



Cymbidium viride (Orchidaceae): a new species from India

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Abstract

A new orchid species belonging to the genus *Cymbidium* Swartz (*C. viride*) was collected in the Hunter Valley from the Indo-Burma Biodiversity Hotspot, Manipur, India. This new species is described and illustrated, information on associated plants and ecology of the collection sites are also provided.

Résumé

Une nouvelle espèce d'orchidée appartenant au genre *Cymbidium* Swartz a été collectée dans la vallée de Hunter, dans le haut lieu de biodiversité de l'Inde et de la Birmanie, à Manipur, en Inde. Cette nouvelle espèce est décrite et illustrée, des informations sur les plantes associées et l'écologie des sites de collecte sont également proposées.

Keywords: conservation, *Cymbidium*, Hunter Valley, Indo-Burma Biodiversity Hotspot, taxonomy.

Mots-clés : conservation, *Cymbidium*, Vallée de Hunter, haut lieu de biodiversité indo-birman, nouvelle espèce, taxinomie.

Introduction

The genus *Cymbidium* Swartz (1799: 70) belongs to the subtribe Cymbidiinae of tribe Cymbidieae (Hooker, 1890), and comprises about 92 species with epiphytic, lithophytic and terrestrial habitat ranging from North-West Himalaya to Japan, South Asia, Indo-China-Myanmar borders, Malaysia to Philippines, New Guinea and Indonesia to Australia (Hooker, 1890; Liu *et al.*, 2009; Pridgeon *et al.*, 2009; Sharma *et al.*, 2012; Chowlu *et al.*, 2015; Kumar, 2017; Huang *et al.*, 2017). From literature, about 27 species, 5 sub-species and 4 varieties of the genus *Cymbidium* were reported from India (Misra, 2007, Chowlu *et al.*, 2015, Kumar, 2017; Deb *et al.*, 2017). Among them, in Indo-Burma Biodiversity hotspot regions of Manipur, 17 species are recorded (Kumar & Kumar, 2005; Kumar *et al.*, 2018). During the botanical expedition to Manipur-Assam boarder and Indo-Myanmar boarder, in October 2017, several *Cymbidium* plants were found at Hunter Valley of Manipur (24° 48' 07.5" N and 93° 40' 58.3" E, 616 m asl). After critical analysis of the morphometric characters and comparison with the closest taxa, they proved to represent a species still unknown to science. It is here described and illustrated under the name *Cymbidium viride*.

Materials and methods

Morphological observations. Three plants of *Cymbidium viride* (BCL-APRFM-HV-01 to BCL-APRFM-HV-03) were collected and put into cultivation in the greenhouse of Biodiversity & Conservation Division, Regional Centre, Ambika Prasad Research Foundation, Imphal, Manipur, for *ex-situ* conservation and vegetative propagation for re-plantation in the wild. Gross morphological data were recorded in the field and all associate plants were enumerated in the surrounding 10 m² area. One specimen was deposited (APRF-MAN-BCD-2018-0003) in the herbarium of Ambika Prasad Research Foundation. The morphological characterization of the new species was done using electronic Digital Caliper (Fisher Scientific, Cert. No. 3415-2456394) and GPS (Garmin, VISTA HCx, etrex) readings were taken from collected sites. Microscopic studies of seeds were carried out using Leica application suite, version 4.40, Leica Microsystems (Switzerland) Limited & Leica DM 3000 LED. A critical analysis of all the vegetative and floral details has been done. The comparison with the morphologically closest species was performed based on protologues and

data from the secondary literature (in particular Seidenfaden, 1983, Wu & Chen, 1991, Chowdhery, 1998, Pearce & Cribb, 2002; Kumar & Kumar, 2005; Rao, 2007; Misra, 2007; Chowlu *et al.*, 2015; Kumar, 2017; Devi *et al.*, 2018; Kumar *et al.*, 2018).

Taxonomic treatment

Cymbidium viride Kumar, *sp. nov.*

Type: India, Indo-Burma Biodiversity Hotspot, Manipur, Hunter Valley, 616 m, 24° 48' 07.5" latitude, 93° 40' 58.30" longitude, 22 October 2017, S. Kumar & R.S. Devi 0013 (Holotype: APRFH).

Description: roots yellowish white, ridged, up to 19 cm long, 0.6 cm diameter; pseudobulbs ovoid, 3.5-6 × 1.8-2.5 cm, enclosed in leaf bases; leaf sheath brown, up to 10 × 1.9 cm; leaves linear, 3-6, deep green, 40-62 × 2.5-2.7 cm, leathery, acuminate; inflorescence arising from the pseudobulb base, 24.5-52 cm long, up to 0.6 cm of diameter, rachis 9-12 flowered; floral bracts 6-8 mm long; flowers fragrant, 5.2 cm diameter, greenish white; dorsal sepal oblanceolate, greenish yellow, 26-30 × 4.8-5.1 mm; lateral sepal lanceolate, 26-28 × 7-8 mm, greenish yellow along with a light purple line in centre up to 13 × 1 mm; petals similar to sepals but wider than them, 22-24 × 7-8 mm, greenish yellow with white diffuse edges on bottom along with a deep green central curve line up to tip, purplish three lines originate from base up to 6 mm long; lip broadly oblong, 19-22 × 9-10.5 mm, 3-lobed, purple with yellowish green, up to 6 mm purplish outwards edges, mid lobe cordate, lateral lobe triangular; column arched, 12-16 × 4 mm, greenish yellow with many purple spots of up to 1.5 mm long; pollinia 2, ovate-elliptic; viscidium triangular; fruits 9-12, green, yellowish white when ripen, capsule 48-81 × 11-16 mm with 6 ridges, 3 rounded 1.9 mm wide, 3 flattened 2.9 mm wide; pedicle green, 7- 13 mm long, 2.5- 3.1 mm diameter; seeds many, creamy whitish, spindle, pointed in both ends, 1 mm long (Fig.1).

Flowering time: September to November

Etymology: the species epithet refers to the greenish-yellow colour of the sepals and petals. *Viridis*, a Latin word meaning green in English.

Habitat and Ecology: *C. viride* is a lithophytic plant and was collected on dense bedding of dead and moist leaves at an altitude of 616 m to 786 m, growing in association with *Cymbidium dayanum* Reichenbach (1869: 710)

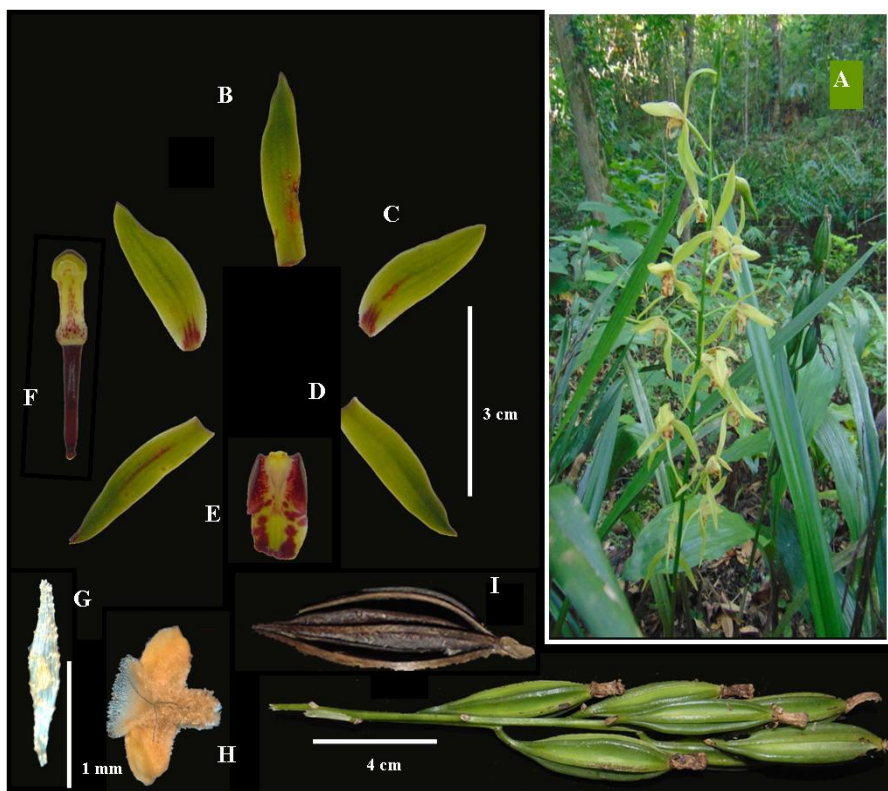


Fig. 1. *Cymbidium viride*

A: inflorescence; B: dorsal sepal; C: petals; D: lateral sepals; E: lip; F: column & ovary; G: seed; H: pollinia; I: capsules & dry fruit

and various plants belonging to the families Cyperaceae (*Cyperus esculentus*), Lamiaceae (*Orthosiphon stamineus*), Convolvulaceae (*Ipomoea pes-tigridis*) and Dioscoreaceae (*Dioscorea hispida*, *D. pentaphylla*) under almost 75 % shade. The species was observed only between 24° 48' 07.5" N - 93° 40' 58.3" E to 24° 47' 12.7" N - 93° 41' 50.5" E in Hunter Valley, Noney district, Manipur, Indo-Burma Biodiversity Hotspot, India (Fig. 2). The area belongs to the moist vegetation. Hitherto this endemic species is only known from the Hunter Valley.

Taxonomic notes: *Cymbidium viride* is distinctive among the species of the genus because it has small pseudobulbs covered with 3-4 brownish sheaths, lateral lobes of lip exceeding the trilobed column and anther cap

with purple lamellae and yellowish green petals and sepals (Table 1). The new species is close to *C. dayanum*, *C. sinense* and *C. aloifolium* but differs as noted in Table 1. Furthermore, blunt, ovate lip with whitish edge along a thick purplish ring around central yellowish green ovate is easy to distinguish among them. The pollinia are yellowish-white and present a Kite structure (Fig. 1H). The seeds of *Cymbidium viride* are spindle shaped (Fig. 1I) while they are fusiform in *C. dayanum* (Huang *et al.*, 2017). This species also differs from *C. sinense* and *C. aloifolium* by its root system, leaves structure, fruits phenology and lamellae along with spindle shaped seeds.

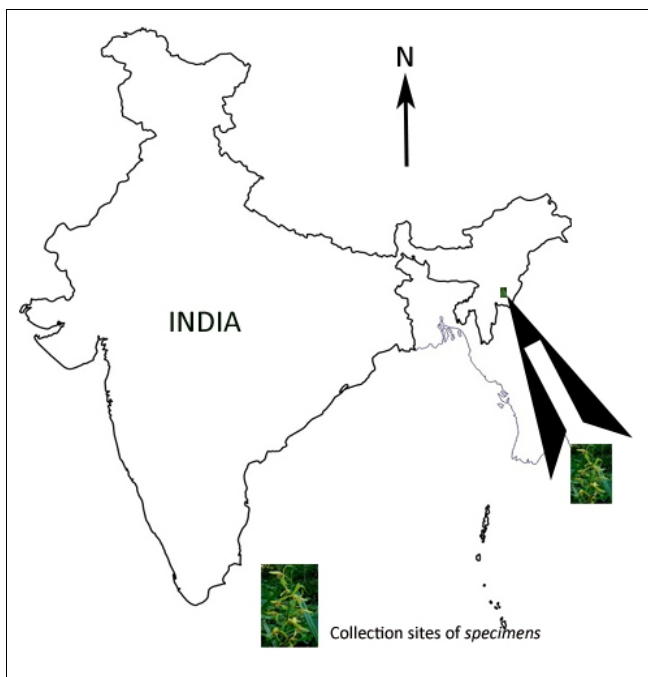


Fig. 2. Geographical distribution of *Cymbidium viride*

Conservation status: the IUCN status for the new species was “Not Evaluated” as only two populations (12 individuals & 17 individuals respectively) within a diameter of 1.5 km were observed. The habitat is a natural forest and, due to increasing anthropogenic activities in study areas, making stones for road materials from natural rock and collecting firewood, these populations are under threat.

TABLE 1. Comparison between
C. sinense, *C. aloifolium*, *C. dayanum* and *C. viride*

Parameters	<i>C. sinense</i>	<i>C. aloifolium</i>	<i>C. dayanum</i>	<i>C. viride</i>
Habitat	Terrestrial, up to 90 cm tall.	Epiphytic	Terrestrial herb, up to 55 cm tall.	Terrestrial, up to 85-90 cm tall.
Leaves	3-5, green, up to 59.3 cm long, 2.1 cm wide.	6-8, light green, up to 40-50 cm long, 2-4 cm wide.	5-7, deep green, up to 50-55.5 cm long, 0.7-1.3 cm wide.	3-6, deep green, up to 40-62 cm long, 2.5 to 2.7 cm wide.
Peduncle	Up to 35 mm long, 4 mm wide.	Up to 36 mm long, 3 mm wide.	Up to 25-30 mm long.	Up to 22 mm long, 3 mm wide.
Racemes	50-90 cm long	Up to 75 cm long	20-30 cm long	Up to 50 cm long
Flower	Purple brownish	Yellowish orange, red stripes on petals and sepals	Whitish with reddish median bands.	Greenish yellow
Lip	Dark purple or purplish brown, striped with red on the side lobes, splashed with a boarder of red on mid-lobe, up to 11 mm long.	White with purple parallel stripes on base, up to 17 mm long.	Maroon, not fused to basal margins of column, up to 19 mm long.	Greenish yellow with purplish, light green at centre of mid lobe, up to 22 mm long.
Petals	Dark purple or purplish brown, ovate, up to 13.6 mm long, 5 mm wide.	Pale yellow to cream-yellow, with a central maroon-brown stripe, oblong-lanceolate, up to 20 mm long, 6 mm wide.	Yellowish white or cream-yellow with a central maroon stripe extending from base, similar to sepals and shorter, up to 23 mm long, 6 mm wide.	Greenish yellow, similar to sepals but wider than them, 22 mm to 24 mm long, 7 mm to 8 mm wide.

TABLE 1. Comparison between
C. sinense*, *C. aloifolium*, *C. dayanum* and *C. viride
 (continued)

Parameters	<i>C. sinense</i>	<i>C. aloifolium</i>	<i>C. dayanum</i>	<i>C. viride</i>
Dorsal sepal	Brownish, 17 mm to 26 mm long, 7 mm wide.	Yellowish orange with stripes, 25 mm long, 5 mm wide.	White or cream-yellow, 26-36 mm long, 6-7 mm wide.	Greenish yellow, 26 mm to 30 mm long, 4.8 to 5.1 mm wide.
Lateral sepal	Up to 25 mm long, 4 mm wide.	Up to 22 mm long, 3.5 mm wide.	Lateral sepals are bigger and narrower than dorsal sepal, 3-3.4 cm and 4.2-5.1 mm wide.	Up to 26 mm to 28 mm long, 7 mm to 8 mm wide.
Column	Yellowish-green, Arcuate, narrowly winged, 9-10 mm long.	Maroon, Arcuate, 10-12 mm long.	Reddish brown with yellow band, slightly arcuate, 8-9 mm long.	Greenish yellow in tip and light brownish white with many purple cylindrical spots, arcuate, of up to 1.5 mm long, 12 mm to 16 mm long.
Pollinia	4 in two pairs, broadly ovoid.	2, ovoid.	2, ovoid.	2, ovate-elliptic.
Fruits	Narrowly ellipsoid, up to 55 mm long, 20 mm diam.	Oblong-ellipsoid, up to 65 cm long, 20-30 mm diam.	Ellipsoid, 58-66 mm long, 20-23 mm diam.	Ellipsoid, up to 81 mm long, 16 mm diam.
Associate Orchid species	<i>Cymbidium dayanum</i>	<i>Calanthe triplicata</i>	<i>Cymbidium sinense</i>	<i>Cymbidium dayanum</i>
Flowering periods	October to March	March to May	August to December	September to November

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