

FLORA OF GAYO PLATEAU IV: A NEW SPECIES OF *BRYOBIUM* (ORCHIDACEAE) FROM GAYO PLATEAU, SUMATRA

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ABSTRACT. A new species of *Bryobium* is described based on specimens collected in northern Gayo Plateau, Sumatra. It differs from *B. hyacinthoides* in the morphology of the calli on the lip, flower colour, and in the broader leaves. It is provisionally assessed as Critically Endangered (CR) due to its narrow range and imminent threats to its habitat. A detailed description, photographs, an illustration, and a key to Sumatran *Bryobium* species are provided.

KEYWORDS/PALABRAS CLAVE: clave, epífita, epiphyte, key, Lista Roja, Red List, taxonomía, taxonomy, Indonesia

Introduction. *Bryobium* Lindl. is a genus of usually epiphytic herbs with about 27 accepted species (Ng *et al.*, 2018; POWO, 2026). The genus used to be included in a broader concept of *Eria* Lindl., which was shown to be polyphyletic (Ng *et al.*, 2018). *Bryobium* is difficult to distinguish from *Pinalia* Lindl., as discussed by Ng *et al.* (2018), even though it was found to be more closely related to *Ceratostylis* Blume. The latter is easily distinguished by the lack of pseudobulbs, which are always present in *Bryobium*. In addition, *Bryobium* has inflorescences with two or more flowers, whereas those of *Ceratostylis* are always single-flowered. We refer to Ng *et al.* (2018) for a discussion of the differences between *Bryobium* and *Pinalia*. The centre of diversity of *Bryobium* is in New Guinea with 10 or 11 species (De Vogel *et al.*, 2025).

Excluding the new species described below, Sumatra is home to four species of *Bryobium* with one of them endemic, *B. rubiferum* (J.J.Sm.) Schuit., Y.P.Ng & H.A.Pedersen (Mustaqim *et al.*, 2021-onwards). The most recent taxonomic account of Sumatran *Bryobium* was published by Comber (2001), who included its species in *Eria*. Since then, no fur-

ther taxonomic studies were carried out on the genus in Sumatra.

In 2021, a plant belonging to *Bryobium* was collected by local orchid enthusiasts from northern Gayo Plateau, Sumatra. It was then cultivated in Bali by JC and subsequently flowered there. An analysis of the flowers showed that the plant differed from the known species of *Bryobium* from Sumatra. Further attempts at identification showed that our plant was superficially similar to *B. pululum* (Schltr.) Schuit., Y.P.Ng & H.A.Pedersen, a Sulawesi endemic (Schlechter, 1911; 1934, as *Eria pulla* Schltr.), but the common and widespread *B. hyacinthoides* (Blume) Y.P.Ng & P.J.Cribb is perhaps the most similar in terms of lip structure. It was concluded that our plant belonged to an undescribed species.

Further explorations in 2024 and 2025 in the original habitat in northern Gayo Plateau were made and three wild populations of the new *Bryobium* species were located. Unfortunately, it was found that the small populations were already threatened by habitat conversion. Here, we describe the new species and provisionally assess its conservation status.

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Material and methods. Material used in this study was gathered during expeditions carried out by WAM in northern Gayo Plateau since 2022, where he and his team finally rediscovered the species in September 2025. A living specimen from the original gathering was cultivated by JC in Bedugul, Bali; unfortunately, it proved impossible to ascertain the exact collecting locality of this specimen. Voucher specimens were prepared following Davies *et al.* (2023). Identifications were made by comparing the description of the plant to protologues and relevant literature (e.g., Comber, 1990, 2001; Seidenfaden & Wood, 1992). Specimens including types were observed in BO and K or in digital herbaria accessed through JSTOR Global Plants (JSTOR, 2026). The IUCN Red List conservation status assessment was prepared by calculating Area of Occupancy (AOO) and Extent of Occurrence (EEO) using GeoCAT (Bachman *et al.*, 2011; <https://geocat.iucnredlist.org/>) following IUCN guidelines (IUCN, 2012; IUCN Standards and Petitions Committee, 2024).

TAXONOMIC TREATMENT

Bryobium scutatum Mustaqim, J.Champion & Schuit., *sp. nov.* (Fig. 1–3).

TYPE: INDONESIA. Aceh: Aceh Tengah, Jagong Jeget, Paya Tungel (4°21'24.3"N 96°44'59.4"E), 1850 m, 29 Sep 2025, Mustaqim *et al.* 4045 (holo: UIDEP; iso: FIPIA).

DIAGNOSIS: The new species is superficially similar to *B. pullum* from Sulawesi but differs in having larger floral parts (e.g., sepals 9.5–10.0 vs. 6 mm), a lip mid-lobe (epichile) with a central callus and two calli at the base (*vs.* mid-lobe without calli), lip not constricted (*vs.* lip abruptly constricted near the middle), basal calli of the lip shield-like (*vs.* basal calli ridge-like). The base of the lip is dark reddish maroon in *B. scutatum*, pinkish red in *B. pullum*. In the structure of the lip the new species is most similar to *B. hyacinthoides*, but *B. scutatum* has the basal calli of the lip mid-lobe transverse, not decurrent on the mid-lobe (*vs.* longitudinal and decurrent on the mid-lobe in *B. hyacinthoides*, so that the central callus on the mid-lobe is situated between the ridges of the basal calli in *B. hyacinthoides*, where-

as the central callus on the mid-lobe of *B. scutatum* is isolated); the calli on the hypochile of the lip are flat and shield-like in *B. scutatum* but raised and ridge-like in *B. hyacinthoides*. The lip is dark reddish maroon at the base in *B. scutatum*, whitish at the base in *B. hyacinthoides*. *Bryobium scutatum* usually has relatively broader leaves (5.6–8.0 cm *vs.* 3–6 cm wide) while of similar length, and the floral bracts are up to twice as long as in *B. hyacinthoides* (*ca.* 9 *vs.* *ca.* 4.5–6.0 mm).

Epiphytic, sympodial *herb*, up to *ca.* 40 cm tall. *Rhizome* creeping, *ca.* 6 mm across, with numerous roots; *roots* up to 1.2 mm across, white pubescent-papillose. *Pseudobulbs* *ca.* 1 cm apart, bifoliate at the apex, ovoid, 3–11 × 1–2 cm, covered by up to 9 sheaths; *sheaths* triangular, conduplicate, shorter at the base of the pseudobulb, becoming longer toward the apex, 2–14 × 1.5–4.4 cm, brown and papery, marcescent, becoming fibrous with age. *Leaves* petiolate, petiole 6.5–22.1 cm long, sheathing for *ca.* 2/5 of the petiole length, articulated above the rigid sheath, glabrous; lamina narrowly elliptic, 29.6–38.2 × 5.6–8.1 cm, base tapering, apex shortly acuminate, shallowly bilobed, unequal, glabrous, medium green above, pale green beneath; midrib and lateral veins prominent beneath, sunken above, two larger longitudinal lateral veins with 3 smaller veins in between. *Inflorescence* patent to arching, with peduncle 3 cm long, rachis 6.5 to 13 cm long, bearing 17 to 20 flowers; peduncle and rachis pinkish, very shortly white-tomentose; peduncle-scales 5–6, white, or with margin pink-tinged; floral bracts ovate or ovate-oblong, 8–9 × 3–4 mm, acute, dorsal side pubescent. *Pedicele-and-ovary* 5–6 mm long, densely white tomentose, ovary slightly wider than pedicel, bluntly 6-ribbed. *Flowers* non-resupinate, spreading, *ca.* 1.6 long, *ca.* 2.0 cm wide, white, with apical abaxial side of sepals purplish-pink, petals white. *Dorsal sepal* hooded, oblong, 9.5–10.0 × 5.0–5.5 mm, apex obtuse, 5-veined, abaxially appressed pubescent. *Lateral sepals* obliquely triangular, 10–11 × 10–11 mm, free part 8.5–9.5 × 7–8 mm, 5-veined, sometimes with additional smaller veins, apex obtuse; abaxially with a strong keel and pubescent, adaxially glabrous. *Petals* narrowly obovate, 9.0–9.5 ×



FIGURE 1. *Bryobium scutatatum* showing a plant in the wild (A) and flowers (B). Photographs by Wendy A. Mustaqim.

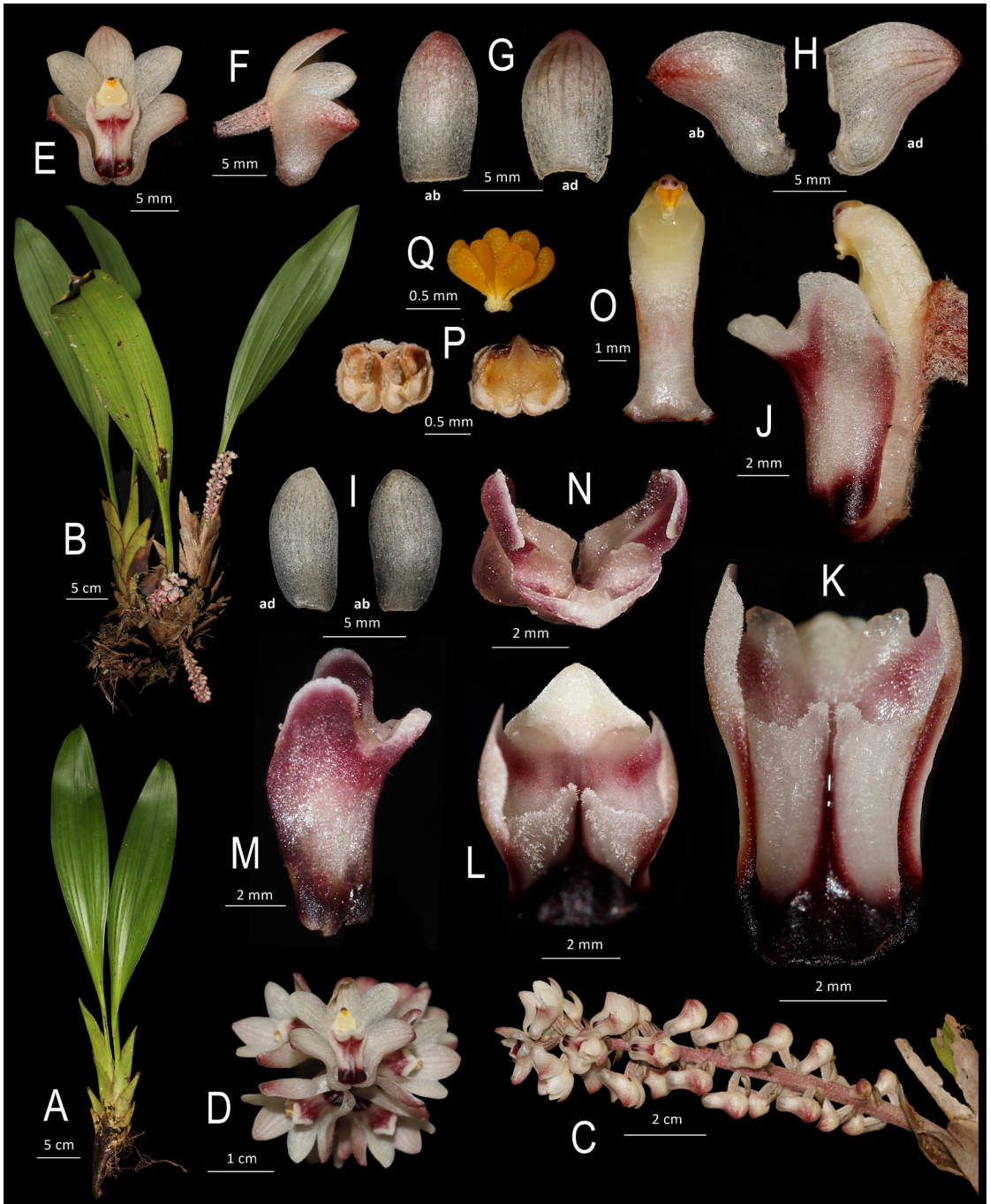


FIGURE 2. Morphology of *Bryobium scutatatum*. A. Sterile stem. B. Plant in flower. C. Inflorescence. D. Flowers. E. Flower, front view. F. Flower, lateral view. G. Dorsal sepals, abaxial and adaxial views. H. Lateral sepals, abaxial and adaxial views. I. Petals, adaxial and abaxial views. J. Column and lip, lateral view. K. Lip, adaxial view. L. Lip, adaxial view. M. Lip, lateral view. N. Lip, front view. O. Column and column-foot, ventral view. P. Anther cap, ventral views without and with the pollinarium. Q. Pollinia. Photographs after *Mustaqim et al. 4045* by Wendy A. Mustaqim (A–L and O–P) and after *cult. J. Champion s.n.* by Jeffrey Champion (M–N).

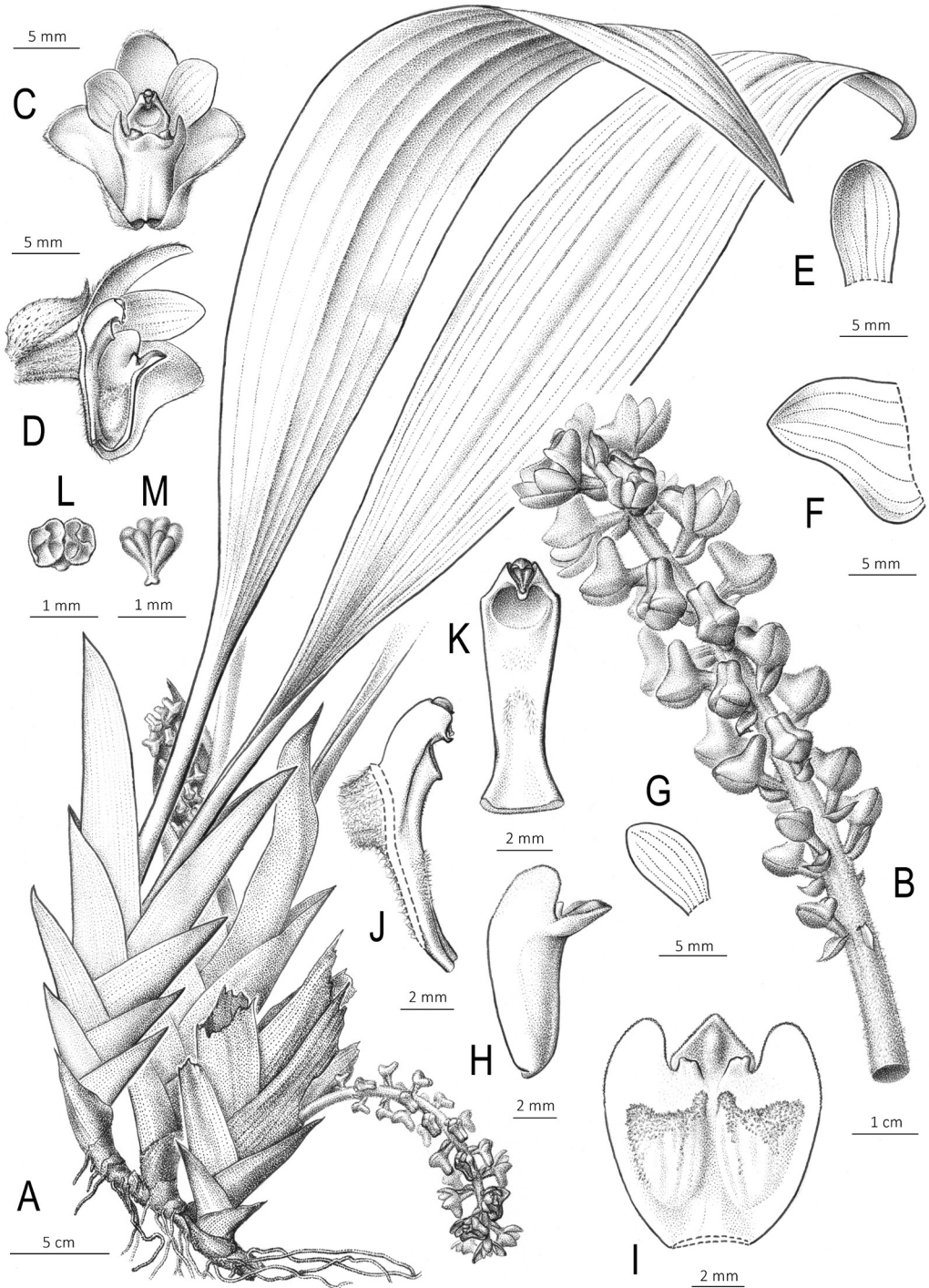


FIGURE 3. Morphology of *Bryobium scutatatum*. A. Plant. B. Inflorescence. C. Flower, front view. D. Flower, lateral view with lateral sepal and petal removed on one side. E. Dorsal sepal. F. Lateral sepal. G. Petal. H. Lip, lateral view in natural position. I. Lip, flattened. J. Column and column-foot, lateral view. K. Column and column-foot, ventral view. L. Anther cap. M. Pollinia. Drawing by Yuanito Eliazar after *Mustaqim et al.* 4045.

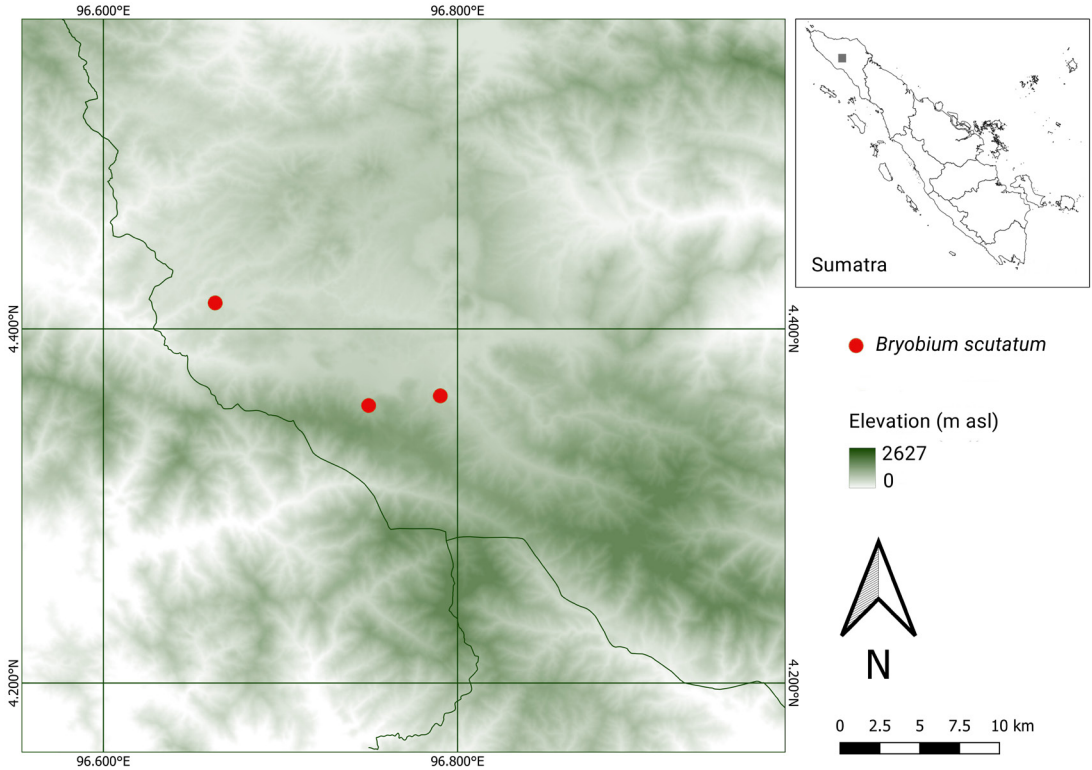


FIGURE 4. Geographic distribution of *Bryobium scutatum*. Map created by Wendy A. Mustaqim using QGIS (2026).

4.0–4.5 mm, slightly falcate, slightly convex, apex obtuse, 3-veined, glabrous. *Lip* firmly attached to the column-foot, 8–9 × 5.0–5.5 mm, about the same length and *ca.* 8 mm wide when spread, more or less flabellate in outline, 3-lobed, when flattened 8.5 × 8 mm; lateral lobes erect, when flattened porrect, 2.2–2.5 × 2.0–2.5 mm, oblong, slightly falcate, apex rounded; epichile between the lateral lobes with two flat, obliquely trapezoid, papillose, shield-like calli separated by a deep groove and extending from a little above the base of the lip to a little below the base of the mid-lobe, the calli obliquely truncate at apex with their longest side along the groove; mid-lobe broadly triangular, 2.5–3.0 × 3.8–4.0 mm, obtuse, decurved, finely papillose, with a median, longitudinal, oblong callos along most of its length, at the base with two transverse, smooth, slightly bilobed calli that are not decurrent on the mid-lobe. *Column* straight, slightly curved at apical part, 3.5 × 2.8–3.0 mm, dorsally without keel, without steldia; stigma

transversely broadly elliptic, with protruding lower margin; column-foot straight, 6.0–6.5 mm long. *Anther* transversely oblong, 0.6 × 1.0 mm; pollinia 8, orange, pyriform, in two clusters; caudicles and viscidium very small.

DISTRIBUTION: Endemic to Sumatra; only known from the northern Gayo Plateau (Fig. 4).

ADDITIONAL SPECIMENS EXAMINED: Sumatra, Aceh, Aceh Tengah, Linge, Wih Keruh (4°21'43.0"N 96°47'58.0"E), 1520 m, 13 Oct 2025, *W.A. Mustaqim et al.* 4046 (FIPIA, UIDEP, paratype of *B. scutatum*); *ibid.* Aceh Tengah, no detailed locality, cultivated at Bedugul, Bali, *J. Champion s.n.* (UIDEP, paratype of *B. scutatum*); Java, Mt. Salak, Blume [249], (L, L0059858, holotype of *B. bicristatum* (Blume) Schuit., Y.P.Ng & H.A.Pedersen); Java, Mt. Salak, *Blume s.n.* (L, L0059876, holotype of *B. hyacinthoides* (Blume) Y.P.Ng & P.J.Cribb); without locality, 1907, *Bogor cult.* 152 (L.L0059908, probable isosyntyne of *B. punctatum*

(J.J.Sm.) Schuit., Y.P.Ng & H.A.Pedersen); Sumatra, Ophir District, Talu [Talo], *Groeneveldt cult.* 387 (L L0059899, syntype of *B. rubiferum* (J.J.Sm.) Schuit., Y.P.Ng & H.A.Pedersen). Photographic records: Aceh, Aceh Tengah, Pegasing, Berawang Baro (4°24'52.8"N 96°39'47.3"E), 1425 m, captured on 29 Sep 2025 by W.A. Mustaqim (see image 1 and image 2, not coll.).

HABITAT AND ECOLOGY: In montane forest on gravel, also in montane riverine as well as bog forest, usually growing on the lower part of tree trunks in light shaded to rather exposed positions. Elevation 1425 to 1850 m.

PHENOLOGY: Flowering observed in September and October in the wild, in cultivation at Bedugul (Bali) in February. Fruiting period unknown.

ETYMOLOGY: From the Latin *scutatus*, 'carrying a shield', referring to the shield-like calli on the lip.

IUCN RED LIST CONSERVATION STATUS: This species is known from three locations in northern Gayo Plateau with an EOO of 20.67 km² reaching a Critically

Endangered (CR) threshold and an AOO of 12.00 km² falling within the Endangered (EN) threshold. The total number of plants seen is less than 10 spread across three populations. Two populations are sited in small and isolated forest fragments, which are highly threatened by future clearing due to forest conversion to agricultural land, i.e., coffee plantations, and by associated activities such as road building. Based on multiple years of exploration by WAM and colleagues in northern Gayo Plateau, this species appears to be rare. Therefore, *Bryobium scutatum* is assessed here as Critically Endangered according to IUCN criteria (CR B2ab(iii, iv)).

NOTES: *Bryobium scutatum* is the fifth member of the genus in Sumatra. Although *B. pullum* from Sulawesi is superficially similar, the nearest relative appears to be the well-known *B. hyacinthoides* from Peninsular Malaysia, Sumatra, Java, Borneo and Bali, at elevations between 1100 and 1700 m. The latter is the most similar in the number and configuration of the callosities on the lip. The differences between the species mentioned are listed in the diagnosis.

KEY TO *BRYOBIUM* IN SUMATRA

- 1a. Pseudobulbs 1-leaved; flowers spotted, resupinate..... *B. punctatum* 2
 1b. Pseudobulbs 2–3-leaved; flowers not spotted, not resupinate..... 2
 2a. Leaves less than 2 cm wide; inflorescence less than 2 cm long; dorsal sepal less than 4 mm long; flowers uniformly dark reddish..... *B. rubiferum*
 2b. Leaves more than 2 cm wide; inflorescence more than 5 cm long; dorsal sepal more than 6 mm long; flowers for the most part whitish..... 3
 3a. Dorsal sepal *ca.* 7 mm long; lip calli consisting of two ridges..... *B. bicristatum*
 3b. Dorsal sepal 9–13 mm long; lip with 5 separate calli (2 on hypochile, 3 on epichile)..... 4
 4a. Lip whitish at base; the two calli on hypochile raised, ridge-like *B. hyacinthoides*
 4b. Lip dark reddish maroon at base; the two calli on hypochile shield-like, separated by a groove..... *B. scutatum*

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AUTHOR CONTRIBUTIONS. WAM and AS wrote the text, WAM created the distribution map and provided photographs, JC provided cultivated material and photographs, and commented on the manuscript.

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CONFLICT OF INTEREST: No conflicts of interest declared.

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