

# Excursion Orchid Flora of The Pushpagiri Wildlife Sanctuary in Karnataka, India

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## भारत के कर्नाटक राज्य में पुष्पागिरी वन्य जीव अभयारण्य के आर्किड वनस्पतिजात की अध्ययनयात्रा

शरत मिश्र

### सारांश

प्रस्तुत शोध पत्र में भारत के कर्नाटक राज्य स्थित पुष्पागिरी वन्य जीव अभयारण्य से आर्किड्स की 18 वंशों की 25 जातियों का सारगर्भित विवरण दिया गया है। जिसमें 10 स्थानिक आर्किड, 2 क्षेत्रीय स्थानिक एवं 13 दुर्लभ आर्किड जातियां सम्मिलित हैं। यह अवलोकन अभयारण्य के पूर्ण आर्किड वनस्पतियों का आकलन करने के लिए क्षेत्र में विस्तृत वनस्पति शोध और इसके लिए विशिष्ट संरक्षण उपाय करने पर भी बल देता है।

### ABSTRACT

The paper enumerates the 25 species orchids under 18 genera that occur in Pushpagiri Wildlife Sanctuary in Karnataka. This includes 10 endemics, 2 regional endemics and 13 rare species. This observation calls for detailed botanisation in the area to assess the complete orchid flora of the sanctuary as also to initiate specific conservation measures for it.

**Keywords:** Flora, Orchid Diversity, Karnataka, Endemics.

## INTRODUCTION

The Kodagu (Coorg) district is located on the south-western part of Karnataka state. It is amidst the Western Ghats of India and therefore, enjoys its climatic and physiographic advantage of bearing a rich and diverse flora including orchids. The family Orchidaceae is well represented in Kodagu district with 62 species under 32 genera (Keshava Murthy & Yoganarasimhan 1990) and occupies fourth position after Uttara Kannada, Hassan and Mysuru districts in Karnataka.

Literature survey reveals that, exclusive study of orchids in this region had been undertaken earlier by T. A. Rao in 1998 covering all the ecological zones. Later this work has paved a way to serve as a model for initiating conservation measures in this region by various policy makers. During his study, Rao (1998) has identified three

hot spot areas for orchids in Karnataka, out of which, one is Tadiandamol, situated in the Kodagu district. On the northwest of Tadiandamol is located the Pushpagiri Wildlife Sanctuary, established in 1987; Somwarpet (12°-35'N, 75°-40'E) is the nearest panchayat town of this area. The well-known Pushpagiri hills are located on the western side of the sanctuary and Kumara Parvata is the highest peak (1712 m) in Pushpagiri hills. The famous Kukke Subramanyam temple shrine is situated on this hill on the western slope of the Western Ghats and is surrounded with dense evergreen forests. The altitude of the study area varies from c. 800 m to 1300 m; the mean day-time temperature was around 25° C. It received an annual rainfall around 3000 mm. The forest type is mainly semi-evergreen in nature.

An exploration tour was undertaken to the Pushpagiri Wildlife Sanctuary during first fortnight of December

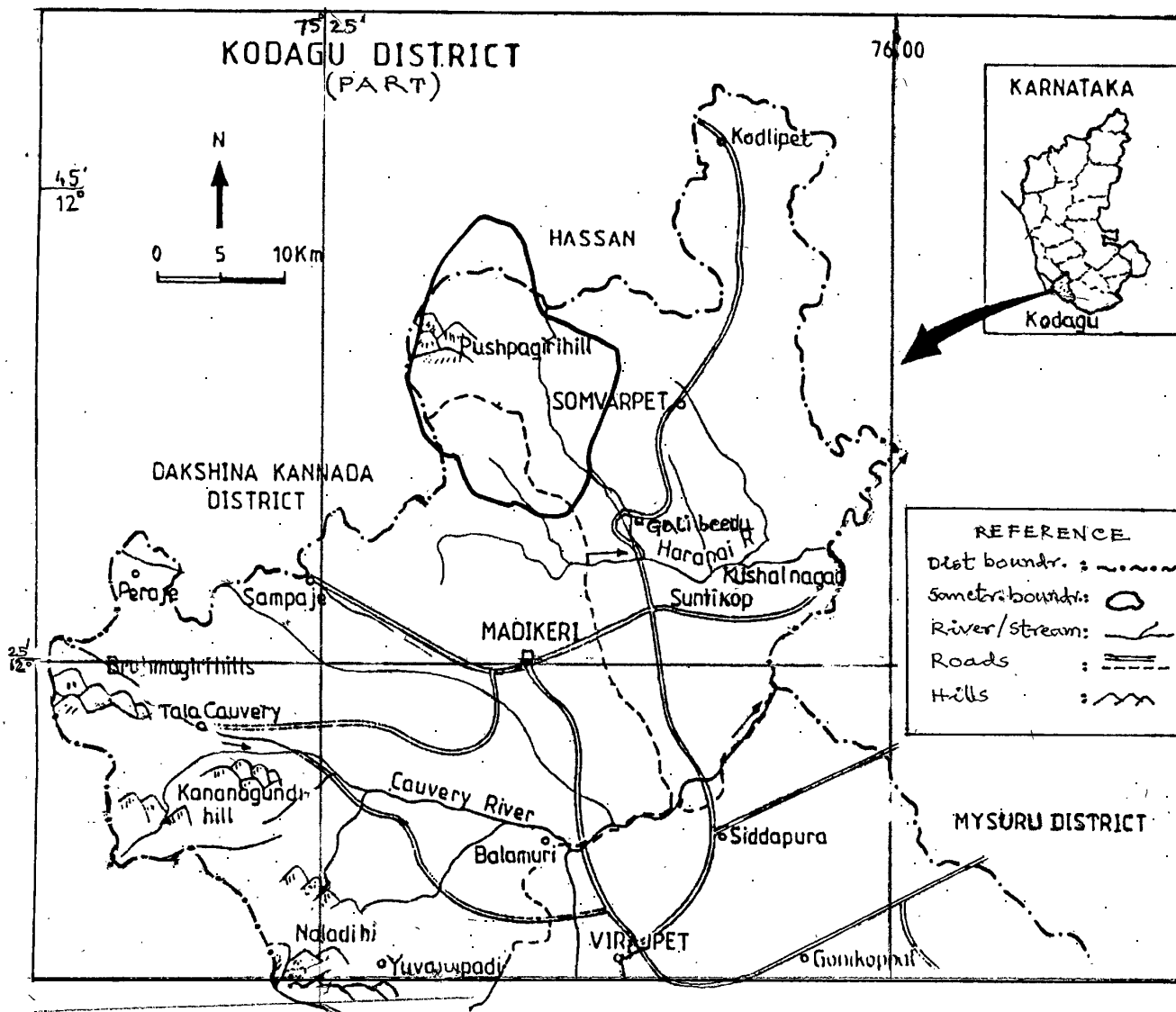


Fig.1. Sketch map (part) of Kodagu district showing the Pushpagiri Wildlife Sanctuary area and the Pushpagiri hills.(After Rao 1998, with modifications).

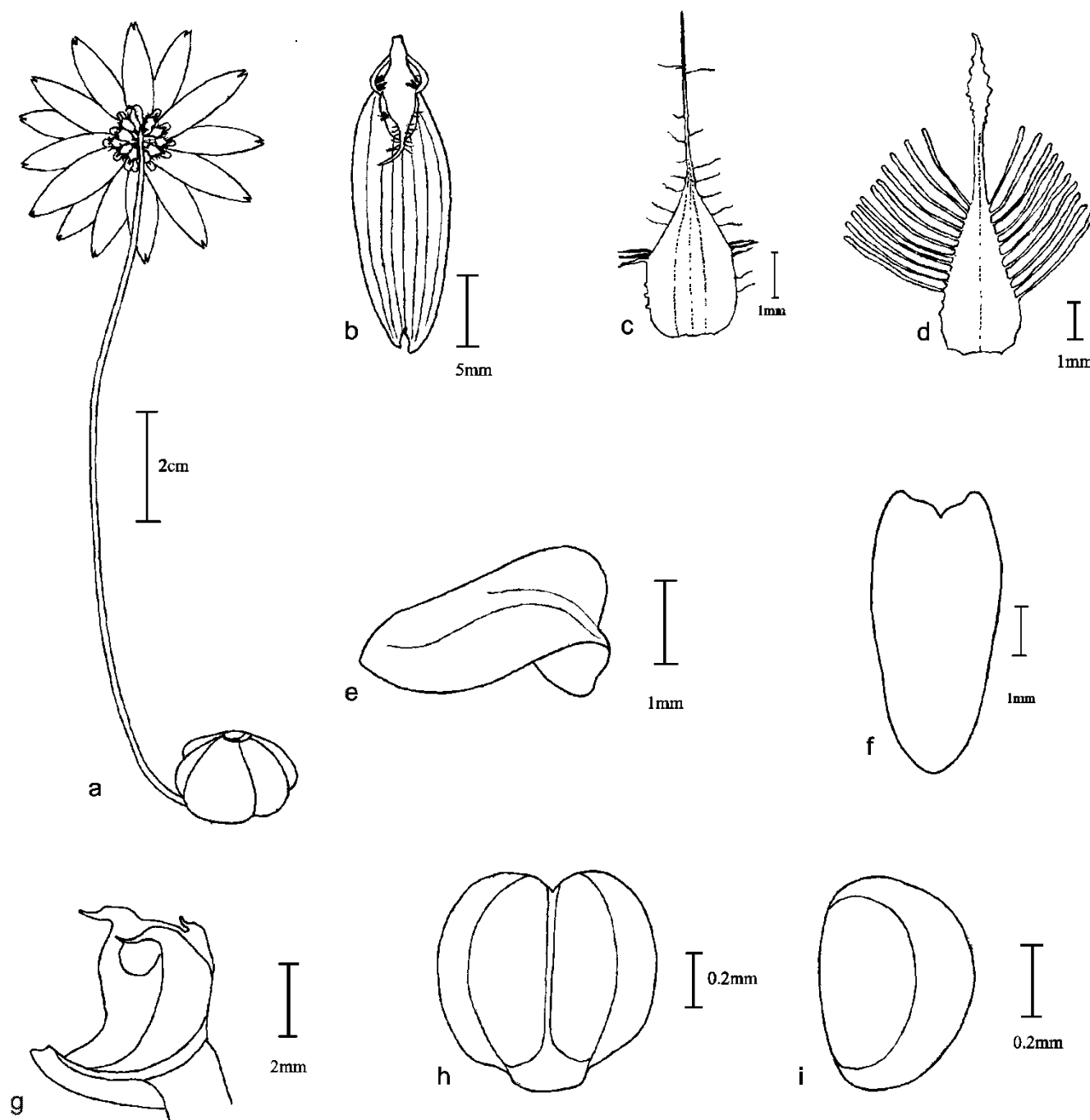


Fig.2. *Bulbophyllum fimbriatum* a. plant, b. flower, seen from top, c. dorsal sepal, d. petal, e & f. lip, seen from side and top, g. column, h. anther, i. pollinia. (S. Misra 2620).

2017 with an aim to study its orchid flora. From the base camp at Galibeedu, the sanctuary was surveyed on foot along the forest road. However, before reaching to Pushpagiri hills it was interrupted due to elephant threat.

## ENUMERATION OF THE SPECIES

The species are enumerated here with their correct names, followed by the basionym and synonyms, if any, its flowering period, frequency of occurrence; the collection number SM refers to Sarat Misra as the collector.

### A. Epiphytes

\**Aerides maculosa* Lindl., Edwards's Bot. Reg. 31: misc. 58. 1845. Rare; SM 2608.

\**Bulbophyllum fimbriatum* (Lindl.) Rchb. f. in Walpers, Ann. Bot. Syst. 6: 260. 1861. *Cirrhopetalum fimbriatum* Lindl. Flowers greenish yellow or chocolate; frequent; SM 2619, 2620.

\**Bulbophyllum fischeri* Seidenf., Dansk. Bot. Ark. 29: 202. 1973. Flowered in November 2018; occasional; SM 2622.

\**Chiloschista glandulosa* Blatt. & McCann, J. Bombay Nat. Hist. Soc. 35: 488. 1932. Rare; SM 2596.

*Cleisostoma tenuifolium* (L.) Garay, Bot. Mus. Leaf. 23: 175. 1972. *Epidendrum tenuifolium* L.; *Sarcanthus pauciflorus* Wight; *S. peninsularis* (Dalz.) Hook. Flowered in May 2018; rare; SM 2624.

*Coelogyne breviscapa* Lindl., Fol. Orch. Coelogyne: 4. 1854. Flowered in February 2018; frequent; SM 2598.

*Cottonia peduncularis* (Lindl.) Rchb.f., Cat. Orch. Schiller 52. 1857. *Vanda peduncularis* Lindl.; *Cottonia macrostachya* Wight. Flowered in March 2018; rare; SM 2595.

*Dendrobium crepidatum* Lindl. & Paxton, Paxton's Fl. Gard. 1: 63. 1850. In fruits; occasional; SM 2628.

*Dendrobium herbaceum* Lindl., Edwards's Bot. Reg. 26. misc. 169. 1840. Flowered in January 2018; occasional; SM 2602, 2616.

?*Dendrobium aquem* Lindl., Edwards's Bot. Reg. 29: t. 54. misc. 5. 1843. In fruits; occasional; SM 2618.

?*Flickingeria nodosa* (Dalz.) Seidenf., Dansk. Bot. Ark. 34: 41. 1980. *Dendrobium nodosum* Dalz. Rare; SM 2603.

*Gastrochilus flabelliformis* (Blatt. & McCann) Saldan. & Nicol., Fl. Hassan Dist.: 830. 1976. In fruits; flowered in February 2018; occasional; SM 2609.

\**Oberonia brunoniana* Wight, Icon. Pl. Ind. Orient. 5(1): 3, t. 1622. 1851. In fruits; occasional; SM 2625.

*Oberonia ensiformis* (J. E. Sm.) Lindl., Fol. Orchid. Oberonia: 4: 1859. *Malaxis ensiformis* J. E. Sm. In fruits; occasional; SM 2601.

?*Oberonia josephii* Saldanha, Indian For. 100: 568, fig. 2. 1974. In fruits; rare; SM 2626.

?*Oberonia maxima* Parish ex Hook. f., Fl. Brit. India 5: 677. 1888. Rare; SM 2617.

*Oberonia mucronata* (D. Don) Ormer. & Seidenf., Contr. Orch. Fl. Thailand 13: 20. 1997. *Stelis mucronata* D. Don.; *Oberonia iridifolia* Lindl. In fruits; frequent; SM 2634.

?*Oberonia proudlockii* King & Pantl., J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 66: 580. 1897. In fruits; occasional; SM 2612, 2613.

*Pholidota imbricata* Hook., Exot. Fl. 2: t. 138. 1825. In fruits; flowered in August 2018; frequent; SM 2627.

*Sirhookera lanceolata* (Wight) Kuntze, Revis. Gen. Pl. 2: 681. 1891. *Josephia lanceolata* Wight. In fruits; flowered in November 2018; occasional; SM 2610.

*Trias stocksii* Benth. & Hook. f., Fl. Brit. India 5: 781. 1890. Flowered in January 2018; occasional; SM 2604, 2605.

?*Vanda tessellata* (Roxb.) Hook. ex G. Don in Loudon, Hort. Brit.: 372. 1830. *Epidendrum tessellatum*; *Vanda roxburghii*. Rare; SM 2594.

*Xenikophyton smeeanum* (Rchb. f.) Garay, Bot. Mus. Leaf. 23(10): 375. 1974. *Saccolabium smeeanum* Rchb. f.; *Rhynchostylis latifolia* Fischer. In fruits; flowered in June 2018; rare; SM 2607.

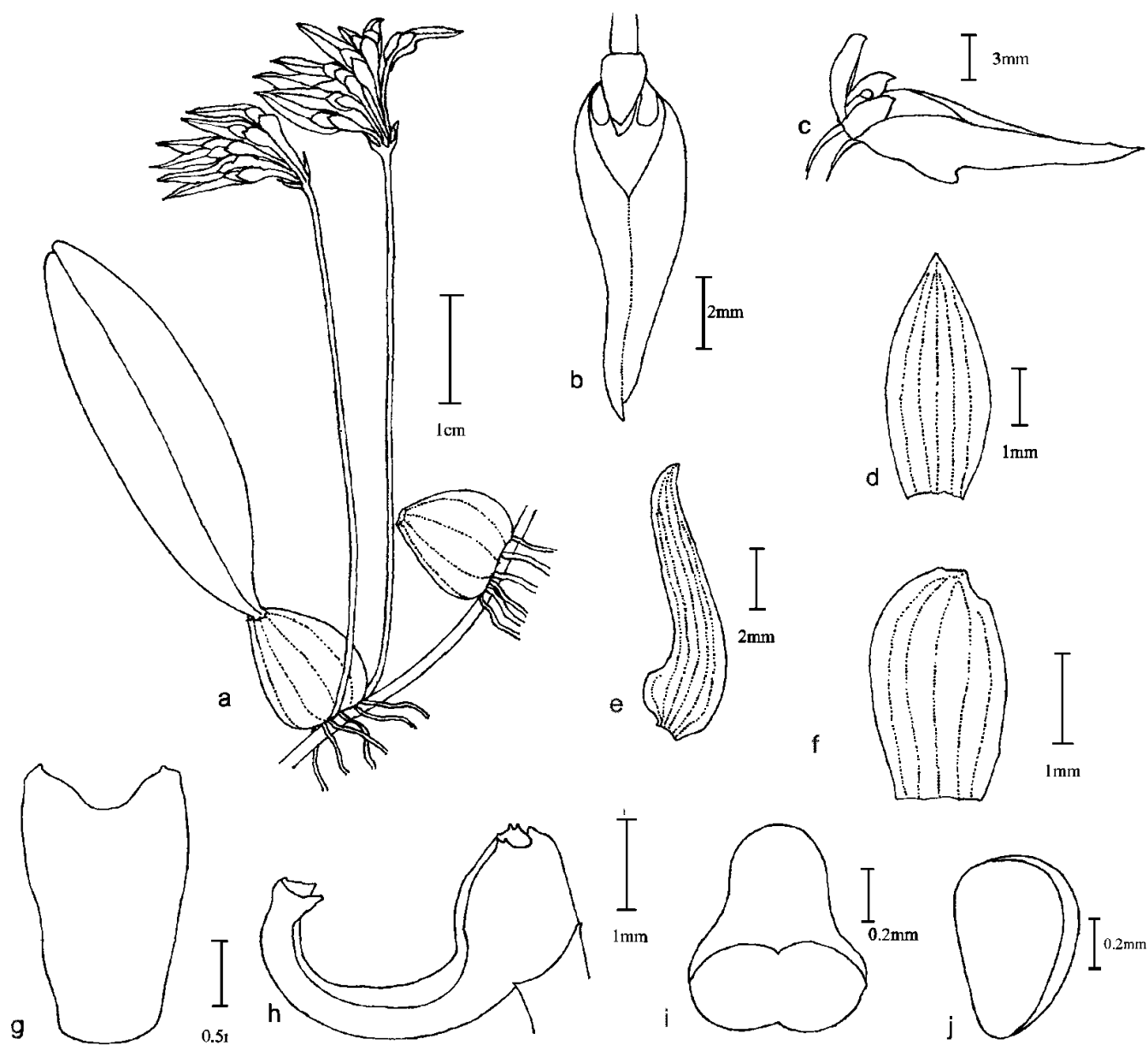
### B. Terrestrials

*Seidenfia versicolor* (Lindl.) Marg. & Szlach., Pol. Bot. Journ. 46(1): 56. 2001. *Microstylis versicolor* Lindl.; *Malaxis versicolor* (Lindl.) Abeywick. In fruits; occasional; SM 2600.

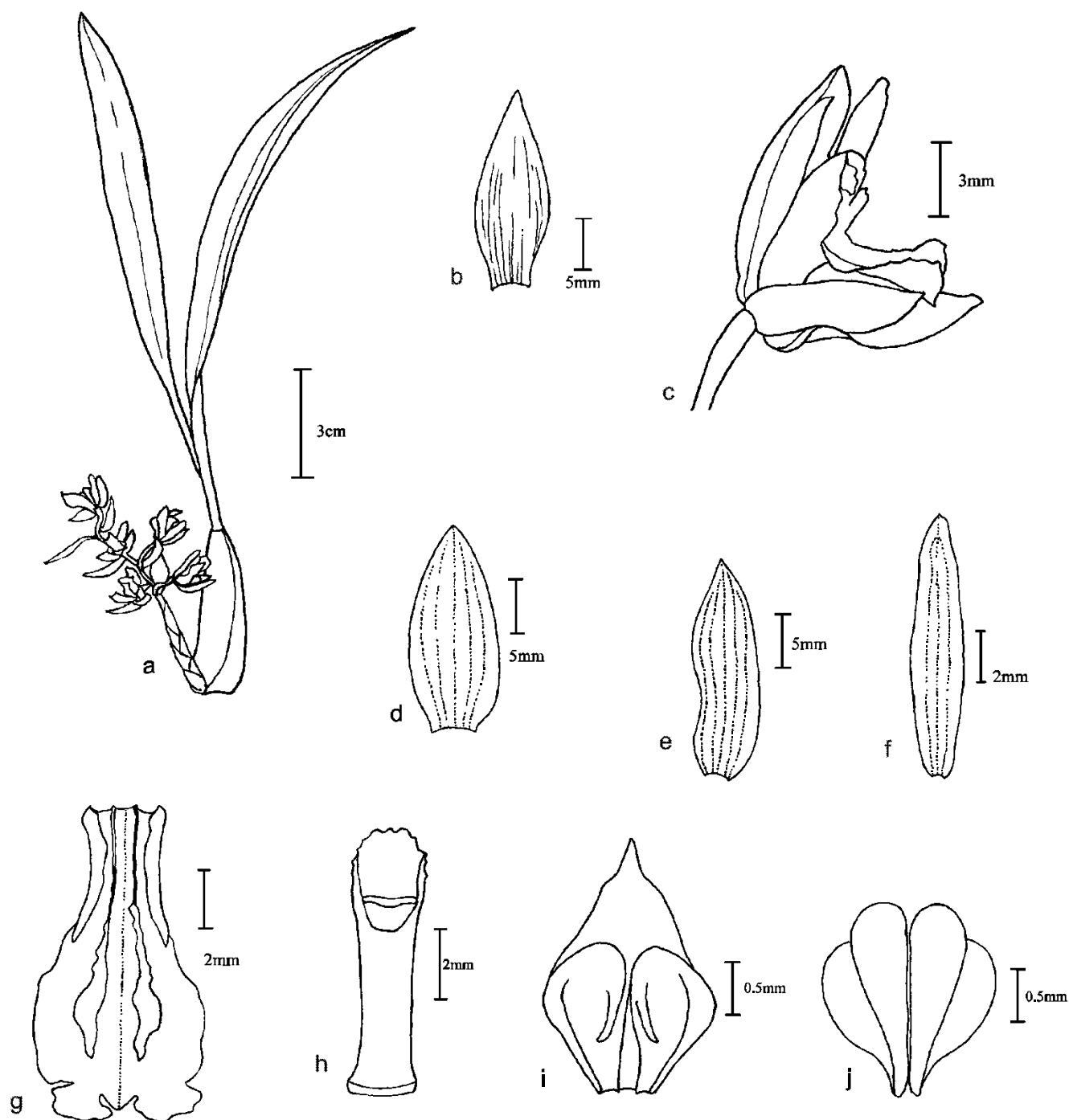
*Zeuxine longilabris* (Lindl.) Trimen, J. Ceylon Br. Roy. Asiat. Soc. 9: 90. 1885. *Monochilus longilabris* Lindl. Flowers white; occasional; SM 2606.

## DISCUSSION

A total of 23 epiphytic and 2 terrestrial species under 18 genera of orchids were observed and collected during the survey. Being a lean cold and dry period, many terrestrial orchids belonging to the genera *Eulophia*, *Geodorum*, *Habenaria*, *Nervilia*, *Peristylus* etc. could not be located with their seasonal growth habit. Only two orchids i.e. *Bulbophyllum fimbriatum* (epiphytic) and *Zeuxine longilabris* (terrestrial) were collected in flowering condition. A few of these were in fruiting condition.



**Fig.3.** *Bulbophyllum fischeri* a. plant, b & c. flower, seen from top and side, d. dorsal sepal, e. lateral sepal, f. petal, g. lip, seen from top, h. column, i. anther, j. pollinia. (S. Misra 2622).



**Fig.4.** *Coelogyne breviscapa* a. plant, b. bract, c. flower, d. dorsal sepal, e. lateral sepal, f. petal, g. lip, h. column, i. anther, j. pollinia. (S. Misra 2598).

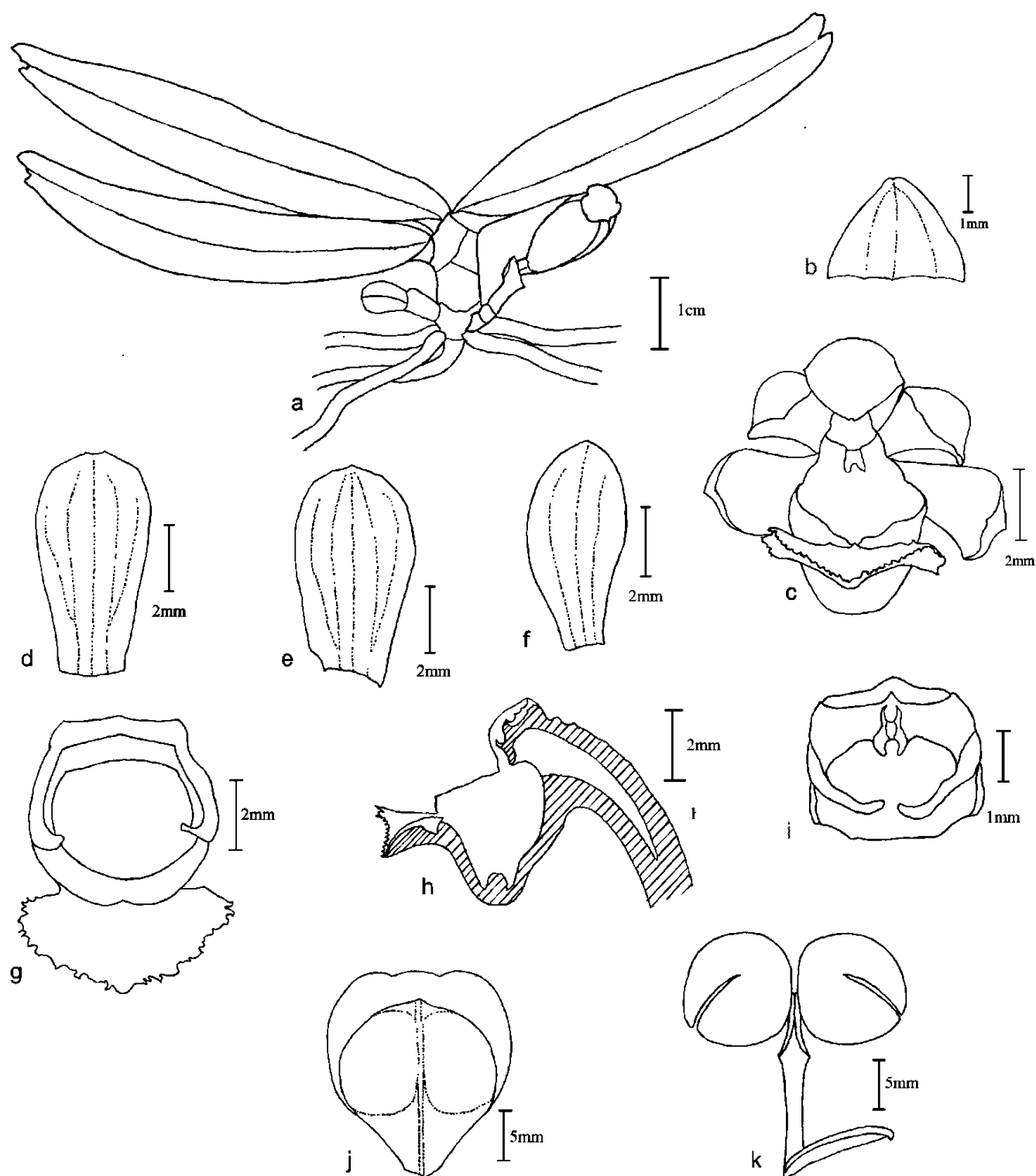
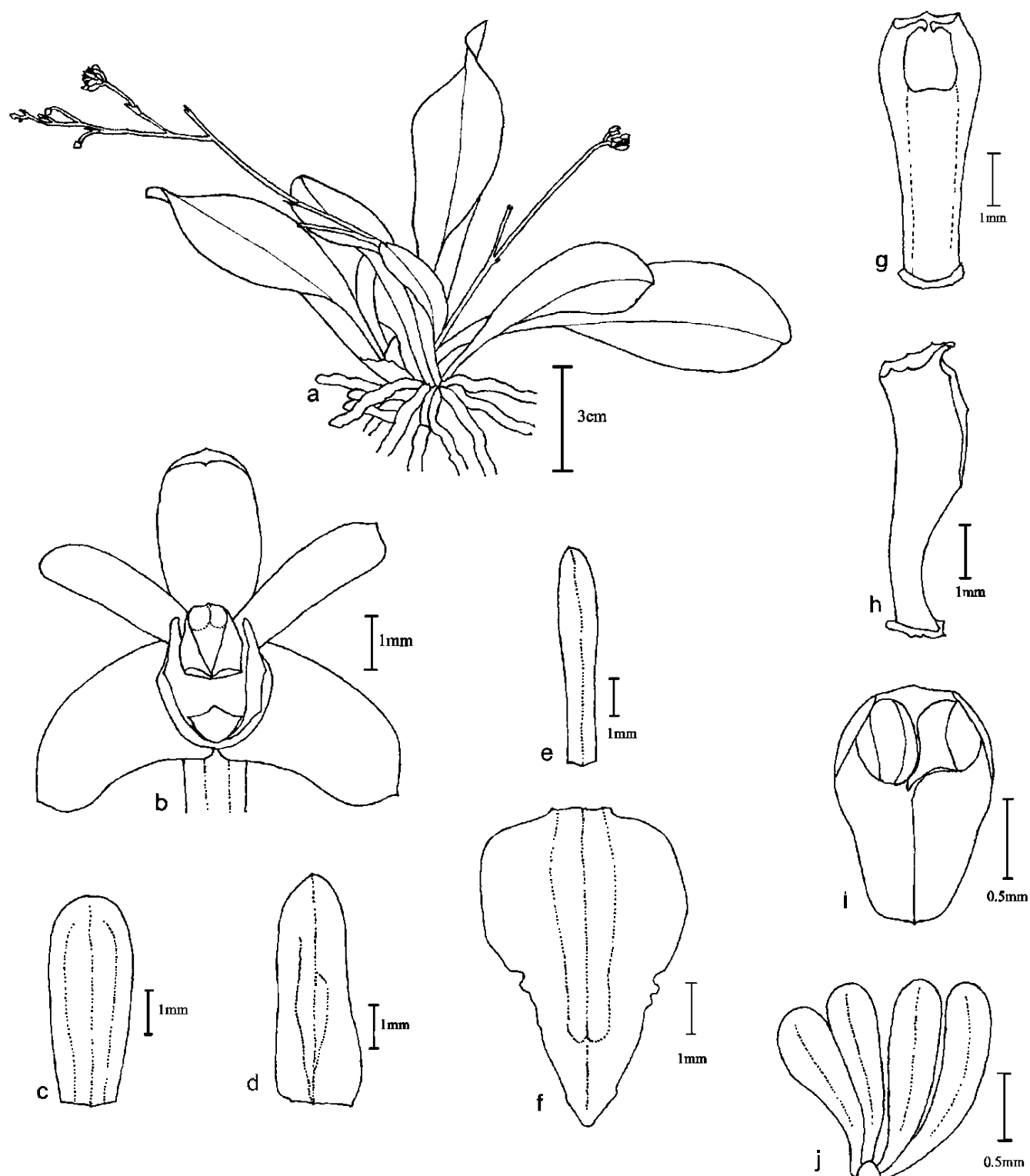


Fig.5. *Gastrochilus flabelliformis* a. plant, b. bract, c. flower, d. dorsal sepal, e. lateral sepal, f. petal, g. lip, showing its attachment with column, h. section through the lip and the column, i. column, j. operculum, k. pollinarium. (S. Misra 2609).



**Fig.6.** *Sirhookera lanceolata* a. plant, b. flower, c. dorsal sepal, d. lateral sepal, e. petal, f. lip, g & h. column, seen from front and side, i. anther, j. pollinarium. (S. Misra 2610).



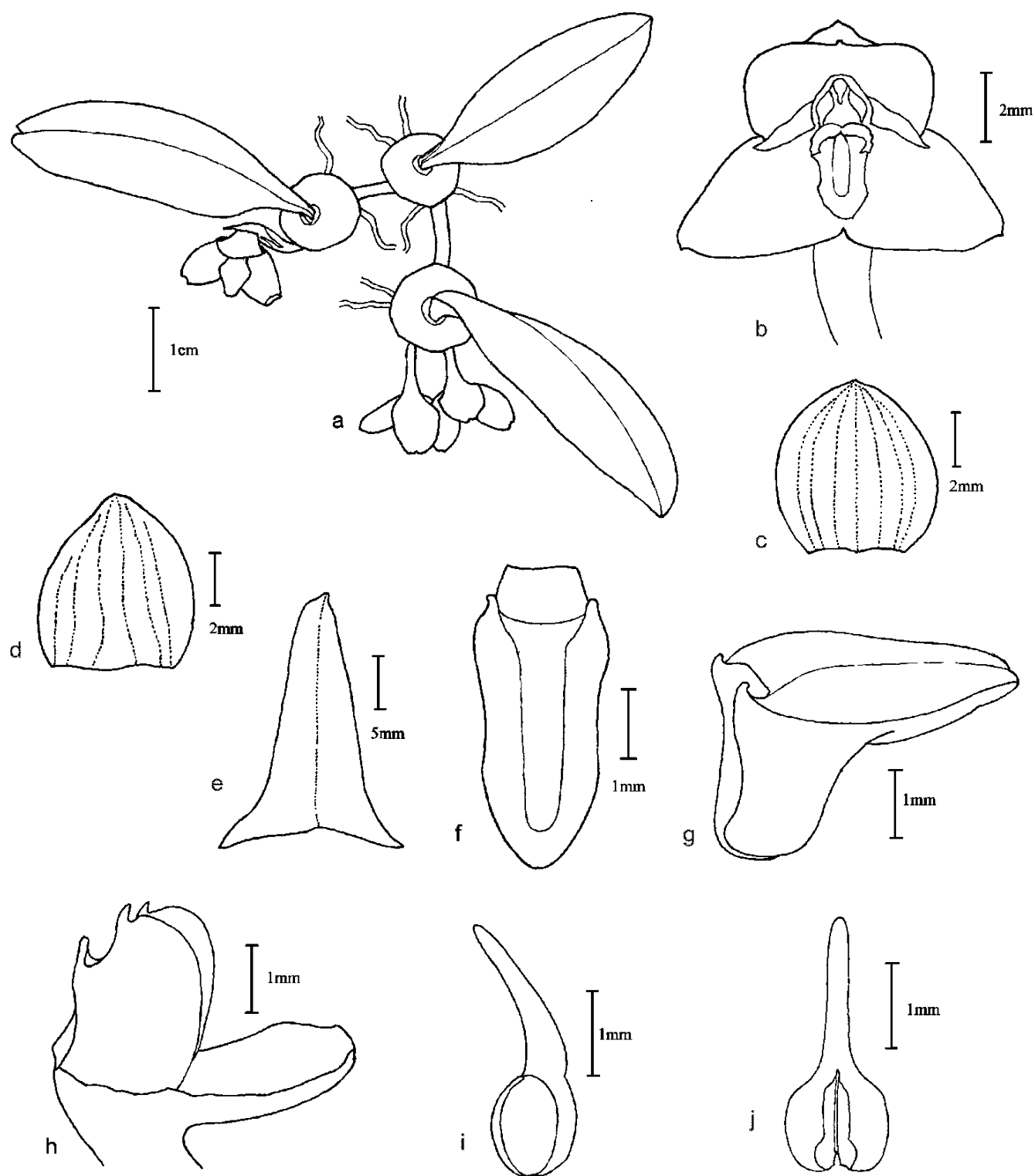
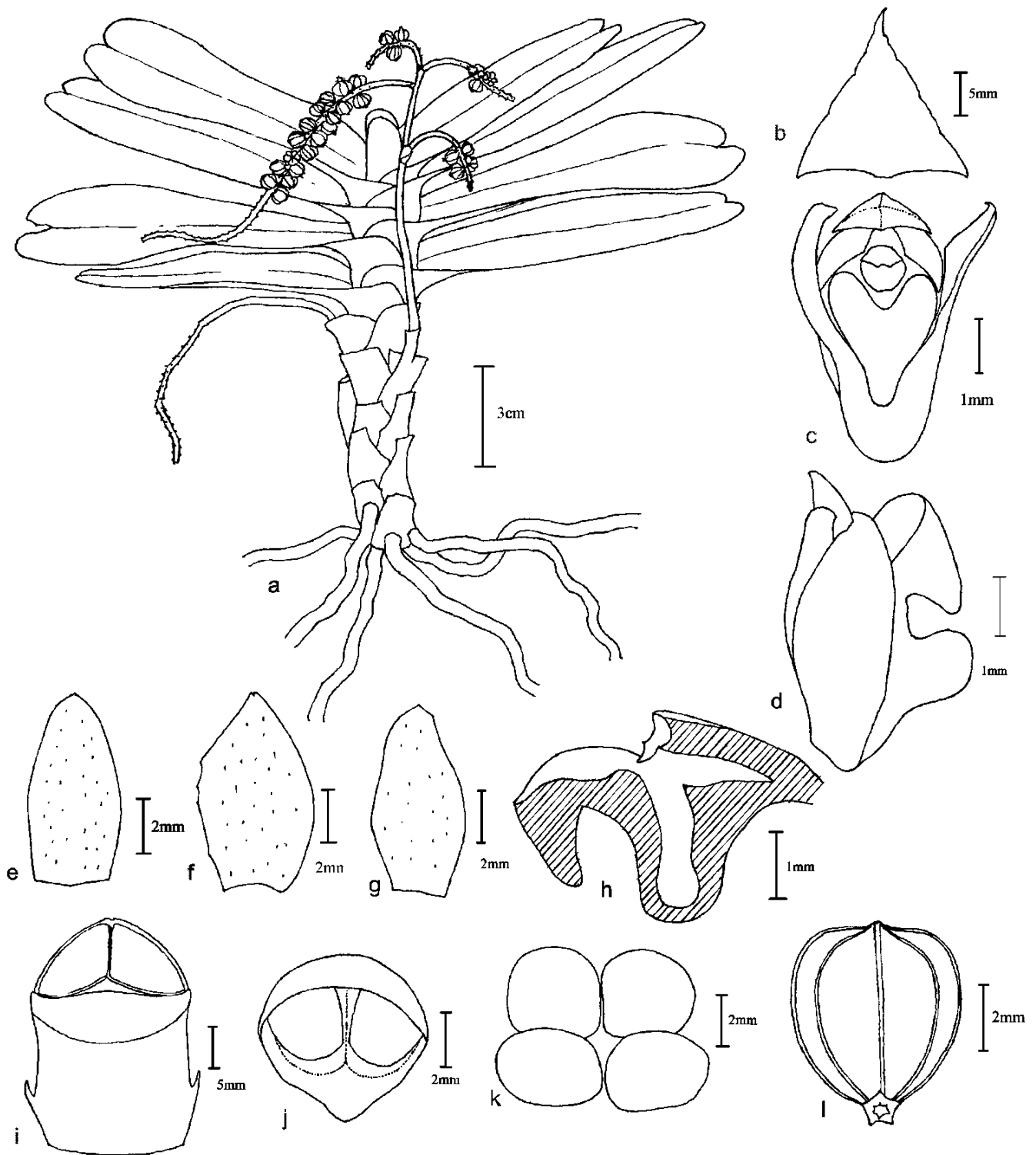


Fig.7. *Trias stocksii* a. plant, b. flower, c. dorsal sepal, d. lateral sepal, e. petal, f & g. lip, seen from top and side, h. column with foot, i & j. operculum, seen from side and front. (a. S. Misra 2604, b-j 2605).



**Fig.8.** *Xenikophyton smeeanum* a. plant, b. bract, c & d. flower, seen from front and side, e. dorsal sepal, f. lateral sepal, g. petal, h. section through lip and column (Note the absence of backwall callus in lip; and foot of column), i. column, j. operculum, k. pollinia, l. capsule. (S. Misra 2607).

The plants that were collected during the tour were introduced and conserved in the orchidarium of the Regional Plant Resources Centre (RPRC), Bhubaneswar. All the species were identified when flowered. For a precise identification, all the flowers were dissected; illustrations with their morphological characters were prepared. Some of the species such as *Aerides maculosa*, *Oberonia brunoniana* etc. were identified based on the vegetative characters.

## ANALYSIS OF THE FLORA

The epiphytes consist of 14 species with sympodial growth habit and 7 species with monopodial growth habit. Only three genera like *Bulbophyllum*, *Dendrobium* and *Oberonia* are represented with 2, 3 and 6 species respectively (*Oberonia* is the dominant genus among all); the rest, all are known with only one species each. This could be explained by reason that the entire sanctuary area is not covered in this study (for which we call it is



Plate 1.: a. & b. *Bulbophyllum fimbriatum*, c. *Bulbophyllum fischeri*, d. *Ceelogyne breviscapa*, e. *Cleisostoma tenuifolium*



an “excursion” study). It is important to note that even this small number of species occurring in Pushpagiri Wildlife Sanctuary (Part) and the adjoining area on its approach, consists of 10 endemic elements! (except *Flikingeria nodosa*, that could as well be *F. macrae*). The present observation is in line with the earlier finding (Rao 1998) that the Western Ghats are home to more endemic elements – 46% of the known species, against the figure of 31% for India. Besides the above endemics,

it also includes two other species *Cottonia peduncularis* and *Sirhookera lanceolata* which are regional endemics, having been known outside India only from Sri Lanka.

## SPECIFIC OBSERVATIONS

The area receives moderately high rainfall of c. 3000 mm, and the relative humidity is also high (around 80%) in the region. The topography cuts across a number of perennial streams. In spite of this, there was no sight of epiphytic



**Plate 2:** a. *Dendrobium aquem*, b. *Oberonia brunoniana*, c. *Oberonia ensiformis*, d. *Oberonia josephi* (Note the sterile apical length in the spike), e. *Oberonia maxima* (Note the leaves large and nearly straight), f. *Oberonia mucronata*



genera like *Eria*, *Liparis* etc., or terrestrial genera like *Acanthephippium*, *Calanthe* etc. Several genera like *Acampe*, *Cymbidium*, *Luisia* and *Rhynchostylis* etc. are conspicuously absent here; even *Aerides* and *Vanda* are seen by a single species, cited only at one locality each, although these genera are seen in other parts of Kodagu district. May be the highly moist atmosphere prevailing does not allow these genera to grow here well. It is recommended that the Pushpagiri sanctuary be botanised further thoroughly and also seasonally to get a complete picture of its orchid flora.

The flora of Pushpagiri has two rare and endemic species *Trias stocksii* and *Xenikophyton smeeanum*, which deserve discussion on their generic status. *Trias* is often made a synonym of *Bulbophyllum* Thouars. But *Trias* is a good old genus with very distinct floral characters. The separating characters of it from the later are: the inflorescence bears always a single stellate flower – the uniformly broad triangular sepals are spreading more or less forming a triangle in outline; the petal rise vertically on each side of the column; the anther is cornute – the front of operculum is prolonged horn-like, sometimes



**Plate 3:** a. *Pholidota imbricata*, b. & c. *Sirhookera lanceolata*, d. *Trias stocksii*, e. *Xenikophyton smeeanum*, f. *Zeuxine longilabris*, g. Signage of the Sanctuary.

bifurcate. Dressler (1993), Garay (1994), Seidenfaden (1995), Szlachetko (1995) and Misra (2019) have maintained *Trias* as a distinct genus.

*Xenikophyton* is similarly merged with *Schoenorchis* by some authors. Dressler (1993) distinguishes the latter with four unequal pollinia, the column with a foot; the former, on the other hand, has four equal pollinia; its column is footless. *Xenikophyton* bears its name in reference to its strange (*xenikos* = strange, *phyton* = plant) admixture of characters from two genera. Vegetatively the plants of this genus resemble those of the genus *Cleisomeria* Lindl. ex G. Don, but the pollinia are very different. It is close to the genus *Sarcophyton* Garay, but the lack of backwall callus immediately separates the two (Garay 1974). A strongly reflexed fleshy lip with a thickened conical backward projection near the tip, and medial pubescent channel in the lamina of the lip is characteristic of this genus (Misra 2019).

We therefore, retain in this treatment both *Trias* and *Xenikophyton* as distinct genera.

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