

## **Extended distribution of rare *Anoectochilus papillosus* L.V. Averyanov (Orchidaceae) to the Indian Himalaya in Asia**

**Bikarma Singh**

Biodiversity and Applied Botany Division, CSIR-Indian Institute of Integrative Medicine, Jammu, India  
*E-mail:* drbikarma@iiim.ac.in

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### **Abstract**

This paper records the occurrence of *Anoectochilus papillosus* L.V. Averyanov (Orchidaceae), collected for the first time from India in the state of Meghalaya. This finding is important to increase the data about the angiosperm flora of India, as well as to increase the knowledge about *A. papillosus* distribution at global level. A brief taxonomy, phenology, ecological notes, photograph and proposed IUCN status of this species have been presented.

**Key words:** New record, *Anoectochilus papillosus*, Meghalaya, India

### **INTRODUCTION**

*Anoectochilus* Blume (Orchidaceae) is a remarkable genus of terrestrial orchids that comprises of 43 species found in tropical Asia, Australia, Pacific Islands and East to Hawaii (TPL 2015). About 16 species occurs in India of which 7 are endemic (Kumar & Manilal 1994). Species of this genus are small and shade-loving plants growing on leaf litter and humus or on mossy rocks. They are often referred to as “jewel orchids” due to the coloration of their leaves that tend to remain flat on the ground, highly ornamental, and often variegated (Kataki 1986; Bhattacharjee & Chowdhery 2012). Few of its species also produce green leaves, but most of them have velvety maroon-green or blackish-green leaves with glistening metallic veins of copper, silver, or gold-coloured.

During the recent field survey for inventorying and studying the flora of Himalayan states in India, the author collected a large number of orchids from different locations. During these studies, a rare species of orchid under the genus *Anoectochilus* was collected from two localities in the state of Meghalaya, viz. from Nokrek Biosphere Reserve of the Garo district and from the Mawthabah area of the West Khasi Hill district. After the critical examination of flower characters and reference to the relevant taxonomic literatures (Hooker 1888-1890; Pradhan 1976; Nayar 1980; Das & Deori 1983; Jain & Malhotra 1984; Haridasan & Rao 1985-87; Kataki 1986; Dressler 1993; Kumar & Manilal 1994; Nayar 1996; Bose *et al.* 1999; Karthikeyan 2000; Sumathi *et al.* 2003; Dressler 2006; Misra 2007; Singh 2015), the specimen has been indentified as *Anoectochilus papillosus* L.V. Averyanov. Review of literatures also indicated that this taxon has not been reported from the Himalayan regions and from any part of India. This species was discovered and named by Averyanov (2007) from Hoa Binh Province in Vietnam. Therefore, the present collection and reports from India extends the known geographical distribution from Vietnam to Himalaya. Voucher specimen is deposited at the ASSAM herbarium. A brief description, phenology, ecological notes, photograph, proposed IUCN status and key of different species under the genus *Anoectochilus* (PLATE – I) are provided for easy identification.

**Taxonomic treatment:**

*Anoectochilus papillosus* L.V. Averyanov, *Taiwania* 52(4): 287 – 306. 2007.

Terrestrial herb, 11-15 cm tall, with creeping rhizome and leafy stem; rhizome 2.5-3.5 cm long, dull pink-brown, rooting at the nodes; stem 10-14 cm tall, with 3 leaves at the base. Leaves shortly petiolate; petiole and sheath 0.6-0.8 × 0.2-0.3 cm; leaflets ovate to broadly-ovate, shortly acute, 2.5-4.5 × 2.2-3.5 cm, abaxially pale purplish red, adaxially dark green to purple with pinkish golden reticulate network of nerves. Inflorescence 3-6 cm long, with 2 or 3 pinkish sterile bracts; rachis 2-10-flowered; flower bracts pinkish, ovate to lanceolate, 0.6-1 cm, shorter than ovary, apex acuminate, sparsely hairy. Flower erect, not resupinate; pedicel and ovary narrowly cylindrical, usually not twisted, densely pubescent with minute hairs; sepals light dull pink-brown, slightly hairy outside; dorsal sepal ovate, 0.6-0.7 × 0.2-0.3 cm, single-veined, acuminate, slightly upward reflexed at the apex; lateral sepals spreading, oblong to elliptic, 0.7-0.8 × 0.2-0.3 cm; petals slightly pinkish white, 0.6-0.7 × 0.1-0.2 cm, strongly oblique, forms a hood with the dorsal sepal, forked papillae; lip whitish, 1-1.5 cm long from the base to the apex, distinctly divided into hypochile mesochile and epichile; hypochile boat-shaped; hypochile and spur placed at the narrow angle with mesochile; spur acutely bifid at the apex; mesochile and epichile narrow at the base; column ovate, 0.3-0.4 cm, with 2 small vertical wings at the front and 2 lateral hemispheric stigmas; wings rising at the middle part of column; anthers small, narrowly-ovate. Fruit not seen.

**Phenology:** *Flowers:* June – August; *Fruits:* not seen.

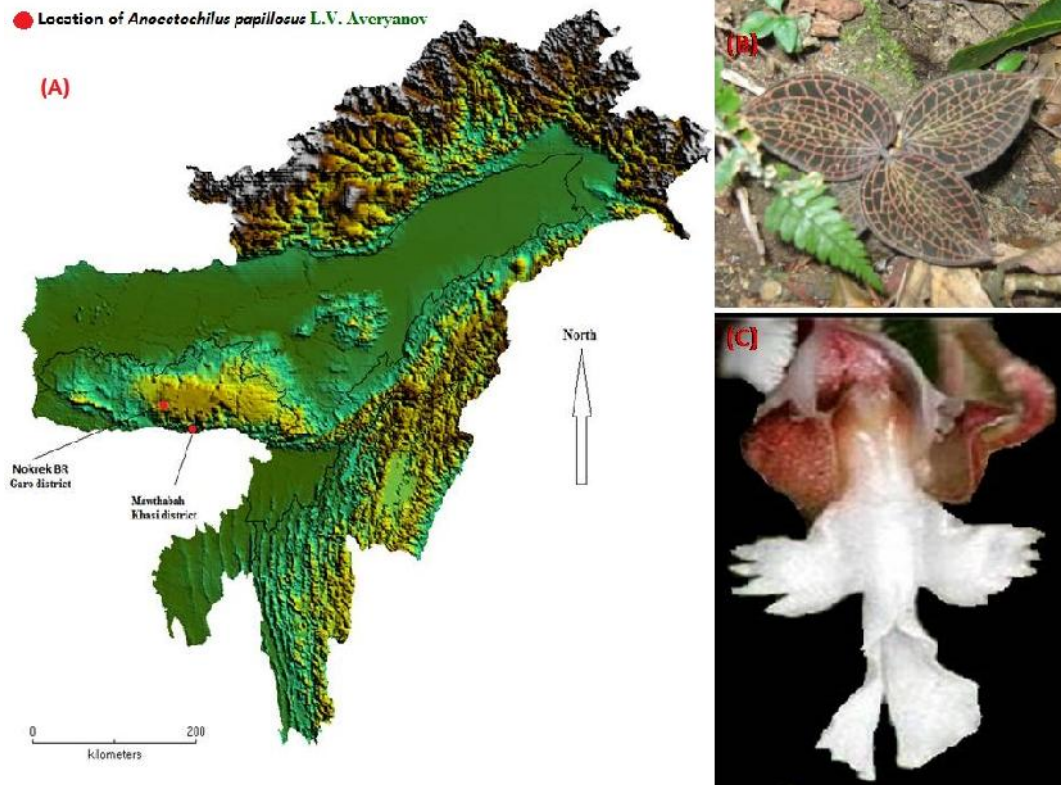
**Habitat and ecology:** The species found growing in shady places in moist evergreen forest of tropical to subtropical regions, and broad-leaved subtropical forest between the altitudinal ranges of 700 – 1350 m. One population was located at 700 m in Nokrek Biosphere Reserve and other population in Mawthabah at 1350 m above mean sea level. Commonly associated herbaceous species with this plant includes *Bolbitis semicordata* Ching, *Arisaema consanguineum* Schott, *Melastoma malabathricum* Linnaeus, *Phrynium capitatum* Willdenow, *Begonia rubro-venia* Hooker and several other plants growing under the dense canopy.

**Distribution:** India (present report) and Vietnam.

**Voucher:** India, Meghalaya, West Khasi Hills, Mawthabah area, *B Singh 114534B* (ASSAM).

**Threat and Conservation Status**

From threat and conservation points of view, *Anoectochilus papillosus* has not yet been evaluated by IUCN neither at the regional level nor the for global level. Therefore, while studying the population of rare and endangered species using guidance from the Geocat (GEOCAT, 2012) online tool and following Guidelines for Using the World Conservation Union (IUCN) Red List Categories and Criteria Version 11 (IUCN Standards and Petitions Subcommittee, 2014), an attempt has been made to study the present population size, geographical range, extent of occurrence, area of occupancy, and habitat quality of this particular species and several other species recorded under endangered groups. When collected field data were evaluated this species was classified as “Critically Endangered” [CR A1. (a,b,c,d); B2. a,b (ii, iv, v); C2.a (i)], which designates this species facing the high risk of extinction in wild. *Anoectochilus papillosus* meets the IUCN criteria in having an area of occupancy of <10 km<sup>2</sup>, severely fragmented individuals, a decline in the quality of habitat, a continuing decline inferred for the number of mature individuals, and a population size <50 mature individuals (Table 1).



**PLATE – I:** *Anoectochilus papillosus* L.V. Averyanov in India: (A): Map showing population site, (B) Habit of the plant, (C) A flower

**Table 1.** Population data for *Anoectochilus papillosus* used for classification of threatened categories of species as per IUCN 2014, Version 11.

A. Population size reduction	A1. 30% decline per generation
	(a) direct observation: very less occurrences
	(b) density per 10 m <sup>2</sup> : 5 individual
	(c) quality of habitat: disturbed, fragmented
B. Geographic range	(d) exploitation: exposed to disturbance due to shifting cultivation and coal mining
	B2. area of occupancy (AOO): < 10 km <sup>2</sup>
	(a) severely fragmented, 2 location
	(b) continuing decline,
	(ii) area of occupancy: < 1 ha
(iv) number of locations: 2	
(v) number of mature individuals: 29	
C. Small population size and decline	number of mature Individuals: > 250
	C2. Continuing decline
	(a.i) total number of mature individuals in each subpopulation: <50

While evaluating and identifying the different species, a key is prepared for *Anoectochilus* species currently known from the Himalayan belts. Few *Anoectochilus* species reported from the Himalayas in literatures (Kataki, 1986; Bose *et al.*, 1999) such as *A. crispa* Lindley and *A. Lanceolatus* Lindley are shifted to the genus *Odontochilus* Blume (TPL 2015), and therefore, key for this two species is not prepared in the present study.

#### Key to the Himalayan species of *Anoectochilus*:

- 1a. Mesochile of lip with wide wings on both sides, wings with pectinate or notched flanges; petals dorsally bearing short longitudinal ridge ornamented with massive, often forked capitates papillae ..... *A. papillosus*
- 1b. Mesochile of lip with narrow wings on both sides, wings with entire, pectinate, notched or filamentous flanges; petals dorsally lacking the above characters ..... 2
- 2a. Flowers pink-white; lips pinkish white ..... *A. roxburghii*
- 2b. Flowers greenish white or brown; lips otherwise ..... 3
- 3a. Petals curved, ovate-oblong ..... *A. brevilabris*
- 3b. Petals falcate-triangular or falcate obtuse or reniform ..... *A. grandiflorus*

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