

Trigonostemon (Euphorbiaceae): A new generic record for the Flora of Bhutan

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Abstract: *Trigonostemon* Blume (Euphorbiaceae: Crotonoideae) is reported here as a new generic record for the Flora of Bhutan with the collection of *Trigonostemon eberhardtii* Gagnep. This study shows that the distribution range of the genus *Trigonostemon* can be extended to Bhutan. Detailed morphological description, habitat of the species and photographs are provided.

Key words: Bhutan, connate stamens, Euphorbiaceae, extended distribution, new generic record, *Trigonostemon*.

Introduction

Trigonostemon Blume is a genus in the subfamily Crotonoideae Burmeist. of family Euphorbiaceae (Wurdack *et al.*, 2005) comprising 59 species (Yu, 1989, Yu & Van Welzen, 2020; POWO, 2024) and distributed mainly in tropical Asia, extending from India and Sri Lanka to New Guinea (Balakrishnan & Chakrabarty, 1991; Li *et al.*, 2006; Mabberley, 2017; Yu & Van Welzen, 2020). A comprehensive study of the genus by Balakrishnan and Chakrabarty (1991), recorded 13 species in the Indian subcontinent. Yu and Van Welzen (2020) revised the genus outside Malasia and reported 32 species from the Indian subcontinent, China, Thailand, Indochina, NE Australia, and New Caledonia.

During a field trip to the Balwani region of Tsirang, Bhutan, in May 2023, the first author collected a

flowering shrub with three connate stamens along a riverbank, growing on a limestone outcrop. The collected species was identified as a member of Euphorbiaceae with the help of Flora of Bhutan (Long, 1987) which enumerated 34 genera in the family, but the plant could not be assigned to any genus. After critical morphological examination of the voucher specimens in consultation with relevant literature and examination of herbarium collections housed at E, K, L, and P, the plant was identified as *Trigonostemon eberhardtii* Gagnep. belonging to sect. *Tylosepalum*.

Materials & Methods

Plant specimens were gathered by the first author during a field survey along the riverbank of a limestone outcrop at Balwani, Tsirang, between April and May 2023. Voucher specimens were deposited at THIM. The specimens were identified through morphological investigations, relevant literature (Blume, 1825; Balakrishnan & Chakrabarty, 1991; Yu *et al.*, 2019; Yu & Van Welzen, 2020), and consultation of herbarium collections at E, K, L, and P via virtual databases.

Taxonomic Treatment

Trigonostemon eberhardtii Gagnep., Bull. Soc. Bot. France 69: 749. 1923. *Lectotype* (designated by Yu & Van Welzen, 2020): VIETNAM, Annam, Thanh-hoa, Bon 5239 [P00717103 digital image!].

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Fig. 1



Fig. 1. Image of a specimen of *Trigonostemon eberhardtii* Gagnep. deposited at the herbarium of Ugyen Wangchuck Institute for Forestry Research and Training.

Shrubs, 1–5 m tall; bark dark to pale-brown or greyish brown. Stipules subulate, 0.3–0.7 mm long, caducous. Leaves, alternate; petiole terete, grooved or flat above, up to 5 cm long, glabrous or pubescent; lamina elliptic, 5–21 × 2–10 cm, chartaceous, base acute-cuneate, two adaxial glands present, margin entire or very distantly crenulate, apex acuminate to caudate, upper surface glabrous, dark green, lower surface sparsely pubescent along veins, pale green;



Fig. 2. Map showing the distribution of *Trigonostemon eberhardtii* Gagnep. in Bhutan.

venation tri-nerved from the base, midrib slightly raised above and distinctively elevated beneath, other secondary veins 4–7 pairs, convergent, tertiary veins scalariform, veinlets reticulate. Inflorescences bisexual, terminal or axillary, paniculate; main axis terete, up to 20 cm long, pubescent to glabrous; bracts linear to lanceolate to triangular, 0.7–2.7 × 0.3–0.6 mm, pubescent outside; bracteoles linear to lanceolate, 0.4–0.7 × 0.1–0.2 mm, densely pubescent. Inflorescences bisexual, terminal or axillary, paniculate; main axis terete, up to 30 cm long, pubescent to glabrous; bracts linear to lanceolate to triangular, c. 0.7 × 0.6 mm, pubescent outside, bracteoles linear to lanceolate, 0.4–0.7 × 0.1–0.2 mm, densely pubescent. Staminate flowers 6–8 mm in diam.; pedicels c. 2 cm long, glabrous; sepals elliptic, c. 6 mm long, base connate, margin entire, apex acute, pubescent outside; petals obovate, c. 5 × 5 mm, contort, white, lower part cuneately narrowed, apex rounded, glabrous; stamens 3, stamen c. 1.5 mm long, white, filament free part c. 0.2 mm long. Pistillate flowers 1 cm in diam.; buds conical; pedicels slightly thickened toward apex, c. 9 mm long, glabrescent; sepals elliptic c. 9 mm long, accrescent in fruit; petals as in staminate flowers; ovary 1 mm in diam., glabrous, green, style 0.1–0.2 mm long, stigmas 0.8–1.1 mm long, bent outward, white, apically slightly thickened and slightly bifid. Fruits c. 18 mm in diam., greenish, glabrous, pedicel up to 2 cm long.

Flowering & fruiting: Flowering and fruiting from March to December.

Habitat & ecology: The species in Bhutan is found along riverbanks in silty-loamy soil associated with limestone outcrops in subtropical forests. Associated plant species include *Crateva religiosa* G. Forst., *Flueggea virosa* (Roxb. ex Willd.) Royle, *Clerodendrum infortunatum* L., *Bergera koenigii* L., and *Litsea* sp.

Distribution: China, Thailand, Laos, Cambodia, Vietnam and now in Bhutan.

Specimen examined: BHUTAN, **Tsirang**, Balwani, N 26° 54' 43.191" E 90° 1' 56.154", 203 m, 14.05.2023 Sangay Wangchuk SN01080 (THIM [15871]); *ibid.*, 14.05.2023, Sangay Wangchuk SN0592 (The Ugyen Wangchuck Institute for Forestry Research and Training Herbarium).

Notes: This is a new generic and species record for the Flora of Bhutan, and the distribution extension of the genus *Trigonostemon* till the foothills of the Himalayas. The genus can be easily distinguished from the other members of the subfamily Crotonoideae by its bright, colourful petals, as suggested by Balakrishnan and Chakrabarty (1991), and by its 3 or 5 connate stamens (Yu, 1989). Morphologically, *T. eberhardtii* resembles *T. viridissimus* (Kurz) Airy Shaw, but it can be differentiated through its monopodial inflorescence branching pattern, white petals, and indistinctive style (Yu & Van Welzen, 2020).

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