



RESEARCH COMMUNICATION

Habenaria diphylla (Nimmo) Dalzell (Orchidaceae), new record for the flora of Vietnam

Hong Thien Van^{1*}, Thi Hong Van Nguyen¹, Hong Thia Le², Ngoc Nam Trinh³, Nguyen Tuong An Huynh⁴, Van Son Le⁵, Thi Thanh Nha Phan^{6,7} & Le Anh Tuan Dang^{6,7}

¹Institute of Biotechnology and Food Technology, Industrial University of Ho Chi Minh City, No. 12 Nguyen Van Bao Street, Ward 4, Go Vap District, Ho Chi Minh City, Vietnam

²Institute of Environmental Science, Engineering and Management, Industrial University of Ho Chi Minh City, No. 12 Nguyen Van Bao Street, Go Vap District, Ho Chi Minh City, Vietnam

³Office of Science Management and International Affairs, Industrial University of Ho Chi Minh City, No. 12 Nguyen Van Bao Street, Go Vap District, Ho Chi Minh City, Vietnam

⁴Office of Postgraduate Management, Industrial University of Ho Chi Minh City, No. 12 Nguyen Van Bao Street, Go Vap District, Ho Chi Minh City, Vietnam

⁵Binh Chau-Phuoc Buu Nature Reserve, Bung Rieng Ward, Xuyen Moc District, Ba Ria-Vung Tau Province, Vietnam

⁶Department of Ecology and Evolutionary Biology, University of Science, Vietnam National University HCMC, 227 Nguyen Van Cu Street, District 5, Ho Chi Minh City, Vietnam

⁷Vietnam National University Ho Chi Minh City, Linh Trung Ward, Thu Duc City, Ho Chi Minh City, Vietnam

*Email: vanhongthien@iuh.edu.vn

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ABSTRACT

Habenaria diphylla (Nimmo) Dalzell is reported for the first time as a new discovery for the flora of Vietnam based on the specimens collected in Binh Chau-Phuoc Buu Nature Reserve, Ba Ria-Vung Tau Province. The present study provided the detailed characteristics of the species including detailed photographs of the morphological characteristics, the cross section of the leaf, inflorescence axis and root. Furthermore, the information about the species, including distribution, habitat, ecology and conservation status were also provided.

Introduction

Habenaria Willd, one of the large genus of the family Orchidaceae, has about 876 species which are growing in tropical and subtropical climate (1). In Vietnam, the genus included 30 species (2-4). In another study, there recorded 35 species of this genus in Vietnam, “The Orchids of Vietnam illustrated survey” (5). Recently, *H. austrosinensis* was recorded as new to the flora of Vietnam (6). Therefore, prior to this paper, the total number of known species of *Habenaria* in Vietnam were 36. *Habenaria diphylla* (Nimmo) Dalzell was discovered for the first time in India (7). To date, this species found in several countries including Nepal, Bhutan, Bangladesh, China, Myanmar, Thailand, Philippines and India (8-10).

In 2019, we found a population of unusual *Habenaria* in the field trip at Binh Chau-Phuoc Buu

Nature Reserve, Southern Vietnam. Our careful examination of its morphological attributes indicated that the collected species is *H. diphylla* which represents a new discovery for the flora of Vietnam.

Materials and Methods

Materials collection

Habenaria diphylla specimens were collected from Binh Chau-Phuoc Buu Nature Reserve, Bung Rieng Ward, Xuyen Moc District, Ba Ria-Vung Tau Province, Vietnam on 30 August 2019. All vouchered specimens are encoded as collected Le VS 221, Le VS 222 and deposited at Herbarium of Department of Ecology and Evolutionary Biology, Faculty of Biology and Biotechnology, University of Science, National University Ho Chi Minh City, Vietnam (PHH).

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Morphological features

The guidebook of Royal Botanic Gardens, Kew was used to collect and analyze the specimens (11). By comparing the previously published illustration of *Harbenaria* specimens, identified the collected specimen (2, 3, 5, 8–10) examining its morphological characteristics.

Taxonomic treatment

Habenaria diphylla (Nimmo) Dalzell, Hooker's J. Bot. Kew Gard. Misc. 2: 262. 1850. *Habenaria humistrata* Rolfe ex Downie, Bull. Misc. Inform. Kew 1925: 419. 1925 (Fig. 1, 2 & 3).

Terrestrial herbs, stem 15–30 cm high. Tuber underground, ellipsoid to subcylindrical, 1–1.2 cm

long, 5–8 mm in diameter, producing some roots. Stem erect, slender, 15 – 30 cm high, 12 mm in diameter, green to pale green, producing few roots at the base. Leaves 2, opposite, appressed to the ground; leaf blade dark green above, pale green below, orbicular to ovate, 4–6 cm long, 3–4 cm wide; midrib impressed adaxially, prominent abaxially. Scape erect, slender, terminal, 8–20 cm high; raceme several, laxly or subdensely flowered; floral bracts ovate-lanceolate, 3.5–6 mm. Flower small, ca. 1 cm long, green and white. Dorsal sepal and petals connecting to form a hood, green; dorsal sepal ovate, ca. 7 mm long, ca. 6 mm wide, apex obtuse rounded; lateral sepal oblong ca. 7 mm long, ca. 3 mm wide, apex acute; Petals linear lanceolate, ca. 4.5 cm long, ca. 8 mm wide. Lip deeply 3-lobed, central lobe linear, ca. 8 mm long, ca. 1 mm wide, lateral lobes

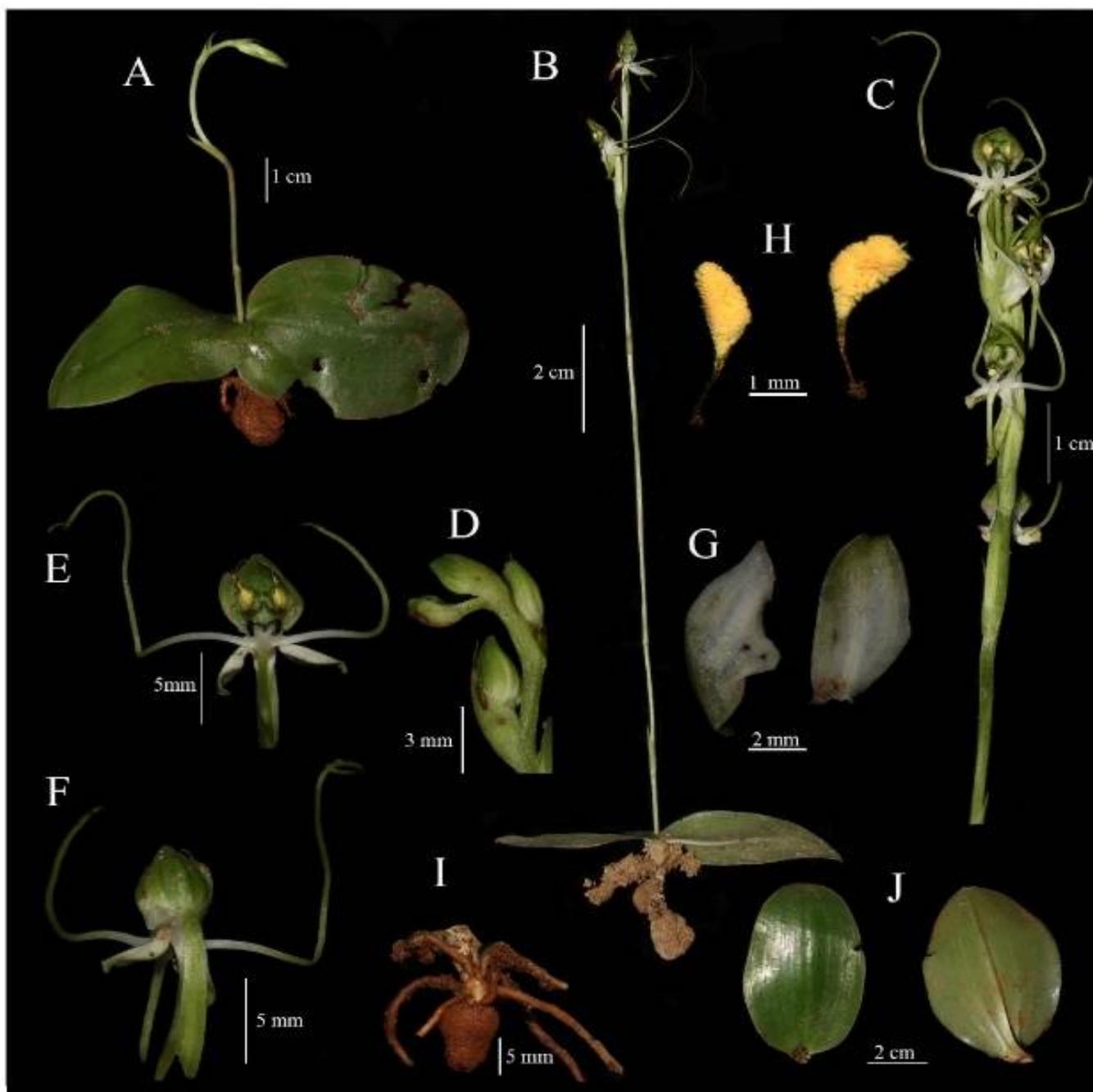


Fig. 1. *Habenaria diphylla*. A & B. Details of flowering plant at young and maturity. C. Inflorescence. D. Young Flower. E & F. Flower (front view and back view); G. Lateral sepal. H. Pollinia. I. Tuber. J. Leaves (above and below).

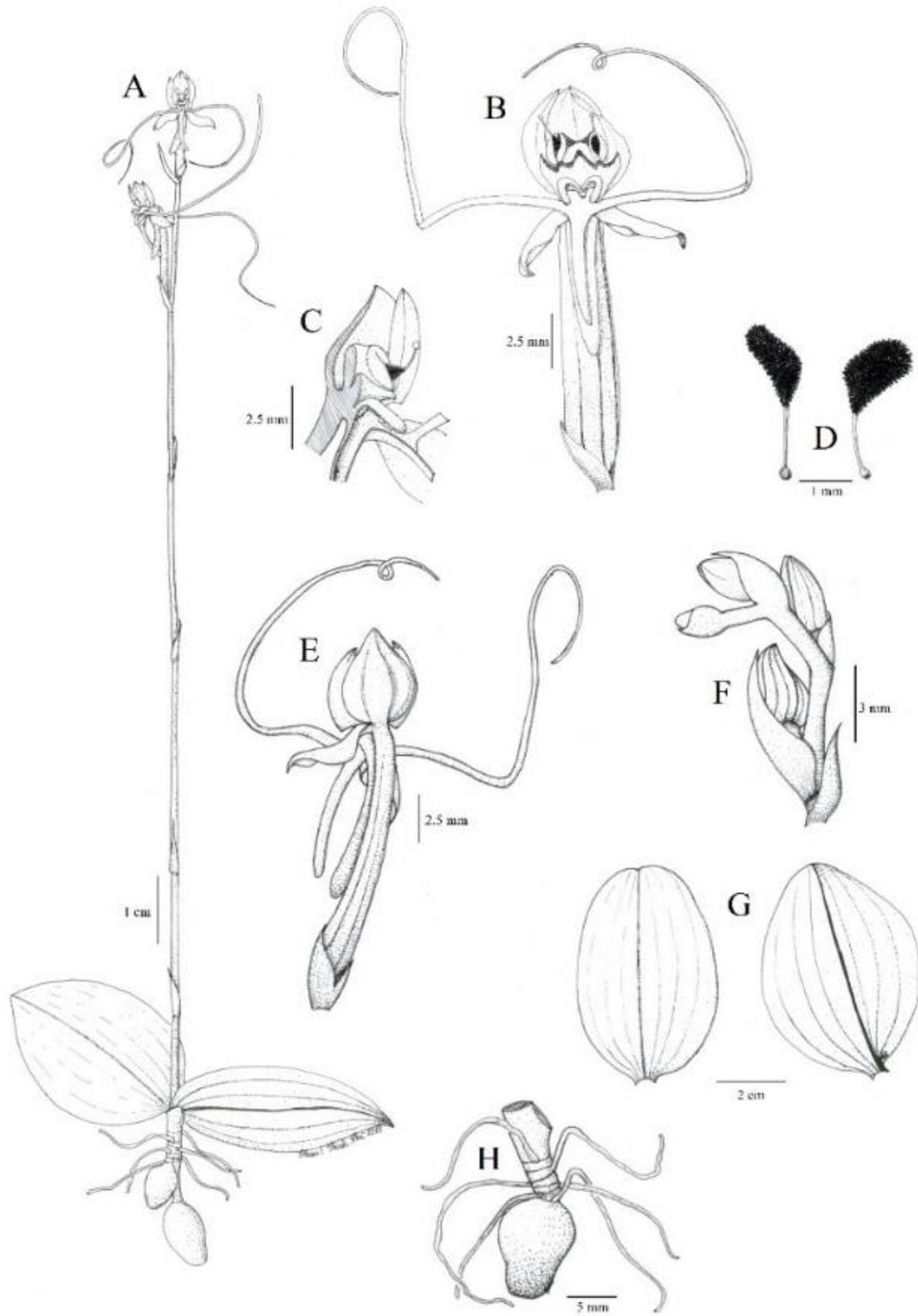


Fig. 2. *Habenaria diphylla*. A. Habit. B & E. Flower (front view and back view). C. Longitudinal section of flower. D. Pollinia. F. Young Flower. G. Leaves. H. Tuber.

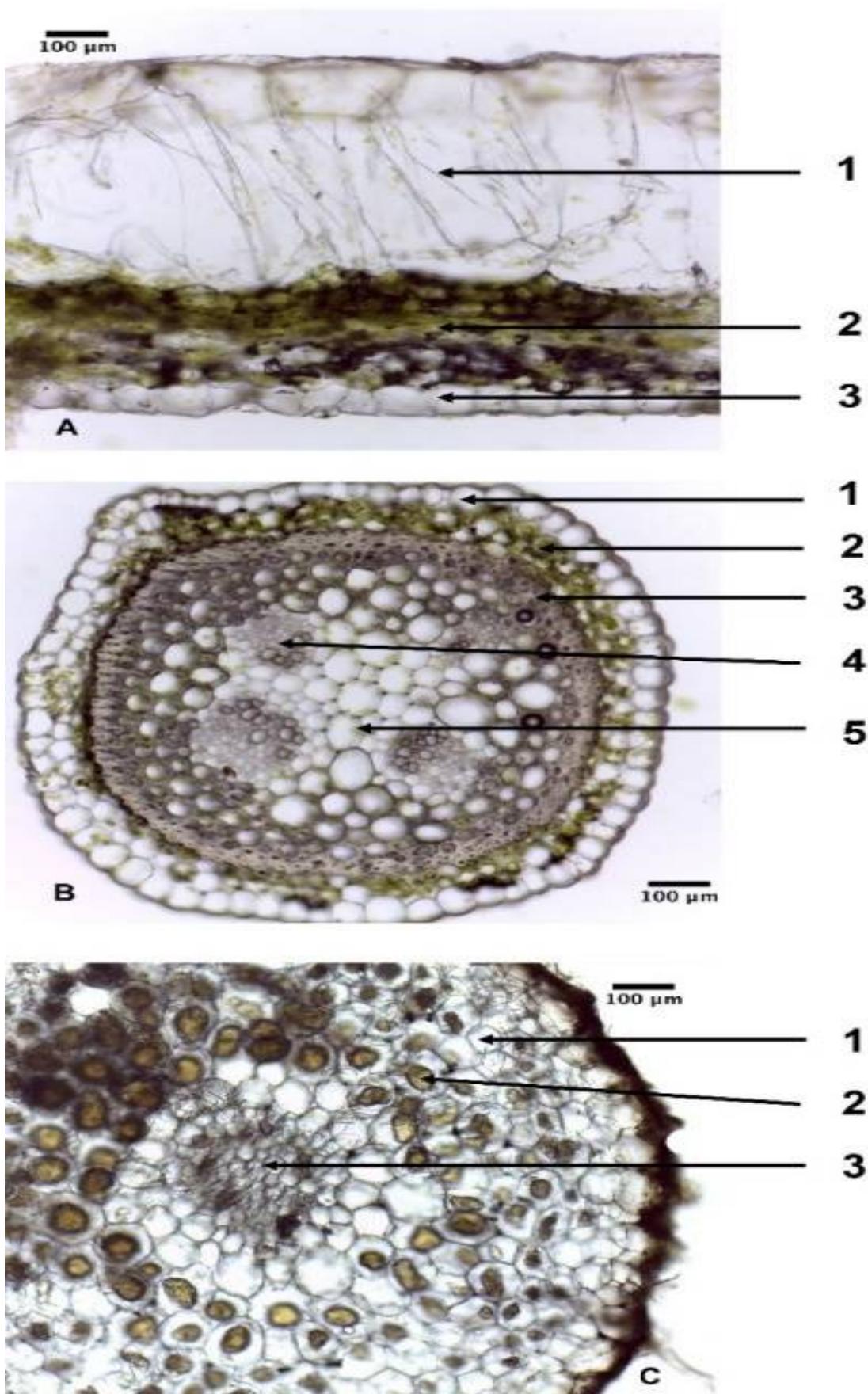


Fig. 3. Cross section of *Habenaria diphylla*. A. Leaf-1. Enlarged adaxial epidermis; 2. Mesophyll; 3. Abaxial epidermis. B. Inflorescence axis-1. Epidermis; 2. Chlorenchyma; 3. Sclerenchymatous ring; 4. Vascular bundles; 5. Parenchyma. C. Root-1, cortical parenchyma; 2. Orchid mycorrhizae; 3. Stele.

filiform, up to 3 cm long, curled upward toward apex. Spur green to white, ca. 5 mm long, slender, curved. Pollinia 2, dark yellow, capsule fusiform.

Leaf anatomy: enlarged adaxial epidermis occupies one-half to two-thirds of leaf volume, probably function in water storage; homogeneous mesophyll. Inflorescence axis: 1 layered epidermis, ground tissues interrupts by a sclerenchymatous ring; vascular bundles are collateral; Root: orchid mycorrhizae presents in the cortical cells.

Flowering and fruiting: September to November.

Type: INDIA. s. coll. sn. (K000247479, seen image).

Specimens examined

Le Van Son 221 & 222 (PHH), VIETNAM. Ba Ria-Vung Tau Province, Binh Chau-Phuoc Buu Nature Reserve, on 30th August 2019 at approximate coordinates 10°30'38" N, 107°30'34" E and 19 m in elevation; s. coll. sn. (K000247479, seen image), India; Dungboo. Sn (K000247481, seen image), India; Hooker JD (K000247480, seen image), India.

Distribution

Habenaria diphylla is only known from Binh Chau-Phuoc Buu Nature Reserve, Bung Rieng ward, Xuyen Moc District, Ba Ria-Vung Tau Province, Vietnam.

Habitat and ecology

The species is usually found in secondary and mixed forest at wetland under forest canopy in association with such species as *Cratoxylum formosum* (Jacq.) Benth. & Hook. f. ex Dyer, *Eurycoma longifolia* Jack, *Curculigo annamitica* Gagnep. and *Curcuma pierreana* Gagnep.

Conservation status

According to The Government of Vietnam's Decree 06/2019/ND-CP on management of endangered, precious and rare forest flora and fauna and implementation of the Convention on international trade in endangered wild animals and plants, the plant species of the Orchidaceae family are listed in group II including of the species which are not necessarily threatened with extinction, but its exploitation and trade must be controlled in order to avoid utilization incompatible with their survival (12).

Authors' contributions

This study was designed Hong Thien Van and Van Son Le are the sample collectors. The Figure 2 and 3 were performed by Thi Thanh Nha Phan and Le Anh Tuan Dang. All authors performed experiments and handled the research data. Hong Thien Van prepared the manuscript and resolved all the queries of reviewers.

Conflict of interests

No conflict of interest was declared by the authors.

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