Rediscovery and Lectotypification of the Philippine Endemic *Hornstedtia microcheila* Ridl. (Zingiberaceae) Including An Amendment to its Description

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ABSTRACT

Hornstedtia microcheila Ridl. (Zingiberaceae; Alpinioidieae; Alpinieae) is a poorly known endemic species in the Philippines. It has not been collected again since its description in 1909. In 2017, however, the species was rediscovered in the Mt. Mandalagan Range, Patag, Silay City, Negros Occidental, after a lapse of over a century. A new, amended and extended description of *H. microcheila* based on this new collection is presented herein. Typification, colour photographs, distribution data, ecological details as well as a taxonomic key to the different *Hornstedtia* species in the Philippines are also provided.

INTRODUCTION

The Zingiberaceae is represented by more than 1500 species in 53 genera worldwide. Approximately 80% of all known species are found in tropical forests with the center of diversity in Southeast Asia (Lamb et al., 2013). The Philippines has about 107 species in 14 genera, however, these include only the named species (Pelser et al., 2017). The Zingiberaceae of the Philippine archipelago is relatively unexplored botanically and the number of known species is expected to increase in the near future. There are still a number of high mountains in the Philippines which warrant exploration where new species have been found (*e.g.* Naive, 2017a).

The genus *Hornstedtia* Retzius with *H. scyphifera* (J. König) Steud. as the type species is represented by about 40 species, which are distributed from the forests of China to New Guinea and northern Queensland. The genus belongs to tribe Alpinieae A. Rich. Among the 16 genera in Alpinieae, *Amomum* Roxb. and *Etlingera* Giseke are the most similar to *Hornstedtia*. *Hornstedtia* species are characterized by a fusiform inflorescence (sometimes cyathiform) which is borne separately from the leafy shoot above the ground or radically and enclosed by rigid involucral bracts subtending one or five flowers, a rachis that is condensed into a flat receptacle, absence of filament and a less pronounced staminal tube (Leong-Škorničková & Newman, 2015). The genus is not yet adequately studied taxonomically in the Philippines. Only four *Hornstedtia* species are known to occur in the Philippines (*H. conoidea* Ridl., *H. havilandii* (K. Schum) K. Schum., *H. lophophora* Ridl., and *H. microcheila* Ridl.), three of which are endemics (Pelser et al., 2017; Zingiberaceae Resource Centre, 2017). The absence of keys and illustrations as well as incomplete and sometimes misleading descriptions make identification difficult (Naive, 2017b).

Materials of an unknown *Hornstedtia* specimens collected in Mt. Mandalagan Range, Patag, Silay City, Negros Occidental last June 1, 2017, could be identified as *H. microcheila* Ridl. The species was described by Ridley (1909) based on *A.D.E. Elmer 10279* collected from Cuernos de Negros mountains in Dumaguete City, Negros Oriental in 1909. It has not been collected after its initial description and taxonomic treatment of *H. microcheila* was incomplete and lacked any illustration. The rediscovery of the plants after over a century in full bloom in its natural habitat has made it possible to describe the species in more detail.

METHODOLOGY

The redescription of *H. microcheila* is based on the examination of photographic images of plants *in situ*, live specimens, and a voucher specimen held at the Central

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Mindanao University Herbarium (CMUH). The terminology in general follows Beentje (2016). Flowers were preserved in formalin-acetic-acid-alcohol (FAA) for further study. All type material of *Hornstedtia* spp. from the Philippines was examined in different herbaria (BM, BISH, E, G, HBG, K, NY and US) through high resolution images accessed at https://plants.jstor.org/. A taxonomic key was made of the four *Hornstedtia* found in the Philippines.

TAXONOMIC TREATMENT

Hornstedtia microcheila Ridl. – Figure 1

Hornstedtia microcheila Ridl. Leaflets of Philippine Botany 2 (1909) 606 –Type: Philippines, Negros Oriental, Dumaguete, seepage bank along streams, elev. 900 metres, *Elmer, A.D.E. 10279* (lectotype: K000255170, designated here; isolectotypes: BISH1005395, BM000617561, E00279173, G00008037, HBG520836, K000255171, K000255172, NY00320255).

Homotypic name. *Amomum microcheilum* (Ridl.) Merr. Enumeration of Philippine Flowering Plants 1 (1922): 239.

Terrestrial sub-erect, clumping, medium-sized perennial herb. *Rhizome* at or just below ground, bulbous base globose, 3.5–4 cm in diameter, woody, with long stilt roots, externally reddish to brown, internally cream white. *Leafy shoots* arching to drooping, puberulent, striate, green to yellowish green, up to 1.5 cm in diameter, c. 12–19 cm apart in compact clumps of 20–40 shoots, bearing 35–40 leaves, 2–3 m long. *Leaves* distichous, ascending, 30–40 cm long; *lamina* subcoriaceous, oblong to narrowly elliptic, 27–38 cm long by 9.5–10 cm wide, adaxially green, glabrous, abaxially paler green, glabrous; *midrib* adaxially reddish to yellowish brown, ridged, glabrous, abaxially reddish to yellowish brown, pubescent on the edges; *margin* entire, wavy, reddish brown; *base* oblique; *apex* acuminate, recurved; *midrib* adaxially reddish to yellowish brown, canaliculate, glabrous, abaxially reddish to yellowish brown, protruding, pubescent on the edges. *Ligule* entire, ovate to triangular, subcoriaceous, reddish to brownish, puberulent, 1.5–1.8 cm long by 0.8–1 cm wide. *Petiole* short, puberulent, chanelled, green to greenish brown, 2–2.5 cm long by 0.3 cm in diameter. *Inflorescence* short, upright, lateral, narrowly ovoid, embedded in the ground near the base of the leafy shoot, bearing single flower, 6–10 cm long. *Peduncle* short, 4–5 cm long, covered with two-ranked increasing in size distally scales which grade rapidly into involucral bracts, 2–3 cm long, submerged in the ground. *Spike* narrowly ovoid, partly submerged in the ground, 5–7 cm long, single flowered. *Largest involucral bracts* ovate to narrowly ovate, concave, 6–7.5 cm long by 1.5–2 cm wide, coriaceous, red, striate, tightly overlapping, outer surface with white hairs at the base, margin entire, apex acute, sharply pointed. *Floral bracts* narrowly ovate, striate, subcoriaceous to papery, glabrous, outer surface puberulent, 5–5.5 cm long by 1–1.5 cm wide, partially transluscent, margin entire, apex acute. *Bracteoles* narrowly obovate to obovate, papery, striate, 2–2.5 cm long by 0.5–1 cm wide, open at base, partially translucent, apex acute. *Calyx* oblanceolate to tubular, striate, white, 4–4.3 cm long by 1.7–1. 9 cm wide. *Corolla lobes* lanceolate, trilobed, dirty white to pinkish white, with numerous distinct veins, subhyaline, cucullate, partially transluscent, slightly concave, margin entire, involute, apex rounded; *dorsal corolla lobe* 1.5–1.7 cm long by 0.4–0.6 cm wide; *lateral corolla lobes* 1.3–1.6 cm long by 0.2–0.4 wide. *Labellum* unguiculate, longer than the corolla lobes, 2.2–2.4 cm long by 1.7–1. 9 cm wide, pubescent, with reticulate veins running from the basal middle towards the margin, margin crispate, apex broad, bilobed to rounded; *auricles* short, indistinct, oblong to elliptic, 1–1.3 mm long by 0.4–0.5 mm wide, glabrous, apex rounded, margin entire; *claw* yellowish, fleshy, pubescent. *Lateral staminodes* absent. *Stamen* 10–10.5 mm long; *anther-thecae* sericeous, oblong, short, 4–4.5 mm long by 0.7–1 mm wide, cream white, apex bilobulate. *Stigma* flabellate, pubescent, up to 1.2 mm long by 1–1.5 mm wide, cream white. *Style* up to 5 cm long, pubescent. *Epigynous gland* covering the base of the style, 3, fleshy, lobules subulate, 8–8.3 mm long by 1 mm wide, slightly grooved, glabrous. *Ovary* oblong to ovate, glabrous, with a thick tuft of silky hairs at the apex. *Fruit* not seen.

Distribution. Endemic to the Philippines. Negros: Negros Oriental, Dumaguete City; Negros Occidental, Silay City, Patag, Mt. Mandalagan Range. MINDANAO: Davao Oriental, San Isidro, La Union, Mt. Hamiguitan Range Wildlife Sanctuary (Fig. 2).

Ecology. Found growing near the stream, in humid environment and close to semi open canopy at elevations of 400 to 950 m above sea level.

Phenology. Observed to flower in February, May and June; presumed to flower throughout the year as all other *Hornstedtia* species.

Conservation status. There is no adequate information to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status. Following the Red List criteria of the IUCN (2017), *Hornstedtia microcheila* is herein considered as Data Deficient (DD).

Taxonomic notes. Merrill (1923) transferred this species to the genus *Amomum*. However, having an involucre of tightly overlapping sterile bracts (involucre of tightly overlapping sterile bracts absent in *Amomum*), a rachis that is condensed into a flat receptacle (not flat in *Amomum*),

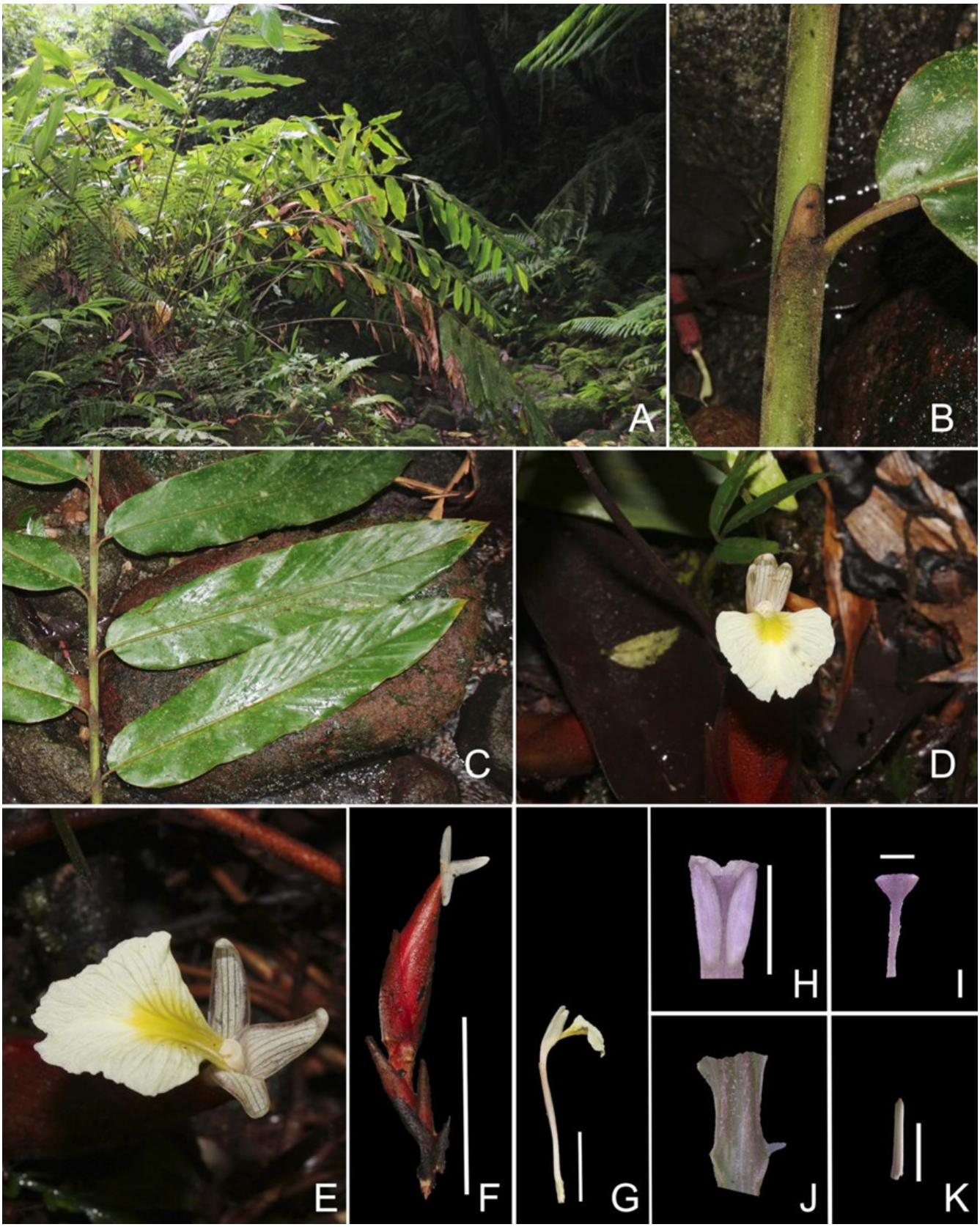

Figure 1. *Hornstedtia microcheila* Ridl. A. Habit, B. Detail of ligule, C. Leaves, D. Detail of flower (front view), E. Detail of flower (profile view), F. Inflorescence (scale bar: 5 cm), G. Flower (scale bar: 2 cm), H. Anther (scale bar: 10 mm), I. Stigma (scale bar: 1 mm), J. Claw, K. Epigynous gland (scale bar: 5 mm).

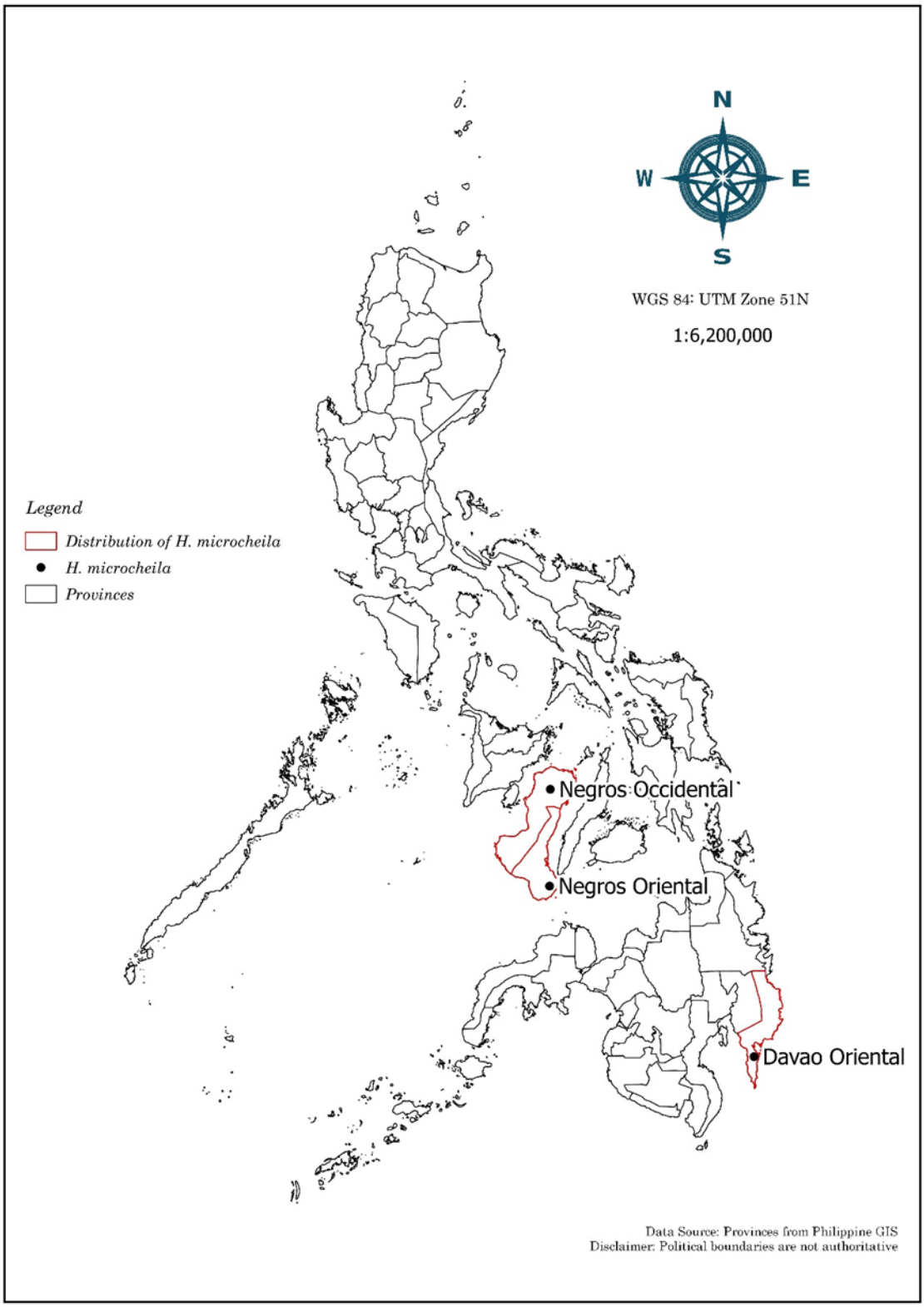

Figure 2. Map showing the distribution of *Hornstedtia microcheila* across the Philippine archipelago.

Table 1. List of *Hornstedtia* species from the Philippines

Name of species	Distribution
Hornstedtia conoidea Ridl.	Laguna, Sorsogon, Negros Oriental, Bukidnon, Davao Oriental, Misamis Oriental, Lanao Del Sur, Davao City
Hornstedtia havilandii (K. Schum.) K. Schum.	Sulu, Bukidnon, Zamboanga del Norte
Hornstedtia lophophora Ridl.	Negros Oriental, Bukidnon, Davao City
Hornstedtia microcheila Ridl.	Negros Oriental, Negros Occidental, Davao Oriental

absence of filament (filament present in *Amomum*), inconspicuous staminal tube (conspicuous in *Amomum*), and an inflorescence that are fusiform (never fusiform in *Amomum*) therefore, support its placement in the genus *Hornstedtia*.

Hornstedtia microcheila is similar to *H. lophophora* by having a lip that is longer than the corolla lobes. However, *H. microcheila* differs significantly in having an arching and shorter leafy shoot (2–3 m vs. 5–7 m), a broad, 1.7–1.9 cm wide labellum (vs. narrow, 0.5–0.8 cm wide), shape of the labellum (unguiculate vs. elliptic to oblong), shape of the leaf (oblong to narrowly elliptic vs. lanceolate to oblong), and a much longer and distinct petiole (2–2.5 cm long vs. 0.8–0.9 cm long). According to Ridley (1909), the small inflorescences of this species and its white labellum are remarkable and unusual for this genus in comparison to other *Hornstedtia spp.* in the Philippines, which is supported in this present study. He also added that the lip is creamy white except the yellow, pubescent, narrow base with two short narrow lobes that are as long as the anther. Furthermore, among *Hornstedtia* species in the Philippines, *H. microcheila* is unique in having a clawed labellum.

Some of the differences in Ridley's (1909) description and meristics noted with the redescription presented in this paper can be explained by the stage of development of the inflorescence, growth conditions and processing techniques. In addition, variability in the meristics of the characters most especially the leaves, was also observed in the different type specimens.

Ridley (1909) designated *Elmer 10279* as the type of which nine syntypes are known (Zingiberaceae Resource Centre, 2017). I hereby take this opportunity to designate K000255170 as the lectotype of *H. microcheila* as it has the same collection number as in the protologue and has a hand-written note probably by Ridley or Elmer. All other syntypes (BISH1005395, BM000617561, E00279173, G00008037, HBG520836, K000255171, K000255172, NY00320255) become isolectotypes.

Specimen examined. Philippines, Negros: Negros Occidental province, Silay City, Patag, Mt. Mandalagan Range, found growing as terrestrial near the stream, elev. 930 m, 1 June 2017, *M.A.K. Naive 021/2017* (**new provincial record,** CMUH).

Key to the different *Hornstedtia* species in the Philippines

1. Labellum longer than corolla lobes……2
1. Labellum more or less equally long as the corolla lobe……....3

2. Ligule ovate to triangular, puberulent; labellum unguiculate, apex rounded, crispate..……***…...H. microcheila***
2. Ligule oblong, pubescent; labellum pinkish white, elliptic to oblong, apex truncate to rounded, entire……...***H. lophophora***

3. Inflorescence partly submerged in the ground, peduncle <15 cm long……....***H. conoidea***
3. Inflorescence not submerged in the ground, peduncle >15 cm long……...***H. havilandii***

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