



Habenaria sahyadrica (Orchidaceae, Orchideae) a new species from the Western Ghats (India) with critical notes on allied taxa

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Habenaria Willdenow (1805: 544) is a large genus represented by approximately 848 species making it by far the largest in subfamily Orchidoideae (Cribb 2001, Kurzweil 2009, Govaerts *et al.* 2014, Batista *et al.* 2011), with centres of diversity in Brazil, southern and central Africa, and East Asia (Kurzweil & Weber 1992). In India, it is represented by 72 species, of which 36 are endemic (Misra 2007). About 45 species of *Habenaria* are known to occur in the Western Ghats of India, of which 21 species are endemic (Jalal & Jayanthi 2012). In Kerala, 26 species were reported so far with 17 endemic (Sasidharan 2013).

During floristic exploration in Kerala, the authors collected an unknown *Habenaria* species from the shola forests along grasslands on the way to Elival hills of the Muthikulam forest area, Palakkad District, during November 2013. Critical studies have revealed that the species is allied to *H. multicaudata*, *H. ramayyana* and *H. panigrahiana* in some characters, but differs in many attributes (Table 1). Detailed taxonomic studies with the perusal of relevant literature (Trimen 1885, Hooker 1890, Gamble 1928, Abraham & Vatsala 1981, Kumar & Manilal 1994 & 2004, Jalal & Jayanthi 2012, Govaerts *et al.* 2014) and herbarium references (CAL, MH, CALI, KFRI, CMPR) proved this to be a new species, which is described here with colour photographs. On the other hand, while doing these studies of allied species, *H. panigrahiana* var. *panigrahiana*, *H. panigrahiana* var. *parviloba* and *H. ramayyana* were found to be conspecific and hence, they have been reduced to synonymy of *H. panigrahiana*.

Taxonomy

Habenaria sahyadrica K.M.P.Kumar, T.K.Nirmesh, V.B.Sreek. & Kumar, *sp. nov.* (Fig.1)

Type:—INDIA. Kerala: Palakkad district, Muthikulam, way to Elival hills, 1700m, 22 November 2013, Nirmesh & Prabhukumar 28501 (holotype: KFRI!; isotypes: CMPR!, CALI!)

Habenaria sahyadrica shows affinities with *H. multicaudata* Sedgewick (1919: 352) and *H. panigrahiana* Misra (1981: 213) in having similar filliform petals, labellum lobes and posterior sepals, but it can be easily distinguished from the allied taxa by its attenuate floral bract, spreading lateral sepals, truncate bifid or bipartite petals divided into an anterior and a posterior lobe and the trilobed or tripartite labellum, 6-nerved dorsal sepal, midlobe of lip and upward curve of the apices of the lateral lobes, clavate-obtuse apex of spur and ridged ovary with normal apex.

Terrestrial herbs, 35 cm tall, stem cylindrical, leafy from base upwards mainly on the upper two thirds of stem. Stem closely embraced by leaf sheath. Tuber one, globose 20 mm diameter and placed directly underneath the stem. Leaves 5–8, alternate, sessile, elliptic-lanceolate, 10.0–12.0 × 2.5–3.5 cm, acute, base narrow, petiole like, glabrous on both sides; leaf margin undulate. Inflorescence terminal, racemose. Peduncle 12–14 cm long, glabrous, clothed with elliptic, acuminate, sterile greenish bracts completely covering the pedicel, 3.4–4.5 cm long, glabrous. Raceme 6–8 cm long, 6 cm broad, 8–15 flowered. Floral bracts elliptic-attenuate, trinerved, glabrous, 20.0–20.8 × 8.0–10.0 mm. Flowers pale greenish-white; dorsal sepal ovate, 6-nerved out of which 3 nerves continuing to the apex, 10–13 × 3–5 mm, densely hispid on upper part, lower part glabrous; lateral sepals ovate-elliptic, sub-falcate, acute, trinerved, 10–13 × 4–6 mm, densely hispid on upper part, lower

part glabrous; petals bipartite, posterior lobe filiform, falcate, obtuse, connivent with dorsal sepal, 10–15 mm long, glabrous, anterior lobe slightly narrower, filiform, apex acute and curving upwards, 14–18 mm long; lip trilobed; midlobe filiform, dilated towards rachis, 20–24 mm long, glabrous; lateral lobes slightly narrower, filiform and curving upward, 15–18 mm long, glabrous; spur green, cylindrical, clavate at apex, decurved, 17–24 mm long, glabrous; column greenish-yellow, 1.5 mm long, glabrous; anther locules large, 3.0×1.5 mm, glabrous; canals erect 2 mm long, ovary fusiform, glabrous, 18–22 mm long; pollinia yellow, pyriform, 2.0×1.5 mm; caudicles transparent, longer than the pollinia, 5 mm; rostellum 3 mm long. (Fig. 1).

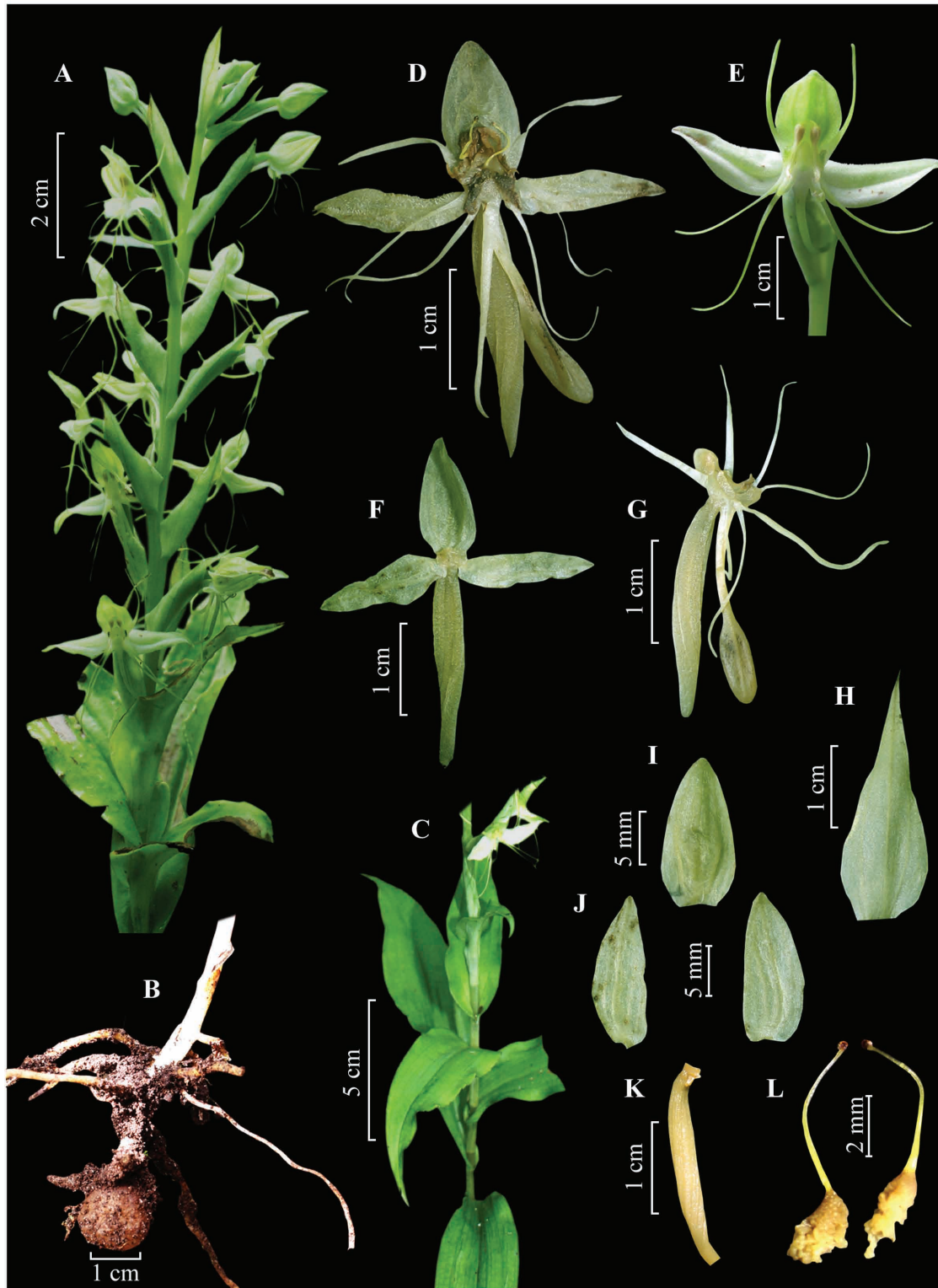


FIGURE 1. *Habenaria sahyadraca*. A. & C. Habit. B. Tuber. D. Single flower (pressed specimen). E. Single flower (fresh specimen). F. Sepals with ovary. G. Column with lip and spur. H. Bract. I. Dorsal sepal. J. Lateral sepal. K. Ovary. L. Pollinia with caudicle. (Photographs by K.M. Prabhu.).

Flowering and fruiting:—October–January.

Etymology:—The specific epithet refers to the type locality, Sahyadri, which is the Sanskrit name of Western Ghats.

Distribution and Ecology:—*Habenaria sahyadrica* grows under the shola forests on the way to Elival Hills in Muthikulam High Value Biodiversity Area at 1350–2300m, Palakkad District. The Muthikulam High Value Biodiversity Area (HVBA) is located in Mannarkad Forest Division, which borders the north-western portion of the Western Ghats on the northern side of Palakkad Gap in Mannarkad Taluk. Muthikulam forests fall under the Indo-malayan bio-geographic zone and Western Ghat Biotic province (Champion & Seth 1968). Muthikulam Hills cover less than 350 sq. km.. Muthikulam HVBA consists of undulating hills and valleys well clothed with vegetation except for the large grassy area around Muthikulam to the southeast and the mass of high hills to the south viz., Elival Range. The area is characterised by a tropical climate and high degree of endemism. The new species appears to be endemic and grows in small pockets in shola forests near Muthikulam grasslands.

Conservation status:—This species has so far only been collected from the type locality. The area of occupancy is estimated to be less than 4 km² and the known populations contain a maximum of 15–30 plants. Until further studies and more surveys this species should be considered Data Deficient (IUCN 2013). We have tried to grow the plants ex-situ for conservation at Herb Garden Kottakkal and KFRI, Thrissur, but they did not survived.

Additional specimens examined (paratypes):—INDIA. Kerala: Palakkad district, Muthikulam, way to Elival hills, 1700m 22 November 2013, *Nirmesh, Sreekumar & Hareesh* 28525 (KFRI); Palakkad district, Muthikulam, way to Elival hills, ±1700m, 22 November 2013, *Prabhukumar* 7754 (CMPR).

Notes on allied species

Habenaria panigrahiana Misra (1981: 213)

Type:—INDIA. Orissa State: Ganjam District, Mohana, 19°26'N, 84°17'E, 500m, 3 October 1975. *Misra* 122 (holotype: CAL!).

Heterotypic synonyms: *Habenaria panigrahiana* var. *parviloba* Misra (1981: 214), *syn. nov.*

Type:—INDIA. Orissa State: Ganjam District, Bhanjanagar, 19°57'N, 84°35'E, 200m, 25 January 1976, *Misra* 176 (holotype: CAL!).

Habenaria ramayyana Ramachandra Chary & Wood (1981: 235), *syn. nov.*

Type:—INDIA. Andhra Pradesh: Amrabad Forest Reserve, Bahrapur, 700 m, 9 November 1979, *Ramachandra Chary* 642 (holotype: CAL!).

[Description from Misra 1981] Terrestrial herbs, 22–35 cm tall, stem cylindrical, leafy from base upwards mainly on the upper two thirds, lower third with close fitting sheaths. Tuber one, perfectly globose, 15 mm in diameter and directly below the stem. Leaves 7–9 spreading, alternate, elliptic-lanceolate, 8–11 × 3–4 cm, acute; base narrow, petiole like; leaf margin sometimes undulate; veins and veinlets conspicuous; the lamina and scape covered with greyish coating when fresh. Inflorescence erect, 13–18 cm long. Peduncle terete, 6–8 cm long, with 2–3 sheathing, lanceolate, acuminate bracts which are 28 × 10 mm, trinerved. Raceme 6–9 cm long, laxly 8–11-flowered. Bracts foliaceous, rolled over the ovary half its length, then twisted and remaining free as long as or shorter than the ovary, lanceolate, to 18 × 6 mm, acuminate with 3 brownish nerved, central nerve strong and continuing to apex, the lateral sub-terminating and covering the central and with a fainter branch shortly above the base extending half the length. Flowers 30–35 mm long, shortly pedicellate, green, inodorous; sepals unequal, trinerved, nerves brownish, continuing to the apex, the central one strong; dorsal sepal hooded over the column, concave, lanceolate, acute, 7–8 × 4 mm; lateral sepals reflexed, keeled, their apices inflexed, sometimes touching each other, obliquely ovate-lanceolate, sub-falcate, 8–9 × 4 mm; petals bipartite to the base; upper segment erect, sickle-shaped, close to the margin of the dorsal sepal, base about 2 mm wide and then abruptly narrowly linear, 10–12 mm long, 2-veined; the outer one shorter and forking into the lower segment which is inclined about 15° above or sometimes almost horizontal, reflexed, 17 × 0.6 mm, the basal two-third filiform, straight, the apical third more filiform, upcurved; lip tripartite to the base with narrowly linear-filiform, subequal and wide-spreading segments; lateral segments together forming an angle of about 150°, ± resembling the lower segment of the petal, 19 × 0.75 mm, the basal half straight, nearly 1 mm wide, the apical half more filiform, curved upwards and inwards, being solitary while taking off from the edge of the lip base, branching twice on the inner side making 3 parallel veins; mid-segment straight or slightly bent at the obtuse apex, narrowly linear, 12–16 × 1 mm, 3-veined; spur in contact with the ovary or the upper half somewhat bent laterally and backwards, 18 × 1.2 mm, narrowed at the base, mouth narrowly infundibuliform, apex obtuse; column 4 × 2 mm; pollen narrowly trapezoid; caudicle transparent, filiform, 3 mm long with a dilated apex and a brown reniform gland at the base; staminodes 2, extending from the column laterally and downwardly, sub-orbicular, surface papillose; stigmatic processes rounded, oblong, ligulate, about 2

× 1 mm, base oblique, close to and around the entrance to the spur; midlobe of rostellum low, rounded; lateral lobes abruptly narrowed, filiform, bent upwards, lying immediately below the anther tubes; ovary green, 20 × 2 mm, slightly fusiform and curved at apex, strongly ribbed.

Notes:—*Habenaria panigrahiana* var. *panigrahiana*, *H. panigrahiana* var. *parviloba* and *H. ramayyana* were described in the same year from different localities. *Habenaria panigrahiana* var. *parviloba* was originally described from wilted specimens and partly from the *ex-situ* collection, and we believe that characters like smaller flowers, angular differences between lobes of petals and lobes of labellum are superficial.

TABLE 1. Diagnostic morphological characters of *Habenaria sahyadrica*, *H. multicaudata* and *H. panigrahiana*

Parts	<i>Habenaria sahyadrica</i>	<i>H. multicaudata</i>	<i>H. panigrahiana</i>
Leaf	Elliptic-lanceolate, acuminate at apex.	Elliptic-oblong, acute at apex.	Elliptic-lanceolate, acute at apex.
Flower	Pale greenish-white, 4.5–5.0 cm dia.	Pale brownish-white, 5 cm dia.	Green, 3.0–3.5 cm dia.
Floral bract	Elliptic-attenuate, 20.0–20.8 mm	Elliptic-acuminate, 15.0 mm	Lanceolate-acuminate, 18.0 mm
Dorsal sepal	6-nerved	3-nerved.	3-nerved
Lip	Midlobe dilated towards rachis, apex of lateral lobes curving upwards.	Midlobe and lateral lobes curled.	Midlobe straight, lateral lobes curved upwards and inwards.
Spur	Apex clavate-obtuse.	Apex clavate or subclavate.	Apex obtuse.
Column	ca. 1.5 × ca. 2.5 mm	ca. 3.0 × ca. 1.5 mm	ca. 4.0 × ca. 2 mm
Caudicle	5 mm	1 mm	1 mm

Acknowledgments

The authors thankful to the Kerala Forest Department for the permission to conduct scientific work in the forests; KMP and IB express their sincere gratitude to Arya Vaidya Sala, Kottakkal for extending the facilities and TATA Trust, Mumbai, for the financial support and VBS and TKN grateful to Director, KFRI for providing all facilities, KSCSTE for the financial assistance. We are also thankful to C. Sathish Kumar, JNTBGRI for his suggestions, Rajendra Shinde, University of Bombay, for his help in studying the type specimens at BLAT and to Jyotsna Sharma, Texas Tech University, for her help in acquiring some protologues.

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