

# *Dendrobium longicornu*: an addition to the orchid flora of Western Himalaya<sup>a</sup>

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## Abstract

*Dendrobium* is one of the largest genera of the Orchidaceae. Hitherto, 116 species of the genus have been reported from India, of which 17 (including 2 doubtful taxa) have been recorded from Western Himalaya and 7 from the Askot Wildlife Sanctuary (AWS). By this publication, we add *Dendrobium longicornu* to the flora of Western Himalaya.

## Résumé

***Dendrobium longicornu* : une espèce supplémentaire pour la flore de l'Himalaya occidental** – Le genre *Dendrobium* est l'un des genres les plus vastes parmi les Orchidaceae. Jusqu'ici 116 espèces ont été enregistrées pour l'Inde, dont 17 (en comptant deux taxons douteux) pour l'Himalaya occidental et 7 pour le sanctuaire AWS (Askot Wildlife Sanctuary). Le présent article ajoute une espèce, *Dendrobium longicornu*, à la flore de l'Himalaya occidental.

## Introduction

Orchidaceae is one of the largest families of flowering plants with an estimate of 24,500 species worldwide (73% epiphytic: Dressler, 2005). Most of the species has been listed under appendix II of CITES, due to their mycorrhizal associations (Gill, 1989; Taylor & Bruns, 1997; McCormick *et al.*, 2004; Otero & Flanagan, 2006; Shefferson *et al.*, 2007), habitat specificity

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(Linder, 1995; Shefferson *et al.*, 2008) or specialised pollinators (Darwin, 1862; Cozzolino & Widmer, 2005), and are categorized as critically endangered and rare. Often their growth is correlated with environmental conditions of the habitat (Aravindhavan *et al.*, 2011). Orchids have a wide ecological range of distribution, especially in tropical forests of America, Indo-Malayan and East Himalayan regions and contribute to a large extent to the epiphytic community (Dressler, 2005). Their high economic value is due to an incredible range of floral diversity attracting botanists, ecologists, traditional healers and naturalists. The Indian orchid flora comprises 1,331 species (of which 400 are endemic) in 184 genera (Misra, 2007). This makes the Indian orchid flora one of the richest in tropical Asia (Sathishkumar & Manilal, 1990; Dressler, 1981; Joseph, 1982; Santapau & Henry, 1973; Bose & Bhattacharjee, 1980).

*Dendrobium* is the third largest epiphytic genera of the Orchidaceae with 1,184 species (Leitch *et al.*, 2009) and can be characterised by a mentum made up from the column foot, the lip and the lateral sepals. Its distribution range comprises India, China, South East Asia, Japan, Malaya, Philippines, New Guinea, Australia, Pacific Islands and New Zealand. Papua New Guinea has the highest density with a total of 150 species. In India, the genus is represented by 116 species (Misra, 2007). According to Lokho (2013) the highest number of *Dendrobium* species (82) is recorded from the North-Eastern states, with a hotspot of 49 species in Arunachal Pradesh. In 2011, Kumar *et al.* reported eleven *Dendrobium* species from the Chotanagpur Plateau.

While collecting the data about the composition of the forest and the medicinal plants, one of authors (SB) came across the orchid species, and various parameters such as the habit, slope (habitat inclination), the light conditions, the number of plants in the population and the elevation coordinates of the population were recorded. The specimen was examined and reviewed with the help of various floras (Collett, 1902; Duthie, 1906; Raizada *et al.*, 1981; Vij *et al.*, 1982; 1983; Chowdhery & Wadhwa, 1984; Deva & Naithani, 1986; Pangtey *et al.*, 1991; Pearce & Cribb, 2002; Lucksom, 2007; Misra, 2007; Rokaya *et al.*, 2013) and various research papers in national and international journals (Jalal, 2007; 2012a; 2012b; Jalal *et al.*, 2008a; 2008b). It was identified as *Dendrobium longicornu* Lindley, a species that hitherto never has been recorded from the western Himalaya. The accepted name and its synonyms are given according to the World Checklist of Monocotyledons (Govaerts, 2003).

## Results

### Ecology

Habitat: *Dendrobium longicornu* (Long-horned *Dendrobium*) is found in conifer-broadleaved mixed forest, coniferous forest or oak forest on the stem and branches of the trees between 1200 and 3000 m elevation. The species was encountered in few quadrats laid for vegetation assessment in oak-conifer forest (*Quercus lanuginosa*, *Q. leucotrichophora* and *Pinus roxburghii*) by the first author.

Host plants: The host species were *Quercus leucotrichophora*, *Q. lanuginosa* with an association of other tree species (*Lyonia ovalifolia*, *Myrica esculenta*, *Pinus roxburghii*, *Pyrus pashia*) and *Rhododendron arboreum*. The plants were growing on the branches of oak species (80-85%) and stems of *Lyonia* (15-20%) in exposed sites (moderate canopy cover and windy) on a south facing gentle slope (< 25°) in Askot WS (Fig. 1). The populations comprised 300 to 350 individuals.

### Systematic treatment

*Dendrobium longicornu* Lindley

*Genera and Species of Orchidaceous Plants*: 80 (1830).

Homotypic Synonym: *Callista longicornis* (Lindley) Kuntze, *Revisio Generum Plantarum* 2: 655 (1891)

Heterotypic Synonyms:

*Froscula hispida* Rafinesque, *Flora Telluriana* 4: 44 (1838)

*Dendrobium flexuosum* W.Griffith, *Notulae ad Plantas Asiaticas* 3: 317 (1851)

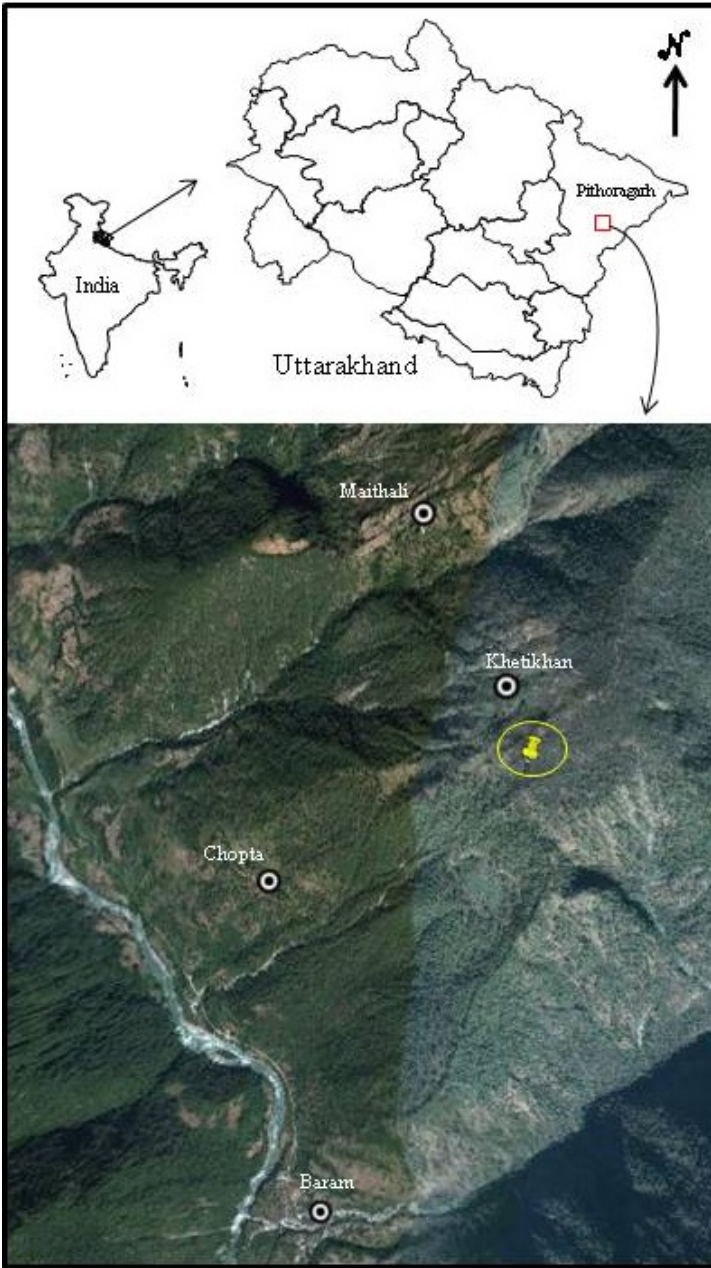
*Dendrobium hirsutum* W.Griffith, *Notulae ad Plantas Asiaticas* 3: 318 (1851)

*Dendrobium bulleyi* Rolfe, *Notes from the Royal Botanic Garden, Edinburgh* 8:20 (1913)

*Dendrobium fredianum* hort.

### Description

The plant, commonly described as a nigro-hirsute dendrobium which refers to the fine black hairs that cover the pseudobulbs, is a 10-40 cm tall epiphyte. The plant is tufted, minutely sulcate, somewhat fractiflex, several noded. Its roots are fasciculate. The plant carries 5-11 obliquely pointed linear lanceolate deciduous leaves. It blooms on very short, axillary racemes that arise from the top of leafed canes with 1-3, fragrant, waxy, long-lasting flowers. Stems clustered, pendulous, cylindrical, 7-35 cm, 2-4 mm thick, slightly rigid, erect, wavy, unbranched, with many nodes, internodes



**Fig. 1: Location of *Dendrobium longicornu* in Askot Wildlife Sanctuary in the state of Uttarakhand, India (yellow circle)**

2-4 cm, sheaths tubular, funnel shaped, black-hairy, 2.5-4 cm long. Leaves 6-10, distichous, lamina ovate-elliptic to oblong-lanceolate, base a tubular clasping sheath, apex acuminate, emarginate, puberulose, leathery, both surfaces with blackish brown rigid hairs including leaf sheaths, sessile, 2.5-8 × 1-2.2 cm. Inflorescence 5-7.5 mm, terminal or axillary racemes on leafless stem with 1-3 pedicellate flowers; peduncle attenuate *ca.* 5 mm, terete, smooth, enveloped by 2-4, 0.4-1.5 cm long, ovate to lanceolate, acute, imbricate scarious sheaths, with black hairs; rachis 0-2 mm, slightly terete, smooth. Pedicel and ovary nearly cylindric, 2.5-3.5 cm, obscurely ribbed, smooth, slender; floral bracts ovate-lanceolate, 0.5-1.7 cm, subacute to acuminate, coarsely black-hairy, 8 × 3 mm. Flowers white with a lip with yellow or red-orange lamellae, fragrant, 3.0-4.5 cm across, pendulous, pointing downward, cylindric, often not opening fully, nodding, sepals carinate, mentum straight or hooked, 1.5-2 cm long, forming a spur (Fig. 2). Flowering takes place during rainy season (August-September) and flowers are long lasting (up to December).



**Fig. 2:** *Dendrobium longicornu*  
front (right) and side (left) view of flower

Sepals sub-similar, ovate-lanceolate, acuminate, keeled; dorsal sepal ovate, 1.5-2.0 × *ca.* 0.5-0.7 cm, 7-veined, mid-vein slightly keeled abaxially, apex acute; lateral sepals obliquely ovate-triangular; petals oblong or lanceolate, 15-20 × 4-7 mm, 5-veined, margin irregularly denticulate, apex acute; lip 3-lobed, broadly triangular when spread, 2.2-3.0 × 2.4-2.9 cm; lateral lobes rounded, margins entire to weakly undulate, 2.2-2.5 × 1.0-1.1 cm; mid-lobe small, suborbicular, fimbriate-lacerate, 6-9 mm wide; disc with a broad



**Fig. 3: *Dendrobium longicornu***

1: habit; 2: dorsal view of a single flower; 3: lateral view; 4: dorsal sepal; 5: lateral sepals; 6: petals; 7: column (anther *in situ*)

central ridge from base to mid-lobe where it divides into 3 or 4 branches. Column with 2 stelia at apex, 4-8 mm long; foot 1.0-1.2 cm long, teeth triangular; anther cap nearly flatly conic, front margin densely barbate, apex subtruncate; pollinia four, 1.5-2.0 mm long, in two appressed pairs, ovoid or oblong, without caudicle (Fig. 3).

### Overall Distribution

India: East Himalaya (including Arunachal Pradesh, Assam, Meghalaya, Mizoram and Nagaland), Sikkim and Darjeeling in West Bengal (Rao, 2007; Lokho, 2013; Yonzon *et al.*, 2012); China (Zhengyi *et al.*, 2010); Bangladesh (Hossain, 2002); Nepal (Subedi *et al.*, 2013; Rokaya, 2013); Bhutan (Pearce & Cribb, 2002); Myanmar (Tanaka, 2003); Vietnam (Averyanov & Averyanova, 2003) and Thailand (Sathapattayanon *et al.*, 2009; Yukawa, 2009).

### Orchid diversity in Western Himalaya

The orchid diversity of the Uttarakhand state of India is 240 species (130 terrestrial, 11 saprophytic and 99 epiphytic) from 73 genera (Jalal *et al.*, 2008a). *Habenaria*, *Dendrobium*, *Bulbophyllum*, *Liparis*, *Oberonia*, *Eulophia*, *Eria*, *Calanthe*, *Cymbidium* and *Herminium* are the most dominant genera in Western Himalaya. The genus *Dendrobium* is represented by seventeen species: *Dendrobium amoenum*, *D. aphyllum*, *D. bicameratum*, *D. candidum*, *D. chrysanthum*, *D. chryseum*, *D. crepidatum*, *D. denudans*, *D. fimbriatum*, *D. fugax*, *D. hesperis*, *D. heterocarpum*, *D. monticola*, *D. normale*, *D. primulinum*, *D. moschatum* and *D. transparens* (Jalal *et al.*, 2012a; Pangtey *et al.*, 1991). The last two species have been treated as doubtful in both studies, as they were collected by Duthei in 1906 and have not been reported again since. With the collection of *Dendrobium longicornu* from Askot WS (Coll. No.:31 dated 23 October, 2013 at 2005 m altitude; Soni Bisht), the number of *Dendrobium* species rises to 18 for Western Himalaya and 8 for Askot WS.

### Etymology

The generic name *Dendrobium* has been derived from the greek words '*Dendron*' meaning 'tree' and '*bios*' meaning 'life', referring to the epiphytic nature of the genus. The species epithet is combined from the characteristics of the mentum: '*longus*' meaning 'long' and '*cornu*' meaning 'horn'.

## **Medicinal Use**

The species is very rarely used for medicinal purposes. In Askot, WS, the local people occasionally feed the plants to their goats. The juice of the stems is consumed by humans for the treatment of fever and cough in Nepal and the boiled roots are fed to the livestock when the animals are suffering from cough (Subedi *et al.*, 2013). In the traditional Chinese medicine the stems of several *Dendrobium* species are used as '*Shi-Hu*', mainly for throat problems and to enhance the immune system (Ye *et al.*, 2002). Hitherto, fifteen known phenolic compounds have been isolated from the stems of *Dendrobium longicornu* (Hu *et al.*, 2008; 2010).

## **Trade**

Most of the species of orchids are listed under Appendix II and can be traded through export permits (CITES). The data available through the CITES reports suggest that over the last four years living plants of *D. longicornu* have been traded to Germany (80 individuals), USA (40 individuals), France (41 individuals) and Japan (5 individuals), which shows that the trade of *D. longicornu* has been more or less constant over a period of three years (CITES, 2009; 2010; 2012).

## **Threat**

In the present situation the habitat of *Dendrobium longicornu* is not under threat. However, recurrent fire incidences are happening in the lower side of the forest, which is dominated by *Pinus roxburghii*, and may affect the regeneration and establishment of the species in other host species.

## **Conservation**

The presence of maximum number (*ca.* 95%) of *Dendrobium* species in the eastern part of Uttarakhand state *i.e.* Askot WS in particular suggests that it is one of the best suited habitat. Efforts have to be made for the conservation of the genus in the region by conducting awareness programmes for the local youth including school/college students, while, to maintain the gene pool in nature, the frontline staff should be motivated to conserve the genus.



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