *chatterjii* from var. *viridissimus* on the basis of filament type only, i.e. free filament in the former and connate in the latter. Subsequent workers viz. Joseph (1982), Balakrishnan (1981-1983), Haridasan and Rao (1985-1987) were unable to locate and recollect this endemic taxon elsewhere in the state of Meghalaya or from any other adjacent North-East Indian states.

MATERIALS AND METHODS

During the through field exploration from 2012 to 2014 in South Garo Hills district of Meghalaya, one of us (DKR) collected two samples of *Trigonostemon* sp. from core zone of the Balpakram National Park (Narong Chiring-Khundol Gup, 350 m, 25°14'32.09" N & 090°52'16.3" E), where few populations of this taxon are surviving in semi-evergreen forest. After critical examination of the collected specimens and consultation with authentic herbarium materials deposited at ASSAM, the taxonomic identity of taxon revealed as *T. viridissimus* var. *chatterjii*. Therefore, present collection not only comprises second authentic report of this endemic taxon after a lapse of seven decades but also extends its distributional range from Jaintia Hills to Garo Hills of Meghalaya. The conservation status of this endemic taxon has been evaluated based on IUCN Red List Categories and Criteria (IUCN, 2001).

RESULTS AND DISCUSSION

Taxonomic treatment

Trigonostemon viridissimus var. *chatterjii* (Deb & G.K.Deka) N.P.Balacr. & Chakrab., J. Econ. Taxon. Bot. 5: 967. 1984 & in Fl. India 23: 268. 2012. *Trigonostemon chatterjii* Deb & G.K.Deka, Indian Forester 91: 577. 1965. *Type*: Meghalaya, Jaintia Hills, Dawki, 04.05.1943, G.K. Deka 19A-E (holotype: CAL!; isotype: ASSAM!).

A shrub; branches woody terete, tubercled; young stems with several ridges and furrows, pubescent. Leaves simple, alternate, petiolate; younger ones pubescent along the nerves on dorsal surface, matured ones slightly sub-glabrous; petiole 1–4.5 cm, geniculate; lamina elliptic-lanceolate, 6–22.5 × 2.5–6.5 cm, margin distantly serrulate, less

towards base, light green above, pinkish underside, cuneate or oblique at the base, long caudate-acuminate at apex, cauda 1–3 cm long; veins pinnate, reticulate, distinctly trinerved at base; lateral nerves 4–5 on either half, alternate except the basal pair. Inflorescence axillary or terminal, paniculate up to 12 cm long, tomentose. Peduncle filiform 1.2–4 cm long. Flower unisexual, monoecious, bracteate. Bracts linear hairy. Male flowers small, about 3 mm in diameter, pedicellate. Pedicel 3–5 mm long, slender, hairy. Sepals 5 united at the base, deltoid, ca. 1.5 × 1.2 mm, imbricate, hirsute outside, glabrous within. Petals 5, ovate, 2.8–3 × 1.8–2 mm, imbricate, yellow. Disk cupuliform, slightly lobed, 5–6 mm high. Stamens 3, filaments forming a very short column, with free spreading tips; anthers 3, each two lobed, ca. 8 × 9 mm; lobes two locular. Female flowers pedicellate; pedicel 5–8 mm long, stout, gradually thickened towards apex. Sepals 5, free, imbricate, deltoid 1.8–2 × 1.3–1.5 mm, hirsute outside, glabrous within, apex acute. Petals 5, free, imbricate, obovate, 4.5–5 × 3–4 mm, cuneate at base, apex obtuse or truncate. Disk cupuliform slightly lobed. Ovary 3 loculed, one ovule in each locule. Style ca. 2–3 mm long, trifid; lobes ca. 1 mm long, recurved usually at 90° angle. Stigma short, horseshoe shaped. Fruit a capsule, globose.

Specimen examined: India, Meghalaya, South Garo Hills district, Balpakram National Park (Narong Chiring-Khundol Gup), 350 m, 25°14'32.09" N & 090°52'16.3" E, D.K. Roy 11.03.2013, 129632 (ASSAM).

Habitat: Growing on rocky hill slopes in semi-evergreen forests of Meghalaya. Some of the associated species are *Aesculus assamica* Griff., *Atalantia simplicifolia* (Roxb.) Engl., *Eranthemum suffruticosum* Roxb., *Eurya japonica* Thunb., *Gymnostachyum venustum* (Nees) T.Anderson, *Memecylon celastrinum* Kurz, *Neolitsea umbrosa* (Nees) Gamble, *Sabia limoniacea* Wall. ex Hook. f. & Thomson, etc.

Distribution: India: Meghalaya (Dawki, Jaintia Hills and Balpakram National Park, South Garo Hills). Endemic.

Conservation status

T. viridissimus var. *chatterjii* (Deb & G.K.Deka) N.P.Balacr. & Chakrab. was previously not listed in the IUCN red list category, in Red Data Book of Indian flowering plants or in the scheduled category of plants in the Indian Wild Life Protection Act 1972, may be due to lack of proper and ample information regarding the taxon.



Fig.1: *Trigonostemon viridissimus* var. *chatterjii* (Deb & G.K.Deka) N.P.Balacr. & Chakrab. A. A portion of the branch with inflorescence; B. A portion of leaf and inflorescence magnified. C-F. Male flower: C. Male flower without corolla; D-E. Male flower showing calyx and androecium; F. Petals. G-M. Female flower: G. A portion of the inflorescence showing female flower; H. Top view of the flower showing petals; I: Sepals; J. Gynoecium; K. Cupular disk; L-M. T.S. of ovary.



Fig.2. Isotype of *Trigonostemon viridissimus* var. *chatterjii* (Deb & G.K.Deka) N.P.Balakr. & Chakrab. [G.K. Deka 19E (ASSAM)].

During present field explorations all the localities were thoroughly surveyed and distribution of the taxon was plotted by using Google Earth. The Area of Occupancy (A.O.O) was worked out by using the software GE Path v. 1.4.6 (Sgrillo, 2012). The total A.O.O. is calculated to be ca. 550 km² (Criteria VU B2<2, 000 km²) and there is a continuous decline in area of occupancy due to habitat loss as because of various anthropogenic interferences such as primitive method of shifting cultivation called “Jhum cultivation” or “slash-and-burn cultivation”, mining activities, over exploitation of natural resources etc. which are prevalent in the area (Criteria VU B2b(ii)). The population size is estimated to number fewer than 1000 mature individuals (Criteria VU D1). Hence, following the IUCN Red List Categories and Criteria (IUCN, 2001), this taxon may be classified as Vulnerable (VU).

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REFERENCES

- Balakrishnan NP, 1981-1983.** *Flora of Jowai and Vicinity, Meghalaya*. Vol. 1 & 2. Botanical Survey of India, Howrah.
- Balakrishnan NP and Chakrabarty T, 1984.** Notes on *Trigonostemon chatterjii* Deb et Deka (Euphorbiaceae). *J. Econ. Taxon. Bot.*, 5(4): 967.
- Chakrabarty T & Balakrishnan NP, 2012.** Crotonoideae– In: Balakrishnan NP, Chakrabarty T, Sanjappa M, Lakshminarsimhan P and Singh P (Eds.), *Flora of India*. Vol. 23. Botanical Survey of India, Kolkata. Pp. 203-269.
- Deb DB and Deka GK, 1965.** A new species of *Trigonostemon* Blume from the Khasi Hills. *Indian Forester*. 91: 577-580.
- Haridasan K and Rao RR, 1985-1987.** *Forest Flora of Meghalaya*, Vol. 1 & 2. Bishen Singh Mahendra Pal Singh, Dehradun.
- IUCN, 2001.** IUCN Red List categories. Version 3.1. Prepared by the IUCN Species Survival Commission. World Conservation Union, Gland, Switzerland and Cambridge, United Kingdom. (<http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria>).
- Joseph J, 1982.** *Flora of Nongpoh & its Vicinity*. Forests Deptt. of Meghalaya, Shillong.
- Sgrillo R, 2012.** GE-Path: Make Path for Google Earth v 1.4.6. Ricardo Sgrillo, Cocoa Research Center (CEPLAC/CEPEC), Ilheus, Bahia, Brasil. Available from <http://www.sgrillo.net/googleearth/gepath.htm> (accessed on 17th March 2015).
- The Plant List, 2015.** Available at: www.theplantlist.org. [accessed on 22 February 2015]

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