



Habenaria plantaginea Lindl. (Orchidaceae): A new record for Eastern part of the Chhotonagpur Plateau, West Bengal, India

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ABSTRACT

The taxonomy and micro-morphology of the terrestrial orchid species *Habenaria plantaginea* Lindl. (Orchidaceae) is reported here as a new distributional record for the state of West Bengal based on field collection, literature survey and laboratory work. Botanical description, line drawings, colour photographs of different plant parts, notes on ecology, distribution pattern, stereo-microscopic and SEM studies of the taxon has been provided for authentication of identity.

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1. Introduction

Orchidaceae is regarded as second largest family of the Liliopsida and contains 25,000-35,000 species under 800-1,000 genera in the world (Dressler, 2006). About 90% of the orchid species are epiphytes and rest grow in terrestrial habitats. In India, about 1300 species of orchids belonging to 140 genera are reported to occur and maximum concentration of species can be found in eastern Himalayas, the Western ghats, Eastern ghats and the South Indian hills. The genus *Habenaria* is represented by about 876 species (Batista *et al.*, 2013) and these are widely distributed in all continents except Antarctica. India is well represented with 72 species of *Habenaria*, of which 30 are endemic (Misra, 2007; Prasad & Venu, 2015). The presence of 12 species of *Habenaria* from West Bengal state has so far been reported (Choudhury *et al.*, 2011).

Habenaria plantaginea Lindl., a terrestrial orchid having prominent underground bulbs was observed in the

slope of Ajodhya hills (Chamtaburu) in Purulia District, West Bengal at an altitude of about 2336 ft under the canopy of *Terminalia chebula*. Ajodhya hills are the eastern most part of the Chhotonagpur plateau and also considered by some as the extended part of Eastern Ghats ranges.

Review of literature revealed that very little work has been done on this group. Stern (1997) worked on vegetative anatomy of Habenariinae and Bhaurav and Rajaram (2016) analysed the distribution, density and characteristics of 18 species of *Habenaria* occurring in Western Ghats of India. Some sporadic work on orchids, in general, has been done in different parts of India such as from Andhra Pradesh (Miria *et al.*, 2012), Madhya Pradesh (Mujaffar *et al.*, 2013), Tamil Nadu (Kottaimuthu *et al.*, 2008; Christudhas and Mary, 2015) and Jharkhand (Kumar *et al.*, 2007). The present paper deals with the taxonomy, micro-morphology and SEM studies of *Habenaria plantaginea*.

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2. Materials and methods

Field survey was conducted at Ajodhya hills of Purulia district, the Eastern part of the Chhotanagpur Plateau, West Bengal. The floral part were dissected, measured and photographs of both the vegetative and reproductive parts of the flower were taken under the Lica Stereo zoom Microscope (Model-S8APO). The SEM study of pollinia was done at Central Research Facilities, IIT, Kharagpur, West Bengal, India.

3. Enumeration of the species

Habenaria plantaginea Lindl. Gen. Sp. 323.1835; Prain, Bengal Pl.1032. 1903. *Plantaginorchis plantaginea* (Lindl.) Szlach. Richardiana 4 (2): 65. 2004.

Botanical description

Habitat: Terrestrial (Fig. No.2. a, c). **Habit:** Annual herb; erect; 40-45 cm tall (Fig No.1. a). **Root:** Roots adventitious, some modified to form ovoid or globose bulb (Fig N.1.a. & 2.h). **Stem:** Erect, cylindrical, glabrescent, herbaceous. **Leaf:** Exstipulate, simple, alternate, short-petioled or sessile, 10×3 cm long, leaf base sheathing; lamina elliptic to oblong, base obtuse, apex acute, succulent, soft in texture, glabrous, venation parallel (Fig No.2. f). **Inflorescence:** Racemose (Fig No.2.b, d, e & 3. a). **Flower:** Resupinate, bractate, pedicilate, bisexual, zygomorphic, hypogynous, white in colour, up to 15mm long (fig No. 4.b & c). **Calyx:** Sepals 3, anterior sepal (near to mother axis) fused, lateral 2 petals free, spreading and reflexed; anterior sepals cover the petals forming hood which further cover the column (Fig No.1.f & 3.d). **Corolla:** Petals 5, zygomorphic, bilabiate, upper 3 with long lips, deeply lobed, labelum to about 13 mm long, two side lobes much larger than middle lobe; the base of the upper petals spurred, spurs about 35-37 mm long; lower lip 2-lobed, free, 1.5-2 mm long, elliptic, apex acute, 1-2 nerved, hyaline, both the lips adnate at the base of the column (Fig No.3. c). **Androecium:** Formed to gynostemium, column short, anther cells adnate to the front of the column, discrete or rarely touching, their bases often prolonged in to tubes or a sack like structure containing

translator (Fig No. 1. g. & 3. e, f), caudicles short, glands exposed, flat and discoid or elliptic or elongate with truncate end, pollinia 2, clavate or pyriform (Fig No. 1. h & 5. i, j, k). **Gynoecium:** Carpel 3; stigma 2; placenta parietal (Fig No. 3. h). **Fruit:** Dry dehiscent, bract persistent, 1.5 cm long, green in colour (Fig No. 1. i & 3. g).

Flowering and fruiting: August to October.

SEM study of the pollinia

The examination of the pollinia taken under Scanning Electron Microscope (SEM) generated some important information. The whole pollinia 2-3mm long, consisting 4 different parts viz. pollen sac, caudicles, translator and corpusculum (Fig No.4. i). Corpusculum looks like ligules at one side and short at the other side (Fig No.4. j). Translator very long, about 1.5-2 mm in size, translator narrow on one side and wider on the other (Fig No.4. i). Translator is dorsiventrally flattened. Caudicles very short, covering translator. Pollen sac in cluster, cell surface of pollinium rectangular or reticulate in shape; every cell consists of series of rectangular or triangular massula; retipilate thickening present on the massula (Fig No. 4. n); retipilate thickening consists of muri with distinct columella and sometime columella are fused with each other and forms bridge like tagetum (Fig No. 4. o).

Distribution

This orchid species is native to tropical and subtropical parts of the world, like India (Fig No. 1), Nepal, Sri Lanka, Bangladesh, and Southeast Asia. The plant prefers well drained shady localities. In India it usually grows in moist and dry deciduous forests with rich humus and leaf litters.

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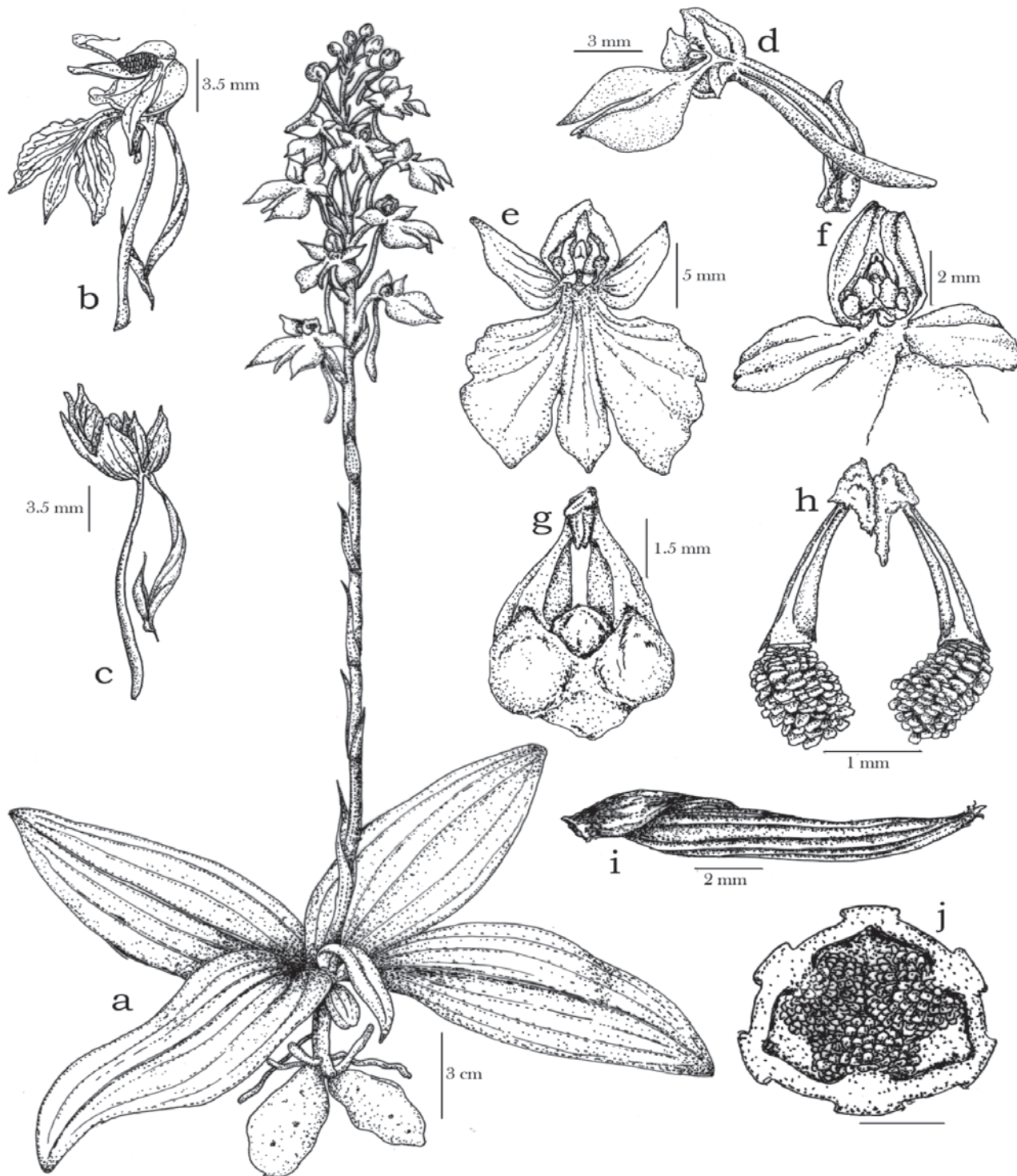


Fig. 1. Illustration of the plant, **a.** Habit sketch, **b-c.** Flower with spur, **d.** Lateral view of flower, **e.** Front view of flower, **f.** Column cover with hood, **g.** Column with pollinium, **h.** Single pollinia, **i.** Fruit with bract, **j.** T.S. of the ovary.



Fig.2. a-c, Habitat of the plant, b. Inflorescence, d-e. Flower, f. Leaf, g. Fruit, h. Plant with bulb.

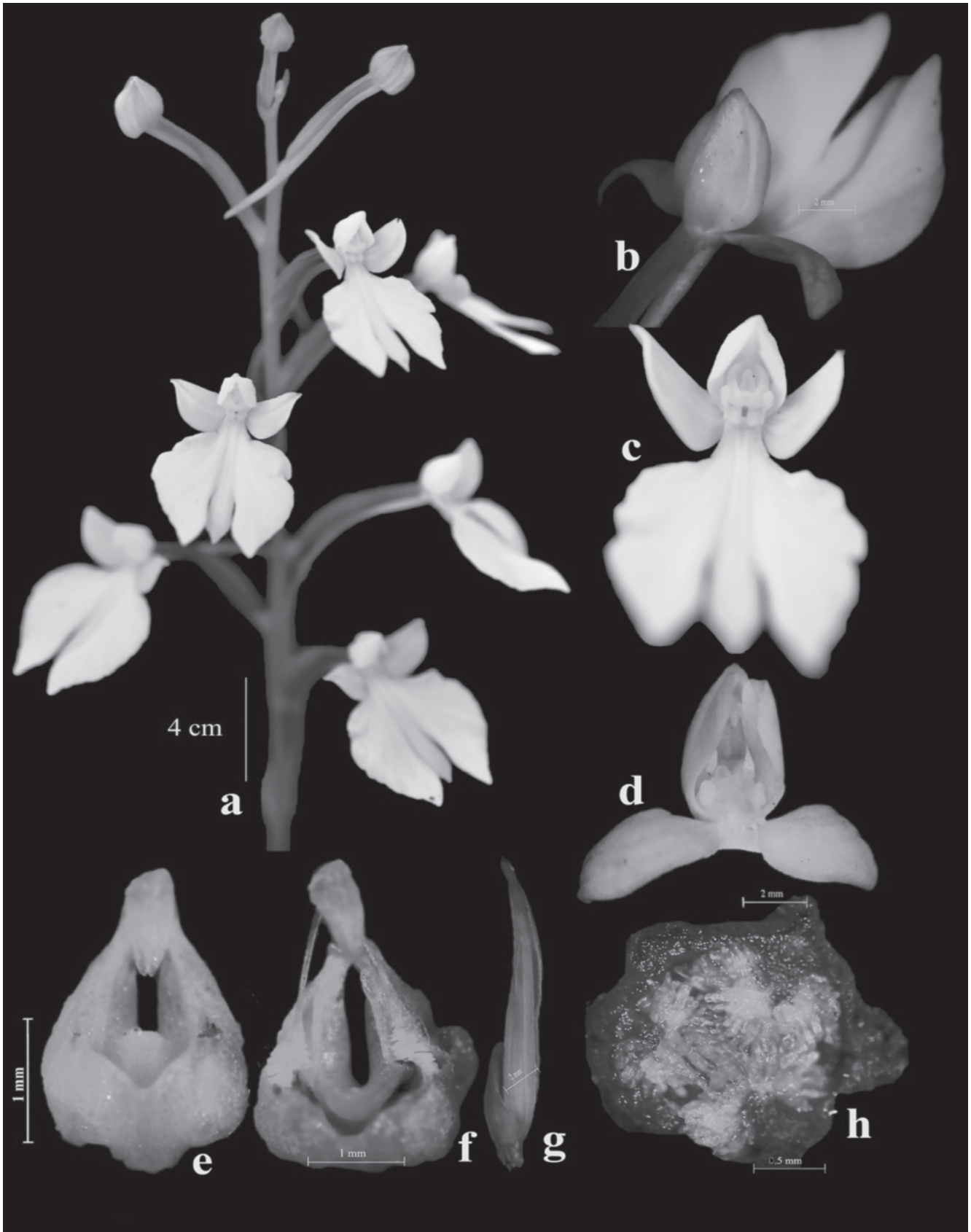


Fig No. 3. a. Inflorescence of the plant, b. lateral view of flower, c. Front view of the flower, d. Flower with pollinia, e-f. Column, g. Fruit with bract, h. T.S. of the Ovary.

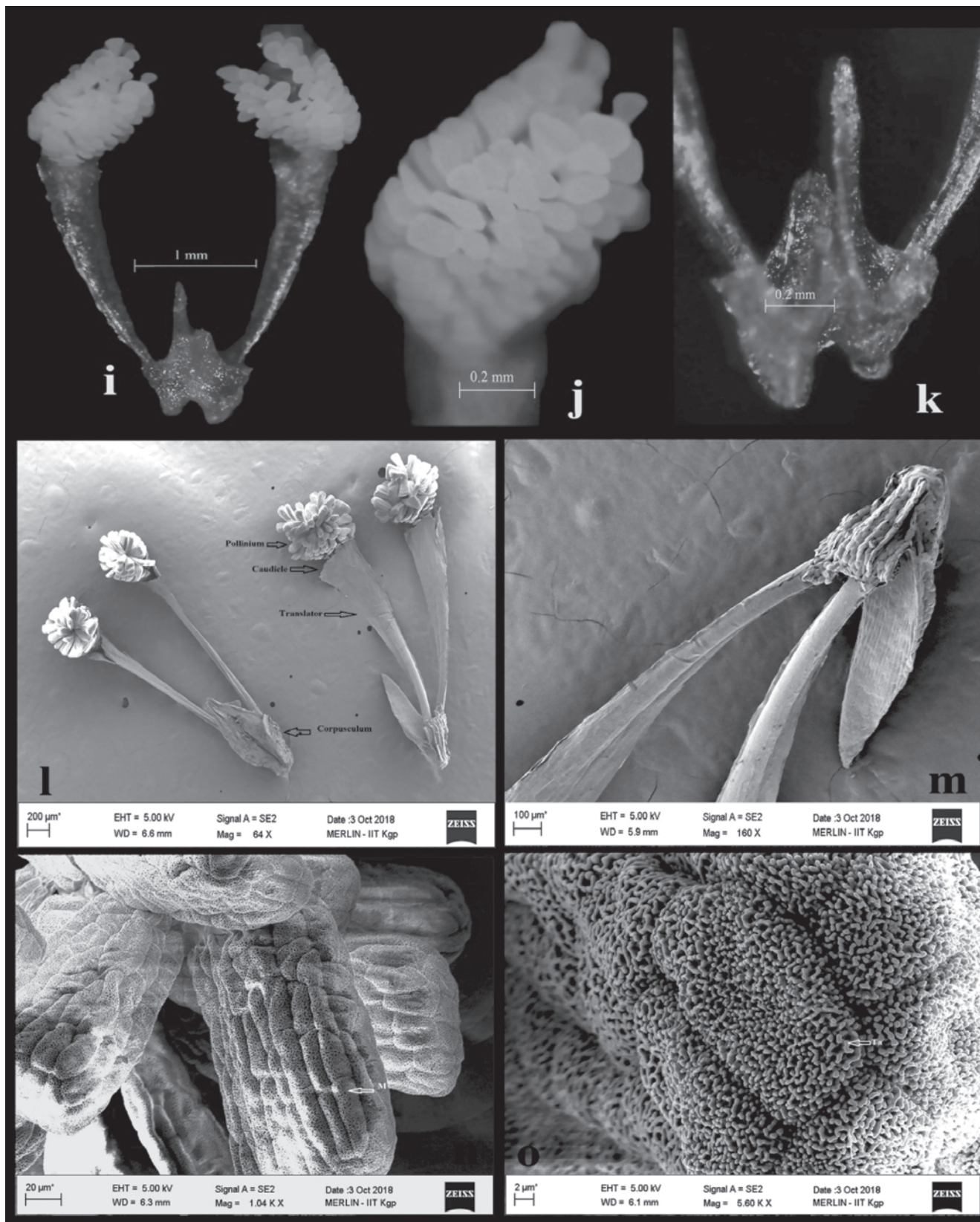


Fig No. 4. i. Pollinia, j. Single pollinium showing cluster of cell, k. Corpusculum, l. SEM structure of pollinia, m. SEM structure of Corpusculum with legule like appendage, n. Series of Masulla, o. Surface of pollen showing Muri and Tagellum. M- Masulla, Ta- Tagellum

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