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New distribution record of *Habenaria gibsonii* var. *foetida* Blatt. & McCann (Orchidaceae, Orchidoideae) from Panay Island, Philippines, with notes on allied taxa, ecology, and conservation

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Abstract

We report the occurrence of *Habenaria gibsonii* var. *foetida* Blatt. & McCann on Panay Island in the Philippines. Our new records represent the easternmost distribution of this species, and also the first in the Malesian region. We present a full description, photographs, updated distribution map, and notes on allied taxa, ecology, and conservation status of this taxon. Our report highlights the importance of Panay Island in floristic studies of the Philippines.

Keywords

Habenaria digitata complex, range extension, terrestrial orchid

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Introduction

Habenaria Willd. is one of the largest genera within the family Orchidaceae and comprises approximately 890 species of mostly terrestrial or rarely epiphytic orchids (WCVP 2021; POWO 2021). The genus has a pantropical and subtropical distribution (Chen and Cribb 2009), with centers of diversity in Brazil, southern and central Africa, and East Asia (Kurzweil and Weber 1992; Batista et al. 2013). Like other members of the tribe Orchidinae, *Habenaria* is characterized by fleshy roots or tubers, leaves that are basal or spirally arranged along the stem, and a racemose, terminal inflorescence that bears mostly resupinate flowers (Jin et al. 2017). The characters used to distinguish *Habenaria* from closely related genera vary widely, but stalked, convex stigma lobes are consistently associated with the genus (Batista et al. 2013). The taxonomy of *Habenaria* and its relatives, such as *Bonatea* Willd. and *Pecteilis* Raf., has been in discussion for many years (Kurzweil 2009; Batista et al. 2013; Jin et al. 2014, 2017). Many species that were described under *Habenaria* are currently placed in other genera, e.g. *Bonatea* Willd., *Planthatera* Rich., and *Peristylus* Blume (Kurzweil 2009; Batista et al. 2013; Kolanowska et al. 2015), and further study is needed to clarify the generic delimitations and infrageneric- systems within the genus (Kurzweil and Weber 1992; Kurzweil 2009; Batista et al. 2013; Jin et al. 2014, 2017).

In the Philippines, much of the knowledge about *Habenaria* comes from the works of Oakes Ames (Ames 1908; Merrill 1923). Currently, *Habenaria* is represented by 20 species, 12 of which (60%) are endemic to the country (Pelser et al. 2011).

Panay is a triangular island located in the west-central Philippines. It has a total land area of 11,693 km² and a topography consisting of wide coastal plains and rugged hills and a mountainous interior. The Central Panay Mountain Range, with the highest peaks at about 2000 m a.s.l., runs nearly north to south along the western coast of the island. The plant diversity of Panay was poorly documented in the last century (Barcelona 2004). The years after 2000 saw an increase in vascular plant species documented from the island, representing new distribution records for the country or novel descriptions (Barcelona and Fernando 2002; Barcelona 2004; Alejandro et al. 2008; Cabuang et al. 2012; Journé et al. 2014; Peng et al. 2017; Hetterscheid et al. 2020; Naive et al. 2020). Despite the increase in taxonomic effort, the flora is under-collected compared with other islands of the Philippines (Barcelona 2004; Peng et al. 2017).

During a floristic exploration in the campus of the University of the Philippines Visayas (UPV), in the town of Miagao, Iloilo Province, south of Panay Island, the second author (MDM) found flowering individuals of *Habenaria gibsonii* var. *foetida* Blatt. & McCann. This taxon has been recorded from East Himalaya, India, West Himalaya, and Indochina (Kumar et al. 2018; POWO 2021; NHM 2022). The occurrence of *H. gibsonii* var. *foetida* on Panay Island, Philippines, represents the easternmost record, and the first from the Malesian biogeographic region for this taxon. This paper provides a full description of the collected plants, an updated distribution map, photographs and notes on allied taxa, ecology, and conservation status of *H. gibsonii* var. *foetida.*

Methods

Photo-documentation and collection of *H. gibsonii* var. *foetida* were conducted in its natural habitat in the UPV Miagao Campus Nature Trail on July 3 and 10, 2021. Five plants were collected through Wildlife Gratuitous Permit No. R6-2021-001 from the Department of Environment and Natural Resources (DENR) Region 6. Local abundance was estimated by counting mature individuals found within a 130 × 3 m transect laid along the trail in the collection site. The flowering and fruiting period of the species was determined by observing *H. gibsonii* var. *foetida* populations within the UPV Miagao campus from 2020–2021.

Descriptions and measurements were made from the specimens in the fresh state and preserved in 70% denatured alcohol with 20% glycerine and 10% water (Copenhagen solution). Flower details were examined under a BEL STMPRO-B stereomicroscope. For identification, relevant literature was consulted (Ames 1908; Santapau and Kapadia 1966; Seidenfaden 1977; Kumar et al. 2018; Swami 2019; Paramesh et al. 2021). Protologues and scanned images of herbarium materials of *H. gibsonii* var. *foetida* and allied taxa from AMES, BLAT, CAS, K, L, LE, and P (acronyms follow Thiers 2021) were also studied. Voucher specimens were prepared using techniques described in Alexiades (1996) and were deposited at CAHUP, DLSUH, and PNH.

The previous distribution records of *H. gibsonii* var. *foetida* and its synonyms *Habenaria foliosa* var. *foetida* (Blatt. & McCann) Bennett and *Habenaria thailandica* Seidenf. (following WCVP 2021) were obtained from published information (Seidenfaden 1977; Misra 1980; Kurzweil 2009; Choudhury et al. 2011; Panda et al. 2011; Cerejo-Shivkar and Shinde 2015; Barbhuiya and Salunkhe 2016; Kumar et al. 2018; Swami 2019; Kulloli and Purohit 2020; Paramesh et al. 2021) and online databases (POWO 2021; GBIF 2022). When information on the location and/or geographic coordinates were incomplete or missing from the collection records used for the background data for the distribution map, Google Maps (Google 2022) was consulted for approximate location and/or coordinates. Derived secondary information on location and coordinates also appears enclosed in brackets in the collection records of the additional specimens of *H. gibsonii* var. *foetida* examined for this study. For the new records from Panay Island, a Garmin Etrex30 GPS receiver (Garmin, USA) was used to mark the coordinates of the collection site. The distribution map was generated from Natural Earth Data using OziExplorer GPS Mapping Software v. 3.95 (D&L Software Pty Ltd, 2016).

Results

***Habenaria gibsonii* var. *foetida* Blatt. & McCann J.** Bombay Nat. Hist. Soc. 36: 16 (Blatter and McCann 1932)

Figure 1A–J

Type: India, Maharastra, Khandala, Monkey Hill, Hallberg s.n. (holotype BLAT).

Habenaria foliosa var. *foetida* (Blatt. & McCann) Bennet J. Econ. Taxon. Bot. 5: 452 (Bennet 1984).

Habenaria thailandica Seidenf. Dansk Bot. Ark. 31: 78 (Seidenfaden 1977)

Type: Thailand, Chiang Mai, between Chiang dao and Fang, 7 June 1973, Geesink, Phanichapol, Santisuk 5759 (holotype L0061379 [image!])

New records. PHILIPPINES – **Panay Island** • Province of Iloilo, Municipality of Miagao, Brgy. Mat-y, U.P. Visayas Nature Trail; 10.6435°N, 122.2308°E; 27 m a.s.l.; 03-VII-2021; MRB Altamirano & MCD Malay RMIA001 leg.; CAHUP 074232 • same locality; 10.6426°N, 122.2283°E; 70 m a.s.l.; 10-VII-2021; MRB Altamirano & MCD Malay RMIA002 leg.; DLSUH 6252 • same

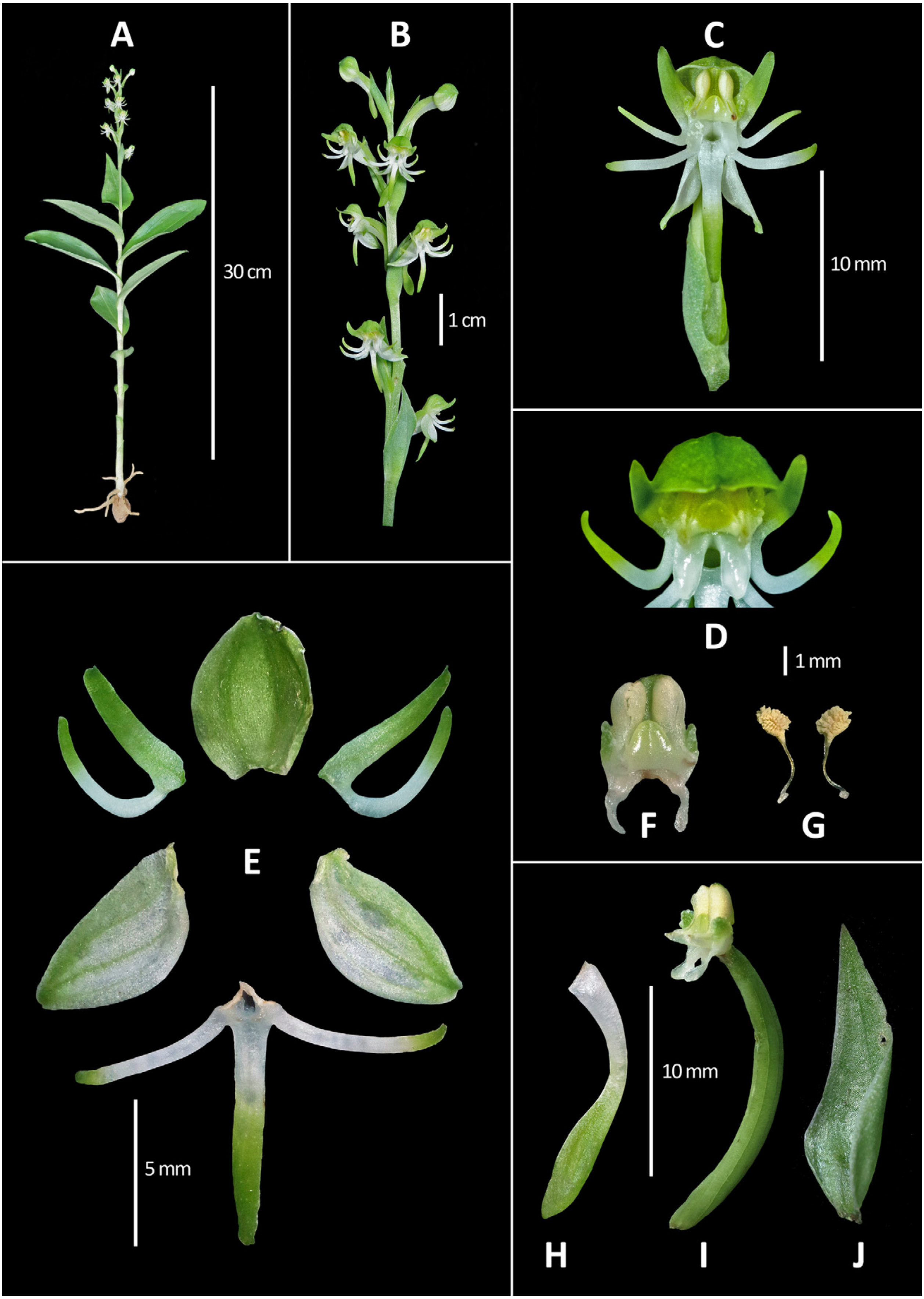

Figure 1. *Habenaria gibsonii* var. *foetida*. **A**. Habit. **B.** Inflorescence. **C**. Flower, frontal view. **D.** Stigmatic processes, frontal view. **E.** Dissected perianth, frontal view. **F**. Column and stigmatic processes, frontal view. **G**. Pollinaria, frontal view. **H.** Spur, side view. **I.** Ovary plus pedicel, column and stigma lobes, side view. **J.** Bract, frontal view.

locality; 10.6427°N, 122.2295°E, 55 m a.s.l.; 10-VII-2021; MRB Altamirano & MCD Malay RMIA003 leg.; CAHUP 074233 • same locality; 10.6248°N, 122.2296°E; 50 m a.s.l.; 10-VII-2021; MRB Altamirano & MD Malay RMIA004 leg.; PNH 258610 • same locality; 10.6433°N, 122.2305°E, 31 m a.s.l.; 10-VII-2021; MRB Altamirano & MCD Malay RMIA005; PNH 258611

Additional materials examined. INDIA – **[Maharasthra]** • [Ratnagiri], Dapoli; [17.7672°N, 073.1907°E]; VII 1922; RD Acland 1170; BLAT 72746 (image) • [Thane], Ghodbunder; [19.2887°N, 072.9304°E]; 19-VII-1956; ZJ Kapadia 2101; BLAT 72747 (image) • same locality; 19-VII-1956; ZJ Kapadia 2102; BLAT 72748 (image) • [Raigad], Neral, Jummapatti; [19.0033°N, 073.3027°E]; 20-VII-1960; NA Irani 5036; BLAT 72752 (image) • Thakurwadi-waterpipe; no geographical coordinates; 02-VII-1959; NA Irani 4148; BLAT 72765 (image) • [Pune], Lonavla; [18.7573°N, 073.4085°E]; 1-VIII-1954; ZJ Kapadia 5477; BLAT 72758 (image) • [Pune], Lonavla, [Tungarli] Hill; [18.7602°N, 073.4038°E]; 1-VIII-1954; ZJ Kapadia 551; BLAT 72768 (image) • [Mumbai Suburban District], Borivali National Park; [19.2287°N, 072.9182°E]; 18-VII-1957; PS Herbert 2741; BLAT 72754 (image) • same locality; 18-VII-1957; PS Herbert 2741; BLAT 72763 (image) • [Mumbai Suburban District], Borivali; [19.2314°N, 072.8554°E]; 18-VII-1957; RR Fernandez 4221; BLAT 72766 (image) – **[Gujarat]** • Dang, Waghai; [20.7727°N, 073.5003°E]; 12-IX-1955; ZJ Kapadia 1636; BLAT 72761 (image) • same locality; 12-IX-1955; ZJ Kapadia 1637; BLAT 72755 (image).

THAILAND (as *H. thailandica*) – **Chiang Mai •** Chiang Dao, Doi Chiang Dao, east side Pa Blawng cave area; 19.5833°N, 098.8333°E; 525 m a.s.l.; 10-VI-1989; JF Maxwell 89-749; CAS 629532 (image), L1516442 (image) – **Lampang •** Muang Bahn (Pan), Jae Sawn National Park, between park headquarters and Dawn Chai Village; 18.3333°N, 099.8667°E; 500 m a.s.l.; 29-V-1996; JF Maxwell 96-747; CAS 629533 (image), L1516441 (image) – **Krabi •** Ao Nang at Krabi; [8.0167°N, 098.8333°E]; 12-VII-1992; K Larsen, SS Larsen, C Niyomdham, P Sirirugsa, DD Tirvengadum & CT Norgaard 43325; P00439808 (image).

VIETNAM (as *H. thailandica*) – **Tinh GJak Lak**; 13.2911°N, 108.1689°E; 24-V-2013; Nguyen Van Canh s.n.; LE 01089698 (image) – **Tinh Lam GJong**; 11.6667°N, 108.0833°E; 3 V 2020; Truong Ba Vuong, Loc Bao Sang; BV 622; LE 01073090 (image).

CAMBODIA (as *H. thailandica*) – **Kampong Chhnang**; [12.4109°N, 104.5908°E]; 1875; M Godefroy 220; P00439809 (image), P00439810 (image)

Description. Terrestrial, erect herb, 29.0–38.0 cm tall (inflorescence included). Tuber one, fleshy, ovoid (–globose), beige, 1.5–2.6×1.3–1.7 cm. Roots slender, fleshy, unbranched, growing from the base of the stem directly above the tuber. Stem green, cylindrical, glabrous, 0.35–0.4 cm in diameter, the lower third covered in leaf sheaths. Leaves 6–8, sheathing, alternate, 1.1–10.0 × 1.0–3.5 cm, shape variable, from elliptic or ovate to lanceolate, apex acute to acuminate, green on the adaxial side, pale silvery green on the abaxial side, glabrous, margins undulating, the largest leaves found in the middle portion of the stem. Inflorescence a lax raceme, terminal, 12.0–13.8(–17.0) cm long. Flowers 8–15(–22), resupinate, greenish-white, 2 × 1.0–1.3 (–1.5) cm, emitting a faint, foul smell. Bracts sheathing, green, glabrous, margins entire, 3-nerved; bract size decreases towards the apex of the rachis; lower bracts longer than the ovary, 15.0–22.0 × 5.0–9.0 mm, ovate to lanceolate, apex acute to acuminate; upper bracts shorter than the ovary,7.0–11.0 × 3.0–6.0 mm, lanceolate, apex acuminate to attenuate. Ovary+pedicel (13.0–) 14.0–18.0 mm long, spreading from the rachis, arched, twisted, ribbed, green, glabrous. Dorsal sepal 4.8–6.1 × 4.3–5.4 mm, green, 3-nerved, orbicular, apex obtuse, glabrous, strongly concave. Lateral sepals 5.4–7.0(–7.5) × 3.0–4.3 mm, 3-nerved, oblique, ovate to lanceolate, apex obtuse; base, middle portion and inner margin white, the nerves and outer margin towards the apex green; recurved. Petals 2-lobed almost to the base, apices obtuse; upper lobe 5.4–6.5(–8.0) × 1.0–1.4(–1.7) mm, falcate, green; lower petal lobe 5.0–5.7(–7.5) × 0.5–0.7 mm, linear-falcate, narrower, and slightly shorter than the upper segment, white turning green towards the apex. Labellum 3-lobed almost to the base, base and lobes white, turning green towards the apices; undivided base 0.8 × 2.9 mm wide; lobes linear, apex obtuse; side lobes 5.0–6.3(–8.7) × 0.5–0.7(–0.9) mm, shorter than the midlobe; midlobe 7.0–9.5(–12.5) × ca.1 mm, base slightly wider at 1.3–1.5 mm, pendulous. Spur 11.0–14.0(–15.0) mm long, shorter than or as long as ovary, white, turning green towards the apex; mouth broad and fleshy, broadly funnel-shaped, apex strongly clavate, obtuse or rounded. Column erect, 3.0–4.0 mm high; connective light green, apex emarginate, 0.4–0.7 mm wide between the anther locules. Rostellum 1.3–1.8 × 1.4–1.8 mm, pale green to yellow-green; midlobe triangular, apex obtuse, completely placed between the anther locules; rostellum side lobes 1.3–1.4 mm long, projecting forward. Anther locules white, broad, 1.8–2.6 × 1.0–1.3 mm, erect, parallel with each other but diverging slightly towards the basal portion, curving outwards; anther canals ca. 1.6 mm long, curving outwards just outside of the rostellum side lobes. Staminodes 1.4–2.0 × 0.8–1 mm, 0.6 mm thick, erect, white -to light green, verrucose, apex round, appressed to the base of the anthers. Pollinia 1.5–1.9 × 0.9–1.2 mm, yellow, obovoid; caudicles 1.8–2.0 mm long; viscidia 0.2–0.3 × 0.4–0.5 mm, kidney-shaped, flat. Stigmatic processes 2, separate, the free projected portion 1.3–1.4 mm long; white, fleshy, appressed to the labellum at the sides of the mouth of the spur, margins slightly curved inwards, apex obtuse to rounded. Fruit a capsule, 18.0–20.0 mm long, fusiform, ribbed.

During collection, the foul odor of the flowers was barely noticeable, probably masked by the odor of the thick layer of decomposing leaf litter in the collection site. The foul odor became more evident when the collected specimens were taken from the field indoors, while they were in the fresh state, and was observed to dissipate by the middle of the day.

Discussion

Taxonomic comments. Our specimens resemble *Habenaria leibergii* Ames, a species endemic to the Philippines (Pelser et al. 2011). Based on the images of dried herbarium specimens and illustration of the type material (Ames 1908: 34–35), we take note of the similarity with our specimens in terms of the 2-lobed petal, 3-lobed labellum with linear lobes, and clavate spur with broad mouth. However, we were not able to validate these initial observations with a thorough examination of the flowers, due to the limitations in the access to the type material in AMES and scarcity of specimens. *Habenaria leibergii* was last collected from the wild in 1948 (Davis s.n., AMES 65699), with no existing clear photographs or additional illustrations. Ames (1908) indicated the affinity of *H. leibergii* with *H. travancorica* Hook.f. [(=) *Habenaria digitata* Lindl.]. *Habenaria leibergii* may belong to the *Habenaria digitata*-complex, whose affinities and nomenclature remain unclear and yet to be resolved (Seidenfaden 1977; Kurzweil 2009; Kumar et al. 2018). Until further information is obtained, we maintain *H. gibsonii* var. *foetida* and *H. leibergii* as distinct taxa.

We compared measurements of *H. gibsonii* var. *foetida* from Panay Island with those of scanned images of herbarium specimens from India, as well as Thailand and Vietnam (representing Indochina (Table 1). We found the specimens from India to have larger dimensions of bracts, ovary+pedicel, dorsal and lateral sepals, and spur, while specimens from Thailand and Vietnam tend to have shorter petal lengths. In all specimens examined, the labellum sidelobes were shorter than the midlobe; however, our estimates of sidelobe-to-midlobe length ratios varied from 0.6 to 0.8, and we consider this, together with varying leaf shapes, as part of the natural variation of populations of *H. gibsonii* var. *foetida*, given the taxon's wide distribution.

Distribution. The type locality of *H. gibsonii* and its variety *H. gibsonii* var. *foetida* is Khandala in the state of Maharastrata, India (Blatter and McCann 1932) (Fig. 2). *Habenaria gibsonii* var. *foetida* was earlier recorded as endemic to the Western Ghats, in the states of Maharashtra and Karnataka (Kumar et al. 2001). It was later reported from other states in Peninsular and northeast India and East Himalaya (Misra 1980; Choudhury et al. 2011; Panda et al. 2011; Barbhuiya and Salunkhe 2016; Kumar et al. 2018; Swami 2019; Kulloli and Purohit 2020; Paramesh et al. 2021). *Habenaria gibsonii* var. *foetida* is reported to occur in West Himalaya (POWO 2021), but we did not find any additional publication or herbarium material from this region. Outside of India and the Himalayan region, *H. gibsoni var. foetida* has been recorded from Myanmar, Thailand, Laos, Cambodia, and Vietnam (Averyanov and Averyanova 2003; Schuiteman et al. 2008; Kurzweil 2009; Kumar et al. 2018; NHM 2022).

The discovery of *Habenaria gibsoni* var. *foetida* from the Philippines extends the global distribution of the species and variety further eastward into the Malesian

Table 1. Comparisons of *Habenaria gibsonii* var. *foetida* Blatt. & McCann from India, Indochina (Thailand and Vietnam), and the Philippines.

Character		*Habenaria gibsonii* var. *foetida* (Maharasthra and Gujarat, India)	*Habenaria gibsonii* var. *foetida* (= *H. thailandica*; Thailand and Vietnam)	*Habenaria gibsonii* var. *foetida* (Panay Island, Philippines)
Habit	Height (cm) (including inflorescence)	30.0–38.6	19.9–48.2	29.0–38.0
	Inflorescence length (cm)	6.5–14.0	7.2– 16.7	12.0–13.8(–17.0)
Largest leaf	Length (cm)	5.2–11.5	5.8–12.0	6.5–10.0
	Width (cm)	2.5–4.0	1.7–2.7	2.8–3.4
	Shape	Oblong to elliptic	Lanceolate to elliptic	Ovate to elliptic
	Apex	Acute	Acute to mucronate	Acute to acuminate
Flower				
Bract	Length (mm)	8.0–38.0	9.7–24.3	7.0–22.0
Ovary plus pedicel	Length (mm)	(10.0–)15.0–20.0	12.3–16.0	(13.0–)14.0–18.0
Dorsal sepal	Length (mm)	4.4–7.7(–9.2)	3.8–5.0	4.8–6.1
	Width (mm)	—	ca. 4.5	4.3–5.4
Lateral sepal	Length (mm)	6.0–8.0(–12.0)	5.5–6.8	5.4–7(–7.5)
	Width (mm)	3.0–3.5(–5.0)	2.4–3.1	3.0–4.3
Upper petal lobe	Length (mm)	4.0–7.0(–9.0)	3.8–4.5	5.4–6.5(–8.0)
Lower petal lobe	Length (mm)	3.0–5.7(–7.4)	3.0–3.5	5–5.7(–7.5)
Lower petal length relative to upper petal length		0.8 as long	0.8 as long	0.9 as long
Labellum side lobe	Length (mm)	5.4–7.0 (–11.0)	3.8–6.1	5.0–6.3(–8.7)
Labellum midlobe	Length (mm)	(6.5–)8.0–12.0(–14.0)	5.2–7.4	7.0–9.5 (–12.5)
Labellum sidelobe length relative to midlobe length		0.6–0.7 as long	0.7–0.8 as long	0.7 as long
Spur	Length (mm)	8.5–13.0(–20.0)	9.0–13.0	11.0–14.0 (–15.0)

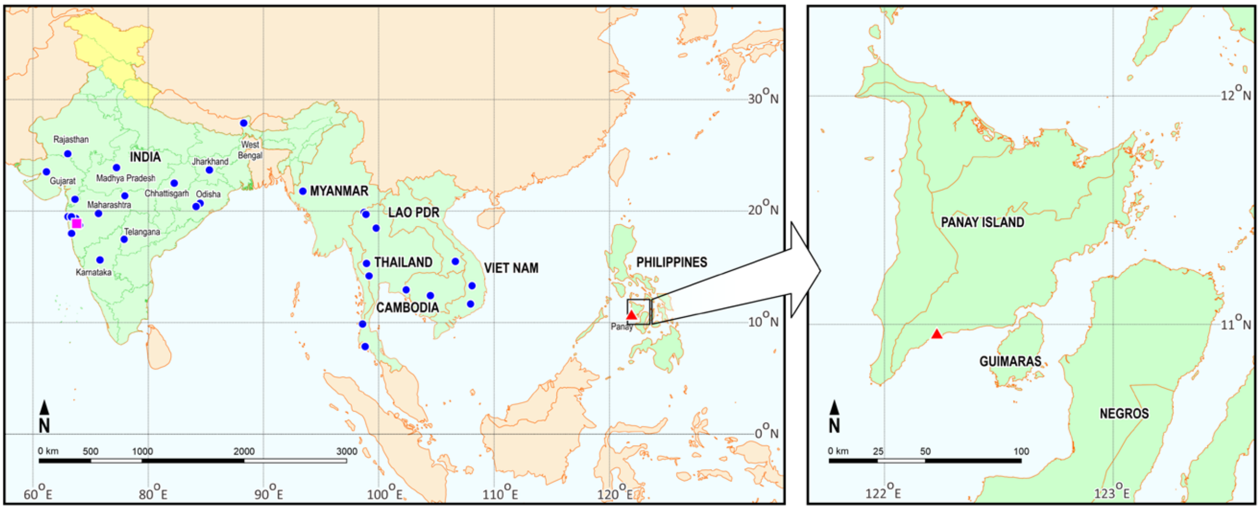

Figure 2. Distribution of *Habenaria gibsonii* var *foetida* (Blatt. & McCann.) Purple square = type locality; Blue circles = previous records; Red triangles = new records in the Philippines. The yellow-shaded area represents a reported range of *H. gibsonii* var. *foetida* in West Himalaya but was not verified by the authors.

biogeographic region. Indian flora, in general, is dominated by humid tropical Asiatic elements, consisting largely of Indo-Chinese and Malayan affinities (Mani 1974; Nayar 1977). Members of the Indian flora display various distribution patterns, from completely continuous to greatly disjunct isolates (Mani 1974). Similarly, the Indian orchid flora shows close affinities with those of adjoining countries, while a number of species have a much wider range of distribution in widely separated countries (Chowdhery 2015). The Malesian orchid flora, in contrast, is largely derived from Southeast Asian and West Malesian elements, with a high percentage of endemic species (91.5%) (Schuiteman 1999). *Habenaria* is among orchid genera found in the Malesian region that are generally extremely widespread, with a pantropical (subcosmopolitan) distribution (Schuiteman 1999).

Ecology and conservation. The coastal town of Miagao, Iloilo, where *H. gibsonii* var. *foetida* was found, has a tropical monsoon climate (Beck et al. 2018). The vegetation type at the collection site, based on elevation, is tropical lowland evergreen forest (Barcelona 2004). *Habenaria gibsoni* var. *foetida* was observed at low elevations (20–70 m a.s.l.) in a hilly area that was used for agriculture before infrastructure for the UPV campus was built around it in the early 1980s. The tree layer is dominated by exotic Big-leaf Mahogany (*Swietenia macrophylla* King), interspersed with *Artocarpus blancoi (Elmer)* Merr., *Corypha utan* Lam., *Gmelina arborea* Roxb. ex Sm., and other species. The orchids were observed in shaded spots in the understory, on sloping ground with gravelly soil covered with thick litter. Understory plants found growing with *H. gibsonii* var. *foetida* included *Zingiber zerumbet* (L.) Roscoe ex Sm., *Oplismenus burmanni* (Retz.) P. Beauv, *Flemingia strobilifera* (L.) W.T.Aiton, *Desmodium* sp., and *Nervilia* spp.

Within its previously reported distribution range, *H. gibsonii* var. *foetida* was observed growing in the understory of a variety of forest types, from tropical evergreen to semi-evergreen forests, to tropical moist deciduous and dry deciduous forests, often on hilly or sloping ground (Santapau and Kapadia 1966; Misra 1980; Maxwell et al. 1997; Kumar et al. 2001; Averyanov and Averyanova 2003; Kurzweil 2009; Panda et al 2011; Cerejo-Shivkar and Shinde 2015; Paramesh et al. 2021). It has been observed at lower elevations (0–800 m) in Thailand, Vietnam, and Laos (Maxwell et al. 1997; Averyanov and Averyanova 2003; Kurzweil 2009; Kumar et al. 2018), and at generally higher elevations (100–2000 m) in India (Misra 1980; Kumar et al. 2001). Despite the variations in latitude and vegetation types, a common feature of its reported distribution range is a strongly seasonal climate, characterized by heavy rains due to the southwest monsoon in June–October, followed by a dry season influenced by the northeast monsoon in November–April across tropical Asia (MacKinnon 1997). This is reflected in the phenology of *H. gibsonii* var. *foetida*, where it has been observed flowering in May or June–July in Thailand and Laos (Kurzweil 2009; Kumar et al. 2018) and July–August or September in India (Misra 1980; Barbhuiya and Salunkhe 2016; Paramesh et al. 2021). In the Philippines, *H. gibsonii* var. *foetida* was observed flowering from July–August after the onset of the rainy season, and fruiting from September–November. During the dry season (November–April), the aboveground parts wither and are lost, and the plant becomes dormant.

The occurrence of *H. gibsonii* var. *foetida* populations in the wild has been variously reported as frequent (Misra 1980), occasional (Misra 1980; Averyanov and Averyanova 2003); rare (Kurzweil 2009; Paramesh et al. 2021), or very rare (Swami 2019).

In India, *Habenaria. gibsonii* var. *foetida* has been assessed as Critically Endangered (IUCN 1994, 2001); during this time, it was thought to be endemic to the Western Ghats (Kumar et al. 2001). It was evaluated as Vulnerable (IUCN 1994) in Vietnam (Averyanov and Averyanova 2003) and as Least Concern (IUCN 2001) in Thailand (Kurzweill 2009). However, the two latter assessments were considered approximations that were based on field explorations (Averyanov and Averyanova 2003) or the number of the localities of available herbarium collections in the country (Kurzweill 2009). Since these preliminary assessments, no comprehensive study of the conservation status of *H. gibsonii* var. *foetida* at the national level has been found. In India, populations of *H. gibsonii* var. *foetida* are threatened by habitat loss and degradation (Kumar et al. 2001; Paramesh et al. 2021).

In the Philippines, *H. gibsonii* var. *foetida* has so far only been observed from two forest patches within the UPV Miagao campus, including the collection site. About 150 mature individuals were counted in July 2021 in the collection site, occurring singly or in clumps of 3–5 plants along the trail. We were not able to survey additional areas outside of the UPV campus, and additional botanical surveys will be needed to fully understand the distribution and conservation status of *H. gibsonii* var. *foetida* in the Philippines. While their location within the university offers some form of protection, the plants are in danger of being trampled on by hikers and locals who occasionally harvest firewood and buri palm as well as graze animals there. Heavy rains also cause erosion in the slopes that can wash out individuals. Future campus development plans may also adversely impact the populations by increasing exposure of the plants to foot traffic and ground clearing activities.

Our new occurrence records of *H. gibsonii* var. *foetida* highlights the importance of the island of Panay in floristic studies of the Philippines. In recent years there has been an increase in new records from Panay, including island endemics, while it was once thought to harbor the same flora and fauna as the neighboring island of Negros (Ferner et al. 2000; Barcelona 2004). The fact that *H. gibsonii* var. *foetida* was discovered in a largely built environment supports the idea that the island flora is under-surveyed (Barcelona 2004; Peng et al. 2017). With our findings, we also agree with earlier suggestions (Seidenfaden 1977; Kurzweil 2009) on the need to resolve taxonomic and nomenclatural issues surrounding the *H. digitata* species complex, whose members are mainly distributed in the Deccan and Himalayan regions of India (Seidenfaden 1977; Kurzweil 2009) but have since then been reported from outside of these areas. It is likely that species, especially the widely distributed ones, have been described several times in several countries, as what has been the case with members of *Habenaria* from the Neotropics (Batista et al. 2014). A broad-scale, monographic study of the entire group, employing molecular phylogenetic analysis, would help in understanding relationships and aid in the development of appropriate conservation strategies for the taxa involved.

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Authors' Contributions

Conceptualization: MCM, RAAB. Data curation: MRBA, MCM. Formal analysis: MRBA. Investigation: MRBA, MCM. Methodology: MRBA, RAAB. Project administration: MCM, MRBA. Validation: MRBA, RAAB. Visualization: MRBA. Writing – original draft: MRBA. Writing – review and editing: MRBA, RAAB, MCM.

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