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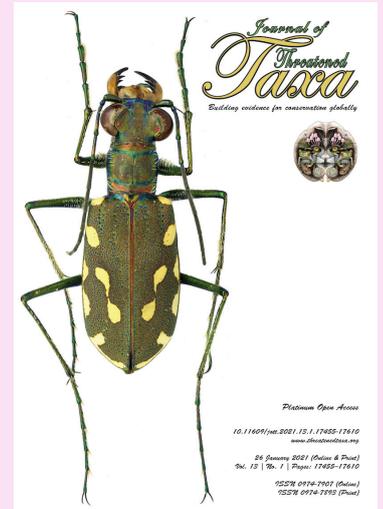
NOTE

***BULBOPHYLLUM SPATHULATUM* (ORCHIDACEAE), A NEW RECORD FOR BHUTAN**

Pema Zangpo, Phub Gyeltshen & Pankaj Kumar

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Bulbophyllum spathulatum (Orchidaceae), a new record for Bhutan

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Bulbophyllum Thouars (1822) is one of the largest genera in family Orchidaceae comprising approximately 2,200 species, distributed in the tropical and subtropical regions of the world with the richest diversity in the tropics of Africa and Asia (Pearce & Cribb 2002; Chen & Vermeulen 2009; Chase et al. 2015; Gyeltshen et al. 2020). In Bhutan, the genus is represented by 57 species from 13 sections distributed mostly in eastern, western, and southern parts of Bhutan (Gurung 2006; Dalstrom et al. 2017; Gyeltshen et al. 2020).

During a recent floristic exploration in the Subrang and Pantang under Zhemgang District in 2019, the first author encountered a small population of an unfamiliar orchid growing on a tree. For initial examination sufficient photographs were taken. After critical examination of morphological parts, careful scrutiny of herbarium materials and literatures (Reichenbach 1970; Seidenfaden 1970, 1973; Garay et al. 1994; Pearce & Cribb 2002; Chen & Vermeulen 2009; Averyanov 2016), this species was identified as *Bulbophyllum spathulatum* (Rolfe ex E.Cooper) Seidenf. and this is a new record for Bhutan (Figure 1).

Originally described as *Cirrhopetalum spathulatum* Rolfe ex E.W.Cooper, this species was circumscribed

under the genus *Bulbophyllum* by Seidenfaden (1970) as *Bulbophyllum spathulatum*. Alternatively, Garay et al. (1994) described a new genus as *Rhytionanthos* where based on fusion of lateral sepals to form a synsepal by inward twisting and connation of their edges and included *Bulbophyllum spathulatum* as *Rhytionanthos spathulata*, however, this concept has changed. The genus *Rhytionanthos* has now been merged under *Bulbophyllum* (Pridgeon et al. 2014) and accordingly followed thereafter (Govaerts et al. 2020).

Bulbophyllum spathulatum had been included in the Orchids of Bhutan by Pearce & Cribb (2002) based on its occurrence in adjacent areas in India, however, it was never collected from within the political boundaries of Bhutan. Hence, the present collection of the species from Zhemgang District, Bhutan stands as a new record for Bhutan. Later, plants were also discovered at one more area in Zhemgang District followed by two sites in Wangduephodrang District, however, no voucher specimens were collected due to the rarity of the species. Detailed morphological descriptions, updated distribution, phenology, and ecology along with distribution map and colour photographs are provided based on the collected specimens.

Editor: Anonymity requested.

Date of publication: 26 January 2021 (online & print)

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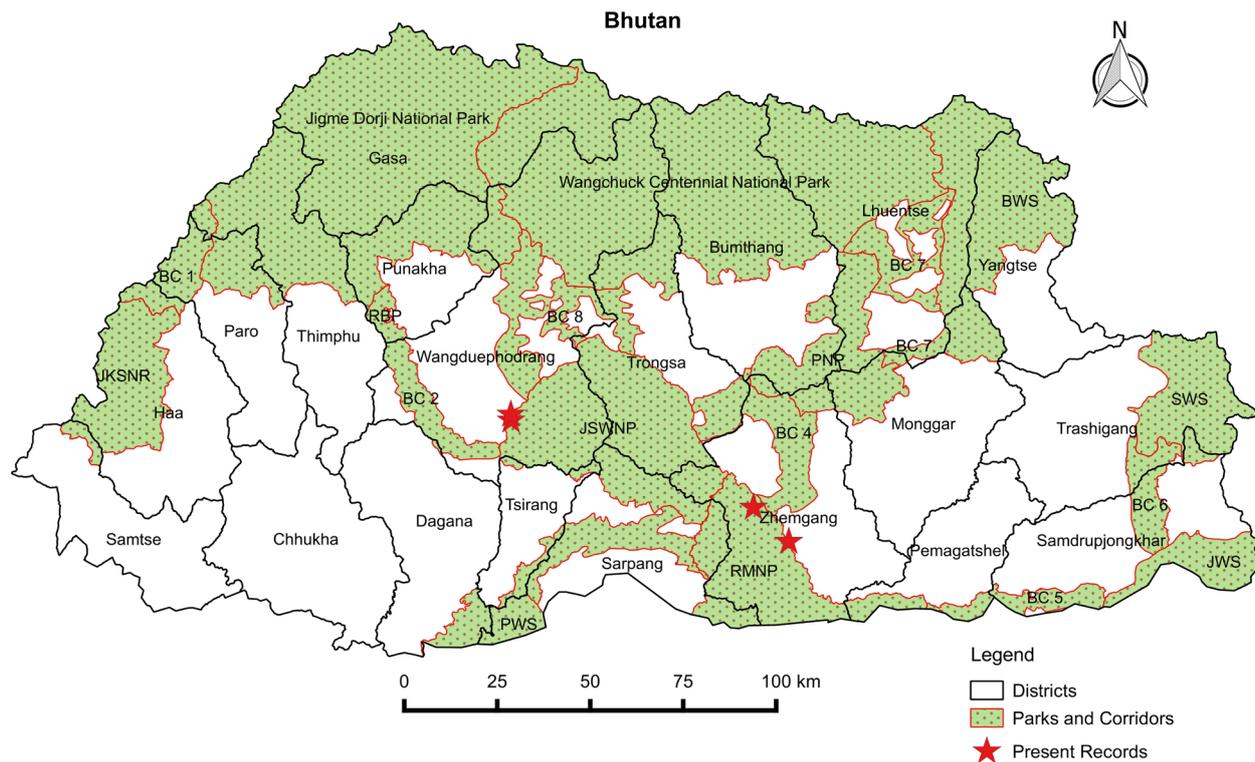


Figure 1. Distribution of *Bulbophyllum spathulatum* at Pangkhar block in Zhemgang District in Bhutan.

Bulbophyllum spathulatum (Rolfe ex. Cooper) Seidenf. Bot. Tidsskr. 65: 347 (1970); *Cirrhopetalum spathulatum* Rolfe ex. Cooper in Orchid Rev. 37: 106 (1929); *Rhytionanthos spathulatum* (Rolfe ex Cooper) Garay, Hemer & Siegerist in Nordic J. Bot. 14(6): 639 (1994).

Type: Thailand, Bangkok, Roebelen 292-12 (K000829943) (KI-Holotype).

Epiphytic herb. Roots terete, ca. 1mm thick, caespitose. Rhizome creeping, terete, 2.5–9.3 cm long, 1.5–3.0 mm wide, covered with membranous sheaths, old sheaths brownish, new sheaths greenish-yellow with purplish-mauve spotted, 1.0–1.5 cm long, 1.0–1.2 cm wide, persistent, internodes of rhizome 1.0–1.4 cm long. Pseudobulbs cylindrical-ovoid, narrowly-ovoid, 1.5–4.0 cm x 0.6–1.5 cm wide, 2.5–9.3 cm apart from each other on the rhizome, glabrous, greenish-yellow, brownish-pale yellow with the age, longitudinal ridges present, bearing a solitary leaf at the apex. Leaf blade green, linear-oblong to oblong-elliptic, 3.5–15.0 cm long, 1.3–2.5 cm wide, entire, apex sub-acute or obtuse, base attenuate, adaxially glabrous, abaxially whitish-brown spotted and occasionally purple coloured, fleshy, coriaceous to leathery. Petiole yellowish-green, 0.4–1.0 cm long, ca. 0.2 cm wide, longitudinally channeled,

glabrous, obliquely notched on the pseudobulb, conduplicate. Inflorescences arising from the base of the pseudobulbs, sub-umbellate, ca. 6.5–7.0 cm long, 4–10 flowers, erect; peduncle with 4–5 sheaths, 1.5–2.5 cm long, pale yellow with mauve streaks and spotted towards apex, sheathing bracts broadly ovoid to oblong-ovoid, 0.8–1.2 cm x 0.7–0.9 cm wide, thin, glabrous, basal bracts turning brownish with the age. Flowers, 4.2–5.0 cm long including pedicel and ovary, resupinate, golden-yellow with reddish-brown spotted. Floral bracts oblong-lanceolate, 10–14 x 4–5 mm, thin, margin entire, apex acute, base truncate, glabrous, whitish-pink, three-veined. Pedicel and ovary pale yellow with reddish-maroon spots, 1.5–2.5 cm long, 1.5–2.0 mm wide. Dorsal sepals obovate, 7.5–9.0 x 4.0–4.5 mm when flattened, yellowish-green with reddish-brown spots mostly in the middle, two prominent reddish spots at the base, margin entire, apex obtuse and slightly mucronate, base truncate, abaxially glabrous, adaxially papillose, concave, three-veined. Lateral sepals fused to form slipper-shape, 1.6–2.2 cm long, 5.5–6.5 mm wide, upper and lower edges connate to forming a synsepal; synsepal 10–11 mm wide, golden-yellow with reddish-brown, outer surface minutely warty with white papillae including margins, apex rounded and slightly incurved,

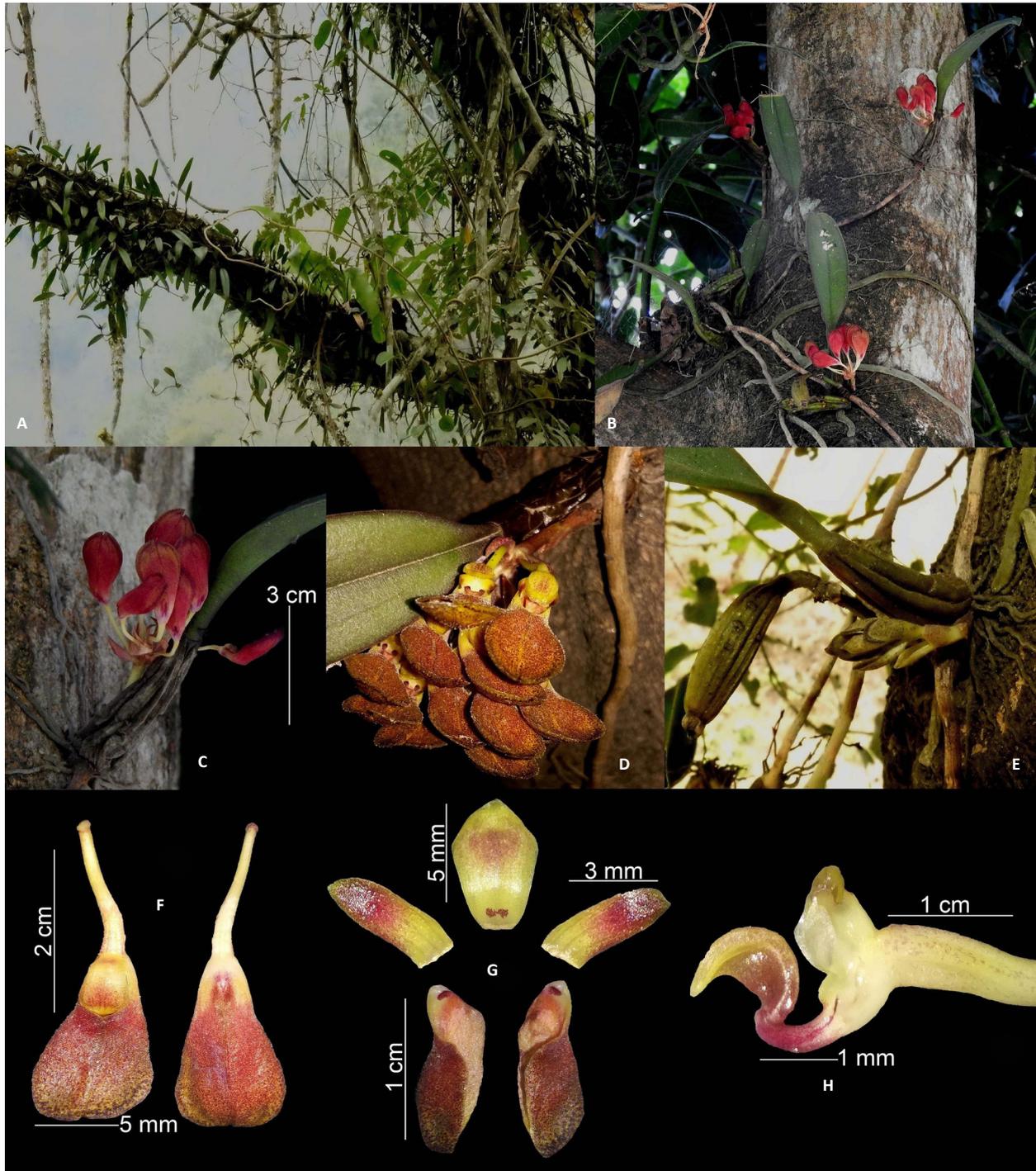


Image 1. *Bulbophyllum spathulatum* (Rolfe ex E.W.Cooper) Seidenf.: A & B—Plant in habitat | C—inflorescence | D—top view of flowers | E—fruit and flower shoot | F—flowers (adaxial and abaxial surface view) | G—dorsal sepal, petals and lateral sepals (adaxial view) | H—column and lip attached to ovary (lateral view). © A–E - Pema Zangpo; F–H - Phub Gyeltshen.

base obliquely truncate to rounded when dissected, two prominent reddish-maroon spots at base. Petals oblong to oblong-lanceolate, 4.0–5.0 × 1.2–2.0 mm, yellow with deep maroon-purplish, falcate towards left, slightly incurved, margin entire, revolute, apex obtuse,

base obliquely truncate, surface glaucous, left petal slightly longer than the right petal. Lip thick and fleshy, ovate–lanceolate, 4–4.2 mm long, 1.5–2.0 mm wide, glabrous, side ridges present, margin entire, mobile, recurved, base with reddish-brown and yellow towards

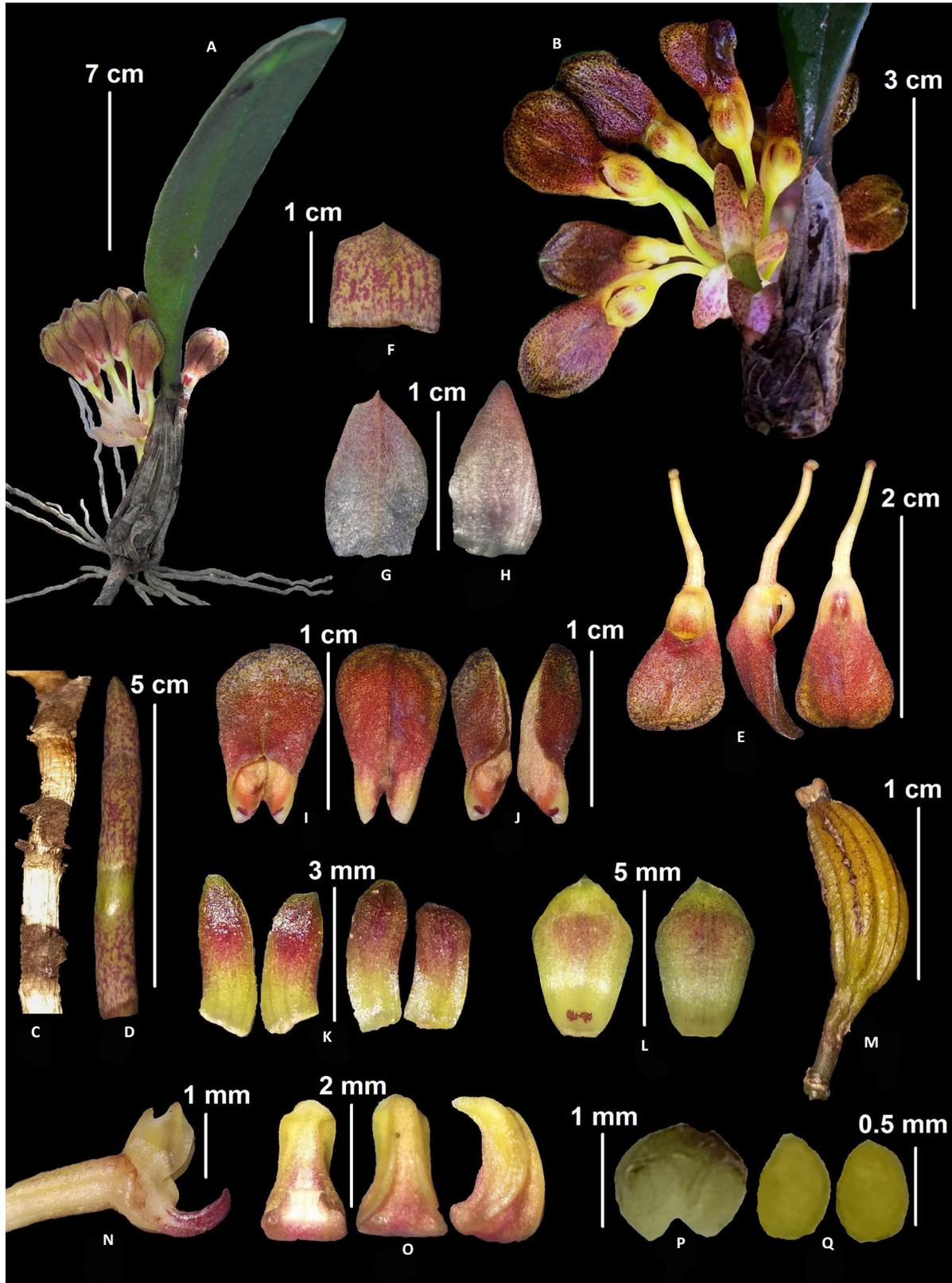


Image 2. *Bulbophyllum spathulatum* (Rolfe ex E.W.Cooper) Seidenf.: A—plant in habit | B—inflorescence | C & D—rhizomes (mature (C) and young (D)) | E—flowers (adaxial, lateral and abaxial view) | F—rhizome sheath (adaxial surface) | G—inflorescence bract (adaxial surface) | H—flower bract (adaxial surface) | I & J—lateral sepals (adaxial, abaxial and dissected view) | K—petals (abaxial and adaxial surface view) | L—dorsal sepals (abaxial and adaxial surface view) | M—fruit | N—column (lip and operculum removed) | O—lip (abaxial, adaxial and lateral view) | P—operculum | Q—pollinia. © A–B - Pema Zangpo; C–Q - Phub Gyeltshen.

the apex, apex obtuse, base broad, truncate to slightly auriculate. Column yellow, quadrangular, 1.8–2.0 mm long, 2mm wide, forwarded and incurved foot; foot rectangular, 2.0–2.5 mm long, 1.5mm wide, purplish-maroon, minutely wing margins with maroon lining, margin entire, prominent triangular shape at abaxial surface, column wall with prominent deep-maroon lines one on each sides separating the column wing, a swollen protruding structure at the inter-connecting inner column and column foot bases. Stelidia deltoid, ca. 1mm long 1.5mm wide, yellow. Operculum sub-spherical, cucullate, ca. 1.4–1.6 mm long, 1.0–1.2 mm wide, white towards the base from middle and yellowish-green towards the apex. Pollinia four in two pairs, ovoid, ca. 1.2 × 1.0 mm, glaucous, slightly flat and slightly curved towards apex from the middle. Fruits yellowish-green, clavate, 2.5–2.7 cm long, 1.5–1.7 cm wide, straight or slightly curved, longitudinally grooved (Figures 1; Image 1, 2).

Phenology: Flowers from mid-February to end of March, fruits mature from May to September.

Habitat: *Bulbophyllum spathulatum* was found growing as epiphyte on the tree trunks of *Canarium strictum* in the subtropical forest at around 350m along the river bank. Other associated trees and shrubs in its habitat comprises of *Tetrameles nudiflora* R.Br., *Ficus auriculata* Lour., *Maesa chisia* Buch.-Ham. ex D.Don., *Terminalia grandiflora* Benth., *Alangium alpinum* (C.BClarke) Smith. & Cave, *Alstonia neriifolia* D.Don., *Celastrus paniculatus* Willd and *Boemeria* sp. The associated orchids sharing the same habitat are *Dendrolirium lasiopetalum* (Willd.) Chen & Wood and *Vanda ampullacea* (Roxb.) L.M. Gardiner.

Updated Global distribution: Bhutan, China, India, Myanmar, Laos, Thailand, and Vietnam.

Specimens examined: Vietnam: 2 (P00355148) (P!), 01.i.1954, Annam, Dalat, Vietnam, C.R.S.T. 274; (P00355149) (P!), 01.i.1957, Annam, Dalat, Vietnam,

Grillet s.n.; (P00355150) (MNHN-P!), 1,000m, Region de Dalat, Pougour, Vietnam, P. Tixier s.n.. Thailand: 0916 (K000597358) (K!), 23.ii.1931, 1,000m, Pu Kio, Chaiyapum, Thailand, A.F.G. Kerr 292; (K000829943) (K!), 10.i.1973, Thailand, C. Roebelen s.n. India: 131 (BM000516930) (NHMUK!), northern Sikkim, Sikkim, India, 01.iii.1891, R. Pantling 131; (P00355147) (P!), 01.iii.1891, tropical valleys, India, R. Pantling s.n.; (L1488962) (NBC!), Sikkim, India, R. Pantling s.n. Bhutan: 015–016 (THIM), Subrang, Trong, Zhemgang District, 20.ii.2020, 1,130m, P. Zangpo & P. Gyeltshen 017.

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