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Rediscovery and micromorphological observations on *Bulbophyllum rheedei* (Orchidaceae): Karnataka, India

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Abstract

This paper reports the rediscovery of *Bulbophyllum rheedei* in Udupi district, Karnataka (India). The study includes anatomical and micromorphological observations, including scanning electron microscopy (SEM), accompanied by photographic illustrations of the different parts of the plant.

Résumé

Cet article relate la redécouverte de *Bulbophyllum rheedei* dans le district d'Udupi, au Karnataka (Inde). L'étude comprend des observations anatomiques et micromorphologiques, notamment par microscopie électronique à balayage (MEB), accompagnées d'illustrations photographiques des différentes parties de la plante.

Keywords: Endemic orchid, epiphytic orchid, *Rhytionanthos rheedei*, "*Tsjerou Tecka Maravara"*, Udupi, Van Rheede.

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Mots clés : orchidée endémique, orchidée épiphyte, *Rhytionanthos rheedei*, « *Tsjerou Tecka Maravara* », Udupi, Van Rheede.

Introduction

In the 1600's, in his work *Hortus Malabaricus* (vol. 12, entry "*Tsjerou Tecka Maravara*"), Van Rheede (1693) recorded 690 plant species. Part of his work was summarized by Nicolson, Suresh and Manilal in 1988 (Nicolson *et al.*, 1988). Van Rheede reported 14 orchid species based solely on vegetative characteristics. One of these orchids remained unnamed during his lifetime, as only vegetative parts and fruits were available. Lamarck (1811) suggested that it might belong to the genus *Bulbophyllum* Thouars (1822: t. 3). A corresponding specimen was collected at Palode by Sharma *et al.* (1984), and later also observed at Kallar and Thiruvananthapuram (formerly Trivandrum), but not at the original site mentioned by Van Rheede. Manilal and Kumar (1991) kept this plant in cultivation for several years until it flowered between June and July. They were then able to study it in detail and described it as a new species under the name *Bulbophyllum rheedei* Manilal & C.S. Kumar (1991: 55), in homage to Van Rheede.

Later, Bhat (2003) reported the presence of *B. neilgherrense* Wight (1851: 6, t. 1650) from Udupi district. Jalal and Jayanthi (2012), in their review of Endemic orchids of peninsular India, mentioned *B. rheedei* as a species endemic to the Western Ghats specifically to the state of Kerala.

Bhat (2014) reported two species from South Kanara district: *B. neilgherrense*, now treated as a synonym of *B. sterile* (Lamarck 1783: 189) Suresh (1988: 298), and *B. rheedei*, originally described by Manilal and C. S. Kumar (1991) from specimens collected in Karkala, Udupi district. Rather than expanding the list of Bulbophyllum species for Karnataka, these records represented new district-level occurrences of taxa already known from the state.

Sanjappa and Sringeshwara (2019) reported 197 wild orchids, including 12 *Bulbophyllum* species, from Karnataka. Later, Ravikumar *et al.* (2021) reported 14 *Bulbophyllum* species from the state.

Most recently, Sulaiman *et al.* (2021) documented new orchid records from Kozhikode, confirming the presence of *B. rheedei* at Ambalappara (Kakkayam), while still considering the species endemic to Kerala.

Taxonomic Treatment

Bulbophyllum rheedei Manilal & C.S. Kumar, *Rheedea* 1: 55 (1991); *Rhytionanthos rheedei* (Manilal & C.S. Kumar) Garay, Hamer & Siegerist, *Nordic Journal of Botany* 14: 639 (1994).

Specimen examined: India, Karnataka, Kudremukh-Kudremukha Range, Udupi, Karkal-Mala village road, 14/05/2025, *Shreyas Betageri & Prashant Karadakatti 0369* (HKSCD-20675).

Description (Fig. 1–3)**:** Plant very small, epiphyte, creeping. Rhizome 10–15 mm long and 1 mm in diameter, reddish-green tinged. Pseudobulbs 3–7 × 3–5 mm, unifoliate, ovoid-globular, dark green, arranged irregularly on the rhizome, with a few sheaths at base disappear over time. Leaf 6–8 × 4–6 mm, oblong-ovate or elliptic with a very small petiole of 1 mm long, mid-vein very prominent, dark green with small brown spots, bifid at apex. Inflorescence at the base of the pseudobulbs. Scape ca. 14 mm long, creamish-pink, usually bearing two flowers. Floral bract ca. 1 mm long, cream-yellow, gland-dotted, linear, apex acute. Flowers creamy white with maroon tinged. Dorsal sepal 2 × 1 mm, oblong, oblique, boat-shaped, glandular, papillose at margin, with 5-veined. Lateral sepals 4 x 2 mm long, crescent shape with glands at the apex (glands 80–86 × 50–55 µm). Petals 1.5 × 1 mm, oblong, 3-veined in pink, glandular, apex entire or indistinctly 3-dentate. Labellum 2 mm long, thick, creamy yellow with darker pink markings, attached to the column-foot by a short ligament. Column 1.5 mm long, thick, narrowly winged with dorsolaterally an incurved foot. Anther cap 0,6 × 0,63 mm, creamish yellow, bilocular. Pollinia 2, yellow, ca. 0,3 × 0,3 mm.

Geographic distribution and phenology: Endemic to the states of Karnataka and Kerala (India). Flowering occurs from June to July.

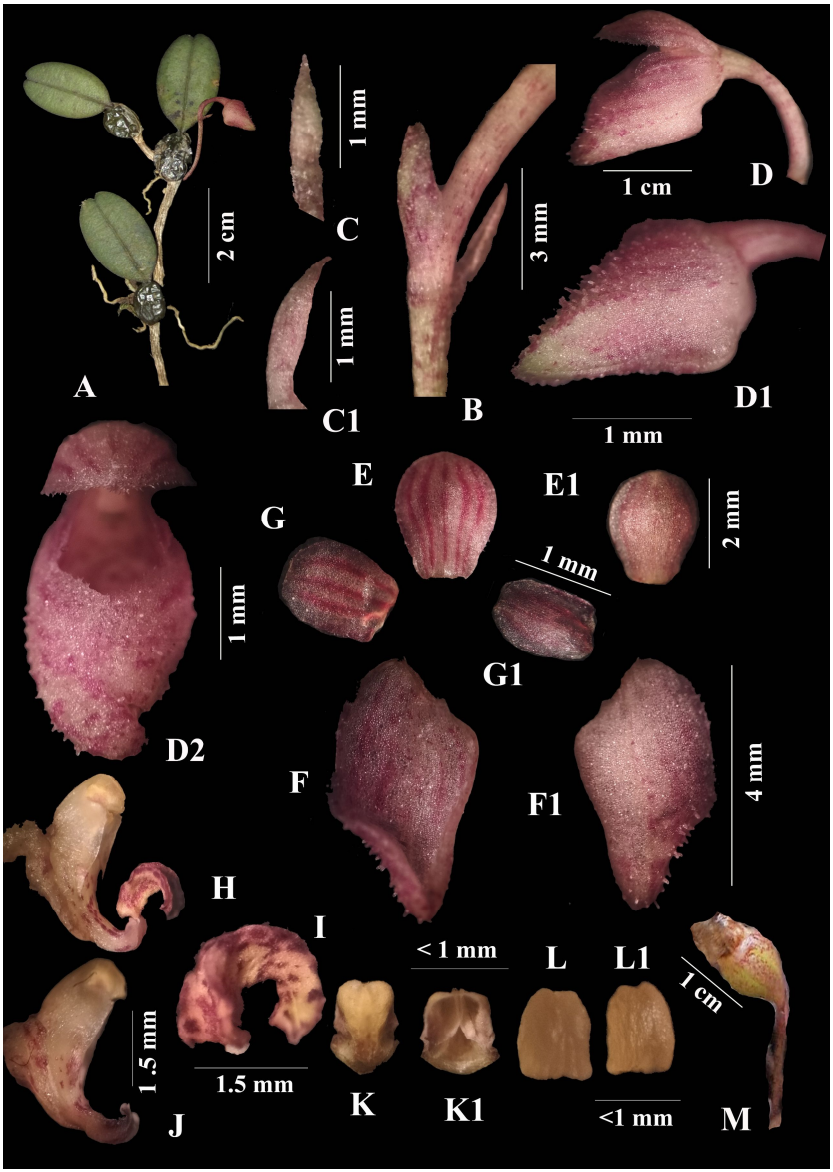

Figure 1: ***Bulbophyllum rheedei.*** A – habit; B – fragment of the raceme with bracteole and floral bract; C – bract; C1 – bracteole; D – flower, lateral view; D1 – flower, partial ventral view; D2 – flower, front view; E-E1 – dorsal and ventral views of dorsal sepal; F-F1 – dorsal and ventral views of lateral sepal; G-G1 – dorsal and ventral views of petal; H – column with labellum; I – labellum, lateral view; J – column; K-K1 – dorsal and ventral views anther cap; L-L1 – pollinia. M – capsule. Plate: Shreyas Betageri.

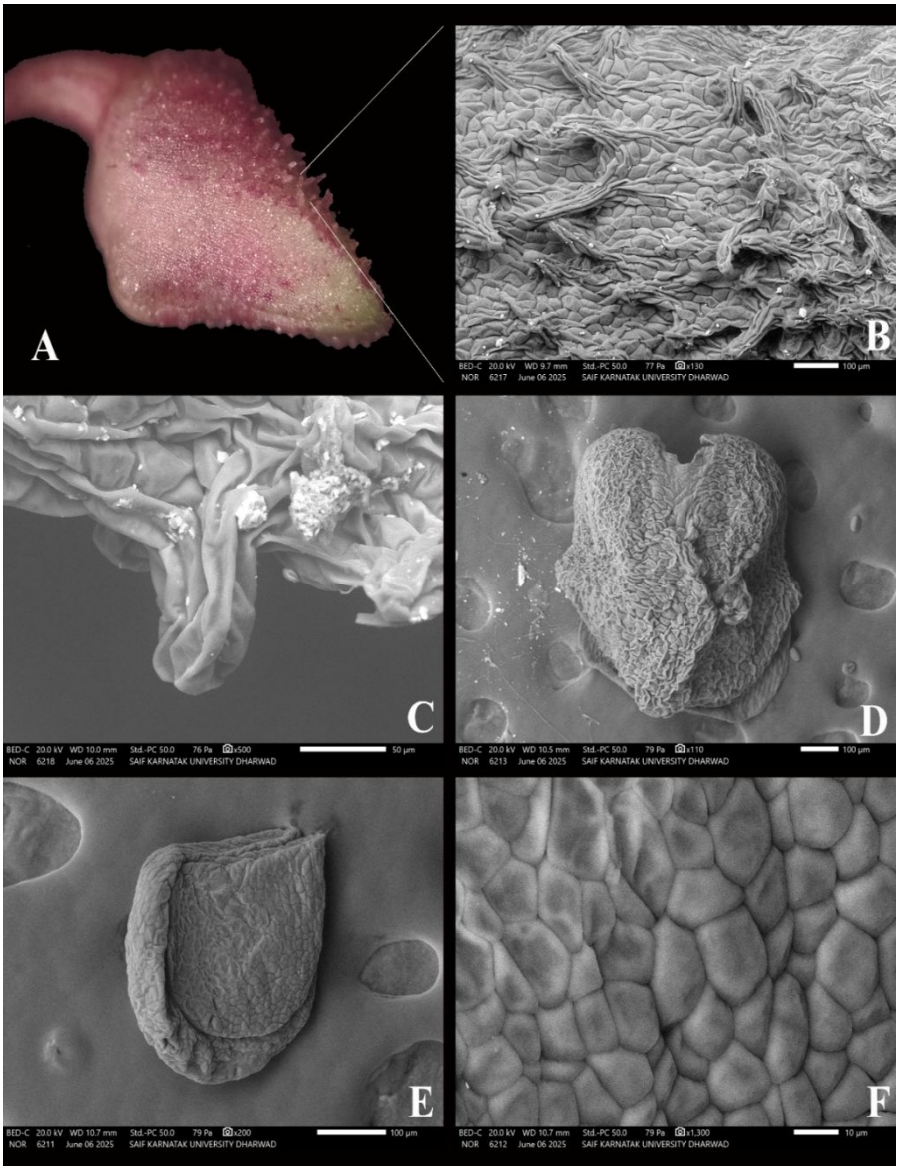

Figure 2: ***Bulbophyllum rheedei*****.** A – semi-lateral view of the flower showing marginal appendages on the lateral sepal (light microscopy); B – surface of the lateral sepal with appendages (×130); C – enlarged view of a single sepal appendage (×500); D – anther cap (×110); E – single pollinium (×200); F – close-up of pollinium surface showing cellular texture (×1300). SEM Photograph: DST-SAIF-USIC Karnataka University Dharwad.

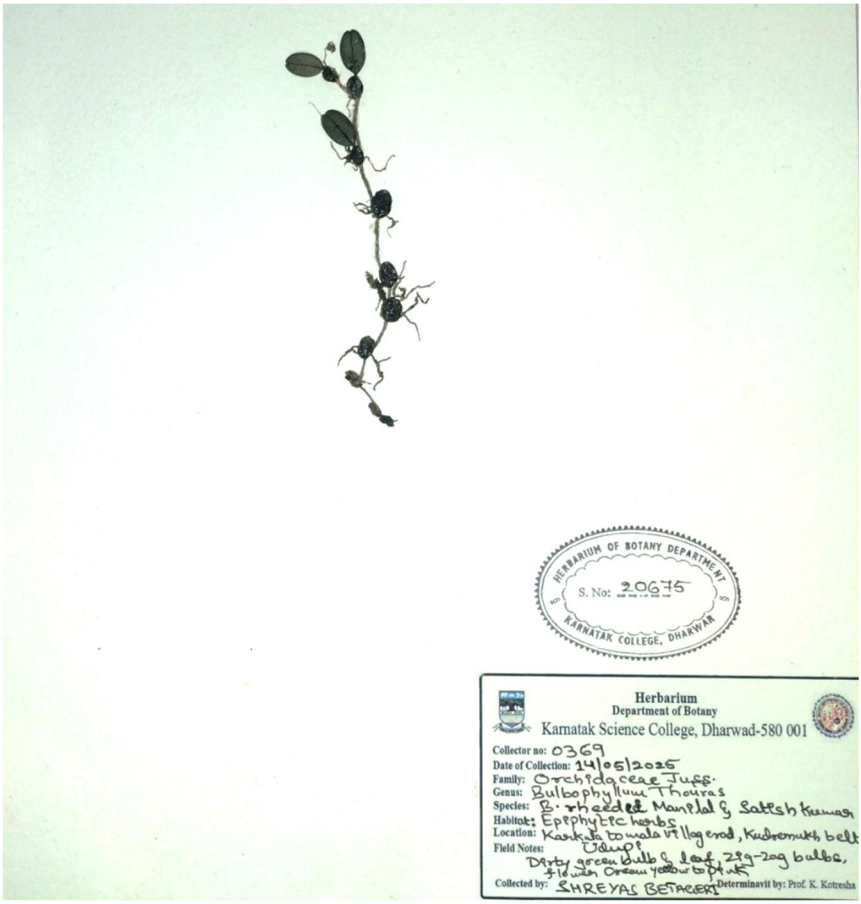

Figure 3. ***Bulbophyllum rheedei.*** ©Herbarium deposited at Karnatak Science College, Dharwad (HKSCD).

Anatomical observations on leaf and pseudobulb structure

The leaf is coriaceous, with a thick, dark cuticle covering a single-layered epidermis. The mesophyll consists of elongated cuboidal palisade parenchyma and compact spongy parenchyma cells, tightly packed with no intercellular spaces. Vascular bundles are small, sparsely distributed, and centrally located. The xylem surrounds the phloem in a ring-like arrangement (Fig. 4A–D).

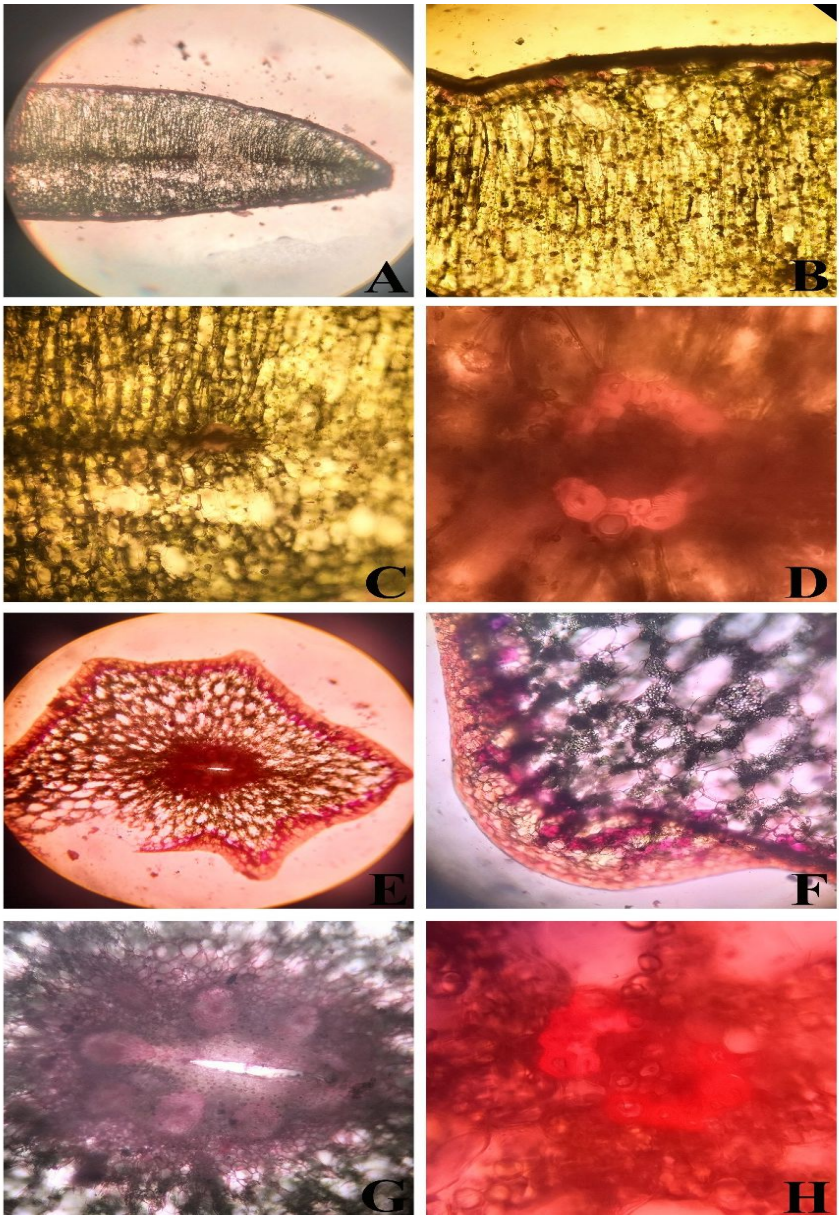

Figure 4: *Bulbophyllum rheedei*, (A-D) leaf anatomy and (E-H) pseudobulb anatomy. A – transverse section of one side leaf; B – showing epidermis and mesodermal layers; C – vascular bundle; D – enlarged vascular bundle; E – transverse section of pseudobulb; F – cuticle and epidermis; G – vascular bundles; H – single vascular bundle enlarged. [Photography under Light microscope-Magnus at 10× and 40×].

The pseudobulb is irregularly shaped, with seven prominent angles. It is covered by a thick cuticle and a uniseriate epidermis composed of small, cuboidal cells. The hypodermis is sclerenchymatous and contains large intercellular air spaces. There are seven to eight closed vascular bundles, each containing xylem and phloem, and the structure lacks a central pith (Fig. 4E–H).

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