



Bulbophyllum basiflorum (Orchidaceae), a new species from southeastern Xizang, China

Meng-Kai LI^{1,2,3}, Xue-Da CHEN^{1,3}, Shen-Shen PANG^{1,3}, Jian-Ping DENG², Wei WANG^{1,3}, Yan LUO^{2,*}, Zhen XING^{1,3,*}

1. Resources & Environment College, Tibet Agriculture & Animal Husbandry University, Nyingchi 860000, Xizang, China. 2. Southeast Asia Biodiversity Research Institute, Chinese Academy of Sciences & Center for Integrative Conservation, Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences, Mengla, Yunnan 666303, China. 3. The Orchid Conservation Center, Tibet Agriculture & Animal Husbandry University, Nyingchi 860000, Xizang, China. *Corresponding authors' emails: YL: luoyan@xtbg.org.cn; ZX: xztibetan@163.com.

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ABSTRACT: *Bulbophyllum basiflorum* M.K.Li, J.P.Deng & Y.Luo (Orchidaceae) from southeastern Xizang, China, is described as a new species and illustrated. This species is morphologically similar to *B. cauliflorum* and *B. stenobulbon*, but can be clearly distinguished from them by having shorter scapes adhering to rhizomes and pseudobulbs, raceme dense with 1 or 2 flowers, petals ovate, lip white with 2 longitudinal ridges, and very short column foot. The new species belongs to *Bulbophyllum* sect. *Desmosanthes*.

KEY WORDS: *Bulbophyllum cauliflorum*, *Bulbophyllum stenobulbon*, Mêdog, hybrid, sect. *Desmosanthes*, Taxonomy.

INTRODUCTION

Bulbophyllum is one of the largest genera in the Orchidaceae family with about 2200 species, and widely distributed in the tropics and subtropics of Asia, Africa and America (Chen and Vermeulen, 2009, Pridgeon *et al.*, 2014, Gamisch and Comes, 2019). Vermeulen (2014) expanded the circumscription of *Bulbophyllum* based on molecular evidence. More than 150 species from 18 sections have been recorded in China (Chen and Vermeulen 2009; Zhou *et al.*, 2016; Jin *et al.*, 2019). *Bulbophyllum* sect. *Desmosanthes* (Blume) J. J. Sm., treated as section *Corymbosa* (Blume) Averyanov by Chen and Vermeulen (2009), is characterized by sepals free, lateral sepals 1-3 times longer than the dorsal, stelia deltoïd to subulate, rounded to acuminate, not twisted inward (Chen and Vermeulen, 2009; Vermeulen, 2014). The section includes 76 accepted species distributed from Himalaya to the Philippines and Sulawesi, of which 14 species were found in China (Chen and Vermeulen, 2009; Vermeulen, 2014).

The Eastern Himalaya is one of the global biodiversity hotspots (Myers *et al.*, 2000), and southeastern Xizang is an important part of this region. Recently, some new species have been discovered in this region (Li *et al.*, 2019; Ya *et al.*, 2019, 2021; Luo *et al.*, 2020; Ma *et al.*, 2020). During the course of botanical explorations in southeastern Xizang in 2020–2022, several *Bulbophyllum* specimens with similar habits and floral characteristics were collected and transplanted to the orchid conservation center of Tibet Agriculture and Animal Husbandry University. A thorough examination of morphology and further comparative study with the specimens at herbaria, and a survey of literature revealed

that those specimens belong to *B.* sect. *Desmosanthes* and could be classified into three entities, one identified as *B. stenobulbon* C.S.P. Parish & Rchb. f., the other identified as *B. cauliflorum* Hook. f., however, the third one was apparently different from those two species and belongs to a previously undescribed species. Therefore, it is described here as a new species.

MATERIALS AND METHODS

The comparative study of morphology was based on examinations of living plants and dried specimens. Type specimens and other vouchers were deposited in the herbarium of HITBC, XZE and Tibet Agricultural and Animal Husbandry University (TAAHUC, not registered in Index Herbarium). Terminology for the morphological description follows Chen and Vermeulen (2009) and Vermeulen (2014). The types and other specimens of related *Bulbophyllum* sect. *Desmosanthes* species were examined directly or through high-resolution images available from various herbaria (e.g., K, P, MO, A, L, PE, HITBC, XZE). Identification of sections and species follows a survey of literature (Chen and Vermeulen, 2009; Vermeulen, 2014). The regional conservation status was assessed using the IUCN guidelines (2022).

TAXONOMIC TREATMENT

Bulbophyllum basiflorum M.K.Li, J.P. Deng & Y.Luo, *sp. nov.* **Figs. 1-2**

Type: CHINA. Xizang, Mêdog County, Dexing village, 95°14'26.49"N, 29°14'21.92"E, 1159 m, epiphytes on tree trunks in evergreen broad-leaved forest, 06 May 2020, M. K. Li 2020233 (holotype: HITBC 0083564!;

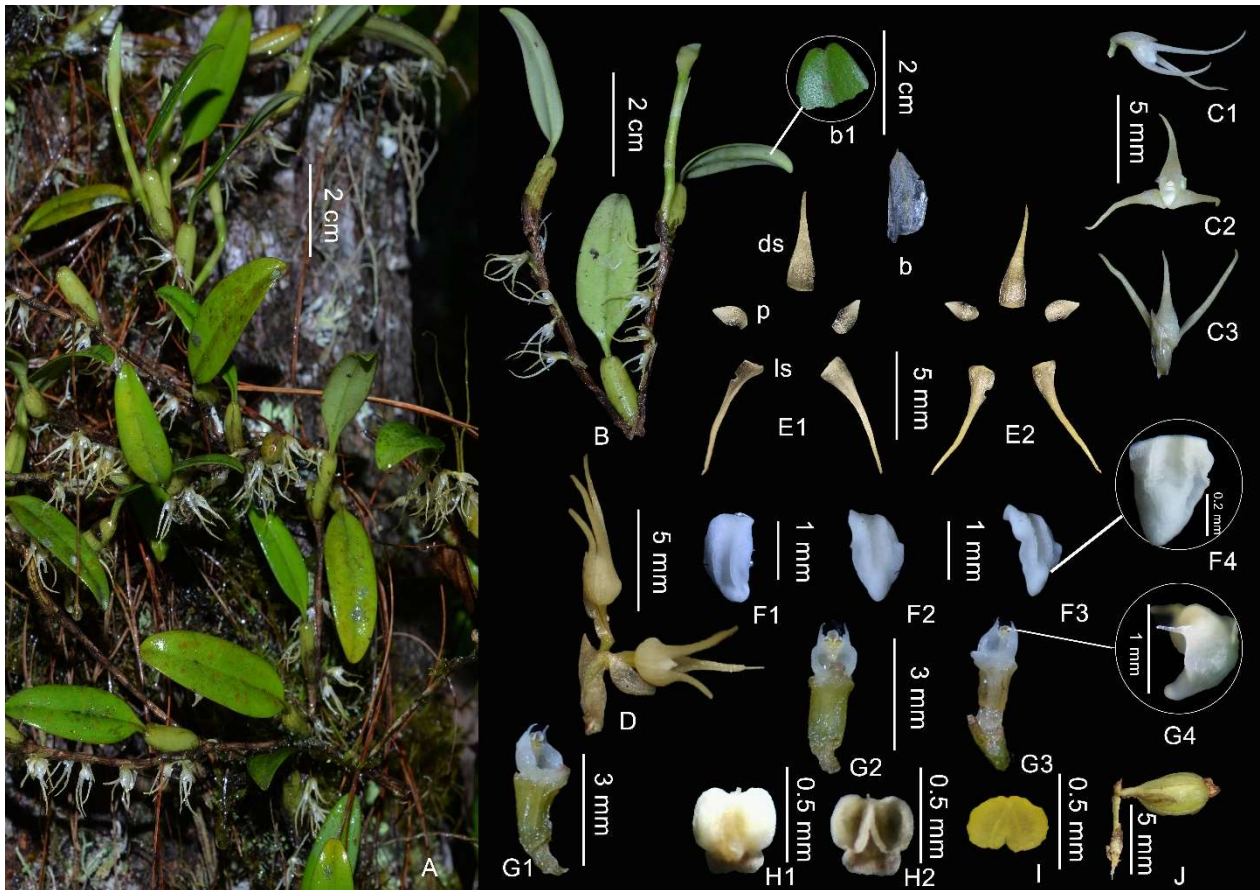


Fig. 1. *Bulbophyllum basiflorum* M. K. Li, J. P. Deng & Y. Luo **A**. plant and habitat; **B**. plant and inflorescence (b1. apex leaf); **C1-C3**. flower; **D**. inflorescence; **E1-E2**. split flower (ds. dorsal sepal, p. petal, ls. lateral sepals, b. bract); **F1-F4**. close-up of lip; **G1-G3**. column and ovary; **H1-H2**. anther cap; **I**. pollinia; **J**. fruit. (Photos: A by Zhen Xing in Mèdog, B-I by M. K. Li).

isotypes: HITBC 0083565!, XZE016070!).

Diagnosis: *Bulbophyllum basiflorum* is morphologically similar to *B. cauliflorum* and *B. stenobulbon*, but can be clearly distinguished from them by having shorter scapes adhering to rhizomes and pseudobulbs, raceme dense with 1 or 2 flowers, petals ovate, lip white with 2 longitudinal ridges, and very short column foot.

Description: **Rhizome** creeping or straggling, ca. 0.15 cm in diam. **Pseudobulbs** 2–5 cm apart from each other, narrowly ovoid to cylindric, 1–2.5×0.5–0.6 cm, grooves with a terminal leaf. **Leaf** blade oblong, 1.5–4×0.5–0.7 cm, base contracted into petiole-like, apex acute to retuse. **Scapes** arising from nodes of rhizome or base of pseudobulbs, adhering to rhizomes or pseudobulbs, no more than half of pseudobulbs, 4–10 mm, peduncle with 3 tubular sheaths; raceme with 1 or 2-flowered. **Flowers** yellowish-white; floral bracts ovate-triangular, 4.0–5.0×3.0–4.0 mm, longer than the pedicel and ovary, apex acute; pedicel and ovary 2.5–3.5 mm. **Dorsal sepal** somewhat recurved, narrowly lanceolate, 3-veined, 5.0–7.0×1.4–1.5 mm, apex acuminate; **lateral sepals** narrowly lanceolate, 3-veined, 7.0–9.0×1.3–1.4

mm, base adnate to column, apex long acuminate, 3-veined. **Petals** ovate, 3-veined, 1.5–2.0×1.0–1.2 mm, apex acute. **Lip** slightly recurved, tongue-shaped, white, 2.0–2.5 mm, fleshy, two ridges along a median furrow which start at the base and continue up to 2/3 along the length of the lip, where they converge slightly and merge to a single, distinctly convex apical part, apex obtuse. **Column** stout, ca. 1.1 mm in height, stelidia subulate, ca. 0.5 mm; column foot short, slightly upcurved, ca. 0.3 mm; **anther cap** subglobose, apex rounded and truncate; **pollinia** 4, in two pairs, each pair with unequal lobes. **Capsule** ovoid, ca. 5 mm long, ca. 3 mm in diam.

Distribution and habitat: *Bulbophyllum basiflorum* is collected from Dexing and Beibeng village of Mèdog, Xizang, China. It was found growing epiphytically on tree trunks in evergreen broad-leaved forest at an elevation range of 730–1579 m.

Phenology: Flowering from May to June, fruiting from July to October.

Etymology: The specific epithet "*basiflorum*" refers to racemes that adhere to rhizomes in this species.

Vernacular name: Ji Hua Shi Dou Lan, 基花石豆兰

Conservation status: During our field investigations,

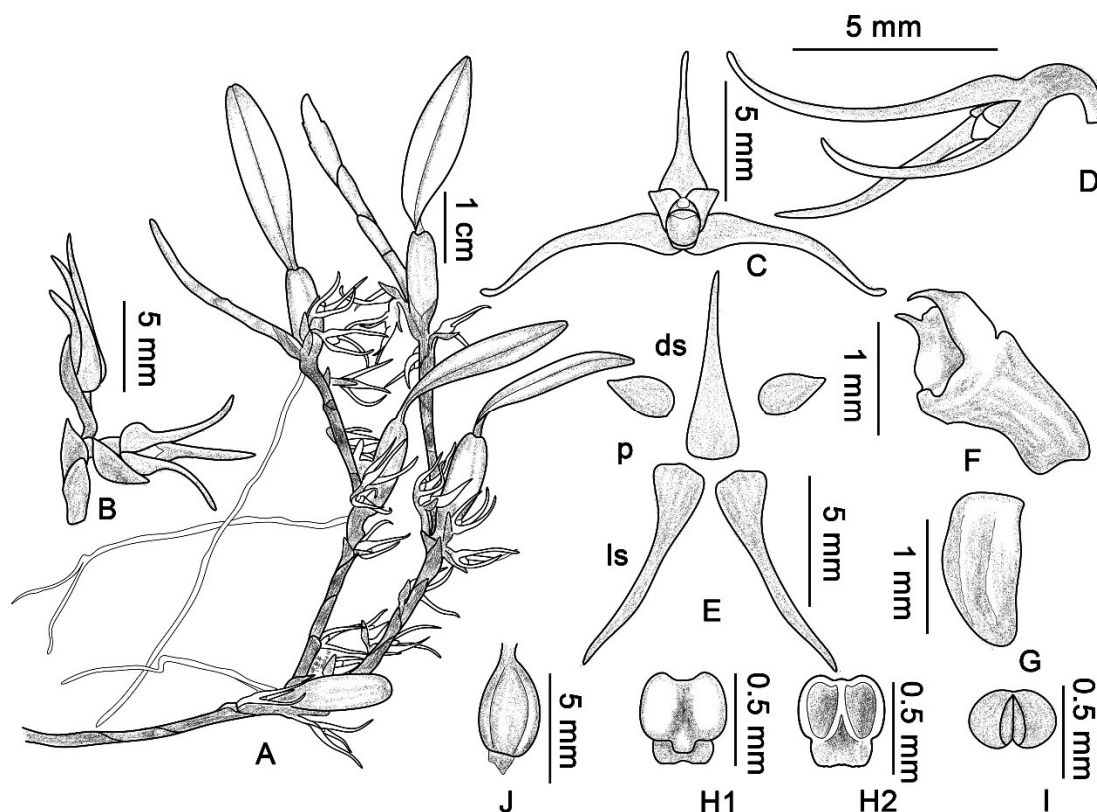


Fig. 2. *Bulbophyllum basiflorum* M. K. Li, J. P. Deng & Y. Luo **A.** plant and inflorescence; **B.** inflorescence; **C-D.** flower; **E.** split flower (ds. dorsal sepal, p. petal, ls. lateral sepals); **F.** column; **G.** lip; **H1-H2.** anther cap; **I.** pollinia; **J.** fruit. (Drawn by J. P. Deng)

B. basiflorum is currently known only from Mêdog county, four populations of ca. 20 individual plants were found. We regard its status as Data Deficient following IUCN guidelines (IUCN, 2022). In the future, we will conduct a detailed investigation and assess its endangered status.

Additional specimens examined (paratypes): CHINA: Xizang, Mêdog County, Xirang Village, 95°2'13"N, 29°10'58"E, 730 m, epiphytes on tree trunks in monsoon rain forests, 10 May 2022, M. K. Li 20220073 (TAAHUC!). Xizang, Mêdog County, Gelin Village, 95°11'3"N, 29°13'26"E, 1559 m, epiphytes to tree trunks of *Pinus bhutanica* Grierson et al., 28 May 2022, M. K. Li & X. D. Chen 20220135 (TAAHUC!). Xizang, Mêdog County, De'ergong Village, 95°9'5.06"N, 29°10'56.70"E, 1544 m, epiphytes to tree trunks in subtropical evergreen broad-leaved forests, 11 June 2022, M. K. Li & X. D. Chen 20220178 (TAAHUC!).

Notes: Morphologically, *Bulbophyllum basiflorum* is similar to *B. cauliflorum* and *B. stenobulbon*. A comparative study of living plants and dried specimens showed that the habit and floral shape of the three species are quite similar, such as roots spreading, pseudobulbs spaced, sub-umbellate raceme, small flowers with free, subequal and narrowly lanceolate sepals, but *B. cauliflorum* has larger leaves, pseudobulbs and flowers (Fig. 3, S1). We list the differences among the three related species in Table 1. Scapes of *B. basiflorum* and *B. cauliflorum* arise from both the base of pseudobulb and the nodes of rhizome, while those of *B. stenobulbon* only arise from the base of pseudobulb (Fig. 3). *B. cauliflorum* and *B. stenobulbon* have longer and erect scapes, but *B.*

basiflorum has very short scapes adhering to rhizome (Fig. 3). *B. basiflorum* has dense racemes on rhizomes, whereas in *B. cauliflorum* racemes are sparse (Fig. S1). Additionally, the flower characteristics of the new species are different from those of two related species. The lip is white and has 2 ridges in *B. basiflorum*, but yellow in *B. cauliflorum* and *B. stenobulbon* (Fig. 3). *B. cauliflorum* and *B. stenobulbon* have distinct column foot ca. 1 mm, but *B. basiflorum* has very short column foot ca. 0.3 mm (Fig. 3). According to the sectional classification proposed by Vermeulen (2014), *B. basiflorum* belongs to section *Desmosanthes*, which is characterized by sepals free, lateral sepals 1-3 times as long as dorsal sepal, stielidia deltoid to subulate, rounded to acuminate, and not twisted inward. The three *Bulbophyllum* species discussed here are all found in the Himalaya. *B. basiflorum* is similar to *B. stenobulbon* in shape and size of pseudobulbs and flowers, while it resembles *B. cauliflorum* in arising position of scapes. *B. basiflorum* might be a hybrid originating from *B. cauliflorum* and *B. stenobulbon*. According to our investigations, *B. cauliflorum* is more common in Mêdog, where only a few populations of *B. stenobulbon* and *B. basiflorum* were found. We found those three species co-occurred at only one site, and *B. basiflorum* and *B. cauliflorum* co-occurred at one site. *B. basiflorum* and *B. stenobulbon* have the same flowering time, whereas the flowering time of *B. cauliflorum* is slightly earlier.

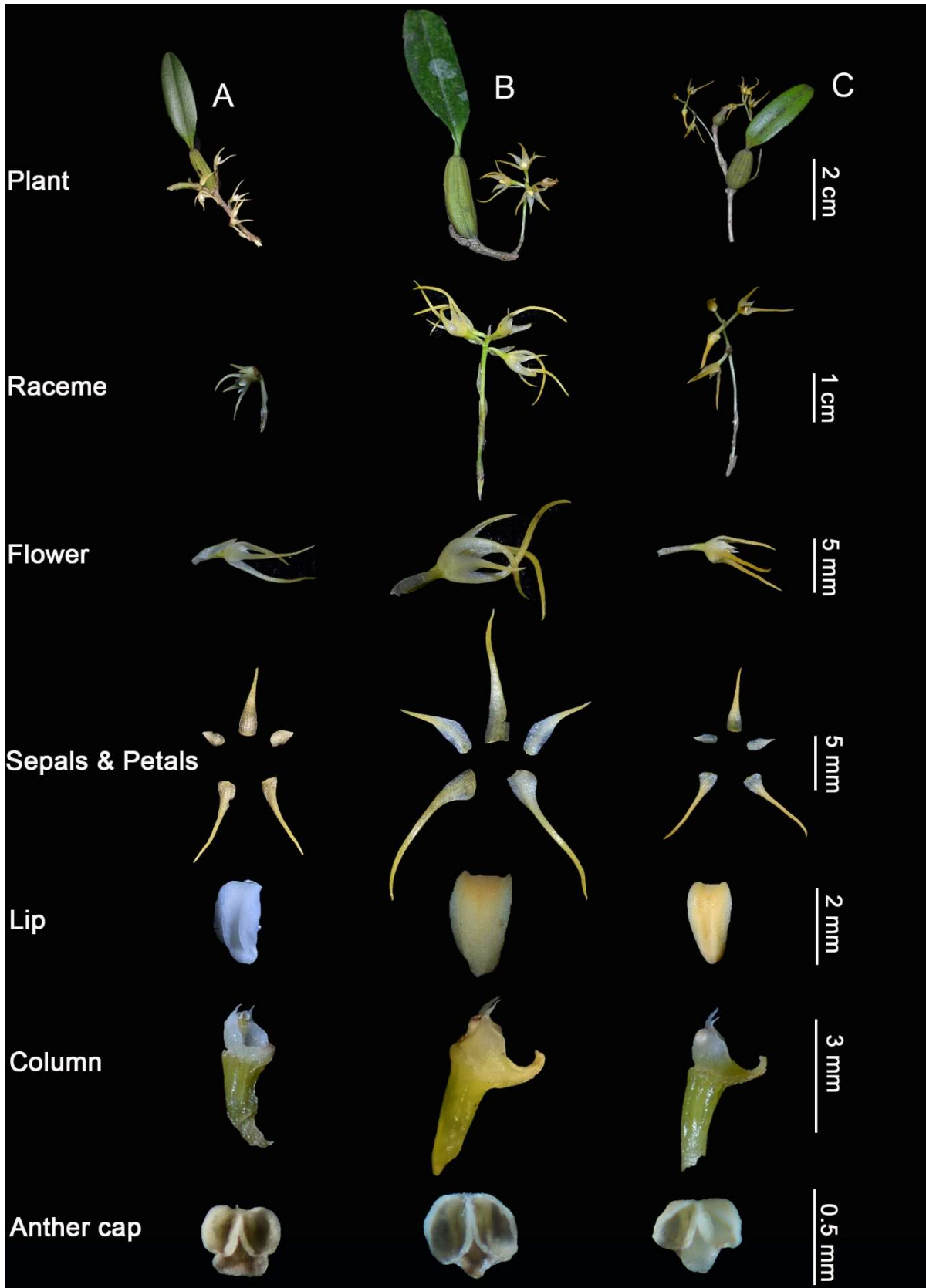


Fig. 3. Morphological differences between *Bulbophyllum basiflorum* and its two closely related species A. *Bulbophyllum basiflorum* B. *Bulbophyllum cauliflorum* C. *Bulbophyllum stenobulbon*.

**Table 1.** Morphological comparison of *Bulbophyllum basiflorum* and closely related *B. cauliflorum* and *B. stenobulbon*.

	<i>B. basiflorum</i> (Fig. 1-3, S1A)	<i>B. cauliflorum</i> (Fig. 3, S1B)	<i>B. stenobulbon</i> (Fig. 3, S1C)
Pseudobulbs	2–5 cm apart from each other, cylindrical or narrowly ovoid, 1–2.5×0.5–0.6 cm	4–12 cm apart from each other, cylindrical or narrowly ovoid, 2–5 × 0.7–1 cm	1.5–3 cm apart from each other, ovoid-cylindrical, 1–1.5 × 0.3–0.7 cm
Leaf	1.5–4×0.5–0.7 cm	5–10 × 1.4–2.7 cm	1.5–3.3 × 0.8–1 cm
Scope	arising from nodes of rhizome or base of pseudobulb, adhering to rhizome or pseudobulb, 0.4–1 cm	arising from nodes of rhizome or base of pseudobulb, erect, 2–4 cm	arising from base of pseudobulb, erect, 2–3.5 cm
Inflorescence	raceme dense with 1 or 2-flowered	raceme sparse with 3-5-flowered	raceme sparse with 2-4-flowered
Flowers	yellowish-white	yellowish green	yellowish
Sepals	lateral sepals slightly longer than dorsal sepal, 5.0–9.0 × 1.3–1.5 mm	subequal, 7-10 × ca. 1.5 mm	lateral sepals slightly longer than dorsal sepal, 4.5–5.0 × 1.3–1.5 mm
Petals			
size (mm)	ovate	lanceolate	ovate
size (mm)	1.5–2.0×1.0–1.2	5–7 × ca. 1.2	2–2.4 × 0.8–1
apex	acute	acuminate	acute
Lip	tongue-shaped, white, 2.0–2.5 × 1.2 mm, with 2 longitudinal ridges, apex obtuse	lanceolate, yellow, 2.8 × 1.6 mm, grooved at adaxial base, apex acuminate	ovate-lanceolate, yellow, 2 × 1.0 mm, grooved at adaxial base, apex rounded
Column	ca. 1.1 mm, foot ca. 0.3 mm	ca. 1.3 mm, foot ca. 1.5 mm	ca. 1.0 mm, foot 1–1.3 mm
Anther cap apex	rounded and truncate	acute	rounded

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Supplementary materials are available from Journal Website