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Cover: Mixed media illustration of a Blue bird and Sunbird. © Lakshmi Niranjana.



Reassessment of *Strobilanthes recurva* (Acanthaceae), an endangered plant from Manipur, India

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Abstract: The presence and status of *Strobilanthes recurva* C.B. Clarke (Acanthaceae) in Manipur, northeastern India is re-assessed with a brief description and illustration. Photographs and their conservation status are also provided. The values of Extent of Occurrence (EOO) and Area of Occupancy (AOO) calculated as 16,313.797 km² (VU), and 20.000 km² (EN) respectively predicted *S. recurva* as Vulnerable and Endangered. Therefore, we proposed to treat this threatened species, *S. recurva* as Endangered (EN) until further information becomes available.

Keywords: Biodiversity, description, eastern himalaya, exploration, flora, northeastern India, rare, red list, taxonomy, threatened.

The genus *Strobilanthes* Blume of the family Acanthaceae consists of around 463 species (POWO 2024). It is distributed mostly in Asia, extending to Japan and Korea in the north, Afghanistan and Pakistan in the west, and northern Australia in the south. It is most diverse in the Indian subcontinent, southern China, and mainland southeastern Asia, but many species have also been reported to occur on the islands of southeastern Asia (Wood & Scotland 2021). Most species under the genus *Strobilanthes* are recorded as rare and localized in their distribution (Wood & Scotland 2009). Species

belonging to the genus *Strobilanthes* of peninsular India, the Himalaya, and hills of northeastern India are recorded to be varied and have no connection (Wood 1994). About 65 species were reported from peninsular India, and approximately 85 species were reported from hills of northeastern India (Wood & Scotland 2021). The *Strobilanthes* of the whole Himalayan region were discussed by Wood (1994), however, southwestern China, upper Burma, and the hills on the Indo-Burmese border were excluded from the study. It is reported that there is no comprehensive study on the *Strobilanthes* species of the hills on the Indo-Burmese border, which include the Indian states of Meghalaya, Nagaland, and Manipur.

Manipur is one of the states of the northeastern region of India. It lies between 23.83'–25.68'N and 94.31'–94.78'E and falls under the Indo-Burma Biodiversity Hotspot (<https://www.cepf.net/our-work/biodiversity-hotspots/indo-burma>). In the Flora of Manipur, no species of *Strobilanthes* was previously recorded (Singh et al. 2000). However, a total of six species—*Strobilanthes affinis* Terao ex J.R.I. Wood &

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J.R.Bennett, *S. asymmetrica* J.R.I.Wood & J.R.Benn., *S. auriculata* Nees, *S. clarkei* J.R.I.Wood, *S. cusia* J.R.I.Wood & J.R.Benn., and *S. torrentium* Benoist—were recorded by Ningombam (2012), of which *S. auriculata* is reported to have an eight-year plietesial cycle in Manipur (Devi et al. 2021). In addition, *S. frondosa* J.R.I.Wood was also reported to be rediscovered in Manipur (Wood et al. 2003). Among the other *Strobilanthes* species collected in the 19th century from Manipur, a newspaper article reported photographic evidence for the presence of *S. recurva* at Sadu chiru water fall Kangpokpi District, Manipur (<https://easternmirrornagaland.com/coneflower-photographed-in-wild-after-73-years-in-manipur/>). *Strobilanthes recurva*, a rare species, was also collected from Mt. Tiyi in Wokha, Nagaland, India by N. Odyuo and D. Roy. Herbaria specimens are present at Botanical Survey of India, Eastern Regional Center in Shillong bearing numbers 096495 and 096496. However, these vouchers lack information on the altitude, habitat, and geographical coordinates (latitude and longitude). John R.I. Wood, an expert on the genus *Strobilanthes*, confirmed another collection of *S. recurva* from Chittagong, Bangladesh (Collector: Mr. Mohammed Uddin). No record on the description and illustration of these new collections of *S. recurva* are available on public domain.

A plant specimen of *S. recurva* was collected by the present author(s) from Mao Songsong, Senapati District, Manipur, India in February 2022 and the species was authenticated by J.R.I. Wood. Plants were growing at an altitude of 1,835 m on a shaded streamside at the hill slope of an open forest. Although not plentifully distributed, the collection site recorded 20–30 mature individuals. Voucher specimens were deposited in the Institute of Bioresources and Sustainable Development (IBSD), Imphal with accession number IBSD/M-279. In this study, the presence of *Strobilanthes recurva* C.B.Clarke (Acanthaceae) in Manipur, northeastern India is re-assessed with a brief description and illustration. Photographs and their conservation status are also provided below.

RESULTS AND DISCUSSION

Strobilanthes recurva C.B.Clarke

J. Linn. Soc., Bot. xxv. (1889: 53).

Type: INDIA, Naga Hills, Kohima, alt 4,500 ft (1,360 m), Clarke C.B. 41379, 30.x.1885, (Holotype K000883138!).

Description: Isophyllous to weakly anisophyllous undershrub, 0.6–0.8 m height. Stem quadrangular, swollen at the base of the node. Leaves petiolate, ovate, pubescent on both sides, 7.8–9.9 × 3.0–4.5 cm, margin

crenate, apex broadly acuminate, base attenuate. Inflorescence of terminal and axillary bracteates spikes, 3.5–3.7 × 1.1–1.3 cm. Bracts imbricate, broadly ovate, persistent, green, glandular-pilose, 1.3–1.7 × 0.7–1.1 cm. Bracteoles 2, linear, obtuse, 7–8 mm. Calyx 5-parted, glandular hairs present, linear, obtuse, lobes unequal in length, 0.8–0.9 cm. Corolla 5-lobed, curved, funnel-shaped. Corolla tube short, white, 1.5–2 × 0.2 cm, gradually widened at the mouth., purple. Stamens 4, fertile, didynamous, longer filament 2.2 cm, shorter filaments 0.3–0.4 cm; anthers included, 0.2–0.3 cm long. Style pilose, curved, 2.1 cm. Ovary 0.9 cm, hirsute at the apex. Capsule oblong, hairy at the apex 1.0–1.2 cm. 4-seeded; seeds lenticular, villous, 0.2–0.3 cm (Image 1).

Specimen examined: INDIA, Manipur, Senapati, Mao Songsong, 1,835 m, 09.ii.2022, RJ Devi & B.Thongam, M-279 (IBSD) (Image 2).

Other specimens of *S. recurva* recorded so far.

India: hills of Kohima, alt 4,500 ft (1,360 m), C.B.Clarke 41379, 30.x.1885 (Holotype K000883138!) (<http://specimens.kew.org/herbarium/K000883138>); India: Manipur, 14.i.1882, Watt G. 5156, E00133469 (<https://data.rbge.org.uk/herb/E00133469>); India: Sirhoi, alt 6,500 ft (1,970 m), 15.iv.1948, F. Kingdon-Ward 17292 (NY2652219!) (<http://sweetgum.nybg.org/science/vh/specimen-details/?irn=3451210>); India: Mt. Tiyi, Wokha, Nagaland, N. Odyuo and D. Roy, 17.iv.2016, 096495! and 096496; Chittagong, Bangladesh (photographs by Mr Mohammed Uddin).

Conservation Status

No earlier evaluation was made to assess the conservation status of this species. Since its type specimen collection was made in the year 1885, this species is presently known from only four locations of northeastern India, viz.: Kohima & Wokha of Nagaland State; Ukhrul & Senapati District of Manipur State; and another one from Chittagong, Bangladesh. Records available so far may indicate the confinement of this species in the higher altitudinal hills of the Indo-Burma border. Geographical coordinates are not available for the locations from where *Strobilanthes* species are collected so far except for the present study. Therefore, the standard Geospatial Conservation Assessment Tool (Bachman et al. 2011) was used for automatic assessment of IUCN Red Listing. The extent of occurrence (EOO) and area of occupancy (AOO) were calculated as 16,313.797 km², and 20,000 km², respectively.

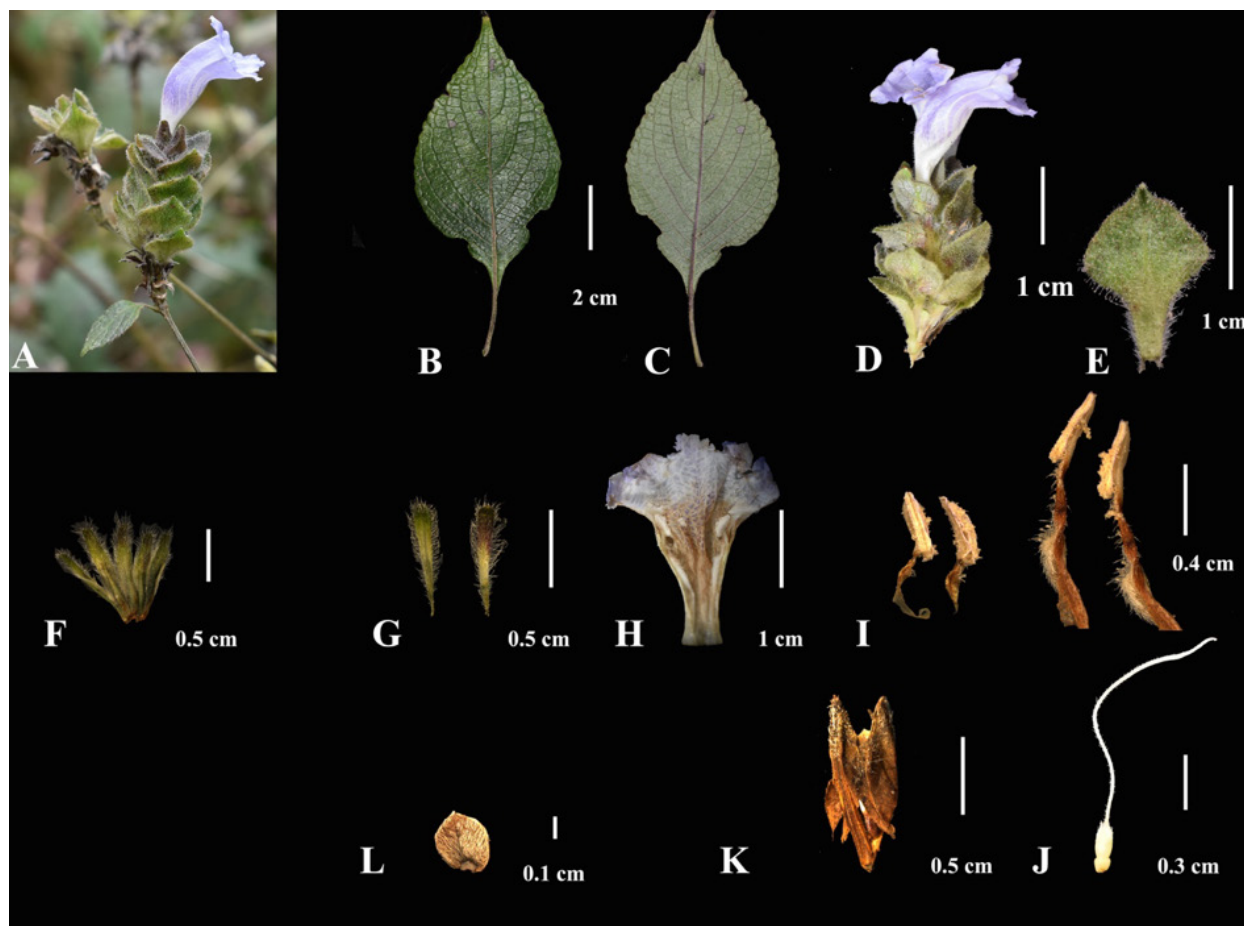


Image 1. *Strobilanthes recurva*: A—A twig with inflorescences | B—leaf adaxial | C—leaf (abaxial) | D—inflorescence | E—bract | F—calyx split open | G—bracteoles | H—corolla (split opened from curvy side) | I—Stamens | J—carpel | K—capsule | L—seed | © M. Aldrin & R.J. Devi.

Keys to species of *Strobilanthes* recorded from Manipur, India

- 1a. Inflorescence short terminal spike; Leaves petiolate; Bracts obovate – subspathulate; Bracteoles oblanceolate subspathulate; Corolla lobe pale sulphur or white *S. asymmetrica*
- 1b. Inflorescence axillary or terminal spike; Leaves subsessile; Bracts obovate or elliptic obovate; Bracteoles oblanceolate or subacute; Corolla lobe white or purple 2
- 2a. Inflorescence small axillary & terminal panicle; Bracts obovate; calyx lobe equal; Corolla lobe glossy violet, curved *S. clarkei*
- 2b. Inflorescence terminal or axillary spikes; Bracts obovate to oblanceolate or leaflike imbricate; Calyx unequal; Corolla not glossy, slightly bent to curved, lobe pale blue to purple colour 3
- 3a. Anisophyllous, subsessile; Inflorescence short, nodding subcapitate spike on simple or sparsely branched axillary branchlets; Bracts elliptic-obovate with scattered gland dots; Corolla straight, lobe pale blue colour *S. frondosa*
- 3b. Isophyllous to weakly anisophyllous, subsessile or petiolate; Inflorescence terminal or axillary spike; Bracts leaflike imbricate or obovate or oblanceolate; Corolla straight to slightly bent or highly curved, lobe blue colour 4
- 4a. Leaves oblong, ovate, elliptic, glabrous or pilose; Cystolith absent 5
- 4b. Leaves ovate to elliptic, pubescent; Cystolith present 6
- 5a. Leaves sessile, lanceolate, oblong, cordate, both surface pilose; Bracts imbricate broadly ovate to obovate spathulate; Corolla funnel shape, lobe pale purple *S. auriculata*
- 5b. Leaves petiolate, elliptic, ovate, glabrous or pubescent; Bracts leaflike imbricate broadly ovate or oblanceolate to obovate; Corolla straight to slightly bent or highly curved, lobe blue colour 7
- 6a. Leaves both surface sparsely stringose, densely covered with subulatecystoliths; Bracts imbricate broadly obovate, rhomboidal or elliptic; Corolla purplish-blue to violet, curved *S. affinis*
- 6b. Leaves adaxially sparsely pubescent, numerous cystolith; Bracts obovate to subrhombic, distinctly angled; corolla blue to violet, curved *S. torrentium*
- 7a. Isophyllous to weakly anisophyllous; Leave glabrous; Bracts oblanceolate to obovate; Corolla straight to slightly bent, lobe blue *S. cusia*
- 7b. Isophyllous; Leaves pubescent on both sides; Bracts broadly ovate; Corolla curved, funnel shaped, lobe purple *S. recurva*.



Image 2. Image of the herbarium specimen of *Strobilanthes recurva* deposited at IBSD (IBSD/M-279).

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