Wulfenia **27** (2020): 139–144

Wulfenia
Mitteilungen des
Kärntner Botanikzentrums
Klagenfurt

Beccarinda tonkinensis (Gesneriaceae), a new record for India and its IUCN Red List status in India

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Summary: We present the first record of *Beccarinda tonkinensis* (Pellegr.) B.L. Burtt (Gesneriaceae) for India on the basis of specimens collected in Kerang and Yosing, Siang district of Arunachal Pradesh, India. The species is easily recognized from its congeners by its decumbent stem, basal leaves, axillary cymes and broadly ovate bracts. Until now, *Beccarinda tonkinensis* has only been known from China and Vietnam. A brief description of the records along with additional notes and photographs are provided. On the basis of known data, we conducted IUCN Red List assessment of the species in India with status EN B1ab(iii)+B2ab(iii); C2a(i); D.

Keywords: Arunachal Pradesh, flora of India, Himalayas, IUCN

Beccarinda Kuntze with currently nine accepted species (POWO 2019) is a small genus in the family Gesneriaceae Dumort. It is distributed in northeastern India, Myanmar, southern China, Laos, Vietnam and Indonesia (Möller et al. 2017). This species can be distinguished from other closely related genera (*Oreocharis*, *Boeica*, etc.) by the fertile coherent anthers and oblique orientation of the flowers and capsules. So far, only one species, *B. cordifolia* (Anthony) B.L. Burtt is known from India (Sinha & Datta 2016). Recent field surveys in Arunachal Pradesh led to the discovery of many new taxa as well as new records to Gesneriaceae (Borah et al. 2020; Singh et al. 2020; Taram & Borah 2020; Taram et al. 2019, 2020a, b, c, d). On such an exploration in 2018, some interesting *Beccarinda* specimens were collected in Siang district of Arunachal Pradesh. After critical studies, these specimens were found to represent a new record for the flora of India.

In the present paper, we studied the known population of the newly found plant species and conducted the IUCN Red List assessment of species status in India.

Materials and methods

Data collection. While conducting extensive floristic surveys in 2018, the authors collected some interesting *Beccarinda* specimens from Kerang and Yosing locations in Siang district, Arunachal Pradesh, India. They were cultivated later in Itanagar, Arunachal Pradesh and finally bloomed in 2019. Later collections were made again from the same locations in 2019. The flowering specimens were then processed into mounted herbarium sheets following Jain & Rao (1977) and deposited in HAU (Herbarium of Rajiv Gandhi University, Arunachal Pradesh, India formerly Arunachal University).

Identification. Identifications were performed according to Wang et al. (1998), Phuong (2007), Sinha & Datta (2016) and Möller et al. (2017), consulting the images of types present in P (Muséum national d'Histoire naturelle, Paris, France), vouchers at PE (Herbarium, Institute of

Botany, Chinese Academy of Sciences, China) and with the kind assistance of different experts acknowledged below.

IUCN Red List assessment. On the basis of data obtained in the field and our expertise, we conducted national IUCN Red List assessment of *B. tonkinensis* in India according to IUCN (2012, 2019). The extent of occurrence (EOO) and area of occupancy (AOO) were calculated according to Bachman et al. (2011). In addition, we used some recent publications devoted to global and sub-global IUCN assessments of vascular plants (e.g. Orsenigo et al. 2018; Fenu et al. 2019; Linnik & Khapugin 2020) to structure our assessment report to be appropriate in international level.

Results and discussion

Nomenclature. *Beccarinda tonkinensis* (Pellegr.) B.L. Burtt. Notes Roy. Bot. Gard. Edinburgh 22(1): 64 (1955). Basionym: *Slackia tonkinensis* Pellegr. Bull. Soc. Bot. France 73: 428–429 (1926). Synonym: *Beccarinda sinensis* (Chun) B.L. Burtt. Notes Roy. Bot. Gard. Edinburgh 22(1): 63. 1955.

Distribution. China (Guangxi, Guizhou, Sichuan, Yunnan), Vietnam, Siang (India) (Fig 1.).

New records. 1) India, Arunachal Pradesh, Siang district, Kerang (28.354444°N, 94.681389°E), 16.10.2019, L. Gammi, M. Taram, D. Borah, 32069 [HAU]; 2) India, Arunachal Pradesh, Siang

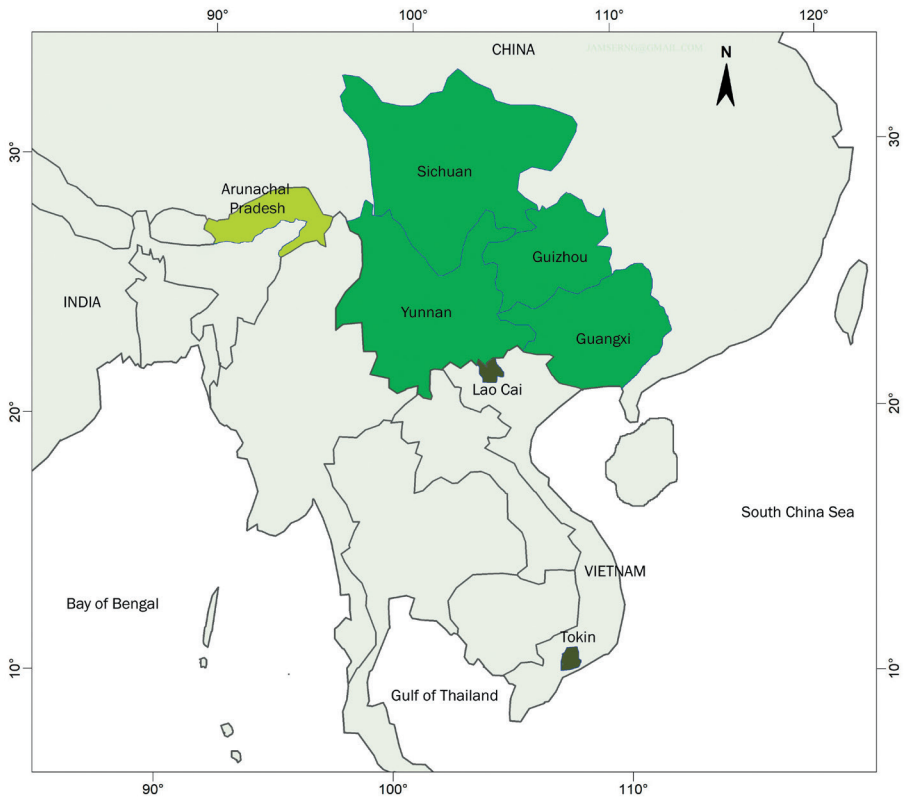

Figure 1. Geographical distribution of *Beccarinda tonkinensis*. The light green colour indicates the currently reported location (i.e Arunachal Pradesh in Northeast India), green (China) and dark green (Vietnam) indicate the earlier records of the species.

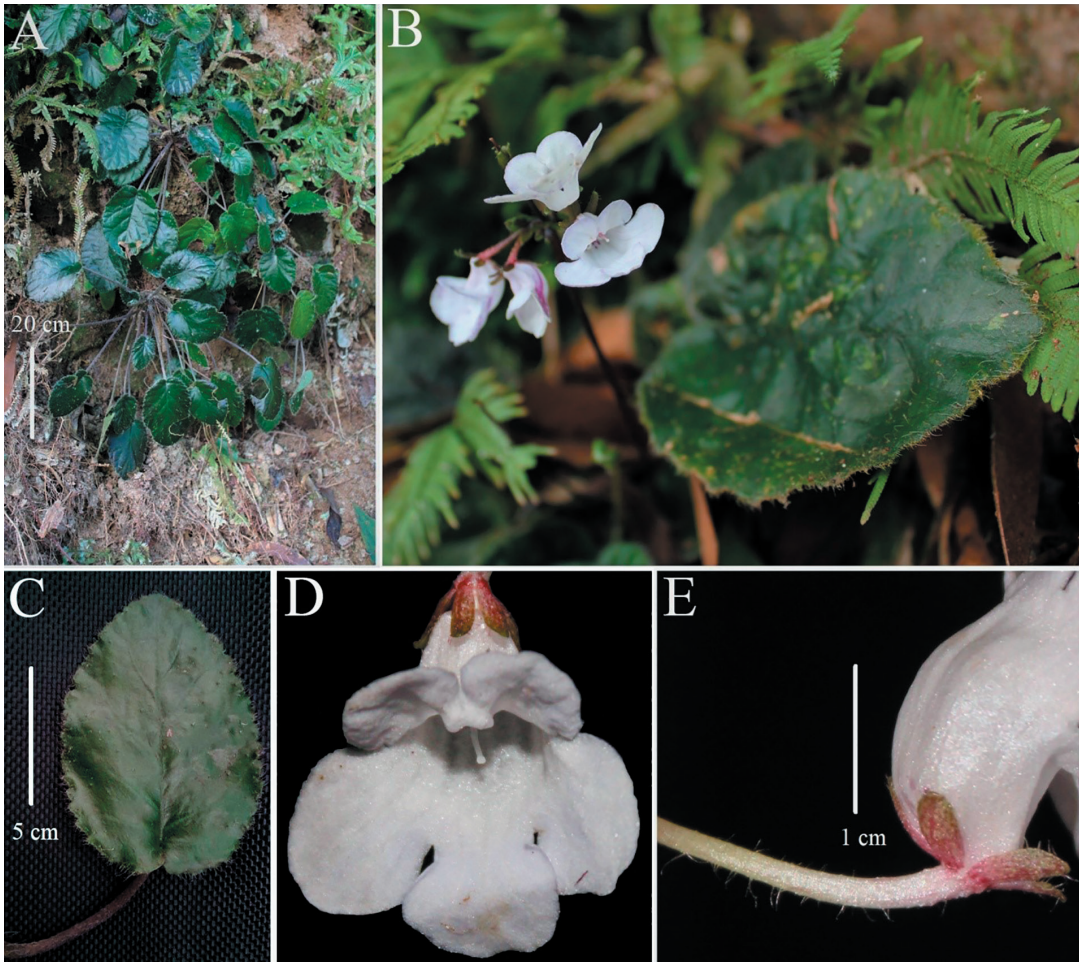

Figure 2. *Beccarinda tonkinensis*. A – habit, B – cyme, C – leaf adaxial surface, D – front view of a flower, E – side view of a flower showing calyx and oblique orientation to the pedicel.

district, Yosing (28.353889°N, 94.795000°E) 22.12.2019, L. Gammi, M. Taram, D. Borah, 33110 [HAU] (Fig. 2).

Additional examined material. 1) Vietnam, Tonkin, Pia Ouac massif, road from Nam Kep to Cao-Ouac, 1300 m a.s.l., VII.1922, Petelot 704 [P 03851858, holotype] (available at https://plants.jstor.org/stable/10.5555/al.ap.specimen.p03851858); 2) China, Guangxi Zhuang Autonomous region, 1965, Tse Chung-Yuen et al. (00140180); 3) Vietnam, Lao Cai, 1400–1500 m a.s.l., 23.03.2002, L.V. Averyanov, P.K. Lôc, D.T. Doan, 2654 [LE 01050153]; 4) Vietnam, Ha Giang province, Quan Ba district, Tung Vai commune, Thang village, around point 23.051167°N, 104.852694°E, steep rocky slopes near mountain top composed with eroded stratified highly eroded limestone at elevation 1200–1450 m a.s.l., 24.04.2018, L.V. Averyanov, Nguyen Sinh Khang, Nguyen Tien Hiep, Nguyen Quang Hieu, Chuong Quang Ngan, T. Maisak, VR 793 [LE].

Description. Perennial herbs, 8–40 cm tall, rhizomatous or with decumbent stem 3–12 × 0.8–2.0 cm. Leaves, basal or on stem; petiole 3.5–18.0 cm × 2–6 mm, whitish pilose to villous; lamina 4–12 × 3–9 cm, ovate to orbicular, adaxially and abaxially hirsute (whitish to brownish hairs), later glabrescent, apex obtuse to round, margin crenate to dentate, base cordate, 6–7 lateral

veins on either side of mid vein, obscure above, raised beneath. Cymes 2–5, axillary (umbel), 5–9-flowered; peduncle 8.0–12.5 × 0.2–0.4 cm, densely pilose near base, glabrescent above; two bracteoles, opposite, broadly ovate, 0.5–0.8 × 0.5–0.9 cm, outside pilose inside glabrous, apex obtuse, ciliate along margin; pedicel 1.1–1.8 × ca. 0.1 cm, glabrescent; calyx 5, sub-equal, divided from base, imbricate ascending, segments ovate-lanceolate, 0.3–0.5 × 0.1–0.2 cm, apex sub obtuse, margin ciliate, outside sparsely pubescent inside glabrous; corolla purplish white, glabrous, tube ampliate towards mouth, lower lip lobes orbicular 0.8–1.0 × 0.8–1.0 cm, upper lip shortly bifid, truncate, 0.5–0.7 × 0.6–0.8 cm, apex rounded, margin entire. Stamens 4, epipetalous, all fertile; filaments green, sub-equal 0.4–0.6 cm long; anthers 4 basifixed, cohering together, ovate-cordate, ca. 2 × 2 mm; staminodes absent; style 7–9 × 3–5 mm, glabrous; stigma capitate; disc white undulate; ovary hypogynous, 1–2 × 1 mm, glabrous, unilocular, bicarpellary. Capsule was not seen. Flowering in December to March.

Diagnosis. *Beccarinda tonkinensis* is easily recognized from most of its congeners by its decumbent stem, ovate to orbicular lamina, cordate base, broadly ovate bracts and plant body with whitish to brownish hairs. It can be distinguished from the Indian species, *Beccarinda cordifolia* reported from the same region, by sub-obtuse leaf apex (vs ovate to acute), pilose to villous petiole (vs pilose), ovate bracts (vs orbicular), ovate to obovate calyx segments (vs elliptic lanceolate), obtuse calyx apex (vs acute), purplish white corolla (vs yellow), glabrous style (vs glabrescent) and capitate stigma (vs bifid).

Habitat. It grows in shady areas of forest edges along with *Henckelia* sp. (Gesneriaceae), *Thysanolaena latifolia* (Roxb. ex Hornem.) Honda (Poaceae), *Mussaenda roxburghii* Hook.f. (Rubiaceae), *Sellaginella* sp. (Selaginellaceae), *Begonia aborensis* Dunn (Begoniaceae), *Pteris vittata* L. (Pteridaceae), *Rhynchotechum* sp. (Gesneriaceae) and other species.

Taxonomic comments. The population growing in Arunachal Pradesh differs from the Chinese population in glabrous bracts and corolla, pilose to glabrescent peduncle as well as in color and number of flowers.

National IUCN Red List assessment. On the basis of obtained data, we assessed IUCN Red List status for *B. tonkinensis* in India:

Criterion B: In India, *B. tonkinensis* is represented by less than five (two) locations (Fig. 2). AOO: 8 km^2 calculated with a 2 × 2 km-cell fixed grid by GeoCAT programme (Bachman et al. 2011). Decline in extent and quality of the habitat (iii) has been directly observed and expected to continue in the future.

Criterion C: We found a small population size (< 2500 mature individuals in total), an observed and expected continuing decline in number of mature individuals; no subpopulation contains more than 250 mature individuals with its expected continuing decline.

Criterion D: Number of mature individuals is less than 250.

Category: EN B1ab(iii)+B2ab(iii); C2a(i); D.

Conclusions

Plants collected during this study extend westward the native range of this species. *B. tonkinensis* is a new record for the flora of India. The current IUCN Red List status of this species in India is

proposed as EN B1ab(iii)+B2ab(iii); C2a(i); D. In future, we recommend continuing the search and investigation of habitats supposedly suitable for *B. tonkinensis* surviving in India.

Acknowledgements

We are thankful to David Middleton (Singapore Botanic Gardens) and Prof. Leonid V. Averyanov (Komarov Botanical Institute of RAS, Russia) for confirming the identity of the taxon. We are also grateful to the Department of Botany, Rajiv Gandhi University (India) for providing necessary facilities.

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