

Conference Paper

Morphological Variation among Flowers of *Bulbophyllum ovalifolium* (Blume) Lindl. (Orchidaceae) in Bali

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Abstract

Bulbophyllum ovalifolium (Blume) Lindl., an epiphyte orchid species was collected from several region in Bali and maintained in "Eka Karya" Bali Botanic Garden. The orchid is a common and widespread species in Southeast Asia, thus makes the flower has high variability. Here a study through morphological characters on the flower was done to give more information and understandable of characteristic range. The species was found at altitude range 700 to 2000 m a.s.l., the morphological observation was conducted on 2014 to 2015 particularly in the flowering season. There were three variants of flower based on the differences on size, colour, and the lip. The character on lip surface was found as spot character with three types of surface: coarsely verrucose, scattered verrucose, and glabrous.

Keywords: Bali; *Bulbophyllum ovalifolium*; morphological variation; orchidaceae; orchidi.

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1. Introduction

Orchidaceae known as one of the largest families on angiosperm, which is recognize as the second largest prior to Asteraceae. There are 736 genera in Orchidaceae were recognized and more new orchid genera or species are still being described [1]. *Bulbophyllum* is a large genus on orchidaceae with about 1 900 species accepted as valid taxa [2]. The genus is characterized by sympodial rhizome, with the last node swollen into a pseudobulb; new shoots and inflorescences generally arise from one of the nodes immediately below the pseudobulb; inflorescences single or many flowers; more or less mobile lip which attached to the column-foot by a thin ligament. *Bulbophyllum* is pantropical genus, occur in tropical parts of America, Africa, Madagascar, the mainland of Asia, Pasific Island to South-east Asia [3]. New species were rapidly reported from Malesian parts [4–9].

Bulbophyllum ovalifolium (Blume) Lindl. is a widespread species in Shouth-east Asia. Blume were described it as *Diphyes ovalifolia* in his book "Bijdragen tot de Flora van

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Nederlandsch Indie: 318 (1825)" [10] with the holotype from Mount Gede, West Java. Since the genus *Diphyes* was not the accepted taxa [11], Lindley was proposed *D. ovalifolia* as a synonym to *B. ovalifolium* [12]. *Bulbophyllum ovalifolium* belongs to section *Macrocaulia*. This species is closely related to *B. montense*, *B. puntjakense*. *Bulbophyllum montense* differs by having small keels on the lip, while *B. ovalifolium* is not having the keels *Bulbophyllum puntjakense* differs in having a distinct thickening along the mid-vein towards the base of the lip, while *B. ovalifolium* is not having the distinct thickening [3].

Bulbophyllum ovalifolium has much variability within the species as shown in Vermeulen (1991) [3] with two different lips from a single branch of a tree. The flower size, the shape of sepals and petals, and lips surface of the flower show high variability. The lip surface usually coarsely papillose-verrucose with entire margin, but Vermeulen [3] also found a smooth lip. This high variability of *B. ovalifolium* gave a difficulty to distinguish from *B. montense*. Moreover Comber [13] was stated that it's difficult to draw varietal lines within this species. *Bulbophyllum tineae* found by Vermeulen at Berumban mountain–Cameron Highlands and *B. tineae* found by Vaughan were considered to be conspecific with *B. ovalifolium* [14]. This vague species and confuse in varietal line need more plant collections to be observed and propose a clarification of species variation.

2. Material and Methods

2.1. Morphological examination

Plant living specimen collections of *B. ovalifolium* from Mount Batukau and Bukit Tapa (all from Bali) were examined particularly during flowering time of the year around May through September. Living collection registration observation was conducted in Bali BG by looking up the orchid registration data.

2.2. Herbarium examination

Herbarium observation was conducted by examined herbarium vouchers in the online portal of Naturalis Biodiversity Center Leiden (<http://herbarium.naturalis.nl/>).

Specimens examined. Indonesia. JAVA: Blume 509 (L)Holo!; Blume s.n. (L)Syn!; Blume 454 (L)Syn!; Blume s.n. (L)Lecto!; Docters van Leewen-Reijnvaan 2396; 2437 (L); W. Meijer 1251 (L); S. G. G. J. van Steenis 10891 (L); A. Rank s.n. (L); Bakhuizen van den Brink 4516 (L); Cult. Hort. Bog. 242; Cult. Hort. Bog. 246; Smith 490 (L); s.c. 185 (L); Korthals 637 (L); Leschenault s.n. (L). SUMATRA: W. J. J. O. Wilde and B. E. E. de Wilde-Duyfjes 13128; 18375 (L); Rahmat Si Boeea 10470; 10577 (L); E. F. de Vogel 1479



Figure 1: (a) Epiphytic habit of *B. ovalifolium* in Bali BG cultivation; (b) Three variations flower of *B. ovalifolium* from left to the right: Bukit Tapa (BT), Mount Batukau 1 (MB1), Mount Batukau 2 (MB2).

(L). FLORES: Fr. E. Schmutz SVD 5644; 6042 (L); J. F. Veldkamp 7137 (L). BALI: A. Dilmy 1017 (L) Malaysia. SABAH: Vermeulen 654 (L).

3. Result and Discussion

Plant living collection of *B. ovalifolium* in Bali BG showed three types of flower (see Figure 1). Our observation showed that there is no difference in vegetative characters. Pseudobulb ovoid–orbicular, rather flattened on basal part, 6 mm to 7 mm × 3 mm to 4 mm, 0.4 cm to 1 cm apart. Leaves thin, ovate–elliptic–oblong, sub-acute, 12 mm to 23 mm × 3 mm to 4 mm. Therefore, we have found differences in flower characters. Specimens from Bukit Tapa (BT) have orange flower with large size than the other two types with 9 mm to 10 mm diameter peduncle up to 3.5 cm long, and coarsely verrucose adaxial surface lip with reflexed margin. Specimens from Mount Batukau showed two types of flower, we called first variant as MB1 and second variant as MB2 (see Figure 2). First type from Mount Batukau has yellow flower with smallest size than other types with 7 mm diameter, 1.3 cm long peduncle, and scattered verrucose adaxial surface lip with reflexed margin. Second type from Mount Batukau has 8 mm diameter. In flower size, 2.3 cm long peduncle, red flower and glabrous lip which is very vicious character to another types.

From the three types of flower, we can tell that it's more easy to identified the BT type with coarsely verrucose lip as *B. ovalifolium* rather than when we found MB2 type with glabrous lip (see Figure 3). The glabrous lip often mis-identified as *B. montense*. This we may need a closer look to the petal vein which is only one vein occur in *B. ovalifolium* while there are three veins in *B. montense*. We were convinced all of the types of flower specimens from Bali only have one vein on petals and there is no distinct thickening nor keels on the lip. All of the types have reflexed margin, the three types of flower showed all main characters of *B. ovalifolium*. Here we can clearly say

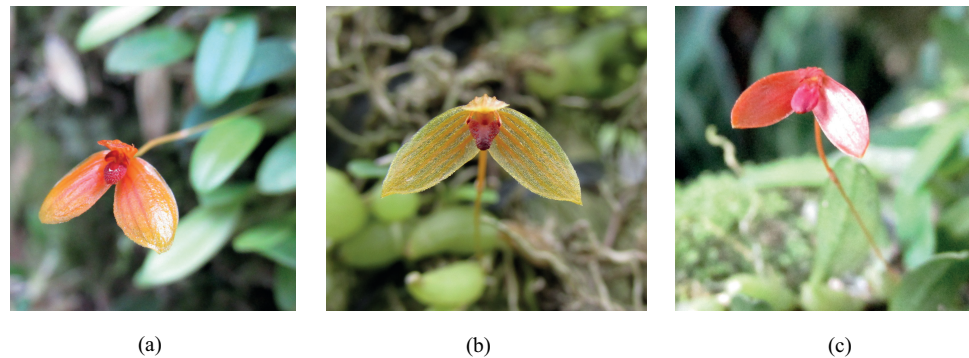


Figure 2: (a) Orange flower in BT type; (b) Yellow flower in MB1 type; (c) Red flower in MB2 type.

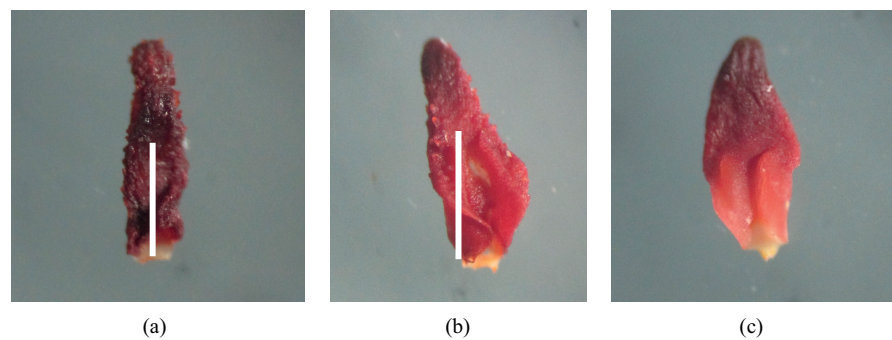


Figure 3: (a) Coarsely verrucose lip, BT type; (b) Scattered verrucose lip, MB1 type; (c) Glabrous lip, MB2 type. Scale bar: 1mm.

that *B. ovalifolium* specimens in Bali have three types and those can be distinguished by the surface lip characters within species and also to the other species.

From herbarium specimens' examination, we found a voucher specimen from Mount Batukau-Bali (A. Dilmy 1017) with notes "herb with yellow flower". We expect the voucher specimen from Dilmy 1017 has the same type as MB1 with yellow flower and scattered verrucose lip. We also found that all the specimens from Toba (Rahmat Si Boeea 10470; 10577), Gunung Bandahara (W. J. J. O. Wilde and B. E. E. de Wilde-Duyfjes 13128), Gunung Leuser Nature Reserves Area (W. J. J. O. Wilde and B. E. E. de Wilde-Duyfjes 18375) Sumatra have some notes that "plant has a larger smooth lip". The same type as described above also observed from MB2 type, Bali specimen. From this result, we convinced that *B. ovalifolium* with glabrous or smooth lip type maybe occur on elsewhere other than Borneo [3], Sumatra, and Bali.

4. Conclusion

There are three types of *B. ovalifolium* in Bali, coarsely verrucose lip type, scattered verrucose lip, and glabrous lip. We suggest more widespread distribution of glabrous lip type from Borneo, Sumatra, and Bali.

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