

A recommendation on conservation of the endemic orchid *Bulbophyllum indicum* from the Kerala Western Ghats

Bulbophyllum Thouars, 1822 (Orchidaceae) is one of the largest genera with a native range in the tropics and subtropics. It comprises of about 137 species widely distributed in India (Singh et al. 2019), among which 27 species are endemic. The state of Kerala is reported to have 23 species, with 13 species endemic to the Western Ghats (Singh et al. 2015). The family Orchidaceae was surveyed and studied in Kerala since 2018, where the authors collected around 16 species of *Bulbophyllum* from different parts of the state. During the survey, *Bulbophyllum indicum* (C.S. Kumar & Garay) Kottaim was collected from the type locality of Agasthyamalai Biosphere Reserve, Thiruvananthapuram, Kerala and Kulamavu Reserve Forest, Idukki, Kerala. The collection from Idukki confirms the range extension of the species. *B. indicum* could be easily recognized in the field from other species of *Bulbophyllum* by the presence of a solitary flower on a long peduncle and a labellum covered with sepals and petals. After critical study of this species, a short description, live dissected photographs, notes on its distribution and conservation are provided.

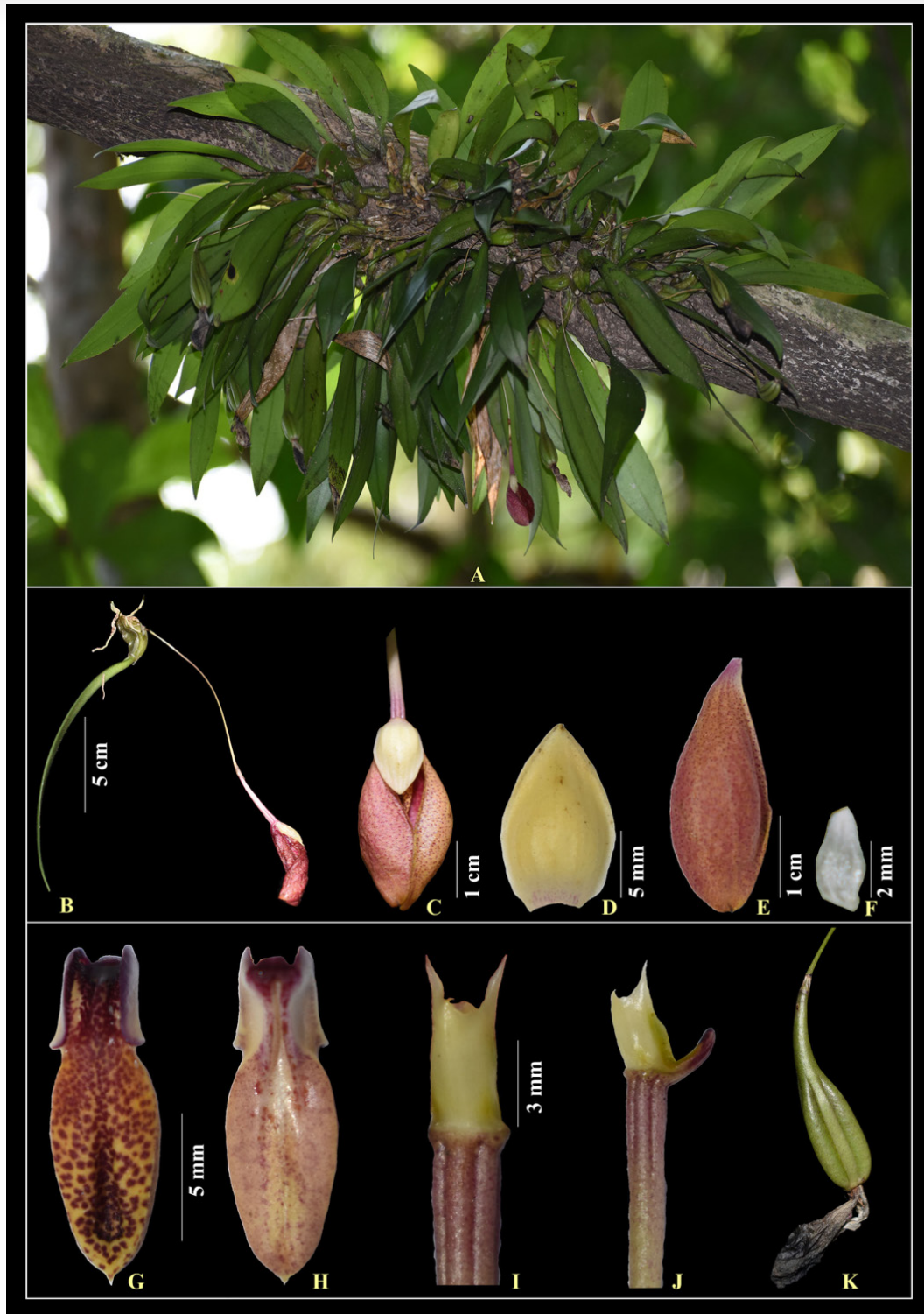
Kerala lies on the undulating hills of the Western Ghats from 8.2836 to 12.7836 N latitude and 74.4503 to 77.6169 E longitude, covering an area of about 38,863 km². It has a diverse vegetation pattern, including scrub forests, tropical dry deciduous forests, tropical moist deciduous forests, tropical evergreen and

semi-evergreen forests, montane sub-tropical temperate forest, and grasslands.

A frequent survey of different seasons was carried out in the study area. The species were located along with geo-coordinates using GPS (Garmin etrex10) and good live images captured by Canon D5600. The collected species were identified using standard monographs, revisions, state floras, district floras, and literature, and the map was prepared using ArcGIS 10.2 version for future conservation.

Bulbophyllum indicum (C.S.Kumar & Garay) Kottaim., Int. J. Curr. Res. Biosci. Plant Biol. 6(10): 33. 2019. *Rhytionanthos indicus* C.S.Kumar & Garay, Proc. 20th World Orchid Conf.: 114. 2013.

Epiphytes up to 15 cm tall. Pseudobulbs 1.5–2.5 × 1–1.5 cm, ovoid, clusters, green color. Leaf 8–10 × 0.8–1.2 cm, solitary in each pseudobulb, lanceolate, coriaceous, apex acute. Peduncle 4–6 cm long, with basal sheath. Flower 2.5–3 × 1.2–1.5 cm, solitary, pink, pendulous, slender. Bracts ca 5×4 mm, ovate-oblong, mucronate. Dorsal sepal 1.3–1.5 × 0.8–1 cm, pale yellow, ovate, apex obtuse-acute, 7-veined; lateral sepals 2.5–3 × 1.2–1.5 cm, apex obtuse-acute, 7-veined, cohering together laterally to form a sac like structure. Petals 3.5–4 × 1.5–2 mm, white, lanceolate, apex acute, 3-veined. Lip yellow with pink tinge, 1.3–1.5 × 0.4–0.45 cm, lanceolate, thick, fleshy, 3-lobed; lateral lobes



Bulbophyllum indicum (C.S.Kumar & Garay) Kottaim: A—Habit | B—Inflorescence | C—Flower | D—Dorsal sepal | E—Lateral sepal | F—Petal | G, H—Lip (dorsal & ventral) | I—Column | J—Column with foot | K—Fruit.

3.5–4 mm long, obtuse, incurved; mid lobe 7–8 mm long, grooved, attached to the foot, mesochile saccate, apex at acuminate. Column 4–5 mm long, with two narrow projections or horn at the side of anthers short foot. Anther

2-celled; pollinia 4, in 2 pairs, ca 1.8×0.6 mm, pyriform. Pedicel with ovary 1.5–2.5 cm long.

Flowering & Fruiting: January–April.

Distribution: Kerala (Agasthyamalai Biosphere Reserve, Thiruvananthapuram, 8.6208 N and

77.2264 E, Alt. 1005m, and Kulamavu Reserve Forests, Idukki, 9.8156 N and 76.9006 E, Alt. 857 m).

B. indicum is threatened in the type locality of the Agasthyamalai Biosphere Reserve, because of habitat loss through the introduction of tourism and recreation. Besides, the species is sensitive to long-term survival as the plant is structured with a pseudobulb of solitary flower with enclosure of essential parts over non-essential parts; thus leading to an uncertain condition of pollination. It has been observed that there are very few pollinated flowers among 10–20 individuals. A very few individuals are observed in this type of locality in Kerala, whereas about three localities were identified in the Kulamavu Reserve Forest of Idukki District with very little population in the marginal areas of the forest.

On scrutiny of the related literature, it was revealed that the documentation of the same species is only from the protologue (Kumar & Garay 2013) while distributional records on other parts are untraceable in recent publications.

If assessed as per the IUCN Red List Categories and Criteria, this species will be Vulnerable and is recommended for the conservation through: (i) It is necessary to conduct population monitoring program together with orchid ecological study in the adjoining regions. (ii) Since *B. indicum* produces large numbers of seeds per capsule, invitro propagation techniques could be used to produce mass production with restoration and reintroduction programme. (iii) Conserving a database through a repository would help

to locate the species, trace out the current status or distribution of species and plan the species recovery management. (iv) Finally, the forest department and local people should be enlightened about the orchid conservation programme and achieve it through the progressive transfer of conservation knowledge to students and tourists.

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