

RESEARCH ARTICLE

REDISCOVERY OF AN ESCAPED TAXON, *CERATOSTIGMA GRIFFITHII* (PLUMBAGINACEAE), FROM WILD HABITAT AFTER A GAP OF 90 YEARS FROM ARUNACHAL PRADESH, INDIA

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Abstract: *Ceratostigma griffithii* C.B. Clarke (Plumbaginaceae) is recorded from India after a gap of 90 years from wild habitat. The species has also been assessed as "Vulnerable" by applying the IUCN criteria B. A detailed description along with a color photo plate of the species and its dissected flower parts is provided here to facilitate the identification of the species.

Keywords: Arunachal Pradesh, *Ceratostigma*, Vulnerable, *Plumbagineae*, recollection, Tawang

INTRODUCTION

Ceratostigma Bunge is a tiny genus in the *Plumbagineae* tribe (Plumbaginaceae), with seven species scattered over tropical East Africa and East Asia (Peng, *et al.*, 1996; POWO, 2026). Most members of this genus are grown as ornamental garden plants due to their striking appearance. *Ceratostigma griffithii* is an "escaped taxon" often introduced for aesthetic reasons, which has evaded human control and formed self-sustaining, naturalized colonies in the wild. In India, the genus has 2 species distributed in Arunachal Pradesh and Sikkim Himalaya. Members of the genus thrive at altitudes between 1000 and 4000 meters and are commonly found in the temperate, and sub-alpine regions of the Himalayan highlands. The main center of diversity for the genus *Ceratostigma* is the Qinghai-Tibet Plateau (QTP) and North China. Specifically, South Tibet is considered the current primary distribution center for the genus (Zhao, *et al.*, 2023). *Ceratostigma* is characterized by a non-glandular, tubular, 5-ribbed calyx (10-nerved at the base) and a glabrous style (Zhao, *et al.*, 2023), while some species display heterostyly (Hedberg, *et al.*, 2006; Peng, *et al.*, 1996).

In 2025, during floristic research in Arunachal Pradesh, India, as part of the project "Assessing the

Impact of Climate Change on Floristic and Migration of Vascular Plants in the Alpine Subalpine Landscape of Western Arunachal Pradesh," an unidentified *Ceratostigma* species was collected from Zemithang, Tawang district, at an elevation of 2100 meters. Following a thorough investigation of *Ceratostigma* species in India, encompassing protologues, type specimens, additional herbarium specimens, and pertinent literature (Clarke CB, 1882; Peng, *et al.*, 1996), it has been classified as *Ceratostigma griffithii* C.B. Clarke. In India, two species from the genus *Ceratostigma* have been documented viz. *C. griffithii*, and *C. plumbaginoides*. *Ceratostigma griffithii* is known in India, Bhutan, and China; there are only a few herbarium specimens in India. In India, only four old collections are known; among them, the one from Assam of British India collected by *N.L. Bor* in the year 1935 from Naga Hills, held at DD, was the last collection in the last 90 years. The present collection from Arunachal Pradesh is a rediscovery of this species from India after a lapse of about 90 years, confirming the second locality for this country. This collection offers a comprehensive taxonomic description, habitat information, phenological data, and a color picture plate (Fig. 2).

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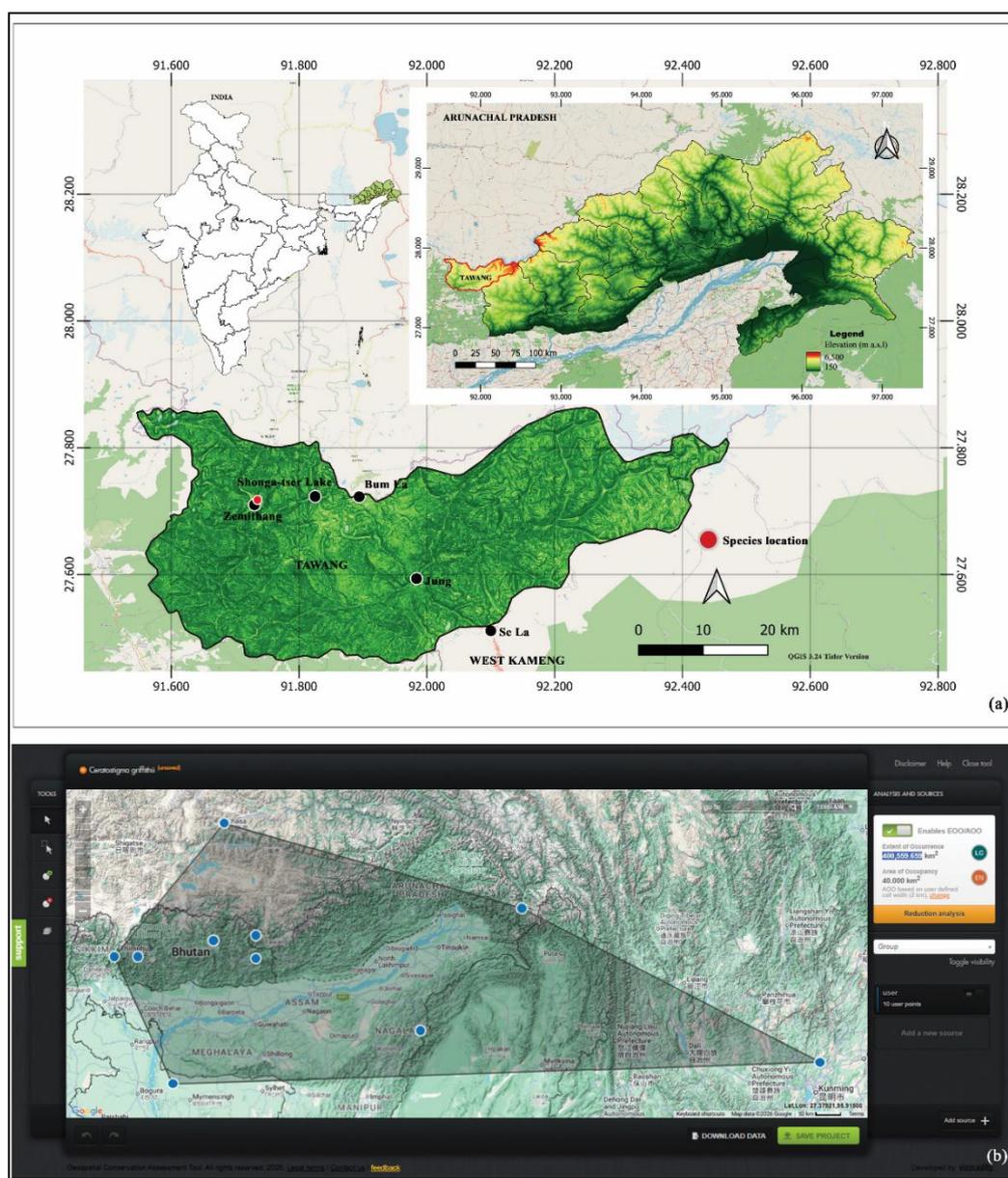


Fig. 1 (a) Present collection site of *Ceratostigma griffithii* C.B. Clarke; (b) Threat assessment showing area of occupancy and extent of occurrence.

MATERIALS AND METHODS

Flowering specimens were collected from Zemitang, Tawang district of Arunachal Pradesh during post monsoon season. All collected voucher specimens were processed as per standard protocol. Photographs were taken in field with Nikon Z50 camera. A locality map was created by using the software ArcGIS10.5 (Fig. 1). The geographical coordinates of the species were collected with the help of a GPS (Garmin eTrex® 30x, Taiwan) during the survey. Based on the recorded geo-coordinates of the present locality and the type locality, the Extent of Occurrence (EOO) and Area of Occupancy (AOO) of the populations were estimated using the conservation assessment tool extension developed by the Royal Botanic Gardens, Kew (Moat, 2007;

IUCN, 2019) in Arc View. For AOO, a 2×2 km grid cell size was used. The preliminary assessments thus generated for EOO and AOO were then subjected for comparison with the IUCN criteria for assigning the threat status of the species.

RESULTS AND DISCUSSION

***Ceratostigma griffithii* C.B. Clarke** in Hook.f., Fl. Brit. India 3: 481. 1882.

Type:— BHUTAN. East Himalaya: between Woollookka and Lamnoo, Chupeke, 8000 ft., 1862–1863, *Griffith* 4181 (K [K000786678, digital image!]).

Shrub evergreen 0.5–1.3 m tall. Stems erect, very branched, without scars at the nodes and with rounded branchlets, densely strigose when young,

with ferruginous or brown hairs of two kinds; axillary shoots with scales. Leaves subsessile, alternate, obovate-spatulate to sub rhombic, 1.5–7.5 × 0.8–3 cm, cuneate or attenuate at base, margin strigose-ciliate, acute at apex, somewhat coarse in texture, matte green with reddish edges, with both surfaces densely and uniformly strigose, making them rough to the touch. Inflorescences terminal and axillary, with heads 1.5–3 cm in diameter bearing 5–20 flowers. Bracts oblong-lanceolate or oblong-ovate foliaceous bracts, 6–7.5 × 2–2.8 mm, ciliate and with reddish tints. Bracteoles lanceolate, 5–7 mm long, strongly keeled and with hyaline margins. Flowers capitate, fine blue. Calyx ciliate between the veins, tube 2–3 mm long and 5 subulate teeth, 7–8 mm long. Corolla 1–1.7 cm, purple or pale pink; lobes deep blue, rarely white, limb with 5 obovate lobes, about 5–7 mm long, emarginate, mucronate at the apex. Stamen adnate to the middle of the corolla-tube, filaments linear, 1.1 cm long; filament 7 mm, glabrous; anthers oblong, blue, c. 2 mm, slightly exerted. Ovary ovoid; style filiform, with 5 stigmatose branches, branches equal in length to anthers. Fruit not seen.

Specimen Examined. **BHUTAN.** Between Woollookka and Lamnoo, Chupeke, 2438 m, 1862–1863, *Griffith* 4181 (K000786678); Tsalimape to Simo Sampa, 08 July 1938, *B.J. Gould* 886 (K005545087); Near Khelekha, Tang Chu, 2100 m, 11 October 1984, *I.W.J. Sinclair & D.G. Long* 5641 (K005545095); Thimphu, 2370 m, 04 September 1984, *I.W.J. Sinclair & D.G. Long* 4796 (K005545096). **CHINA.** Yunan, Between Likiang and Talifu, 2286 m, 13 September 1922, *J. Rock* 6414 (US 1511085); Yunan, Tsangshan Range, west of Talifu, 2895 m, August 1922, *J. Rock* 6577 (US 1511086); Yunan, Litiping Range, Mekong-Yangtze divide, east of Weihsi, 2895 m, 1923, *J. Rock* 11578 (US 1511087); Xizang, Lhasa Shi, Langkazi Xian, Gangbala Mountain, Yangzhuoyong Lake, 4170 m, 04 Jul 2009 *MacArthur, J. Wen, Z. Nie, L. Xie, Y. Niu, G. Li, F. Yang, S. Lutz & J. Van De Veire* 3357 (US 3594948). **INDIA.** Sikkim, Chumbi, 21 June 1884, *Dr King's Collector* 349 (K005545089); Sikkim, Chumbi, 21 June 1884, *Dr King's Collector* 450

(K005545090); Arunachal Pradesh, Kahao, Lohit Valley, 1219–1524 m, 16 November 1926, *F. Kingdon Ward* 7651 (K005545091); Assam, Chipoketance, Naga Hills, 31 October 1935, *N.L. Bor* 6670 (K005545088); Naga Hills, 1935, *N.L. Bor* 6670 (DD 76906); Arunachal Pradesh, Zemithang, 2100 m, 25 September 2025, *Subhajit Lahiri* 101433 (CAL0000310720), 101434 (CAL0000310719), 101314 (CAL0000310718).

Distribution. India [Arunachal Pradesh (Present report), Sikkim], Bhutan, and China.

Habitat. Growing in dry temperate forest edges in sunny open areas at elevation of 2000–2900 m. Found only in two localities with a small population of 7–9 individuals.

Conservation Status. The Eastern Himalaya region, which includes India, Bhutan, and China is primary habitat of *Ceratostigma griffithii* C.B. Clarke. No historical data on population size or reduction in population size is provided. Thus, our investigation included eight subpopulations, delineated by the number of collections and the spatial separation between locations. Therefore, no data available on its past population size and decline for application of Criteria A, C, and D. The species was known from four locations in India: Chipoketance, the Naga Hills of Assam, Chumbi of Sikkim, Kahao, the Lohit Valley, and Zemithang of Arunachal Pradesh. During our present study, we have collected the species from Zemithang of the Tawang district, Arunachal Pradesh. Based on the present and past collections, the extent of occurrence (EOO) is calculated to be 400,559.659 km², and the area of occupancy (AOO) is calculated to be 40 km² with very limited distribution at less than 5 subpopulations where the habitats are continuously shrinking due to developmental works (Fig. 1 a & b; Table 1). Although the majority of the known habitat of *Ceratostigma griffithii* encounters several threats such as tourism, developmental activities, and natural occurrences including landslides, avalanches, and grazing, there are no documented direct threats to its use or trade. Therefore, the taxon is assessed here as 'Vulnerable' [VU B2ab(iii)] in global level.

Phenology. August–January

Table 1. Details of subpopulations of *Ceratostigma griffithii* C.B. Clarke

Subpopulations	Country/ Provinces	Locality	Latitude	Longitude
Subpop.-1	India	Assam, Chipoketance, Naga Hills	26 °	94.99°
Subpop.-2	India	Sikkim, Chumbi	27.32°	88.91°
Subpop.-3	India	Arunachal Pradesh, Kahao, Lohit Valley	28.18	97
Subpop.-4	India	Arunachal Pradesh, Zemithang	27.70°	91.72°
Subpop.-5	Bhutan	Thimphu	27.29°	91.72°
	Bhutan	Tsalimape to Simo Sampa	27.32°	89.38°
	Bhutan	Near Khelekha, Tang Chu	27.61°	90.88°
Subpop.-6	China	Yunan, between Likiang and Talifu	25.04°	90.07°

	China	Yunan, Litiping Range, Mekong-Yangtze divide, east of Weihsi	25.43°	102.92°
Subpop.-7	China	Xizang, Lhasa Shi, Langkazi Xian, Gangbala Mountain, Yangzhuoyong Lake	29.67°	91.09°



Fig. 2 (a) Habitat; (b) flowering twig; (c) adaxial surface of leaves; (d) abaxial surface of leaves; (e) Close-up of upper view of flower; (f) bract (g) flower; (h) corolla split open; (i) stamen; (j) pistil. (Photo credit: *Subhajit Lahiri*).

Key to the species under the genus *Ceratostigma* Bunge from Eastern Himalaya

1. Style branches equal in length to anthers *C. griffithii*
- Style branches extending beyond anthers 2
2. Corolla lobes lanceolate-obovate..... *C. ulicinum*
- Corolla lobes obdeltate..... 3
3. Corolla up to 2 cm, tube purple *C. minus*
- Corolla larger than 2 cm, tube red-purple..... 4
4. Stamens \pm as long as corolla tube; anthers purple..... *C. willmottianum*
- Stamens slightly exserted; anthers blue..... *C. plumbaginoides*

Note. Previously, only two regions in India were recognized as habitats for this species (Mastakar, 2023). The herbarium study indicates that the species was initially collected from the Naga Hills of Assam, British India, by *N.L. Bor*, and is preserved at DD and K. No further collections of this species have been documented since *N.L. Bor's* last collection from the Naga Hills, Assam, in 1935 (*N.L. Bor* 6670; DD!, K digital image!). This study serves as the foundation for the rediscovery [*Subhajit Lahiri* 101433 (CAL0000310720!), 101434 (CAL0000310719!), 101314 (CAL0000310718!)] of the species within Indian territory after a period of 90 years. Subsequent to 1935, the species was not collected again. After a 90-year interval, this species has been rediscovered in Zemithang, Tawang District, Arunachal Pradesh.

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