

# *Habenaria diphylla* (Nimmo) Dalzell: A new addition to the orchid flora of Bilaspur district (Chhattisgarh), Central India

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## ABSTRACT

A detailed taxonomic description, distribution and illustrations are provided for easy and accurate identification. This finding has contributed towards the current knowledge on earthbound orchids in AABR. Another interesting discovery in AABR, This terrestrial orchid was found growing on specific white rocky slopes with sand rich in mica, covering two rocks with its two cordate leaves (i. e, *diphylla*) and tubers in between. Due to less rainfall in 2015-2016, the species showed severe decline in their number of population i.e, 5-10 individuals within 10 m<sup>2</sup>. Being very fragile to the changing environment, lead to local disappearance. It is proposed that several ephemeral orchids viz. *Nervilia crociformis*, *H. digitata*, *Habenaria dentata* along with *H. diphylla* are prone to local extinction in the Achanakmar Reserved forest which is a matter of serious concern.

**KEY WORDS:** Achanakmar-Amarkantak Biosphere Reserve, *Habenaria diphylla*, new record, *Orchidaceae*

## INTRODUCTION

Genus *Habenaria* Willd. is the third largest genera in the family *Orchidaceae* with 876 species distributed in the tropical and subtropical regions of the world (Batista *et al.*, 2013). Misra (2007) reported 84 species of this genus from India while Chowdhury *et al.* (2011) revealed 58 species with three varieties from India. Earlier in the 1890s, Sir J.D. Hooker enumerated 106 species of *Habenaria* in his book "The Flora of British India" (Hooker, 1890).

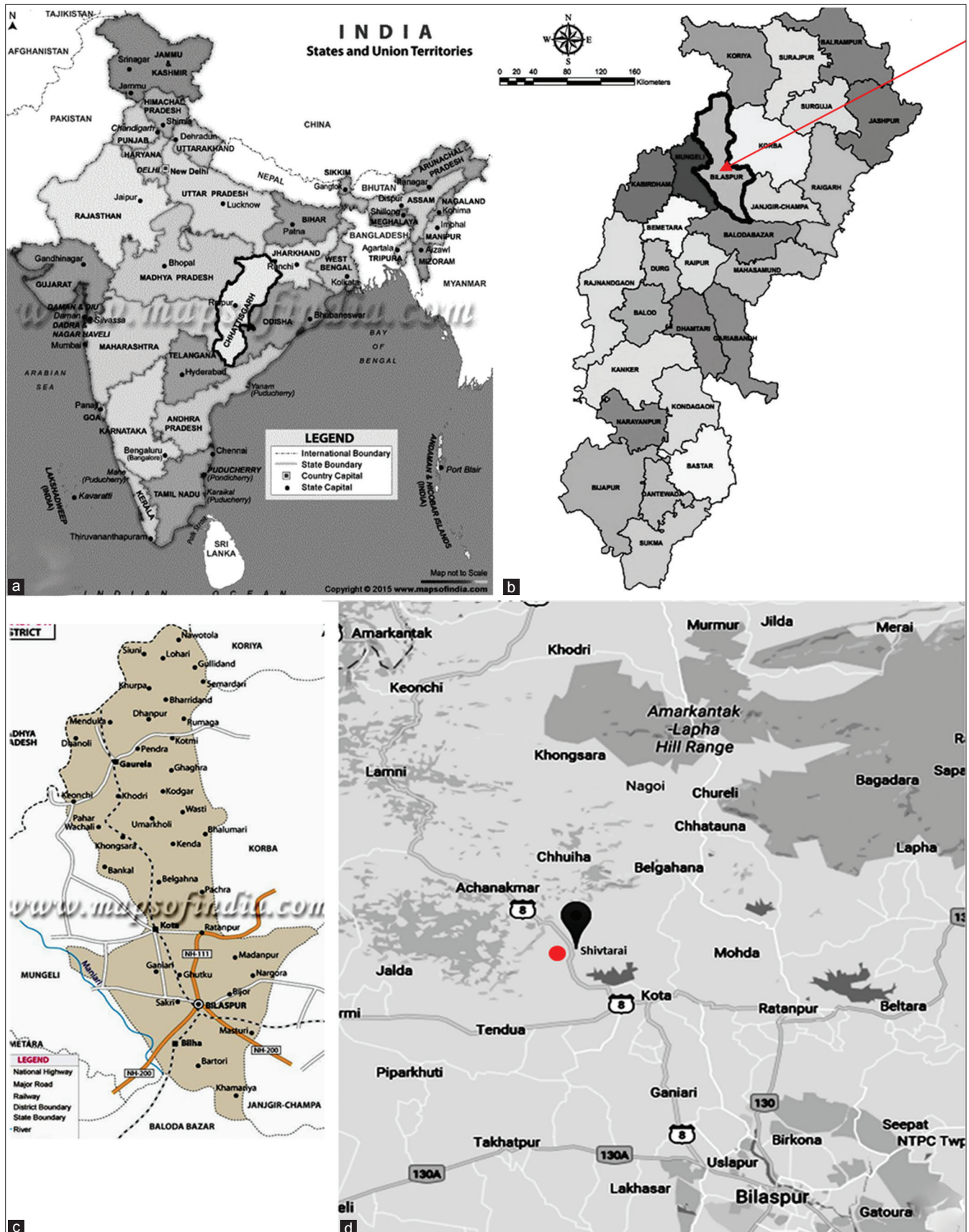
Blatter and McCann (1932) reported 25 species from Western Ghats while Chowdhery and Wadhwa (1984) enumerated 15 species of the genus from Himachal Pradesh. Totally 31 species were reported from Tamil Nadu (Henry *et al.*, 1989). Pulliah (1997) noted 11 species from Andhra Pradesh. Cooke (1907) reported 17 species from Bombay Presidency whereas Satish Kumar and Manilal (2004) enumerated 25 species from Kerala. A total of 16 species have been reported from Odisha (Misra, 2004). A checklist of orchids enumerated 22 species including *Habenaria diphylla* from the state of Uttarakhand, Western Himalayas (Jalal *et al.*, 2008). A checklist of 63 species of orchids were recorded from Chota Nagpur region of India

includes 10 species of genus *Habenaria* including *H. diphylla* (Jalal *et al.*, 2007).

From Chhattisgarh, *H. diphylla* was previously reported from Bastar district (Khanna *et al.*, 2001) including 12 other species of genus *Habenaria*. In the report of biosphere reserve information series of Achanakmar-Amarkantak Biosphere Reserve (AABR), 25 species of family *Orchidaceae* were reported, of which 3 species were of the genus *Habenaria* i.e., *Habenaria dentata*, *Habenaria digitata*, *Habenaria furcifera* (BRIS, 2010). From the Kanger valley National Park of Chhattisgarh, 5 species were reported by Kotia *et al.* (2013) whereas 2 species were noted by Murti and Panigrahi (1999) in Flora of Bilaspur from Achanakmar i.e., *H. digitata* and *H. dentata* whereas 7 species were recorded from East Nimar region of Madhya Pradesh (Mujaffar *et al.*, 2013).

## MATERIALS AND METHODS

The present study was carried out in AABR. It occupies an area of 205898 ha. AABR is extended across Chhattisgarh State to Madhya Pradesh of Central India between latitude 22° 15' to 20° 58' North and longitude 81°25' to 82° 5'



**Figure 1:** (a-d) Map of study site (Shivtarai, Achanakmar-Amarkantak Biosphere Reserve) in Bilaspur district (Chhattisgarh) (Source - www.mapsofindia.com)



East. Buffer zone that stretched out in Shivtarai (collection area) falls under Bilaspur district (Figure 1). The forest is dominated with Sal and Sal mixed vegetation. Climate here is monsoonal type.

During field exploration in various parts of AABR, plant species were collected in flowering condition in the month of September 2015. Field note, date, locality and brief



**Figure 2:** Habitat of *Habenaria diphylla* (Nimmo) Dalzell

identification features were noted. Based on the available literature (Khanna *et al.*, 2001; Hooker, 1890), the taxon was identified as *H. diphylla* (Nimmo) Dalzell and voucher specimen in the form of herbarium sheet (Jain and Rao, 1977) have been deposited in the Department of Botany (Gurughasidas Vishwavidyalaya), Bilaspur (Chhattisgarh). A brief description with illustrations (plate 1) and conservation status is provided in this paper. A key to all the 12 species reported earlier from Chhattisgarh is provided (Table 1).

### Taxonomic description

*H. diphylla* (Nimmo) Dalz. In Hook's J. Bot. 2: 262.1850; Hook.f., Fl. Brit. India 6:151.1890; Prain: 1033; Haines: 1158; Fischer: 1471; Tiwari and Maheshwari: 435; Misra, 1982b. p. 24; 1990a. p. 64; 1996a. p. 30; 2000. p. 26.

Terrestrial monocot herbs, 10-30 cm tall. Tubers ovoid to ellipsoid, stem erect green, glabrous, leaves-2, opposite,

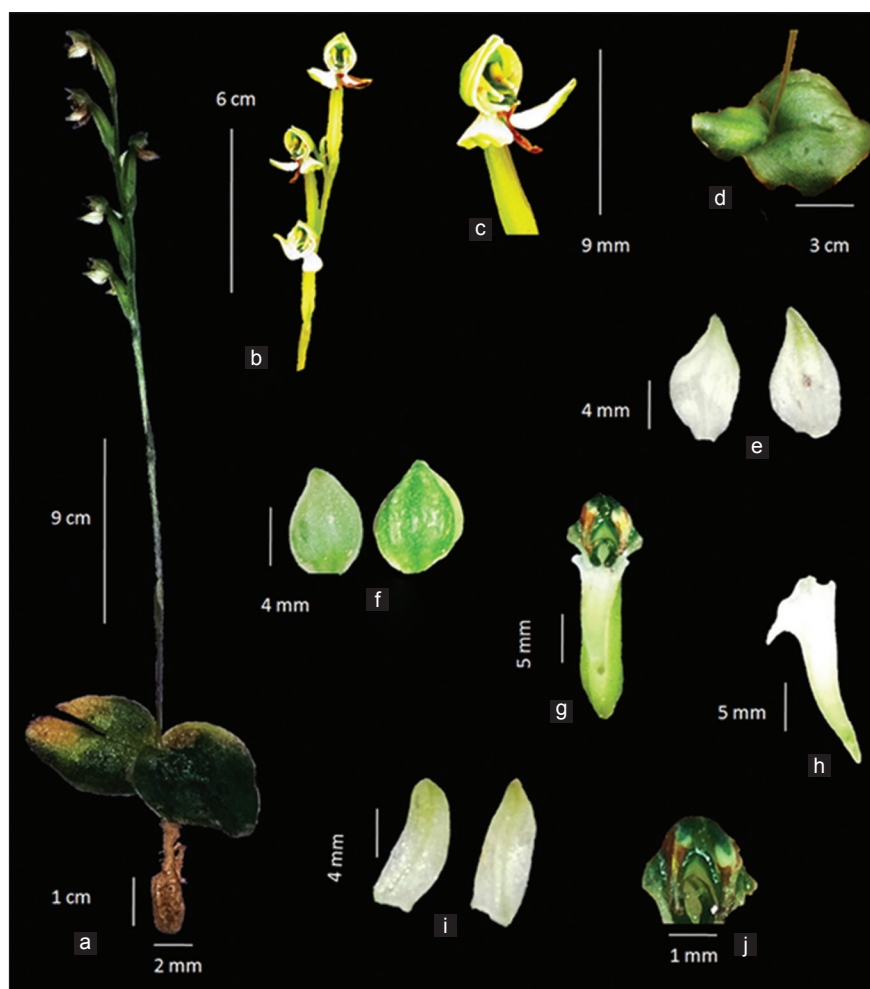


Table 1: A key to all the taxa reported in Chhattisgarh

Plant species	<i>Habenaria foliosa</i>	<i>Habenaria furcifera</i>	<i>Habenaria dentata</i>	<i>Habenaria digitata</i>	<i>Habenaria grandifloriformis</i>	<i>Habenaria decipiens</i>
Found at elevation	2000-3000	900-1800	400-800	300-900	800-1000 m	2000-3000 m
Plant height	20-40 cm	30-60 tall	30-60 cm	20-60 cm	10-12 cm	10-40 cm
Tuber	Cylindrical	Ovoid to ellipsoid	Oblong to ovoid, fleshy	Ovoid, 2 cm across	1, ovoid	Oblong
Leaves	Alternate, ovate	3-6, large, elliptic, sheathed in lower part of stem	3-5, bract-like leaflets	Alternate, elliptic, 5-10 cm long	Flat on the ground, single, heart-shaped, broad	Slender, elliptic to linear, 2-6 cm long
Inflorescence/flower	Lax spike	Green, many flowered, 10-15 cm long raceme	White	Green, spike, 5-10 cm long	White, 1-5 bundles	Dense, second spike, decurved
Bracts	Ovate to lanceolate	Lanceolate	Lanceolate	Ovate	Ovate or oblong-lanceolate	Ovate to lanceolate
Petals	White, bifid	Usually longer, ovoid, greenish yellow,	Green, lanceolate	Green, oblique at base	White, bilobed, upper segment oblique, ovate. Lower segment filiform	White in color, lanceolate, acute,
Sepals	White, unequal	Oblong blunt, unequal	Ciliate	Green, oblique at base	White, unequal, dorsal sepal broad and ovate and concave, lateral sepal oblique ovate	Dorsal sepal ovate, lateral sepals linear
Lip or labellum	White, 3 lobed nearly up to the base	3-lobed, lateral segment filiform, spur up to 17 mm long	Broadly ovate, 3 lobed	3 lobed	White, 3 narrow lobes: Midlobe linear, lateral lobes filiform	Oblong, 3-lobed, mid lobe linear and broad, lateral lobes rhomboid and fimbriate
Spur	White, elongate at mouth	Slender, broad at base	Pendulous, green, longer than ovary, slightly curved at end	Green, 1-2 cm long, sub-clavate, ligule at mouth	White, longer than ovary, curved	Slender
Flr. and Frt.	July-September	September-December	August-October	September-December	June-July	May-March
Capsule	Ribbed	Fusiform, turgid, decurved	Thickly ribbed, short stipitate	Ribbed	Ribbed	Ovoid
Plant species	<i>Habenaria barbata</i>	<i>Habenaria plantaginea</i>	<i>Habenaria roxburghii</i>	<i>Habenaria commelinifolia</i>	<i>Habenaria marginata</i>	<i>Habenaria diphylla</i>
Found at elevation	1000 m	About 580 m	300-400 m	300-400 m	100-1000	400-600
Plant height	upto 30 cm	10-30 cm	30-40 cm	40-75 cm	20-80 cm	Upto 10-30 cm
Tuber	Oblong or pyriform	2, unequal	1-2, ovate or oblong	Ellipsoid	Cylindrical	Sub-globose, oblong to ovoid, fleshy
Leaves	Cauline, lanceolate, sheathing at base	3 or 4, prostrate, elliptic, adpressed at ground	Fleshy, flat on the ground, 2-3, appear before flowering and disappear after flowering	Alternately arranged, 6-10 cm long, oblong.	Lanceolate to ovate along the stem or only at the base, sessile	Leaves 2, opposite, cordate at base, acute apex green
Inflorescence/flower	Terminal, lax racemes	20-25 cm long lax raceme	White, lax spike	Dense spike, 10-20 cm long	Large spike	Flowers in lax, raceme, shortly pedicillate
Bracts	Large, as long as flower, lanceolate	Ovate to lanceolate	Lanceolate	3-4 cm long, lanceolate	Green	Green, 2-3 mm
Petals	Greenish yellow, bilobed	Obliquely elliptic to oblong	White, 3 lobed, midlobe linear to lanceolate,	White, oblong, entire, 4 mm wide	Yellow	Greenish white, linear to oblong
Sepals	Ovate, dorsal sepal concave, lateral sepals oblong	Broadly ovate, obliquely obtuse	White, unequal: Dorsal sepal oblong, lateral sepal oblique ovate	Lateral sepals oblique axe-shaped	Green, white or yellow, ovate, erect	Sub-equal, entire
Lip or labellum	Linear, trilobed	Lateral lobes broader	Rhomboid, lateral lobes broader,	White, 3 lobed, filiform	3 lobed, fleshy, lateral lobes narrow	White, 3 lobed
Spur	More or less equal to ovary, ligule at mouth	33 mm long, cylindrical to acute	White, 3-4 cm in length, clavate at apex	5-8 cm, clavate or pendulous, longer than ovary	Up to 10 mm long, swollen at end, fusiform	Curved, clavate at apex
Flr. and Frt.	September-December	September-December	August- September	August-December	September -October	September -October
Capsule	Linear to oblong	Fusiform, turgid and curved	Ribbed	Ribbed	Fusiform, 1-2 cm long, turgid	Fusiform, shortly stipitate

attached to the ground, cordate at base, acute apex, 3-6 bract-like green leaves along the stem, acute apex. Inflorescence – spike, flowers in lax, many flowered, 6-8 cm long racemes, dorsal sepals pale green, lateral sepals white, small, dorsal sepals hooked with petals, concave, greenish white. Labellum 3-lobed: Lateral lobes filiform, mid lobe acute. Spur greenish white, curved, acute at apex and slightly broad at mouth. Pollinia yellow, capsule fusiform.

- Flr. – Frt.: September-October
- Locality: Shivtarai, District - Bilaspur, AABR (Chhattisgarh)
- Specimen examined: India, Chhattisgarh, AABR, Shivtarai, latitude - 22°23'1.1459, longitude - 81°53'27.99599, altitude 498.2, date of collection – September 07, 2015, S Vinodia, SHIV20/02/GGV/BOT
- Habitat and ecology: In moist deciduous forest (Fig 2), on the rocky hill with sandy soil, with average shade, found growing along with other species viz. *Iphigenia indica* (L.) A. Gray ex Kunth, *Curcuma ceasia* Roxb., *Curcuma longa*, *Globba* sp., *Orthosiphon* sp., *Elephantopus scaber*, *Eriocolon quinquangulare*, etc. at the elevation between 400 and 500 m.
- Distribution: Nepal, Bhutan, Bangladesh, China, Myanmar, Thailand, Philippines, India (Himachal Pradesh and Uttarakhand, Kerala, Tamil Nadu, West Bengal, Karnataka and Odisha).

## DISCUSSION

*H. diphylla* has been reported from Bilaspur district (AABR) for the first time showing narrow range of distribution with lesser number of individuals and considered as rare. So far, in Chhattisgarh state, present species was reported from Bastar (Khanna *et al.*, 2001) and it has been recollected now after 15 years from Bilaspur. Also, it assessed as “rare” in Western Himalaya and Odisha (Jalal, 2012, Misra 2004). Some morphological changes have also been observed like variation in plant height and population size was found to be reduced due to environmental changes which affect the structure and phenology. Similar observations have been made by Gattoo and Ahmad (2013), Reddy *et al.* (2013), Barman and Devadas (2013), Cribb *et al.* (2003). Investigated plant species has been very sensitive to the changing environment and prone to high risk of extinction in the near future. Anthropogenic activity as well as cattle grazing in buffer zone is the key cause of its rarity. Therefore, habitat protection of this rare plant is urgently needed for healthy native habitat.

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