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**Research Article**



## *Habenaria austrosinensis* Tang & F.T. Wang (Orchidaceae): A Newly Recorded Species For Vietnam

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### Abstract

The present study is the first record on the occurrence of *Habenaria austrosinensis* to the flora of Vietnam based on the specimens collected from Quảng Ngãi province, Central Vietnam. Our specimens are different from the type specimen in China and Thai specimen in having the broadly elliptic to oblanceolate-elliptic leaves, longer rachis, dorsal and lateral sepals, much longer lobes of the labellum 18–20 mm, cylindrical-fusiform spurs with a short mucro at apex. Data on distribution, habitat, phenology, a key to most allied species in Vietnam is also given.

### INTRODUCTION

*Habenaria* Willd. is one of the largest genera of Orchidaceae comprising about 920 species (Govaerts *et al.*, 2016). It distributed throughout pantropical regions Africa, America, and Asia with centers of species diversity in Brazil, southern and central Africa and East Asia (Kurzweil and Weber, 1992; Pridgeon *et al.*, 2001). The genus has been well studied in the surrounding areas of China and Taiwan, Peninsular Malaysia and Singapore, Thailand (e.g. Seidenfaden and Wood, 1992; Chen and Cribb, 2009; Kurzweil, 2009). Currently, about 36 species of *Habenaria* are known in Vietnam (Gagnepain, 1934; Phạm, 2003; Averyanov, 2010; Averyanov *et al.*, 2016).

During recent botanical surveys in Central Vietnam in 2016, an interesting species of *Habenaria* was discovered and collected from Cà Đam Mountains, Tây Trà district, Quảng Ngãi Province, Vietnam. The plant has morphological characters of strongly hairy stems, oblique lateral sepals with a false downward pointing apex, and elongate anther canals which share to several species such as *H. austrosinensis* Tang & F.T.

Wang, *H. reflexa* Blume. After a through scrutiny examination of the material and comparison with *Habenaria* species and examined protologues of most closely species (e.g. Phạm, 2003; Averyanov, 2010; Averyanov *et al.*, 2016) in Vietnam and neighbour countries, it confirmed that the plant is *Habenaria austrosinensis*. This species was previously known in South Yunnan, China and Thailand (Seidenfaden, 1977, Chen and Cribb, 2009; Kurzweil, 2009), but not yet recorded from Vietnam. Hence, we report it as a new record for the flora of Vietnam. In the present paper, we provide a detailed taxonomic description and microphotographs of diagnostic characteristics of *Habenaria austrosinensis* (Figure 1), and a key to delimiting characters with its.

### MATERIALS AND METHODS

Herbarium specimens were collected, dried and processed following the standard taxonomic methods (Bridson and Forman, 1998) and hold at the VNM herbarium (VNM), Institute of Tropical Biology, Vietnam. The fresh plant materials have been determined by literature (e.g. Kurzweil and

Weber, 1992; Phạm, 2003; Seidenfaden, 1977; Kurzweil, 2009; Averyanov, 2010). All measurements and descriptions were made from living plants and herbarium specimens. The morphological characters were described using the general terminology by Beentje (2012) and standard works of Kurzweil and Weber (1992) and Averyanov (2010).

## TAXONOMIC TREATMENT

*Habenaria austrosinensis* Tang & F.T.Wang, Bull. Fan Mem. Inst. Biol. Bot. 7: 134. (1936); Seidenf., Dansk Bot. Ark. 31(3): 94, fig. 55 (1977); Chen S.C. & P.J. Cribb in Z.Y. Wu *et al.* (eds.) Fl. China 25: 155 (2009); Kurzweil, Thai Forest Bull., Bot., special issue: 36, 2009, fig. 45; plate V: 1. Terrestrial, annual herbs, with flowering shoot up to 70 cm tall. Root tubers cylindrical, 10.5–10.7 × 1.3–1.6 cm, externally brown, covered with densely minute woolly hairs, internally translucent white, with several fibrous roots. Cataphylls ca. 3, tubular, sheathing, enveloping the stem base, 2.5–6 cm long, pale greenish, glabrous, apex mucronate-apiculate. Stems erect, stout, angular with shallow keels, greenish, glabrous on the base third, sparsely stout grouped or branched-hairs above. Leaves to 9, cauline, in a cluster on the lower third of the stem, smaller ones at base and above, much larger ones in the middle, spreading; lamina slightly equal, broadly elliptic to oblanceolate-elliptic, (14.8–)20.5–23.7 × (4.7–)5.8–7.8 cm, light green and semi-shiny adaxially, glaucous abaxially, glabrous, apex acuminate, base tapering into a narrow petiole ca. 4.5 cm long, glabrous, midrib sunken above, prominent below, each half of lamina with 3-secondary veins, between them with 3 fine tertiary nerves with numerous anastomoses, margin entire, undulate. Bract-like leaves on scape 9, somewhat erect in their basal part, spreading to oblique above, broadly ovate at basal part, narrowly acuminate-lanceolate at upper part, sessile or shortly sheathing at the base, glabrous except for sparsely short hairs on the midrib, margins ciliate, shortly hairy, the basally larger ones 5.3–7.2 × 3–3 cm, the much reduced uppers 3.2–3.8 × 0.6–1.1 cm. Inflorescences lax, ca. 24-flowered; rachis ca. 24 cm long; floral bracts acuminate-lanceolate, 18–28 mm long, 6–9 mm wide near base, as long as the pedicel plus the ovary, greenish, outside sparse hairs, glabrous inside, with stiff white short hairs on the mid-vein and margin. Flowers 15–16 mm across, greenish-white, anther yellow. Dorsal sepal broadly ovate, concave, 3-veined, 6.5–7 × 5.3–6

mm, green, apex short acute, hooded, with stiff white short hairs on the veins and margin. Lateral sepals recurved, very obliquely triangular, with 3 strongly curved veins, truly apex 6.5–7.5 × 5–6 mm, behind the sepal base, the front margin forming a narrowly ovate false apex down-pointing, 6–7 × 5–6 mm, translucent white, tinted pale-greenish at apex and veins, glabrous. Petals erect, forming a hood with the median sepals, obliquely ovate, acuminate, 8.5–9 mm long, 3–3.5 mm wide at base, with single curved vein, white at base, pale greenish towards apex. Labellum deeply 3-lobed to near the base, all lobes linear, nearly equal, fleshy, irregularly spiraling, white at the base half to 2/3, greenish towards apex, glabrous, midlobe 18–20 mm long, 1 mm wide at base, lateral lobes 18–19 mm long, ca. 0.8 mm wide at base; spurs cylindrical-fusiform, straight, upward directed, 22–23 mm long, whitish at the base third, green distally, apex acute, with a short mucro ca 0.5 mm long, glabrous. Gynostemium [column] 3–3.5 mm long, whitish, glabrous, with connective narrow. Anthers slightly clavate, canals, 9–10 mm long, pale cream. Pollinarium ca. 20 mm long; viscidiums linear, straight, ca. 1 × 0.2 mm, pale yellowish; caudicles linear, straight, ca. 7.5 mm long, translucent yellowish; pollinium slightly obovate, 1.5–2.5 × 1–1.5 mm, bright yellow. Staminodes erect, cylindrical, slightly curved s-shape, ca. 1.8 mm long, ca. 0.3 mm wide, finely tuberculate, white. Stigma lobes slightly clavate, elongate stigmaphores, straight, 7–7.5 mm long, greenish at base, white distally. Rostellum 3-lobed, central lobe insignificant, lateral lobes ca. 1.2 mm long, pale greenish. Ovary (including pedicel) cylindrical-fusiform, slightly twist, 18–28 mm long, fine denticulate keels, green, curved, with sparsely elongate papillose or stout branched hairs, beaked narrow. Fruit not seen.

**Specimen examined:** Vietnam. **Quảng Ngãi Province:** Tây Trà District, Trà Trung Commune, Vàng hamlet, Bà Noong stream, 15°09.260'N, 108°27.528'E, 850 m elev., 26 September 2016, *Lý Ngọc Sâm and Trương Bá Vương Lý-820* (VNM); *ibidem*, Nước Biếc stream, 5 August 2017, *Lý Ngọc Sâm, Lý-820* (VNM).

**Phenology:** Flowering in August to September. **Habitat:** Grows in shady area in lower secondary bamboo mixed evergreen broadleaf forest in Mount Cà Đam, at about 750–800 m elev.

**Distribution:** China (South Yunnan); Thailand (Chiang Mai, Nakhon Ratchasima, Prachuap Khiri

Khan, Prachin Buri); Vietnam: Quảng Ngãi Province.

**Remarks:** *Habenaria austrosinensis* was first described in 1936, from the type specimen collected in Dam places in forests along valleys in Southern Yunnan, China. Much later its distributed range was extended to Thailand (Kurzweil 2009). Our finding shows the eastward distributional extension of this species in Indochinese peninsula. In China, *H. austrosinensis* is the first species recorded with the obliquely triangular lateral sepals ca. 5 × 8 mm, the spur as long as or shorter than pedicel and ovary, and the pubescent ovary are clearly distinct from the most closed species, *H. commelinifolia* (Roxb.) Wallich ex Lindley.

In general, the plants from central Vietnam fit Tang and Wang's description but differ from Tang and Wang's species in some characters as the 9 broadly elliptic to oblanceolate-elliptic leaves (vs. 3–5 narrowly elliptic to oblong-oblanceolate), the longer rachis, dorsal and lateral sepals (vs. shorter), the longer and obliquely ovate petals (vs. shorter and obliquely linear) and much longer lobes of the labellum, 18–20 mm (vs. shorter, ca. 8 mm). Also Vietnamese plants distinctly differ to Thai species, *H. austrosinensis*, in broadly elliptic to oblanceolate-elliptic (vs. lanceolate), longer rachis,

petals somewhat longer, labellum well developed, spurs cylindrical-fusiform with acute and short teeth on apex (vs. clavate, rounded to obtuse, without teeth) (see Table 1 for detail).

*Habenaria austrosinensis* is also similar to *H. reflexa* in having the vegetative and reproductive features like the plant habit, somewhat elliptic lamina, acuminate-lanceolate floral bracts, ovate dorsal sepals, strongly oblique ovate lateral sepals with lower margin well developed, the labellum being 3-lobed divided near to base. However, *H. austrosinensis* differs from the later species in having the floral bracts as long as the ovary, 18–28 mm long (vs. shorter than ovary, ≤ 18 mm long), the upper edge [truly apex] of lateral sepals being well elongated into acuminate apex, 6.5–7.5 mm long (vs. ± acute, ≤ 5 mm long), much larger and obliquely ovate petals with apex acuminate, 8.5–9 × 3–3.5 mm (vs. obliquely linear, ca. 4 × 1 mm, triangular, 2.4–4 × 1.5–1.8 mm, apex obtuse, respectively), the much longer 3-lobed labellum with equal lobes (vs. shorter, lateral lobes are shorter than the mid lobe) and the apex of spur being an acute with a short teeth ca 0.5 mm (vs. rounded apex). A key to distinguish most related species of *H. austrosinensis* in Vietnam is also given.

Key to distinguish most related species of *Habenaria austrosinensis* in Vietnam (modified from Averyanov 2010)

1. Spur < 4.5 cm long, labellum ≤ 2 cm long..... 2
  - Spur 4.5–6 cm long, labellum > 2 cm long..... *H. commelinifolia*
2. Petals obliquely ovate, 8.5–9 mm long, apex acuminate; labellum with equal lobes, 18–20 mm long; the apex of spur acute, with a short teeth..... *H. austrosinensis*
  - Petals obliquely triangular, 2–3 mm long, apex acute; labellum with unequal lobes, 10–15 mm long; spur rounded at apex..... *H. reflexa*

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**Table 1. Comparison of morphological characters between our specimen and type and Thai specimens**

Characters	Our specimens	Type specimens	Thai specimens
Number of leaf	to 9	3–5	4–6
Leaf shape	broadly elliptic to oblanceolate-elliptic	narrowly elliptic to oblong-oblanceolate	Lanceolate
Rachis length (cm)	ca. 24	9–14	9–33
Floral bract length (mm)	as long as the ovary, 18–28	shorter than ovary, ca. 15	shorter than ovary, 12–21
Dorsal sepal size (mm)	6.5–7 × 5.3–6	ca. 3.5 × 5	2.4–3 × ca. 3
Lateral sepals size (mm)	6.5–7.5 × 5–6	ca. 5 × 5	ca. 5 × 5
Petals shape and size (mm)	obliquely ovate, apex acuminate, 8.5–9 × 3–3.5	obliquely linear, apex obtuse, ca. 4 × 1	obliquely ovate, apex acuminate, 7–8 × 1.5–3
Labellum lobes length (mm)	18–20	ca. 8	8–12
Spur shape	cylindrical-fusiform, apex acute with a short mucro ca. 0.5 mm	cylindrical-clavate, apex rounded or obtuse	cylindrical-clavate, apex rounded or obtuse

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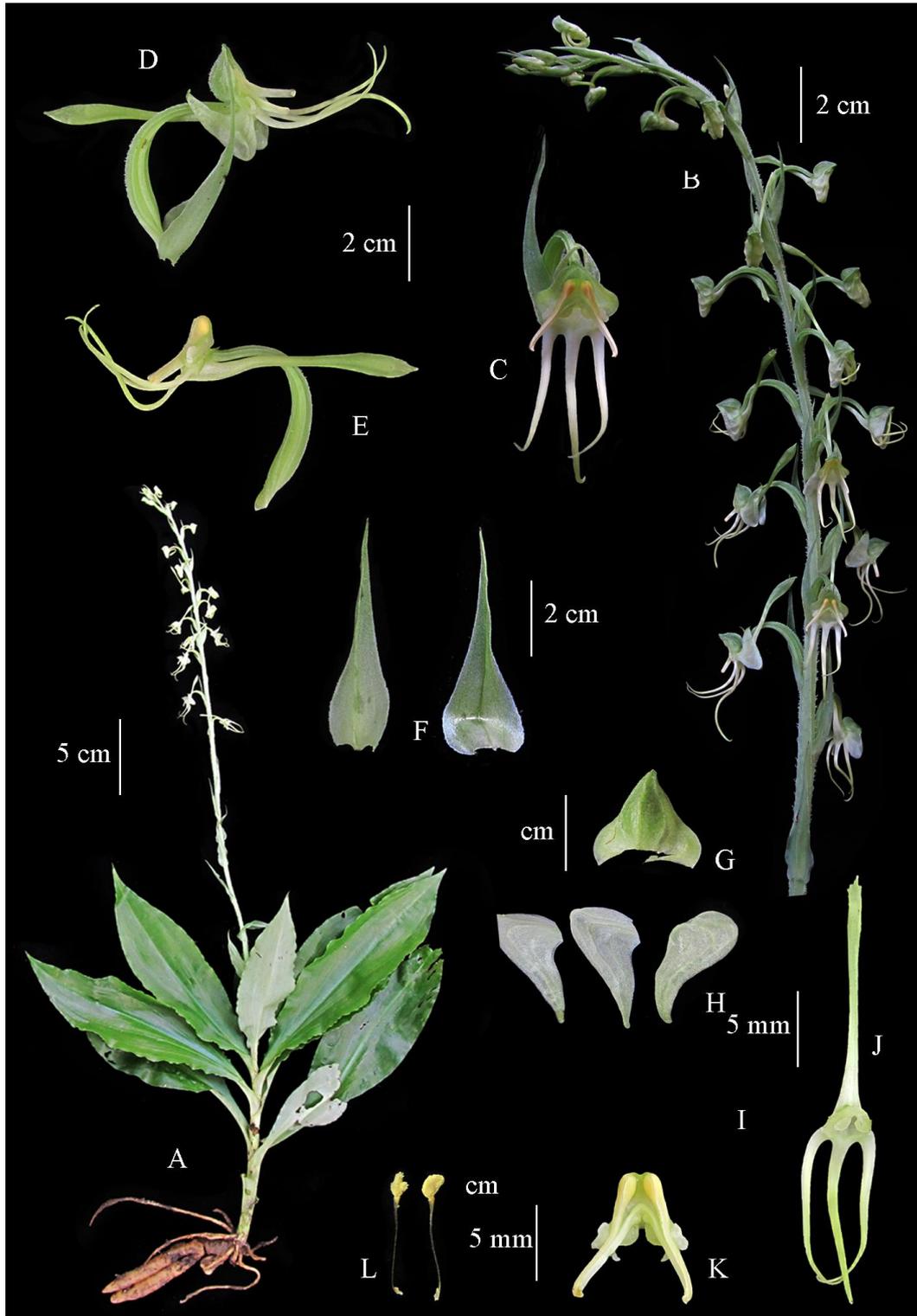
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**Figure 1.** *Habenaria austrosinensis* Tang & F.T. Wang, detail of flowering plant; B, inflorescence; C, flower (front view); D, flower (side view); E, side view of flower without bract and dorsal sepal; F, sterile bracts; G, dorsal sepals (left): outer view of the dorsal sepal with petal connective forming a hooded apex and its inner view; H, lateral petals (outer and inner views); I, petals (inner and outer views), J, lip with spur; K, detail of column showing staminodes, anthers, stigma and rostellum; L, pollinicum. Scale bars: C–E: 1 cm; H–I: 10 mm; and K–L: 5 mm. Photo from type Lý-820.