

ORCHIDS OF NILGIRIS

DR. J. JOSEPH



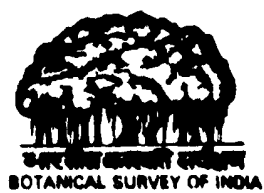
BOTANICAL SURVEY OF INDIA

The Nilgiris—the blue mountains, so called because of the rich azure-blue blossoms of the monocarpic strobilanthe (*Phlebophyllum kunthianum* Nees) flowering once in a decade and covering the whole area, form a nucleus of the Western Ghats, the mountain ranges lying parallel to the Arabian Sea in a South–West direction. Grassy downs with their characteristic densely wooded gorges (locally called Sholas–montane evergreen forests) are rich in species diversity. This book deals with 120 species of orchids belonging to 49 genera, so far known from the area with upto date nomenclature, synonymy, descriptions and analytical sketches of individual species. It is the result of author's intensive field studies and observations. Nilgiri Flora, in general, shows striking affinities with that of the far distant cooler regions of North–Eastern India.

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FOREWORD

The second revised edition on the Orchids of Nilgiris has become necessary owing to the addition of species, nomenclatural changes and arrangement of illustrations for quick reference. The first edition of the book was well received by the public and all the books were sold out. There is a constant demand from the orchid enthusiasts and scientists for this book.

Orchidaceae is one of the largest families of the flora of India. Since the species are adapted to diverse climatic and topographic conditions, exhibiting epiphytic, terrestrial and saprophytic habits, it is one of the most interesting families with wide floral adaptations. Dr. Joseph has worked on the Orchids of Nilgiris for a number of years and later on he worked on the Orchids of Northeastern India. He has revised this book and I am sure this book will be a useful identification manual for students, botanists and horticulturists.

**Botanical Survey of India
CALCUTTA.
16 March 1987**

**M.P. NAYAR
DIRECTOR**

PREFACE

This illustrated book in its second edition on the Orchids of Nilgiris is to facilitate easy identification of this fascinating group of flowering plants of this region which is being visited regularly by students of Botany of various colleges, national and international botanists, tourists and amateur orchid growers. More than 50% of the species dealt by Fischer in Gamble's Flora of Madras Presidency are available in this region itself.

The uncommonness of the Orchids, though they form one of the largest families of flowering plants of the world, is owing to paucity of individual plants representing each species, the epiphytic habit of majority of them on wild forest trees, the preference, though not specificity, of hosts or perch-plants and narrow endemism. These unique characteristics make them more vulnerable, and even the felling of a single tree might cause destruction of many well-established individuals if not species. Orchids are not only a highly evolved group of flowering plants but also form a group under active speciation process through intergeneric and interspecific hybridization both in nature and under cultivation, betraying thereby, the classical definition of a species.

In the time-space continuum, species are more of time but individuals, of space and both species and individuals move both in space and time. Change and transformation are laws of nature. Just like an individual is born, does grow, reproduce, disperse and die (disappear), the species too, with the elapse of long time, disappear or become extinct, after begetting distinct species, with variations necessary to inhabit the changed environment. As individuals and species change, the pattern of different stands of vegetation too undergo changes just like the design of a cloth in the loom, according to the threads. A river is changing, though looks same, so is the vegetation.

More the number of species in a unit of time and space, less will be the number of individuals representing each species and vice versa. In other words, species is inversely proportionate to individuals. Orchidaceae exemplifies this phenomenon adequately and forms one of the largest families of flowering plants comprising of above 17,000 species for the world (and an equal number if not more of hybrids) with more than 1500 species belonging to 150 genera in India.

As mentioned earlier, the number of plants in each species, even in a very congenial environment is minimum, guaranteeing thereby less competition within the population. In the recent past (1985) we could gather about 40

different epiphytic species belonging to about 15 different genera from a single lofty tree of Namdapha Biosphere of Arunchal Pradesh (N.E. Himalaya). But one could come across hardly even half a dozen on a single tree in South Indian forests.

Thus it is paradoxical to note, that in spite of the fact that South Indian land mass is as old as earth, in terms of Geological times and fostering very dense both Tropical and Subtropical forest stands with high relative atmospheric humidity, conducive for the prolific production of epiphytic orchids, still there is paucity of species as compared to N.E. India (less than 250 spp. in South, while in N.E. India more than 700 spp.). One of the reasons attributed for this high incidence of taxa in different groups of plants is that N.E. India forms the junction of the immigratory elements from the neighbouring regions like Tibet, China, Burma and other regions. The other reason is that N.E. India is an active zone of speciation, while Peninsular India is not. It falls in the tremor belt and according to the tremor theory (Joseph 1982) the electromagnetic and other forms of invisible energies, released by the occasional tremors, bombard the genome, effecting large scale natural mutation which ultimately leads to speciation. Such sudden changes in the genotype, as for orchids are concerned if not for other groups, perhaps, remove the incompatibility for both interspecific and intergeneric natural hybridization, within a wider range of taxa, harboured by the land-mass being the confluence of the neighbouring elements.

Orchhids can be protected and perpetuated by adopting the formula $C = P + R$ (Conservation is equal to Protection and Preservation plus Regeneration and Rehabilitation). Steps must be taken to protect them in their natural habitats— *in situ* and preserve them by cultivating in suitable environment— *ex situ*. Multiply those which are under the danger of extinction owing to many reasons, for reintroduction into their natural habitats as well as for *ex situ* cultivation, through mass-scale seed and meristem culture. Lastly the programme of rehabilitating the dislodged ones, owing to the clearance of climax forests for development projects is absolutely necessary especially in developing tropical countries, where forests are cleared very fastly and hence well-established orchids both epiphytic and terrestrial are destroyed as weeds. Inordinate delay in the implementation of the rehabilitation programme would lead to wanton destruction of well-grown individuals and thus might lead to the extinction of many a hitherto unknown species and definitely the well-known species would become very rare. It is true that development without destruction is impossible, but it is also true protection of virtues by ignorance is dangerous.

In this revised edition, efforts have been taken to reorient the illustrations for easy identification besides revising the text where necessary.

My grateful thanks are due to the Director, Botanical Survey of India for his encouragements, to Dr. Gunnar Seidenfaden of Denmark for his munificent supply of information on the study of the orchids of Asiatic region and also for his helpful suggestions. I am also thankful to Mr. C. Sathish Kumar of Tropical

Botanic Garden, Kerala for his service in the preparation of the revised manuscript. My grateful thanks are also to Dr. N.P. Balakrishnan, for proof corrections and other helps in bringing out this.

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CALCUTTA
OCTOBER 2, 1986**

J. JOSEPH

INTRODUCTION

Nilgiris or the blue mountains, located in peninsular India (Lat. 11° 12' & 11° 43' North and Long. 76° 14' & 77° East) form the nexus of three mountain systems, the Sahyadri (Western Ghats) in the North (opposite Mukurti Peak), the Southern Ghats joining across the Palghat Gap in the South, and the Eastern Ghats, in the North-eastern corner. The Nilgiris, with altitudes of 500-2000 m and rainfall of 900-7620 mm from both the Northeast and the Southwest monsoons, nourish about 2500 sq. km of forests, which contain a rich orchid flora, representing nearly half the total number of species known for peninsular India. The need for a distinctive account of these orchids has been acutely felt by botanists, students, orchid hobbyists, amateur gardeners and tourists. This fascinating group of flowering plants has been awaiting detailed study. Fyson (1932) in his *Flora of South Indian Hill Stations* dealt with about 60 species in 25 genera. Kammathy *et al.* (1967) have listed for the Biligirirangan Hills, in the northern vicinity of the Nilgiris only 68 species. Fischer (1928) has treated this family including 190 species in 60 genera, as part of the *Flora for the then Madras presidency*. With the revival of the Botanical Survey of India, and the increased exploration and plant collection programmes of its southern circle at Coimbatore, a large herbarium collection has been built up. Further, with the starting of the second National Orchidarium at Yercaud, near Salem, a live collection of wild orchids has been brought together for study, giving new impetus to the study of these biologically complex, naturally ornamental plants which attract the laymen as well as the Scientists, alike. Using all these sources, this illustrated work on the Orchids of Nilgiris, presents descriptions of 120 species in 49 genera. Only for a few species, earlier literature sources had to be depended on, as no fresh collection has been possible, due to changes in the habitat and the very likely disappearance of the already rare species. The description here would enable fresh collection by interested and enthusiastic conservationists. In the past, due to inadequate appreciation of the range, extent and significance of variation, or due to difficulty of interpreting the somewhat sketchy descriptions, themselves based often on inadequate material, either several botanical names have been given to what is really only one kind of plant or entity, species or taxon, or the opposite, of one name being given to really different but superficially similar plants. Such confusion is less likely to happen when visual representations of the plant and its critical parts are available, along with the verbal descriptions. This work on the Orchids of Nilgiris, with the supporting analytical line drawings of every species, should assist in a correct understanding of the different species dealt with. It should also stimulate the naturalists and other

orchid enthusiasts to explore for new species that may still be in hiding in the forests of these mountains.

ORCHID ECOLOGY AND CONSERVATION

It is in the forests of the Western mountain ranges along the border of Kerala that orchids are more abundant. However, in the 'Shola' forests of Nilgiris, amidst grasslands at elevations of 1700 m and above the Orchid flora is comparatively poor, particularly in comparison with forests at comparable altitudes in the Eastern Himalayas and in the Khasi & Jaintia Hills of Meghalaya. Recent phytosociological and pollen analysis studies show that the sholas are progressively receding and form a 'living fossil plant community'. This environmental situation seems to be adversely affecting the spread of orchids. In other parts of India (the North-eastern region) the orchids have been threatened in their natural habitat, by repeated collection for ornamental and commercial purposes in the past. However, this cannot be said of the Nilgiri orchids. In all the surrounding states in the entire peninsula, the traditional flowers for ornamenting, personal decoration and ritual use are the Jasmine, the Champak, the Lotus, the Rose, *Hibiscus*, *Eranthemum*, *Crossandra* and *Tagetes*. Here, people hardly know of the orchid flower commercially. It is only a minority of the sophisticated elite that fancy orchids in their gardens and in their drawing rooms. Hence, the orchids of Nilgiris cannot be said to be threatened by man. Their dwindling and in some cases possible disappearance has been due to the ecological changes taking place in the shola vegetation of these mountains. It is essential to take urgent conservation measures by demarcating orchid sanctuaries for certain species, protecting the host trees and the general vegetation as also to undertake extensive cultivation of several species in Botanical Gardens. This should not be a very difficult task as orchids are comparatively easy to cultivate. Further, notwithstanding their biological complexity and special flower structure, flowers of different species and even genera can be hybridised and new creations with various combinations of colours and other characters of the concerned parents can be obtained. By the use of laboratory methods of seed culture and meristem culture millions of these 'cultivars' can be commercially grown. This has started an Orchid Industry in other countries, and even small countries like Thailand and Singapore have a thriving orchid trade supplying orchid flowers to western countries where there is a high demand for these. India with its natural orchid wealth is yet to tap this resource for large scale commercial operations.

ORCHID DISTRIBUTION

Orchidaceae is one of the largest flowering plant families with a cosmopolitan distribution. Orchids are profuse, particularly in the humid tropics and subtropics. 17,000 species have been so far known in the world, with about 1,500 in India. In peninsular India there are about 200 species in 60 genera, the Nilgiris having about 120 species in 49 genera. 72 species are found to be ende-

mic, i.e. only confined to peninsular India. The Nilgiris contain 33 species that are reported from Himalayas, and 35 species have a common distribution in Malaya or Thailand or Java. Further, a fuller knowledge of Sri Lanka (Ceylon) orchids may reveal some more common species to that Island and peninsular India including the Nilgiris. Increased plant exploration and a critical taxonomic analysis of orchids in different regions with comparable climate and elevation is bound to throw more light on the inter- and intraspecific variations of orchids and a better knowledge of their distribution pattern. Illustrated orchid floras like the present one should help in stimulating such efforts.

ORCHID CULTIVATION

Successful orchid cultivation depends upon an artificial provision of near natural growth conditions. Terrestrial orchids, thriving in the damp decaying thick humus of the forest floor are best grown in pots in deep shade in green houses. Epiphytic orchids flourishing on tree trunks and branches amidst moss, lichens and ferns, are best grown on bark-covered log pieces with moss cushioning and suitably hung in appropriate place. Orchids do not tolerate over watering. Their water needs in cultivation should more or less follow the rainfall rhythm in nature. For all orchid enthusiasts it is essential to observe the ecological conditions under which orchids grow in nature and to keep adequate notes on such observations.

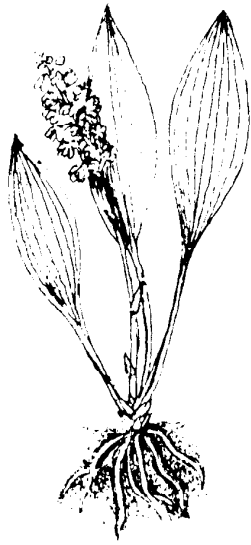
Orchid seeds are minute, and will only germinate in association with the appropriate fungus or mycorrhiza. On the other hand, orchids can be propagated and multiplied easily by vegetative methods. Orchid roots should not be cleaned before planting so as to retain the concerned fungal partner.

In view of the unusual range of variation in the orchid flower, orchids are bound to become increasingly popular in Floriculture and in Home gardens. Orchid hobbyists would find 'Orchids of India' by A.S. Rao, published by the National Book Trust, of much interest. Other books that are useful in cultivation and/or identification of orchids have been listed in the bibliography.

ORCHID HABIT AND HABITATS

Orchids are biologically very specialised. They grow on land, like other plants, but the majority of them prefer to perch on other plants—mostly trees—and sometimes on moss covered rocks. Accordingly, they are described as terrestrial, epiphytic or epilithic.

The high biological complexity exhibited by orchids must have taken a long span of time in evolution, but so far there is no clear report of fossil orchids. Excepting for a small group of leafless orchids briefly growing on decaying organic matter (saprophytes) all orchids are autophytes. There are no parasites. Even though, epiphytic orchids grow on other plants, there is no physiological or organic connection between the orchid and the host plant. There are also no water-orchids or Hydrophytes and no insect eating or insectivorous orchids.



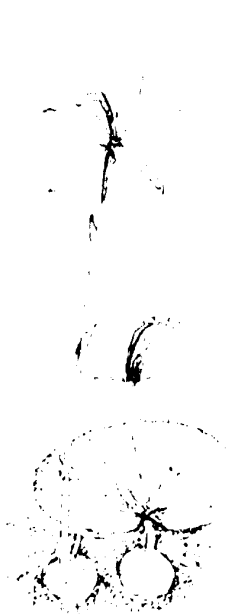
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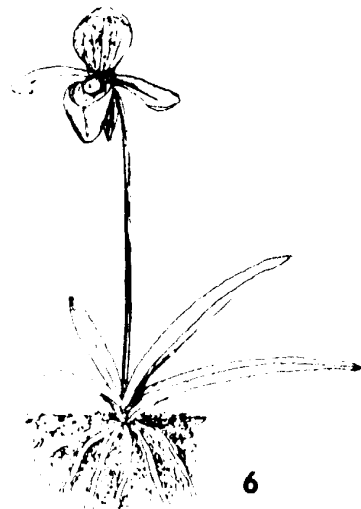
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6

PLATE 1

HABIT OF ORCHIDS:— TERRESTRIALS.

1. *Calanthe* sp.; 2. *Habenaria* sp.; 3. *Cypripedium* sp.; 4. *Nervilia* sp.; 5. *Epipogium* sp.; 6. *Paphiopedilum* sp.;



PLATE 2

PLATE 2

HABIT OF ORCHIDS: EPIPHYTES.

1. *Vanilla* sp. (climber); 2. *Dendrobium* sp.; 3. *Oberonia* sp.; 4. *Coelogyne* sp.;
5. *Vanda* sp.; 6. *Bulbophyllum* sp.

ORCHID MORPHOLOGY

Orchids are perennial herbs. Land orchids have rhizomes, root stocks or tubers and a bunch of roots. Very few of them have a climbing stem with roots at nodes. Several of the epiphytic orchids have fleshy roots with a special spongy water absorbing tissue called *velamen*. The stem may be branching, creeping or erect. Leaves are parallel-veined, simple, varying from one to several, either in a bunch or spread all along the stem. Mostly the leaf has at its base a fleshy, swollen, bulbous part called the *pseudobulb*. In a few orchids the leaves are deciduous. In some of them the leaf and the flower appear at different times from the same tuber. Such orchids have caused confusion in identification (Pls. 1 and 2, Figs. 1-6).

Orchid flowers are either in varying kinds of bunches or inflorescence or solitary, appearing at the top of the leafy stem or in the axils of leaves or in separate, distinct flower bunches. Orchid flowers vary in size from the microscopic to fairly large ones measuring almost 15 cm across. All the same, they all exhibit the same 3-merous pattern showing their relationship to the Lily flower. There are three *sepals* and three *petals*, one of which is strikingly different and is called the *lip* or the *labellum*. At the center is a stumpy part which represents the much modified fused style, stigma and stamen. This is known as *column*. At the tip of the column is the *anther* with a mass of sticky pollen grains called *pollinia*. These may be in 2, 4, or 8. The stigmatic tip or the *rostellum* is atop the anthers. The column leads below to the ovary, which is below the rest of the floral parts, sunk inside the long stalk and hence called inferior or pedicellate ovary. In many orchids, this stalk with pistil, twists round 180° from the bud to the blossom, bringing the lip from the back to the front, facilitating pollination and fertilisation. This gyration is called *resupination*. The sepals, the petals and the lip together with the column display an unparalleled range of variation in relative size, shape and colour. Further, the lip itself seems to compete with the rest in its diversity. It displays various kinds of lobation, patterns or ridges, grooves, pubescence and extensions in the form of spurs which themselves further display variations. All these astonishing variations help the orchid classifier in identifying and naming them (Pl. 3, Figs. 1-10). In one group of orchids there are two stamens and the pollen is granular. The lateral sepals are fused, and the lip is like a vase or old fashioned Lady's slipper. This feature has earned these orchids the popular name of Lady's slipper orchids (incidentally it should be mentioned that there is only one species of this in South India—*Paphiopedilum druryi*, which has become extremely rare or almost extinct in Nature).

The lip structure in some orchid species representing a female insect has misled male insects into pseudocopulation and thus effecting pollination. Orchid floral structure and biology of pollination and fertilization is an extremely fascinating field in which amateur naturalists can greatly contribute by their observations. Orchid fruits (capsules) split when ripe into 3 or 6 parts and release an enormous number of dust-like tiny seeds. The seed lacks any

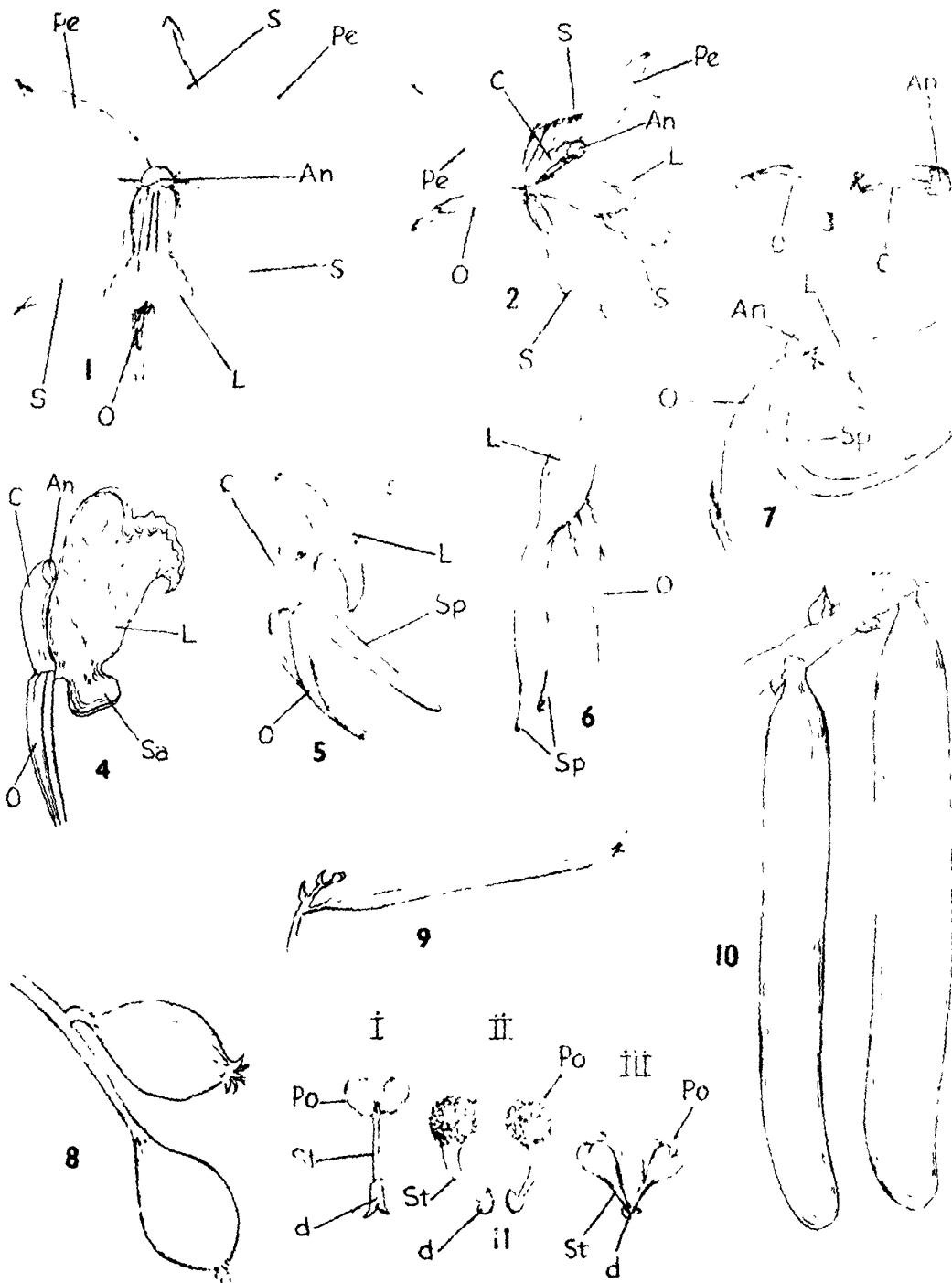


PLATE 3

Fig. 1-3. *Coelogyne* sp.:— 1. Flower front view; 2. Flower lateral view; 3. Ovary with column; Fig. 4-7. Lips with ovary:— 4. Saccate Lip (*Eulophia* sp) 5. Lobed lip with one spur (*Calanthe* sp); 6. Lip with two spurs (*Satyrium* sp); 7. Deeply trifold Lip with one spur (*Habenaria* sp); Fig 8-10. Fruits:— 8. *Cymbidium* sp.; 9. *Thrixspermum* sp.; 10. *Vanilla* sp.; Fig. 11. Pollinia:— I. *Acampe* sp.; II. *Habenaria* sp.; III. *Eria* sp.;

An. Anther; C. Column; D. Disc; L. Lip; O. Ovary; Pe. Petal; Po. Pollinia; S. Sepals; Sa. Sac; Sp. Spur; St. Stipe.

nourishing tissue like endosperm of other seeds. There is only an embryo. The seed germinates on a chance coming together of the needed fungal partner or mycorrhiza. There is a large wastage of seeds. It takes from 8-12 years for the seedling to become an adult plant. The common method of multiplication of orchids even in nature is by breaking off of parts of the parent plant. This is vegetative propagation.

Plant physiologists have now been able to provide the essential nutritives for the seed in a culture medium. Also, tiny bits of orchid tissue can be similarly grown in the laboratory. This is called meristem culture. These processes are used in large scale cultivation of ornamental orchids by nurserymen in foreign countries. A start has been made in India also.

An orchid gathered in the Nilgiri area can be recognised as an orchid and further identified to the respective genus and species with due familiarity with the general description and illustrations provided here. With this background the key which gives repeatedly two alternatives and choice of characters, will eventually lead the reader to the name of the orchid. This could be further confirmed by the detailed description of that particular species and the related illustrations. If the reader finds that he cannot decide, either his plant is not an orchid or he has one, not covered by this book or likely even a new species ! Every naturalist has a chance to find new orchids.

ORCHIDS OF NILGIRIS

KEY TO THE GENERA

**The keys are artificial meant to aid identification of
Orchids of Nilgiris**

- 1a. Terrestrial
- 2a. Climbers (with long green aerial stem) ... VANILLA 1
- 2b. Non climbers
- 3a. Leafless, either during flowering time or throughout
- 4a. Leafless throughout, (and only inflorescence appearing seasonally)
- 5a. Flowers with slender ovary, erect; lip without spur, deeply constricted about the base and with a triangular wing on either side at the very base ... APHYLLORCHIS 2
- 5b. Flowers with very swollen ovary, drooping; lip with a saccate spur and bereft of wings ... EPIPOGIUM 3
- 4b. Leaf appearing only after flowering time, disappearing before the next flowering
- 6a. Flowers glandular pubescent ... PACHYSTOMA 4
- 6b. Flowers glabrous
- 7a. Leaves orbicular to broadly ovate, solitary ... NERVILIA 5
- 7b. Leaves linear, two or more ... EULOPHIA 6
- 3b. Leafy plants
- 8a. Lip with two spurs ... SATYRIUM 7
- 8b. Lip with one spur or none
- 9a. Lip neither saccate nor spurred
- 10a. Flowers solitary or in racemes, axillary or lateral
- 11a. Flowers solitary (in the axil of leaves progressively reduced in size upwards) ... EPIPACTIS 8
- 11b. Flowers in simple racemes or panicles
- 12a. Pseudobulbous; leaves 2 or 3 tapering into a long petiole; racemes simple, lateral, from the side of the pseudobulb; flowers with sepals united to form a gibbous tube ... ACANTHEPHIPIUM 9
- 12b. Not pseudobulbous; leaves 5 or more, sessile to the sheath; inflorescences spreading panicle from the axils of the upper leaves; flowers not gibbous ... CORYMBORKIS 10

- 10b Flowers in spikes or racemes, terminal
- 13a. Leaves at distant nodes; flowers two (rarely 1 or 3); lip much smaller than the sepals and petals, T- or Y-shaped, adnate to the front of column ... **DISPERIS 11**
- 13b Leaves radical or subradical or scattered; flowers many; lip larger or subequal with the sepals and petals, neither T- or Y-shaped
- 14a. Inflorescence a lax raceme; dorsal sepal and lateral petals distinct, and held in various ways; lip broad and strongly reflexed from the base; margins of sepals and petals often curved
- 15a. Column very short, straight ... **MALAXIS 12**
- 15b. Column long, hooded at apex ... **LIPARIS 13**
- 14b. Inflorescence a dense spike; dorsal sepal and lateral petals adhere to form a hood; lip not reflexed, inferior; margins of sepals and petals not curved
- 16a. Leaves many, large (11—18 x 1.5—3.0 cm) with long sheathing petioles, scattered; lip setose within, entire, with 2 subterminal calli on dorsal side and the apex strongly recurved ... **GOODYERA 14**
- 16b. Leaves a few, small (3—12 x 0.5—0.9 cm) sessile, crowded at the base; lip trilobed with 2 calli at the base within, geniculate about the middle ... **SPIRANTHES 15**
- 9b. Lip distinctly saccate at the base or spurred
- 17a. Lip with saccate base
- 18a. Inflorescence glabrous; lip entire
- 19a. Scape lateral from the base; raceme decurved; bracts linear; lip retuse ... **GEODORUM 16**
- 19b. Apical portion of the plant itself flower bearing, erect; bracts foliaceous; lip obcordate ... **BRACHYCORYTHIS 17**
- 18b. Inflorescence glandular pubescent; lip lobed
- 20a. Lip margin uneven but deeply forked at the apex; lateral sepals free ... **ZEUXINE 18**
- 20b. Lip margin lobed and also with a deep cleft at the apex, lateral sepals connate ... **CHEIROSTYLIS 19**
- 17b. Lip spurred
- 21a. Spur long cylindrical
- 22a. Non-tuberous; leaves plaited, long petioled; base of the lip adnate all along the column; midlobe of the lip deeply cleft ... **CALANTHE 20**
- 22b. Tuberous; leaves not plaited, sessile or subsessile; lip free from the column; midlobe entire

23a. Flowers large, more than 5 cm across; stigma sessile	PECTELIS	21
23b. Flowers small, less than 3 cm across; stigma with distinct appendages ...	HABENARIA	22
21b. Spur scrotiform or conical or vermiform		
24a. Non-bulbous, non-tuberous, decumbent plants; inflorescence glandular pubescent; lip with basal pectinate segments ...	ANOECTOCHILUS	23
24b. Bulbous or tuberous, erect herbs; inflorescence glabrous; lip without basal segments		
25a. Bulbous caespitose herbs; inflorescence lateral ...	EULOPHIA	6
25b. Tuberous simple herbs; inflorescence terminal ...	PERISTYLUS	24
1b. Epiphytic		
26a. Plants with terete leaves		
27a. Flowers many in a pendulous raceme; lip with large spur and inconspicuous lobes ...	SCHOENORCHIS	25
27b. Flowers a few (2-5) on an erect raceme; lip with inconspicuous spur or without it, with large lobes		
28a. Lip without spur ...	LUISIA	26
28b. Lip with a spur ...	PAPILIONANTHE	27
26b. Plants without leaves or leaves flat or keeled or subterete and sulcate		
29a. Leaves absent (only roots green and assimilatory)		
30a. Column with a distinct foot, (bearing lateral sepals); ovary puberulous ...	CHILOSCHISTA	28
30b. Column without a foot; ovary glabrous ...	TAENIOPHYLLUM	29
29b. Leaves present		
31a. Leaves equitant, ensiform	OBERONIA	30
31b. Leaves otherwise		
32a. Plants with pseudobulbs		
33a. Pseudobulbs with single leaf		
34a. Pseudobulbs at irregular intervals on an elongate pendulous nodose stem; flowers 1—3 at the base of the leaf on the pseudobulb ...	FLICKINGERIA	31
34b. Pseudobulbs in clusters or at regular intervals on a horizontal creeping stem; flowers many on long scapes		
35a. Pseudobulbs in clusters; inflorescence terminal on the pseudobulb, pendulous; bracts many closely		

- bifarious; perianths more or less equal in size; lip distinctly 3-lobed, firmly attached ... PHOLIDOTA 32
- 35b. Pseudobulbs on creeping stem; inflorescence lateral to the pseudobulb, erect; bracts a few, more or less crowded; perianth very unequal, lip unlobed or obscurely lobed, mobile (lateral sepals larger, often cohering along margins and twisted) ... BUIBOPHYLLUM 33
- 33b. Pseudobulbs with two or more leaves
- 36a. Pseudobulbs discoid with reticulate sheath-covering; sepals connate into a campanulate tube ... PORPAX 34
- 36b. Pseudobulbs ovoid or oblong or elongate (rarely discoid with reticulate sheath), sepals free
- 37a. Flowers with lateral sepals adnate to the foot of the column to form a mentum
- 38a. Lip lobed; midlobe much larger than the side-lobes (and often crenulate to pectinate); pollinia 4, ovoid or oblong ... DENDROBIUM 35
- 38b. Lip entire or obscurely lobed, when lobed midlobe shorter than the lateral ones; pollinia 8, pyriform ... ERIA 36
- 37b. Flowers without a mentum
- 39a. Pseudobulbs with two terminal leaves, with or without sheathing bracts at the base; column hooded and winged at apex
- 40a. Pseudobulbs *ca* 7 cm long, ovoid-elongate, slender; flowers small, pale green; lip entire, strongly reflexed from the base, without dorsal ridges ... LIPARIS 13
- 40b. Pseudobulbs *ca* 4 cm long, ovoid-oblong, swollen; flowers large, white; lip trilobed, straight with dorsal longitudinal ridges ... COELOGYNE 37
- 39b. Pseudobulbs with four or more leaves, covered with sheathing bracts or sheathing bases of leaves; column neither hooded nor winged at apex
- 41a. Plants large (leaves *ca* 70 x 3 cm); pseudobulbs globose; inflorescence up to 50 cm, lateral, axillary, pendulous; sepals and petals subequal; lip inferior with 2 parallel ridges ... CYMBIDIUM 38
- 41b. Plants small (leaves *ca* 25 x 3 cm); pseudobulbs ovoid, slender; inflorescence up to 20 cm, terminal, erect; petals much narrower than the sepals; lip superior, with a single ridge ... POLYSTACHYA 39

- 32b. Plants without pseudobulbs (but with short or long, slender or stout stems)**
- 42a. Lip with two spurs ... DIPLOCENTRUM 40
- 42b. Lip with one spur or none
- 43a. Plants short, less than 10 cm high (1.5—8.0 cm)
- 44a. Leaves flat obliquely bilobed at tip; inflorescence (a corymb) much shorter than the leaves ... GASTROCHILUS 41
- 44b. Leaves subterete, sulcate, obliquely acute at tip; inflorescence longer than the leaves
- 45a. Inflorescence a simple raceme; lip glabrous; spur laterally compressed ... ROBQUETIA 42
- 45b. Inflorescence a condensed spike (at the end of a long scape); lip glandular hairy; spur scrotiform ... THRIXSPERMUM 43
- 43b. Plants tall, more than 10 cm high (up to 30 cm or more)
- 46a. Lip without spur
- 47a. Leaves ovate-lanceolate, usually three to five times longer than broad, obtuse or acute at tip; inflorescence of simple, short racemes; flowers with a mentum; perianth spreading; lip without callus ... DENDROBIUM 35
- 47b. Leaves linear, ten times or more longer than broad, unequally forked at tip; inflorescence a sparsely branching long panicle; flowers without a mentum; perianth strongly reflexed over the ovary; lip with two auricular calli ... COTTONIA 44
- 46b. Lip with spur
- 48a. Leaves at long internodes (on slender elongate stem) small (1.5—8.0 cm long), oblong, flat, two to four times longer than broad
- 49a. Leaves 0.5—5.0 cm long, obtuse; flowers in a condensed raceme; racemes shorter than the leaves ... TRICHOGLOTTIS 45
- 49b. Leaves 3.5—8.0 cm long, obliquely cleft; flowers on a long erect raceme; racemes much longer than the leaves ... VANDA 46
- 48b. Leaves in vertical rows with the base of the lower sheathing, that of the upper, long (9—25 cm) linear, more or less keeled, more than 5 times longer than broad

- | | | | |
|---|-----|---------------|----|
| 50a. Leaves praemorse at apex | ... | VANDA | 46 |
| 50b. Leaves retuse or cleft at apex | | | |
| 51a. Inflorescence drooping; lip deeply cleft
at tip | ... | RHYNCHOSTYLIS | 47 |
| 51b. Inflorescence erect; lip trilobed | | | |
| 52a. Inflorescence racemose, much
longer than the leaves; spur conical
or cylindrical | ... | AERIDES | 48 |
| 52b. Inflorescence corymbose, much
shorter than the leaves; spur
gibbous | ... | ACAMPE | 49 |

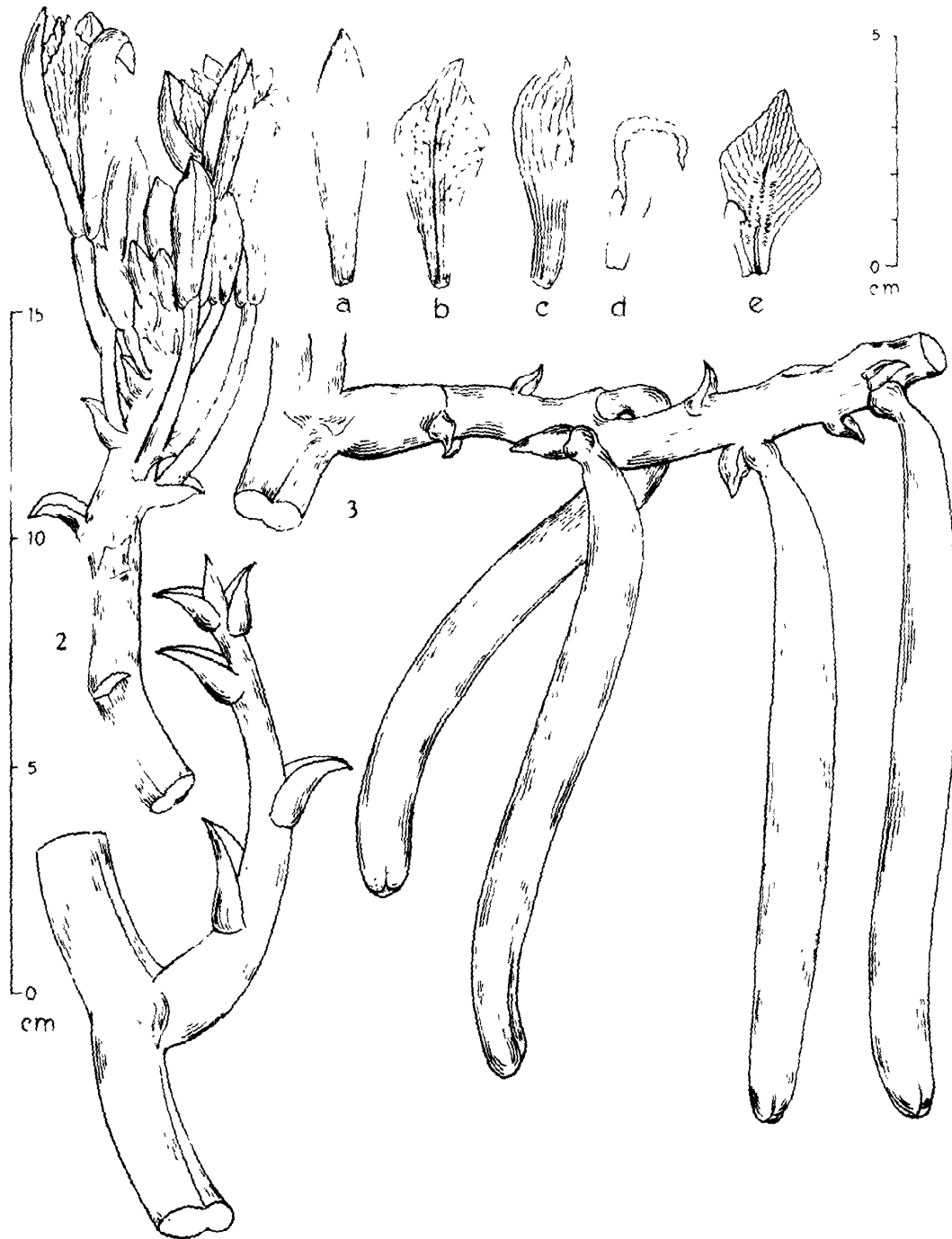


PLATE 4

Vanilla walkeriae Wt.: 1. Growing tip; 2. Inflorescence; 3. Fruits; a. Dorsal sepal; b. Lateral petal; c. Lateral Sepal; d. Lip (Lateral view) with column; e. Lip (spread out.)

1. VANILLA Mill.

Vanilla walkeriae Wight, Ic. 3 (3) : 12. t. 932. 1845; Hook. f. Fl. Brit. Ind. 6 : 90. 1890; Fischer in Fl. Pres. Madras 1451. 1928 (Repr. ed. 3 : 1015. 1957). **Pl. 4. Figs. 1-3 & a-e.**

Straggling root climbers reaching up to 3 metres or more, on large shrubs, or trees. Stem stout, dark green with a mealy coating on the tender parts, sub-cylindrical with 2 or 3 longitudinal grooves, with aerial roots at nodes. *Leaves* found towards the growing tip, reduced, bract like, 6.0-2.2 x 0.7-1.3 cm, sessile, cucullate, thick, lanceolate, with reflexed obtuse tips, shriveling and persistent. *Inflorescences* many-flowered, erect, congested corymbs. *Flowers* white. *Bract* ca 1.1 x 0.6 cm, thick, lanceolate, obtuse, reflexed, concave. *Ovary* ca 4.3 cm long, cylindrical, erect, green. *Dorsal sepal* ca 5.5 x 1.5 cm, oblanceolate, obtuse, shallowly concave, fleshy. *Lateral sepals* ca 5.0 x 1.7 cm, obliquely oblanceolate, obtuse, concave, fleshy. *Lateral petals* ca 5 x 2 cm, oblanceolate, acute to shortly acuminate with a thick submedian nerve; margin thin, slightly wavy. *Lip* ca 4 x 2 cm, trumpet-shaped, rhomboid when spread out, shortly acuminate, thin, undulate margined, adnate to the column, with 3 parallel, erect, fimbriate lamellae towards the base and a median thickening towards the acuminate tip. *Column* ca 1.5 cm long, united with the lip almost throughout the whole length. *Fruits* ca 17.0 x 1.2 cm, cylindrical, dark green, smooth, truncate and uneven at tip.

Wight has described this as a leafless plant. However, there are reduced leaves on the growing branches, which slowly dry and persist for a time. He has also described the lip as less distinctly 3-lobed and sparingly bearded towards the base. The lip is rhomboid and entire, when spread out with 3 irregularly fimbriate lamellae along half the length, on the dorsal surface.

Flowering : December-January, *Fruiting* : August.

Vajravelu 46401 & 47206, rare, Veerakkalai forest—Parali, alt. ca 550 m.

2. APHYLLORCHIS Blume

Aphyllorchis montana Reichb. f. in Linnaea 41 : 57. 1876; Hook. f. Fl. Brit. Ind. 6 : 116, 1890; King & Pantl. in Ann. Roy. Bot. Gard. Cal. 8 : 262. t. 349. 1898; Fischer in Fl. Pres. Madras 1457. 1928 (Repr. ed. 3 : 1019. 1957), Seidenf. in Bot. Tidskr. 70 : 69. 1975. *A. prainii* Hook. f., Fl. Brit. Ind. 6 : 117. 1890 & Icon. pl. t. 2192. 1894; Vajr. & Rathakr. in Bull. Bot. Surv. Ind. 10 : 97. 1968. **Pl. 5. Fig. 2.**

Tall slender saprophytic leafless herbs, 47-70 cm long with only flowering shoots. *Inflorescence* a raceme, lax-flowered, with long scape, covered by many sheathing tubular bracts. *Flowers* pinkish yellow. *Bracts* 0.7-1.0 x 1.5-3.0 mm, linear-lanceolate, acute, shorter than the ovary, deflexed. *Ovary* with pedicel ca 2 cm long, slender. *Dorsal sepal* 10.0-12.0 x 3.0-3.5 mm, linear-oblong obtuse,

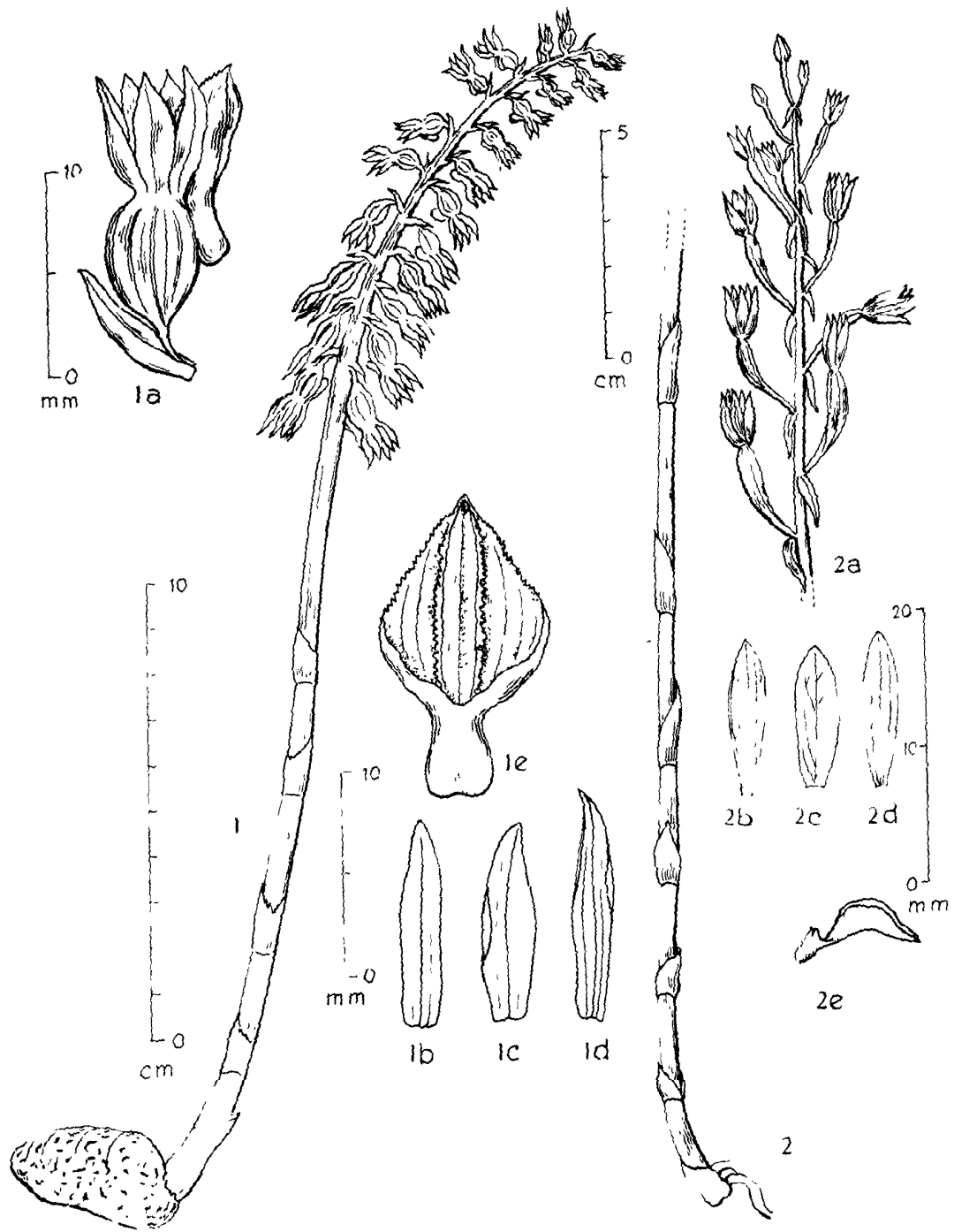


PLATE 5

Fig. 1. *Epipogium roseum* (D. Don) Lindl. Habit; a. flower; b. Dorsel sepal; c. Lateral petal; d. Lateral sepal; e. Lip spread out.

Fig. 2. *Aphyllorchis montana* Reichb. f. Habit; 2.a. Detached inflorescence; b. Dorsel sepal; c. Lateral petal; d. Lateral sepal; e. Lip (side view).

concave. *Lateral sepals* ca 10.0 × 2.5 mm, linear-oblong, obtuse, more or less concave, keeled or not. *Lateral petals* 9.0-11.0 × 3.0-3.5 mm, oblong, obtuse. *Lip* ca 9 mm long, two winged at the base; terminal lobe much larger, abruptly cuneate at base, broadly ovate, obtuse at tip; basal wings triangular, acute, erect, parallel.

Flowering : August.

Lawson s.n. (MH Acc. No. 50720). Camp. Georg; Alt. 700-800 m.

In most floras *A. montana* and *A. prainii* are treated as distinct species mainly based on the presence or absence of the wings at the base of the lip. Gunnar Seidenfaden (*loc. cit.*) in his critical account of the species has shown these to be conspecific.

3. EPIPOGIUM melinex Borkh

This genus has a very limited number of species in India, distributed in tropical Himalayas and in the South Indian Hills.

Van Leeuwen, (*Blumea* suppl. 1 : 57-65. 1937) in an account of the life history of this curious orchid has pointed out that the fleshy inflorescence lasts only for a few days, and within this short period the dispersal of the seeds takes place and the aerial portion rapidly decays and disappears. Hence, its collection is difficult and there is poor representation in the regional herbaria.

Epipogium roseum (D. Don) Lindl., J. Linn. Soc. 1 : 177. 1857; Sant. & Kapad., orch. Bombay 237. 1966; Seidenf. in Dansk Bot. Ark. 32(2) : 171. 1978. *Limodorum roseum* D. Don, Prodr. Fl. Nepal. 30. 1825. *Galera nutans* Bl.) Bijdr. 415. t. 3. 1825 *Epipogon nutans* (Bl.), Reichb. f., Bonplandia 5 : 36. 1857; Hook. f., Fl. Brit. Ind. 6 : 124. 1890; King & Pantl., in Ann. Roy. Bot. Gard. Cal. 8 : 253. t. 335. 1898; Fischer in Fl. Pres. Madras 1460. 1928 (Repr. ed. 3 : 1021. 1957). *Podanthera pallida* Wight. Ic. 5(1) : 22. t. 1759. 1851.

Pl.5 Fig.1.

Leafless saprophytic, tuberous herbs. *Tubers* oblong-ovoid, wrinkled. *Inflorescence* stout racemes, fleshy, white, erect, 17-27 cm long, with sheaths at intervals. *Flowers* white, maroon blotched, pendulous, with the very conspicuous ovary. *Bracts* 7-10 × 3-4 mm, lanceolate, acute hyaline, shorter than the ovary. *Pedicel* ca 3 mm long. *Sepals* and *petals* hyaline, not much spreading. *Dorsal sepal* 7.0-9.0 × 1.5-2.0 mm, linear, acute, faintly 3-nerved. *Lateral sepals* 6.5-11.0 × 1.0-1.5 mm, linear, obtuse, 3-nerved. *Lateral petals* 6.5-9.5 × 2.0-2.5 mm, linear-oblong, obtuse, 3-nerved. *Lip* 10-14 mm long with spur, entire broadly lanceolate-ovate, concave, with erect side margins and short apiculum having a small dorsal oblong swelling on it; margins irregularly erose beyond the base. There are 2 crested lamellae one on each side of the median nerve. *Spur* 3- mm long, scrotiform, adhering to the ovary.

Flowering : January.

Beddome s.n. (MH Acc. No. 51068), Ellis, 37746, Ouchterlony Valley : Alt ca 910 m.

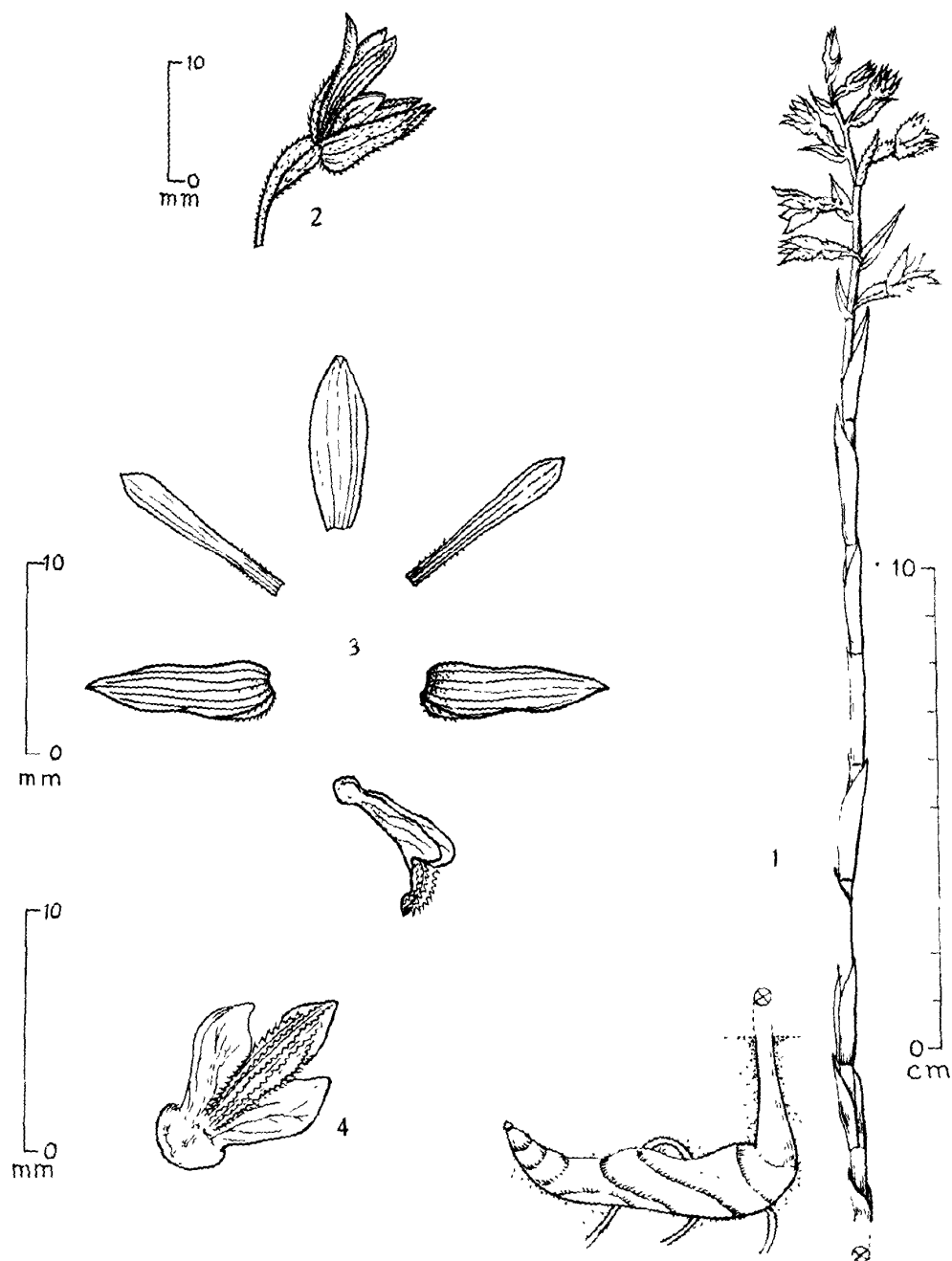


PLATE 6

Pachystoma pubescens Bl. 1. Habit (with detached rhizome), 2. Flower (side view), 3. Sepals, petals and lip (side view); 4. Lip spread out.

4. PACHYSTOMA Blume

Pachystoma pubescens Bl., Bijdr. 6: t.f. 29. 1825. *Apturia senile* Lindl., Gen. Sp. Orch 130. 1831. *Pachystoma senile* (Lindl.) Reichb.f. in Bonplandia 3 : 251. 1855; Hook.f., Fl. Brit. Ind. 5 : 812. 1890; King & Pantl. in Ann. Roy. Bot. Gard. Cal. 8 : 101. t. 140. 1898; Fischer in Fl. Pres. Madras 1426. 1928 (Repr.ed. 3 : 997 1957); Sant. & Kapad., Orch. Bombay 191.t.46.1966.

Pl.6. Figs.1-4.

Tuberous terrestrial herbs. *Rhizome* ca 7.0 × 0.7 cm, horizontal, subcylindric, leafless, while flowering, with only a simple raceme, 30-35 cm high. *Leaves* appearing after flowering, 1 or 2, grass like. *Flowers* subsecund, dull purplish or pinkish, glandular puberulous. *Bracts* very long 1.2-2.5 × 0.2-0.3 cm. lanceolate, acuminate. *Ovary* and *pedicel* ca 11.5 mm long, glandular pubescent. *Sepals* and *petals* spreading; sepals densely pubescent without, and sparsely so within. *Dorsal sepal* 10.5-13.0 × 0.3-0.4 mm, oblong, abruptly toothed at tip, 5-nerved. *Lateral sepal* 11.0-13.0 × 0.3-0.4 mm, weakly cohering along the lower margins, porrect, subsaccate at base, lanceolate, oblique and mucronate at tip. *Lateral petals* 11.0-14.0 × ca 2 mm, much narrower than the sepals, appressed to and subequal with the dorsal sepal, spathulate, more or less beaked at tip, sparsely pubescent, especially towards the base without and along the margins, glabrous within. *Lip* 10-12 mm long, trilobed, saccate at base; sac with a median thickening, proximal rim clad with hairs; sidelobes erect, oblong, obtuse; terminal-lobe oblong-orbicular, 5-lamellate; lamella thick crested, the marginal ones beset with short hairs. *Column* without foot, 6 mm long, dilated at apex, puberulous.

Flowering: October.

Lawson s.n. (MH Acc. No. 50331), Pykara falls; Alt. ca 1000 m.

5. NERVILIA Comm. ex Gaud.

Raceme many-flowered; lip triobed; leaf broadly ovate, held high up from the ground broadly ovate, held high up from the ground with a long petiole (ca 14 cm) ...

N. aragoana

Raceme 1-3-flowered; lip entire or shallowly lobed; leaf orbicular, short petiolate, flat on the ground ...

N. plicata

Nervilia aragoana Gaud. in Freycinet, Voy. Bot. 422. t. 35. 1829; Fischer in Fl. Pres. Madras 1459. 1928 (Repr.ed. 3 : 1020. 1957); Sant. & Kapad., Orch. Bombay 134. 1966; Seidenf. in Dansk Bot. Ark. 32(2) : 164. 1978. *Pogonia flabelliformis* Lindl., Gen. & Sp. Orch. 415. 1840; Hook.f., Fl. Brit. Ind. 6 : 121. 1890. *P. carinata* Lindl., l.c. 144. 1840; Wight, l.c. 5(1) : 15. t. 1720. 1851; Hook., f., l.c. *P. scottii* Reichb.f., Flora 55, 18 : 276. 1872; Hook.f., l.c. King & Pantl. in Ann. Roy. Bot. Gard. Cal. 8 : 269. t. 360. 1898. Pl.7. Figs. 1-3.

Small tuberous herbs. *Tubers* globose, 1.0-2.0 cm across. *Leaf* appears after flowering, solitary, long-petioled; *petioles* 13.0-16.7 cm; *lamina* 5.0-7.0 × 5.7-6.7 cm, broadly ovate, cordate at base, abruptly caudate at tip, with obscurely undulate margin, glabrous. *Inflorescence* raceme 10-30 cm long, few

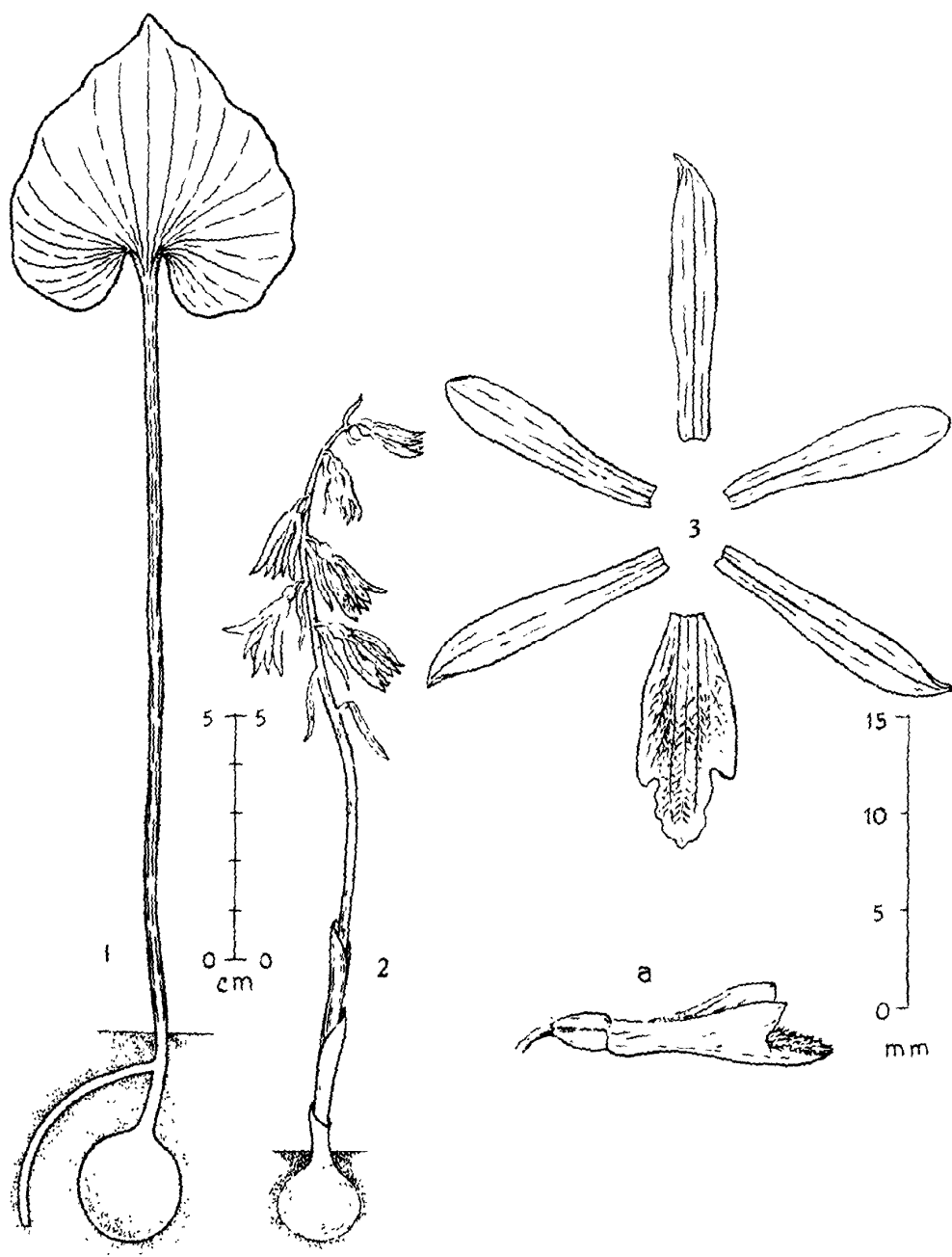


PLATE 7

Nervila aragoona Gaud. 1. Habit (Vegetative); 2. Inflorescence; 3. Sepals, Petals and lip; 3a. Lip with ovary (side view).

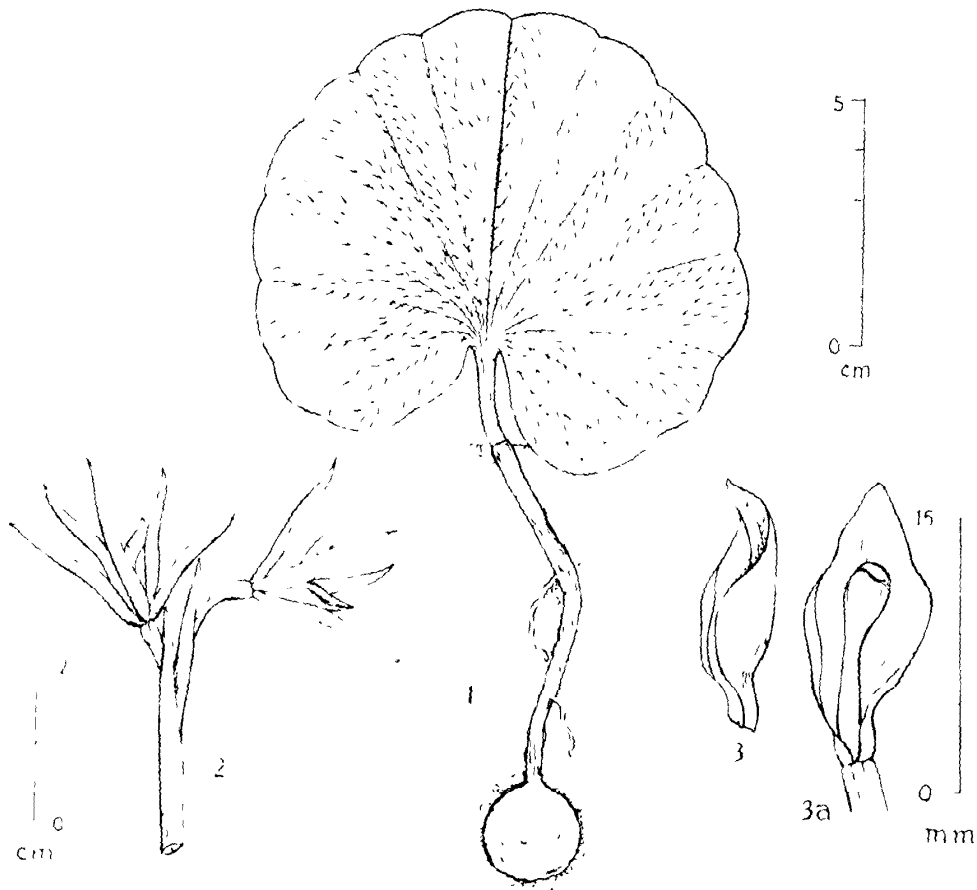


PLATE 8

Nervilia plicata (Andr.) Schltr. 1. Habit (Vegetative); 2. Inflorescence; 3 Lip (Side view);
3a Lip spread out, with column.

to many-flowered, lax. *Flowers* green, pendulous, 20-24 mm long. *Bracts* 9-17 × 1.0-1.5 mm, deflexed, linear lanceolate, acute, 3-nerved. *Ovary* with pedicel *ca* 6 mm long (pedicel *ca* 3 mm). *Sepals* subequal, linear, acute, 3-nerved, median nerve keeled on the dorsal side. *Dorsal sepal* 14.5-16.0 × 2.0-2.5 mm. *Lateral sepals* 14.0-17.0 × 2.0-2.5 mm. *Lateral petals* 12.5-14.0 × 2.0-2.5 mm, linear-narrowly oblanceolate, obtuse, 3-nerved. *Lip* 12-13 mm long, *ca* 5 mm broad across the sidelobes, obovate in general outline, trilobed; sidelobes erect *ca* 9 mm long, embracing the column, obtuse; midlobe ovate, *ca* 4 × 3 mm obtuse, crenulate at margins, densely pubescent along the nerves on the upper side. *Column* *ca* 7 mm long, dilated towards the tip.

Flowering : May-June. *Leaves* ; Octobr.

Vivekananthan 43089 A, Birla, Way to Thorapalli ; Alt. *ca* 850 m.

N. plicata (Andr.) Schltr., Engl. Bot. Jahrb. 45 : 403. 1911; Seidenf. in Dansk Bot. Ark. 32 (2) : 156. 1978. *Arethusa plicata* Andr. Bot. Rep. 5 : t. 321. 1803. *Cordyla discolor* Bl., Bijdr. 417. 1825. *Pogonia discolor* (Bl.) Bl., Mus. Bot. Ludg. Bat. 1 : 32. 1849; Hook.f. in Bot. Mag. 100 : t. 6125. 1874. *Nervilia discolor* (Bl.) Schltr., Engl. Bot. Jahrb. 45 : 403, 1911; Sant. & Kapad. Orch. Bombay 131. t. 32. 1966. *Pogonia biflora* Wight, l.c. 5 (1) : 22. t. 1758. 1851; Hook.f., El. Brit. Ind. 6 : 119. 1890. *Nervilia biflora* (Wight) Schltr., l.c.; Fischer in Fl. Pres. Madras 1459. 1928 (Repr.ed. 3 : 1020.1957)

Pl.8. Figs. 1-3.

Tuberous herbs with a leaf lying flat on the ground : leafless during flowering. *Tuber* globose, 8-20 mm across. *Stolon* 7.0-8.5 cm long with a few roots. *Leaf* orbicular, up to 13 cm broad, sessile, cordate, entire to broadly denatate at margin; upper surface dull or yellowish green with dark purple blotches and with white setaceous hairs all over and along the radiating veins; lower surface paler, with the blotches more light purplish, and sparsely hairy. *Inflorescence* raceme, 2 or 3-flowered. *Scape* white, 11-12 cm long, with 2-3 sheaths. Flowers erect or suberect, creamy white with lip having violet streaks. *Bracts* 3-8 × 1-4 mm, ovate-lanceolate to subulate acute, entire or faintly toothed at the apex. *Sepals* and *petals* spreading, oblong-lanceolate, acute, shortly acuminate, glabrous, sparsely gland-dotted. *Sepals* *ca* 20 × 4 mm, mid-nerve prominent below. *Lateral petals* shorter and narrower than sepal. *Lip* 15 × 10 mm, entire, side margin covering the column and widening beyond it, but not reflexed; tip broadly rounded or slightly cleft obovate-oblong or nearly elliptical, embracing the column, the midrib thickened and callus like for more than half its length, the base slightly saccate. *Column* 10-12 × 4-5 mm, erect, sigmoidally curved, clavate at the apex, shallowly grooved in front.

Sharma 35515; *Vivekananthan* 43089B. Northern Hay R.F. & Mudumalai, Alt *ca* 950 m.

6. EULOPHIA R. Br. ex Lindl.

- 1a) Pseudobulb elongate, fusiform; leaves 2, spur didymous; lip with a forked callus at the base near the mouth of the spur

E. pulchra

- 1b Pseudobulb short, conical; leaves none when in flower or 3-many, spur otherwise; callus absent
- 2a Leafless when flowering; leaves only 3 or 4, broadly elliptic; foot of the column long, forked, the rim of the conical spur ... *E. nuda*
- 2b Leafy when flowering; leaves many, linear, grass like, long; column without foot, spur vermiform ... *E. epidendracea*

Eulophia pulchra (Thou.) Lindl., Gen. & Sp. Orch. 182. 1833. *Limodorum pulchrum* Thou., Orch. Iles. Austr. Afr. Pls. 43, 44. 1822. *Eulophia macrostachya* Lindl., Gen. & Sp. Orch. 183. 1833; Wight, Ic. 5(1) : 8. t. 1667-68. 1851; Hook. f., Fl. Brit. Ind. 6 : 4. 1890; Fischer in Fl. Pres. Madras 435. 1928 (Repr. ed. 3 : 1003. 1957). **Pl. 9. Figs. 1-5.**

Pseudobulbs two leaved, plurinodal, erect, green, 9.0-13.0 × 1.5-2.0 cm, caespitose, nodes with persistent dried sheath fibres. *Roots* many, white, fleshy or spngy. *Leaves* two, terminal, 21.5-26.0 × 5.8-6.0 cm, oblong, broadly elliptic, acute-acuminate, prominently 3-nerved, tapering at base, petiole 4.5-6.5 cm long, narrowed into clasping, sheathing base. *Inflorescence* long racemes, erect, longer than the leaves, ca 48 cm, arising from the base of the pseudobulb, with a few sterile bracts. *Peduncle* pale pink towards the base and greenish above. *Flowers* greenish yellow with pinkish striations, alternate, sometimes appear to be opposite, 1.1 × 0.8 cm. *Bracts* 6.0-8.0 × 1.0-1.5 mm, linear-lanceolate. *Ovary* with pedicel ca 1.0-1.2 cm. *Sepals* subequal, green outside, greenish yellow inside. *Dorsal sepal* 11.0-12.5 × 2.7-3.0 mm, linear mm, linear abruptly acuminate at tip, 3-nerved, narrower than the lateral sepals and petals. *Lateral sepals* 11-12 × ca 4 mm, oblong, abruptly acuminate at tip, 3-nerved, deflexed, narrower than lateral petals. *Lateral petals* ca 12.0 × 4.5 mm, oblong-elliptic, subacuminate at tip, 3-nerved, green outside, greenish yellow with pinkish streaks inside, broader than sepals. *Lip* 11 × 15 mm, trilobed; lateral lobes large, erect, auricular; midlobe trilobulate, with conspicuous lateral lobules and obscure midlobule, with shallow sinus in the centre lateral lobules erect, ovate, obtuse, midlobule narrow, more or less reflexed, especially at the middle, retuse, crenulate. There is a forked projecting white callus at the mouth of the spur at the anterior rim and a median ridge on the dorsal side of the lip. *Spur* conspicuous, ca 2 × 3 mm, scrotiform, constricted at mouth, medianly grooved externally with glistening globular glands and median grooved ridge within. *Anther* Terminal, two, with slight cleft at base, caudicle short and elastic. *Pollinia* 2, pyriform, orpusculum forked.

Flowering: June

Varjavelu 45067 Manar river side—Parali; Alt. 600 m.

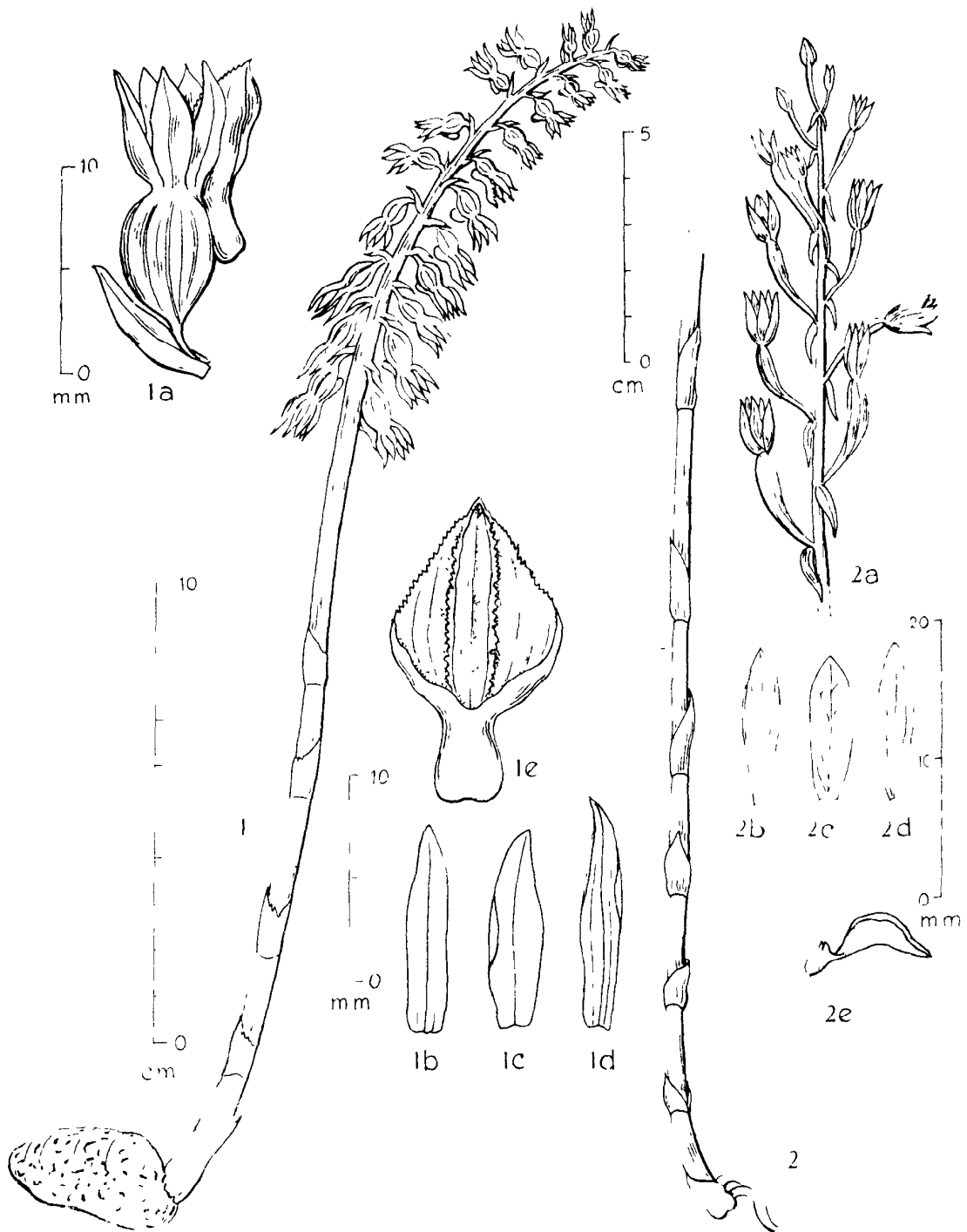


PLATE 5

Fig. 1. *Epipogium roseum* (D. Don) Lindl. Habit; a. flower; b. Dorsel sepal; c. Lateral petal; d. Lateral sepal; e. Lip spread out.

Fig. 2. *Aphyllorchis montana* Reichb. f. Habit; 2.a. Detached inflorescence; b. Dorsel sepal; c. Lateral petal; d. Lateral sepal; e. Lip (side view).

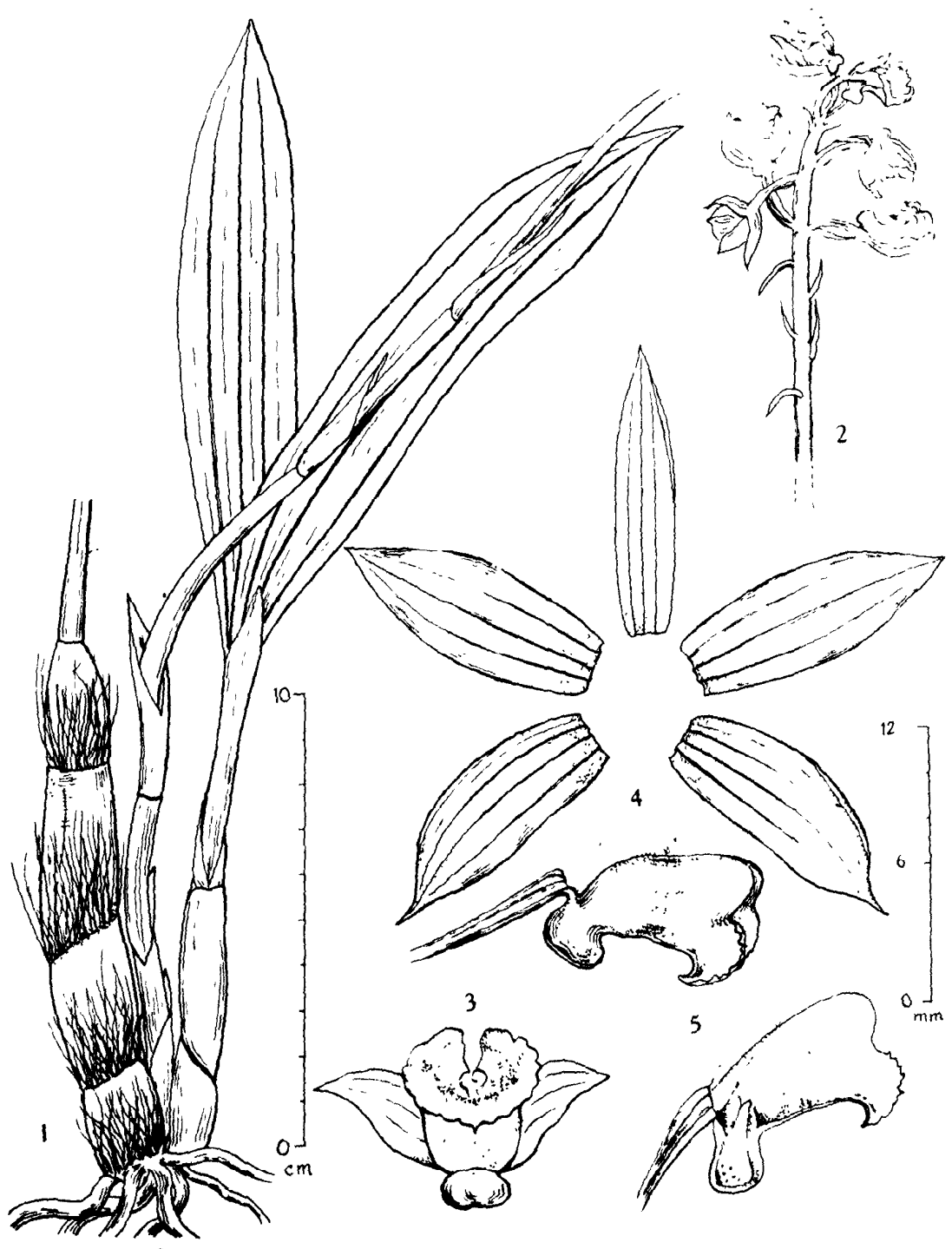


PLATE 9

Fig. 1-5. *Eulophia pulchra* (Thou.) Lindl. 1. Habit; 2. Part of inflorescence; 3 Flower (front view); 4. Sepals, petals and lip with ovary (lateral view); 5. Longitudinal section of lip (with ovary)

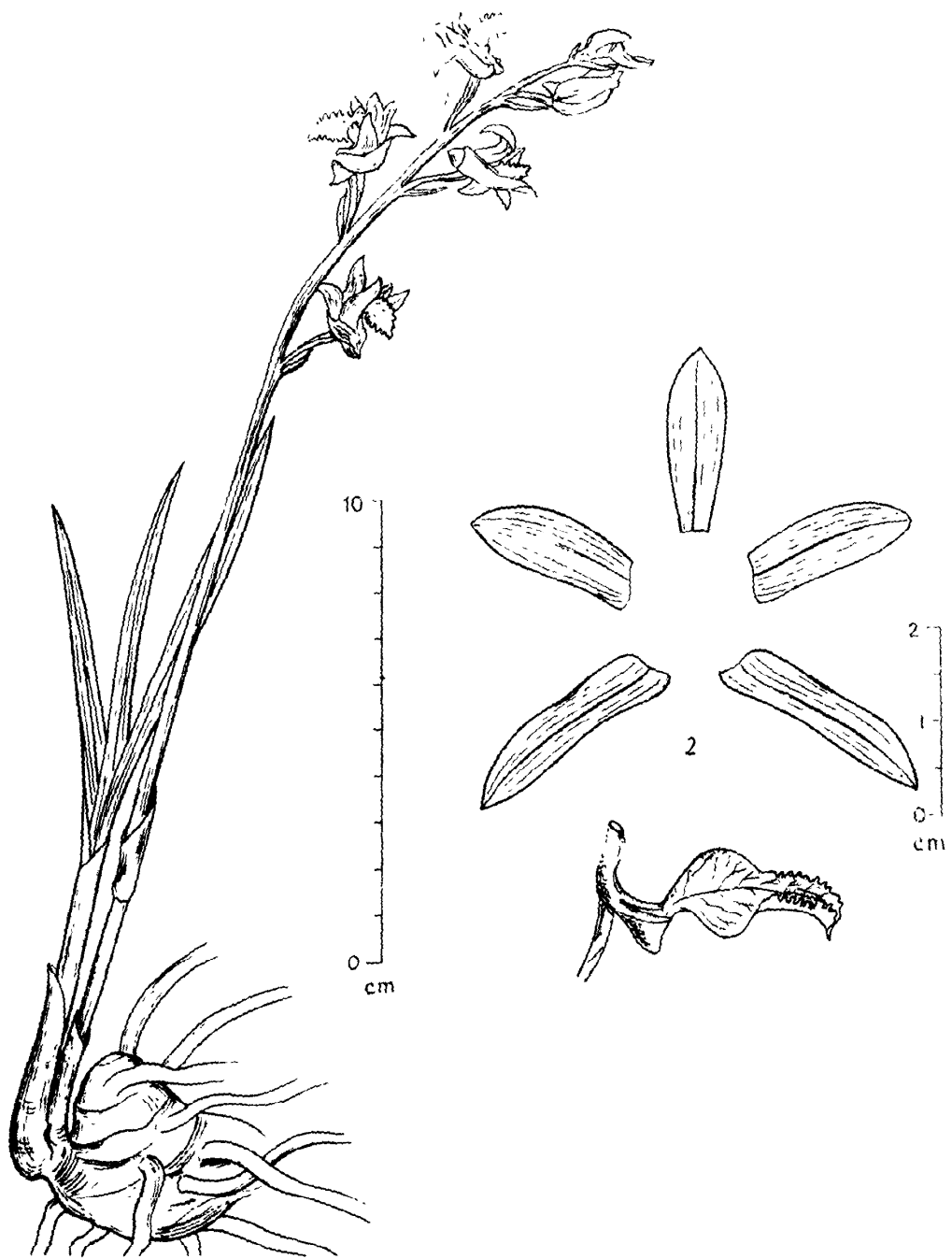


PLATE 10

Fig. 1-2. *Eulophia nuda* Lindl. 1. Habit; 2. Sepals, petals and lip with ovary and column.



PLATE 11

Fig. 1-3. *Eulophia epidendreae* (Koenig) Schltr. 1. Habit ; 2. Part of inflorescence, 3. Sepals, Petals and lip with ovary (lateral view).

2. *E. nuda* Lindl., Gen. Sp. Orch. 180. 1833; Hook. f., Fl. Brit. Ind. 6 : 5. 1890 and in Ann. Roy. Bot. Gard. Cal. 5 : 32. t. 47. 1895; King & Pantl. Ann. Roy. Bot. Gard. Cal. 8 : 180. t. 243. 1898; Fyson, Fl. Nilgiri & Pulney Hill-tops 1 : 393. 1915 & 3 : t. 514. 1920; Fischer in Fl. Pres. Madras 1435. 1928 (Repr. ed. 3 : 1003. 1957); Sant. & Kapad. Orch. Bombay 115. 1966. *Cyrtopera fusca* Wight, Ic. 5(1) : 11. t. 1690. 1851. **Pl. 10. Figs. 1-2.**

Terrestrial herbs with creeping underground (hypogean) tubers. *Tubers* ca 8 × 5 cm, spherical or horizontally oblong with transverse ridges and with many thick roots. *Leaves* alternate (appearing after the production of inflorescence) distichous, broad elliptic, acute-acuminate, ca 50 × 9 cm. *Inflorescence* arises from the sides of the pseudostem, 29-70 cm long, scape terete, stout covered by sheathing bracts. *Flowers* greenish white. *Bracts* 1.0-2.5 × 0.3-0.4 cm, lanceolate, acuminate. Ovary with pedicel ca 2.5 cm. *Dorsal sepal* ca 20.0 × 5.5 mm, oblanceolate, acute, 7-nerved. *Lateral sepals* ca 24 × 6 mm, falcate, acute, 7-nerved, completely attached to the foot of the column. *Lateral petals* 17-18 × ca 6 mm, oblong, oblique at base, obtuse, many nerved, partially attached to the foot of the column. *Column* produced into a forked foot, to which are attached lip and the saccate spur. *Lip* ca 19 × 10-13 mm, trilobed, midlobe of the lip, oblong-obovate, more or less reflexed, crisped at margins, multilamellate on the dorsal side; sidelobes erect, auricular. *Spur* conical, in continuation with the lip, and the forked foot forming the rim of the sides.

Hooker established four varieties (in Ann. Roy. Gard. Cal. 5 : 32. t. 47. 1895) based on size and colour variations of the flower.

Flowering: May & July.

Beddome s. n. (MH Acc. No. 51065) Carcoor Ghat; *Lawson s. n.* (MH Acc. No. 50467) Naduvattam; 50468 Coonoor; 50469 Kundha; Alt. 700-950. m.

3. *E. epidendrea* (Koenig) Schltr., Die Orchideen 346. 1915; Fischer in Bull. Misc. Inform. 1928 : 283. 1928 & in Fl. Pres. Madras 1434. 1928 (Repr. ed.) 3 : 1003. 1957) *Serapias epidendracea* Koenig in Retz., Obs. Bot. 6 : 65. 1791. *Limodorum virens* Roxb., Pl. Corom. t. 38. 1795. *Eulophia virens* (Roxb.) R. Br. ex Lindl., Bot. Reg. 7 : subt. 573. 1821; Wight, Ic. 3(1) : 10. t. 913. 1845; Hook. f., Fl. Brit. Ind. 6 : 1. 1890. **Pl. 11. Figs. 1-3.**

Terrestrial herbs, pseudobulbs (epigeal) ovoid-conical with narrow rings. Fresh ones covered by sheaths, older ones naked with sheath fibres. *Leaves* 20-60 × 1.0-2.5 cm, alternate, distichous, linear, acuminate, sheathing at base. *Inflorescence* raceme, 80-210 cm, arise from the sides of the bulb, flexuous, many flowered, lax; scape 54-75 cm long, with sheathing sterile bracts. *Flowers* ca 3.5 cm across, green with pink veins. *Bracts* ca 8 × 5 mm, ovate-lanceolate, acute. Ovary pedicel with ca 1.5 cm. *Sepals* ca 21.0 × 6.5 mm,

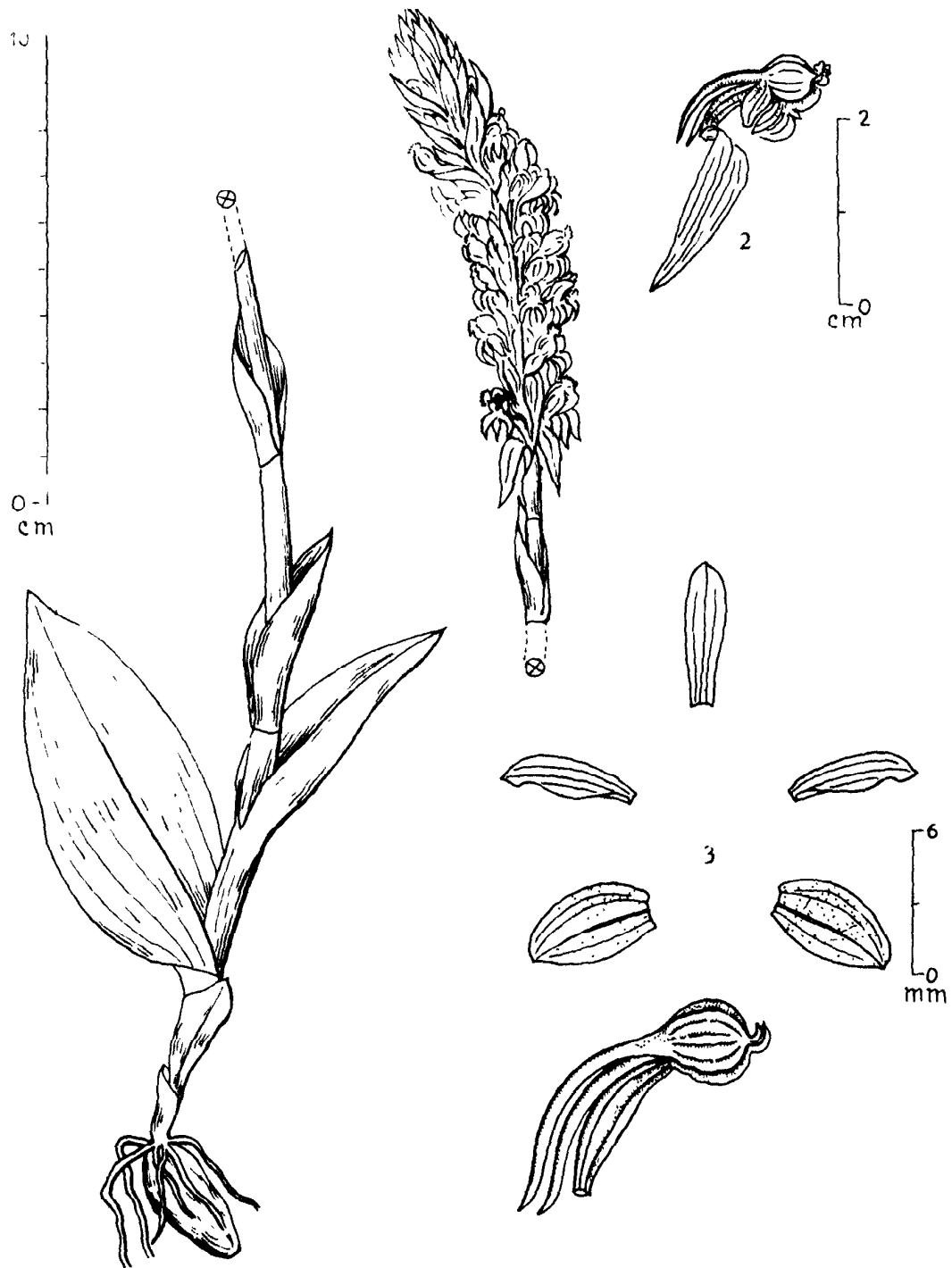


PLATE 12

Fig. 1-3. *Satyrium nepalense* 1. Habit, 2. Flower (with a bract) 3. Sepals, Petals and lip with ovary

oblanceolate, acute, recurved towards the apex. *Lateral petals* ca 19×8 mm, obovate-oblanceolate, acute, recurved towards the apex. *Lip* 17×13 mm, trilobed, trumpet-shaped, green towards the base, white towards the tip, obovate-oblong in outline, with three erect longitudinal ridges, margins of the ridges entire at the proximal end and crenulate-pectinate at the distal end. There are two more short lateral ridges at the distal end; sidelobes erect, with overlapping margins above the column; midlobe emarginate at tip; margins incurved, pink-streaked along the sides within and along the ridges. *Spur* ca 4 mm long, vermiform.

Flowering: October-March.

Often found in rock crevices in humus heaps. Can be successfully cultivated in green houses; produce very long inflorescence of two or more m. length.

Barber 6556, Kallar; Alt. 100-700 m.

7. SATYRIUM SW.

An African genus enjoying a wide distribution both in Himalayas & South Indian hills between altitudes of 1000-3000 m. by a single species which exhibits marked variations in the size of plants, in the shades of colour of flowers—from white to dark pink, in the degree of congestion of flowers, in the size of sepals and petals and in the length and thickness of spurs. Presence of twin spurs of the lip held on the dorsal side at once separates this from other terrestrial orchids.

Satyrium nepalense D. Don, Prodr. Fl. Nepal. 26. 1825; Wight, Ic. 3(2) : 12. t. 929. 1844; Hook. f., Fl. Brit. Ind. 6 : 168. 1890; King & Pantl. in Ann. Roy. Bot. Gard. Cal. 8 : 338. t. 444. 1898; Fischer in Fl. Pres. Madras 1435. 1928 (Repr. ed. 3 : 1032. 1957); Fyson, Fl. Nilgiri & Pulney Hill-tops I : 406. 1915 & 3 : 113. t. 526. 1920. *S. perrottetianum* A. Rich. in Ann. Sci. Nat. Ser. 2. 15 : 76. t. 53. 1841; Wight, Ic. 5(1) : 14. t. 1716. 1852. *S. albiflorum* A. Rich in Ann. Sci. Nat. Ser. 2. 15 : 76. 1841; Wight, Ic. 5(1) : 15. t. 1717. 1852. *S. pallidum* A. Rich in Ann. Sci. Nat. Ser. 2. 15 : 77. 1841.

Pl. 12. Figs. 1-3.

Tuberous, terrestrial herbs, 17-53 cm high with inflorescence. *Tubers* one or two, ovoid-oblong, $2.5-4.0 \times 0.7-1.2$ cm. *Stem* short with one or two sheaths below. *Leaves* 2, rarely more, subradical, oblong, ovate-lanceolate, fleshy, often complicate, sheathing at base, obtuse-acute, $4.0-16.5 \times 1.1-6.7$ cm. *Inflorescence* terminal, 10-30 cm long, dense. *Scape* covered by large foliaceous bracts, progressively smaller upwards. *Flowers* pink, fragrant, non-resupinate. *Bracts* longer than ovary, foliaceous, deflexed, ca 1.9×0.5 cm. *Ovary* ca 7 mm long with pedicel. *Perianth* reflexed over the ovary. *Dorsal sepal* ca 6.0×1.5 mm, oblanceolate-spathulate, obtuse. *Lateral sepals* ca $5.5 \times 2.5-3.0$ mm, oblong, thick, acute with a prominent submedian longitudinal nerve, pellucid gland dotted. *Lateral petals* ca 5.5×1.2 mm, as long as lateral sepals, more or less

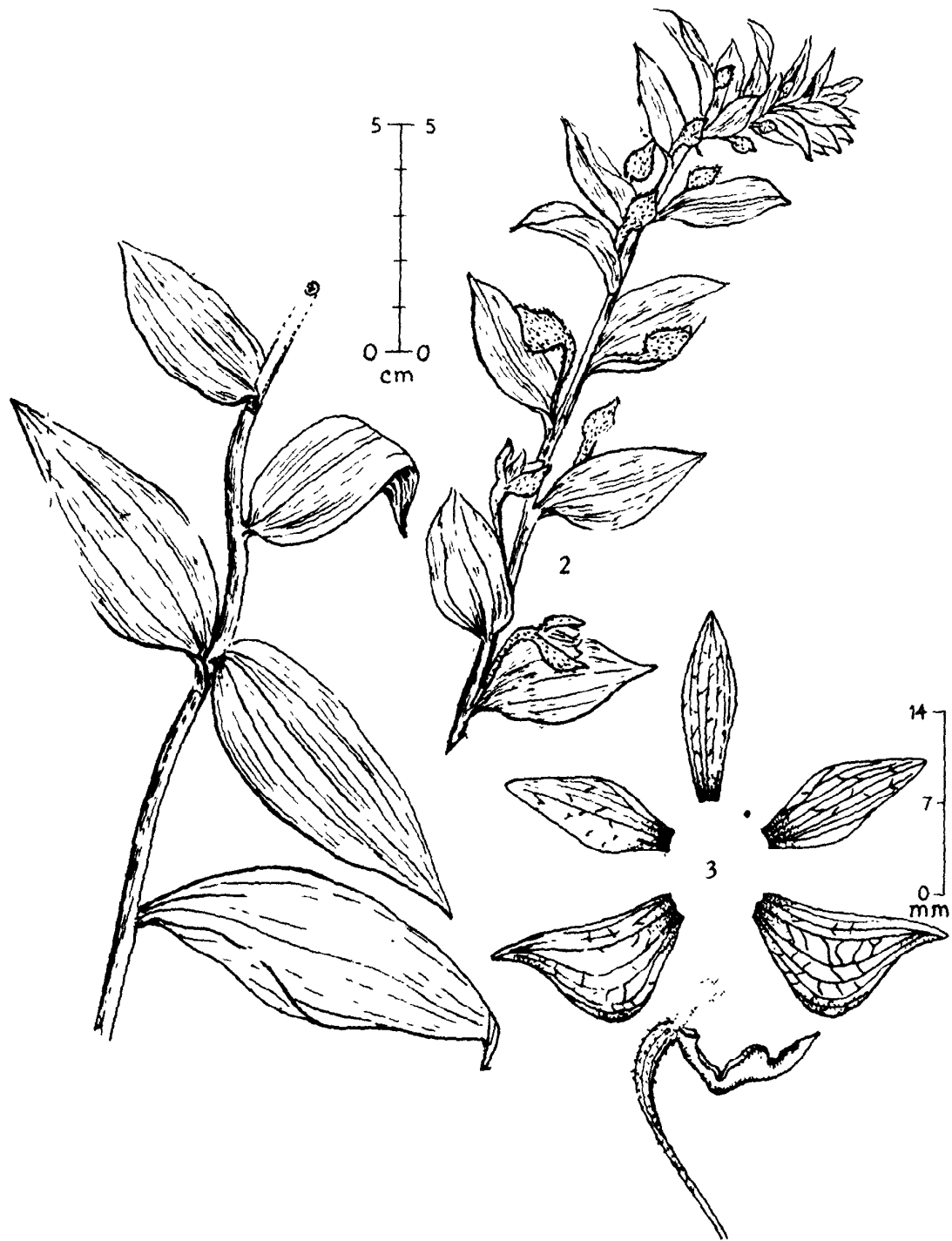


PLATE 13

Fig. 1-3. *Epipactis veratrifolia* Boiss. 1. Part of stem; 2. Flowering portion of stem; 3. Sepals, Petals and Lip with ovary.



PLATE 14

Fig. 1-2. and a-f. *Acanthephippium bicolor* Lindl. 1. Habit (not to scale); 2. Old pseudobulb with young shoot bearing inflorescence; a. Dorsal Sepal; b. Lateral petal; c. Lateral sepal with column and foot; d. Lip (side view); e. Anther; f. Pollinia (in two groups).

twisted at the mouth of the lip, narrowly lanceolate, obtuse, 3-nerved, median nerve keeled. *Lip* very conspicuous, globose, ca 4 mm across, hooded, held on the dorsal side with a narrow reflexed median rim and a prominent dorsal ridge without, 2-spurred. *Spur* 1.1 cm long, held closely over the ovary, filiform, longer than ovary.

Flowering & Fruiting: July–December.

Balakrishnan 88, *Biedie s.n.* (MH Acc. Nos. 50484, 51038, 51041); *Ellis* 34643, 43359; *Gamble* 15308; *King s.n.* (MH Acc. No. 50966); *Lawson s.n.* (Acc. Nos. 50767, 50967, 50969, 50987, 50995, 50997, 50998, 51000); *Narayana & Raju* 18465; *Narayanaswami* 4218, 4227; *Rangachari* 15557; *Sharma* 35840; *Subramanian* 10526, 10595; *Vajravelu* 43189; *Vivekanathan* 42971; *Wight s.n.* (MH Acc. Nos. 50989, 50991) Anon. (MH Acc. Nos. 51003, 51004), common; Ooty, Pykara, Thala Kundha, Naduvattam-Devarshola, Pakkasuralai, Lakkadi; Alt. 1500–2050 m.

8. EPIPACTIS Zinn

***Epipactis veratrifolia* Boiss. Diagn. Ser.I, 13 : 11. 1842; Rathakr. in Bull Bot. Surv. Ind. 13 : 3. 1971 (1973). *E. consimilis* Wall. ex Hook. f., Fl. Brit. Ind. 6 : 126. 1890, non D. Don (1825); Fischer in Fl. Pres. Madras 1460. 1928 (Repr. ed. 3 : 1021. 1957). Pl. 13. Figs. 1–3.**

Leafy, terrestrial orchids, 30–60 cm high, stem slender. *Leaves* sessile, opposite or alternate, elliptic-lanceolate, acute, shortly acuminate, plicate, 2.5–160 × 0.7–6.2 cm. The upper portion of the plant (transformed into flower bearing) with solitary flowers in the axil of reduced leaves. *Flowers* pale bluish grey, finely pubescent. Ovary with pedicel ca 1.9 cm long. Perianths with prominent nerves and cross nervules. *Dorsal sepal* ca 14 × 4 mm, lanceolate-elliptic, acute, concave, pubescent externally. *Lateral sepals* ca 14.0 × 7.5 mm, much broader than dorsal, obliquely ovate, acute, spreading, pubescent externally. *Lateral petals* ca 13 × 5 mm, ovate, obtuse. *Lip* ca 13 mm, almost as long as the sepals, but narrower, and constricted about the middle, the portion beyond the constriction is inflexed and trilobulate, side lobules erect, obtuse, midlobule lanceolate; basal portion narrower, margins more or less erect. *Pollinia* granular, dusty.

King & Pantling figures differ in that the leaves narrowly lanceolate, acuminate and the flowers in the axil of small bracts.

Flowering: February.

Lawson s.n. (MH, Acc. Nos. 50728, 50729), near Devarshola; Alt. 1300 m.

9. ACANTHEPHIPIUM Blume

***Acanthephippium bicolor* Lindl. in Bot. Reg. t. 1730. 1835; Hook. f. Fl. Brit. Ind. 5 : 815. 1890; Fischer in Fl. Pres. Madras 1426. 1928 (Repr. ed. 3 : 997. 1957). Pl. 14. Figs. 1 & 2, a-f.**

Tall terrestrial, leafy herbs, *ca* 1 metre high (46–90 cm). *Pseudobulbs* 7–17 cm, 1.5–5.0 cm across, long, stout, fleshy, pluriondal, narrowly conical with persisting sheathy scales or sheath fibres. *Leaves* 2 or 3, unequal in size, 23–55 × 6.0–11.5 cm, broadly elliptic, ovate-oblong, plicate, narrowed into a short or long petiole, acuminate at tip. Young shoot 10–18 cm long, slender, arising laterally from the base of the old pseudobulb with imbricating scales, bearing a solitary inflorescence laterally from the axil of the lower scale (develops gradually into a stout pseudobulbous plant). *Scales* 6–9, foliaceous, progressively larger, 2.4–6.3 × 1.5–3.0 cm, upper ones tubular, sheathing, grows along with the developing shoot and persisting on the pseudobulb. *Inflorescence* simple, short, one raceme of 3–7 flowers, lateral, from the axil of the scale, in the young shoot about the base, elongating with the developing offshoot. *Flowers* large, fleshy, yellowish white with pink dots, perianth not fully opening. *Bracts* foliaceous, 2.8–3.3 × 2–2.6 cm, cymbiform, ovate-lanceolate, acute. *Ovary* and *pedicel* indistinguishable, 3.5–4.0 cm long, thick, subcylindric, grooved, finely and sparsely puberulous. Perianth succulent, pink dotted about the middle. *Sepals* sparsely and finely puberulous or glabrescent within, obscurely and finely puberulous outside, 7-nerved. *Dorsal sepal* *ca* 3.2 × 1.7 cm, oblong, cohering with the lateral sepals along its margins except towards the rounded apex. *Lateral sepals* *ca* 4.6 × 2.0 cm, largest, obliquely oblong, attached to the foot of the column about half of its length or less and cohering with dorsal sepal to form a gibbous tube. *Lateral petals* *ca* 3.2 × 1.4 cm, subequal with sepals and hidden within the tube of sepals and appressed to them, oblong-lanceolate, abruptly narrowed into a short claw, sparsely puberulous within, 5-nerved. *Lip* *ca* 1.7 cm long, trilobed, much smaller than the perianth, held within the tube formed by sepals, hinged to the free end of the foot of the column, strongly reflexed about the middle, with 3 longitudinal ridges at the base; sidelobes 8 × 8 mm, erect, hatchet shaped; midlobe short, 9 × 8 mm, ligulate, reflexed, dilated towards the tip, thick, surface uneven, grooved. *Column* stout, *ca* 1.5 cm long, 0.7 cm across, subcylindric, narrowly winged at the margins towards the tip; produced into a long foot, inflexed from about the middle, *ca* 4.2 × 0.8 cm, flat, united with the lateral sepals about half of its length and free beyond. *Anther* 2 celled, pollinia 8 in two groups of 4 each, in each group 2 large and 2 small. Fruiting scape from about the middle of the pseudobulb, stout, 4–6 cm long; fruit long stalked, *ca* 8.6 cm long (stalk *ca* 3.2 cm long), ellipsoid, ridged.

Vegetatively it resembles *Calanthe* sp. but the production of inflorescence along with the fresh shoot, and the large gibbous flowers and the long, flat inflexed foot of the column, at once separate it from others.

Flowering : March.

Vajravelu 46263 (This could not be located in Nilgiris, though reported); Alt. *ca* 1,000 m.



PLATE 15

Fig. 1-5. *Corymborkis veratrifolia* (Reinw.) Bl. 1. Habit; 2. Young shoot; 3. Part of inflorescence; 4. Flower; 5. Lip (2-5, after K & P).

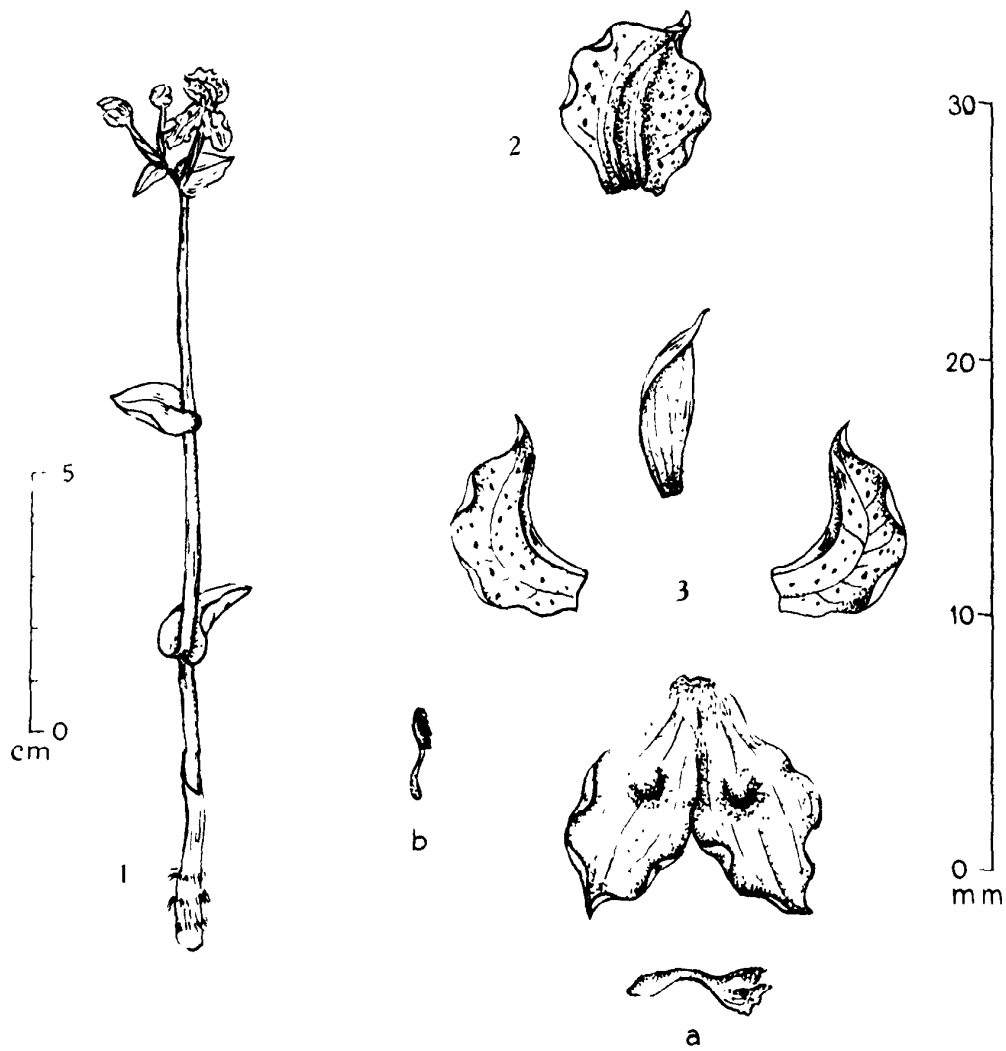


PLATE 16

Fig. 1-3. *Disperis neilgherrensis* Wt; 1. Habit; 2. Dorsal sepal and lateral petals forming a hood; 3. Sepals and lateral petals; a. Lip. b. Pollinia.

10. CORYMBORKIS Thou.

Corymborkis veratrifolia (Reinw.) Bl., Col. Orch. Arch. 125. pl. 42-43. 1859; Fischer in Fl. Pres. Madras 1452. 1928 (Repr. ed. 3 : 1015. 1957); Rasmussen in Bot. Tidsskr. 71(3-4) : 171. 1977. *Hysteria veratrifolia* Reinw., Nov. Pl. Ind. Gen.-Syll. Pl. Nov. 2 : 5. 1825-26. *Corymbis veratrifolia* (Reinw.) Reichb. f., Flora 48 : 184. 1865; Hook. f., Fl. Brit. Ind. 6 : 91. 1890; King & Pantl. In Ann. Roy. Bot. Gard. Cal. 8 : 274. t. 354. 1898

Pl. 15, Figs. 1-3.

Tall, rigid terrestrial leafy herbs. *Stem* 1-2 m high. *Leaves* broad, 30.0-37.0 × 5.8-9.7 cm, elliptic-lanceolate, caudate-acuminate, sessile on the long ridged sheaths, plaited. *Panicle* ca 10 cm long, few flowered, flowers greenish white, fragrant. *Bracts* ovate-lanceolate, shorter than the sessile ovary. *Sepals* linear-oblongate, acute, the upper half with inflexed edges. *Petals* like the sepals but flat and slightly shorter. *Lip* as long as the sepals, linear with the end expanded into an orbicular, apiculate recurved lobe, the edges finely erose and minutely undulate.

The description of the vegetative parts is of collections from the neighbourhood, but that of the flower is from available literature as the flowering material could not be collected.

11. DISPERSIS Sw.

About nine species are reported from all over Asia for this genus and original descriptions of these species overlap one another very much and as such interspecific distinctions are quite vague. The floral parts especially lip, column and anther are very peculiar and curious. Hence study of herbarium specimens hardly helps to know the distinctions and only critical study of live materials of different populations alone can help to re-establish the valid ones of this genus. There are only 2 species reported from South India and even their distinction are not quite convincing. Population study conducted in the field reveals marked intraspecific variations in the size of the individual plants, in the number of leaves, in the colour of flowers, etc.

Dispersis nellgherrensis Wight, Ic. 5(1) : 15. t. 1710. 1852; Hook. f., Fl. Brit. Ind. 6 : 169. 1890; Fyson, Fl. Nilgiri & Pulney Hill-tops. 1 : 407. 1915 & 3 : 114. t. 528. 1920; Fischer in Fl. Pres. Madras 1478. 1928 (Repr. ed. 3 : 1032. 1957). *D. zeylanica* Trim. in Journ. Bot. 23 : 245. 1885; Fyson Fl. Nilgiri & Pulney Hill tops 3 : 114. t. 527. 1920. Pl. 16 Figs. 1-3.

Terrestrial herbs, 10-25 cm tall. *Stem* slender, flaccid, with 1 or 2 sheaths at the base. *Leaves* 1 or 2, sessile, cordate, amplexicaul, acute, 0.5-3.5 × 0.3-2.5 cm. *Flowers* 2-4, terminal white with a pale purple tinge. *Bracts* 0.5-1.3 × 0.4-1.0 cm, vary in size, foliaceous, ovate, acute. *Ovary* ca 2 cm long. Dorsal

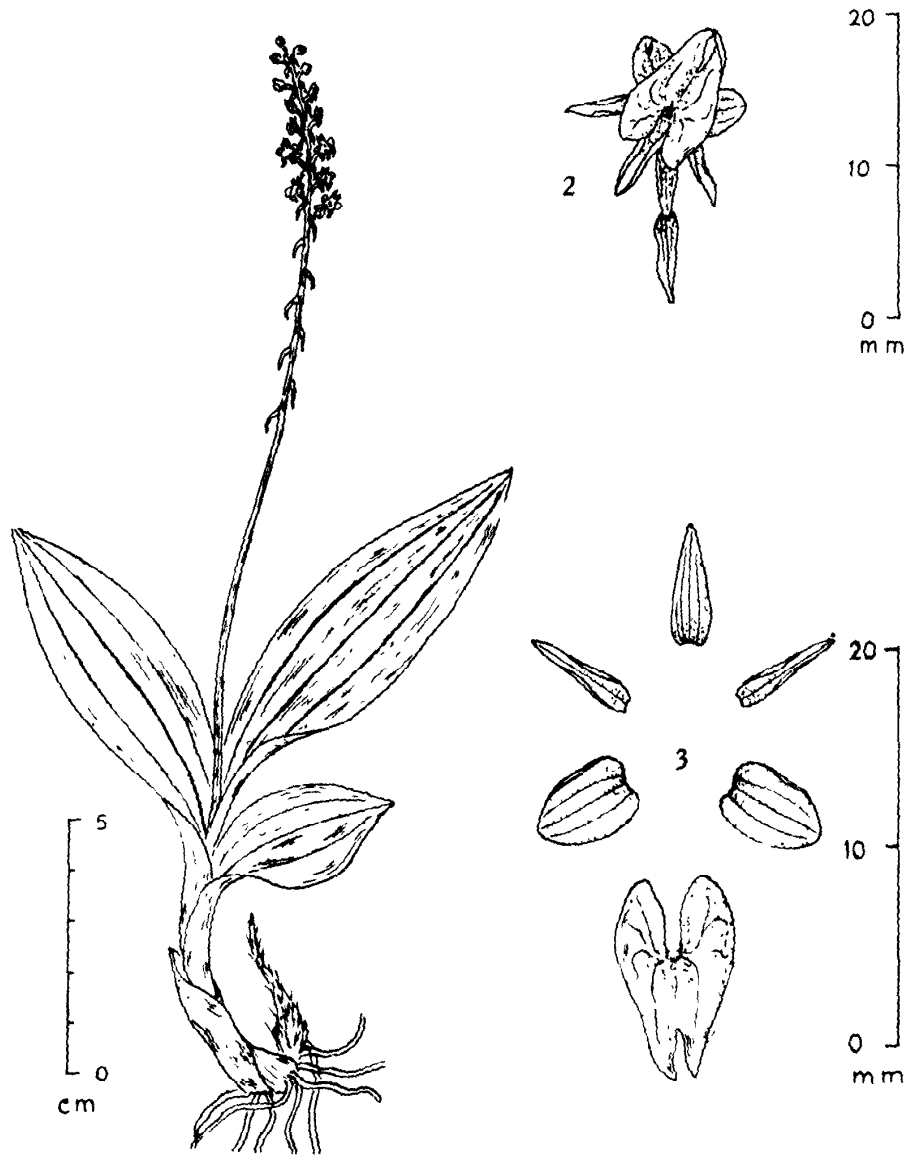


PLATE 17

Fig. 1-3. *Malaxis acuminata* D. Don 1. Habit; 2. Flower; 3. Sepals and petals including lip.

sepal and petals connate, forming a hood with pedicel. *Dorsal sepal* 7–9 × ca 2 mm, oblong-lanceolate, obtuse or acute, much narrower than petals. *Lateral sepals* 9.0–13.0 × 4.0–5.5 mm, obovate, obtuse, deflexed over the ovary, narrow and united at base with fovea, concave, finely pubescent at base, wavy at margins. *Lateral petals* ca 7.9 × 3 mm, semi-lunate, folded backward along one margin, broadly falcate, more or less incurved at tip, acute. *Lip* ca 5.5 mm, long, white without, purple veined and spotted within, trilobed, Y-shaped, lobes narrow, upper arms diverging, recurved or not, obtuse or truncate at tip, lower lobe of the lip dilated towards the tip, with or without mucronate apex or vermiform outgrowth on it or blunt at tip.

Flowering : May-August.

Barber 2046, 3472 (2); *Ellis* 34759, 38526; *Sharma* 35923; (MH Acc Nos. 51014, 51015, 51016, 51017). Fairly common; Naduvattam, Ooty, T.R. Bazaar Shola, Oucherlong valley; Alt. 1600–2000 m.

12. MALAXIS Soland. ex Sw.

- | | | |
|--|-----|-------------------------|
| 1a. Lip margins entire (deeply forked at apex) | ... | 1. <i>M. acuminata</i> |
| 1b. Lip margins toothed or pectinate | | |
| 2a. Plants large (ca 30 cm with inflorescence); lip dentate with a few teeth | ... | 2. <i>M. rheedii</i> |
| 2b. Plants small (up to 15 cm, often smaller); lip pectinate | | |
| 3a. Lip rhomboid | ... | 3. <i>M. densiflora</i> |
| 3b. Lip flabellate | | |
| 4a. Lip closely pectinate at margins | ... | 4. <i>M. intermedia</i> |
| 4b. Lip more or less irregularly crenulate | ... | 5. <i>M. crenulata</i> |

1. *Malaxis acuminata* D. Don, Prodr. Fl. Nep. 29. 1825. *Microstylis wallichii* Lindl., Gen & Sp. Orch. 20. 1830; King & Pantl. in Ann. Roy. Bot. Gard. Cal 8 : 16. t. 18. 1898; Fischer in Fl. Pres. Madras 1407. 1928 (Repr. ed. 3: 1985. 1957). **Pl. 17, Figs. 1–3**

Terrestrial herbs, more or less pseudobulbous at the base, new plant starting from the side of the mother plant which is decaying. Shoot with inflorescence 16–27 cm, basal portion covered by 1 or 2 sheathing bracts and bases of the leaves. *Leaves* 3 or 4, 5.0–12.0 × 1.3–3.7 cm, elliptic-lanceolate, acute, shortly acuminate, sheathing at base. *Inflorescence* terminal, 13.5–20.0 cm long, scape ridged, 8.5–16.0 cm long. *Flowers* dark pink, more or less crowded. *Bracts* ca 6.0 × 1.5 mm, lanceolate, acuminate, deflexed. *Ovary* with pedicel ca 7 mm. *Dorsal sepal* ca 6 × 2 mm, oblong-lanceolate, obtuse. *Lateral petals* 5.0 × 4.0 mm, ovate, obtuse. *Lateral petals* ca 5.5 × 1.2 mm, linear with revolute margins, obtuse. *Lip* ca 10 mm broad at the base, erect, sagittate, deeply forked at the tip, lobes acute-obtuse.

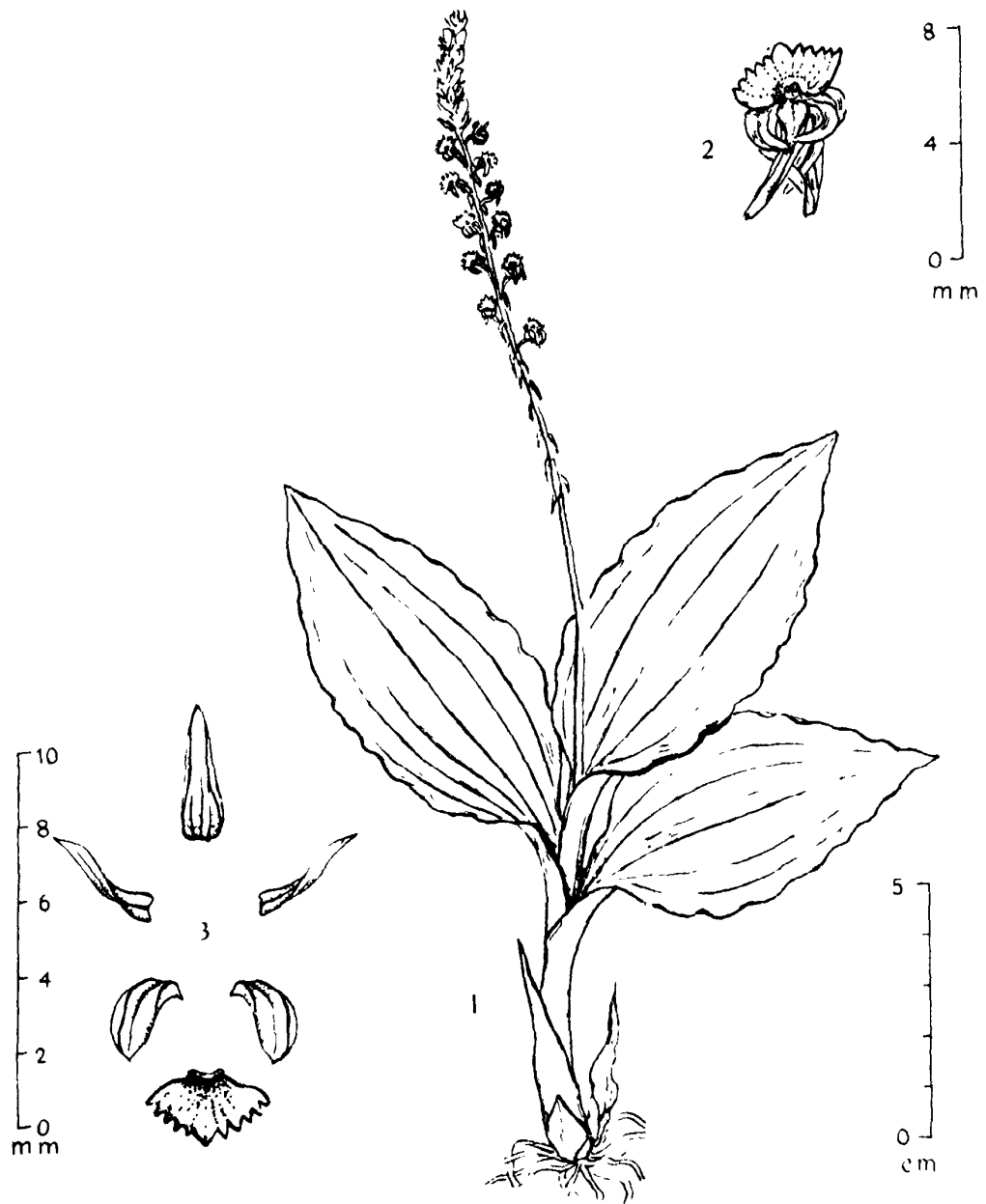


PLATE 18

Fig. 1-3. *Malaxis rheedii* Sw. 1. Habit; 2. Flower; 3. Sepals and petals including lip.

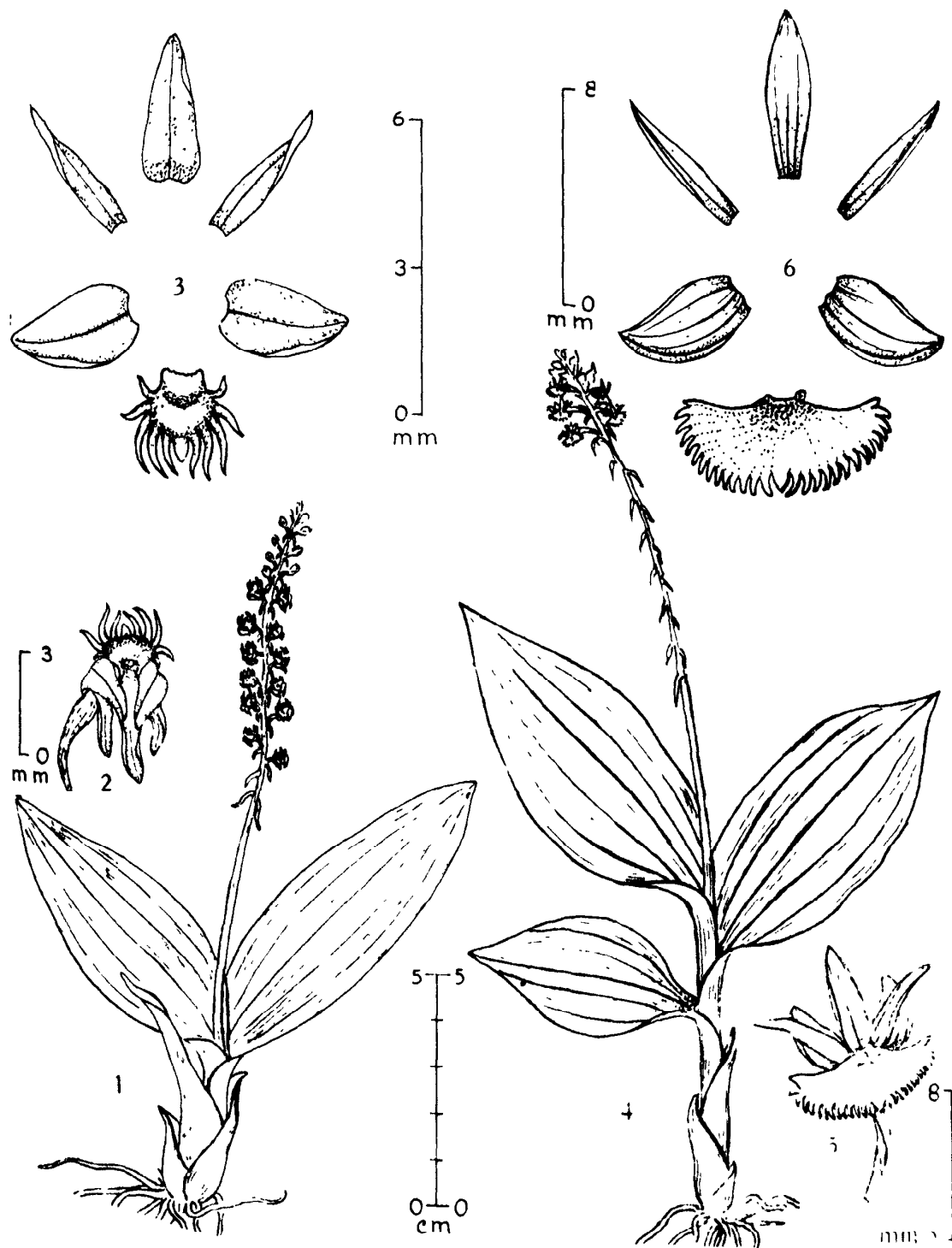


PLATE 19

Fig. 1-6. *Malaxis densiflora* (A. Rich.) O. Kuntze Habit; 2. Flower; 3. Sepals and petals including lip; 4. *Malaxis intermedia* (A. Rich.) Seidenf. Habit; 5. Flower; 6. Sepals and petals including lip.

It is a very variable species. Hooker has segregated three varieties.

Flowering : July.

Barber 2045, Naduvattam *Vajravelu*; 41865, Cherambady, 464335, Kottamalai R.F.; Alt. ca 920 cm.

2. *M. rheedii* Sw., Kgl. Vet. Akad. nya. Handl. 21 : 235. 1800; Seidenf. in Bot. Tidsskr. 73(2) : 97. 1978. *Microstylis rheedii* (Sw.) Lindl., Gen. & Sp. Orch. 21. 1830, *pro parte* (*quoad syn. Malaxis rheedii*); Wight, Ic. 3(2) : 9. t. 902. 1844-45; Hook. f., Ic. Pl. t. 1832. 1889 & in Fl. Brit. Ind. 5 : 690. 1890; Fyson, Fl. Nilgiri & Pulney Hill-tops 1 : 384. 1915 & 3 : t. 510. 1920 *M. versicolor* Lindl., Gen. & Sp. Orch. 21. 1830; Fischer in Fl. Pres. Madras 1408. 1928 (Repr. ed. 3 : 985. 1957). *Malaxis versicolor* Abeywick. in Cey. J. Sci. 2 : 147. 1959; Sant. & Kapad. in J. Bombay Nat. Hist. Soc. 58(2) : 347. 1961.

Pl. 18. Figs. 1-3.

Slender, erect, stoloniferous, leafy herbs. *Stem* 24-31 cm high (with inflorescence), arise by the side of the decaying mother plant, covered by sheathing bracts at base and with 3 or 5 leaves at the apex; sheaths ovate-lanceolate, acute, shortly acuminate. *Leaves* 6.0-14.0 × 2.3-5.8 cm, ovate-oblong to elliptic, shortly acuminate, abruptly narrowed into sheathing petiole, margins wavy. *Inflorescence* 18-29 cm long, axis more or less ridged, erect. *Flowers* maroon coloured, lip yellow with pungent smell. *Bracts* ca 5 × 1 mm, lanceolate, acuminate, deflexed. *Ovary* with pedicel ca 3 mm long. *Perianth* reflexed, held in variously twisted position. *Dorsal sepal* ca 4.5 × 1.5 mm, oblong, narrowly lanceolate, obtuse. *Lateral sepals* ca 3.0 × 1.75 mm, ovate, obtuse, margins curved. *Lateral petals* ca 4.0 × 0.7 mm, linear, acute with reflexed margins. *Lip* 2 × 4 mm, reniform concave at base, reflexed, dentate with median broader and longer tooth.

Refer Seidenfaden in Bot. Tidsskrift 73(2) : 97, 1978 for the nomenclature.

Flowering : July. *Fruiting* : October-November.

Ellis 34867, Mulakadu-Ouchterlony Valley; *Lawson s.n.* (M.H. Acc. No. 50167) Naduvattam; *Subramanyam* 10520, Naduvattam, *Vajravelu* 42838; Alt. 800-1860 m.

3. *M. intermedia* (A. Rich) Seidenf. in Bot. Tidsskr. 73(2) : 99. 1978. *Liparis intermedia* A. Rich. in Ann. Sci. Nat. Ser. 2. 15 : 17. 1841. *Microstylis stocksii* Hook. f., Fl. Brit. Ind. 5 : 1890; Fischer in Fl. Pres. Madras 1408. 1928 (Repr. ed. 3 : 985. 1957) & Ic. Pl. t. 1833. *Malaxis stocksii* (Hook. f.) O. Kuntze, Rev. Gen. Pl. 2 : 673. 1891.

Pl. 19. Figs. 4-6.

Small, terrestrial herbs, more or less swollen at base, covered by 2 or more sheathing bracts and sheathing bases of leaves. Fresh shoots arise from the sides of the old mother plant. Shoot with inflorescence 16-21 cm high. *Leaves* 2 or 3, ovate, lanceolate, acute, shortly acuminate, sheathing at base, 5.0-9.0 × 2.3-4.3 cm. *Inflorescence* terminal racemes, 11-14 cm long. *Flowers* pink,

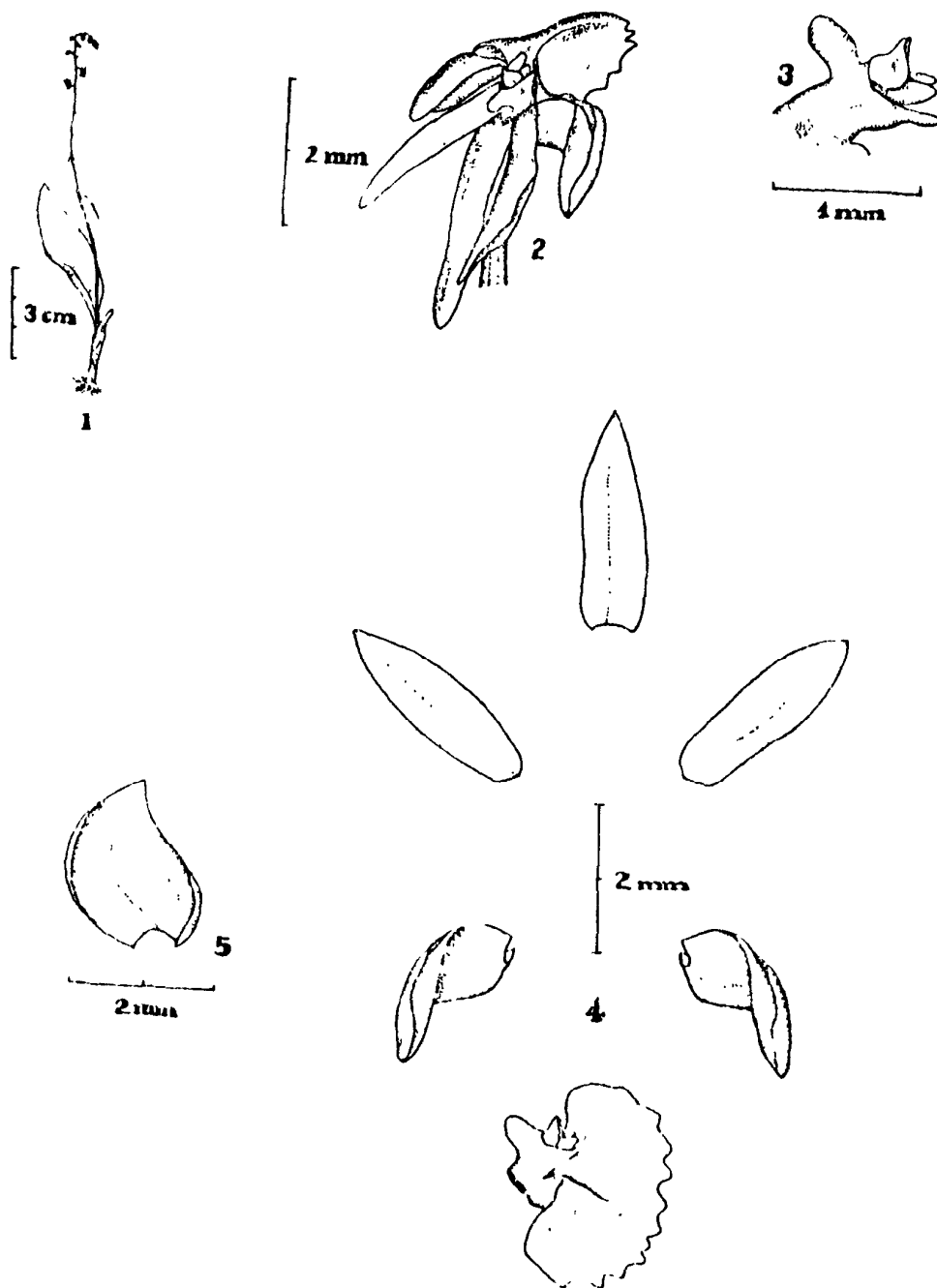


PLATE 20

Fig. 1-5. *Malaxis crenulata* (Ridl.) Ktze. 1. Habit; 2. Flower; 3. Column; 4. Sepals, petals and lip (with column); 5. Lateral sepal spread out (after Seidenfaden in Bot. Tidsskr. 73(2): 103. 1978.

many, dense. *Bracts* 5.0-8.0 × ca 1.5 mm, lanceolate, acuminate, deflexed. *Ovary* with pedicel ca 4 mm long. *Dorsal sepal* ca 6.0 × 1.5 mm, elliptic-oblong, obtuse, 3-nerved. *Lateral sepals* 4.5 × 2.2 mm, ovate, obliquely oblong, obtuse, margins curved. *Lateral petals* ca 5.5 × 0.7 mm, linear, obtuse, revolute at the margins. *Lip* flabellate, deeply pectinate, with about 14 segments, 8 mm across, reflexed.

Flowering : August.

Barber 2044, Naduvattam; *Ellis* 34869, Mulakadu-Ouchterlony valley; *Sharma* 35875, Pykara (MH Acc. No. 50177); Alt. 1600-1900 m.

4. *M. densiflora* (A. Rich.) O. Kuntze, Rev. Gen. Pl. 2 : 673. 1891; Sant. & Kapad., Orch. Bombay 144. 1966. *Liparis densiflora* A. Rich. in Ann. Sci. Ser. 2. 15 : 18 t. 18. 1841. *Microstylis versicolor* Wight, Ic. 3(2) : 9. t. 901. 1844 (non Lindl. 1830); Hook. f., Fl. Brit. Ind. 5 : 691. 1890. *M. luteola* Wight, Ic. 5 (1) : 4. t. 1632. 1852. *M. densiflora* (A. Rich.) Fischer in Fl. Pres. Madras 1408. 1928 (Repr. ed. 3 : 985 1957). **Pl. 19, Figs. 1-3.**

Small, terrestrial herbs, 8-35 cm high with inflorescence, pseudobulbs ovoid, covered by bracts and sheathing bases of leaves. *Leaves* 2, ovate-lanceolate to elliptic, 3.5-18.0 × 1.0-2.9 cm, acute, sheathing at base, plicate. *Inflorescence* 6.5-26.0 cm long. *Scape* 3.5-5 cm long, ridged. *Flowers* red, many, dense. *Bracts* 5.0-7.0 × 1.2-1.5 mm, lanceolate, acuminate, as long as or slightly longer than the flowers, erect at first, later deflexed. *Ovary* with pedicel ca 4 mm long. *Dorsal sepal* 3-4.5 × 1-1.5 mm, lanceolate, obtuse, deflexed, margins curved. *Lateral sepals* 20-35 × 1.5-2 mm, obliquely oblong, obtuse, deflexed with curved margins. *Lateral petals* 3-4.5 × ca 0.7 mm, linear-lanceolate, obtuse or retuse, margins curved, held like horns. *Lip* 2-3 mm long, rhomboid, concave on the dorsal side, pectinate, segments 5 or more on each side, reflexed, often median segment broader and shorter than the lateral ones.

Flowering : June-August.

Ellis 34651; *Lawson* s. n. (MH Acc. No. 50173); *Sharma* 35847, 35868; *Shetty* 34183; *Subba Rao* 36369; *Subramanyam* 10537; Common; Ooty, Naduvattam-Devarshola, Bison Swamp, Bhimakashola, Pykara; Alt. 1600-2300 m.

5. *M. crenulata* (Ridl.) O. Kuntze, Rev. Gen. Pl. 2 : 673. 1891; Seidenf. in Bot. Tidsskr. 73(2) : 102. 1978. *Microstylis crenulata* Ridl., J. Linn. Soc. 24 : 346. 1888; Hook. f., Fl. Brit. Ind. 5 : 691. 1890 **Pl. 20, Figs. 1-5.**

Terrestrial dwarf herbs of ca 12 cm height, erect with a few sheathing scales at base. *Leaf* usually 1, broadly elliptic, obtuse. *Inflorescence* racemose, ca 10 cm, slender with flowers restricted towards the apex. *Flowers* greenish. *Sepals* more or less deflexed. *Dorsal sepal* ca 3 × 1 mm, oblong-lanceolate, 1-nerved, obtuse at tip. *Lateral sepals* 2 mm long and 2 mm broad towards the base, falcately ovate, 3-nerved, slightly twisted beyond the half. *Lateral petals*

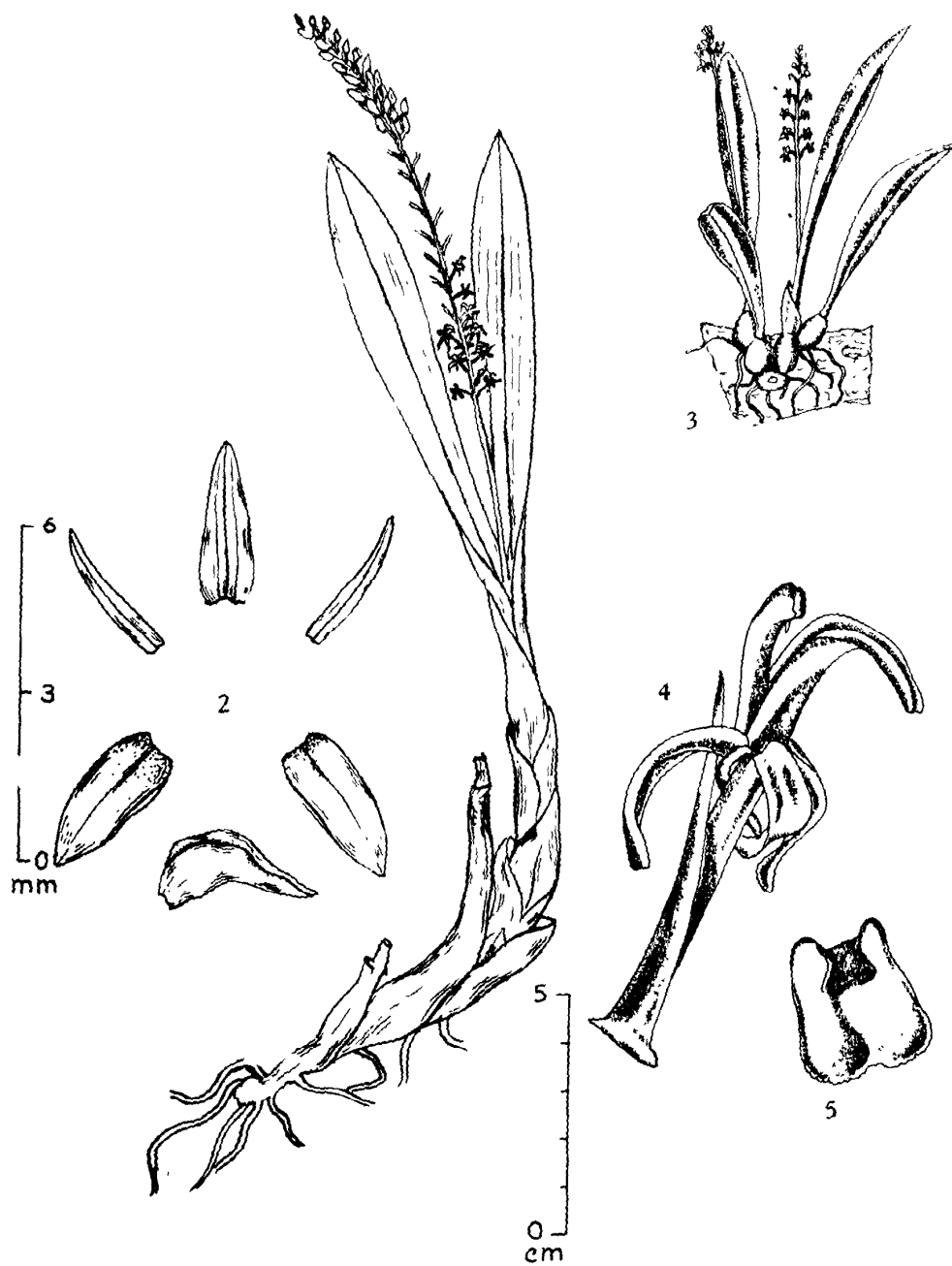


PLATE 21

Fig. 1-5. *Liparis viridi* flora (Bl.) Lindl; 1. Habit; 2. Sepals and petals with lip; 3. *Liparis caespitosa* (Lam.) Lindl. Habit; 4. Flower (lateral view); 5. Lip (Dorsal view) (3-5 after K. & P.)

similar to dorsal sepal but with revolute margin. *Lip* 2.0 × 2.5 mm, reniform to flabellate, shortly stalked, deflexed with a conical obtuse callus at base, crenulate at margin. *Column* ca 1 mm long with a subterminal dorsal horn.

This species could not be collected from the Niligiris nor from neighbourhood except the type collection by Beddome (*Beddome* 8108 BM, *vide* Seidenfaden *l.c.*). Hence, description is adopted from published sources.

13. LIPARIS L.C. Rich.

- 1a. Epiphyte or lithophyte; lip without conspicuous callus
- 2a. Small plants; leaf solitary, small, narrowly elliptic (1.5 × 7.5 ca 0.7 cm); lip truncate ... 1. *L. cespitosa*
- 2b. Large plants; leaves two, long (10.0—25.0 × 1.9—2.7 cm); lip acute-subacute at tip
- 3a. Pseudobulbs narrow, elongate (ca 7 cm); leaves ca 22 cm long; lip entire, ovate ... 2. *L. viridiflora*
- 3b. Pseudobulbs ovoid (ca 2 cm), compressed, costate; leaves ca 12 cm long; lip suborbicular, obscurely 3-lobed ... 3. *L. elliptica*
- 1b. Terrestrial; lip with conspicuous callus
- 4a. Tall plants; stem 10–19 cm tall
- 5a. Leaves 3 (or 4), ovate-orbicular; racemes short, up to 22 cm; flowers dense; lip rhomboid, obtuse at tip ... 4. *L. atropurpurea*
- 5b. Leaves 2 (or 3), narrowly elliptic-lanceolate; raceme long (ca 35 cm); flowers lax; lip obcordate with a broad sinus, with or without an apicula ... 5. *L. nervosa*
- 4b. Dwarf plants; stem 1–4 cm tall
- 6a. Leaves large (ca 7.5–10.5 × 3.5–6.0 cm), subradical; bracts reflexed on the rachis ... 6. *L. platyphylla*
- 6b. Leaves small (3.0–6.5 × 0.5–2.0), cauline; bracts erect on the rachis
- 7a. Lip without a claw, orbicular, finely papillose at margins, obtuse or obscurely retuse at tip. ... 7. *L. wightiana*
- 7b. Lip with a short claw, obovate, naked at margins, deeply cleft at apex ... 8. *L. biloba*

1. *Liparis cespitosa* (Lam.) Lindl. in Bot. Reg. 11. subt. 882. 1825; Seidenf. in Dansk Bot. Ark. 31(1) : 61. 1976. *Epidendrum cespitosum* Lam., Encyl. Method. Bot. 1 : 87. 1783. *Liparis duthei* Hook. f., Ic. Pl. 19 : t. 1857. 1889 & Fl. Brit. Ind. 5 : 701. 1890; King & Pantl. in Ann. Roy. Bot. Gard. Cal. 8 : 32. t. 42. 1898; Fischer in Fl. Pres. Madras 1411. 1928 (Repr. ed. 3 : 987. 1957) Pl. 21. Figs. 3–5.

Small, pseudobulbous epiphytic herbs; pseudobulbs tufted, ovoid, 0.8–1.3 cm. *Leaf* solitary on the pseudobulb, 1.5–7.5 × ca 7 mm, elliptic or linear-lanceolate narrowed into a petiole, acute or acuminate, 5-nerved. *Inflorescence*

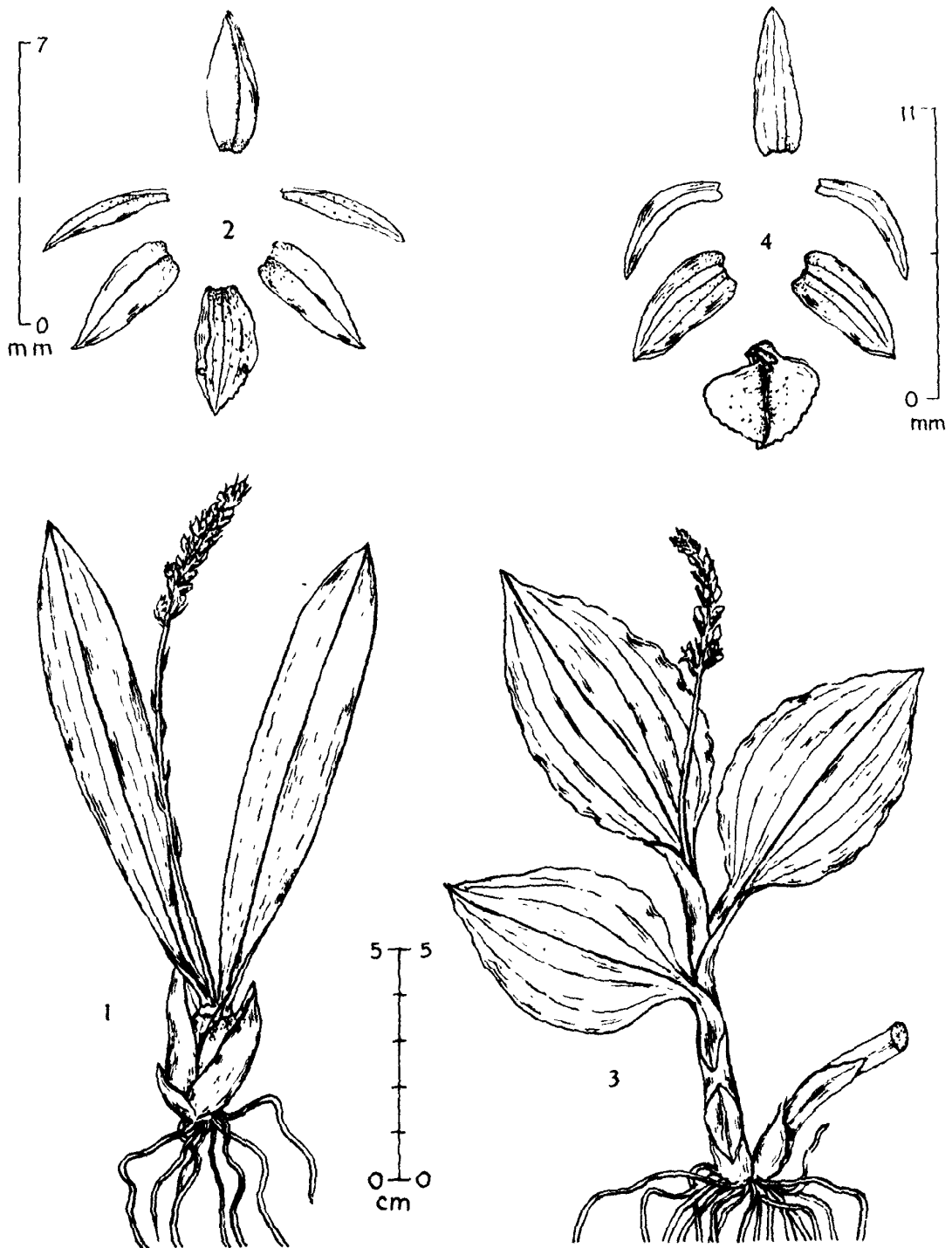


PLATE 22

Fig. 1-4. *Liparis elliptica* Wt.; 1. Habit; 2. Sepals and Petals with lip; 3. *Liparis atropurpurea* Lindl. Habit; 4. Sepals and petals with lip.

3–6 cm long, as long as the leaf, raceme rather dense flowered. *Flowers* minute, yellow. *Bracts* linear-lanceolate, vary in length, shorter or longer than the stalked ovary. *Sepals* elliptic-oblong, blunt, revolute, margins not or slightly recurved. *Petals* linear, recurved, longer than the sepals. *Lip* quadrately oblong, recurved, 5-nerved, tip truncate, crenate without callus, hardly auricled at the base. *Column* slightly curved, rather long, obscurely winged.

The above description is from the available literature as the species could not be collected from Nilgiris or neighbourhood.

2. *L. viridiflora* (Bl.) Lindl., Gen. & Sp. Orch. 31. 1830; Seidenf. in Dansk Bot. Ark. 31(1) : 82. 1976. *Malaxis viridiflora* Bl., Bijdr. 392. 1825. *Liparis longipes* Lindl. in Wall. Pl. As. Rar. 1 : 31. t. 35. 1830; Wight, Ic. 3(2) : 9. t. 906. 1844; Hook. f., Fl. Brit. Ind. 5 : 703 1890; King & Pant. in Ann. Roy. Bot. Gard. Cal. 8 : 29. t. 37. 1898; Fischer in Fl. Pres. Madras 1411. 1928 (Repr. ed. 3 : 967. 1957). **Pl. 21. Figs. 1-2.**

Lithophytic or epiphytic herbs, *ca* 40 cm high (with inflorescence); pseudobulbs *ca* 7 cm long, ovoid or cylindrical, arranged serially on a creeping stem. *Stem* short with few imbricating sheaths. *Leaves* 2, opposite, 20.0–25 × 1.9–2.7 cm, linear, oblanceolate, acute. *Inflorescence* raceme, *ca* 30 cm long; scape many-flowered, naked, or with or two sterile bracts at the base. *Flowers* pale green. *Bracts* *ca* 4.0 × 0.7 mm, lanceolate, acuminate. *Ovary* with pedicel *ca* 5 mm long. *Dorsal sepal* *ca* 2.9 × 0.9 mm, lanceolate, obtuse, revolute. *Lateral sepals* *ca* 2.7 × 0.2 mm, linear, acute, one nerved. *Lip* 2.5 × 1.5 mm, ovate, entire, folded lengthwise, reflexed beyond the middle, acute at tip, thick, callus absent, clawless.

Flowering : September. *Fruiting* : January.

Ellis 37739, Meenmuti–Marva Halla Estate, *Subba Rao* 36684; Alt. 600–1500 m.

3. *L. elliptica* Wight, Ic. 5(1) : 17 t. 1735. 1851; Seidenf. in Dansk Bot. Ark. 31(1) : 79. 1976. *L. viridiflora* auct. non Lindl.: King & Pantl. in Ann. Roy. Bot. Gard. Cal. 8 : 35. t. 47. 1898; Hook. f., Fl. Brit. Ind. 5 : 704. 1890; Fischer in Fl. Pres. Madras 1411. 1928 (Repr. ed. 3 : 987. 1957).

Pl. 22. Figs. 1-2

Small epiphytic herbs, pseudobulbs ovoid, more or less compressed anteriorly *ca* 2.0 × 1.5 cm, costate on one side, truncate at apex. *Leaves* 2, 10.0–13.0 × 1.9–2.3 cm, elliptic-lanceolate, cuspidate. *Inflorescence* *ca* 12 cm long, racemes many flowered, subsecund; scape *ca* 8 cm long with long sterile bracts. *Flowers* green, ascending, pointing upwards. *Bracts* *ca* 4.0 × 0.9 mm, lanceolate-subulate, acuminate, longer than the ovary with pedicel, pedicel decurved. *Ovary* with pedicel, *ca* 3 mm long. *Dorsal sepal* *ca* 3.5 × 1.2 mm, lanceolate, acute with a subterminal cusp on the dorsal side, one nerved. *Lateral sepals* as long as the dorsal, *ca* 1.1 mm broad, lanceolate, acute with a cusp on the dorsal side one nerved. *Lateral petals* 3.2 × 0.5 mm, much linear,

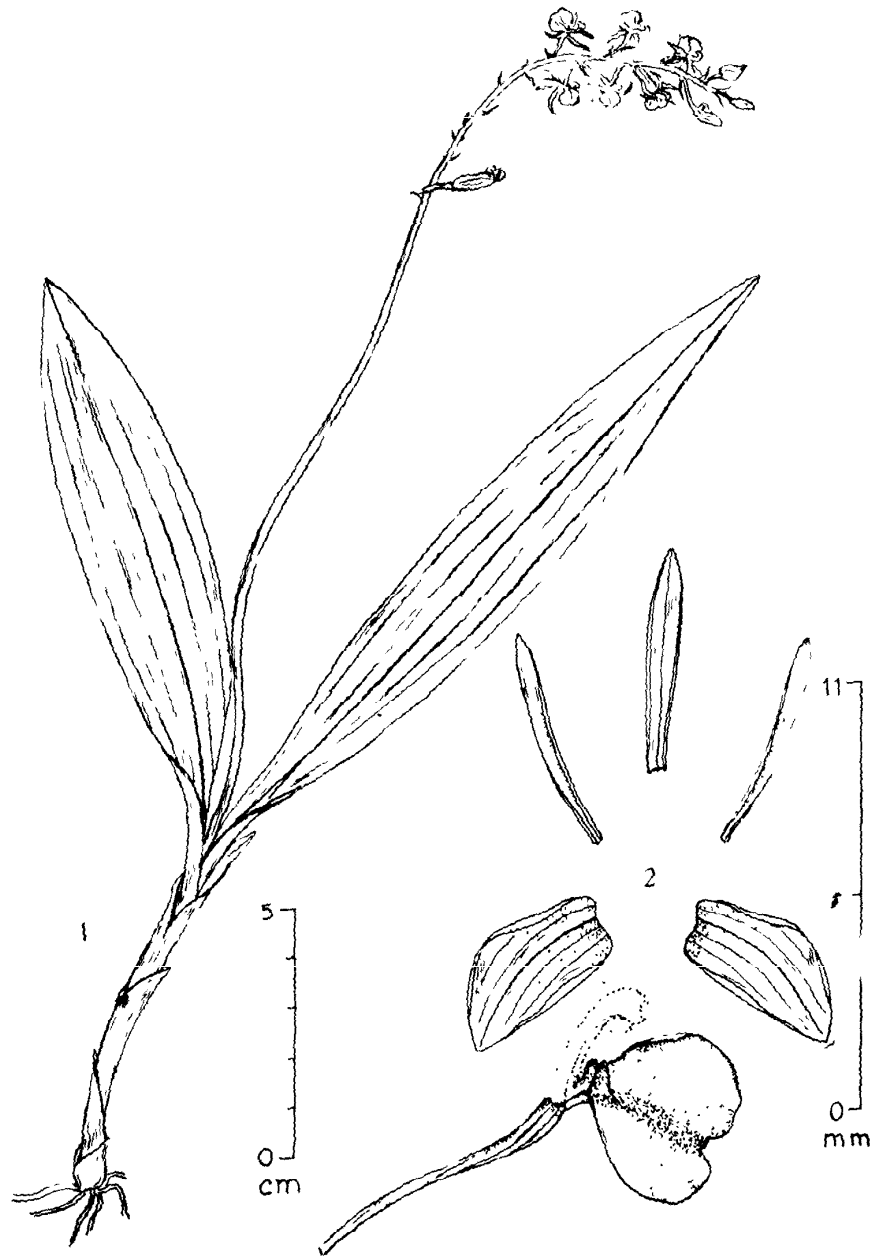


PLATE 23

Fig. 1-2. *Liparis nervosa* (Thunb) Lindl. 1. Habit; 2. Sepals, petals and lip with ovary.

much narrower than the sepals, acute. *Lip* ca 3×2 mm, suborbicular, ovate-subacute, sharply infolded at the margin towards the distal and so as to present an obscurely 3-lobed appearance, finely crenulate at the margin beyond the fold, callus absent.

Flowering : October.

Periaswamy 19790, Ittakalada ; *Alt.* ca 2000 m.

4. *L. atropurpurea* Lindl., Gen. & Sp. Orch. 28. 1830; Hook. f. Fl., Brit. Ind. 5 : 698. 1890; Fischer in Fl. Pres. Madras 1411. 1928 (Repr. ed. 3 : 987). *L. olivacea* Wight, Ic. 3(2) : 9 t. 903. 1844. *L. walkeriae* Wight, l.c. t. 905. 1844. **Pl. 22, Figs. 3-4.**

Terrestrial herbs, 21-34 cm tall (with inflorescence). *Stem* stout, covered by sheathing scales. *Leaves* 3 or 4, 7.0-18.0 \times 4.0-8.5 cm, ovate to orbicular, acute, shortly acuminate, base uneven, narrowed into a petiole. *Inflorescence* terminal racemes, 11-22 cm long, many flowered, more or less dense, scape as long as raceme, with a few sterile bracts. *Flowers* pink with yellow shade. *Bracts* ca 8×1 mm, longer than the ovary and pedicel, linear-lanceolate, acute, **Spr**reading. *Ovary* with pedicel ca 5 cm long. *Perianth* sparsely gland-dotted. *Dorsal sepal* ca 5.5×1.5 m, lanceolate, obtuse, 3-nerved. *Lateral petals* as long as lateral sepals, subequal, falcate, acute, one nerved. *Lip* ca 4.0×4.5 mm, rhomboid, obtuse at tip, more or less narrowed at base, crenulate at distal margin, sparsely gland-dotted, with 2 calli at the base on the upper side. *Fruits* oblong with marcescent perianths.

Flowering : July-August. *Fruiting* : December.

Ellis 34671, 43221; *Sebastine* 3978; *Sharma* 35839; *Shetty* 37577; Not common; Kundha Reserve, Mukurti, Pykara, Avalanche, Ouchterlony Valley; *Alt.* 1700-2100 m.

L. walkeriae Grah., similar to *L. atropurpurea* Lindl., is reported from Nilgiris. In the details of floral structure, there is hardly any difference between the two.

5. *L. nervosa* (Thunb.) Lindl., Gen. & Sp. Orch. 26. 1830; Fischer in Fl. Pres. Madras 1410. 1928 (Repr. ed. 3 : 987. 1957); Sant. & Kapad., Orch. Bombay 181. 1966. *Ophrys nervosa* Thunb., Fl. Jap. 27. 1784. *Empusa paradoxa* Lindl., Gen. & Sp. Orch. 17. 1830. *Liparis paradoxa* (Lindl.) Reichb. f. in Walp. Ann. 6 : 218. 1861; Hook. f., Fl. Brit. Ind. 5 : 697. 1890; King & Pantl. in Ann. Roy. Bot. Gard. Cal. 8 : 27. t. 34. 1898. **Pl. 23, Figs. 1-2.**

Terrestrial, slender, herbs, ca 46 cm (with inflorescence much taller than any of the species of the locality), swollen or not at the base. *Stem* ca 11 cm long, erect, with 2 or 3 terminal leaves and 3 or more sheathing bracts below. *Leaves* 17.0-24.0 \times 2.4-3.8 cm narrowly elliptic-lanceolate, acute, shortly acuminate, narrowed into short, sheathing petiole. *Inflorescence* racemes, 25-35 cm long, lax flowered; scape slender, ridged. *Flowers* pale yellow, long pedicellate. *Bracts* ca 4×1 m, ovate-lanceolate, acuminate, suberect. *Ovary* with pedicel

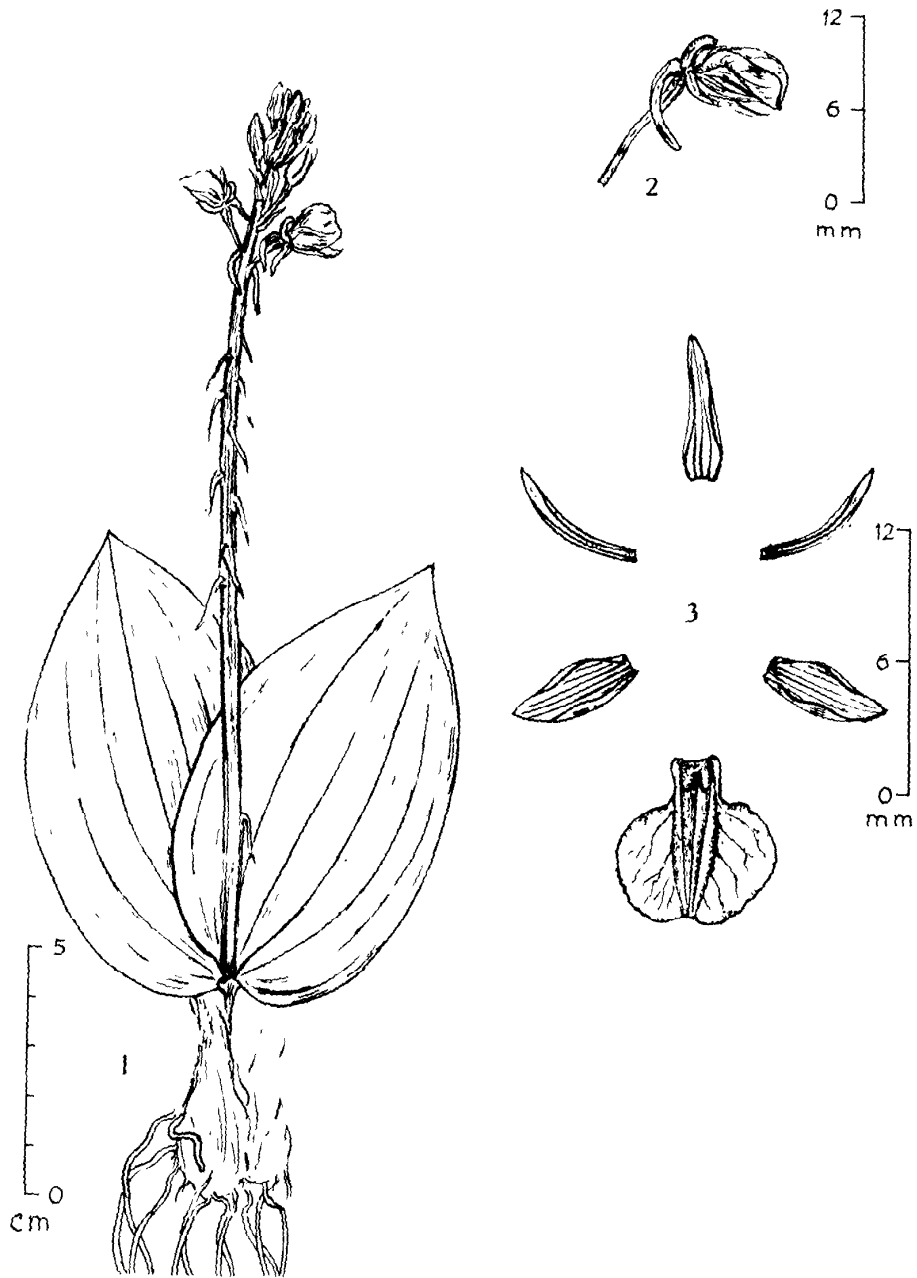


PLATE 24

Fig. 1-3. *Liparis platyphylla* Ridley; 1. Habit; 2. Flower; (side-view); 3. Sepals and Petals with lip.

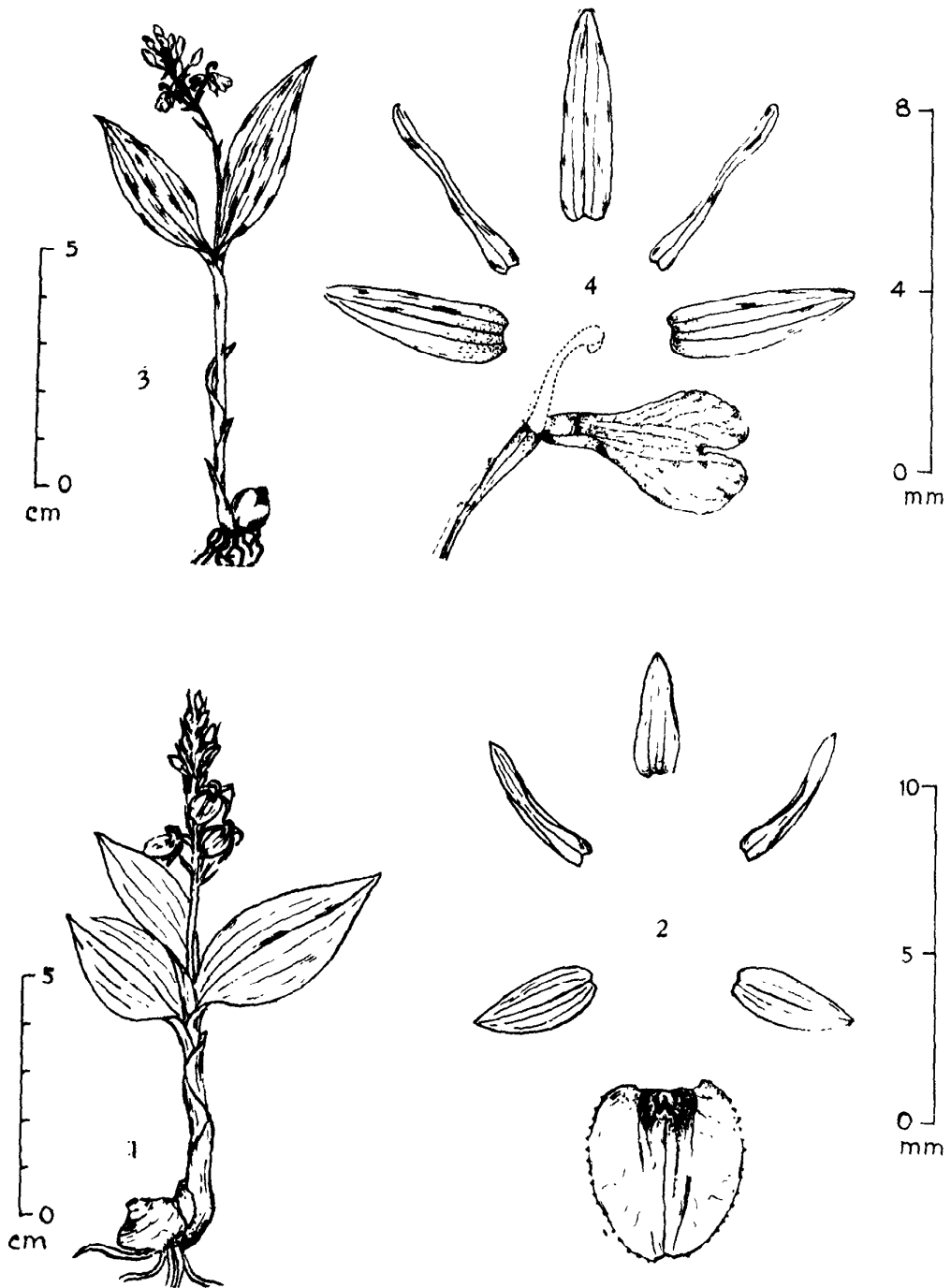


PLATE 25

Fig. 1-4. *Liparis wightiana* Thw. 1. Habit; 2. Sepals and Petals with lip (Dorsal view);
 3. *Liparis biloba* Wt.; Habit; 4. Sepals, petals and lip (with ovary)

0.7–1.0 cm long. *Dorsal sepal* ca 5.5 mm long, ca 1 mm broad, spreading linear-oblong, reflexed, obtuse, margins involute. *Lateral sepals* ca 4.5 × 2.5 mm, falcately oblong, obtuse, spreading, recurved, margins, reflexed. *Lateral petals* ca 5.5 × 0.5 mm, linear, much narrower than sepals, margins involute, obtuse. *Column* short, ca 3.5 mm long, incurved at the tip, with 2 small rounded wings. *Lip* ca 4.0 × 4.5 mm, strongly reflexed, deeply obcordate, with broad sinus, with or without an apicula. There are 2 erect, prominent, narrow calli at base.

Flowering : July.

Vajravelu 41880, Cherankode, rare; alt. ca 860 m.

6. *L. platyphylla* Ridley in J. Linn. Soc. 22 : 264. 1886; Hook. f., Fl. Brit. Ind. 5 : 695. 1890; Fischer in Fl. Pres. Madras 1410. 1928 (Repr. ed. 3 : 986. 1957).

Pl. 24, Figs. 1–3.

Dwarf, 2-leaved, terrestrial herbs, in humus soil; tubers ovate-oblong, 1.5–2.5 × 1.0–2.5 cm, mature tubers clavate at tip. *Stem* 1–2 cm long. *Leaves* 2, spreading, 7.5–10.5 × 3.5–6.0 cm, ovate-lanceolate, acute acuminate at tip, sheathing at base, 7–9 nerved. *Inflorescence* racemes, terminal, ca 16 cm long. *Flowers* green, long pedicellate, many, lax, restricted beyond the middle. *Bracts* 7.0–9.0 × 1.5–2.0 mm, lanceolate, acuminate, deflexed. *Ovary* with pedicel ca 1 cm long. *Dorsal sepal* 6.5–9.5 × 2.0–2.5 mm, linear-lanceolate, obtuse, reflexed over the ovary, margins revolute, 5-nerved. *Lateral sepals* 6.3–8.5 × 2.2–3.0 mm, lanceolate, obtuse, margins more or less incurved, 5-nerved. *Lateral petals* 6.5–9.5 × 0.5–1.0 mm, linear, obtuse, porrect, held parallel to and beneath the lip, involute. *Lip* 6.2–11.0 × 6.0–10.5 mm, orbicular, minutely crenulate at margins, retuse at tip, shortly clawed, geniculate at the claw; claw ca 3 mm long, held parallel to the column, with a conspicuous forked callus at the base on the dorsal side.

Flowering : July.

Subramanyam 10460, Benne forest; Alt. ca 1000m.

Description of *L. platyphylla* and *L. prazeri* King & Pantl. in Sant & Kapad. 179–182 tally very much and they seem to be conspecific. According to Sant & Kapad. loc. cit. “There seem to be very slender differences between *L. prazeri* King & Pantl. and *L. deflexa* Hook. f. (reported from Sikkim Himalaya after the collection of Griffith)”. Hence all the three species seem to be conspecific.

7. *L. wightiana* Thw., Enum. 295. 1861; Hook. f., Fl. Brit. Ind. 5 : 695. 1890; Fischer in Fl. Pres. Madras 1410. 1928 (Repr. ed. 3 : 986. 1957). *L. atropurpurea* Wight, Ic. 3(2) : 9. t. 904. 1844 (*non* Lindl. 1830).

Pl. 25, Figs. 1–2.

Small terrestrial herbs, upto 16 cm high (with inflorescence); pseudobulbs small, ovoid-oblong. *Stem* short, covered by sheaths. *Leaves* 2 or 3, 3.0–6.5 × 10–2.0 cm, opposite, sessile, ovate-lanceolate, acute-shortly acuminate. *Inflo-*

rescence racemes, 4.5-8.5 cm long. *Flowers* green. *Bracts* ca 4 × 1 mm, lanceolate, acuminate. *Dorsal sepal* ca 5.0 × 1.7 mm, ovate-lanceolate, acute, 3-nerved. *Lateral setals* ca 5 × 2 mm, ovate-oblong, acute, appressed with the lip. *Lateral petals* ca 6.5 × 1.0 mm, longer than sepals, linear, margins inflexed, acute. *Lip* ca 7.0 × 6.2 mm, flat, orbicular-oblong, porrect, obtuse or retuse at tip, without claw, with or without 2 small protuberances in the sinus, minutely papillose along the margin. There are 2 pimple-like median calli in between the two large lateral thickenings at the very base of the lip.

Flowering : July-August.

Sharma 35922 : *Subramanyam* 10539; Devarshola & Naduvattam: Alt. 1600-1700 m.

8. **L. biloba** Wight, Ic. 5(1) : 4. t. 1633. 1851; Hook. f., Fl. Brit. Ind. 5 : 699. 1890; Fischer in Fl. Pres. Madras 1410. 1928. (Repr. ed. 3 : 986. 1957).

Pl. 25. Figs. 3-4.

Small pseudobulbous herbs; pseudobulbs globose, 6-10 × 7-9 mm, fresh shoot lateral from the old pseudobulb, 7.0-9.5 cm tall with inflorescence. *Stem* short, 2 leaved, terminally with 1-3 sheaths towards the base. *Sheaths* 1.2-2.2 cm long, tubular with oblique mouth. *Leaves* 2, 3.0-4.7 × 0.5-1.3 cm, ovate-elliptic, acute, narrowed into a long sheathing petiole, margin closely obscurely wavy. *Inflorescence* racemes, terminal, 3-5 cm long, flowers few, more or less dense. *Scape* with or without sterile bracts. *Flowers* purple. *Bracts* 5.0-8.0 × 1.0-1.7 mm, lanceolate, acuminate, 1-nerved. *Ovary* with pedicel ca 5 mm long. *Dorsal sepal* ca 4.5 × 1.0 mm, oblong-lanceolate, obtuse, 3-nerved. *Lateral sepal* similar to dorsal, a little shorter. *Lateral petals* ca 4.2 × 0.5 mm, linear, obtuse. *Lip* conspicuous, spreading, ca 4.5 mm long, 2.5 mm broad towards the distal end, shortly clawed at base, obovate with a deep median cleft; narrow and concave at the base with two calli on the dorsal side, distal margin obscurely crenulate.

Flowering : July.

A. V. N. Rao 47227, Kollimund; Alt. 2225 m, [Live specimens grown in Orchidarium, Yercaud (1,360 m) which flowered during July 1973].

L. resupinata Ridley : could not be collected either from Nilgiri or from neighbourhood. Its availability in Nilgiri reported by Ridley attributing to Wight's collection seems to be erroneous as Hooker suspects, since "there are no specimens in Wight's Herbarium" (Hook. f., Fl. Brit. Ind. 5 : 705. 1890). Moreover its absence in Western Ghats (in Bombay area - Santapau & Kapadia 1966 *loc. cit.*) when it is reported even from Himalayas makes its occurrence doubtful in Nilgiris.

L. alata A. Rich. in Ann. Sc. Nat. Ser. 2, 15, 17 : 1841; Hooker f. Fl. Brit. Ind. 5 : 707. 1890.

Hooker (*loc. cit.*) mentions this species collected by Perrottet from the

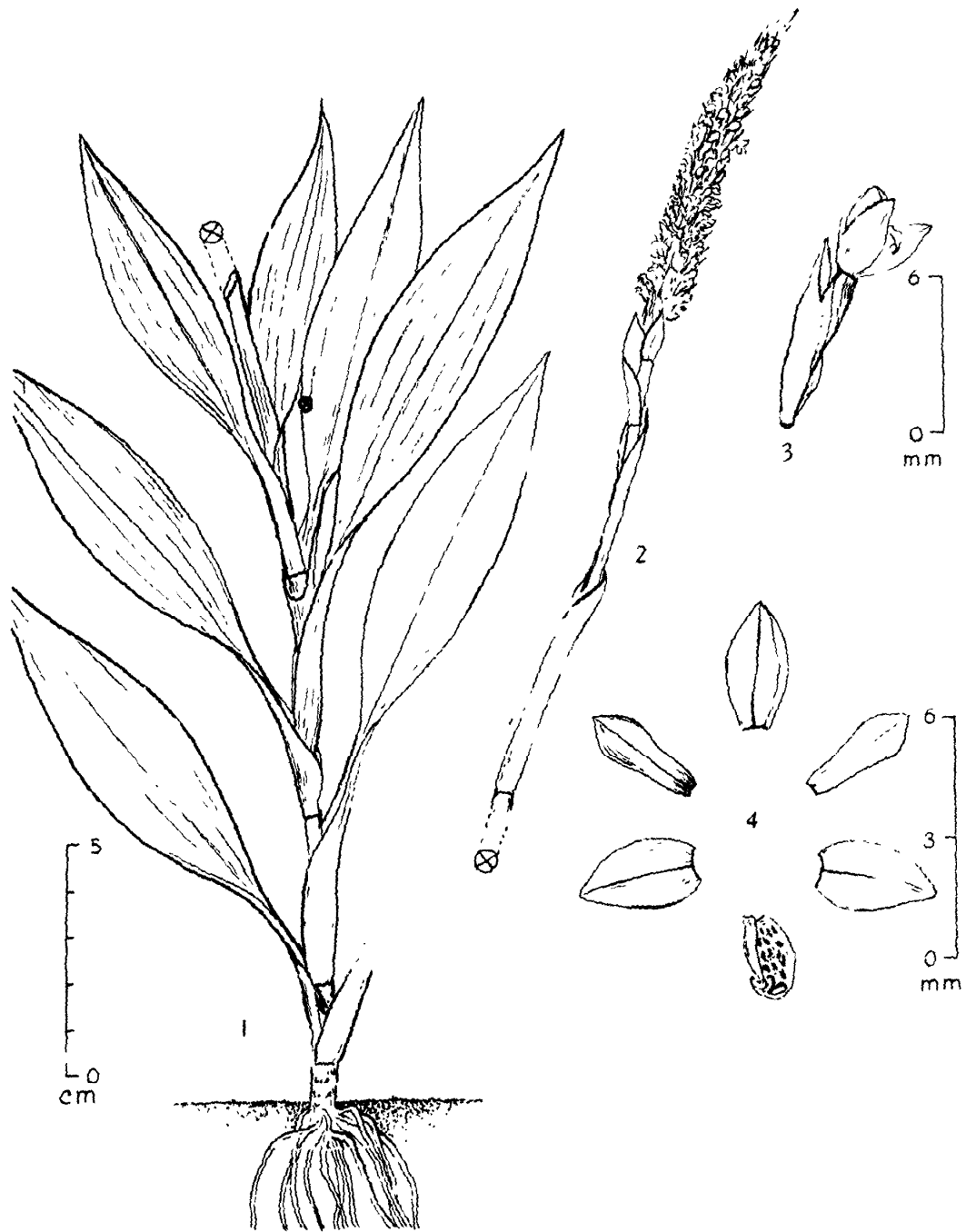


PLATE 26

Fig. 1-4. *Goodyera procera* (Ker-Gawl.) Hook. 1. Habit; 2. Inflorescence; 3. Flower; 4. Sepals and Petals with lip.

“moist woods at the water fall Nighiri Hills” as a doubtful one (Neither Fischer nor Fyson includes this in their work).

According to Hooker (*loc. cit.*) the species is characterized by ovoid pseudo-bulbs, sheaths lax, membranous, acute; leaves usually 2, subpetioled, sheathing, membranous, ovate, acute, entire; base rounded; spike elongate, few-flowered; rachis compressed winged; lip subcordate, convex, quite entire, base erect-embracing the column.

No specimens agreeing with the above description could be collected for the present work from anywhere in the Nilgiris including the locality mentioned above.

14. GOODYERA R. Br.

Goodyera procera (Ker-Gawl.) Hook., Exot. Fl. t. 39. 1823; Wight, Ic. 5(1) : 16. t. 1729. 1851; Hook. f., Fl. Brit. Ind. 6 : 111. 1890; King & Pantl. in Ann. Roy. Bot. Gard. Cal. 8 : 282. t. 378. 1898; Fischer in Fl. Pres. Madras 1456. 1928 (Repr. ed. 3 : 1018. 1957). *Neottia procera* Ker-Gawl. in Bot. Reg. 8 : t. 639. 1822. *G. carnea* A. Rich. in Ann. Sci. Nat. Ser. 2. 15 : 80. 1841. **Pl. 26, Figs. 1-4.**

Leafy, terrestrial herbs, 40–65 cm tall with inflorescence decumbent. *Stem* stout, enveloped by sheathing bases of leaves. *Leaves* many, 11.0–18.0 × 11.5–3.0 cm, elliptic, acute-shortly acuminate, narrowed into long petiole, sheathing at base. *Inflorescence* dense spikes, 27–45 cm long; peduncle stout with 4 or 5 large, sterile, sheathing bracts, pubescent above. *Flowers* small, white. *Bracts* heteromorphous, vary in size, ca 7 × 3 mm, lanceolate, narrowly elliptic, acuminate, pubescent along the margin. *Ovary* ca 6 mm. *Dorsal sepal* ca 3.2–3.5 × 1.5–2.0 mm, ovate, concave, obtuse, cohere with petals to form a hood. *Lateral sepal* 3.0–3.2 × 1.5–2.0 mm, ovate, concave, obtuse. *Lateral petals* 3.0–3.2 × 2.0 mm, broadly ovate, obtuse. *Lateral petals* 3.0–3.2 × 1.0–1.5 mm, spatulate-ob lanceolate, obtuse. *Lip* ca 2.5 × 2.0 mm, entire, cymbiform, setose within, strongly reflexed, narrow apex with 2 subterminal, conspicuous, large calli.

Flowering : June, November.

Vajravelu 43485, Burliar, Devala-Pandalur forest, *Wight s.n.* (MH Acc. No. 50711); *Alt.* ca 925 m.

15. SPIRANTHES L.C. Rich.

Spiranthes sinensis (Pers.) Ames, Orch. 2 : 53. 1908; Fischer in Fl. Pres. Madras 1454. 1928 (Repr. ed. 3 : 1017. 1957). *Neottia sinensis* Pers. Syn. 2 : 511. 1807. *N. australis* R. Br., Prodr. 319. 1810. *Spiranthes australis* (R. Br.) Lindl., Bot. Reg. 10 : sub. t. 823. 1824; Wight, Ic. 4(4) : 15. t. 1724. 1851; Hook. f., Fl. Brit. Ind. 6 : 102. 1890. *S. lancea auct. non* (Thunb. ex Sw.) Backer : Sant. & Kapad., Orch. Bombay 160. 1966. **Pl. 27, Figs. 1-5.**

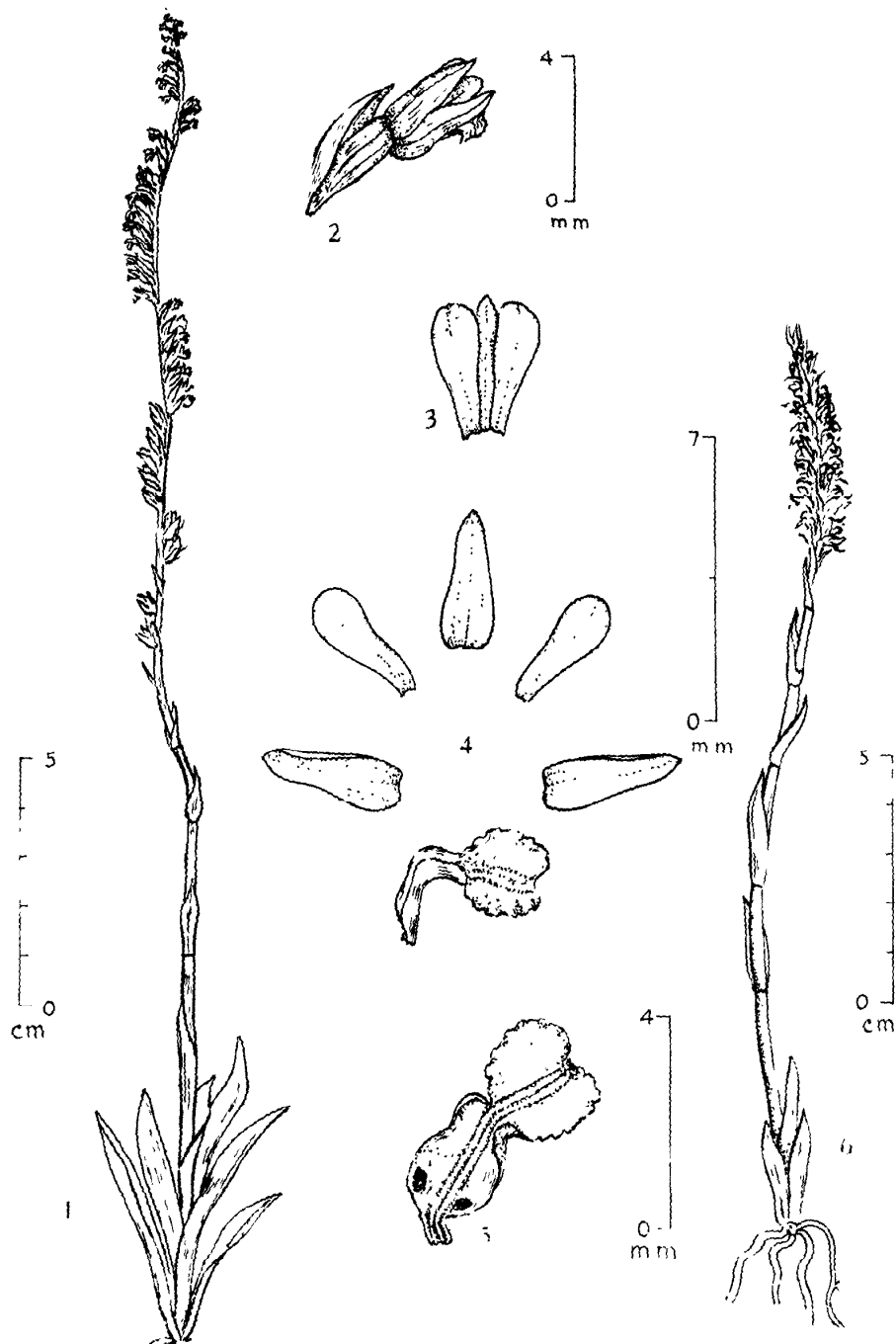


PLATE 27

Fig. 1-6. *Spiranthes sinensis* (Pers.) Ames var. *sinensis* 1. Habit; 2. Flower; 3. Dorsal sepal and lateral petals adhering together; 4. Sepals and petals with lip; 5. Lip (Spread out); 6. *Spiranthes sinensis* (Pers.) Ames var. *Wightiana* Lindl. Habit.

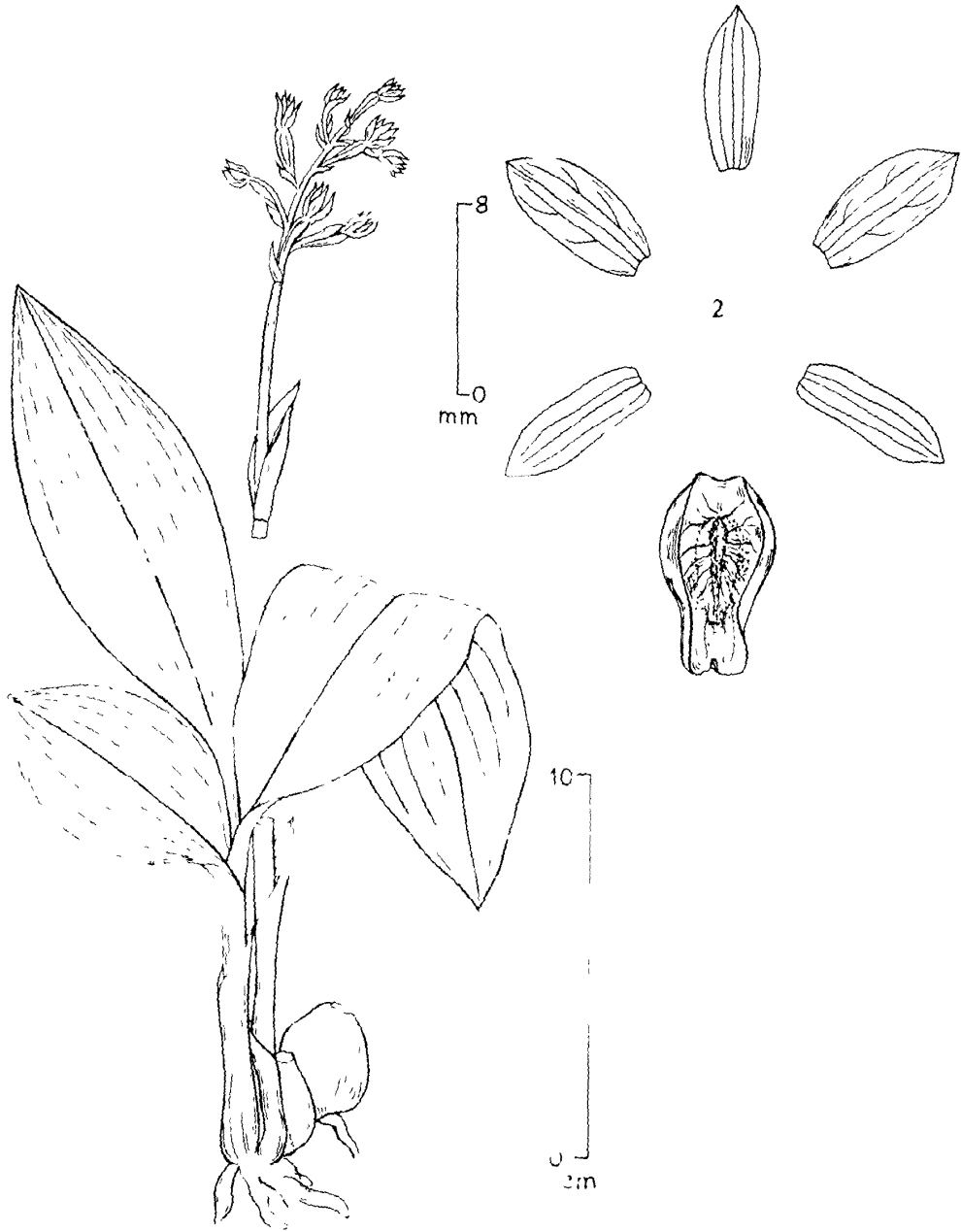


PLATE 28

Fig. 1-2. *Geodorum densiflorum* (Lam.) Sch. 1. Habit; 2. Sepals and Petals with lip.

(For details regarding identity and nomenclature, please refer J. Vuijk in *Blumea* 11 : 226–228. 1961).

Slender terrestrial herbs, 21–54 cm high with more or less fleshy, fasciculate roots. *Leaves* in clusters, at the base of the flowering shoot, 3.0–12.0 × 0.5–0.9 cm, linear-lanceolate or elliptic or oblanceolate, narrowed into sheathing base. *Inflorescence* erect spikes, 20–47 cm long, twisted. *Scape* with a few tubular sterile bracts. *Flowers* many, secund, white, scented. *Bracts* 4.0–7.0 × 1.5–2.0 mm, usually longer than ovary, oblong-lanceolate, acute. *Ovary* ca 4 mm long. *Dorsal sepal* ca 3.5 × 1.2 mm, oblong-lanceolate, obtuse 1-nerved. *Lateral sepals* ca 3.5 × 1.2 mm, oblong-lanceolate, obtuse, 1-nerved. *Lateral petals* ca 3.2 × 1.1 mm, spatulate or oblanceolate, obtuse, cohering with dorsal sepal, 1-nerved. *Lip* ca 4 mm long, geniculate at the middle, obscurely 3-lobed; sidelobes erect, narrow; midlobe flabellate, strongly reflexed, crumpled at margin, retuse at tip. There are 2 lateral calli, one on each side at the base. *Fruits* oblong, with marcescent perianths.

Flowering & Fruiting : May-June.

Lawson s.n. (MH Acc. No. 50687); *Rangachari s.n.* (MH Acc. No. 50691); *Schmidt s.n.* (MH Acc. No. 51091 p.p.) *Ellis* 38475; *Shetty* 34168 A. *Vajravelu* 38420; Common : Coonoor, Pykara, Mukurti Peak, Longwood R.F.—Kotagiri; Alt. 1800–2000 m.

S. sinesis var. *wightiana* Lindl., *Gen. & Sp. Orch.* 465. 1840; *Wight*, *Ic.* 4(4) : t. 172A. 1851. (left hand figure); *Hook. f.*, *Fl. Brit. Ind.* 6 : 102 1890; *Fischer* in *Fl. Pres. Madras* 1454. 1928 (Repr. ed. 3 : 1017. 1957). **Pl. 27, Fig. 6.**

Similar to *S. sinesis* but smaller plants, 10–18 cm high with many imbricating sheaths. Spike dense, short, 2.5–5.0 cm long, flowers large.

Flowering : June, November.

Beddome s.n. MH Acc. No. 51072; *Schmidt s.n. p.p.* (MH Acc. No. 50694); *Shetty* 34168 B; *Wight s.n.* (MH Acc. No. 50999); *Bangi Tapal-Sispara*; Alt. ca 2000 m.

16. GEODORUM G. JACKSON

Geodorum densiflorum (Lam.) Schltr., *Fedde Repert. Beih.* 4 : 159. 1919; *Fischer* in *Fl. Pres. Madras* 1434. 1928 (Repr. ed. 3 : 1004. 1957). *Limodorum densiflorum* Lam. *Encycl.* 3 : 516. 1792. *Geodorum purpureum* R. Br. in *Aiton f., Hortus Kew.* 5 : 207. 1813; *Hook. f.*, *Fl. Brit. Ind.* 6 : 16. 1890. *G. dilatatum auct. non* R. Br. : *Hook. f.*, *l.c.* 6 : 17. 1890.

Pl. 28, Figs. 1–2.

Stout, terrestrial herbs with swollen root stock. *Stem* short, stout, arising laterally from the underground root stock, with tubular sheaths at base. *Leaves* 10.0–24.5 × 4.0–6.3 cm, elliptic-lanceolate, plicate, acute. *Inflorescence* crowded raceme, ca 33 cm long, with erect scape and strongly arcuate flowering

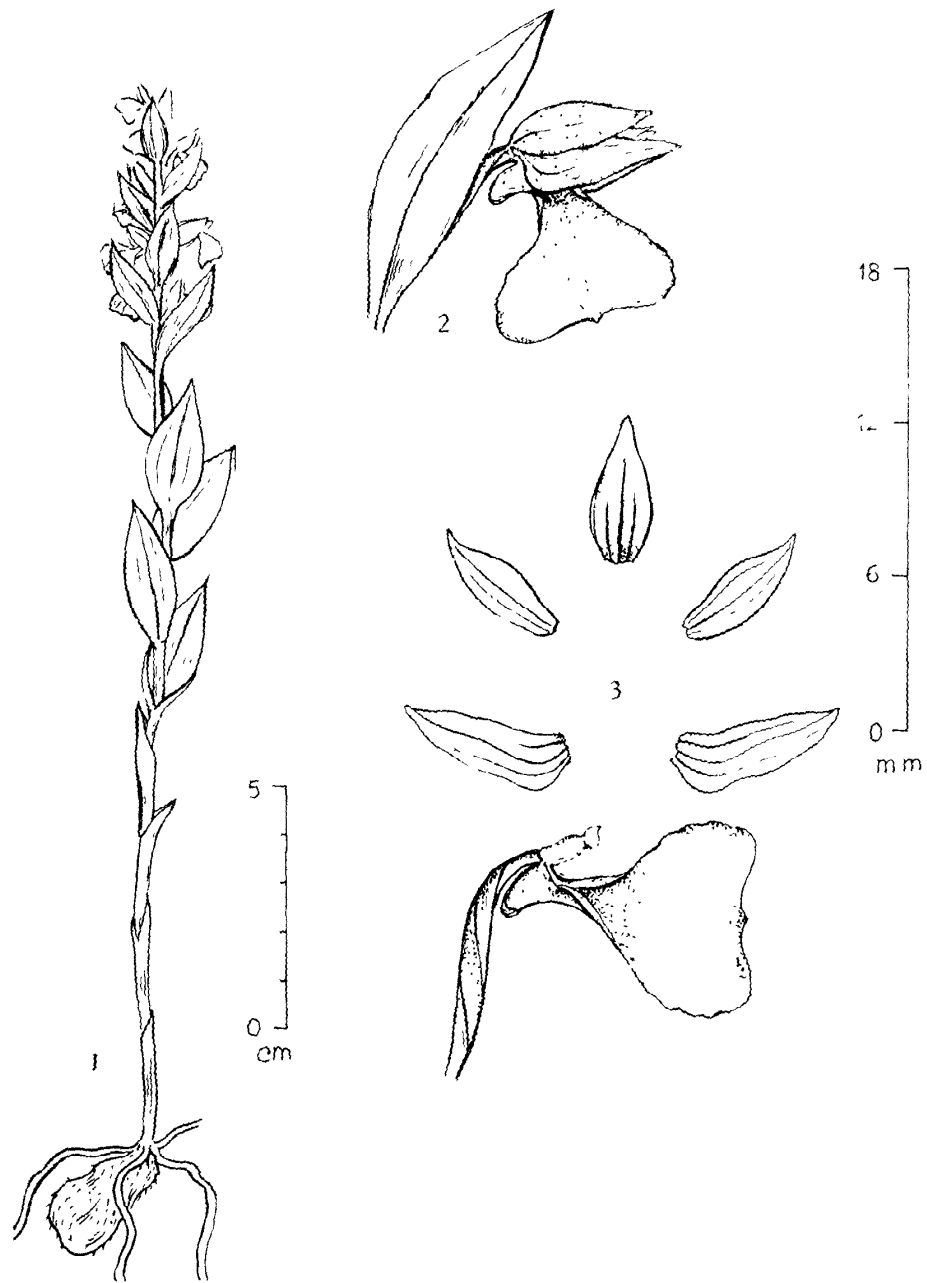


PLATE 29

Fig. 1-3. *Brachycorythis lantha* (Wt.) Summerh. 1. Habit; 2. Flower; 3 Sepals, Petals and lip with ovary.

portion; scape thick, arise from the side of the fresh off-shoot, covered by sheaths. *Flowers* purplish white, perianth not spreading. *Bracts* 4.0–10.0 × 1.5–2.0 mm, lanceolate, acuminate. *Ovary* and pedicel ca 1.1 cm long. *Dorsal sepal* ca 7 × 2 mm, oblong-lanceolate, acute. *Lateral petals* ca 7 × 3 mm, broader than sepals, oblong, acute at tip. *Lip* ca 8 mm long, subpandurate, purple streaked within, with a median channelled oblong yellow ridge, ventricose at base, rim involute, more or less truncate with a median sinus.

Flowering : August.

Lawson s. n. (MH Acc. No. 50389), Gudalur Ghat; Alt. 90–900 m.

17. BRACHYCORYTHIS Lindl.

Easily mistaken for a *Habenaria* or *Peristylus* because of the habit. Plants of *Brachycorythis* can be distinguished by the very conspicuous entire, obcordate lip and the sessile stigma. They are extremely variable in the size of entire plants, flowers, congestion of inflorescence and the size of lip. Hence, the taxonomic varieties treated in Floras have to be considered as only ecological variants.

Brachycorythis iantha (Wight) Summerh. in Kew Bull: 1955 : 258. 1955. *Platanthera iantha* Wight, Ic. 5(1) : t. 1692. 1852. *P. affinis* Wight, Ic. 5(1) : 12. t. 1693. 1851. *Habenaria galeandra* Benth. var. *nilagirica* Hook. f., Fl. Brit. Ind. 6 : 164. 1890. **Pl. 29, Figs. 1–3.**

Terrestrial herbs, 17–37 cm high. *Tubers* 1 or 2, oblong hairy, 1.5–3.2 × 1.0–1.5 cm. Basal part of the stem bereft of leaves, elongated or not, with 4 or 5 infundibular sheaths. *Leaves* 5–8, equally spaced, imbricating, ovate-lanceolate, 2.0–5.5 × 0.8–1.5 cm, acute-mucronate at tip, sheathing at base. *Inflorescence* short, few-many flowered spike, flowering part of the stem not clearly defined from the vegetative part because of the foliaceous bracts and want of scape. *Flowers* pink, sessile. *Bracts* vary in size, foliaceous, ovate, acute, larger than the flowers. *Sepals* minutely papillose. *Dorsal sepal* ca 6.0 × 2.2 mm, ovate, erect, concave, obtuse, 3-nerved; nerves prominent on the dorsal side, adnate to the lateral sepals and petals to form a hood over the short column. *Lateral sepals* ca 7.0 × 2.5 mm, obliquely lanceolate, acute, 3-nerved, all the nerves more or less ridged on the dorsal side, adnate to the dorsal sepal along the upper margin up to two third of its length forming a hood. *Lateral petals* ca 6 × 2 mm, lanceolate, acute, adnate to the dorsal sepal along the whole length held concealed within the sepals. *Lip* ca 8 × 8 mm, flabellate, obcordate, narrowed into a claw at the base, claw 2-ridged, puberulous towards the base, margin wavy with a conical mucro in the shallow sinus. *Spur* 2.0 × 1.5 mm, conical or oblong, cleft at base, puberulous within. *Column* short with an auricular flap at the tip.

Flowering : May–August.

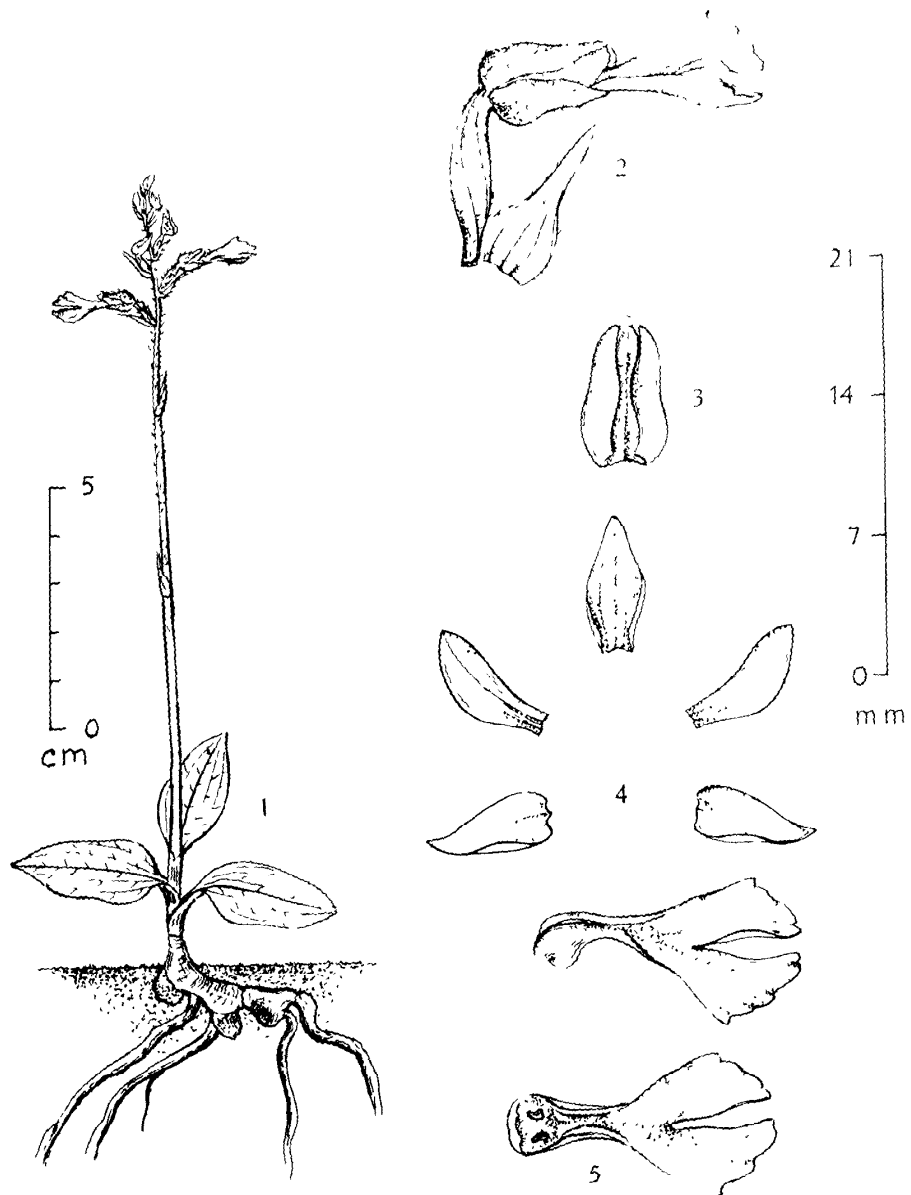


PLATE 30

Fig. 1-5. *Zeuxine longilabris* (Lindl.) Benth. ex Hook. f. 1. Habit; 2. Flower (lateral view); 3. Dorsal sepal with lateral petals forming a hood; 4. Sepals and Petals with lip. 5. Lip (Spread out)

Barber 692; *Ellis* 34623, 38481; *King s. n.* (MH Acc. No. 50960); *Lawson s. n.* (MH Acc. Nos. 50865, 50961); *Rangachari s. n.* (MH Acc. No. 50948); *Subramanyam* 10515. Common : Ooty, Pykara, Porthimund, Mudimund, Naduvattam—Devarshola; Alt. 1800–2300 m.

18. ZEUXINE Lindl.

Zeuxine longilabris (Lindl.) Benth. ex Hook. f., Fl. Brit. Ind. 6 : 107. 1890; Fischer in Fl. Pres. Madras 1456. 1928 (Repr. ed. 3 : 1018. 1957); Sant. & Kapad., Orch. Bombay 169. t. 39. 1966. *Monochilus longilabre* Lindl., Gen & Sp. Orch. 487. 1840. *Monochilus affine* Wight, Ic. 5(1) : 16. t. 1728. 1852, non Lindl. 1840. **Pl. 30. Figs. 1-5.**

Slender herbs 13–15 cm tall, in dark shady places, with slender decumbent, rhizome; rhizome swollen at nodes with thick roots. *Leaves* 3, rarely 4, 1.5–3.7 × 0.7–1.4 cm, membranous, pinkish on drying, crowded at the base of the inflorescence, ovate-acute, sheathing at base. *Inflorescence* racemes, 12–15 cm long, villous; scape with one or 2 large sterile bracts. *Flowers* large, column conspicuous. *Bracts* ca 9 × 4 mm, as long as the ovary or slightly longer than it, broadly lanceolate, acuminate. *Ovary* subsessile, ca 8 mm long. *Dorsal sepal* 7–8 × ca 3 mm, ovate-oblong, obtuse, connate with lateral petals to form a hood, villous outside. *Lateral sepals* 6–7 × ca 3 mm, ovate-subfalcate, obtuse, villous outside, free. *Lateral petals* 7.0–8.0 × ca 2.5 mm, falcate, obtuse, connate at base, rhomboid in outline, narrowed into a claw (claw ca 3 mm) deeply cleft, uneven at the distal margin, 2 horned within the sac.

Flowering : February.

Vajravelu 39772, Kunjapanai forest; Alt. ca 1200 m.

The genera *Cheirostylis* and *Zeuxine* resemble each other very closely.

19. CHEIROSTYLIS Blume

Cheirostylis flabellata Wight, Ic. 5(1) : 16. t. 1727. 1852 (t. mentioned as *Monochilus flabellatum*); Hook. f., Fl. Brit. Ind. 6 : 105. 1890; Fyson, Fl. Nilgiri & Pulney Hill-tops 1 : 398. 1915 & 3 : 112. t. 517. 1920; Fischer in Fl. Pres. Madras 1454. 1928 (Repr. ed. 3 : 1017. 1957). *Goodyera flabellata* A. Rich. in Ann. Sci. Nat. ser. 2. 15 : 79. t. 12. 1841. **Pl. 31, Figs. 1-4.**

Slender, semisucculent herbs, 12–22 cm tall, in shady places, with decumbent rhizome. *Stem* short, 3–10 cm long, covered by sheathing bases of leaves. *Leaves* 4–7, 1.5–3.5 × 1.5 cm, ovate, acute, petiole with sheathing base, membranous. *Inflorescence* racemes 9–16 cm long, with long scape, glandular hairy. *Scape* slender with 2 or 3 sterile tubular bracts. *Flowers* a few, restricted towards the apex, with conspicuous ovary, white-light purple with conspicuous fimbriate lip. *Bracts* ca 6.5 × 2.5 mm, lanceolate, acuminate with glandular hairs on the outer surface. *Ovary* and pedicel ca 7 mm long. *Sepals* and *petals*

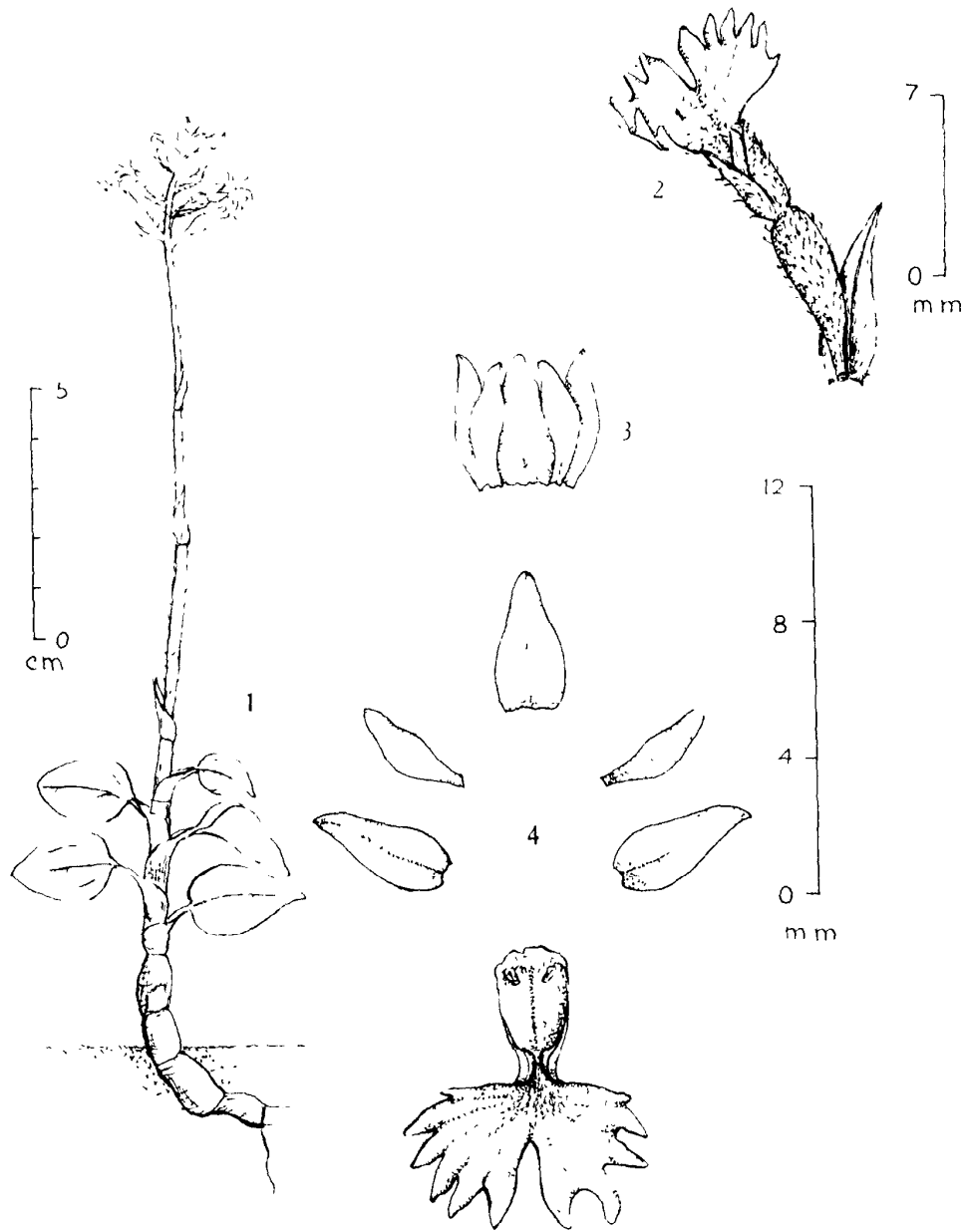


PLATE 31

Fig. 1-4. *Cheirostylis flobellata* Wt. 1. Habit; 2. Flower; 3. Sepals and lateral petals conate to form a tube; 4. Sepals and Petals with lip (Spread out)

unite to form a tube. Sepals glandular hairy without. *Dorsal sepal* ca 4 × 2 mm, ovate, broadly lanceolate, obtuse, sparsely gland-dotted. *Lateral sepals* ca 4.0 × 1.7 mm, lanceolate-oblong, obtuse, sparsely gland-dotted or not. *Lateral petals* ca 3.5 × 1.0 mm, narrower than sepals, falcately elliptic, obtuse, narrowed at the base, connivent with the dorsal sepal, sparsely gland-dotted. *Lip* ca 7 mm long, exerted, conspicuous, constricted about the middle, with a claw like lower portion (claw ca 3 mm) and a flabellate, subgeniculate upper portion. Lower half concealed within perianth tube, slightly dilated towards the base with 2 calli within at the very base. Upper portion with a deep median cleft, margins irregularly, deeply lobed, finely pubescent at the base on the dorsal surface.

Flowering: February-March.

Barber 5543; *Fischer* 3928 & s, n, (MH Acc. No. 83556); *Sebastine* 5661; *Sharma* 39839; *Vajravelu* 43579; Fairly common; Coonoor, Pakasura Kalhatti; Alt. 1500-2000 m.

20. CALANTHE R. Br.

Calanthe triplicata (Willem). Ames in Philipp. J. Sci. Bot. 2 : 326. 1907. *Orchis triplicata* Willem. in Usteri Ann. Bot. 18 : 52. 1796. *Limodorum veratrifolium* Willd., Sp. Pl. 4 : 122. 1805. *Calanthe veratrifolia* (Willd.) Ker-Gawl. in Bot. Reg. 9. t. 720. 1823; Hook. f., Fl. Brit. Ind. 5 : 851. 1890; Fyson, Fl. Nilgiri & Pulney Hill-tops 1 : 391. 1915 & 3 : 110. t. 511. 1920; Fischer in Fl. Pres. Madras 1432. 1928. **Pl. 32, Figs. 1-2.**

Large, terrestrial, foliaceous herbs, in well shady places, in humus soil, 30-70 cm high, erect, with two sheathing bracts at base, rhizome creeping. *Leaves* 34-58 × 6-13 cm, broadly elliptic-lanceolate, oblong, narrowed into short or long petiole, acute, shortly acuminate, plicate. *Inflorescence* erect, terminal racemes, 30-70 cm long. *Scape* with sterile, long infundibular, sheathing bracts at intervals. *Flowers* pale lilac, restricted to the apex, dense. *Bracts* 0.7-2.0 × 0.4-0.6 cm, ovate-lanceolate, acute, foliaceous, persistent. *Ovary* with *pedicel* 2-3 cm long, filiform. *Dorsal sepal* 11-12 × 6-7 mm, as long as or slightly shorter than lateral ones, lanceolate, obtuse, three-nerved, median nerve thickened into a subterminal cusp on the dorsal side. *Lateral sepals* 12-13 × 5-7 mm, obliquely oblong, obtuse, with a subterminal cusp on the dorsal side. *Lateral petals* ca 11 × 5-6 mm, obovate-oblong, obtuse. *Lip* 15-17 mm long, spurred, trilobed; sidelobes erect, adnate to the column throughout its length, forming a tube; mid-lobe tripartite; lateral segments linear, obtuse, middle segment larger than the side ones, cuneate, cleft deep or shallow. *Spur* ca 17 mm long.

Flowering: May-July, October. *Fruiting*: March, October, November.

Balakrishnan 106; *Deb* 31588; *Ellis* 34731; *Lawson* s. n. (MH Acc. No. 50404, 50405, 50406); *Sebastine* 3253 (vegetative); *Shetty* 34087; *Vajravelu*

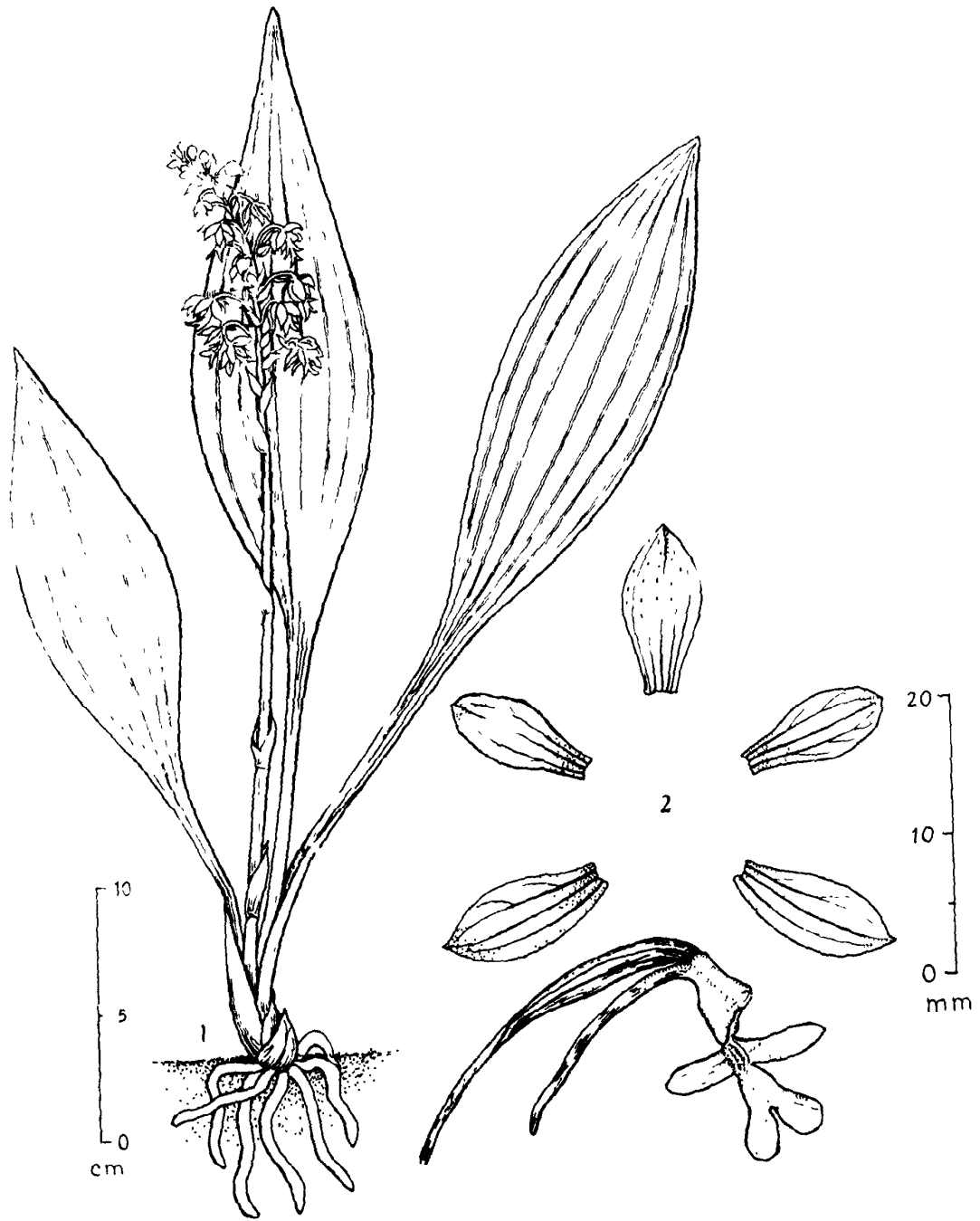


PLATE 32

Fig. 1-2. *Calanthe triplicata* (Willem.) Ames. 1. Habit; 2. Sepals, petals and lip with ovary.

35121, 37035; *Vivekananthan* 42901; *Wight s. n.* (MH Acc. No. 50399); Common: Kotagiri, Doddabetta, Coonoor picnic spot, Avalanche; Alt. 1800–2075 m.

21. PECTEILIS Rafin.

Pecteilis gigantea (J. E. Sm.) Rafin., Fl. Tell. 2 : 38. 1837; Seidenf. & Smitin. Orch. Thailand 1 : 52. 1959. *Orchis gigantea* J. E. Sm., Exot. Bot. 2 : 79. t. 100. 1805. *Platanthera susannae* auct. pl. non (L.) Lindl. (1835); Wight, Ic. 3(1) : 12. t. 920. 1844; Fischer in Fl. Pres. Madras 1475. 1928 (Repr. ed. 3 : 1031. 1957); Sant. & Kapad. Orch. Bombay 42. t. 7 & 8. 1966. *Habenaria susannae* auct. pl. non (L.) R. Br. ex Spr. (1826); Hook.f., Fl. Brit. Ind. 6 : 137. 1890.

Terrestrial herbs, 60–120 cm high. *Tubers* 2, ellipsoid or ovoid. *Stem* stout with 3 or 4 sheaths below and leafy up to the inflorescence. *Leaves* 7–9 7.5–13.6 × 2.4–5.6 cm, ovate-oblong or oblong-lanceolate, acute or acuminate at tip, sheathing at base, midnerve prominent beneath, leaves transformed into large, foliaceous sheathing bracts in the inflorescence. *Inflorescence* raceme 2–6 flowered, 16–20 cm long. *Flowers* bright white, faintly tinged with green, fragrant. *Bracts* 6.0–10.0 × 1.5–2.0 cm, longer than ovary and ensheathing it, oblong-lanceolate, acuminate at tip, often sharply pointed at tip, several. *Ovary* ca 4.3 cm long, strongly ribbed, green with 4 yellowish ridges. *Perianth* parts are thick and more or less brittle. *Dorsal sepal* ca 4.6 × 3.4 cm, very broad, obovate-rhomboid, revolute on the margins, obtuse, 5-nerved. *Lateral sepals* ca 4.4 × 1.8 cm, obliquely sub-quadrately oblong, acute, spreading slightly backwards, revolute on the margins. *Lateral petals* ca 3.4 × 0.4 cm, linear-oblong, much narrower than the sepals, acute at tip. *Lip* ca 4.7 × 9.0 cm, flabellate, tripartite; sidelobes truncate, pectinate: midlobe elliptic, slightly dilated beyond the middle, obtuse. *Spur* twice as long as the ovary, 8.0–11.5 cm long, about 3–5 mm in diameter, obtuse, mouth broad.

Pecteilis gigantea (J. E. Sm.) Rafin. is the correct of name the Indian species (cf. Seidenf., Dansk Bot. Ark. 31 (3) : 22 & 23. t. 8. 1977) while *P. susannae* (L.) Rafin. represents the species, so far known “in Eastern Asia from China down to Northern Malaya (including Thailand) and in Indonesia from Java to Amboina”. And it is characterised by the lateral petals being much shorter than the sepals instead of being little shorter and the midlobe of the lip being longer than the sidelobes instead of being equal (cf. Sant. & Kapad. l.c., t. 8). Besides, in *P. susannae* (L.) Rafin. the laciniation of the sidelobes of the lip is less deep and more regular than in *P. gigantea* (J. E. Sm.) Rafin.

Flowering: September–October.

Lawson s. n. (MH Acc. No. 50942); *s. l.* (MH Acc. No. 50939); Nadugani, Ooty; Alt. 600–1150 m.

22. HABENARIA Willd.

One of the largest genera of about thirty species and three varieties from erstwhile Presidency of Madras. Of these, nineteen species are reported from Nilgiri hills, but here only sixteen are included omitting the doubtful ones. *Habenarias* are typical terrestrial orchids having underground tubers. Soon after the first showers of rain (May–July) the tubers sprout to complete their life before the dry season. They occur in shady places on the hill slopes in humus soil. Flowers are not very attractive as a whole, but a group of them, as often seen in nature, present a pleasant appearance. Flowers are either white or greenish-white or rarely yellow, with characteristic column and anther cells. The two anther cells are held parallel or diverging, forming channels or tubes accommodating the caudicles of pollinia on the sides of the rostellum. The pollinia are also peculiar in that they look like a bunch of granules with conspicuous long or short caudicels, as well as naked large glands. The stigmatic lobes often extend as clavate processes.

- 1a. Leaves 2, sub-orbicular, subcordate, radical, well appressed to the ground ... *1. H. crassifolia*
- 1b. Leaves 3 or more, ovate-lanceolate or elliptic, not cordate, cauline, radical, not appressed to the ground (except in *H. plantaginea*)
- 2a. Petals distinctly bipartite
- 3a. Petals bearded ... *2. H. elwesii*
- 3b. Petals glabrous
- 4a. Plants short 7–15 cm, with subradical leaves; flowers 1–2; upper lobe of petal broadly ovate; spur much longer than the ovary ... *3. H. rariflora*
- 4b. Plants tall 30–65 cm, with cauline leaves; flowers many in racemes; upper lobe of the petal narrowly falcate, (both lobes linear); spur as long as or shorter than the ovary
- 5a. Leaves clustered at the middle, lower lobe of the petal much longer than the upper lobe; sidelobes of the lip much longer than the midlobe ... *4. H. multicaudata*
- 5b. Leaves scattered, lower lobe of the petal little shorter than the upper lobe; midlobe of lip slightly longer than the side-lobe ... *5. H. digitata*
- 2b. Petals entire

- 6a. Side-lobes of the lip linear, entire
- 7a. Leaves subradical, clustered; bracts narrow; flowers scattered, on long lax-flowered raceme; spur longer than ovary ... 6. *H. furcifera*
- 7b. Leaves cauline, scattered; bracts foliaceous; flowers in secund or subsecund spikes; spur shorter than ovary
- 8a. Midlobe of the lip much broader than sidelobes and triangular; spur much shorter than ovary; flowers large, conspicuous, yellow ... 7. *H. perrottetiana*
- 8b. Midlobe of the lip linear, oblong; spur a little shorter than ovary; flowers small inconspicuous, white or greenish
- 9a. Flowers white, many; lip with a long claw; lateral petals broader than the lateral sepals ... 8. *H. heyneana*
- 9b. Flowers greenish, 2 or 3 only; lip without claw; lateral petals narrower than the lateral sepals ... 9. *H. barnesii*
- 6b. Side-lobes of the lip much broader than midlobe; entire, erose or pectinate
- 10a. Side-lobes of the lip fimbriate or pectinate
- 11a. Lateral sepals scurfy pubescent within; lateral petals with marginal setose hairs; spur shorter than ovary ... 10. *H. cephalotes*
- 11b. Lateral sepals glabrous; lateral petals without setose hairs at margins; spur longer than ovary ... 11. *H. polyodon*
- 10b. Side-lobes of the lip otherwise
- 12a. Lateral petals triangular and gibbous at base; lip not longer than other perianth parts
13. Lateral sepals scurfy pubescent; lip with a ligule at the mouth of spur, entire or uneven at outer margin ... 12. *H. elliptica*
- 13b. Lateral sepals glabrous; lip without a

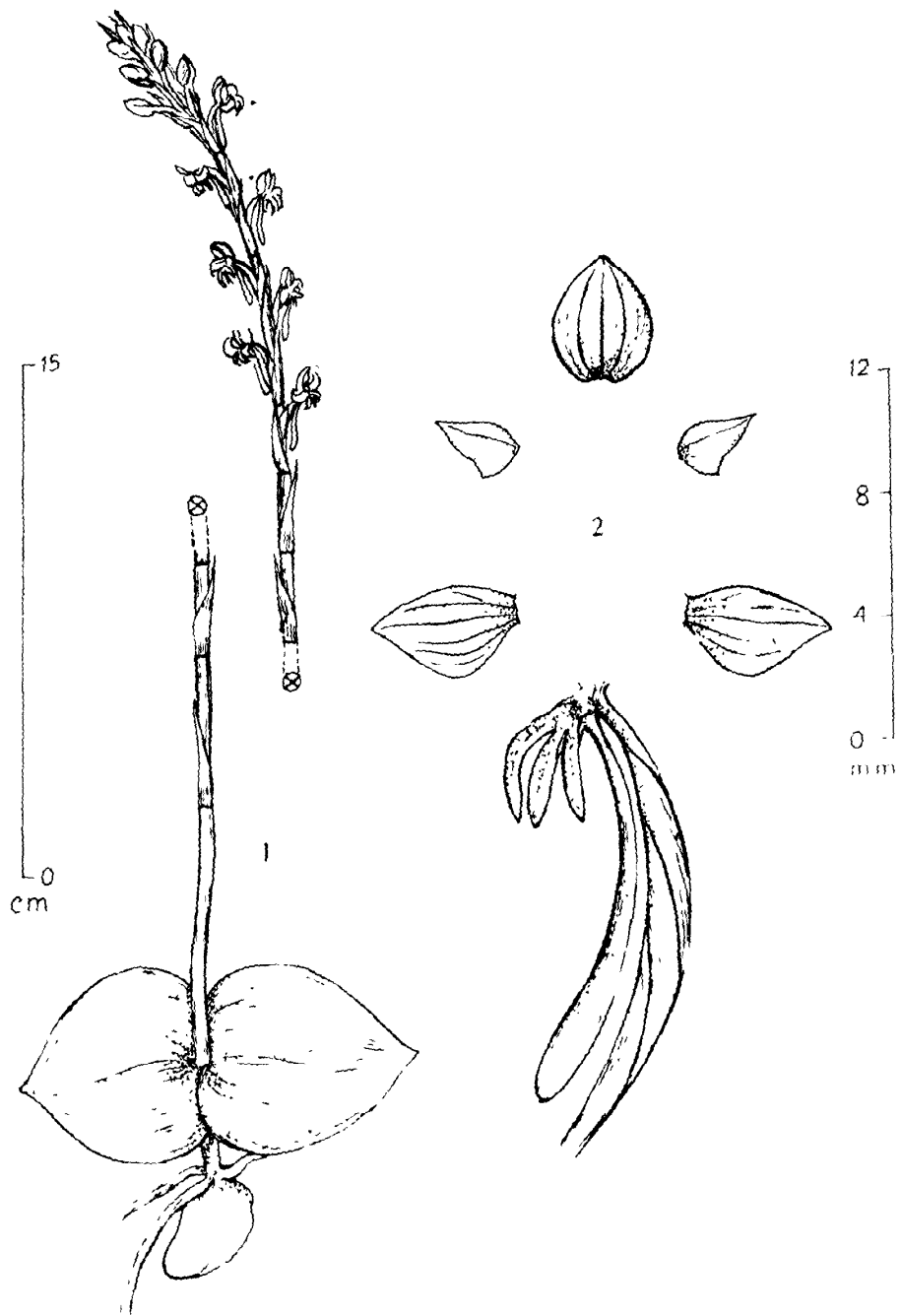


PLATE 33

Fig. 1-2. *Habenana crassifolia* A. Rich. 1. Habit; 2. Sepals, Petals and lip (with ovary)

ligule at the mouth of the spur,
denticulate at outer margins ...

13. *H. richardiana*

12b. Lateral petals narrowly ligulate or
oblanceolate to elliptic; lip longer than
other perianth parts

14a. Flowers usually two on forked
inflorescence apex; spur more than
twice longer than ovary ...

14. *H. longicorniculata*

14b. Flowers a few to many in short or
long raceme; spur only a little longer
than ovary

15a. Leaves cauline; lateral petals
narrowly ligulate-oblanceolate;
lip a little longer than petals
and sepals ...

15. *H. longicornu*

15b. Leaves radical; lateral petals
falcately elliptic; lip much
larger than sepals and petals ...

16. *H. plantaginea*

**1. *Habenaria crassifolia* A. Rich. in Ann. Sci. nat. Ser. 2. 15 : 72 t. 3c. 1841 ;
Hook. f., Fl. Brit. Ind. 6 : 151. 1890. excl. syn. *H. brachyphylla* Reichb. f. ;
Fyson, Fl. Nilgiri & Pulney Hill-tops 1 : 404. & 2 : t. 256. 1915 ; Fischer in
Fl. Pres. Madras 1471. 1928 (Repr. ed. 3 : 1028. 1957) ; Sant. & Kapad.,
Orch. Bombay 22. t. 6. fig. 23. 1966. **Pl. 33. Figs. 1-2.****

Herbs, 15–38 cm tall; tubers 1–2, unequal, 1.5–3.5 × 0.4–2.0 cm, ovoid-oblong. *Leaves* 2 (rarely 3), more or less fleshy, sheathing at base, 2.0–4.0 × 1.8–5.7 cm, abruptly acute to conical at apex. *Inflorescence* 14–36 cm, many flowered, raceme lax; peduncle long, green, cylindrical, covered by sterile sheathing bracts. *Flowers* small, white, shortly pedicellate, bracteate. *Bracts* unequal 1.0–3.0 × 0.4–0.8 cm, ovate-lanceolate, acuminate, 1-nerved, equaling or slightly shorter than the ovary. *Dorsal sepal* ca 4.0 × 3.5 mm, broadly ovate, erect and hooded, obtuse at tip, with 3 main nerves which are ridged on the dorsal side. *Lateral sepals* ca 5 × 3 mm, obliquely ovate-lanceolate, spreading and curved backward about the middle, obtuse at tip with 3 main nerves. *Petals* ca 3 × 2 mm, obliquely lanceolate, with sub-basal small triangular lobe, sharply apiculate at tip, erect, adhering to the sides of the hooded sepal, 1-nerved, much smaller than the sepals. *Lip* ca 4.5 mm, subequal with the sepals, deeply trilobed leaving a short, entire portion at the base, and with a spur almost as long as the ovary; lobes subequal, linear, spreading, reflexed, acute at tip. *Spur* ca 1.3 cm long, curved, slightly inflated. *Ovary* and pedicel ca 1.6 cm, ribbed.

Flowering: July.

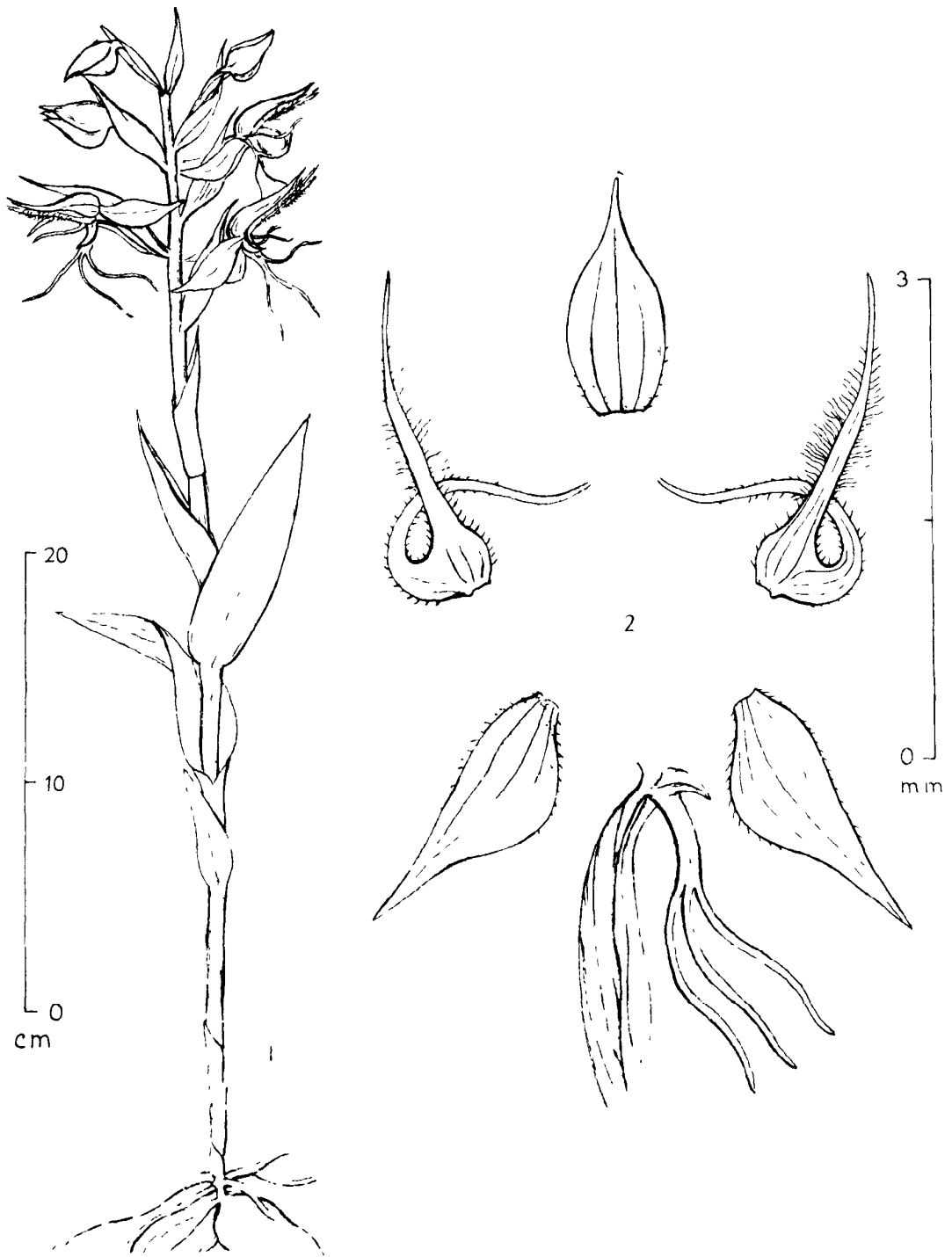


PLATE 34

Fig. 1-2. *Habenaria elwesii* Hook. f. 1. Habit; 2. Sepals, Petals and Lip (with ovary)

H. plantaginea and *H. crassifolia* appear similar in that both possess radical leaves well appressed to the ground, but flowers of the former have quite larger flabellate side lobes for the lip and also leaves are more than two and elliptic.

Barnes 2231; *Beddome s. n.* (MH Acc. No. 50899); *Lawson s. n.* (MH Acc. No. 50881); 10540; *Subba Rao* 41568. Common; Naduvattam, Gudalur, Ebanad-Sirur, Devarshola; Alt. ca 1600 m.

2. *H. elwesii* Hook. f. in Bot. Mag. t. 7478. 1896; Fischer in Fl. Pres. Madras 1468. 1928 (Repr. ed. 3 : 1026. 1957). **Pl. 34. Figs. 1-2.**

Herbs, erect, slender, 25-60 cm high; tuber ca 2 × 1 cm, hairy. Lower leaves reduced to sheaths (3 or more). *Leaves* 3-6, alternate, about the middle of stem, 4.0-7.5 × 1.2-2.0 cm, lanceolate to oblong, acute and cuspidate at tip, long sheathing at base. *Inflorescence* 8-20 cm long, lax flowered, erect. *Flowers* large, ca 3.2 cm long, sessile, bracteate. *Bracts* ca 3.3 × 1.0 cm, foliaceous, cymbiform, erect, embracing the flower, longer than the ovary, broadly ovate-lanceolate, abruptly acuminate at tip, finely puberulous along the margin, venation reticulate. *Dorsal sepal* ca 1.4 × 0.6 cm, erect, ovate-oblong, concave, abruptly acuminate at tip, finely scabrid, especially towards the base, along the margins and nerves beneath, 3-nerved, prominent on the external surface. *Lateral sepals* 1.7-1.9 × ca 0.6 cm, obliquely lanceolate, spreading, abruptly acuminate at tip, slightly longer than dorsal sepal, 5-nerved, of which lateral ones submarginal, nerves prominent beneath, finely puberulous along the margin and scabrid towards the base on the external surface. *Lateral petals* bipartite, almost to the base, ca 2.0 × 0.5 cm, upper segment ca 1.8 cm long, ca 0.15 cm broad, subulate, erect, held parallel to the dorsal sepal, densely hirsute or bearded along the margins in the mid-portion, finely puberulous along the basal margins and naked towards the apex; lower segment slightly shorter, curved or spreading, (1.3-1.7 cm) narrower than the upper, shortly hirsute along the margin in the lower half, naked towards the apex. *Lip* spurred, longer than ovary, trilobed below the middle with a narrow claw, 5-6 mm long, ca 2 mm broad at the claw; lobes narrow, 1.4-1.8 cm long, divaricate, midlobe subequal with side lobes, claw with a conspicuous, broad, erect ligule at the mouth of the spur. *Spur* ca 1.8 cm long, slender, shorter than the ovary. *Ovary* ca 2.5 cm long.

Flowering: September.

Barber 2033, Devala; Alt. ca. 900 m.

3. *H. rariflora* A. Rich. in Ann. Sci. nat. Ser. 2. 15 : 70. t. 20. 1841; Wight, Ic. 5 (2) : 11. t. 924. 1844; Hook. f., Fl. Brit. Ind. 6 : 136. 1890; Fyson, Fl. Nilgiri & Pulney Hill-tops 1 : 400. 1915 & 3 : 112. t. 519. 1920; Fischer in Fl. Pres. Madras 1469. 1928 (Repr. ed. 3 : 1027. 1957); Sant. & Kapad., Orch. Bombay 15. t. 3. fig. 9-10. 1966 **Pl. 35. Figs. 1-2.**

Herbs, often lithophytic, 7-20 cm high (with inflorescence), slender, erect; tubers 1-2, ovoid or oblong, 1.0-2.5 × 0.5-1.0 cm. *Leaves* 3 or 4, subradical

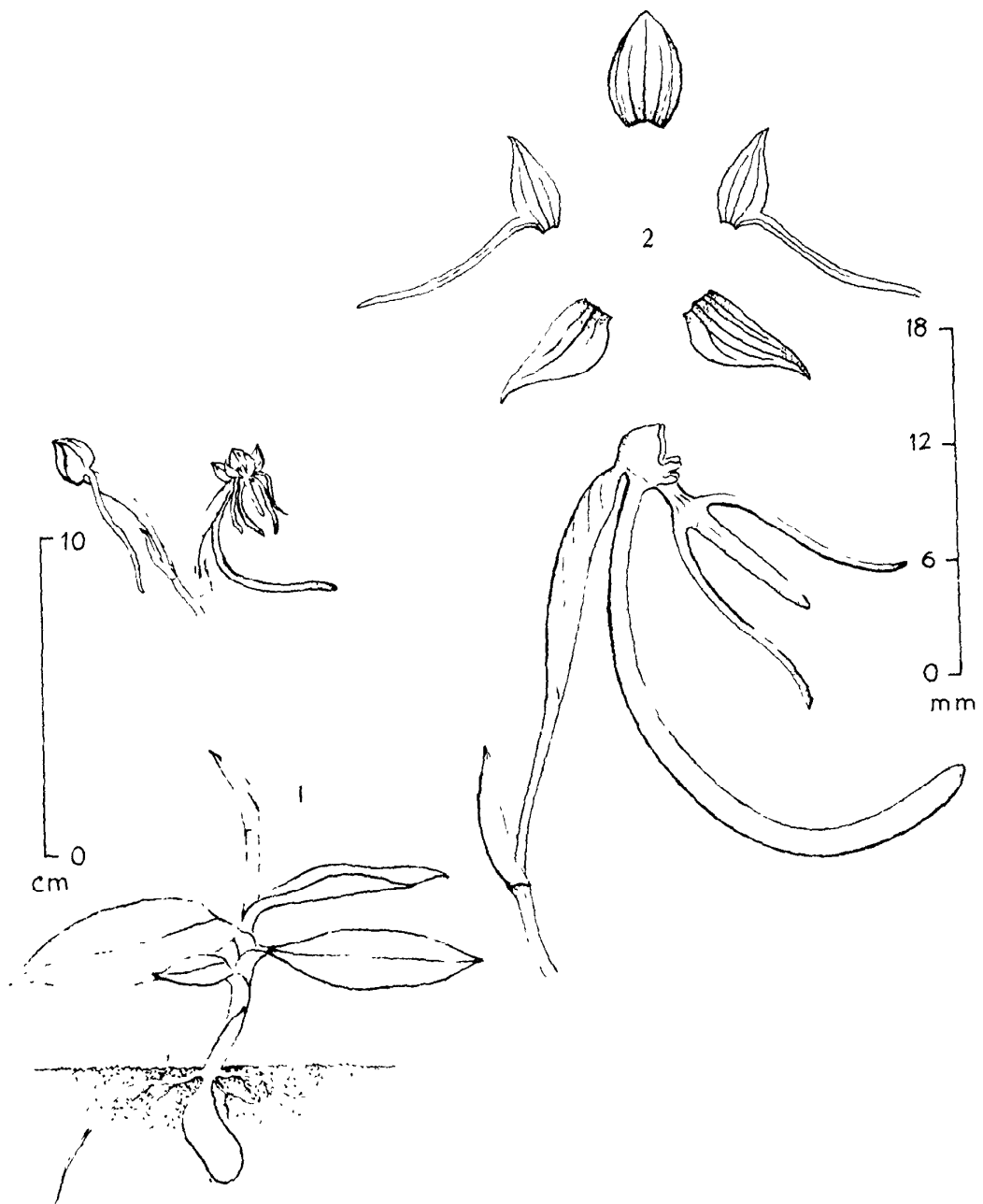


PLATE 35

Fig. 1-2. *Habenaria rariflora* A. Rich. 1. Habit; 2. Sepals, Petals and Lip (with ovary)

with 1 or 2 reduced leaves at the base, 3.0–7.0 × 1.0–1.7 cm, linear-lanceolate or elliptic-oblong, mucronate at tip, sheathing at base. *Scape* 5–10 cm long with a basal sterile bract, usually 1-2 flowered. *Flowers* white, pedicellate, bracteate. *Bracts* unequal, lower ones often larger than the upper ones, 0.8–1.6 × 2.5–3.0 cm, ovate-lanceolate, shortly acuminate. *Dorsal sepal* ca 6 × 5 mm, broadly ovate, acute, 7-nerved (the extreme pair of nerves fainter). *Lateral sepals* ca 7.0 × 3.5 mm, obliquely ovate, spreading, acute at tip, 3-nerved. *Lateral petals* unequally bipartite, upper segment ca 5.5 × 2.5 mm, ovate, acute, 3-nerved; lower segment ca 10 mm long, filiform, acute. *Lip* trilobed with a short basal claw; claw ca 2 × 1 mm, lobes narrow; midlobe shorter than the lateral lobes, 8 mm long, linear, acute; lateral lobes ca 13 mm long, spreading. *Spur* 4 cm long, longer than ovary and pedicel, inflexed. *Fruits* long stalked, (with stalk ca 5.5 cm) erect with marcescent perianth, narrowly oblong.

Flowering & fruiting: August-December.

Gamble 12413; *Lawson s. n.* (MH Acc. No. 50749); *Narayanaswamy* 4294; *Sebastine* 4186 A; *Subba Rao* 37273; *Vajravelu* 36776 A, 43178; *Wight s. n.* (MH Acc. No. 5075). Common: Coonoor-Lambs rock, Pykara, Pakkasuralai-Anakatti area, Kodanad R. F.; Alt. 900–2000 m.

4. **H. multicaudata** Sedgw. in Rec. Bot. Surv. Ind. 6 : 353. 1919; Fischer in Fl. Pres. Madras 1469. 1928 (Repr. ed. 3 : 1026. 1957); Sant. & Kapad., Orch. Bombay 14. Pl. 4. fig. 21. 1966. **Pl. 36. Figs. 1-3 & Photo.**

Tall terrestrial herbs, 35–65 cm high. *Tubers* usually one (rarely two, then unequal) ovoid-oblong, 2–3.5 × 1–2 cm. *Stem* with several closely appressed sheaths on the lower part. *Leaves* clustered about the middle of the plant in flower, wavy at margins, 4.0–15.0 × 1.5–4.0 cm, elliptic-oblong, acute or sub-acuminate. *Inflorescence* many flowered racemes, 10–30 cm, lax. *Flowers* pale brownish green. *Bracts* 15–17 × 3–7 mm, trinerved, shorter than the beaked ovary, lanceolate, acute. *Ovary* with pedicel 17–27 mm long. *Dorsal sepal* ca 9 × 5 mm, strongly concave, erect, hooded, ovate or ovate-oblong. *Lateral sepals* ca 10 × 6 mm, obliquely ovate-oblong subfalcate, acute, spreading at first but later reflexed. *Lateral petals* bipartite, divaricate, posterior or upper segment 5–8 mm long, narrowly linear, filiform, subfalcate, erect along the sides of the dorsal sepal, anterior or lower segment 14–16 mm long, irregularly contorted, more filiform than the upper. *Lip* tripartite almost to the base, segment elongate, filiform, mid-segment ca 11 × 1 mm, curved downwards; lateral segments 20–25 mm long, more filiform than mid-segments, irregularly contorted. *Spur* 20 mm long, brownish green, much curved, shorter than the ovary, slender, apex clavate and subacute or rounded.

The above description is made from the collection from Mannarghat range, (Mukkali forest—Alt. 600 m) in July. This is a very rare orchid and the flowers look like a spider.

5. **H. digitata** Lindl., Gen & Sp. Orch. 307. 1835; Hook. f., Fl. Brit. Ind. 6 : 134 1890; Fischer in Fl. Pres. Madras 1469. 1928 (Repr. ed. 3 : 1026. 1957).

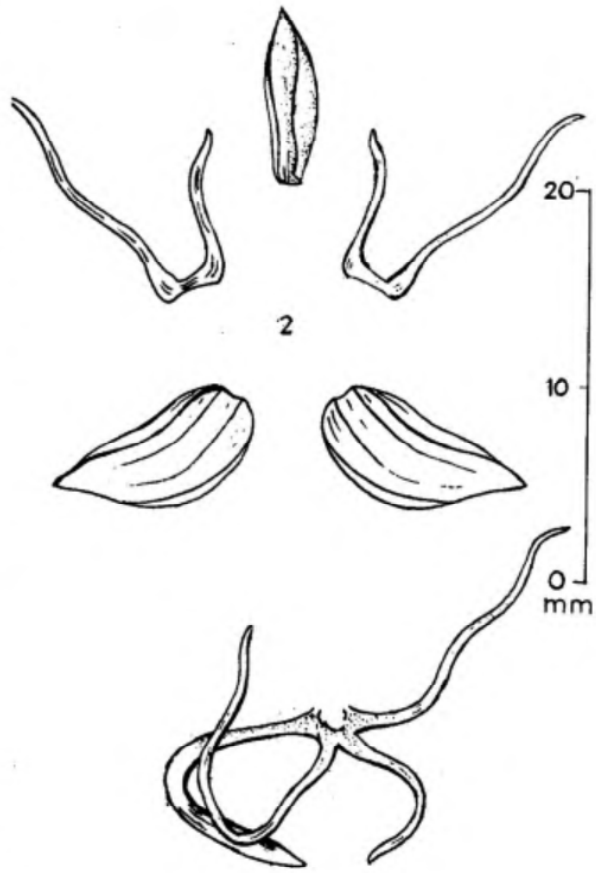
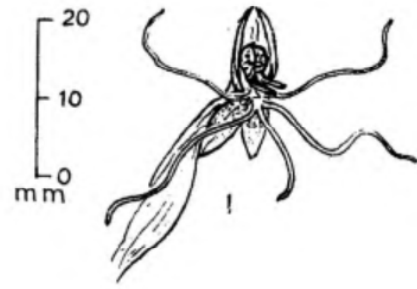
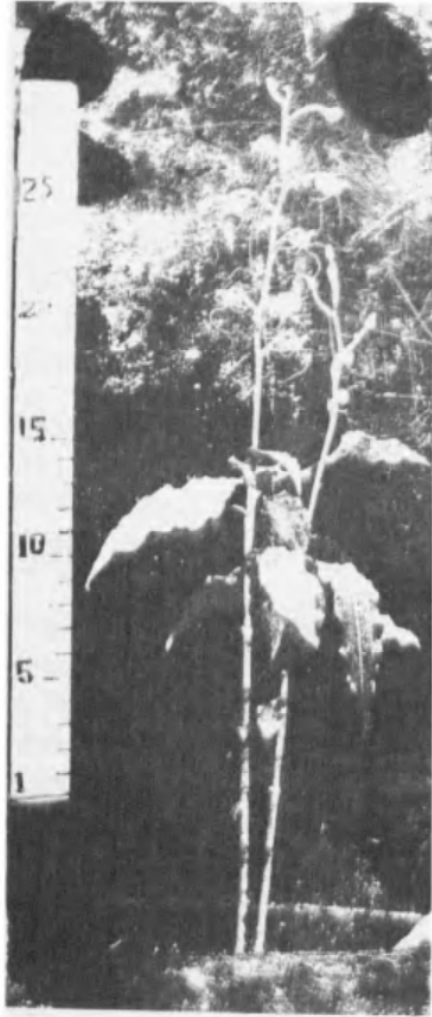


PLATE 36

Fig. 1-2. *Habenaria multicandata* Sedgw. 1. Flower; 2. Sepals, Petals and Lip F. Photo

Sant. & Kapad., Orch. Bombay 10. t. 3. fig. 7-8. 1966. *H. trinervia* Wight, Ic. 5(1) : 12. t. 1701. 1852. **Pl. 37. Figs. 1-3.**

Herbs, 23-35 cm tall. *Tubers* 1 or 2, globose-ovoid, stem slender sheaths 3-6, tubular with oblique mouth. *Leaves* alternate, 3.0-7.5 × 1.1-2.1 cm, elliptic-lanceolate, sheathing at base, acute or shortly acuminate at tip. *Inflorescence* raceme, up to 10 cm. *Flowers* green, bracteate, subsessile. *Bracts* ca 2.0 × 0.8 cm, ovate-lanceolate, shortly acuminate, foliaceous, sheathing, longer than the ovary, enveloping it. *Ovary* and *pedicel* ca 1.6 cm long. *Dorsal sepal* ca 7.5 × 4.5 mm, ovate-lanceolate, obtuse at tip, 5-nerved. *Lateral sepals* 9 × 3 mm, lanceolate, oblique at base, acute at tip, 3-nerved. *Lateral petals* bipartite up to the base, upper lobe ca 9.0 × 0.5 mm, filiform, as long as or shorter than the upper lobe. *Lip* trilobed from the base, ca 1.1 cm long; midlobe slightly longer than the side lobes, rarely shorter. *Spur* ca 1.1 cm long; mouth of the spur raised into a narrow rim or produced into a lanceolate ligule.

H. digitata seems to be a complex group showing variations in the degree of congestion of flowers, in the length of the lower lobe in relation to the upper one of the petals, and the midlobe in relation to the lateral lobes of the lip.

Fischer (*loc. cit.*) recognises 3 varieties under this species as follows, based on the characters mentioned against each. Previously different authors treated them as distinct species.

Smaller; leaves shorter than broader, imbricate; raceme dense flowered; segments of lip filiform; bracts shorter	...	<i>foliosa</i>
Leaves ovate-oblong; flowers much smaller; sepals pubescent within	...	<i>travancoria</i>
More robust; leaves longer and narrower; flowers much larger, fewer; no ligule in the mouth of the spur	...	<i>gibsonii</i>

Sant. & Kapadia (*loc. cit.*) treat var. *gibsonii* as a separate species and include var. *foliosa* under it, along with other varieties.

Flowering : August-November.

Barber 2643; *Bourne* 5348; *Lawson s. n* MH Acc. No. 51075); *Narayana* 18466; *Subba Rao* 37416; *Vivekanathan* 42935 A, 42935 B, 42896. Common : Naduvattam, Avalanche; Alt. ca 1925 m.

6. *H. furcifera* Lindl., Gen & Sp. Orch 319. 1835; Hook. f., Fl. Brit. Ind. 6 : 149. 1890; King & Pantl. in Ann Roy. Bot. Gard. Cal 8 : 313. t. 410. 1898; Sant. & Kapad., Orch. Bombay 39. t. 5. fig. 20. 1966; Balakr. in Bull. Bot. Surv. Ind. 6 : 91. 1964. **Pl. 38 Figs. 1-3.**

Herbs, 35-60 cm tall. *Tubers* 1-2, 2.3-3.0 × 0.8-1.6 cm, ovoid-ellipsoid. *Leaves* usually 4, 6.7-21.0 × 1.5-5.0 cm, oblong-oblong-lanceolate to broadly elliptic, sheathing at base, acute, shortly acuminate at tip, alternate or clustered

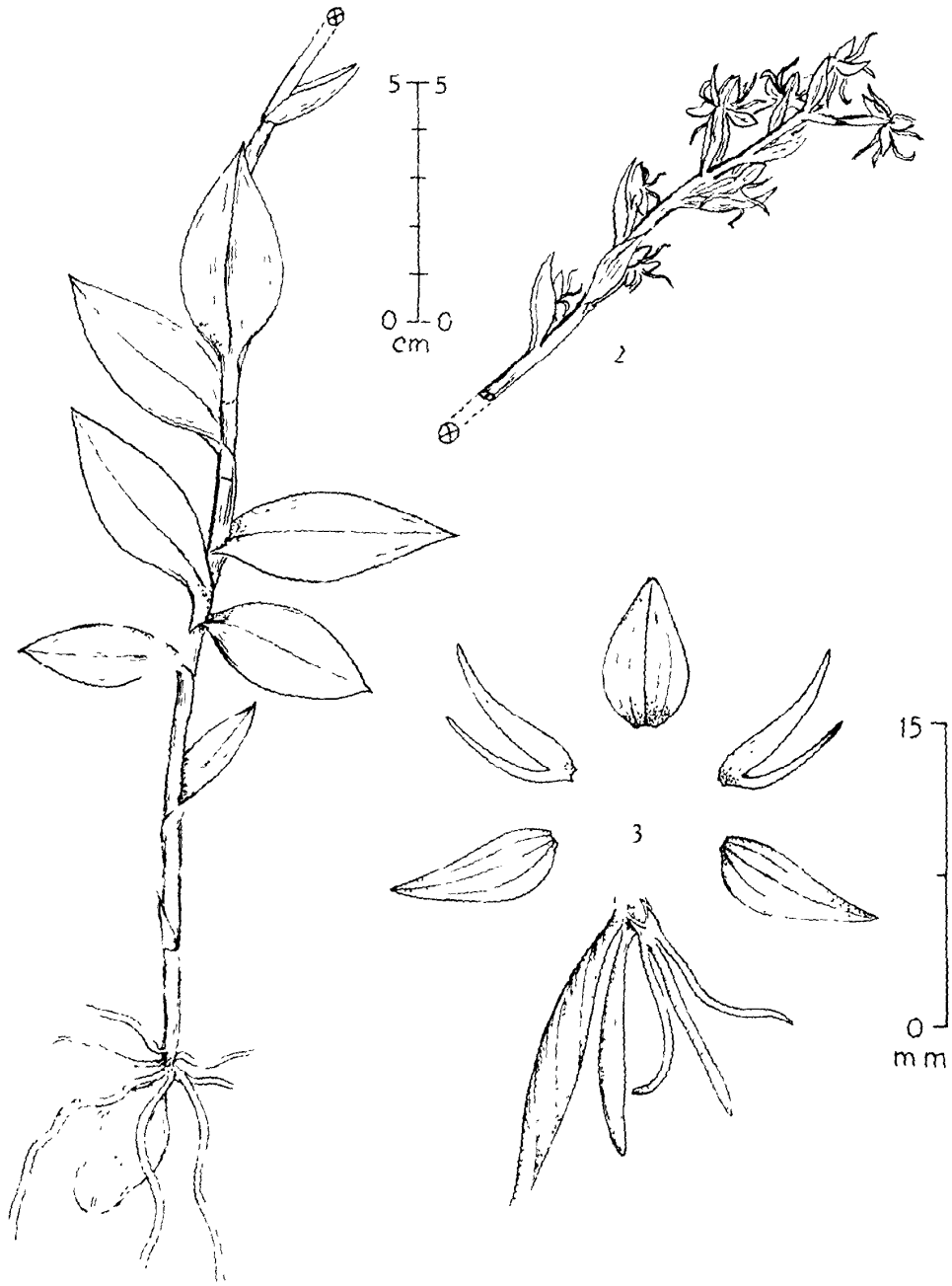


PLATE 37

Fig. 1-3. *Habenaria digitata* Lindl. Var. *digitata* 1. Habit; 2. Inflorescence; 3. Sepals, petals and lip with ovary

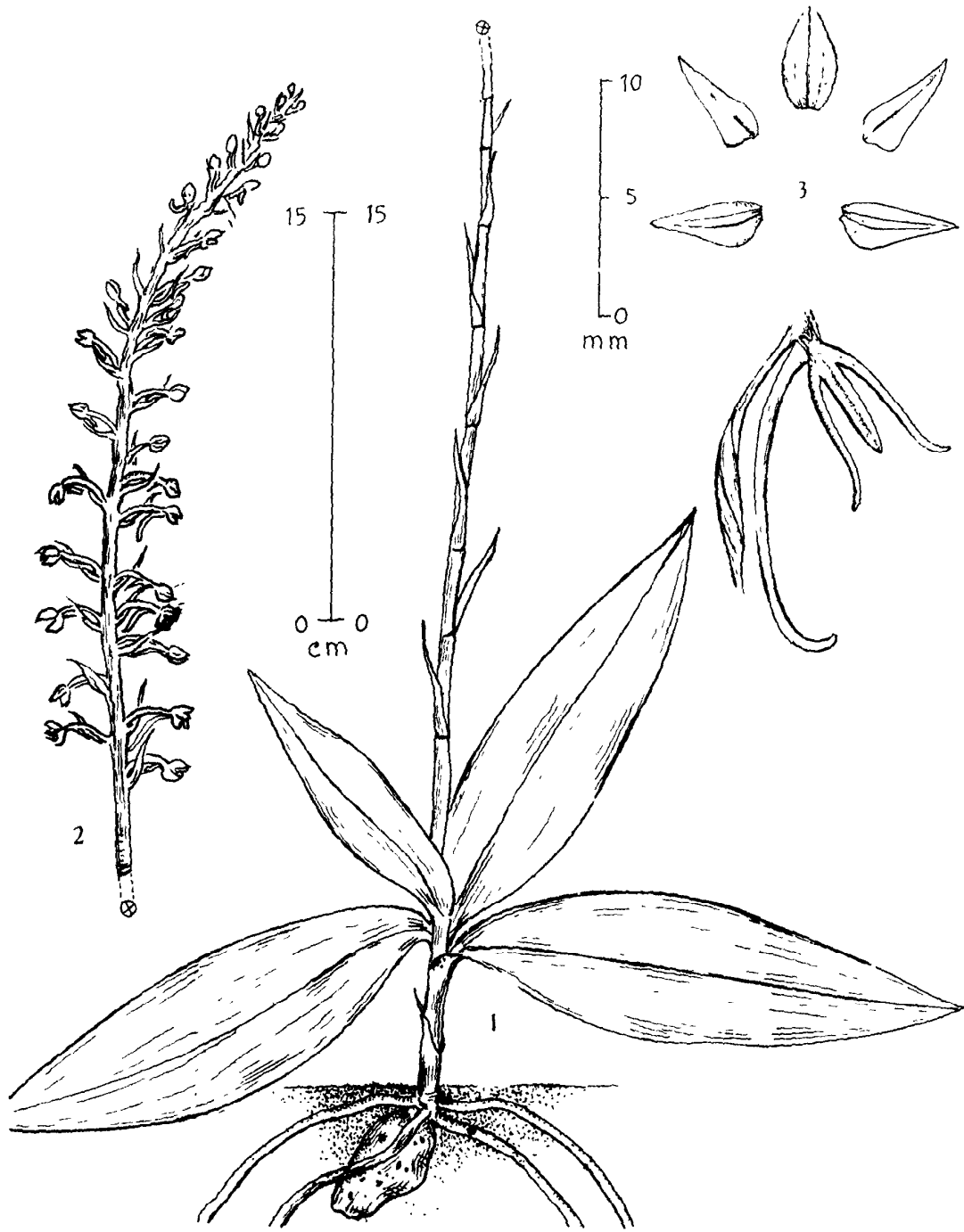


PLATE 38

Fig. 1-3. *Habenaria furcifera* Lindl. 1. Habit; 2. Inflorescence; 3. Sepals, Petals and Lip (with ovary)

towards the base, having 1 or 2 sheaths below. *Inflorescence* many flowered; raceme lax, 30–50 cm, erect. *Scape* covered with lanceolate, acuminate bracts. *Flowers* small, green, shortly pedicellate, bracteate. *Floral bracts* conspicuous, 1.5 × 0.3 cm, ovate-lanceolate, acuminate, as long as the ovary, minutely pubescent along the margin. *Dorsal sepal* ca 4.5 × 2.5 mm, ovate, obtuse, 3-nerved. *Lateral sepals* ca 5 × 2 mm, obliquely lanceolate, little longer than the dorsal, obtuse, 2-nerved. *Lateral petals* ca 5 × 2 mm, lanceolate, obtuse, with a median prominent nerve and an obscure side one. *Lip* trifid from the base; lateral segments 6.8–8.0 × 0.5 mm, filiform, diverging, curved, much longer than the middle one, single-nerved; midlobe broad (ca 1 mm), oblong, straight, obtuse. There is a ligule from the posterior wall at the mouth of the spur. *Spur* ca 1.7 cm long, slightly longer than the ovary. *Ovary* ca 1.3 cm, narrow, bent forward and inflexed at the tip.

It is closely allied to *H. hollandiana* Sant. except that the spur is a little shorter than the ovary and the lobes of the lip are subequal.

Reported from *Andhra Pradesh*: Gurangi, Ganjam Dt.; Araku valley, Visakhapatnam Dt; *Tamil Nadu*: Moyar, Mudumalai, Nilgiri Dt. It is wide spread in Northern and North-eastern India but not reported by Fyson and Gamble.

Flowering: July–October.

Balakrishnan 205; *Gamble* 15653; *Narayana & Raju* 18327; *Sharma* 35513. Mudumalai & Benne regions; **Alt.** ca 950 m.

7. *H. perrottetiana* A. Rich. in *Ann. Sci. Nat. Ser. 2. 15 : 74. t. 48. 1841*; Hook. f., *Fl. Brit. Ind. 6 : 164. 1890*; Fyson, *Fl. Nilgiri & Pulney Hill-tops. 3 : 113. t. 525. 1920*; Fischer in *Fl. Pres. Madras 1471. 1928 (Repr. ed. 3 : 1028. 1957)*; Wight, *Ic. 3(2) : 11. t. 919. 1844.* **Pl. 39, Figs. 1–2.**

Herbs, 36–60 cm high. *Tubers* 1 or 2, oblong, 2.5–4.0 × 1.2 cm. *Stem* with 4–5 tubular sheaths at the lower half. *Leaves* 5–7, 3.5– 6.0 × 10–2.0 cm, lanceolate-ovate, amplexicaul, sheathing, acute-acuminate. *Inflorescence* raceme, up to 14 cm. *Flowers* secund, yellowish green, quite large, exerted, shortly pedicellate, bracteate. *Bracts* large, 2.0–3.5 × ca 2.4 cm, cucullate, foliaceous, concealing the ovary and spur, imbricating, broadly ovate, acute, shortly acuminate, progressively shorter. *Dorsal sepal* ca 1.7 × 0.7 cm, broadly ovate-oblong, erect, obtuse, concave and hooded, 7-nerved, median nerve prominent. *Lateral sepals* as long as or little shorter than the dorsal, ca 1 cm broad, broadly ovate, obtuse, erect, 7-nerved, median nerve prominent. *Lateral petals* as long as the dorsal sepal, erect, much narrower (ca 0.4 cm), falcate, narrowly oblanceolate, 4-nerved. *Lip* ca 1.6–1.9 cm, 3-lobed, folded longitudinally, clawed at base; claw inflexed; lateral lobes shorter than the midlobe, linear-oblong, obtuse; midlobe triangular, obtuse. *Spur* ca 1.4 cm, shorter than the ovary, clavate and abruptly narrowed into a short tube, closely held with ovary. *Ovary* with pedicel ca 2.6 cm.

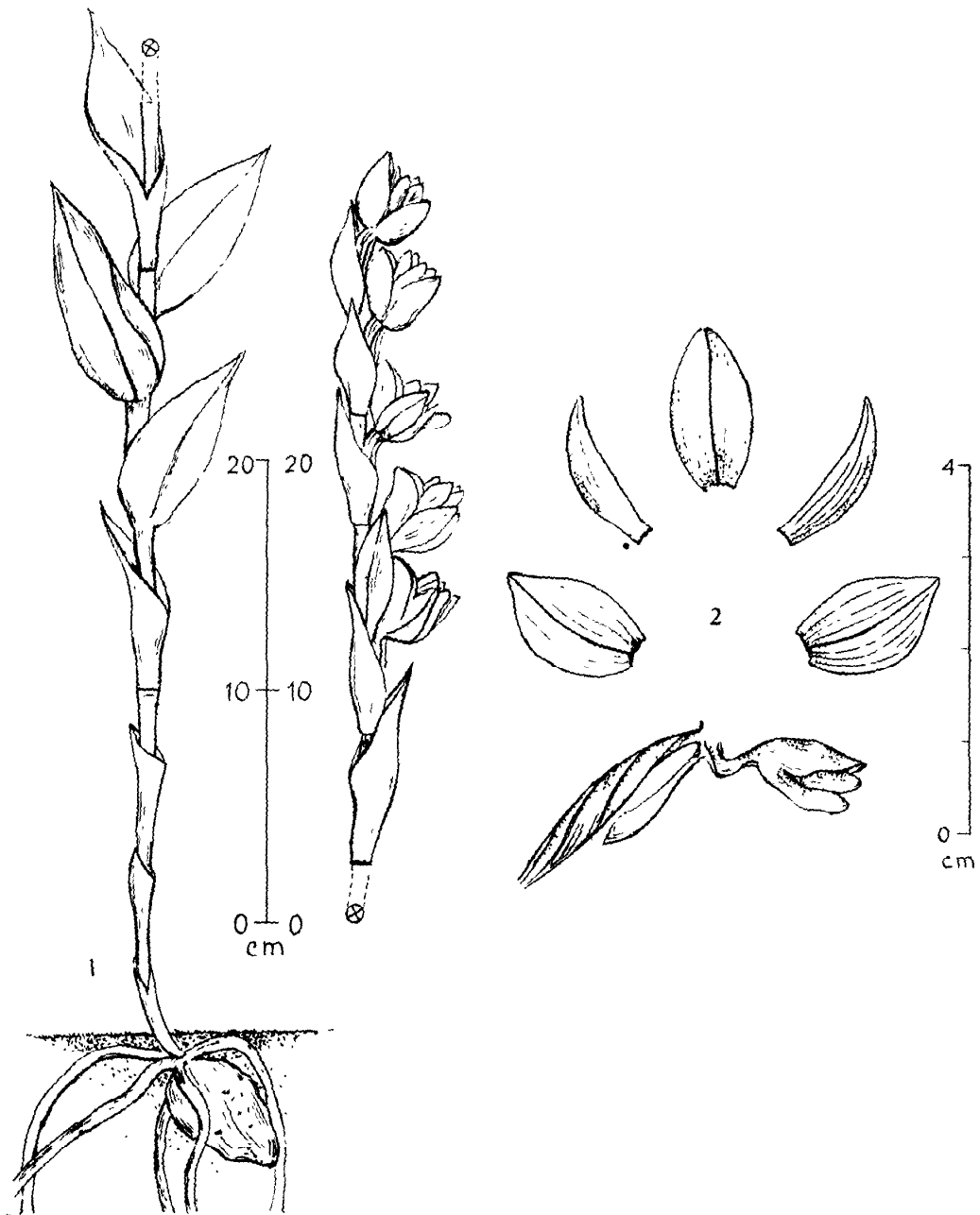


PLATE 39

Fig. 1-2. *Habenaria perrottetiana* A. Rich. 1. Habit with detached inflorescence. 2. Sepals, Petals and Lip with ovary

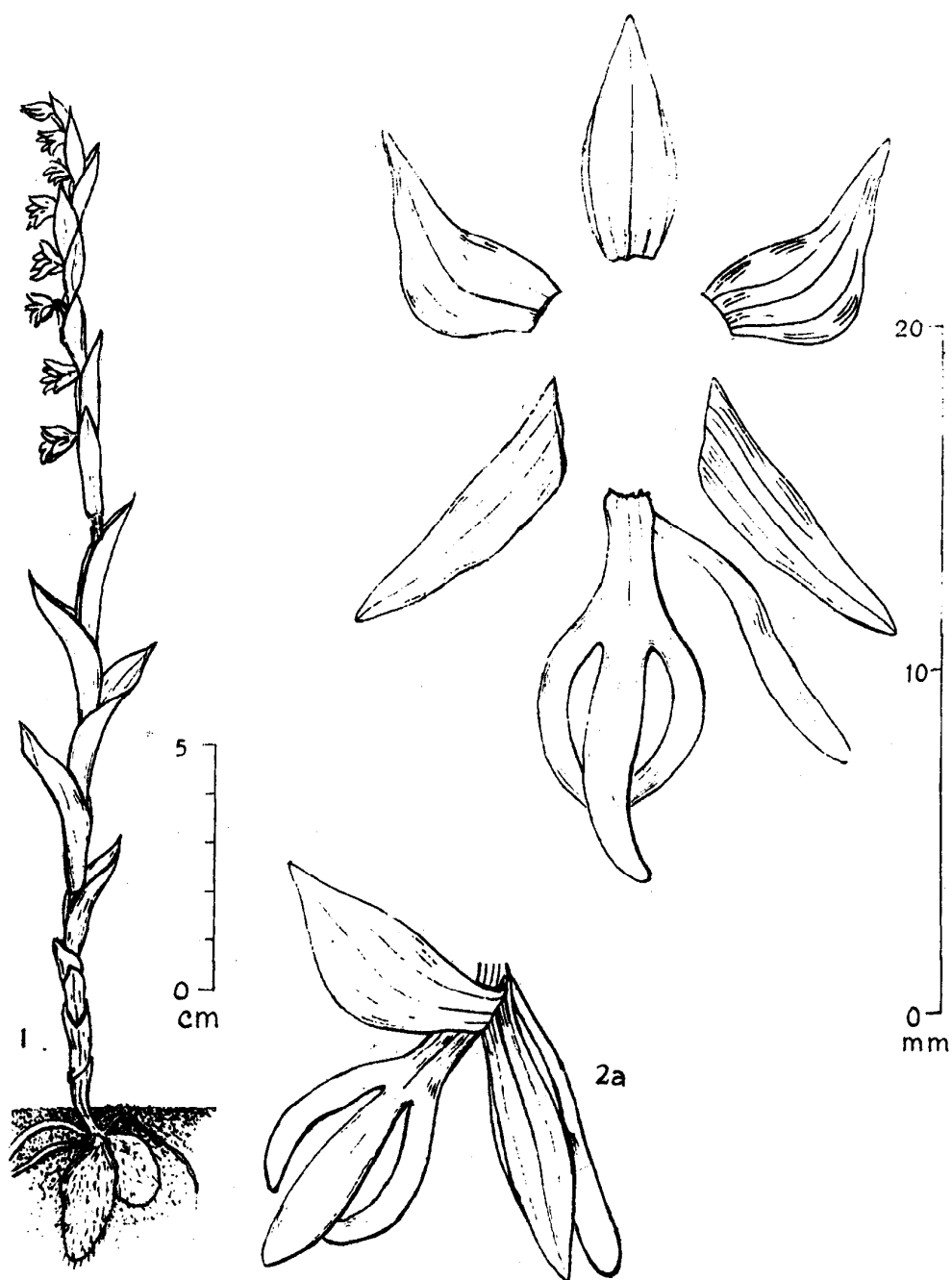


PLATE 40

Fig. 1-2. and 2a. *Habenaria heyneana* Lindl. 1. Habit; 2. Sepals, Petals and Lip; 2a. Lip showing the attachment of lateral sepal and petal.

Flowering : October.

Lawson s. n. (MH Acc. No. 50892); *Vivekanathan* 42986 Avalanche, Alt ca 2000 m.

Although Hooker reports of its collection by Perrottet from Nilgiris, neither Fyson (*loc. cit.*) nor Fischer (*loc. cit.*) reports its occurrence from Nilgiri hills. While Fyson reports it from only Pulney hills, Fischer reports vaguely from Western Ghats. R. Wight supports its occurrence in Pulneys and comments 'I have not met with this species in any other station...'

An elegant ground orchid among grasses. The row of beautiful yellow flowers single it out from all other species of *Habenaria* in the area.

8. *H. heyneana* Lindl., Gen. & Sp. Orch. 320. 1835; Wight, Ic. 3(2) : 11. t. 923. 1844; Hook. f., Fl. Brit Ind. 6 : 148. 1890; Fyson, Fl. Nilgiri & Pulney Hill-tops 1 : 403. 1915 & 3 : 113. t. 523. 1920; Fischer in Fl. Pres. Madras 1471. 1928 (Repr. ed. 3 : 1028. 1957); Sant. & Kapad., Orch. Bombay 32. t. 5. Fig. 15-16. 1966. *H. subpubens* A. Rich. in Ann. Sci. Nat. Ser. 2. 15 : 75. t. 40. 1841; Hook. f., Fl. Brit. Ind. 6 : 148. 1890 *H. glabra* A. Rich. in Ann. Sci. Nat. Ser. 2. 15 : 75. t. 5A. 1841; Hook. f., Fl. Brit. Ind. 6 : 148. 1890.

Pl. 40, Figs. 1-2.

Small tuberous herbs, 10-35 cm tall. *Tubers* 1 or 2, ovoid-oblong, ca 0.5-2.2 × 0.3-1.3 cm, hairy. *Stem* erect, terete with 3 or more sheaths towards the base; sheaths infundibuliform, oblique at mouth. *Leaves* 4 to 6, gradually changing into flowering bracts, distichous with sheathing base, 2.0-6.2 × 0.6-6.7 cm, oblong, narrowly lanceolate, acute at tip. *Inflorescence* up to 10 cm long, 5-10 flowered, rarely less, secund. *Flowers* white, shortly pedicellate, bracteate. *Ovary* geniculate at tip. *Bracts* ca 2.1 × 1.0 cm, foliaceous, erect, cymbiform, acuminate, shorter or longer than flowers, enveloping the ovary. *Sepals* subequal, (sometimes lateral sepals slightly longer than dorsal); median nerve ridged along the abaxial side, especially towards the base. *Dorsal sepal* ca 7 × 3 mm, erect, ovate-oblong, obtuse at tip, 5-nerved. *Lateral sepals* 6-7 × ca 2 mm, narrower than dorsal sepal and lateral petals, oblong-lanceolate, oblique at base, attached to the claw of the lip, obtuse at tip, 3-nerved. *Lateral petals* 6-7 × ca 3 mm, as long and broad as dorsal sepal, falcate, erect, broadly oblique towards the base, acute at tip, united with the claw of the lip, with a prominent median nerve and two obscure lateral ones. *Lip* 11 mm long, thick, spurred, trilobed, clawed; claw ca 4 mm long; lobes deflexed, not spreading; lateral lobes ca 6 × 1 mm, shorter than the midlobe, curved; midlobe broader than the lateral lobes (ca 7.0 × 1.5 mm). *Spur* ca 9 mm long, obtuse, shorter than the ovary.

Flowering : June-October.

Balakrishnan 234; *Barber* 690; *Bidie s. n.* (MH Acc. No. 50849); *Lawson s. n.* (MH Acc. No. 50852 & 50856); *Rangachari s. n.* (MH Acc. No. 50857); *Subramanayam* 10561; *Wight* 3010 Common : Ooty, Naduvattam, Pykara, Mudimund, Karishola; Alt. 170 m.

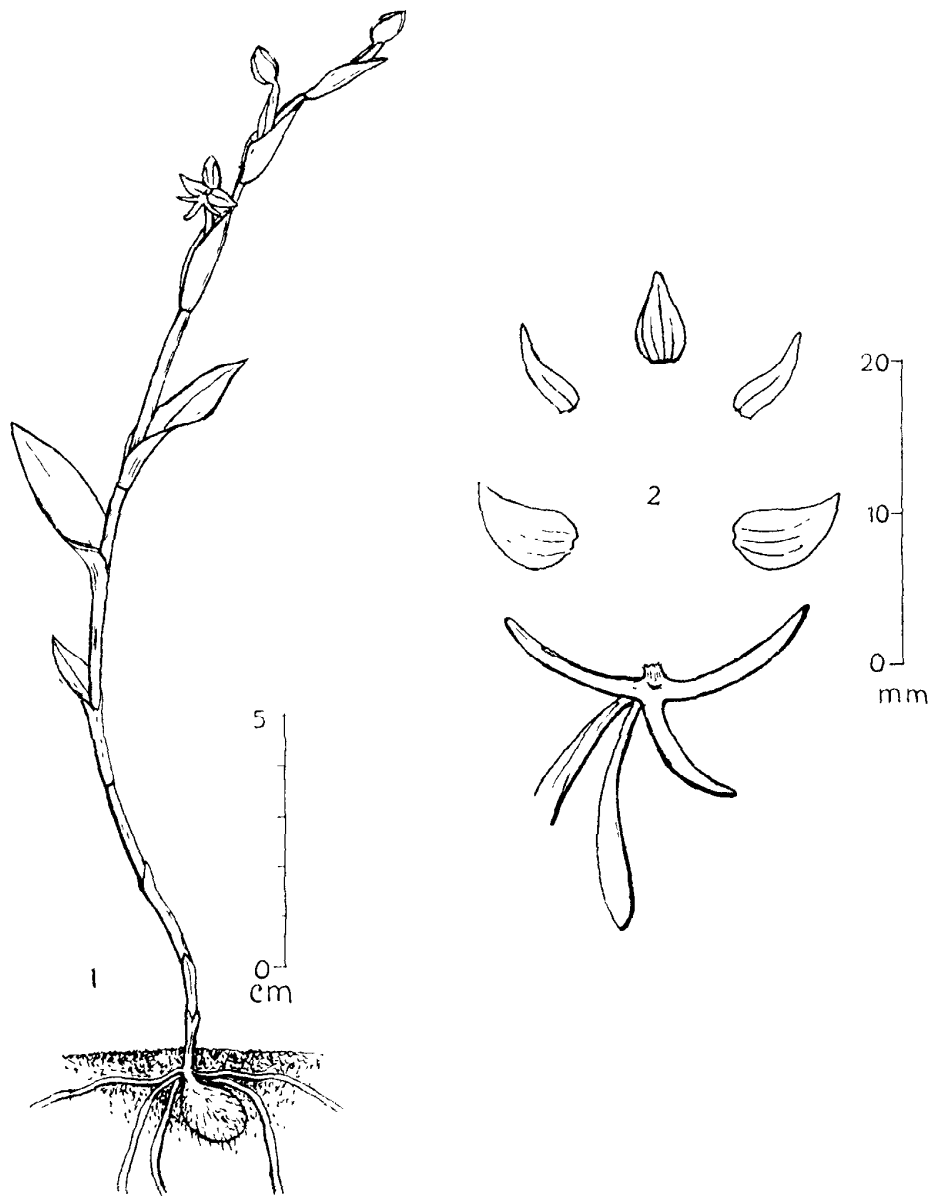


PLATE 41

Fig. 1-2. *Habenaria barnesii* Summerh. ex Fischer. 1. Habit; 2. Sepals, Petals and Lip with the portion of ovary.

9. **H. barnesii** Summerhayes ex Fischer in Fl. Pres. Madras 1887. 1936. (Repr. ed. 3 : 1306. 1957). **Pl. 41, Figs. 1-2.**

Slender, tuberous herbs, 8–25 cm, erect with 2 or 3 leaves about the middle, 2 or 3 sheaths below and a few foliaceous bracts above. *Tuber* globose, ca 1.1 cm across, hairy. *Leaves* ca 3.5 × 1.1 cm, lanceolate, narrowly oblong, sharply acute at tip, narrowed into long sheathing base. *Bracts* up to 3 cm long and ca 1 cm broad, shorter than the flower and the internode, foliaceous, cymbiform, erect, ensheathing the ovary and axis, sharply acute at tip. *Flowers* 1–3, subsecund, with yellow spur, green sepals and yellowish green petals. *Dorsal sepals* and lateral petals erect and together more or less form a hood, lateral sepals and lip spreading. *Dorsal sepal* ca 6.0 × 3.5 mm, concave, ovate, obtuse, 3-nerved. *Lateral sepals* ca 7.5 × 4.0 mm, obliquely lanceolate, acute, larger than dorsal, spreading, 3-nerved. *Lateral petals* ca 6 × 2 mm, falcately lanceolate, much narrower than sepals. *Lip* spurred, much longer than other parts, tripartite up to the base or with a very obscure claw; lobes divaricate, linear, ca 1 mm broad; lateral lobes as long as or longer than the middle one, ca 1.1 cm, deflexed; midlobe often shorter and broader than lateral ones, incurved. *Spur* ca 1.5 cm long, inflated towards the apex and blunt at tip, shorter than the ovary and pedicel. *Ovary* and pedicel ca 2.5 cm.

Flowering : July.

Ellis 34805, Mudimund : *Alt.* ca 2100

10. **H. cephalotes** Lindl., Gen. & Sp. Orch. 322. 1835; Wight. Ic. : 14. t. 1711. 1852; 5(1)Hook. f., Fl. Brit Ind. 6 : 139. 1890; Fyson, Fl. Nilgiri & Pulney Hill-tops 1 : 401. & 2 : t. 253. 1915; Fischer in Fl. Pres. Madras 1469. 1928 (Repr. ed 3 : 1027. 1957). *H. trichosantha* Wall. ex Hook. f., Fl. Brit. Ind. 6 : 138. 1890. **Pl. 42, Figs. 1-2.**

Herbs, 17–25 cm high, tuberous. *Tubers* 2, 3.0 × 1.3 cm, oblong. *Stem* slender, erect, with 2 or 3 sheaths at the base. *Sheaths* infundibuliform, oblique at mouth 1.5–20 cm long. *Leaves* about the middle of the stem, usually 3, sometimes more, 3.5–7.5 × 1.2–2.5 cm, ovate-elliptic, with sheathing base, acute or apiculate at tip, abruptly transformed into sterile and fertile bracts towards the apex. *Inflorescence* dense-flowered raceme, 13–26 cm. *Flowers* white, fragrant, shortly stalked, bracteate. *Bracts* ca 1.8 × 0.6 cm, lanceolate, acuminate, erect. *Dorsal sepal* ca 4 × 4 mm, broadly ovate, cordate at base, obtuse at tip, 3-nerved, with a dorsal median ridge. *Lateral sepals* longer than the dorsal, (ca 6 × 4 mm), deflexed, obliquely ovate, obtuse at tip, 3-nerved, with a dorsal median ridge, densely finely scurfy pubescent within. *Lateral petals* ca 3 × 4 mm, smaller than the sepals, erect, gibbous at base, triangular at tip, 3-nerved, finely ciliate along the margin. *Lip* shorter than lateral sepals (ca 5.0 × 5.7 mm), flabellate, slightly pubescent within, trilobed; side lobes broader than the midlobe, spreading irregularly erose-pectinate; midlobe entire, thick, narrowly ligulate, obtuse at tip. *Spur* ca 1.3 cm, shorter than the ovary.

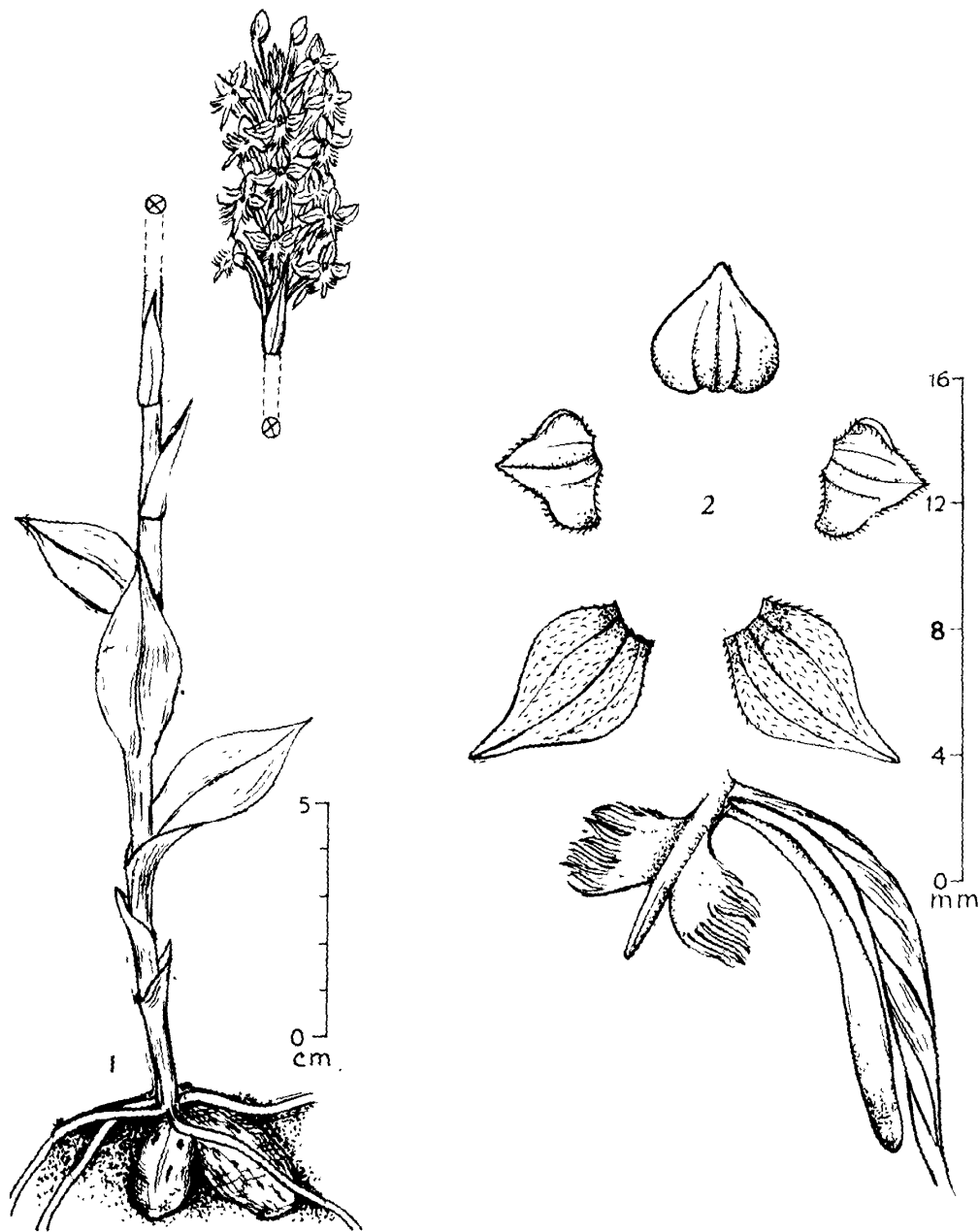


PLATE 42

Fig. 1-2. *Habenaria cephalotes* Lindl. 1. Habit with detached inflorescence; 2. Sepals, Petals and Lip with ovary.

A polymorphic species exhibiting a wide range of variation in the size of the plants, number of leaves, congestion of bracts (both sterile and fertile), lobulation of the side lobes of the lip and also pubescent nature of the perianth parts. The range of variation observed accommodates well *H. denticulata* Reichb. f. (Fischer *loc. cit.*)

Flowering : July-September.

Barber 691; *Bidie s. n.* (MH Acc. Nos 51037 & 51043); *Bourne* 5339; *Lawson s. n.* (MH Acc. Nos. 50763 & 50766); *Narayana & Raju* 18467; *Narayanawamy* 4184; *Rangachari* 15557; *Sharma* 35969; *Subramanyam* 10594. Common : Ooty, Doddabetta, Pykara, Naduvattam; Alt. ca 2100 m.

11. *H. polyodon* Hook. f., *Fl. Brit. Ind.* 6 : 139. 1890. *H. fimbriata* Wight, *Ic.* 5(1) : 14 t. 1712. 1852 *non* R. Br. (1813); Fischer in *Fl. Pres. Madras* 1470. 1928 (Repr. ed. 3 : 1027. 1957). **Pl. 43, Figs. 1-2.**

Terrestrial herbs. *Stem* short, stout, leafy throughout. *Leaves* ovate-lanceolate, acute-acuminate, channelled. *Spike* dense, many flowered. *Bracts* foliaceous, cymbiform, lower ones longer than ovary. *Flowers* white. *Sepals* broadly ovate, obtuse; lateral ones spreading, glabrous, dorsal smallest. *Lateral petals* shorter than sepals, triangular-ovate, obtuse. *Lip* trilobed; sidelobes broad, semi-lunar, fimbriate; midlobe short, oblong-ligulate. *Spur* clavate, very stout, longer than the ovary.

The above description is from literature. The species could not be collected from Nilgiris or neighbourhood.

Wight comments as follows on this species : 'In habit and general appearance this closely approaches the preceding (*H. cephalotes* Lindl.) but the flower is different.'

12. *H. elliptica* Wight, *Ic.* 5(1) : 13. t. 1706. 1852; Hook. f., *Fl. Brit. Ind.* 6 : 147. 1890; *Fyson*, *Fl. Nilgiri & Pulney Hill-tops* 1 : 402. 1915 & 3 : 113. t. 522. 1920; Fischer in *Fl. Pres. Madras* 1471. 1928 (Repr. ed. 3 : 1028. 1957). **Pl. 43, Figs. 3-4.**

Herbs, 20-38 cm. *Tubers* 1-2, 2.0-3.0 × 1.0-1.5 cm, ovoid-oblong. *Stem* with 1 or 2 sheaths at the base. *Leaves* 3 to 4, 6.0-12.0 × 0.5-1.7 cm, elliptic-linear, lanceolate, acute at tip, sheathing at base. *Inflorescence* up to 25 cm with the scape, many flowered, dense. *Flowers* bracteate, short pedicelled. *Bracts* ca 1.5 × 0.3 cm, lanceolate, acuminate. *Dorsal sepal* ca 4 × 3 mm, ovate, obtuse, 5-nerved, erect. *Lateral sepals* ca 5.5 × 3.0 mm, ovate-lanceolate, obtuse, densely scurfy subpubescent on the upper side, prominently 3-nerved, median nerve extends beyond the margin into a short tip. *Lateral petals* ca 3.0 × 2.5 mm, triangular-ovate, gibbous, acute with a median nerve. *Lip* as long as the lateral sepals, ca 2.5 mm broad, deflexed, subglabrous, trifid beyond the middle, narrowing towards the base into a long claw (ca 3 mm) with a triangular erect ligule at the mouth of the spur; lobes equal, obtuse, outer margin of

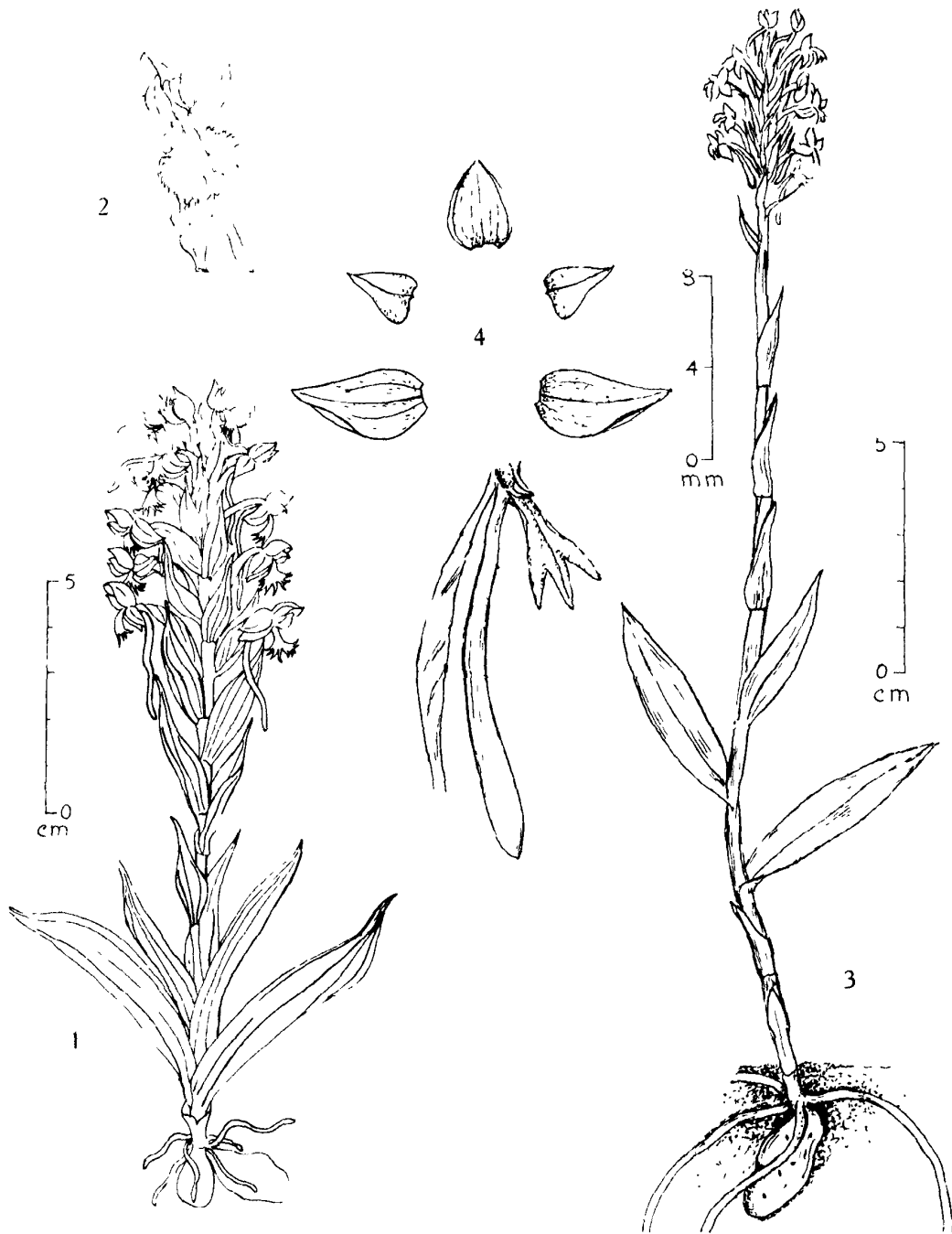


PLATE 43

Fig. 1-2. *Habenaria polydon* Hook.f. 1. Habit; 2. Flower (not to Scale, Fig. 1. & 2. after Wight); Figs. 3-4. *H. elliptica* Wt. 3. Habit; 4. Sepals and Lip with ovary.

the side lobes uneven. *Spur* ca 1.6 cm long, as long as or slightly longer than the ovary, clavate.

Flowering : September.

Anon s. n. (MH Acc. No. 96271), Ooty; Alt. ca 2400 m.

13. *H. richardiana* Wight, Ic. 5(1) : 14. t. 1713; 1852; Hook. f., Fl. Brit. Ind. 6 : 139. 1890; Fischer in Fl. Pres. Madras 1470. 1928. (Repr. ed. 3 : 1027. 1957). **Pl. 44, Figs. 1-2.**

Slender herbs, 11-30 cm high. *Tubers* 2, oblong, ca 2.5 × 0.8 cm. *Stem* short with 1 or 2 sheaths at the base. *Leaves* often subradical, 3-5, crowded, 4-7 × 1-2 cm, narrowly elliptic-lanceolate, acute at tip, sheathing at base, abruptly changing into sterile and fertile bracts towards the apex. *Inflorescence* 3-10 flowered, lax, flowers white. *Bracts* ca 1.5 × 0.4 cm, shorter than the ovary, cucullate, acuminate. *Dorsal sepal* 5-7 × ca 4 mm, erect, ovate-lanceolate, entire, mucronate at tip, smaller than the lateral ones, 3-nerved. *Lateral sepal* 6.8 × 3-5 mm, broadly lanceolate, oblique at base, mucronate at tip, 3-5 nerved. *Lateral petals* 4-6 × 3.5-4.5 mm, lanceolate, more or less gibbous at the base, acute at tip, 3-nerved. *Lip* ca 8 × 3 mm, trilobed towards the apex, long cuneate towards the base, glabrous; midlobe subequal with the sidelobes; sidelobes wing like, denticulate at the outer margin (lobation and denticulate nature vary in the flowers). *Spur* ca 3.2 cm, curved, longer than the ovary.

Flowering : October-November.

Gamble 13098; *Lawson s. n.* (MH Acc. No. 50769); *Vajravelu* 36860; *Wight s. n.* (MH Acc. No. 50771). Fairly common : Dodabetta, Kodanad forest; Alt. ca 2050 m.

14. *H. longicorniculata* Graham, Cat. Bombay Pl. 202. 1839; Sant. & Kapad., Orch. Bombay 29. t. 1, fig. 1.1. 1966. *H. longicalcarata* A. Rich. in Ann. Sci. Nat. Ser. 2.15 : 71.t.38. 1841; Wight, Ic. 3(2) : 11.t.925. 1844; Hook.f., Fl. Brit. Ind. 6 : 141. 1890; Fyson, Fl. Nilgiri & Pulney Hill-tops. 1 : 401. & 2 : 254. 1915; Fischer in Fl. Pres. Madras 1470. 1928 (Repr. ed. 3 : 1027. 1957). **Pl. 45, Figs. 1-3.**

Herbs, 26-96 cm. *Tubers* 1 or 2, oblong or ellipsoid, 2.0-3.0 × ca 1.3 cm. *Leaves* about 6, subradical, rarely cauline, alternate, elliptic, narrowly oblanceolate, narrowed into sheathing base, 4.0-14.0 × 1.6-2.6 cm, acute at tip. *Peduncle* ca 3.5 cm, covered by sterile sheathing bracts. *Flowers* white, usually 2 (rarely 1 or 3). *Bracts* ca 3.2 × 1.5 cm, oblanceolate, abruptly acuminate, encircling the pedicel, erect; both sterile and fertile bracts sparsely finely papillose. *Ovary* with pedicel ca 5.5 cm long, pedicellate, narrowed into a beak. *Dorsal sepal* ca 1.4 × 0.9 cm, ovate, obtuse, hooded, mainly 3-nerved with 2 fainter lateral ones, sparsely papillose along the median line on the lower half. *Lateral sepals* ca 1.6 × 0.7 cm, obliquely lanceolate, oblong (sometimes just like the keel petals of pea flower), obtuse, spreading or reflexed with 3 main nerves and 2 fainter lateral ones, sparsely papillose. *Lateral petals* ca 1.5 × 0.3

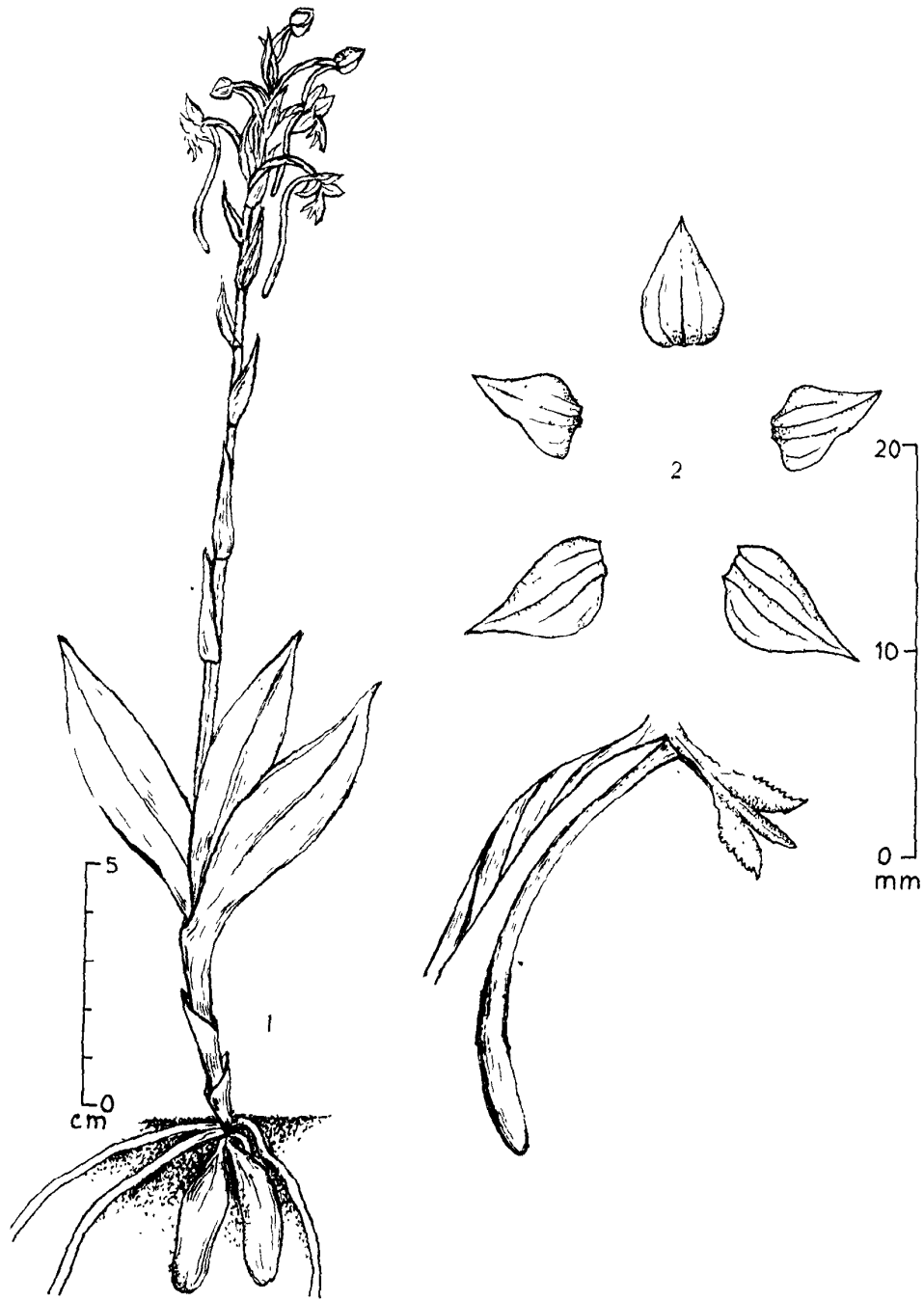


PLATE 44

Fig. 1-2. *Habenaria richardiana* Wt. 1. Habit; 2. Sepals, Petals and Lip with ovary.

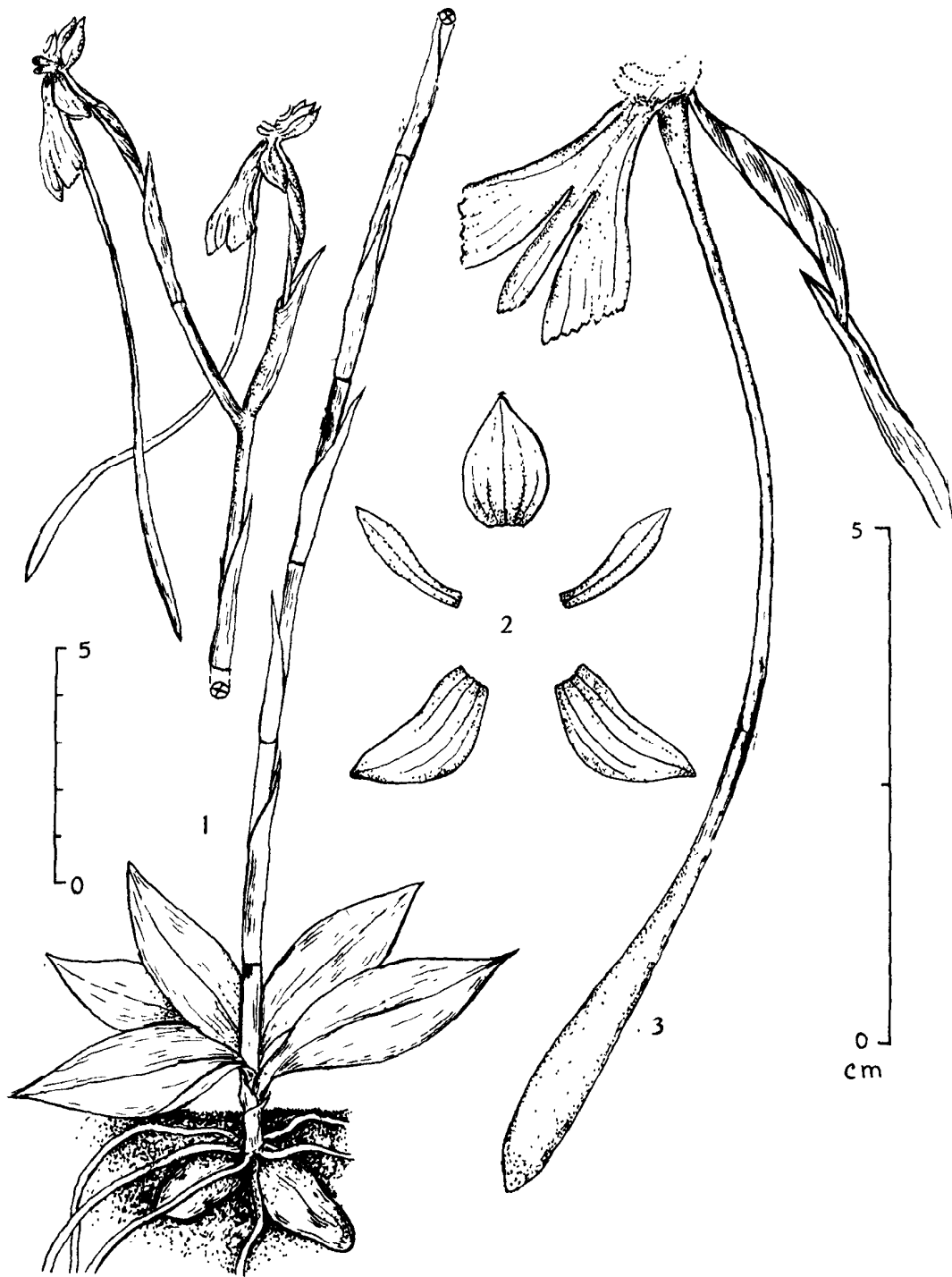


PLATE 45

Fig. 1-3. *Habenaria longicorniculata* Grah. 1. Habit; 2. Sepals and Petals. 3. Lip with ovary.



PLATE 46

Fig. 1-2 *Habenaria longicornu* Lindl. 1 Habit with detached inflorescence; 2. Sepals, Petals and Lip with ovary.

cm, spatulate, narrowly oblanceolate, subfalcate, obtuse, erect, with a median prominent nerve and 2 fainter lateral ones, with a few papillae. *Lip* ca 2.5 cm long, reflexed, much longer than sepals, trifid up to the middle; lateral lobes broader than the midlobe (ca 5 mm), turning downwards, oblique and erose at end margin, subcuneate; midlobe ligulate, more or less equal to the lateral ones, truncate or obtuse at tip. *Spur* ca 12.5 cm, much longer than the ovary, mouth funnel-shaped with a small triangular ligule at the mouth, inflated towards the distal end. Stigmatic processes porrect and conspicuous. The fruiting axis little longer than the flowering axis.

Flowering & Fruiting : September–November.

Gamble 1360; *Lawson s. n.* (MH Acc. No. 50821); *Vajravelu* 42851; *Vivekanathan* 42963. Common : Devala, Coonoor, Naduvattam, Avalanche, Nadugani forest; alt. 800–1900 m.

15. *H. longicornu* Lindl., Gen. & Sp. Orch. 322. 1835; Hook. f., Fl. Brit. Ind. 6 : 139. 1890; Fyson, Fl. Nilgiri & Pulney Hill-tops. 3 : 112 t. 521. 1920; Fischer in Fl. Pres Madras 1470. 1928 (Repr. ed. 3 : 1027. 1957). *H. montana* A. Rich. in Ann. Sci. Nat. Ser. 2. 15 : 73. t. 4A. 1941; Wight, Ic. 3(2) : 11. t. 927. 1844.

Pl. 46, Figs, 1–2.

Herbs, 16–35 cm high. *Tubers* oblong 1.2–3.3 × 0.6–1.3 cm. *Stem* erect with a few sheaths at the base. *Leaves* 4–5, usually alternate, scattered, sometimes crowded towards the base, 2.6–8.2 × 0.6–2.2 cm, oblong-lanceolate to linear, acute and mucronate at tip, sheathing at base. *Inflorescence* 9–14 cm, lower half of the scape covered with few sterile bracts. *Flowers* white, 3–9, very rarely less, subsessile. *Bracts* 1.4–3.0 × 0.3–0.6 cm, narrowly lanceolate, acuminate, shorter than the ovary. *Dorsal sepal* ca 1.0 × 0.6 cm, ovate, obtuse, 5-nerved. *Lateral sepals* ca 1.1 × 0.7 cm, larger than the dorsal, ovate, broadly lanceolate, oblique at base, obtuse, 5-nerved, spreading. *Lateral petal* ca 0.9 × 0.2 cm, erect, shorter and much narrower than the sepals narrowly oblanceolate, acute, 1-nerved. *Lip* ca 1.4 cm, slightly longer than the lateral sepals, trilobed about the middle, cuneate at base, having a warty and puberulous callus at the mouth of the spur; side lobes 1 × 0.3 cm, longer and broader than midlobe, recurved, slightly cunete, end margin broad, oblique, praemorse; midlobe 0.7 cm long, lanceolate, obtuse. *Spur* ca 4.3 cm, slightly longer than the ovary, stout, mouth of the spur broad, apex clavate. Stigmatic processes short, obtuse. *Ovary* ca 2.6 cm, narrowed into long apex.

This species can be distinguished from *H. longicorniculata* Graham by the presence of more than 3 flowers (up to 9), the spur being only one and half times as long as the ovary, and the lip with a median callus at the mouth of the spur instead of a small triangular ligule.

Hooker comments about *Habenaria decipiens* Wight that, 'This much resembles *H. longicornu* Lindl. but has a longer lip and mch longer spur. The present critical study of several specimens reveals that there is hardly any

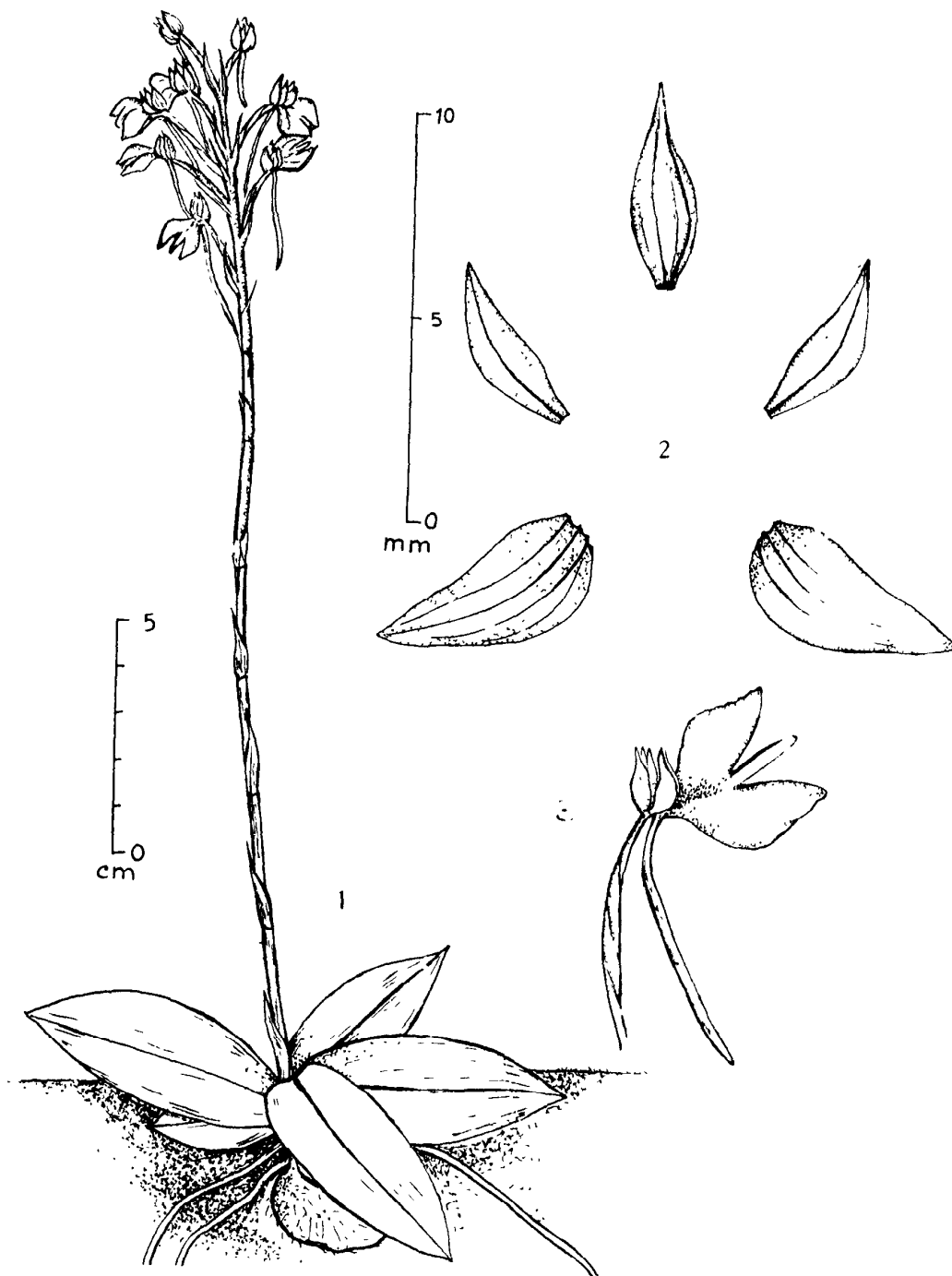


PLATE 47

Fig. 1-3. *Habenaria Plantaginea* Lindl. 1. Habit; 2. Sepals and Petals; 3. Flower with lip spread out.

salient feature by which this species can be singled out from *H. longicornu* Lindl.,

Flowering : August-November.

Gamble 12412, 13078 ; *Sebastine* 3963, 41868 ; *Subba Rao* 36614 ; *Vajravelu* 36776 ; Coonoor, Pakkasuramalai, Ebanad, Kodanad ; Alt. 1726-2067. m.

16. *H. plantaginea* Lindl., Gen & Sp. Orch. 323. 1835 ; Wight. Ic. 5(1) : 13.t. 1710. 1852 ; Hook. f., Fl. Brit. Ind. 6 : 141. 1890 ; Fischer in Fl. Pres. Madras 1470. 1928 (Repr. ed. 3 : 1027. 1957) ; Sant. & Kapad., Orch. Bombay 28. t. 6. fig. 25. 1966. **Pl. 47, Figs. 1-3.**

Tuberous herbs, 20-30 cm tall (sometimes more) with radical leaves and with or without one or two sheaths beneath. *Tubers* up to 3.0 × 1.5 cm, oblong, hairy, 1 or 2 per plant. *Leaves* prostrate on the ground, 3.4-6.0 × 0.9-3.0 cm, lanceolate-oblong or elliptic, mucronate at tip. *Inflorescence* many flowered racemes, lax, 23-36 cm long with a long slender scape beset with sterile bracts. *Flowers* bright white, ca 12 mm across, restricted towards the apex of the scape. *Bracts* narrowly lanceolate, much shorter than the ovary, acuminate at tip. *Dorsal sepal* ca 5 × 3 mm, erect, cucullate, broadly ovate, obtuse at tip, prominently 3-nerved. *Lateral sepals* thick, 5.0-5.5 × 2.5-3.0 mm, suberect or spreading, obliquely lanceolate-ovate, obtuse at tip, 4-nerved, slightly larger than the dorsal sepal. *Lateral petals* 4.7 × 1.5 mm, narrower than the sepals, falcately elliptic, erect, subequal with sepals, acute at tip, one-nerved, more or less hyaline. *Lip* trilobed, long-spurred, rhomboid in outline, ca 12 mm across, porrect ; side lobes much broader than the midlobe, patent, wing like ; midlobe narrowly ligulate, almost equalling the side ones. *Spur* slender, longer than the ovary. *Ovary* 1.5-2.0 cm long, shortly stalked.

A common slender elegant orchid among grass and herbs on rocky hill slopes at lower altitudes (ca 925 m) with many white flowers of spreading lip, on long terminal racemes. In large groups they are pleasing, with the flower bunches standing out from the well appressed carpet of green leaves. This can be a good garden plant.

Flowering : October.

Lawson s. n. (MH Acc. No. 50803) ; *Narayana & Raju* 18326 ; *Rathakrishnan* 39005 ; *Vivekanathan* 43092 ; Mudumalai, Carcoor Ghat, Moyar ; Alt. 850-925 m.

23. ANOECTOCHILUS Blume

- Anoectochilus elatus* Lindl. in Journ. Linn. Soc. 1 : 170. 1857 ; Hook. f., Fl. Brit. Ind. 6 : 95. 1890 ('*elator*'); Fischer in Fl. Pres. Madras 1453. 1928 (Repr. ed. 3 : 1016. 1957). **Pl. 48, Figs. 1-3.**

Terrestrial herbs, decumbent, 21-29 cm tall, with stout roots. *Leaves* 3-5, 4.0-7.0 × 1.8-3.8 cm, ovate-lanceolate, acute ; petiole with sheathing base.

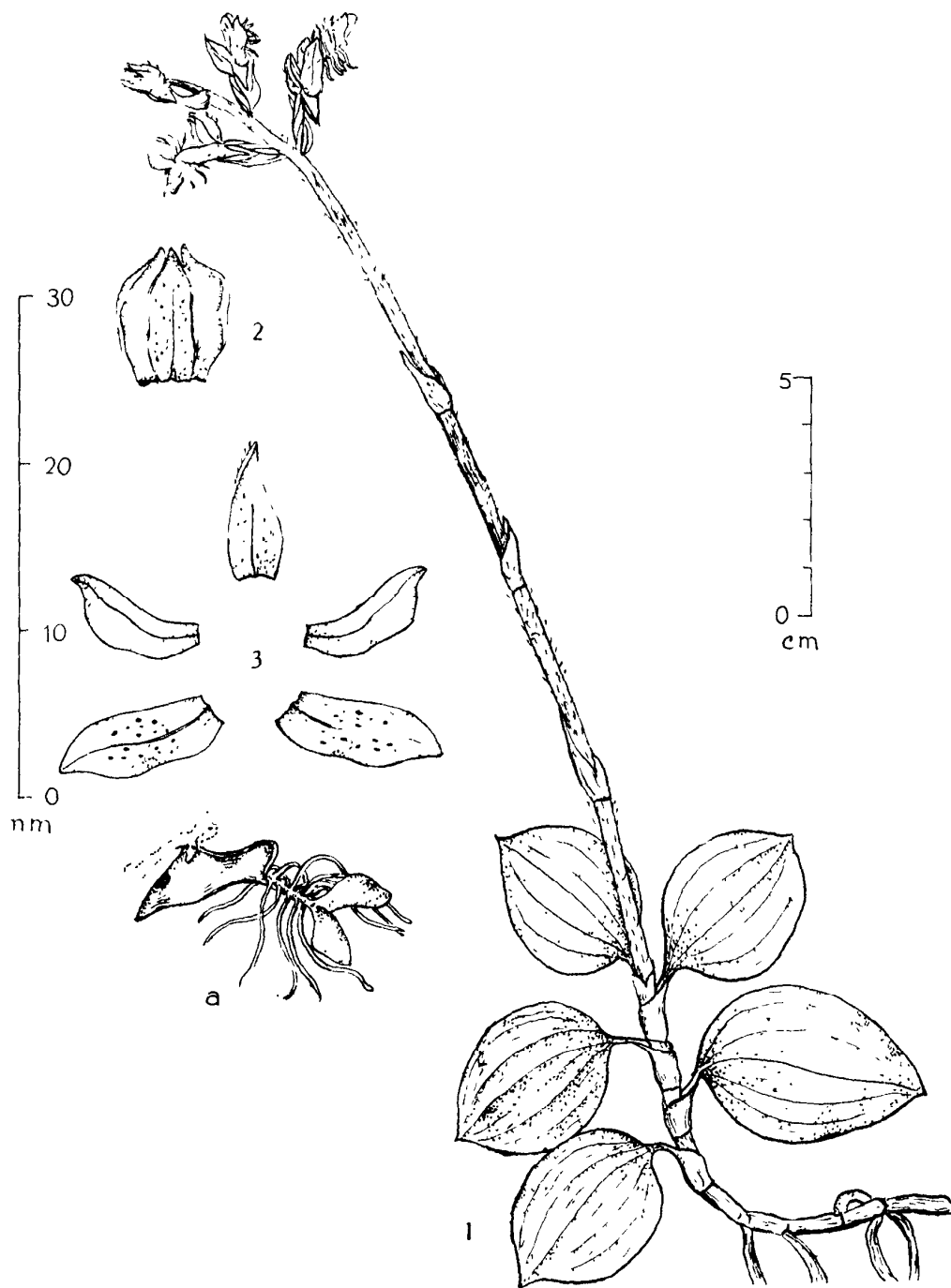


PLATE 48

Fig. 1-3, a. *Anoectochilus elatus* Lindl. 1. Habit; 2. Dorsal Sepal and lateral petals forming a hood; 3. Sepals and Petals; a. Lip.

Inflorescence up to 23 cm long, glandular pubescent. *Flowers* white. *Bracts* ca. 1.3 × 0.7 cm, lanceolate, acuminate, glandular pubescent. *Ovary* subsessile, ca. 1.5 cm long. *Dorsal sepal* ca 9.5 × 4.0 mm, narrowly lanceolate, acute, shortly acuminate, connate with lateral petals to form a hood, glandular pubescent without. *Lateral sepals* ca 11.0 × 4.8 mm, obliquely oblong, spreading, obtuse, 1-nerved, gland dotted, glandular pubescent without. *Lateral petals* ca 9.5 × 3.9 mm, semi-lunate, obtuse; midlobe with narrow claw and 2-winged apex, mucronate in the sinus; claw ca 4 mm long, fimbriate at margin. *Spur* ca 7 mm long, infundibular, with 2 median calli about the middle on the posterior wall, acute, *Column* short, with 2 basal appendages projecting into the spur.

Flowering : November-February.

Gamble 15721; *Sharma* 40318; *Davala*, Lambs rock-Coonor.

24. PERISTYLUS Blume

1a. Leaves clustered about the middle of the plant

2a. Plants about 90 cm tall; leaves broadly ovate, elliptic, obovate, large, 7.0—19.0 × 4.0—6.8 cm; lateral sepals with a subterminal mucro 1. *P. goodyeroides*

2b. Plants below 30 cm tall; leaves narrowly oblong-elliptic, ca 8.5 × 1.7 cm; lateral sepals without mucro ... 2. *P. lawii*

1b. Leaves scattered and imbricate on the stem

3a. Flowers spirally arranged; lip as long as the sepals and petals, without concave claw; lobes of the lip more or less equal in length ... 3. *P. spiralis*

3b. Flowers imbricate; lip longer than the sepals and petals, with a concave claw; side lobes filiform and much longer than the midlobe and horn like

4a. Spur equalling or slightly longer than midlobe of the lip, clavate-ellipsoid 4. *richardianus*

4b. Spur much shorter than the midlobe of the lip ... 5. *P. brachyphyllus*

1. *Peristylus goodyeroides* (D. Don) Lindl., Gen. & Sp. Orch. 299. 1835; Fischer in Fl. Pres. Madras 1474. 1928 (Repr. ed. 3: 1030. 1957); Sant. & Kapad., Orch. Bombay 52. 1966. *Habenaria godyeroides* D. Don, Prodr. Fl. Nep. 25. 1825; Hook. f., Fl. Brit. Ind. 6: 161. 1890; King & Pantl. in Ann. Roy. Bot. Gard. Cal. 8: 32. t. 430. 1898. Pl. 49, Figs. 1-3.

Herbs, up to 1 metre high (with inflorescence). *Tubers* 1-2, oblong, 3-6 × 0.9-2.2 cm. *Stem* with 3-5 sheaths below; sheaths large, tubular, 2-6 cm long, with broad oblique mouth. *Leaves* 4-6, clustered more or less in the middle of the plant with inflorescence 7.0-19.0 × 4.0-6.8 cm, subequal, ovate, elliptic-obovate, sheathing at base, acute at tip. *Inflorescence* long spike, many flowered, dense. *Scape* 13-29 cm long with a few sterile bracts. *Flowers* light yellow, fragrant, sessile. *Bracts* 1.3-1.6 × ca 0.3 cm, lanceolate, acuminate, papillose, longer than flowers, persistent. *Sepals* and *petals* vary in measurement in the same inflorescence. *Dorsal sepal* ca 4.5 × 3.0 mm, ovate-oblong,

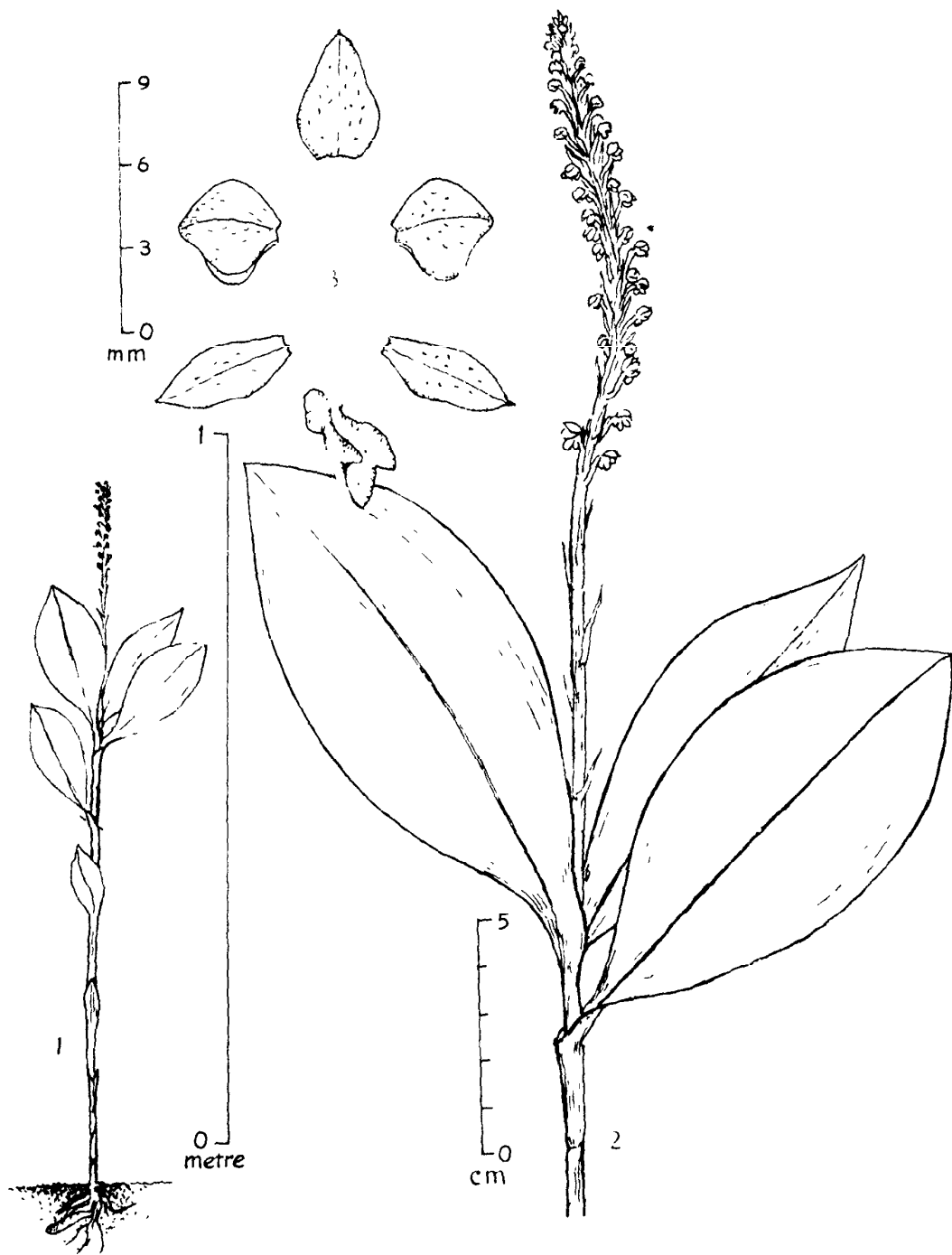


PLATE 49

Fig. 1-3. *Peristylus goodyeroides* (D. Don) Lindl. 1. Habit; 2. Apex of the shoot with inflorescence; 3. Sepals, Petals and lip.

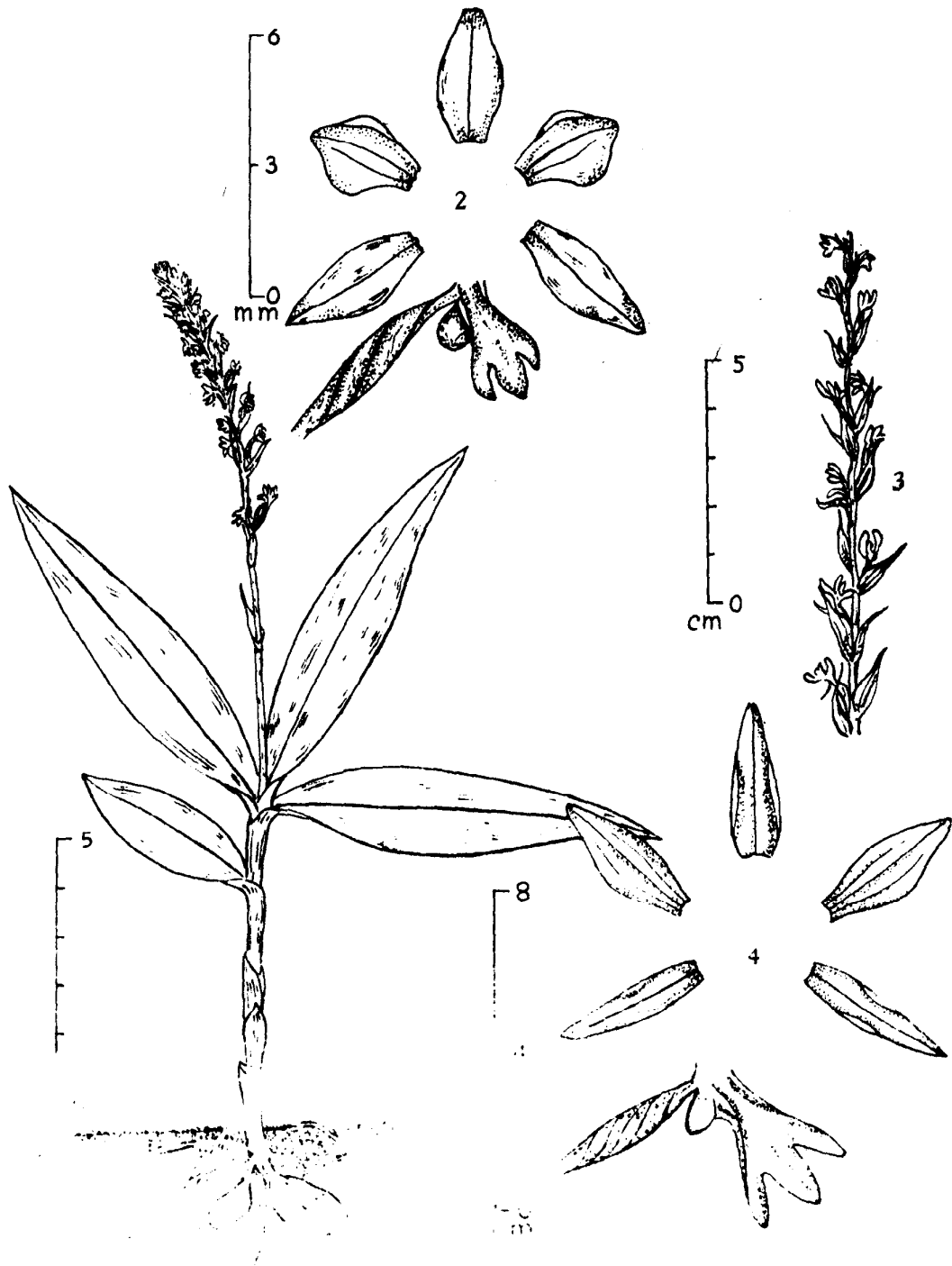


PLATE 50

Fig. 1-2. *Peristylus lauri* Wt. 1. Habit; 2. Sepals and Petals and Lip with ovary. Figs. 3-4. *P. spiralis* A. Rich. 3. Apical portion of the inflorescence; 4. Sepals, petals and lip with ovary.

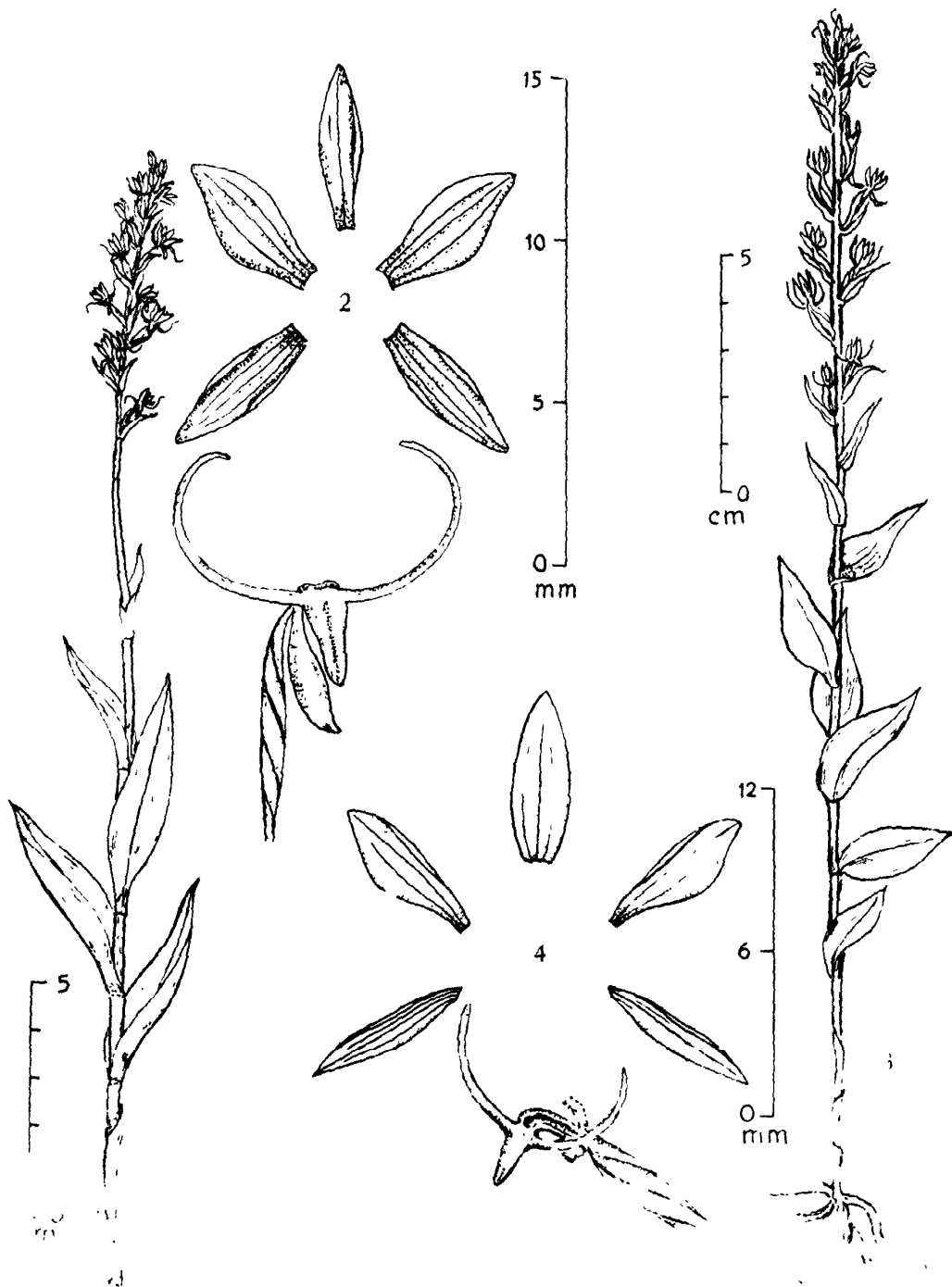


PLATE 51

Fig. 1-2. *Perstylus richardianus* Wt. 1. Tip of the shoot with inflorescence; 2. Sepals, Petals and lip with ovary.; **Figs. 3-4.** *P. brachyphyllus* A. Rich. 3. Habit; 4. Sepals, petals and lip with ovary.

obtuse, 1 nerved, nerve extends at tip into a mucro or not, sparsely papillose. *Lateral sepals* ca 5×2 mm, oblong, oblique at base, obtuse at tip with a sub-terminal mucro on the dorsal side. 1-nerved, papillose. *Lateral petals* ca 3.5×4.0 mm, broadly trapezoidal, ventricose on the lower margin, obtuse, 1-nerved, papillose. *Lip* $3.0-4.0 \times 2.5-4.0$ mm, trilobed; obtuse, 1-nerved, much broader than the sidelobes, often lobulation varies in the same inflorescence. *Spur* globose.

Tallest species of the genus ; occurs in shady places. Presence of a conspicuous subterminal mucro on the dorsal side of the lateral sepals at once separates this from the allied species.

Flowering & Fruiting : July-November.

Barber 2032 ; *Gamble* 15607 ; *Lawson s. n.* (MH Acc. No. 51087) ; *Rangachari s.n.* (MH Acc. No. 50985) ; *Subramanyam* 10947 ; *Vajravelu* 41787 ; *Vivekanathan* 43094 : Gudalur, Devala, Benne, Mudumalai ; Alt. 800-1100 m.

2. *P. lawii* Wight, Ic. 5(1) : 12 t. 1695. 1852 ; Sant. & Kapad., Orch. Bombay 53. t. 10 figs. C-D. 1966. *Habenaria lawii* Hook. f., Fl. Brit. Ind. 6 : 162. 1890.

Pl. 50, Figs. 1-2.

Small herbs, 10-25 cm tall (with inflorescence). *Tubers* 1-2, ovate-oblong, $0.9-2.0 \times 0.5-0.8$ cm. *Stem* slender with 2-4 sheaths at the base ; sheaths 1.0-2.7 cm long, infundibuliform, oblique at mouth. *Leaves* 3-4, clustered at the apex of the stem, unequal, $1.8-8.6 \times 0.6-1.8$ cm, oblong-narrowly elliptic, sheathing at base, acute at tip. *Inflorescence* 6.0-14.5 cm long, spike many flowered. *Flowers* small, dull white, sessile. *Bracts* 7-15 \times 1.5-2.5 mm, lanceolate, conduplicate, acuminate at tip, 1-nerved, longer than the ovary. *Dorsal sepal* $3.0-3.5 \times 1.5-2.0$ mm, ovate-oblong, concave, obtuse or sub-retuse at tip, 1-nerved. *Lateral sepals* $3.0-4.0 \times$ ca 1.5 mm, lanceolate, obtuse at tip, 1-nerved. *Lateral petals* ca 2.5×2.2 mm, obliquely obovate, broader than the lateral sepals, obtuse at tip, 2-nerved, partly adnate at base with lateral sepals and lip. *Lip* ca 3×2 mm, as long as or slightly shorter than the sepals, trilobed about the middle ; midlobe triangular, obtuse, larger than the side lobes. *Spur* small, scrotiform.

Not reported from this area either by Fyson or included in Gamble's Flora. In general, previous report of this is from Western India, Bengal, Central India, North Kanara and Mysore.

Flowering : June.

Shetty 34354 ; Dodagatti-Mudumalai ; Alt. ca 900 m.

3. *P. spiralis* A. Rich. in Ann. Sci. Nat. Ser. 2. 15 : 69. t. 2B. 1841 ; Wight, Ic. 5(1) : 12. t. 1696. 1852 ; Fischer in Fl. Pres. Madras 1474. 1928 (Repr. ed. 3 : 1030. 1957) ; Sant. & Kapad., Orch. Bombay 49. 1966. *Habenaria torta* Hook. f., Fl. Brit. Ind. 6 : 159. 1890. Pl. 50, Figs. 3-4.

Slender, erect herbs, 17–36 cm high (with spike). *Tubers* 1–2, oblong, 1.0–2.0 × 0.5–0.8 cm. *Stem* with 2–3 sheaths at the base. *Leaves* 3–4, alternate, 2.0–7.0 × 0.5–1.4 cm. linear-lanceolate to elliptic, sheathing at base, acute at tip. ***Inflorescence* spikes 10–24 cm long; scape covered with large sterile bracts at the base. *Flowers* lax, in spikes, green or greenish yellow. *Bracts* ca 7 × 3 mm, lanceolate, acuminate, longer than the flowers, 5-nerved. *Dorsal sepal* ca 4.0 × 1.5 mm, lanceolate-oblong, obtuse, 1-nerved, sparsely gland-dotted. *Lateral sepals* as long as the dorsal, but much narrower (ca 1 mm), ligulate, obtuse, 1 nerved, sparsely gland-dotted. *Lateral petals* as long as the sepals, ca 1.5 mm broad, broader than the lateral sepals, slightly oblique at base, lanceolate, ligulate, 3-nerved. *Lip* ca 4 × 3 mm, as long as the sepals, deflexed, fleshy, trifold about the middle, lobes subequal; midlobe broader than the sidelobes, rounded at tip; sidelobes linear, obtuse. *Spur* ovate, projecting down.**

Found in marshy places, in open grassland.

***Flowering & Fruiting* : July–October.**

Ellis 43412; *Lawson s. n.* (MH Acc. No. 50925, 50927); *Vivekanathan* 42943, 42978 : Avalanche, Mukurthi, Naduvattam, Alt. 1900–2200 m.

4. ***P. richardianus*** Wight, Ic. 5(1) : 12. t. 1697. 1852; Fischer in Fl. Pres. Madras 1474. 1928 (Repr. ed. 3 : 1030. 1957). *Habenaria bicornuta* Hook. f., Fl. Brit Ind. 6 : 156. 1890; Fyson, Fl. Nilgiri & Pulney Hill-tops 1 : 404 & 2. t. 257. 1915. **Pl. 51. Figs. 1–2.**

Herbs, 16–34 cm high (with inflorescence). *Stem* with 2–3 tubular sheaths at base and 6–8 leaves above. *Leaves* alternate, 2.5–7.0 × 0.5–2.5 cm, ovate, lanceolate-linear lanceolate, acuminate, sheathing at base. *Inflorescence* spikes up to 12 cm. *Flowers* lax, greenish yellow. *Bracts* 7–14 × 2–3 mm, lanceolate, acuminate, foliaceous, vary in size, usually longer than flowers. *Dorsal sepal* 5–6 × ca 2 mm, oblong, obtuse, 3-nerved. *Lateral sepals* 5.0–6.0 × 1.5 mm, linear-lanceolate, obtuse, 1-nerved, narrower than petals. *Lateral petals* 5.0–6.0 × 1.5–2.5 mm, ovate-elliptic to oblanceolate, obtuse, 2 or 3 nerved. *Lip* trilobed with a concave claw; midlobe short, ca 3 mm, triangular, deflexed, obtuse; sidelobes 6–10 mm long, filiform, erect and incurved like horns. *Spur* ca 4 mm long, ellipsoid, clavate with a short tip, equalling or longer than the midlobe of the lip.

***Flowering* : July.**

Beddome s.n. (MH Acc. No. 50907 B, 50917); *Lawson s. n.* MH Acc. No. 51085 B; Avalanche; Alt. ca 1500 m.

5. ***P. brachyphyllus*** A. Rich. in Ann. Sci. Nat. Ser. 2. 15 : 70. t. 2. 1841; Fischer in Fl. Pres. Madras : 1474. 1928 (Repr. ed. 3 : 1030. 1957). *H. malabarica* Hook. f., Fl. Brit Ind. 6 : 159. 1890. **Pl. 51. Figs. 3–4.**

Herbs, 19–32 cm high (with spike). *Tuber* oblong, 1.0–2.5 × 0.5–0.8 cm. *Stem* slender, with 2–4 tubular sheaths below. *Leaves* alternate. 4–6, 2.0–4.5 ×

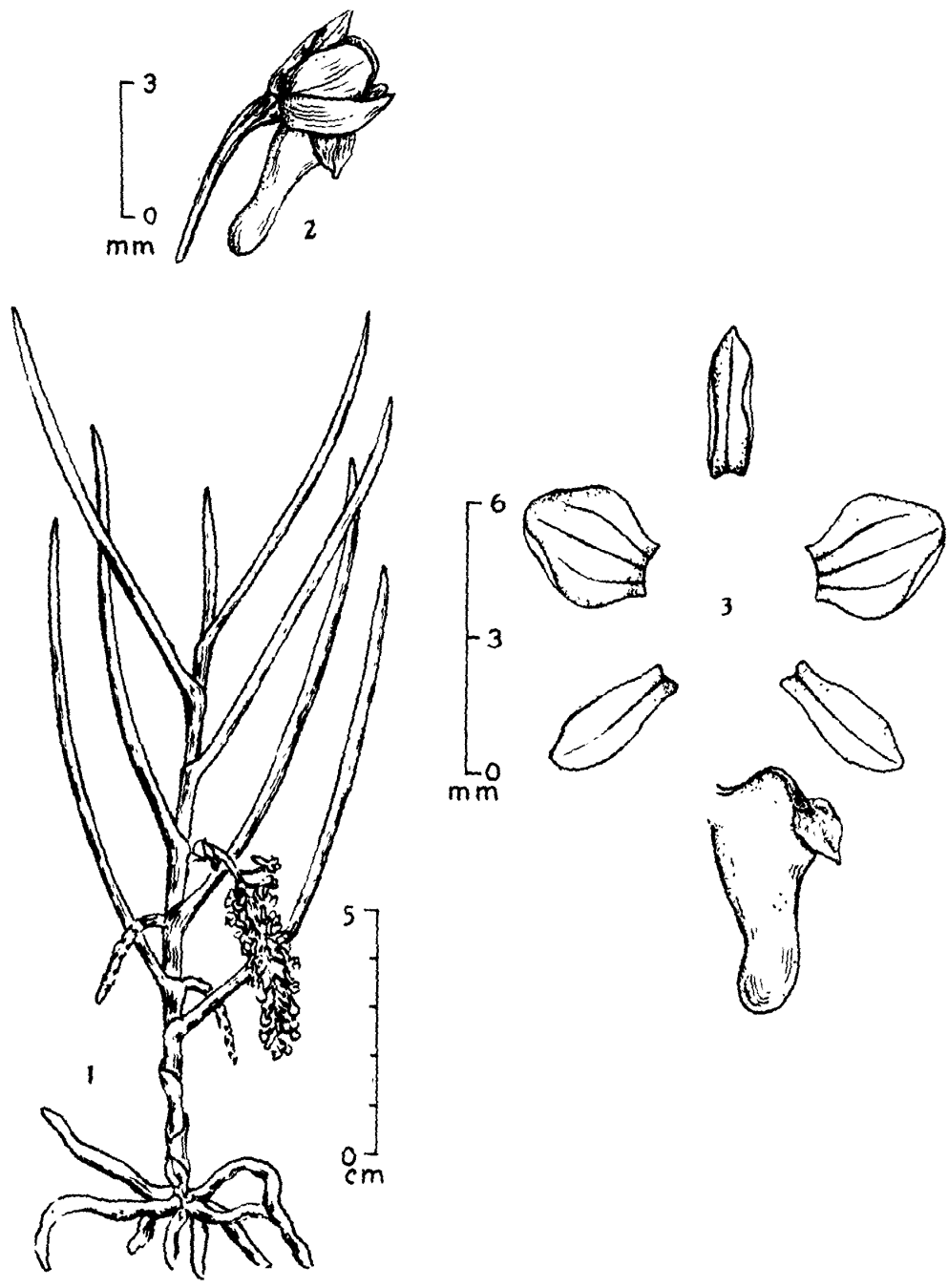


PLATE 52

Fig. 1-3. *Schoenorchis filiformis* (Wt.) Schltr. 1. Habit; 2. Flower (side view) 3. Sepals, Petals and Lip

0.6-1.1 cm, ovate-lanceolate, acuminate, sheathing at base, transformed into foliaceous bracts above. *Inflorescence* spikes, many flowered. *Flowers* dull yellow. *Bracts* ca 1.2 × 0.3 cm, lanceolate, acuminate, (foliaceous, longer than the ovary. *Dorsal sepal* ca 6 × 2 mm, ovate-oblong, obtuse, 3-nerved, median nerve extends into mucro on the dorsal side. *Lateral sepals* ca 6 × 1 mm, much narrower than the dorsal, narrowly elliptic 3-nerved, median nerve extends into a short subterminal mucro or not. *Lateral petals* as long and broad as dorsal sepal, oblanceolate, obtuse, 2-nerved. *Lip* geniculate, claw excavated on the dorsal side with raised rim, trifid; sidelobes ca 5 mm long, filiform, curved upwards (shorter than those of *P. richardianus* Wight); midlobe deflexed or porrect. *Spur* small, shorter than the midlobe of the lip, globose, didymous.

Flowering : October.

Beddome s. n. (MH Acc. No. 50907); *Subramanyam* 10538 A; *Vivekanathan* 42973 : Avalanche, Lakkadi; Alt. 1700-2000 m.

The above description hardly shows much difference from that of *P. lancifolius* of Rich. (*Habenaria robustior* Hook. f.) in the local floras, in the general habit, in the inflorescence, flower structure and especially of lip having filiform or subulate lateral lobes much longer than the midlobe. But the sketches of the type specimen (*Perrottet* 382) of *P. lancifolius* (cf. Seidenfaden, *Dans. Ark.* 5 : 55. 1977) clearly shows that sidelobes of the lip are only as long as the midlobe and not at all filiform or subulate. Since the intra-specific variations of the species of *Peristylus* and *Habenaria* are of a high degree, distinctiveness of A. Richard's species (*P. lancifolius*), as a separate entity is doubtful.

25. SCHOENORCHIS Blume

Schoenorchis filiformis (Wight) Schltr. in Fedde Repert. Beih. 1 : 986. 1913.

Sarcanthus filiformis Wight, Ic. 5(1) : 10 t. 1684. 1852 non Lindl. (excl. capsule). *Saccolabium filiforme* (Wight) Lindl. in Journ. Linn. Soc. 3 : 36. 1858; Hook. f., Fl. Brit. Ind. 6 : 56. 1890; Fyson, Fl. Nilgiri & Pulney Hill-tops 1 : 396 & 2 : t. 250. 1915; Fischer in Fl. Pres. Madras 1446. 1928 (Repr. ed. 3 : 1011. 1957). **Pl. 52. Figs, 1-3.**

Herbs, 5-30 cm high. *Stems* terete, sheathed. *Leaves* terete, alternate, distichous, 7-16 cm long. *Inflorescence* racemes, extra axillary and opposite to leaves, drooping, 2.5-7.0 cm long. *Flowers* pale pink with long, stout spur, perianth not opening fully. *Bracts* ovate-lanceolate, acuminate, minute, ca 1.5 mm long, persistent. *Ovary* and pedicel ca 6 mm long. *Dorsal sepal* ca 3 × 1 mm long, obtuse, 1-nerved. *Lateral sepals* ca 3.0 × 1.0-1.2 mm, oblong, obtuse. *Lateral petals* 2.5-3.0 × 2.0-2.5 mm, suborbicular, as long as or slightly shorter and broader than sepals. *Lip* ca 3 mm long, trilobed; sidelobes auricular-ovate, obtuse, erect; midlobe ovate, reflexed over the spur or not. *Spur* ca 3.5 mm long, stout, infundibuliform, constricted at the middle, obtuse at tip. *Fruits* ca 1.5 cm long with pedicel, pyriform with marcescent perianth.

Flowering : April-May. *Fruiting* : February, April, June & July.

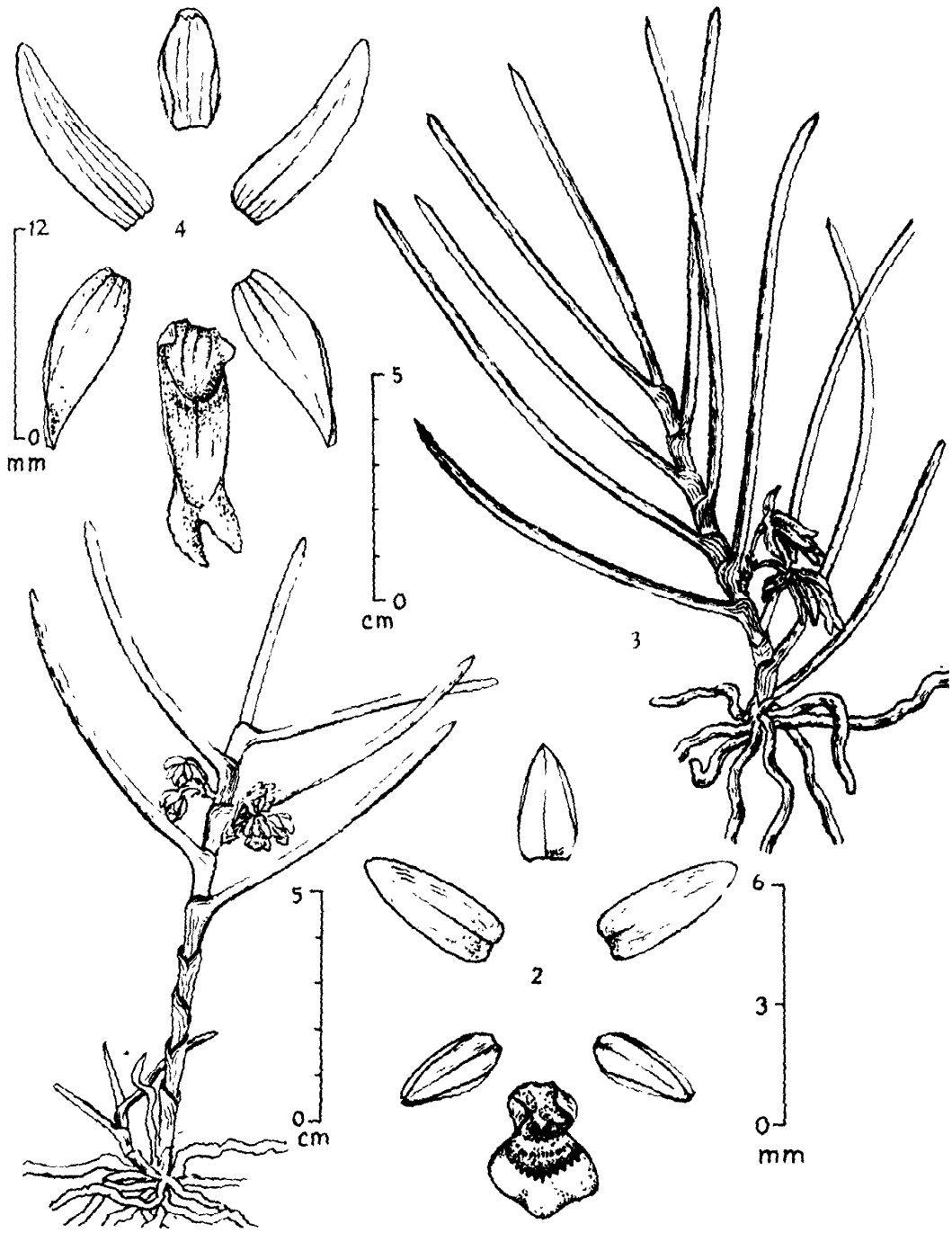


PLATE 53

Fig. 1-2. *Lusia zeylanica* Lindl. 1. Habit; 2. Sepals, Petals and Lip; **Figs. 3-4** *L. birchea* (A. Rich.) Bl. 3. Habit; 4. Sepals Petals and Lip.

Ellis 34761, 38470; *Lawson s. n.* (MH Acc. No. 50594, 51076); *Rangachari* 15244; *Sharma* 39874; *Shetty* 34105; *Vivekanathan* 40732; *Wight s. n.* CMH Acc. No. 51057). Common : Sispara, Doddabetta, Pykara, T.R. Bazar, Carriott shola, Lakkadi, Korakundha; Alt. 1950–2275 m.

Description and diagram in *Orchids of Sikkim Himalaya* by King & Pantl. under *Sarcanthus filiformis* Lindl. are quite different from Wight's *S. filiformis*, especially in the character of the lateral petals, the foot of the column and the partitioned spur.

26. LUISIA Gaud.

Plants of this genus are distributed throughout India, generally at low altitudes. As a genus it is unique in that the leaves are terete, like in *Papilionanthe subulata* (Koenig) Garay, although *Papilionanthe* as a genus is characterised by other features. Refer Seidenfaden (1971) for the details of the nomenclature of the species.

- | | | |
|---|-----|------------------------|
| 1a: Leaves 6–20 cm long, cuspidate at tip; flowers conspicuous with exerted large porrect lip; midlobe oblong with deeply forked apex | ... | 1. <i>L. birchea</i> |
| 1b. Leaves 4–10 cm long, acute at tip; flowers small with more or less concealed lip; midlobe rhomboid | ... | 2. <i>L. zeylanica</i> |

Luisia birchea Bl. in Mus. Lugd. Bat. 1 : 64. 1849; Seidenf. in Dansk Bot. Ark. 27 (4) : 35. 1971. *Birchea teretifolia* A. Rich. in Ann. Sci. Nat. Ser. 2. 15 : 67 t. 10. 1841. *Luisia tenuifolia* Bl., Rumph. 4 : 50. 1849; Hook. f., Fl. Brit. Ind. 6 : 24. 1890. **Pl. 53, Figs. 3–4.**

Slender herbs, 5–21 cm high. *Stems* terete, sheathed. *Leaves* alternate towards the apex or on one side towards the base, 6–20 cm long, cuspidate at tip, sheathing at base. *Flowers* a few on condensed racemes, extra axillary, pale green with dark purple patch on the lip. *Bracts* very small, ca 1.5 mm long, broadly ovate-oblong. *Ovary* with pedicel 0.5–1.1 cm long. *Dorsal sepal* 7.0–8.0 × 3.5–3.7 mm, ovate-lanceolate, concave, cleft at tip. *Lateral sepals* ca 10.0 × 3.5 mm, obliquely lanceolate, acute, concave, keeled towards the apex, ending in a subterminal mucro. *Lateral petals* 12–16 × ca 3 mm, narrowly lanceolate, obtuse. *Lip* 13–18 mm long, 5–6 mm broad across the side lobes, longer and broader than the sepals, concave at base, porrect, fleshy, exerted, swollen on the upper surface and convex, constricted towards the apex and deeply forked at the tip; sidelobes small, auricular. *Fruits* ca 5 cm long with pedicel, oblong, fusiform, winged, with marcescent perianth.

Flowering : May, July, August. *Fruiting* : May, November.

Prodlock s.n. (MH Acc No. 50514); *Sebastine* 4059; *Sharma* 35471; *Subba Rao* 41506; *Vajravelu* 37088 and 38394 : Lower Tiger hills, Bokkapuram R.F., Bimaka shola, Deepdale R.F., Mantharai shol; Alt. 1000–1600 m.

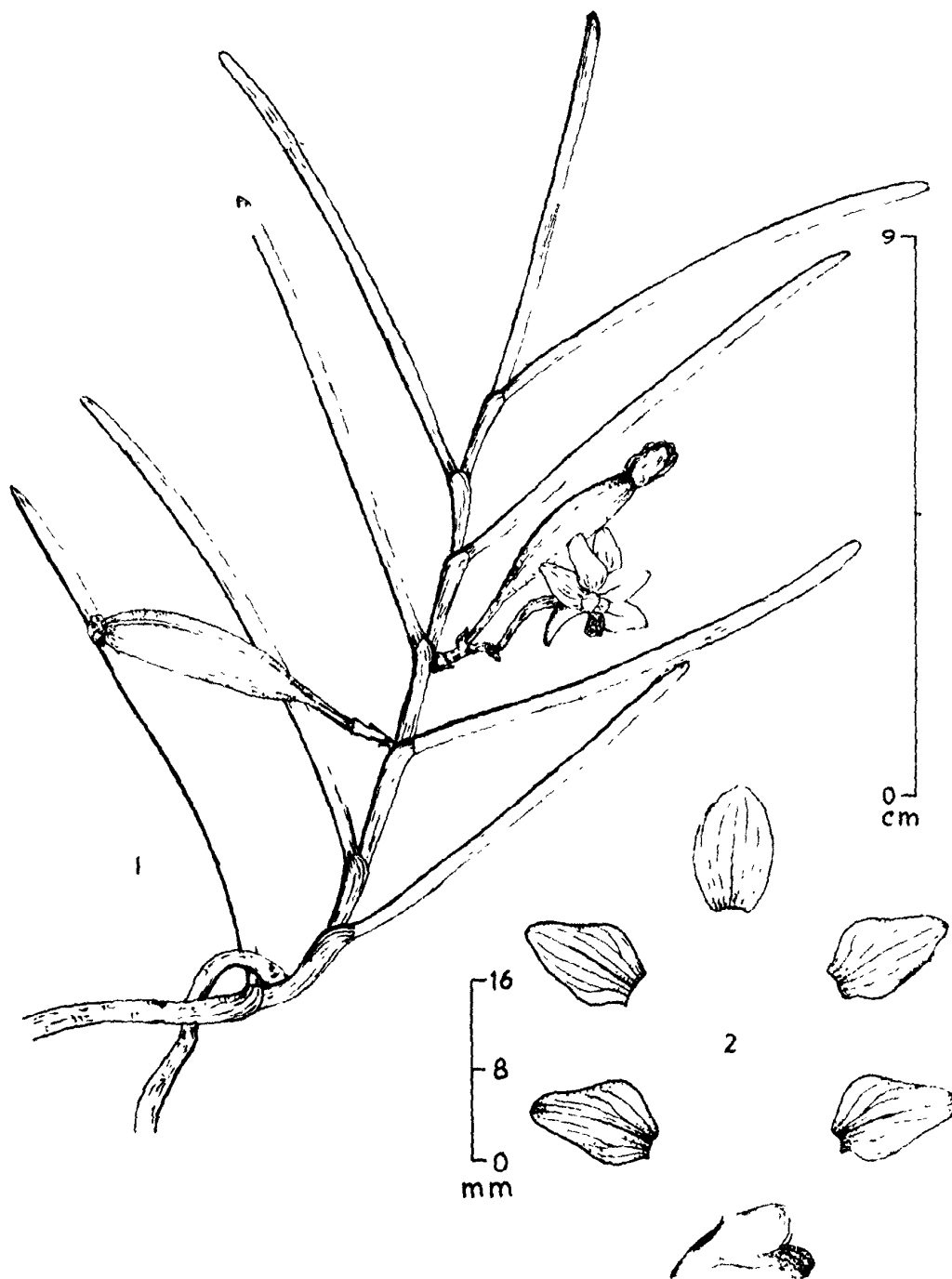


PLATE 54

Fig. 1-2. *Papilionanthe subulata* (Koen.) Garay 1. Habit; 2. Sepals, Petals and Lip.

L. zeylanica Lindl., Fol. Orch. *Luisia* 3. 1853 ; Seidenf. in Dansk Bot. Ark. 24(4) : 62. 1971. *Luisia teretifolia* auct non Gaud ; Fischer in Fl. Pres. Madras 1438. 1928 (Repr. ed. 3 : 1005 1957); Sant. & Kapad., Orch. Bombay 213. 1966; *Cymbidium tenuifolium* Weight, Ic. 5(1) : t. 1689. 1852.
Pl. 53, Figs. 1-2

Herbs with terete stems, 3-10 cm long, sheathed. *Leaves* 4.0-9.5 cm long alternate, acute, sheathing at base. *Inflorescence* condensed racemes, extra-axillary. *Flowers* 2-4, greenish pink. *Bracts* small, 1.5-2.0 × 1.0-2.0 mm, oblong, obtuse. *Ovary* and pedicel ca 2 mm, ovate, acute, concave, keeled towards the apex, ending in a subterminal mucro. *Lateral petals* as or slightly longer than sepals, ca 5.5 × 2.0 mm, oblong, obtuse, sparsely gland-dotted or not. *Lip* 3.5-5.0 mm long, concave towards the base, trilobed with dark maroon horizontal bands; midlobe rhomboid, swollen on the dorsal side, larger than sidelobes, sinuately trilobulate; lateral lobes thin, erect, auricular. *Fruits* 2-4 cm long, oblong with marcescent perianths, winged.

Flowering: July. *Fruiting* : July, November.

Vajravelu 37018, 41754, 42826 : Deepdale R.F. and Gudalur-Sultan-battery road ; Alt. 800-1500 m.

27. PAPILIONANTHE Schlechter

Papilionanthe subulata (Koenig) Garay in Bot. Mus. Leaflet. Harv. Univ. 23 (10) : 372. 1974. *Epidendrum subulatum* Koenig in Retz., Obs. Bot. 6 : 51. 1791. *Aerides cylindrica* Lindl., Gen. Sp. Orch. 240. 1833 ; Wight, Ic. 5(1) : 19. t. 1744. 1851 ; Hook. f., Fl. Brit. Ind. 6 : 44. 1890 ; Fischer in Fl. Pres. Madras : 1441. 1928 (Repr. ed. 3 : 1008. 1957). **Pl. 54 Figs. 1-2.**

Stems slender, elongate, above 30 cm long, with long velamen roots. *Leaves* cylindrical, up to 9 cm long. *Flowers* conspicuous, 2 or 3, pinkish white, mildly fragrant, extra axillary, opposite to the leaves, long pedicellate on short, condensed peduncle. *Bracts* 3-4 × 4-5 mm, broadly oblong, more or less crowded at the apex of the peduncle. *Ovary* with pedicel 1.5-3.0 cm long. *Dorsal sepal* ca 12.5 × 8.0 mm, oblong, obtuse-truncate at apex, 7-nerved. *Lateral sepals* ca 13.0 × 7.7 mm, ovatelanceolate, obtuse 7-nerved. *Lateral petals* ca 12.5 × 8.0 mm, broadly lanceolate, obtuse at tip. *Lip* trilobed; side lobes erect, ovate, ca 5.5 × 5.0 mm; midlobe about as long as the lateral lobes, ca 4.5 × 3.5 mm, thick, fleshy, with ridges. *Spur* ca 7 mm long, conical, obtuse at apex. *Fruits* long stalked, ca 7 cm long, sub-cylindric, narrowly winged.

Flowering : February, March, June. *Fruiting* : November-February, April.

Bourne s. n. (MH Acc. No. 83796); *Deb* 31617; *Lawson s. n.* (Acc. No. 50528); *Rathakrishnan* 38073; *Sharma* 40344; *Subba Rao* 40410; *Vajravelu* 34981, 36803, 39652, 43510, 43705. Common : Naduvattam, Ooty, Kattery falls, Matlada water falls, Kodanad R.F., Kunnakkombai R.F., Gudalur-Killur Forest ; Alt. 850-2100 m.

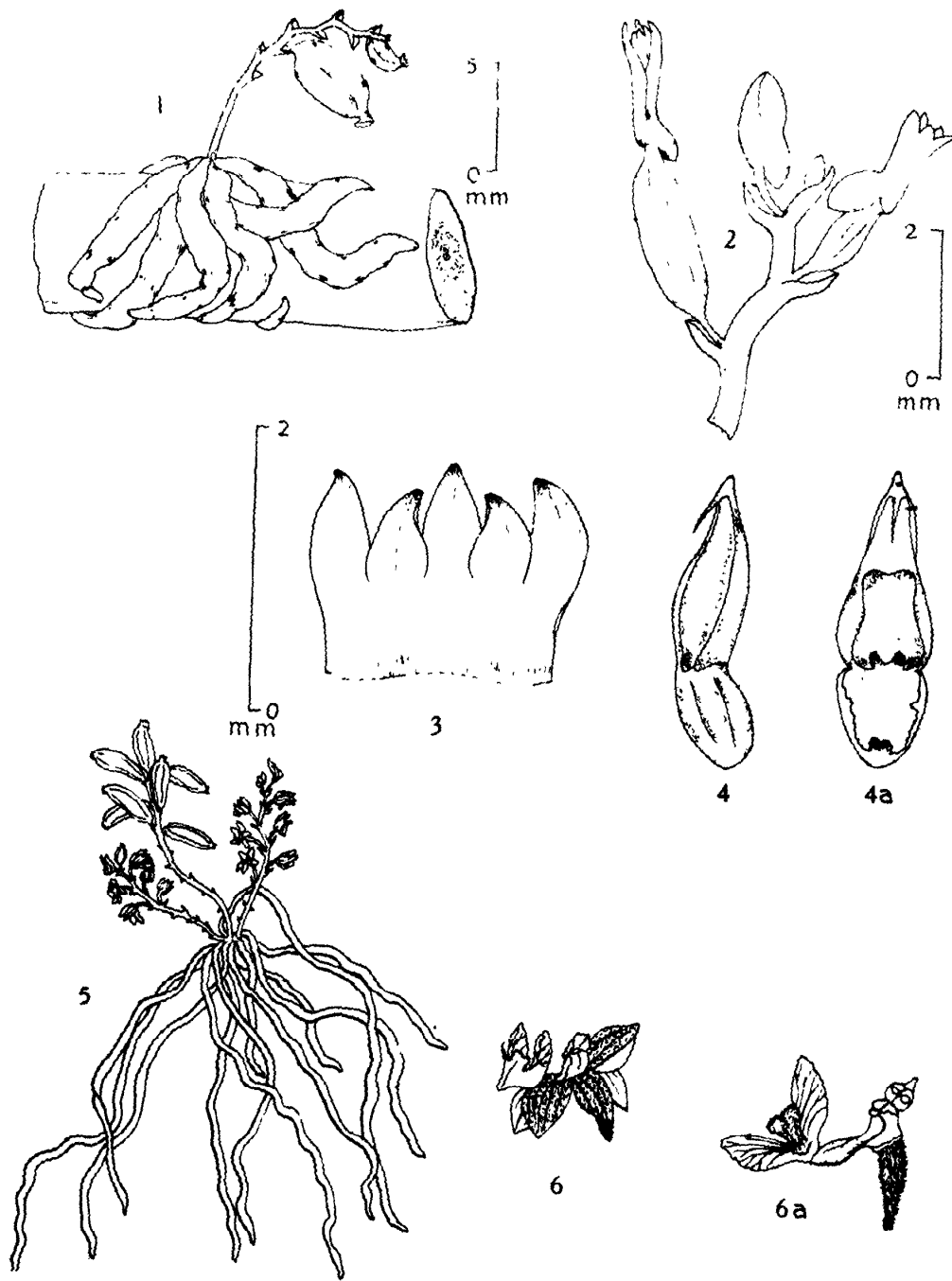


PLATE 55

Fig. 1-4a. *Taeniophyllum* sp. 1. Habit with inflorescence; 2. Inflorescence; 3. Connate sepals and petals (Spread out); 4. Lip (sublateral view); 4a. Lip (with sac cup open to show the calli within); **Figs. 5-6a.** *Chiloschista pusilla* (Retz.) Schltr: 5. Habit; 6. Flower (lateral view); 6a. Lip with ovary and column.

28. CHILOSCHISTA Lindl.

Chiloschista pusilla (Retz.) Schltr. in Fedde Repert. Beih. 4 : 275. 1919; Fischer in Fl. Pres. Madras 1441. 1929 (Repr. ed. 3 : 1007. 1957). *Epidendrum pusillum* Retz., Obs. Bot. 6 : 49. 1791. *Chiloschista usneoides* Wight, Ic. 5(1) : 19. t. 1741. 1851 (excl. left hand figure), *non* Lindl. 1833. *Sarcochilus wightii* Hook. f., Fl. Brit. Ind. 6 : 37. 1890. **Pl. 55, Figs. 5-6.**

Small, leafless, epiphytic herbs, roots flat, green assimilatory in function. *Racemes* short, 3.7-7.5 cm long, few flowered. *Flowers* white or cream-coloured, about 5 mm long. *Sepals* and *petals* glabrous without hairs within. *Lip* movable on the foot, trilobed; sidelobes erect; midlobe very short. *Spur* short, broadly conical. *Ovary* puberulous.

A very rare and imperfectly known species which could not be collected either from Nilgiris or from neighbouring areas. The above description is adopted from published sources.

29. TAENIOPHYLLUM Blume

Taeniophyllum sp.

Pl. 55, Figs. 1-4.

Small, stemless herbs with a cluster of assimilatory roots. *Inflorescence* racemes with 6 or 7 flowers. *Scapè* zigzag. *Flowers* shortly stalked, non-resupinate. *Bracts* ca 0.7 mm long, ovate. *Ovary* with pedicel ca 2 mm long. *Sepals* and *petals* subequal in size, ovate-lanceolate, obtuse, united at the base about the middle to form a campanulate tube of ca 1.7 mm long. *Lip* ca 2 mm long with spur, little shorter than lateral sepals, united up to the middle with sepals at the lower surface; base of the lip concave with thickening at the proximal end; sidelobes erect, auricular; basal half of the lip is swollen; midlobe conical ca 0.5 mm long, beaked at the tip, with incurved aristate tip. *Spur* 0.7 mm long, saccate, with a pair of callus at the base. *Fruiting axis* 0.5-1.4 cm long, arcuate, with persistent minute bracts. *Fruits* 4-7 mm long, shortly stalked, oblong, fusiform with marcescent perianth.

This comes near to *T. tjibodasanum* J.J. Sm. originally reported from Tjibodas in Java, subsequently from Malaya. As the flowering material obtained for study was poor, confirmation of identity could not be made. Hence further study on fresh collection is needed for arriving at correct conclusion.

Flowering : November-June. *Fruiting* : March.

Abraham 47001 : Sim's park-Coonoor ; Alt ca 1825 m.

30. OBERONIA Lindl.

1a. Plants small (largest leaf ca 2 cm long); flowers sunken in pits on the rachis; lip unlobed ...

1. *O. proudlockii*

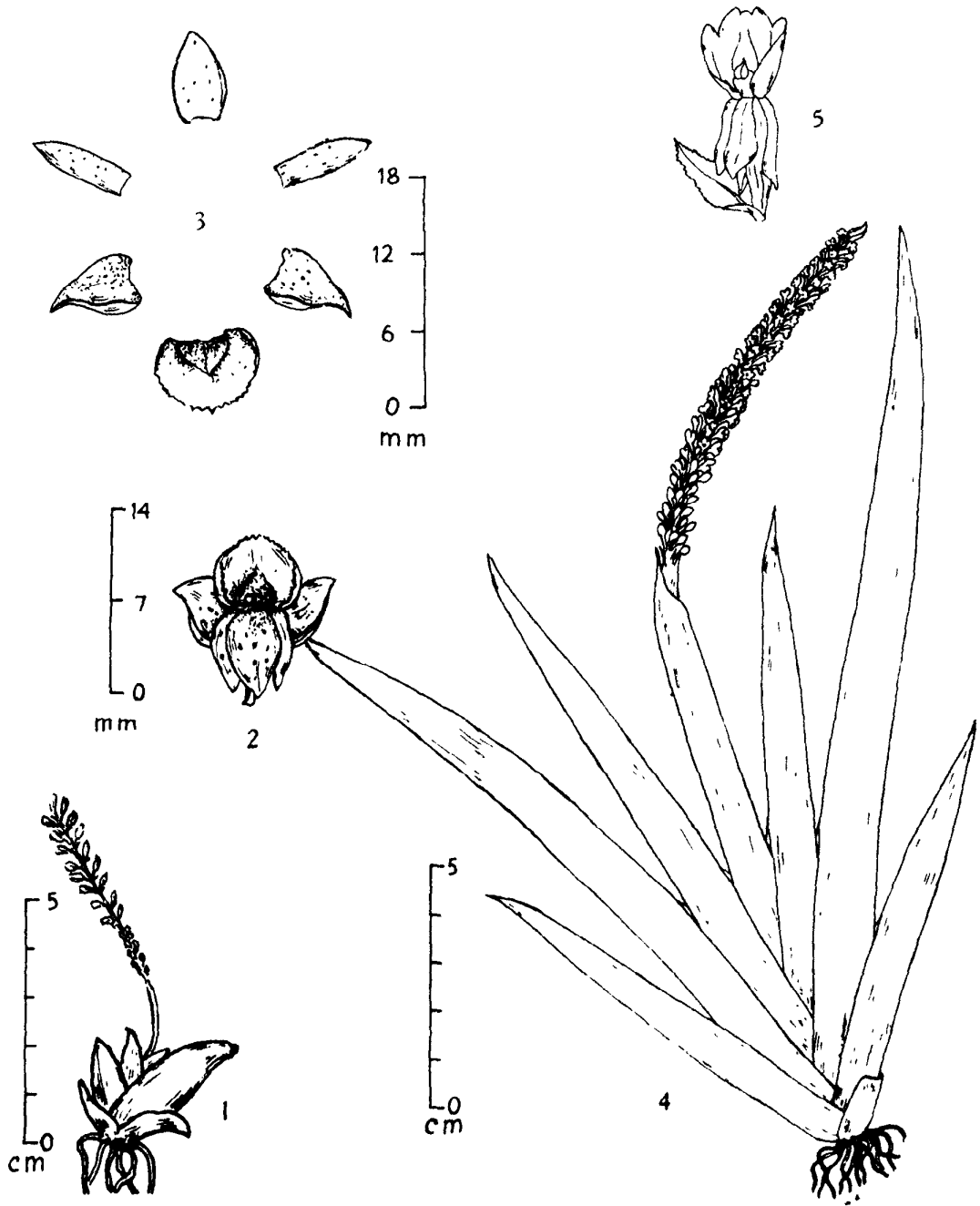


PLATE 56

Fig. 1-3. *Oberonia proudlockii* King & Pandl. 1. Habit; 2. Flower; 3. Sepals, petals and lip; Figs 4-5. *O. platycaulon* Wt.; 4. Habit; 5. Flower (after Wight).

- 1b. Plants large (largest leaf 10--25 cm); flowers not sunken in the rachis; lip trilobed
- 2a. Flowers in a continuous dense imbricate spike; scape long, flat
- 3a. Midlobe of the lip larger than sidelobes and further trilobulate ... 2. *O. platycaulon*
- 3b. Midlobe of the lip as large as or smaller than the sidelobes, bifid with a shallow sinus
- 4a. Spike stout, often ending in sterile tip; lip sparsely gland-dotted; midlobe inconspicuous 3. *O. brunoniana*
- 4b. Spike slender, with flowers upto the tip; lip densely gland-dotted; midlobe inconspicuous 4. *O. santapau*
- 2b. Flowers in spaced verticillate or sub-verticillate whorls; scape short, terete or subterete
- 5a. Sidelobes auricular, conspicuous; incurved and overlapping around the column; lobules of the midlobe narrow, truncate and erose at tip ... 5. *O. wightiana*
- 5b. Sidelobes obsolete; lobules of the midlobe broadly cuneate, round at tip ... 6. *O. verticillata*

1. *Oberonia proudlockii* King & Pantl. in Journ. As. Soc. Beng. 2. 66 : 580. 1897; Fischer in Fl. Pres. Madras : 1406. 1928 (Repr. ed. 3 : 983. 1957); Sant. & Kapad., Orch. Bombay 64. 1966. **Pl. 56 Figs. 1-3.**

Small herbs. *Leaves* 0.7-2.6 × 0.2-0.9 cm, variable in size and shape, ovate, oblong-lanceolate, ensiform acute. *Inflorescence* 3-7 cm long, scape subtended by a bract or not, decurved above, axis thick and fleshy. *Flowers* white or yellow, very small, sunk in pits in the rachis, subsessile, *Bracts* 0.7 × 0.5 mm, slightly longer than the ovary, margins slightly lacinate, acute at tip. *Ovary* with short pedicel, ca 0.7 mm long. *Dorsal sepal* ca 0.7 × 0.5 mm, ovate, acute, gland-dotted, reflexed over the ovary. *Lateral sepals* as long and broad as dorsal sepal, ovate, slightly oblique towards the apex, acute, erect on either side of the lip, gland-dotted. *Lateral petals* ca 0.8 × 0.2 mm, slightly longer than sepals or subequal, oblong-lanceolate, obtuse, gland-dotted. *Lip* ca 0.6 × 0.9 mm, orbicular, concave, margin crenulate-denticulate, broader than sepals. *Fruits* ca 4 mm long, oblong-obovoid.

Flowering & fruiting : January-March.

Shetty 1911, Kariashola, : *Vajravelu* 43796, Nadugani; Alt. 925-1300 m.

2. *O. platycaulon* Wight, Ic. 5(1) : 3. t. 1623. 1851; Hook f., Fl. Brit Ind. 5 : 682. 1888; Fischer in Fl. Pres. Madras 1407. 1928 (Repr. ed. 3 : 984, 1957); Sant. & Kapad., Orch. Bombay 70. t. 15 A-B. 1966.

Pl. 56. Figs. 4-5.

Leaves long, narrow, 1.2-19.0 × 0.8-1.6 cm, ensiform straight, subacute. *Spike* dense imbricate. *Scape* erect, flowering portion subarcuate, compressed,

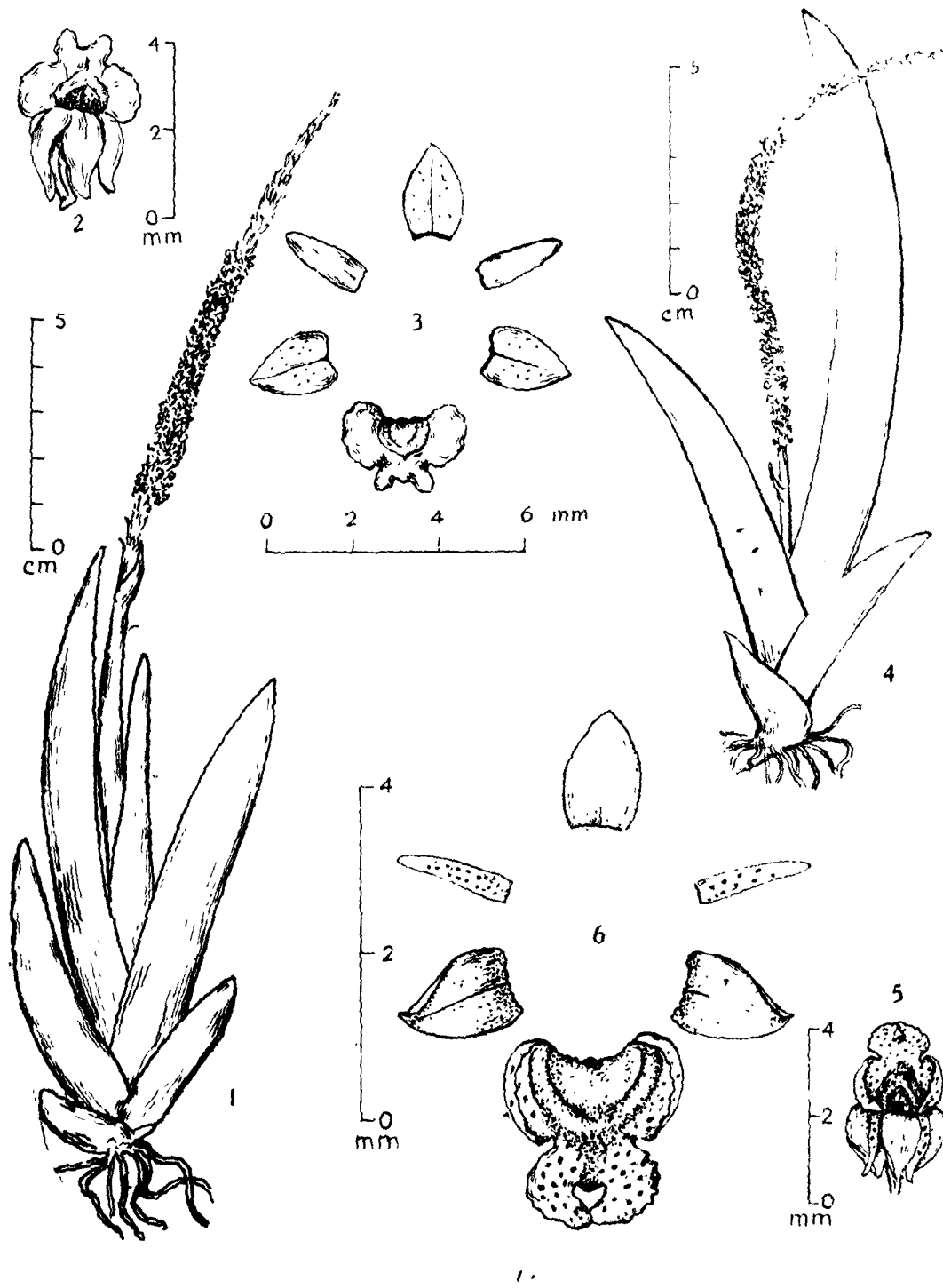


PLATE 57

Fig. 1-3. *Oberonia brunoniana* Wt. 1. Habit; 2. Flower; 3 Sepals, petals and Lip; Figs. 4-6. *O. Santapau* Kapadia. 4. Habit; 5. Flower; 6. Sepals, Petals and Lip.

subtended by a falcate bract, as long as or shorter than leaves. *Flowers* large, whitish or pale yellow. *Bracts* broad, 3.0×1.5 mm, ovate, acute, as long as the sessile ovary and sheathing it, erose at the margin. *Sepals* ovate-lanceolate, acute. *Petals* linear, narrower and slightly shorter than sepals. *Lip* trilobed; midlobe larger than sidelobes, midlobe further trilobulate. Fruiting axis *ca* 25 cm long. *Fruits ca* 7 mm long, oblong-obovoid.

One of the largest species of *Oberonia*. Only fruiting specimen could be collected. Hence the description of floral parts is adopted from the protologue and other published sources.

The specimen dealt with under *O. platycaulon* Wt. by Santapau & Kapadia (1966) does not agree with *O. platycaulon* but resembles *O. seidenfadeniana* Joseph et Vajravelu (1971).

Fruiting : February-March.

Deb 31605; *Lawson s. n.* (MH Acc. No. 501141); *Sharma* 40301. Not common, Naduvattam area; Alt. 1700-2150 m.

3. *O. brunoniana* Wight, Ic. 5(1): 3. t. 1622. 1851; Hook. f., Fl. Brit. Ind. 5: 681. 1890; Fyson, Fl. Nilgiri & Pulney Hill-tops 383. 1915; Fischer in Fl. Pres. Madras 1406. 1928 (Repr. ed. 3: 984. 1957); Sant. & Kapad., Orch. Bombay 69. t. 15 A'-B'. 1966. **Pl. 57 Figs. 1-3.**

Erect or pendulous herbs. *Leaves* $1.5-25.0 \times 0.8-1.7$ cm, linear-oblong, subfalcate, acute. *Inflorescence* erect or arcuate, 7-23 cm long, stout; scape 4-11 cm long, flat, with or without subtended bract. *Flowers* brick red, dense, sessile. *Bracts ca* 3.5×1.5 mm, ovate lanceolate, acute, erose along the margin. 1-nerved. *Ovary* with short pedicel, *ca* 2 mm long. *Sepals ca* 2.0×1.2 mm, subequal, ovate, acute, sparsely gland-dotted, concave, hyaline. *Lateral petals ca* 2.0×0.7 mm, subequal with sepals, linear, acute, sparsely gland dotted. *Lip ca* 1.5×2.7 mm, quadrately auricular, slightly crenulate; midlobe inconspicuous, 2-lobulate with a shallow sinus; lobules irregularly crenulate, sparsely gland-dotted. *Capsule ca* 7 mm long, oblong.

Flowering : February, July, September & October.

Ellis 43350; *Lawson s. n.* (MH Acc. No. 50138); *Rangachari s. n.* (MH Acc. No. 50133-50137); *Vajravelu* 43700; *Vivekanthan* 43001. Common; Naduvattam, Pykara, Sispara, T. R. Bazaar shola, Bangihala. Alt. 800-2200 m.

4. *O. santapui* Kapadia in Journ. Bombay Nat. Hist. Soc. 57: 265. 1960; Sant. & Kapad. Orch. Bombay 72. 1966; *O. lindleyana* Wight, Ic. 5(1): 3. t. 1624. 1851 Brongn. ex Duperr. 1834; Hook. f. Fl. Brit. Ind. 5: 681. 1888; Fischer in Fl. Pres. Madras 1707. 1928 (Repr. ed. 3: 984. 1957).

Pl. 57, Figs. 4-6.

Herbs, *ca* 20 cm high. *Leaves* ensiform, $2.0-12.0 \times 0.6-1.8$ cm, fleshy, acute. *Inflorescence* spikes decurved towards apex, *ca* 19 cm long, scape flat, subtended by a bract or not. *Flowers* dense, straw coloured, or pale green. *Bracts ca* 1.5 mm long, ovate-lanceolate, acuminate, subdenticulate on the margins.

Ovary with short pedicel, *ca* 1.5 mm long. *Sepals ca* 1.2 × 0.9 mm, subequal, ovate, obtuse. *Lateral petals* as long as or subequal with sepals, much narrower, *ca* 0.2 mm broad, linear-ligulate, obtuse. *Lip ca* 2 × 2 mm, trilobed; margins irregularly crenulate, densely gland-dotted; side lobes narrow, auricular, incurved; midlobe quite large, bilobulate, with a sinus, with (or without) a mucro in the centre, lobules more or less overlapping.

Flowering: December-January.

Barber 2687, Pykara; *Bourne* 2931, Ooty; Alt. 400–1600 m.

O. brunoniana and *O. santapau* are represented by distinct ecotypes vegetatively but exhibiting hardly any difference in floral structure of the species, except perhaps in size.

5. *O. wightiana* Lindl. in Bot. Reg. misc. 9. 1839; Hook. f., Fl. Brit. Ind. 5 : 683. 1888; Fyson, Fl. Nilgiri & Pulney Hill-tops 1 : 383. 1915; Fischer in Fl. Pres. Madras 1407. 1928 (Repr. ed. 3 : 984. 1957); Wight, Ic. 5(1) : 3. t. 1627. 1851; Sant. & Kapad., Orch. Bombay 67. t. 14 'A-B'. 1966. *O. stachyoides* A. Rich. in Ann. Sci. Nat. Ser. 2. 15 : 15. t. 1A. 1841. *O. arnottiana* Wight, Ic. 5(1) : 3. t. 1628. 1851. **Pl. 58. Figs. 1-3.**

Small herbs, pendulous. *Leaves* linear-ensiform, acute, 2.0–10.0 × 0.3–0.9 cm. *Inflorescence* 7–16 cm long, erect or arcuate, subverticillate racemes. *Flowers* yellow. *Bracts ca* 2 × 0.7 mm, subequal, ovate, acute; dorsal sepal obtuse, lateral ones acute, concave. *Lateral petals ca* 1.0 × 0.3 mm, linear, subequal with sepals, acute. *Lip ca* 1.7 × 1.7 mm, longer than the sepals, 3-lobed; lateral lobes enveloping the column, oblong-auricular; midlobe erect, 2-lobulate; lobules diverging, truncate, slightly erose. *Capsules* oblong-obovoid, *ca* 5 mm long with pedicel.

Flowering: November. *Fruiting*: January-March, September-December.

Balakrishnan 83; *Beddome s. n.* (MH Acc. No. 50148); *Deb* 31599; *Ellis* 34820, 37861, 43394; *Lawson s. n.* (MH Acc. No. 50146, 50147, 50149, 50150, 50157); *Sharma* 35978, 40337; *Shetty* 37575; *Vajravelu* 36888, 39629; *Vivekanathan* 43013; *Wight* 2061; Coonoor, Ooty-Naduvattam road, Mudimund, Nilgiri peak R.F., Doddabetta, Avalanche, Kodanad, Bangihalla; Alt. 1900–2500 m,

6. *O. verticillata* Wight, Ic. 5(1) : 3. t. 1626. 1851; Hook. f., Fl. Brit. Ind. 5 : 677. 1888; Fyson, Fl. Nilgiri & Pulney Hill-tops. I : 383. 1915; Fischer in Fl. Pres. Madras 1406. 1928 (Repr. ed. 3 : 984, 1957); Sant. & Kapad., Orch. Bombay 66. t. 14 A-B. 1966. **Pl. 58, Figs. 41a-71c.**

Pendulous herbs. *Leaves* 1.0–12.5 × 0.4–0.9 cm, linear-lanceolate-ensiform, acute, shortly acuminate. *Inflorescence* 15–29 cm long, scape with a sterile bracts at base. *Flowers* in verticels, yellow, shortly pedicellate. *Bracts ca* 2.0 × 0.9 mm, as long as or slightly longer than the ovary and pedicel, lanceolate, acute, erose along the margins, encircling the ovary with the pedicel.

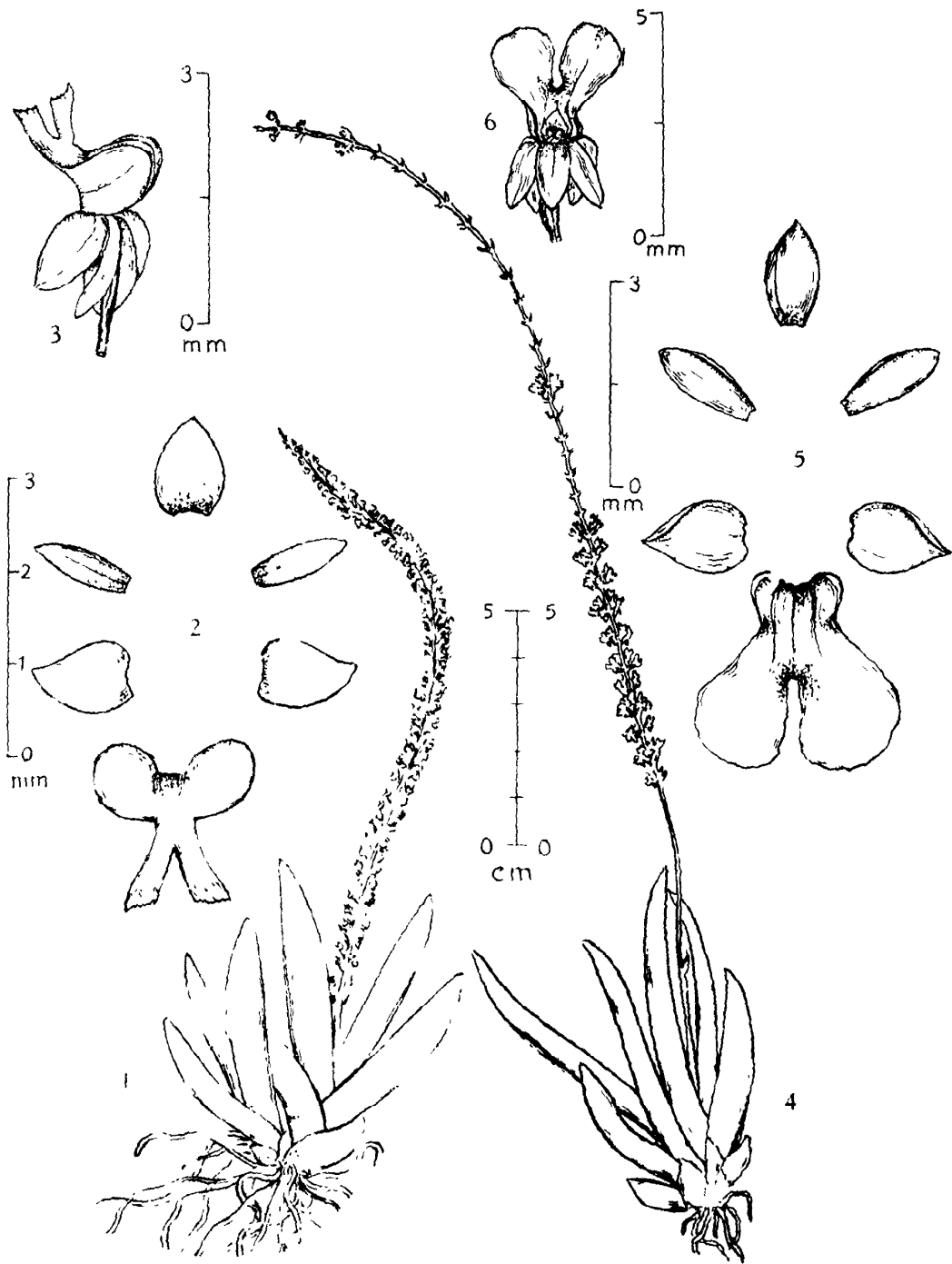


PLATE 58

Fig. 1-3. *Oberonia wightiana* Lindl. 1. Habit; 2. Sepals, Petals and Lip; 3. Flower; Figs. 4-6. *O. Verticillata* Wt.; 4. Habit; 5. Sepals, Petals and Lip; 6. Flower.

Ovary and pedicel *ca* 2 mm long. *Dorsal sepal* *ca* 1.5 × 0.7 mm, ovate-oblong, acute, concave. *Lateral sepals* *ca* 1.5 × 1.0 mm, broadly ovate, acute. *Lateral petals* *ca* 1.6 × 0.5 mm, as long as or slightly longer than sepals, oblong, obtuse. *Lip* *ca* 2.7 mm long, larger than the sepals and lateral petals, flabellate in outline, auriculate at base, deeply 2-lobed at apex; lobes *ca* 1.5 mm broad, rounded, slightly crenulate at the apex. *Capsules* *ca* 6 mm long with pedicel, oblong.

Flowering: August–November. *Fruiting*: September–December

Ellis 43266; *Narayana & Raju* 18444; *Rangachari s. n.* (MH Acc. No. 50115–50119, 50121); *Rathakrishnan* 39059; *Sharma* 35912; *Shetty* 37619; *Subba Rao* 36658, 37401; *Vajravelu* 36802; *Vivekanathan* 42936. Common: Pykara, Naduvattam, Anvalache, Ebenad to Bikkampattimund, Kukkal Betta shola, Kodanad R.F.; Alt. 1200–2100 m.

31. FLICKINGERIA A. D. Hawkes

Flickingeria nodosa (Dalz.) Seidenf., Dansk Bot. Ark. 34(1) : 41. 1980. *Dendrobium nodosum* Dalz., Hook. J. Bot. Kew Gard. Misc. 3 : 292. 1852. *D. macraei* auct. p.p. non Lindl. : Hook. f., Fl. Brit. Ind. 5 : 714. 1890 (*quoad* Deccan specimens); Sant. & Kapad., Orch. Bombay 79. 1966.

Pl. 59, Figs. 1-3.

Herbs with creeping, annulate rhizome, and with suberect or pendulous simple branches. *Branches* 18–27 cm long, pendulous, plurinodal, shining, yellowish brown, bearing pseudobulbs at irregular intervals. *Pseudobulbs* 1.5–4.5 × 0.5–1.2 cm, uninodal, oblong, fusiform, shining. *Leaves* sessile, solitary at the tip of the pseudobulb, 7.0–10.3 × 1.3–1.9 cm, linear-oblong or elliptic, acute. *Flowers* solitary (or two), at the base of the leaf, mildly sweet scented, creamy white with maroon dots within the lateral lobes of the lip; pedicel stout, sheathed by scarious bracts, sterile bracts 3, rarely more, fertile bracts minute, much shorter than the pedicel. *Dorsal sepal* *ca* 7 × 3 mm, oblong, obtuse, 5-nerved, sparsely gland-dotted, subequal with the lateral sepals. *Lateral sepals* *ca* 9 × 6 mm, oblique at base, oblong, obtuse, 5-nerved, attached to the sides of the long foot forming a mentum. *Lateral petals* *ca* 7.0 × 2.2 mm, lanceolate, 3-nerved, sparsely gland-dotted, acute. *Lip* attached to the tip of the long foot, reflexed about the middle, conduplicate, trilobed; sidelobes *ca* 6.0 × 2.5 mm, erect, parallel to the foot, oblong, obtuse; midlobe *ca* 4 mm long, contracted at the base and erose at the margins, two winged towards the tip; terminal wings *ca* 7.5 mm across, more or less diverging. There are two medium entire ridges within, up to the junction of the side lobes, which prolong into short sinuate crests. *Column* *ca* 1.5 × 1.5 mm, short; anther cells hinged to the column by a short slender stalk.

Flowering: September–October.

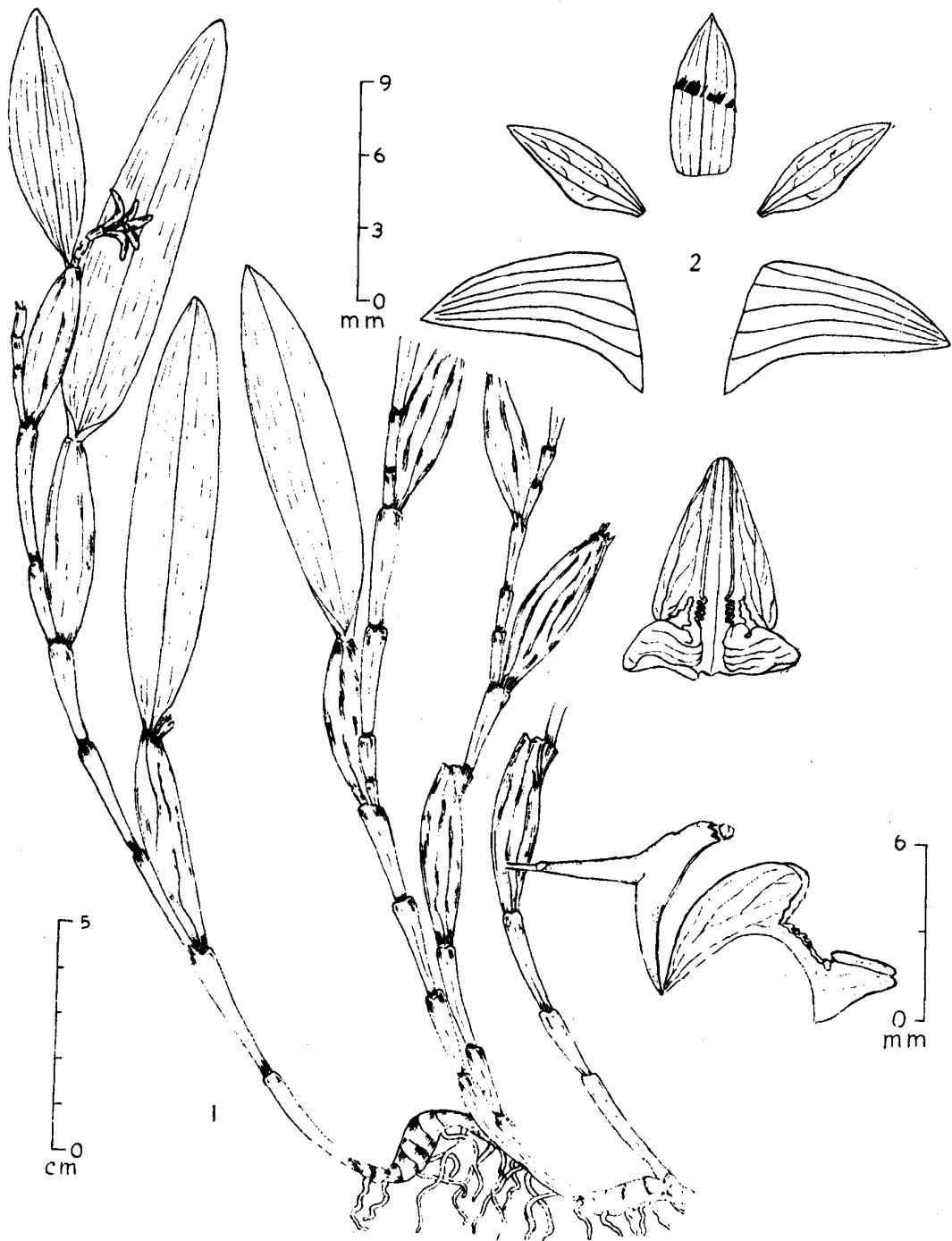


PLATE 59

Fig. 1-3. *Flickingeria nodosa* (Dalz.) Seidenf. 1. Habit; 2. Sepals, Petals and Lip (spread out); 3. Lip (side view) with column and ovary.

Shetty 34416; Kottaikadva; Alt. 110 m.

32. PHOLIDOTA Lindl.

Pholidota imbricata W.J. Hook., *Exot. Fl.* 2 : subt. 138. 1825; Wight, *Ic.* 3(2) : 9. t. 907. 1844; Hook. f., *Fl. Brit. Ind.* 5 : 845. 1890; King & Pantl. in *Ann. Roy. Bot. Gard. Cal.* 8 : 201. 1891; Fischer in *Fl. Pres. Madras* 1431. 1928 (Repr. ed. 3 : 1000. 1957); Sant. & Kapad., *Orch. Bombay* 175. t. 40. 1966. **Pl. 59. Figs. 1-3.**

Pseudobulbs in clusters, large, swollen, green, 2.5-5.0 × 1.0-2.5 cm, oblong-conical, covered by large scaly bracts. *Leaves* 12.5-35.0 × 2.7-6.6 cm, elliptic-oblongate, acute, narrowed into short petiole. *Inflorescence* racemes, 26-54 cm long, pendulous, with bifarious, imbricating bracts from the top of the fresh off-shoots; inflorescence axis zigzag or not, often so at the distal end; scape 12-25 cm long, terete, smooth. *Flowers* white, arranged in two rows. *Bracts* large, ca 8 × 7 mm, broadly ovate, concave, obtuse, pinkish brown, encircling the ovary with pedicel, persistent. *Ovary* with pedicel ca 6 mm long. *Sepals* subequal, concave, 3-nerved. *Dorsal sepal* ca 5.0 × 4.5 mm, broadly ovate, obtuse. *Lateral sepals* ca 6.5 × 3.0 mm, cymbiform, obtuse, with a dorsal median wing. *Lateral petals* ca 5.0 × 1.2-2.0 mm, falcate-linear, acute, 1-nerved. *Lip* ca 6.5 mm long, deeply saccate, sac with 3 longitudinal ridges within, 3-lobed; side lobes broadly triangular, obtuse, erect; midlobe 2-lobulate, with a shallow median sinus, lobules auricular. *Fruits* ellipsoid, ca 2 cm long

Flowing: July. *Fruiting*: October-February.

Barber 5631; *Ellis* 43264; *Vajravelu* 41820, 42877, 43746; Common: Kuzhivayal R.F., Thallur forest, Nadugani, Ouchterony valley & Nedukarna to Nedumballi-Wynaad; Alt. 700-1150 m.

33. BULBOPHYLLUM Thou.

- 1a. Pseudobulbs crowded, leafless while flowering; flowering portion of scape arcuate or drooping ... 1. *B. poudlockii*
- 2b. Pseudobulbs scattered (at long intervals on the creeping rhizome) with leaf while flowering; flowering portion erect
 - 2a. Flowers in racemes; sepals subequal, lateral sepals not cohering along the margins nor twisted
 - 3a. Plants large (pseudobulb with leaf up to 21 cm); inflorescence terminal at the tip of fresh shoot ... 2. *B. fuscopurpureum*
 - 3b. Plants short (pseudobulb with leaf up to 12 cm); inflorescence lateral from the base of developed pseudobulb
 - 4a. Inflorescence shorter than leaves; flowers dense, glabrous ... 3. *B. neilgherrense*
 - 4b. Inflorescence longer than leaves; flowers lax, hairy ... 4. *B. tremulum*

- 2b. Flowers in umbels; sepals very unequal; lateral sepals much longer, cohering along the margins and often twisted
- 5a. Lateral sepals densely papillose or warted towards the base, without
- 6a. Pseudobulbs corrugated; leaves linear-oblong; flowers pale yellow with maroon stripes ... 5. *B. elegantulum*
- 6b. Pseudobulbs not corrugated; leaves linear-oblong to elliptic; flowers yellow mottled with purple dots ... 6. *B. fischeri*
- 5b. Lateral sepals smooth without
- 7a. Scape longer than the leaves; lateral sepals more or less twice as long as dorsal sepal ... 7. *B. acutiflorum*
- 7b. Scape shorter than the leaves; lateral sepals more or less thrice as long as dorsal sepal
- 8a. Dorsal sepal minutely denticulate; lateral petals crose ... 8. *B. nodosum*
- 8b. Dorsal sepal and lateral petals entire ... 9. *B. kaitiense*

1. ***Bulbophyllum proudlockii*** (King & Pantl.) J. J. Sm. in Bull. Jard. Bot. Buitenz. ser. 2, 8 : 27. 1912; Seidenf. in Dansk Bot. Ark. 29(1) : 242. 1975. *Cirrhopetalum proudlockii* King & Pantl. in Journ. As. Soc. Bengal 66 : 588. 1897; Fischer in Fl. Pres. Madras 1421. 1928 (Repr. ed. 3 : 933. 1957). **Pl. 61, Figs. 1-3.**

Pseudobulbs in clusters or at very short intervals on stout creeping stem, sub-globose, yellow when dry, leafless when flowering. *Flowers* 5-10 in a raceme, pale yellow, towards the apex of the slender long scape; axis drooping or arcuate; scape 5.5-6.4 cm long, from the base of the pseudobulb with 2 or 3 tubular sheaths. *Bracts* as long as the ovary and pedicel, lanceolate, acuminate. *Ovary* and pedicel *ca* 2 mm long. *Dorsal sepal* *ca* 4 × 2 mm, broadly ovate-lanceolate, shortly acuminate. *Lateral sepals* *ca* 9.0 × 1.7 mm, oblong, obtuse, twice as long as dorsal. *Lateral petals* *ca* 1.7 × 0.7 mm, triangular, aristate, much smaller than dorsal sepal. *Lip* *ca* 2 mm long, ligulate, more or less reflexed from the middle, subentire, thick.

Two leaves have been noticed in only one collection (*Deb* 31639). They are *ca* 23.0 × 3.7 mm, linear-lanceolate.

Flowering: March.

Deb 31639, Naduvattam-Gudalur; *Lawson s. n.* (MH Acc. No. 50274 B 50275) Naduvattam; Alt. 1400 m.

2. ***B. fusco-purpureum*** Wight, Ic. 5(1) : 6. t. 1651. 1851; Hook. f., Fl. Brit. Ind. 5 : 760. 1890; Fischer in Fl. Pres. Madras 1418. 1928 (Repr. ed. 3 : 992. 1957). **Pl. 62, Figs. 1-2.**

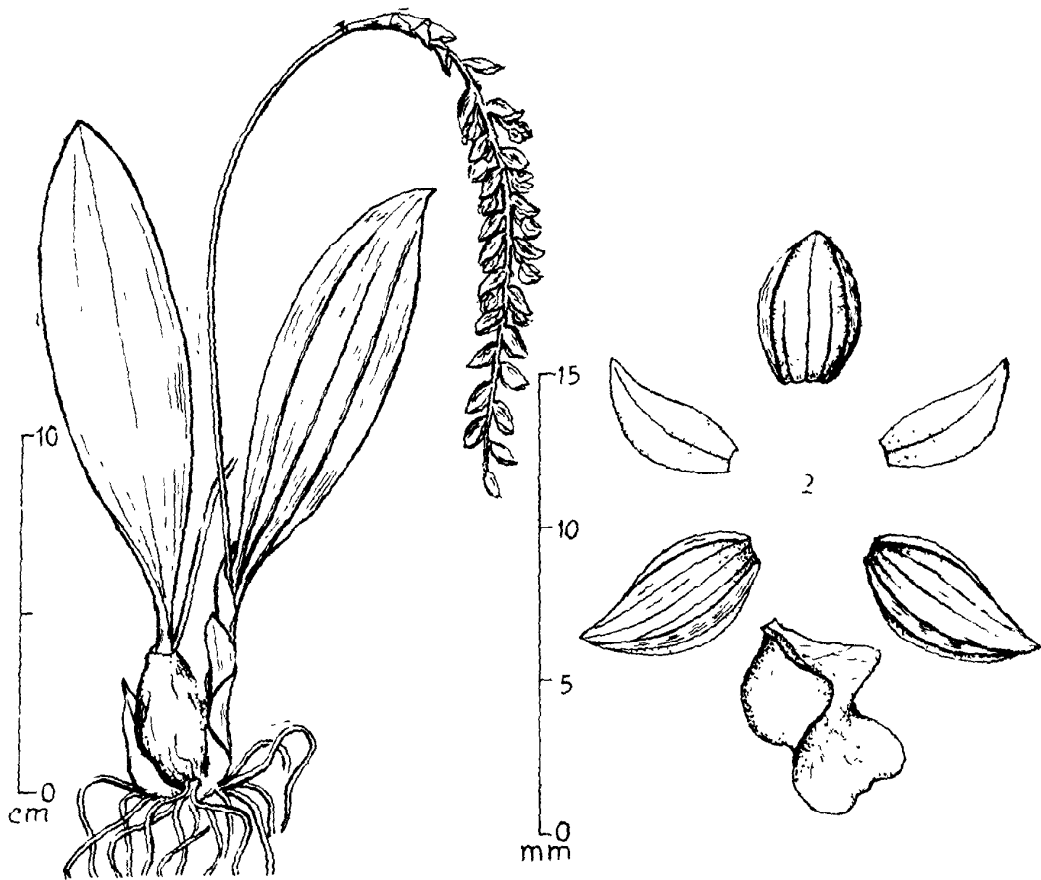
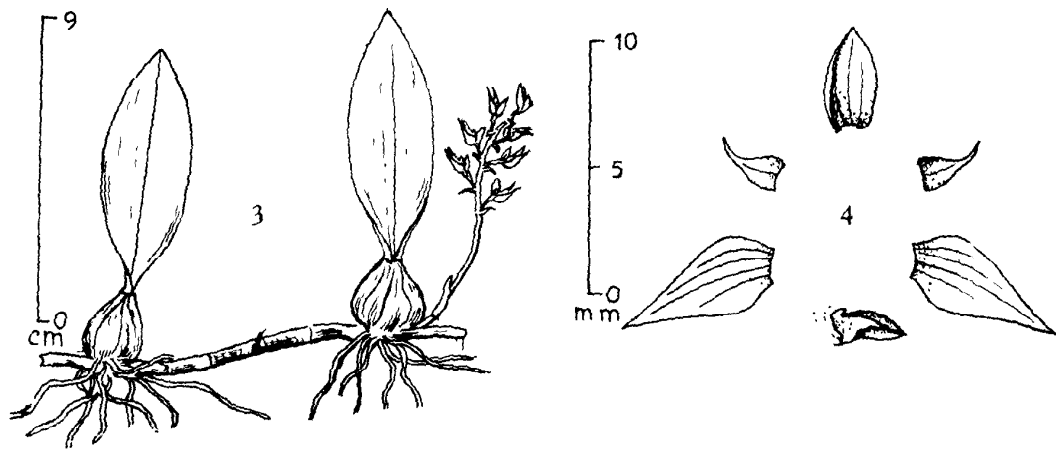


PLATE 60

Fig. 1-2. *Pholidola imbricata* (Roxb.) Lindl. 1. Habit; 2. Sepals, Petals and Lip. Figs 3-4. *Bulbophyllum neilgherrense* Wt. 3. Habit; 4. Sepals, Petals and Lip.

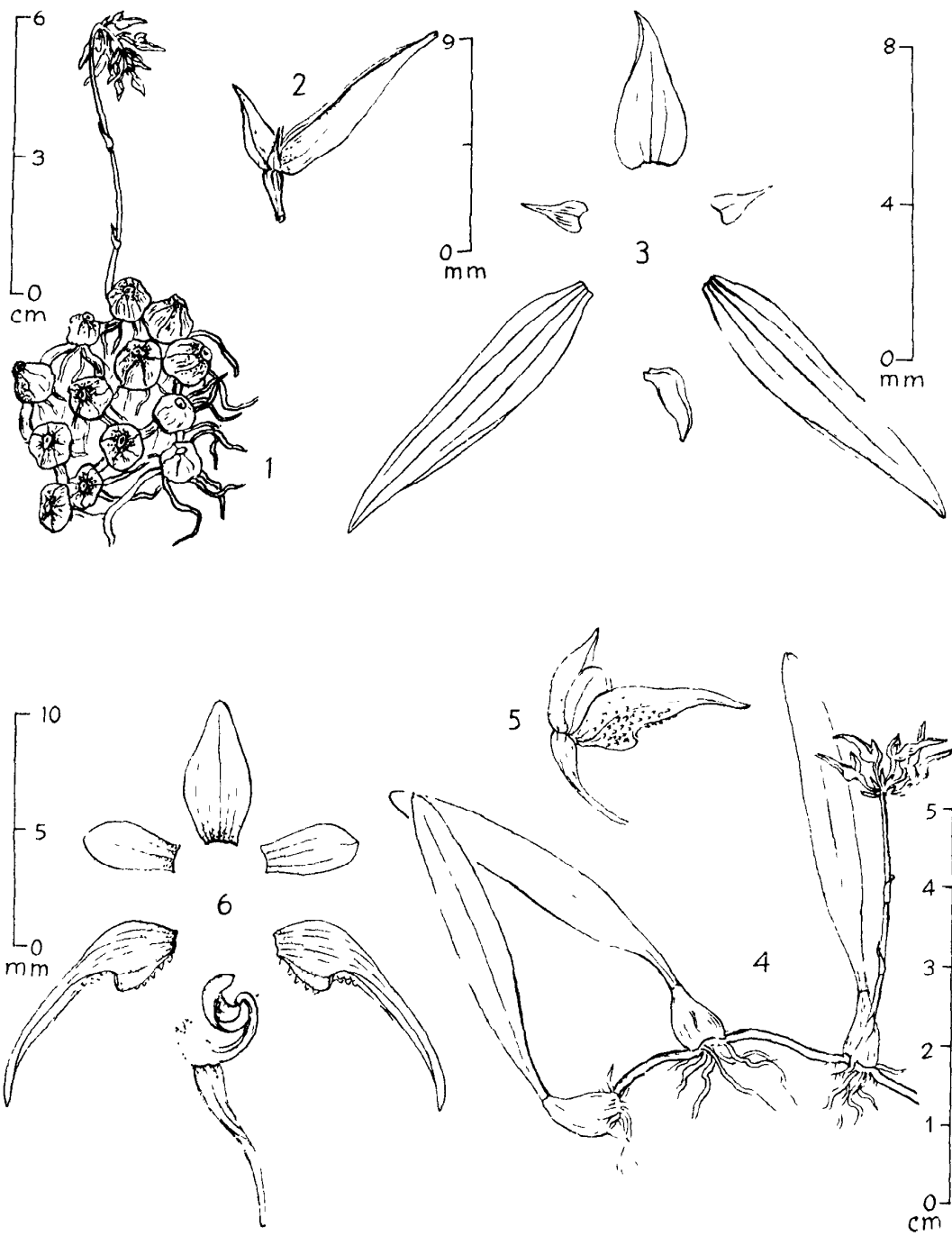


PLATE 61

Fig. 1-3. *Bulbophyllum proudloekii* (King & Prantl.) J.J. Sm. 1. Habit, 2. Flower, 3. Sepals, Petals and Lip. Figs 4-6. *B. elegantulum* (Rolfe) J.J. Sm. 4. Habit. 5. Flower (lateral view). 6. Sepals, Petals and Lip (with column and ovary).

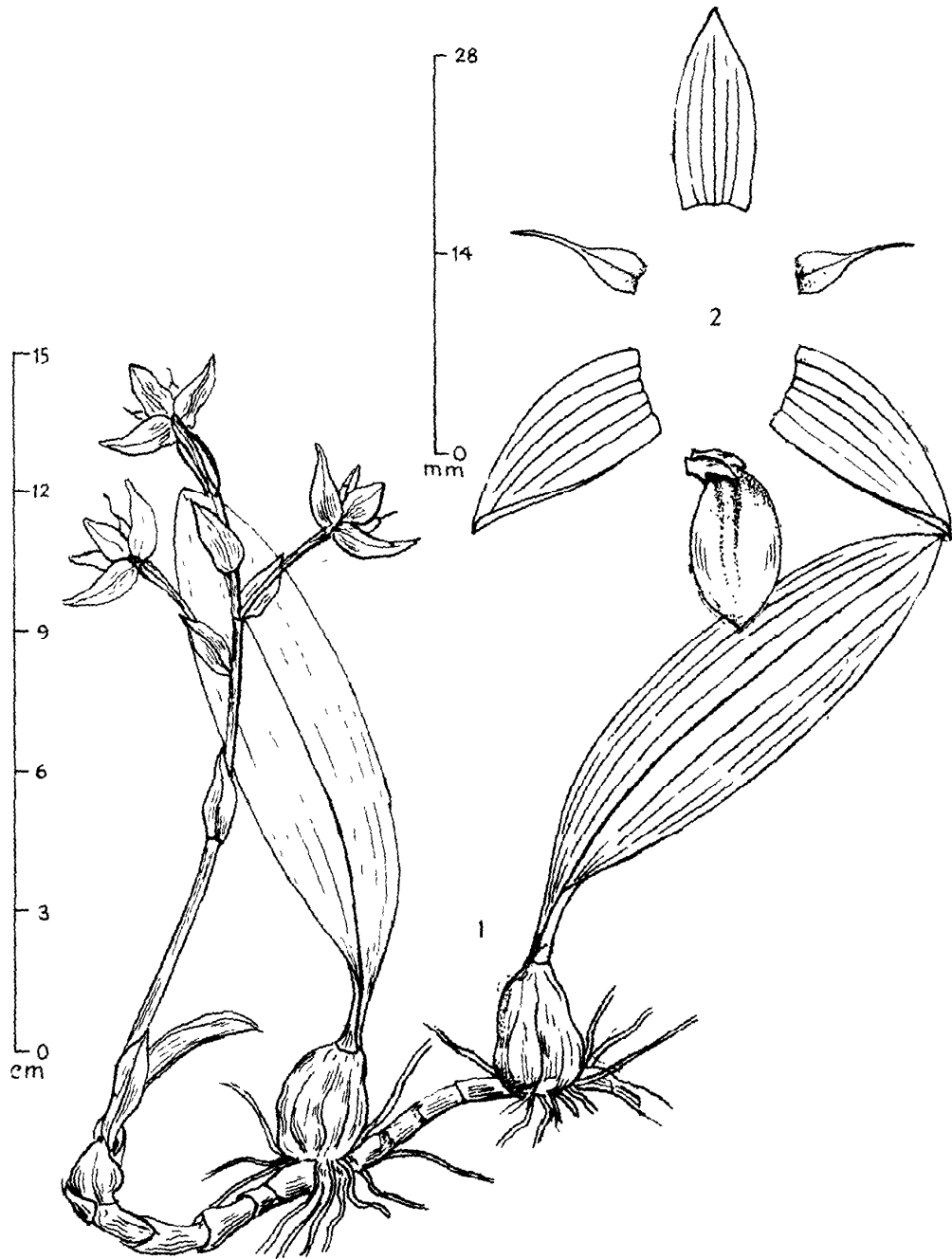


PLATE 62

Fig. 1-2. *Bulbophyllum fusco-purpureum* Wt. 1. Habit. 2. Sepals, Petals and Lip.

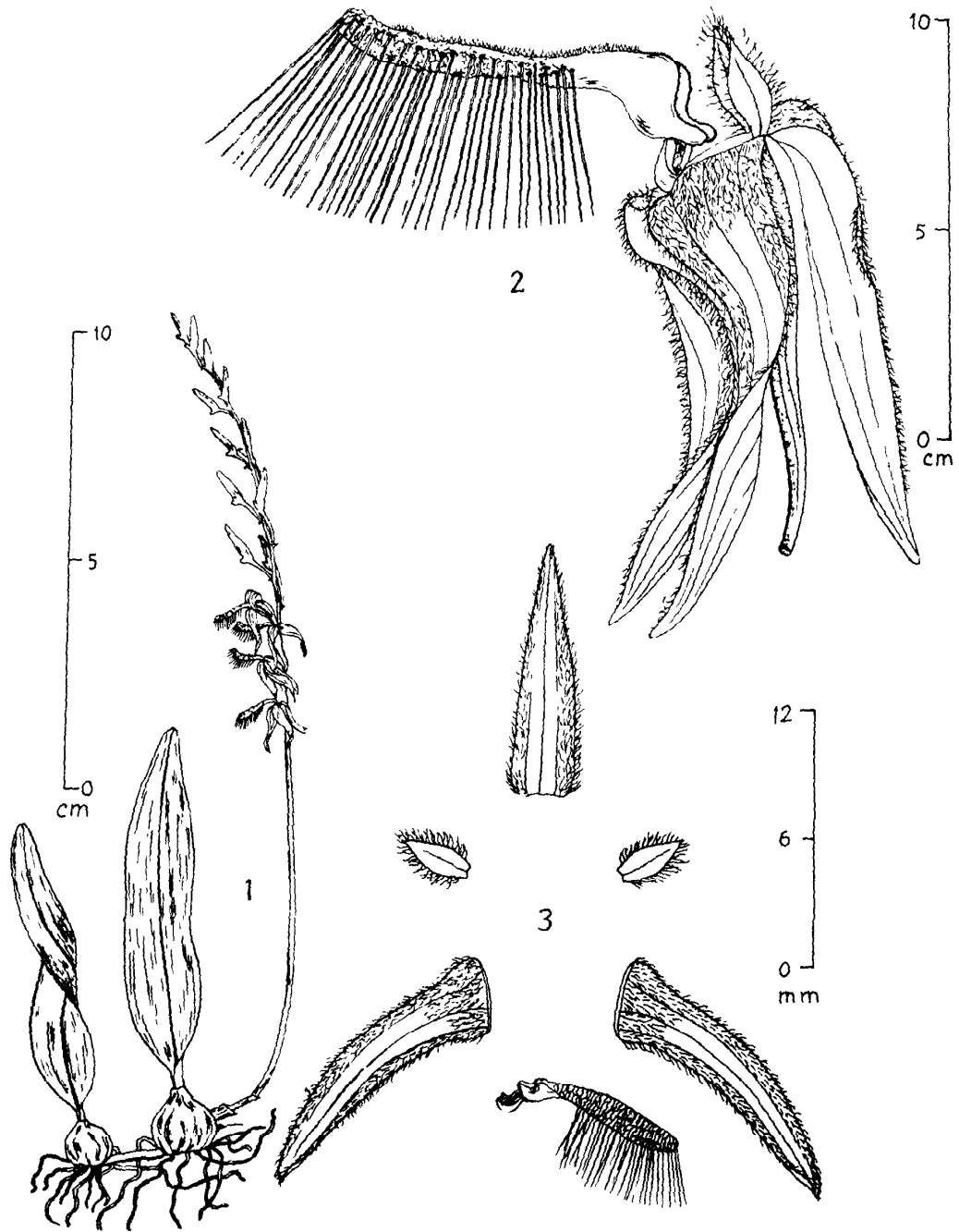


PLATE 63

Fig. 1-3. *Bulbophyllum tremulum* Wt. 1. Habit; 2. Flower; 3. Sepals, Petals and Lip.

3. **B. neilgherrense** Wight, Ic. 5(1): 6. t. 1650. 1851; Hook. f., Fl. Brit. Ind. 5 : 761. 1890; Fischer in Fl. Pres. Madras 1418. 1928 (Repr. ed. 3 : 992. 1957); Sant. & Kapad., Orch. Bombay 195. t. 47. 1966. **Pl. 60, Figs. 3-4.**

Small herbs, with creeping slender stem. *Pseudobulbs* conical ovoid, 1.5-2.5 × 1.0-3.0 cm. *Leaves* tapering into short petiole, 4.3-10.5 × 1.5-2.6 cm, oblong-elliptic, obtuse-emarginate. *Inflorescence* racemes, 5.0-8.5 cm long, shorter than leaves, more or less drooping, arising from the base of the pseudobulb, scape covered by sheaths at base. *Flowers* dense, dull yellow. *Bracts* small, ca 3.0 × 1.2 mm, oblong-lanceolate, acute-shortly acuminate, membranous. Ovary with pedicel ca 4 mm long. *Dorsal sepal* ca 4.0 × 2.0-2.5 mm, ovate, concave, obtuse, with or without a mucro at tip. *Lateral sepals* 6.5 × ca 3 mm, much larger than dorsal sepal and lateral petals, broadly subfalcate, acute, attached to the foot of the column along the sides and united along the lower margins to form a cymbiform structure, accommodating the inflexed foot and the lip. *Lateral petals* ca 2.5 × 1.2 mm, ovate-triangular, awned. *Lip* ca 3 mm long, tongue shaped, geniculate about the middle; sidelobes narrow, acute; midlobe ovate-lanceolate, grooved dorsally. *Column* produced above into 2 teeth.

Flowering: February.

Lawson s. n. (MH Acc. No. 50252): Nadugani; *Vairavelu* 43727 Nadugani-Gudalur road; Alt. ca 825 m.

4. **B. tremulum** Wight, Ic. 5(1) : 20. t. 1749. 1852; Hook. f., Brit. Ind. 5 : 763. 1890; Fischer in Fl. Pres. Madras 1418. 1928 (Repr. ed. 3 : 992. 1957). **Pl. 63, Figs. 1-3.**

Creeping herbs with slender rhizome; pseudobulbs at intervals, 0.7-1.5 × 0.8-1.7 cm, ovoid-conical. *Leaf* one per pseudobulb, sessile, 2.0-8.5 × 0.7-1.6 cm, oblong-lanceolate, obtuse-acute. *Inflorescence* racemes, 12-26 cm long, much longer than the leaf, lax flowered; scape erect, slender, terete with a few sterile bracts. *Flowers* large, subsecund or not, yellowish with purple marks and purple lip. *Bracts* minute, ca 2.0 × 1.2 mm, erect, ovate, acute, persistent. Ovary with pedicel ca 8 mm long. *Sepals* longer than the ovary and reflexed over it, narrowly lanceolate, acute, 3-main nerved, sparsely finely villous on the adaxial side and along the margin. *Dorsal sepal* ca 12 × 2 mm. *Lateral sepals* ca 12.0 × 3.5 mm. *Lateral petals* ca 3 × 1 mm, much smaller than the sepals, lanceolate, acute, projecting forward on either side of the column, fringed with hairs, 1-nerved. *Lip* ligulate, sagittate at the base, ca 8 × 2 mm, with acicular hairs on the lower surface, tremulus, attached to the foot of the column loosely by a short, narrow stipe; concave at the base, warted on the upper surface towards the tip, pubescent along the margin. *Fruiting axis* elongates. *Fruits* ellipsoid with marcescent perianth. Young fruits ca 2 cm long with pedicel.

Flowering: September, December, January. *Fruiting*: April.

Alt. 800-1040 m.

In the Wight Ic., the representation of the scape arising from the tip of the pseudobulb is wrong; it must be lateral.

5. **B. elegantulum** (Rolfe) J.J. Sm. in Bull. Jard. Bot. Buitenz. ser. 2, 8 : 23. 1912; Seidenf. in Dansk Bot. Ark. 29 (1) : 184. 1973. *Cirrhopetalum elegantulum* Rolfe in Gard. Chron. ser. 3,3 : 552. 1891; Fischer in Fl. Pres. Madras 1421. 1928 (Repr. ed. 3 : 993. 1957); Subba Rao et al. in Bull. Bot. Surv. Ind. 15 : 275. 1976. **Pl. 61, Figs. 4-6.**

Epiphytic (rarely lithophytic) herbs with creeping stem and pseudobulbs at intervals. Pseudobulbs 10-15 × 3-9 mm, ovoid, curregated. *Leaves* 3.5-9.0 × 0.7-1.1 cm, linear-oblong, sessile, narrow at base, obtuse or emarginate. *Inflorescence* umbels, peduncle at the base of the pseudobulb, from the creeping rhizome, slender, 3.7-6.0 cm long, with a few tubular sheaths at long intervals on the scape. *Flowers* up to 6 in an umbel, pale yellow, with maroon stripes. *Bracts* ca 3.5 × 10 mm, lanceolate, acute. *Ovary* with pedicel ca 6.5 mm long. *Dorsal sepal* 5.5-7.0 × 2.0-3.2 mm, oblong-ovate, obtuse, 5-nerved, papillose on outer surface, especially along the median sector. *Lateral sepals* 10-13 × 3-4 mm, linear-lanceolate, oblique at base, acute above, cohering along the margins, free below except towards the gibbous base, densely papillose or warted towards base on outer surface, 5-nerved. *Lateral petals* 3.5-4.0 × ca 2 mm, smaller than sepals, oblong, obtuse, 3-nerved. *Lip* ca 2 × 1 mm, attached to the foot of the column, ligulate, strongly recurved. *Column* ca 1.5 mm long, foot of the column very long, ca 2.5 mm, flat, incurved.

Flowering : August.

Subba Rao 41606, on way to Kudini; Alt. ca 1450 m.

A rare elegant epiphytic orchid originally reported from Coorg. Ever since its first publication, this has not been reported from anywhere else. Rao's (*loc. cit.*) is the first report of its occurrence outside the type locality.

6. **B. fischeri** Seidenf., Dansk Bot. Ark. 29 (1) : 202. 1973. *Cirrhopetalum gamblei* Hook. f., Fl. Brit. Ind. 5 : 778. 1890 & Ic. Pl. 21. t. 2058. 1891; Fischer in Fl. Pres. Madras 1420. 1928 (Repr. ed. 3 : 993. 1937). *C. thomsoni* Hook. f., Fl. Brit. Ind. 5 : 778. 1890 & Ic. Pl. t. 2059. 1891; Fyson, Fl. Nilgiri & Pulney Hill-tops 1 : 385. 1915. **Pl. 64, Figs. 5-8.**

Rhizome slender, creeping with globose-ovoid pseudobulbs at long intervals. *Pseudobulbs* 1.2-1.7 cm smooth, often puberulous at base. *Leaves* sessile or sub-sessile, ca 4.0-7.5 × 1.0-1.5 cm., oblong, obtuse. *Inflorescence* umbel at the tip of elongate, slender scape of 3-8 cm. length, with 2-5 tubular sheaths at intervals. *Flowers* yellow with purple dots, attractive, 3-6 in number. *Bracts* ca 4 × 1 mm, lanceolate, acuminate. *Ovary* with pedicel more or less 5 mm. long. *Dorsal sepal* broadly ovate, ca 5 × 3 mm., 5-nerved, obtuse. *Lateral sepals* ca 12.5 × 4.5 mm, falcately lanceolate, acute, 5-nerved, cohering along the upper margin, widely separating below. *Lateral petals* 2.5 × 1.5 mm., ovate-oblong, obtuse to rounded at tip, 3-nerved. *Lip* ca 1.5 mm, ovate-cordate, strangely recurved attached to the tips of the incurved column-foot.

Sebastian 4814, Paksura Hills, 2600 ft.

7. **B. acutiflorum** A. Rich. in Ann. Sci. Nat. 2. s. 15 : 18. t. 7. 1841. *Chirrhopetalum albidum* Wight, Ic. 5(1) : 21. t. 1653. 1851. *Bulbophyllum albidum* (Wight) Hook. f., Fl. Brit. Ind. 5 : 757. 1890; Fischer in Fl. Pres. Madras 1418. 1928 (Repr. ed. 3 : 992. 1957). *Cirrhopetalum acutiflorum* (A. Rich.) Hook. f., Fl. Brit. Ind. 5 : 779. 1890; Fischer in Fl. Pres. Madras 1420. 1928 (Repr. ed. 3 : 992. 1957). **Pl. 65, Figs. 1-3.**

Rhizome creeping with conical pseudobulbs at intervals; pseudobulbs 0.5-1.6 × 0.6-0.8 cm. *Leaves* linear-oblong, obtuse, sessile or subsessile, 1.4-8.1 × 0.5-2.1 cm. *Inflorescence* umbel at the tip of elongated, slender scape; scape 3-10 cm long, with a few tubular sheaths. *Flowers* many, yellowish green with or without reddish streaks on the lip. *Bracts* ca 4 × 1 mm, lanceolate, acuminate. *Ovary* with pedicel ca 5 mm long. *Dorsal sepal* ca 4.5 × 2.0 mm, ovate-lanceolate, subacute. *Lateral sepals* ca 10.0 × 2.5 mm, twice as long as dorsal or more, lanceolate, subacute. *Lateral petals* ca 3.0 × 1.7 mm, (oblong, obtuse. *Lip* ca 1.7 mm long, much smaller than sepals and lateral petals, attached to the tip of the incurved foot of the column, ligulate, more or less reflexed in the middle.

Flowering : March & October.

Balakrishnan 217; *Lawson s. n.* (MH Acc. No. 50227 A); *Vivekananthan* 42903; *Anon.* (MH Acc. No. 50273); *Naduvattam*, Katteri falls; *Alt.* ca 1900 m.

8. **B. nodosum** (Rolfe) J.J. Sm. in Bull. Jard. Bot. Buitenz. Ser. 2. 8 : 23. 1912; Seidenf. in Dansk Bot. Ark. 29(1) : 73. 1973. *Cirrhopetalum nodosum* Rolfe in Kew Bull. 1895 : 35. 1895; Fischer in Fl. Pres. Madras 1421-1928. (Repr. ed. 3 : 993. 1957). **Pl. 64, Figs. 1-4.**

Rhizome very stout, slightly swollen at the nodes; pseudobulbs at long intervals, oblong or ovate-oblong, 4.4-15.0 cm long. *Scape* 7.5-10.0 cm long, 6-7 flowered, *Flowers* reddish brown, densely speckled in a darker tint. *Dorsal sepal* ca 8 mm long, ovate-oblong, acute, minutely denticulate. *Lateral sepals* 2.5-3.0 cm long, linear-oblong, cohering except at the base. *Lateral petals* ca 4 mm long, broadly ovate, subacute, erose.

This species could neither be collected from Nilgiris nor from neighbouring areas even though it is reported from Nilgiris by Fischer. Hence the description is taken from the original and other published sources.

9. **B. kaitiense** Reichb. f. in Walp. Ann. 6 : 262. 1861; Seidenf. in Dansk Bot. Ark. 29(1) : 7. t. 1654. 1851; Hook. f., Fl. Brit. Ind. 5 : 778. 1890; Fischer in Fl. Pres. Madras 1420. 1928 (Repr. ed. 3 : 993. 1957).

Pl. 65, Figs. 4-6.

Rhizome slender, pseudobulbs distant, ovoid, 1.9-2.5 cm long. *Leaves* 7.5-11.3 cm long, linear-oblong, obtuse, emarginate, 3-nerved. *Scape* slender,

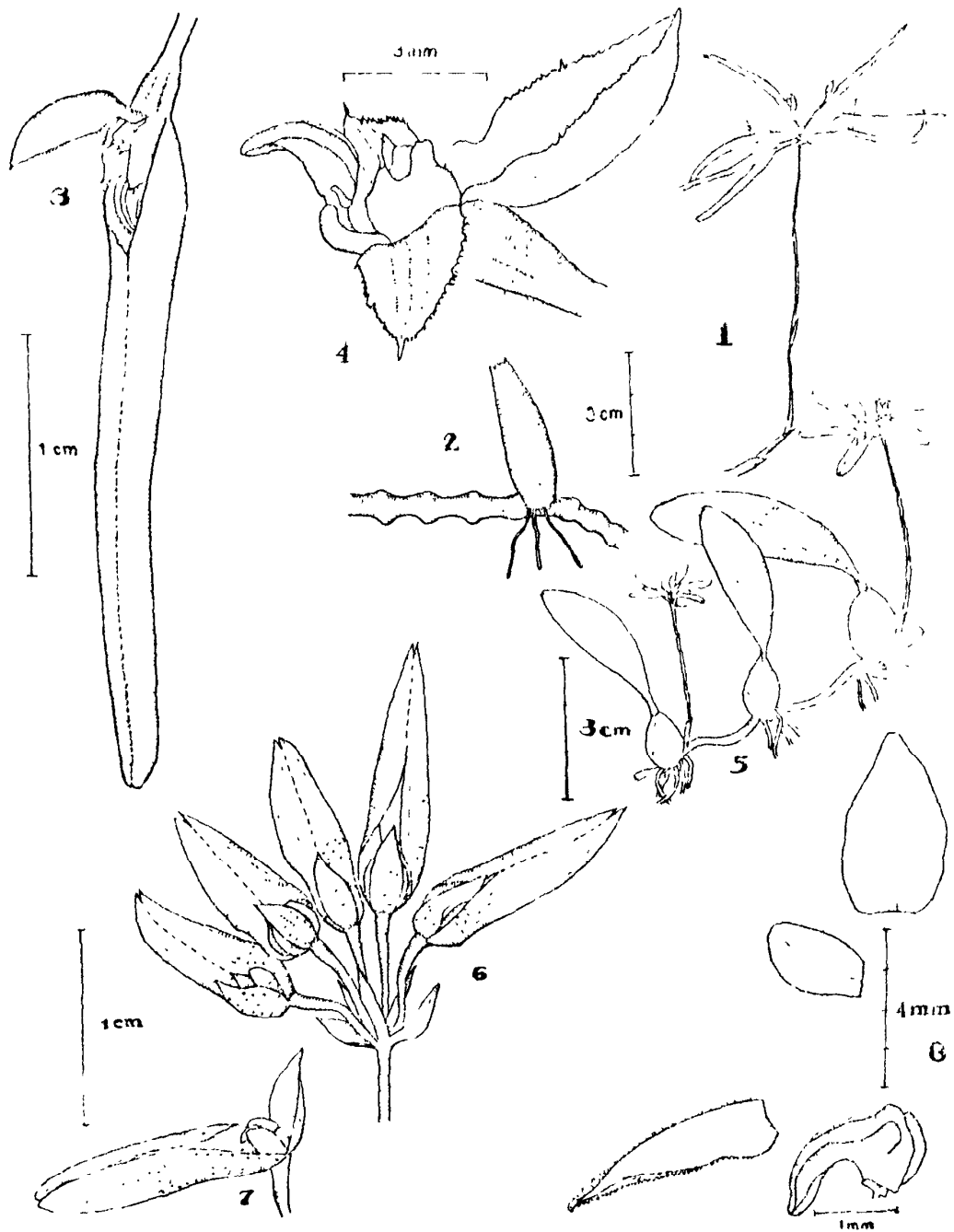


PLATE 64

Fig. 1-4. *Bulbophyllum nodosum* (Rolfe) J.J. Sm. 1. Habit; 2. Nodose rhizome with pseudobulb 3. Flower; 4. Flower without lateral sepals (after Seidenraden 1973). Figs. 5-8. *B. fischeri* Seidenf. b. Habit. 6. Inflorescence; 7. Flower (after Hook. f. Ic. Pl. t. 8059); 8. Floral parts (b and lateral sepal after Hook. f.l.c.t. 2058; 6 and 8 except lateral sepal after Seidenfaden 1973).

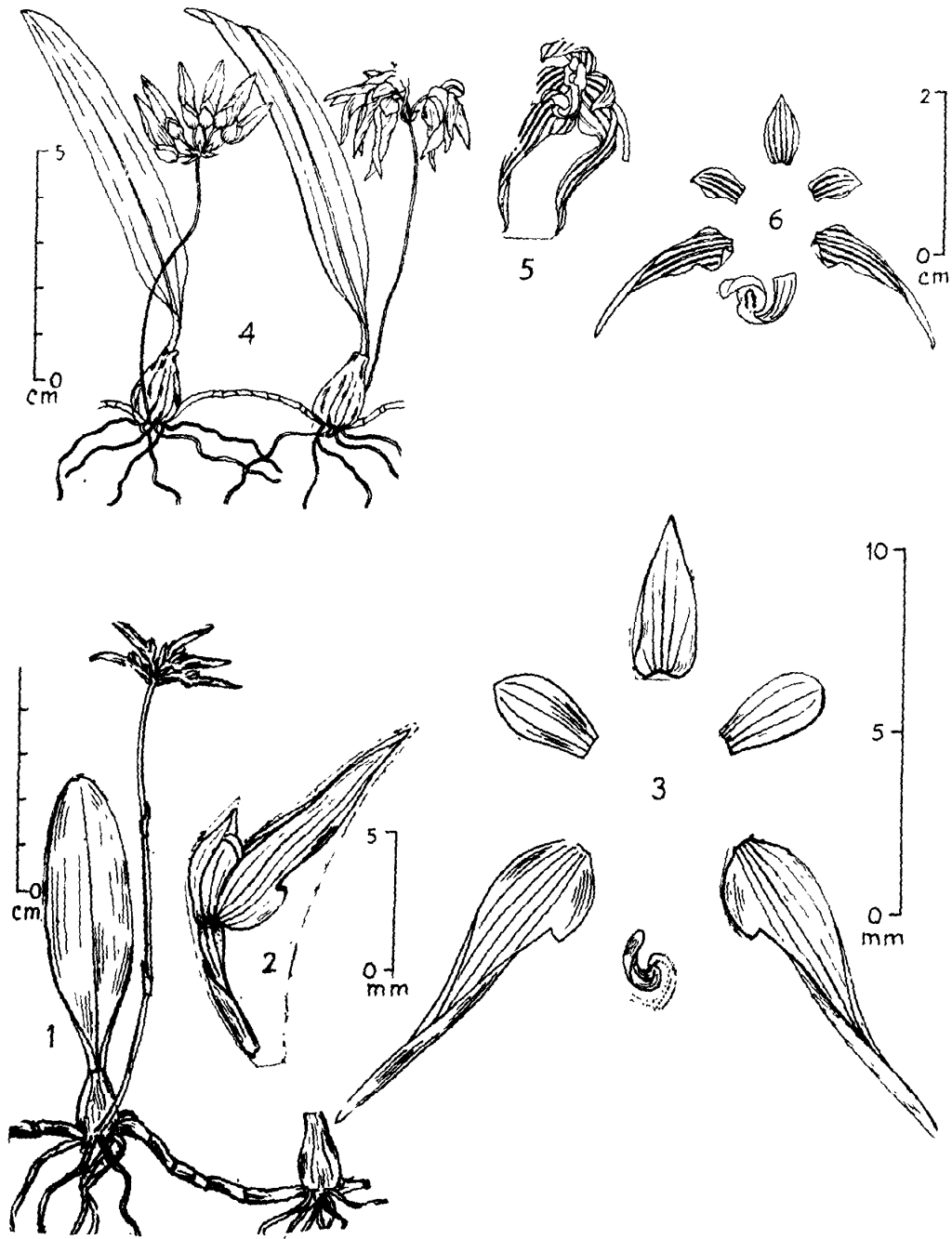


PLATE 65

Fig. 1-3. *Bulbophyllum acutiflorum* A. Rich. 1. Habit; 2. Flower; 3. Sepals, Petals and Lip. Figs 4-6 *B. Kailiense* Reichb. f.; 4. Habit; 5. Flower; 6. Sepals, petals and lip with foot of the column.

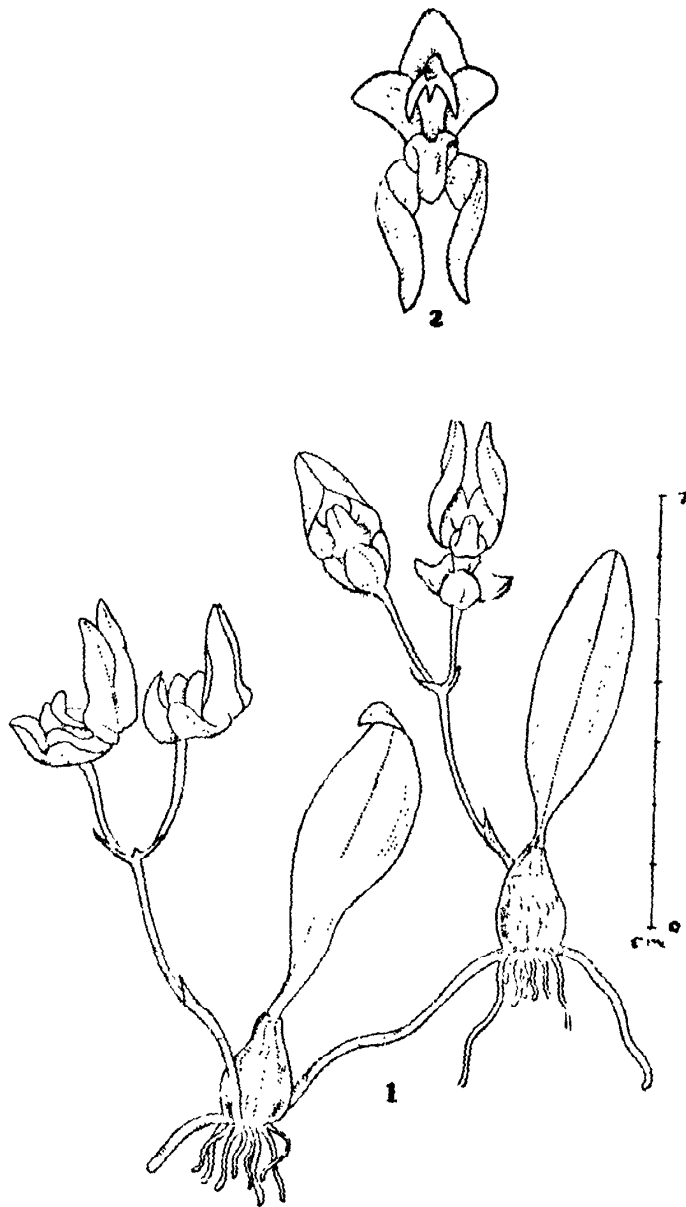


PLATE 66

Fig. 1-2. *Bulbophyllum aureum* (Hook. f.) J.J. Sm. 1. Habit; 2. Flower-front view (after Hook. f., Ic. Pl. t. 2057B)

shorter than leaves, 5–10 cm long. *Umbels* 6–8 flowered. *Flowers* at first pale greenish-yellow, tinged with pink, marked with darker lines, afterwards becoming reddish or light rusty coloured. *Dorsal sepal* ovate, acute, 1/3 as long as the lateral, 5-nerved. *Lateral sepals* 1.9–2.5 cm long, linear-lanceolate, acuminate, 5-nerved, coherent. *Lateral petals* broadly oblong, obtuse, shorter than the dorsal sepal, thickly 3-nerved. *Lip* short, cordate, ovate, recurved, hairy on the back, prolonged base of the column pubescent within. Process of the column short, erect, red.

The original collection of this is from Ootacamund (Nilgiris) by Perrottet ; and from Conoor (Nilgiris) by R. Wight. The present description has been made from the pickled material available in MH, without collector's name and locality of the collection.

Bulbophyllum aureum (Hook. f.) J.J. Sm. in Bull. Jard. Bot. Buitenz. Ser. 2. 8 : 22. 1912; Seidenf. in Dansk Bot. Ark. 29(1) : 187. 1973. *Cirrhopetalum aureum* Hook. f., Fl. Brit. Ind. 5 : 777. 1890; Hook. f., Ic. Pl. t. 2057 B. 1891; Fischer in Fl. Pres. Madras 1419. 1928 (Repr. ed. 3 : 993. 1957.

Pl. 66. Figs. 1–2.

This pretty species had been established by Hooker f. based on a drawing by Jerdon of a specimen from Nilgiri Hills (Wynaad) since then it has not been collected. With the anticipation of its discovery and to facilitate it from the area under study, it is included here as an addition. Following description and illustrations have been adapted from Fischer *l.c.* and Hook. f. *l.c.*.

Rhizome creeping, slender, naked with pseudobulbs at long intervals, *Pseudobulbs* ovoid, ca 1.5 cm. long. *Leaves* 4–5 cm. long, oblong. *Scape* ca 3 cm long, slender. *Flowers* usually 2. *Pedicels* long. *Dorsal sepal* ca 5 cm long, suborbicular. *Lateral sepals* ca 1.3 cm., at first cohering, later separated and twisted. *Lateral petals* oblong, obtuse. *Lip* shortly stalked, attached to the tip of the incurved column-foot, ovate, sub-pandurate, recurved, obtuse.

Recently it has been reported that this species could be located in the Silent Valley area by Sathish Kumar of Tropical Botanic Garden (SV-10780 CALI). It has been noticed that the inflorescence is produced laterally on the developing pseudobulb with attractive golden yellow flowers, usually 3 (rarely 1). Flowering : October–December.

34 PORPAX Lindl.

Porpax reticulata Lindl. in Bot. Reg. 31. misc. 66. 1845; Fischer in Fl. Pres Madras 1422. 1928 (Repr. ed. 3 : 994. 1957); Sant. & Kapad., Orch. Bombay 157. 1966. *Aggeianthus marchantioides* Wight, Ic. 5(1) : 18. t. 1737. 1851. *Eria reticulata* (Lindl.) Benth., Gen. Pl. 3 : 509. 1883; Hook. f., Fl. Brit. Ind. 5 : 786. 1890.

Pl. 67. Figs. 1–4.

Small, pseudobulbous, epiphytic orchid *Pseudobulbs* discoid, 1.0–1.6 cm across, creeping, covered by white sheaths with reticulate nerves, well

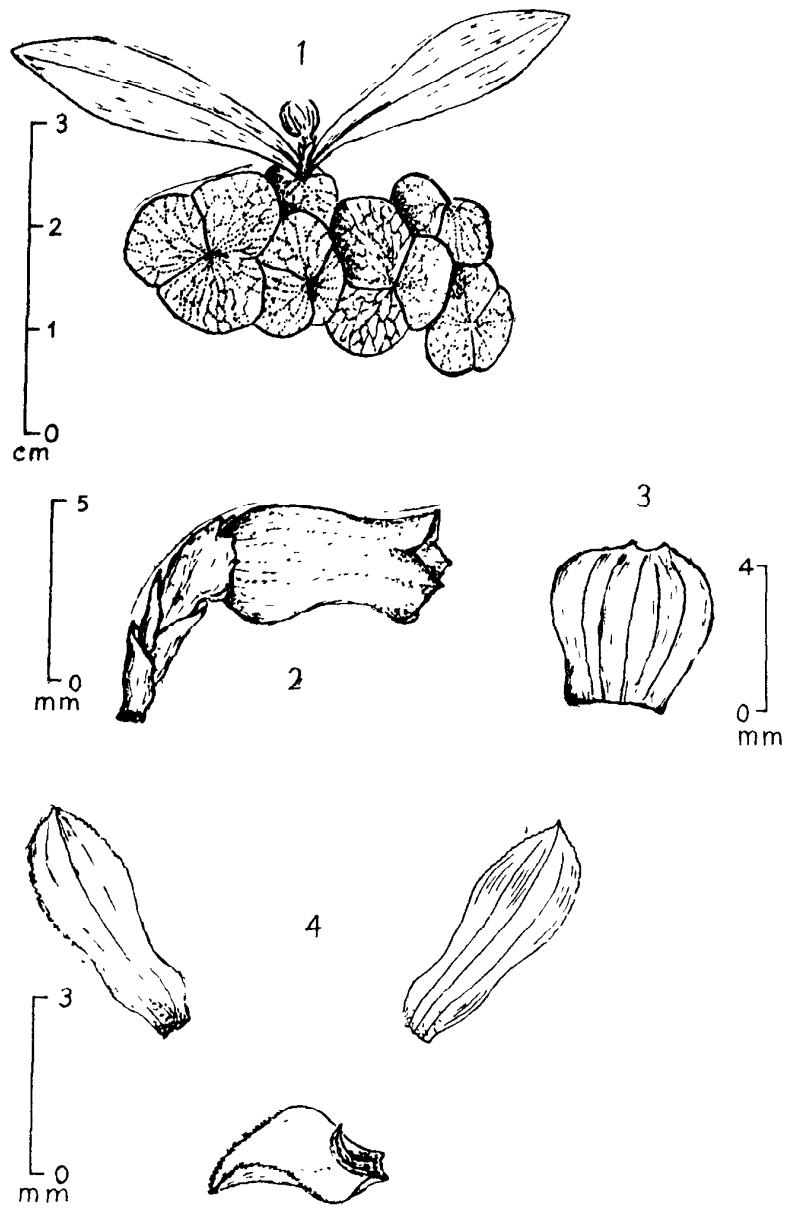


PLATE 67

Fig. 1-4. *Porpax reticulata* Lindl. 1. Habit (in fruit); 2. Flower, (side view); 3. Bract; 4. Petals and Lip.

addressed to the substratum, scarcely distinguishable as orchid when bereft of leaves. *Leaves* 2, oblanceolate-spathulate, sessile, obtuse, 3.0–3.2 × 0.6–0.7 cm, absent during flowering season. *Flower* solitary, campanulate, brownish red. *Scape* with geniculate ovary, *ca* 5 mm long, with about 4 sheathing scales; scales closely imbricate, brownish, membranous, vary in size, 2.5–3.0 × 1.4–4.0 mm, broadly ovate, acute-obtuse. Flowering bract much larger, *ca* 4.5 × 4.5 mm, orbicular, erect, closely adhering to the ovary, mucronate at tip; mucro reflexed. *Ovary* *ca* 3 mm long. *Sepals* united except towards the tip forming campanulate tube; tube *ca* 7 mm long, *ca* 10 mm broad towards the apex; sepals triangular, mucronate at tip, finely papillose. *Lateral petals* *ca* 4.7 × 1.5 mm, concealed within the tube formed by sepals, free, attached to the tube at the base on either side of the column, oblanceolate-spathulate, rounded at tip with a mucro, oblique at base, obscurely erose at margin. *Lip* *ca* 3 × 2 mm, folded along the midlobe, saccate at base, panduriform when spread out, shortly clawed, obtuse at tip, margin irregularly erose except towards the base. There is a thick erect horned structure at the base. *Column* short, with an incurved foot, at the tip of which lip is attached. *Fruits* pyriform, *ca* 7 × 4 mm.

Flowering: May. *Fruiting*: November.

Vairavelu 43120: Cherankode; Alt. *ca* 950 m.

35. DENDROBIUM Sw.

1a. Leafy during flowering

- | | | |
|--|-----|----------------------------|
| 2a. Stem and leaf sheaths (especially towards the apex) dark hirsute hairy; midlobe of the lip linear-lanceolate, closely sinuate at margins | ... | 1. <i>D. nutantiflorum</i> |
| 2b. Stem glabrous; midlobe of the lip orbicular-oblong, crenulate-pectinate | | |
| 3a. Plants short (up to 11 cm with inflorescence) with a few subradical leaves | | |
| 4a. Racemes zigzag; bracts much smaller than pedicel; mentum long (up to 9 mm) subcylindric, projecting forward; lip attached to the foot of the column up to a short distance from the tip | ... | 2. <i>D. nanum</i> |
| 4b. Racemes straight; bracts subequal with the pedicel and ovary; mentum short (<i>ca</i> 5 mm), saccate; lip attached to the tip of the foot of the column; midlobe of lip obscurely crenulate | ... | 3. <i>D. microbulbon</i> |
| 3b. Plants tall (up to 20 cm with inflorescence), with many leaves all along the stem | | |
| 5a. Stem slender, internodes long, racemes terminal; midlobe of the lip obscurely crenulate | ... | 4. <i>D. wightii</i> |
| 5b. Stem stout, internodes short, racemes leaf opposed; midlobe of the lip deeply irregularly crenate | ... | 5. <i>D. heyneanum</i> |

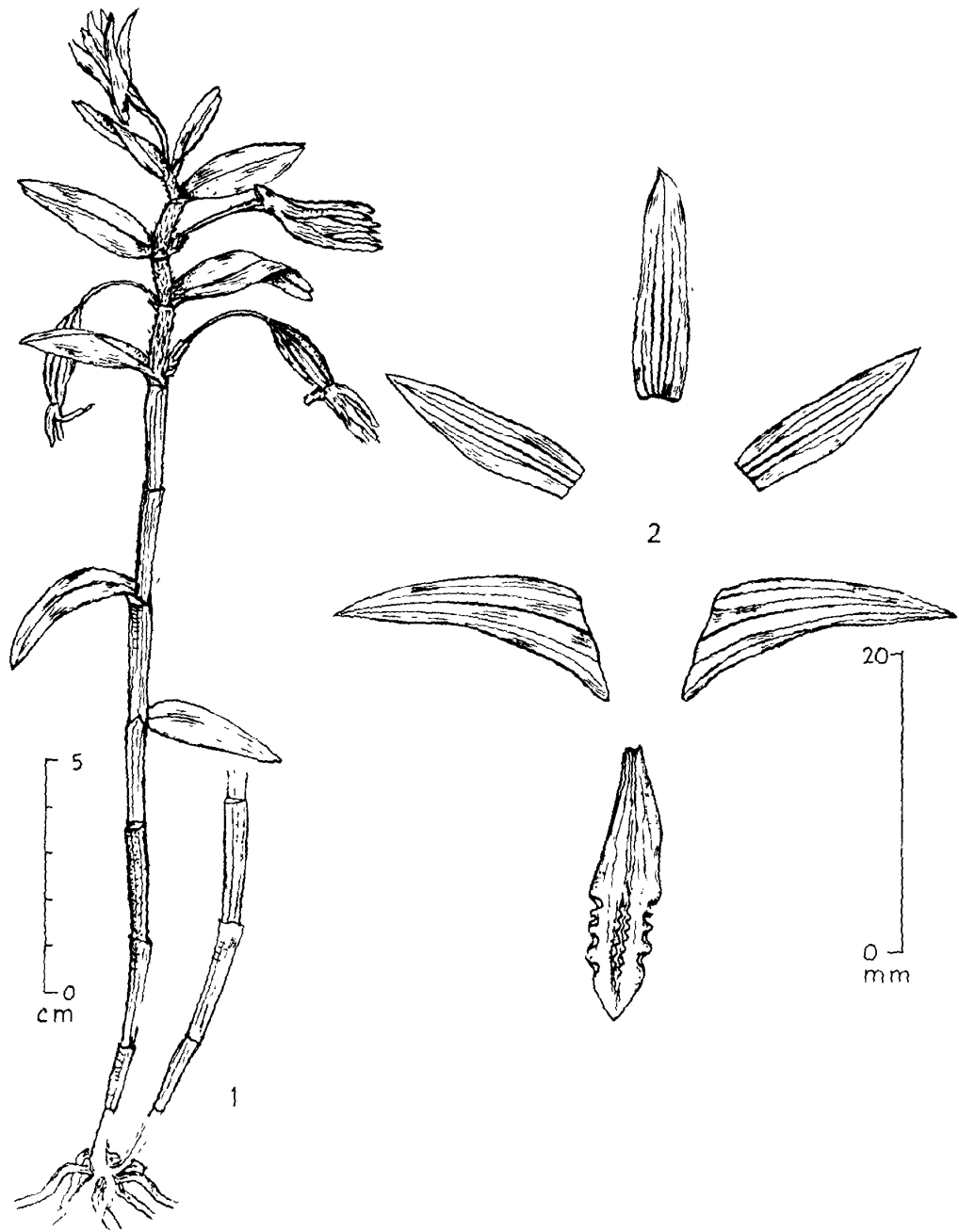


PLATE 68

Fig. 1-2. *Dendrobium nutantiflorum* Hawkes & Heller 1. Habit; 2. Sepals, petals and lip.

1b. Leafless during flowering

- 6a. Stem profusely branched ; lip glabrous ... 6. *D. herbaceum*
- 6b. Stem simple ; lip hairy on the upper surface
- 7a. Flowers many in long raceme ; lip distinctly trilobed ... 7. *D. barbatulum*
- 7b. Flowers 2-3, on condensed peduncle ; lip panduriform,
abruptly narrowed into a long stalk ... 8. *D. macrostachyum*

1. *Dendrobium nutantiflorum* Hawkes & Heller in Lloydia 20(2) : 122. 1957.
D. nutans Lindl., Gen. & Sp. Orch. 90. 1830, *non* Presl 1827 ; Hook. f. in
 Ann. Roy. Bot. Gard. Cal. 5 : 734. t. 18. 1895 ; Fischer in Fl. Pres. Madras
 1416. 1928 (Repr. ed. 3 : 990. 1957). **Pl. 68, Figs. 1-2.**

Erect herbs, caespitose ; stems plurinodal, 13-34 cm tall, thickening upwards, shortly dark hirsute especially towards the apex. *Leaves* alternate, bifarious, 2.2-5.3 × 0.5-1.1 cm, lanceolate, sheathing at tip. *Inflorescence* 2 or 3-flowered on a condensed peduncle, leaf opposed. *Flowers* yellow, long pedicellate. *Bracts* much smaller than the pedicel, ca 2 × 1 mm, ovate-lanceolate, acute, scarious. *Ovary* with pedicel 1.5-1.8 cm long. *Dorsal sepal* ca 16.0 × 3.5 mm, narrowly lanceolate, acute, 5-nerved. *Lateral sepals* ca 18 × 8 mm, lanceolate, broad and very oblique at base, acute. *Lateral petals* ca 15.5 × 3.5 mm, lanceolate, acute, prominently 3-nerved. *Lip* 19.5 × 4.0 mm, trilobed with 3 wavy lamellae on the dorsal side, narrowly lanceolate, as long as or little longer than the lateral sepals ; sidelobes narrow, erect, margins not wavy, margins of the midlobe closely sinuate.

Flowering & Fruiting : 17494 Naduvattam ; Alt. ca 2000 m

**2. *D. nanum* Hook. f., Ic. Pl. 19. t. 1889 & Fl. Brit. Ind. 5 : 717. 1890 ; Fischer in
 Fl. Pres. Madras 1415. 1928 (Repr. ed. 3 : 990. 1957). **Pl. 69, Figs. 1-3.****

Small herbs, ca 9 cm high with inflorescence, caespitose ; pseudobulbs inconspicuous, covered by sheathing bracts and basal portion of leaves. *Leaves* 3 or 4, distichous 1.5-4.5 × 0.3-0.8 cm, lanceolate-elliptic, sheathing at base, acute. *Inflorescence* 4-8 cm long, 1 or 2 per plant, terminal ; peduncle slender, filiform, zigzag. *Flowers* white with green labellum ca 1 cm across, long pedicellate. *Bracts* 2.0-4.0 × 1.0-1.5 mm, smaller than the pedicel with ovary, ovate-lanceolate, acute. *Ovary* with pedicel 5-7 mm long. *Dorsal sepal* 8-9 × 2-3 mm, narrowly lanceolate-oblong, dorsally ridged, 3-nerved, beaked at tip. *Lateral sepals* 7.5-8.0 × 5.0-8.0 mm, obliquely lanceolate, more or less reflexed, acute at tip, with a subterminal mucro, 3-nerved. *Mentum* short or long, inflexed, 4-8 mm long. *Lateral petals* 8.0-9.0 × 2.0-2.5 mm, spatulate, obtuse, 3-nerved, with a subterminal mucro, margin wavy towards the apex. *Lip* ca 7 × 5 mm, included, trilobed, conduplicate, narrowed into a short stalk, united to the foot of the column up to a short distance from the tip ; sidelobes narrow, erect, incurved ; midlobe suborbicular, concave, shortly pectinate, with a median reflexed tooth at the apex, more or less spreading, there is a median forked ridge on the dorsal side.

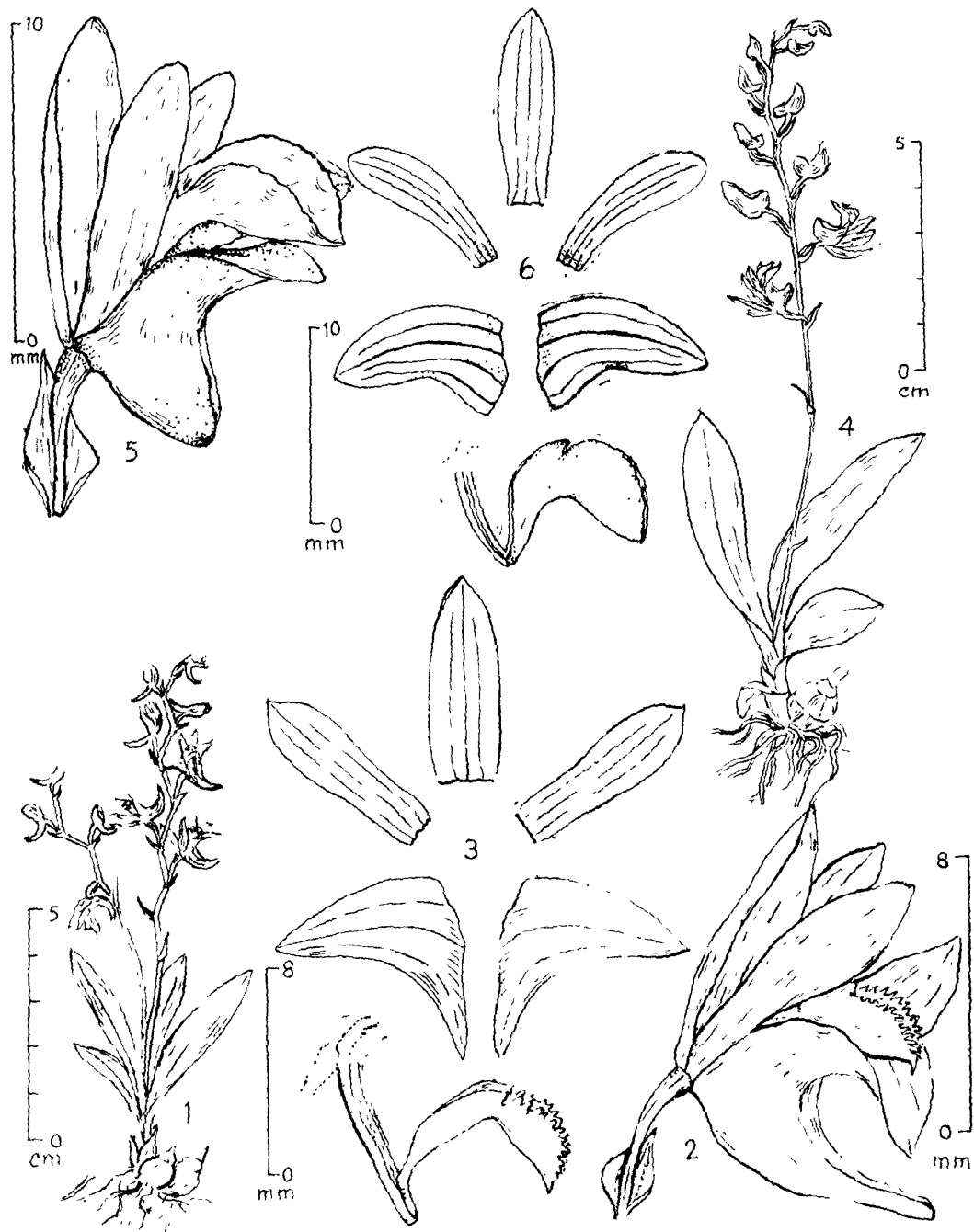


PLATE 69

Fig. 1-3. *Dendrobium nanum* Hook. f. 1. Habit; 2. Flower with bract (lateral view), 3. Sepals, petals and lip with foot of the column. Fig. 4-6. *D. microbulbon* A. Rich; 4. Habit; 5. Flower with bract (lateral view); 6. Sepals, petals and lip with foot of the column.

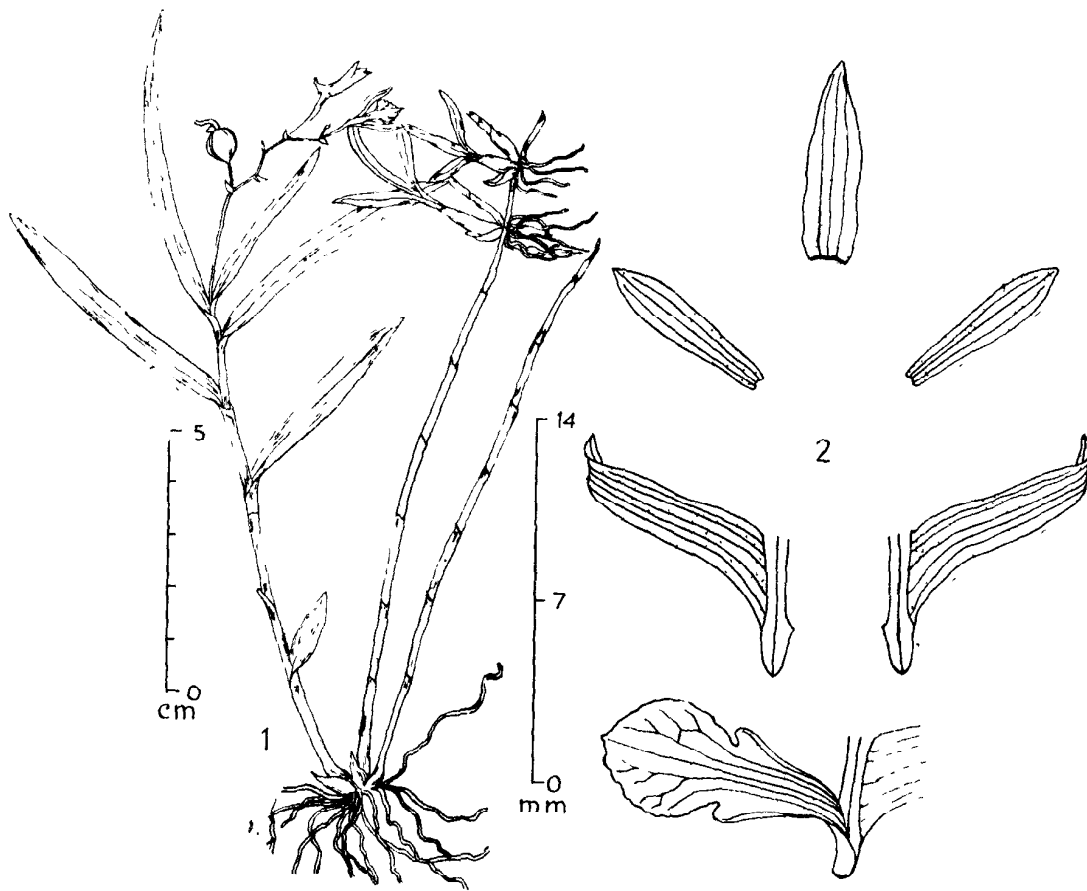


PLATE 70

Fig. 1-2. *Dendrobium wightii* Hawkes & Heller 1. Habit, 2. Sepals (lateral Sepal with foot of the column). Petals and Lip (dorsal view) with tip of the foot.

The diagram in Fyson is wrong as to the structure of lip.

Flowering : July.

Subramanyam 10546, Nelakota-Davela road; Alt. ca 1200 m.

3. *D. microbulbon* A. Rich. in Ann. Sci. Nat. Ser. 2. 150 : 19. t. 8. 1841; Hook. f., Fl. Brit. Ind. 5 : 716. 1890; Fischer in Fl. Pres. Madras 1415. 1928 (Repr. ed. 3 : 990. 1957); Sant. & Kapad., Orch. Bombay 87. t. 19. 1966. *D. humile* Wight, Ic. 5(1) : 5. t. 1643. 1851. **Pl. 69, Figs. 4-6.**

Herbs in clusters. *Pseudobulbs* globose-oblong, ca 1 cm long, 2 or 3 noded, 3-4 leaved. *Leaves* 2.5-6.5 × 0.5-1.4 cm, narrowly elliptic-lanceolate, acute, sheathing at base. *Inflorescence* terminal racemes, lax flowered, not zigzag, ca 12 cm long; scape slender, filiform with few sterile bracts. *Flowers* white with purplish green lips. *Bracts* 5.0-6.0 × 1.5-2.0 mm, broadly lanceolate, abruptly acuminate at tip, more or less equalling the pedicel with ovary. *Dorsal sepal* 10.5 × 3.0 mm, ligulate, obtuse, 3-nerved, median nerve thickened into an obscure subterminal cusp. *Lateral sepals* ca 9 × 5 mm, falcate, broadly lanceolate, obtuse, 4-nerved, median nerve thickened into a subterminal cusp. *Lateral petals* ca 9.5 × 2.5 mm, sub-falcate, obtuse, 3-nerved, median nerve thickened into a subterminal cusp. *Lip* ca 10 mm long, obovate, geniculate about the middle, obscurely trilobed, with a forked median ridge up to the middle, thick, fleshy; sidelobes purple narrow, erect, parallel to the foot of the column, acute, entire, entire, ca 6 mm long long; midlobe parrot green, orbicular, concave, retuse at tip, margin slightly crenulate, sparsely puberulous at the base of the midlobe on the upper surface.

Fruiting : June & October.

Balakrishnan 147; *Lawson s. n.* (MH. Acc. No. 50144); *Sharma* 35913; *Subramanyam* 10590; Naduvattam; Alt. 1700-2000 m

4. *D. wightii* Hawkes & Heller in Orquidea 24 : 16. 1962. *D. graminifolium* Wight, Ic. 5(1) : 6. t. 1649. 1851, *non* Willd. 1805; Hook. f., Fl. Brit. Ind. 5 : 718, 1890; Fischer in Fl. Pres. Madras 1415. 1928 (Repr. ed. 3 : 990. 1957). **Pl. 70, Figs. 1-2.**

Slender epiphytes or lithophytes, caespitose, often with offsets produced from the distal nodes of the stick like old stem which are without leaves but with scale fibres. *Stem* 5-18 cm long, erect, slender. *Leaves* bifarious, 1.5-6.6 × 0.3-0.5 cm, linear-lanceolate, grass-like, acute, sheathing at base. *Inflorescence* terminal racemes, 3-9 cm long, axis slender, filiform, flexuous. *Scape* 1.5-2.4 cm long. *Flowers* 4-8, white-pale pink, mildly fragrant. *Bracts* 2.0-2.5 × 1.2-1.5 mm, ovate, acute, much shorter than the pedicels. *Ovary* with long pedicel 7-11 mm long. *Sepals* and lateral petals sparsely gland dotted. *Dorsal sepal* ca 7.5 × 2.0 mm, oblong-lanceolate, acute, 3-nerved. *Lateral sepals* ca 8.5 × 3.5 mm, obliquely lanceolate, acute, 5-nerved, prolonged at the outer margin, narrowed and attached to the foot

of the column to form a narrow spur like mentum ; mentum *ca* 5.5 mm long. *Lateral petals ca* 7.0 × 1.2 mm, linear lanceolate, acute, 3-nerved, sparsely puberulous along the margin beyond the middle. *Lip ca* 12 mm long, obovate in outline, trilobed, narrowed and united with the foot of the column towards the base, *ca* 3 mm broad across the sidelobes ; sidelobes very small, rounded at tip ; midlobe *ca* 5.0 × 4.5 mm, orbicular-oblong, obscurely crenulate. *Column ca* 2 mm long, foot of the column prolonged beyond the attachment of the lateral sepals to which lip is united. *Fruits* ovoid, *ca* 7 mm long, with marcescent perianths.

Flowering : May, December & January. *Fruiting* : May-December. Alt. 1025-1900 m.

The description of this species drawn from *A. V. N. Rao* 23067 Sanyasi malai, Shevaroyis, Salem Dist., as the plant could not be collected from Nilgiris, though reported by Gamble.

5. *D. heyneanum* Lindl., Gen & Sp. Orch. 90. 1830 ; Wight lc. 3(2) : 10. t. 903. 1844 ; Hook. f., Fl. Brit. Ind. 5 : 718. 1890 ; Fischer in Fl. Pres. Madras 1415. 1928 (Repr. ed. 3 : 990. 1957). **Pl. 71, Figs. 1-2.**

Epiphytes, *ca* 20 cm high with inflorescence. *Stem* 3.5-11.5 cm long, erect, stout, clavate, old stems arcuate, bereft of leaves but with scales fibres. *Leaves* bifarious, 1.0-12.0 × 0.3-0.8 cm, linear-lanceolate, acute with large sheathing base, lamina deciduous leaving the sheath on the stem ; leaf sheath hyaline, as long as or longer than internode. *Inflorescence* racemes, leaf opposed, 2.5-8.0 cm long, spreading, restricted to the apical region, axis flexuose, scape filiform. *Flowers* many, white with pinkish lip. *Bracts* 2-3 × 1-2 mm, minute, ovate, acute. *Ovary* with long pedicel, 7-11 mm long. *Dorsal sepal ca* 9.0 × 2.7 mm, lanceolate, acute, keeled at tip, 3-nerved. *Lateral sepals ca* 10.5 × 0.4 mm, obliquely lanceolate, acute, keeled at tip, 4-nerved, prolonged at the outer margin, narrowed and attached to the foot of the column to form a narrow spur like mentum ; mentum *ca* 6 mm long. *Lateral petals ca* 9 × 2 mm, oblanceolate-spathulate, acute, keeled at tip, 3-nerved. *Lip ca* 14 mm long, obovate in outline, trilobed, narrowed at the base and united with the foot of the column towards the base, *ca* 6 mm, broad across the sidelobes ; sidelobes erect, small, obtuse at tip ; midlobe *ca* 5 × 5 mm, orbicular-oblong, mucronate at tip, crenate. *Column ca* 2 mm long, foot of the column prolonged beyond the attachment of lateral sepals to which lip is attached. *Fruits* ovoid, *ca* 1.2 cm long with marcescent perianths.

Flowering : July-October, December. *Fruiting* : June.

The description of this species is drawn from *Ellis* 29441, collected from Chanthanathode, Cannanore Dist., as the plant could not be collected from Nilgiris, though reported by Gamble.

D. heyneanum and *D. wightii* resemble each other to a great extent in the general habit and flower structure, although offsets are noticed in *D. wightii*.

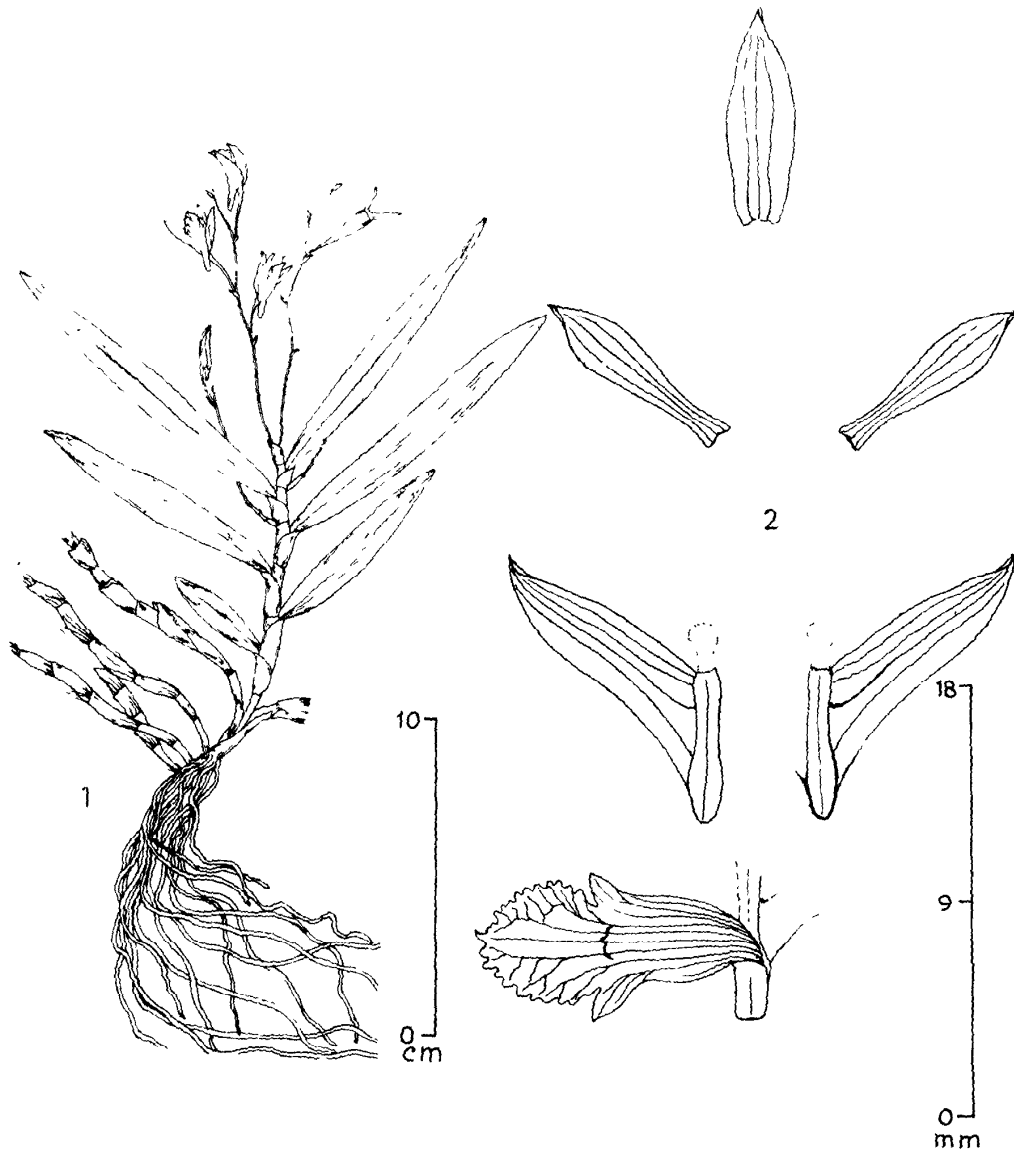


PLATE 71

Fig. 1-2. *Dendrobium heyneanum* Lindl. 1. Habit; 2. Sepals (with foot of the column).
Petals and lip with tip of the foot.

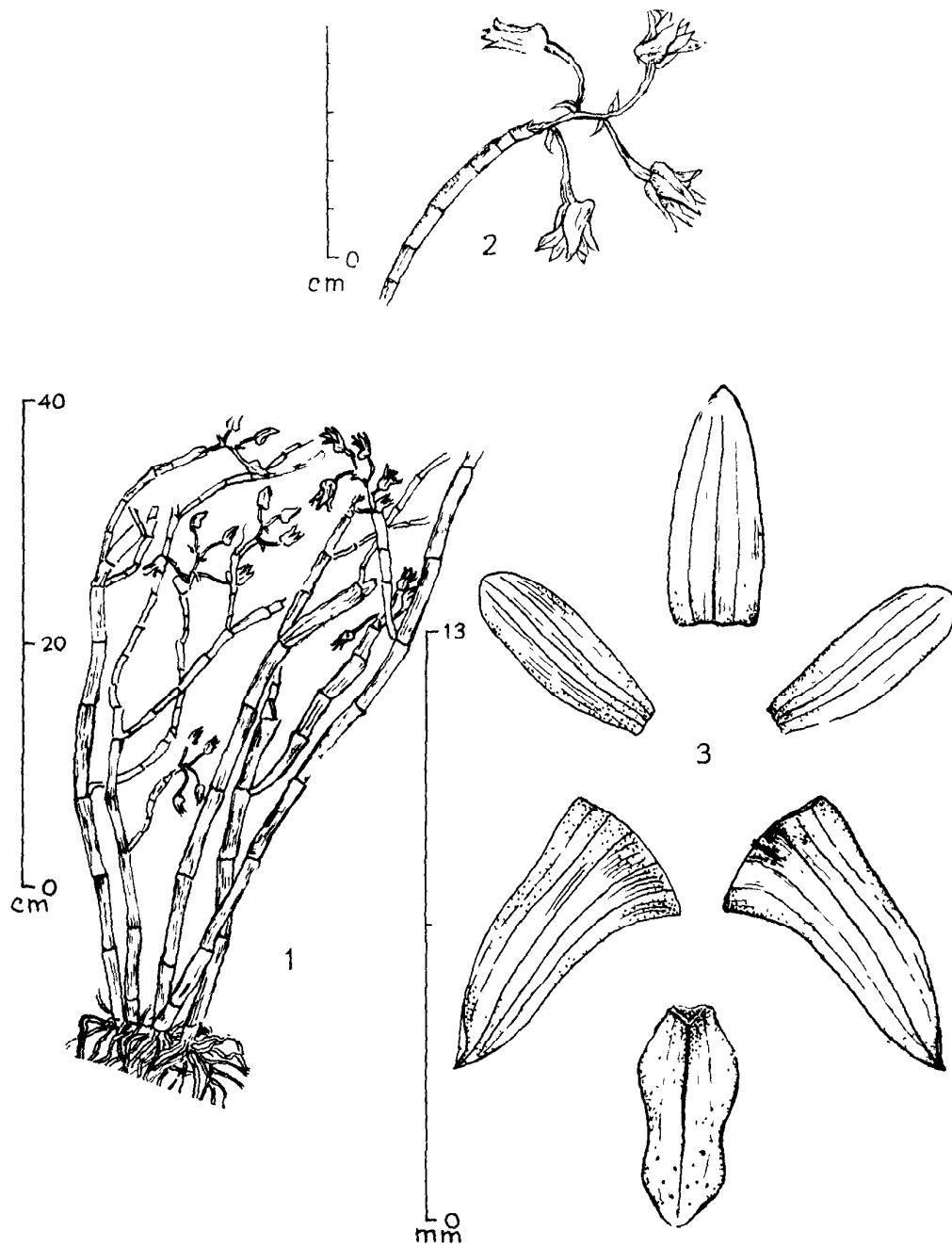


PLATE 72

Fig. 1-3. *Dendrobium herbaceum* Lindl. 1. Habit; 2. Branchlet with inflorescence; 3. Sepals, Petals and lip-spread out.

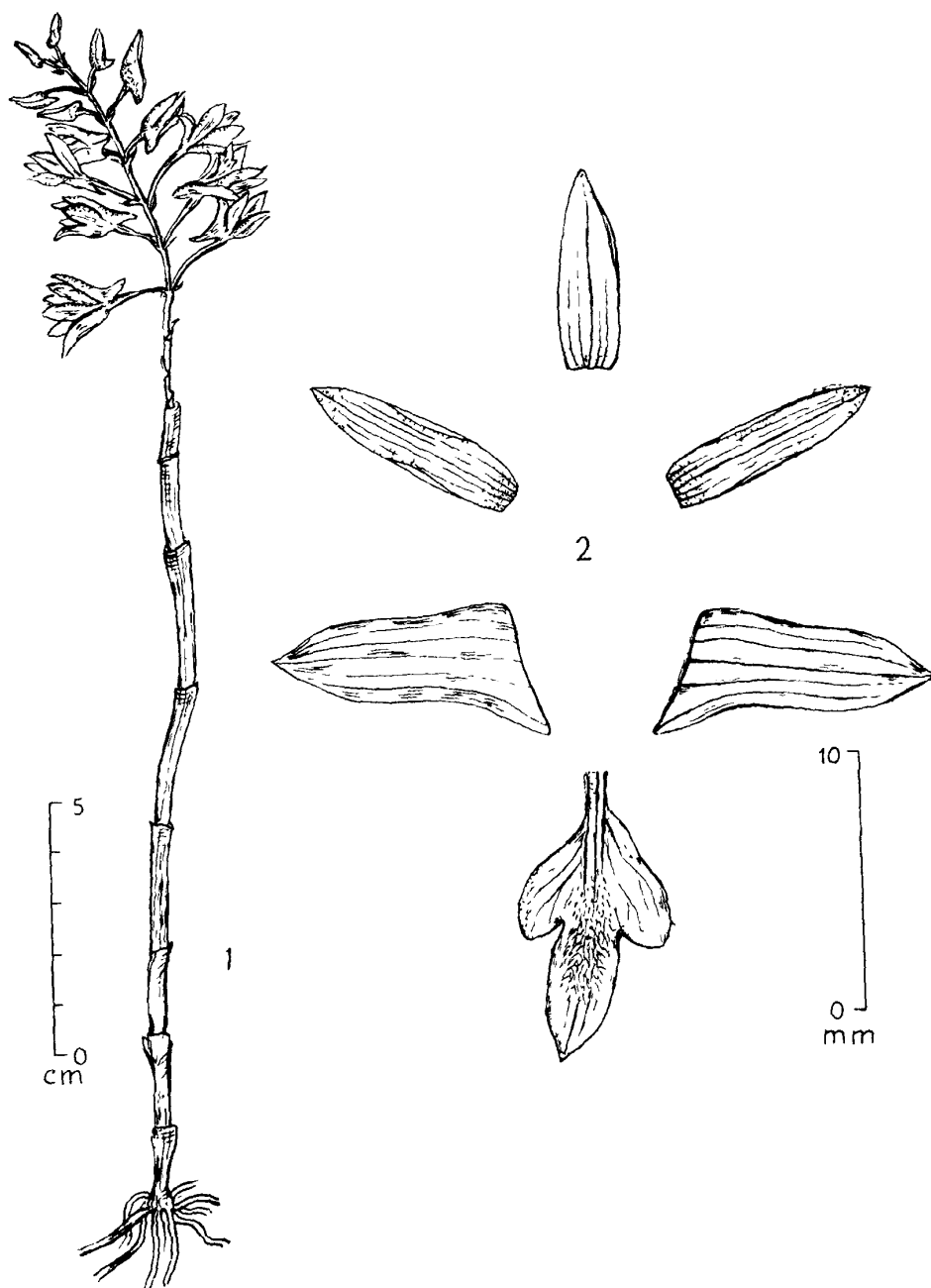


PLATE 73

Fig. 1-2. *Dendrobium barbatulum* Lindl. 1. Habit; 2. Sepals, Petals and Lip (spread out)

6. *D. herbaceum* Lindl., Bot. Reg. misc. 69. 1840 & misc. 58. 1844; Hook. f., Fl. Brit. Ind. 5 : 1890; Fischer in Fl. Pres. Madras 1416. 1928 (Repr. ed. 3 : 990. 1957); Sant. & Kapad., Orch. Bombay 82. t. 17. 1966. *D. ramosissimum* Wight, Ic. 5(1) : 6. t. 1648. 1851. **Pl. 72, Figs. 1-3.**

Erect, bunchy, herbs, with much branched stem and creamy white flowers at nodes. *Stems* caespitose, yellowish, shining (lateral branches dwarf and more slender), ridged, ca 50 cm long, leafless during flowering. *Leaves* 1.5 × 0.2-0.5 cm, linear-lanceolate, acute. *Inflorescence* condensed racemes, lateral at nodes, 2-4 flowered. *Flowers* creamy white-yellow, long pedicellate. *Bracts* 1.5-2.5 × 1.0-1.5 mm, very small, hyaline. *Ovary* with pedicel ca 8 mm. *Dorsal sepal* ca 5.5 × 2.2 mm, oblong, obtuse, 3-nerved. *Lateral sepals* ca 6.5 × 3.5 mm, narrowly lanceolate-oblong, obtuse, 5-nerved; median nerve prominent externally ending in a short subterminal mucro. *Lateral petals* ca 5.0 × 1.7 mm, spatulate, obtuse at tip, 3-nerved. *Lip* ca 5 × 2 mm, attached to the foot of the column, reflexed at the base, sub-entire, oblong, with a shallow constriction about the middle, pale yellow, obtuse at tip, 5-nerved, sparsely gland-dotted.

Flowering: November, January, February.

Lawson s. n. (MH Acc. No. 50217): *Shetty* 12008; *Vajravelu* 43701, 43726; *Wight s. n.* (MH Acc. No. 50215); Alt. 800-1200 m.

7. *D. barbatulum* Lindl., Gen. & Sp. Orch. 84. 1830; Hook. f., Fl. Brit. Ind. 5 : 719. 1890; Fischer in Fl. Pres. Madras 1416. 1928 (Repr. ed. 3 : 990. 1957); Sant. & Kapad., Orch. Bombay 93. t. 22. 1966. **Pl. 73, Figs. 1-2.**

Herbs, caespitose. *Stem* 9.0-16.5 cm long, slender, plurinodal, leafless at the time of flowering. *Inflorescence* terminal or lateral, many flowered raceme, 4-9 cm long. *Flowers* creamy white with pinkish yellow blotch on the tip. *Bracts* 2.0-3.0 × 1.0-1.5 mm, ovate-lanceolate, acute, scarious. *Ovary* with pedicel 1.1-1.3 cm long. *Dorsal sepal* ca 9.0-2.5 mm, oblong, acute at tip, 4-nerved. *Lateral sepals* ca 10 × 5 mm, obliquely oblong-lanceolate, acute at tip, 5-nerved, the lateral sepals form a mentum with the foot of the column; mentum concial, acute. *Lateral petals* ca 9.5 × 5.0 mm, obovate-oblong-lanceolate, acute at tip, 3-nerved, lateral nerves further branched. *Lip* ca 11.5 × 6.0 mm, trilobed, bearded on the upper surface about the middle and sparsely hairy towards the base; midlobe much larger than the side lobes, oblong obtuse-acute at tip.

Flowering: January.

Lawson s. n. (MH Acc. No. 50248), Nadugani; *Shetty* 11992 Kariashola); Alt. ca 1300 m.

8. *D. macrostachyum* Lindl., Gen. & Sp. Orch. 78. 1830 & in Bot. Reg. misc. 60. t. 1865. 1844; Wight, Ic. 5(1) : 6. t. 1647. 1851; Hook. f., Fl. Brit. Ind. 5 : 735. 1890; Fischer in Fl. Pres. Madras 1416. 1928 (Repr. ed. 3 : 990. 1957); Sant. & Kapad., Orch. Bombay 96. t. 23. 1966. **Pl. 74, Figs. 1-2.**

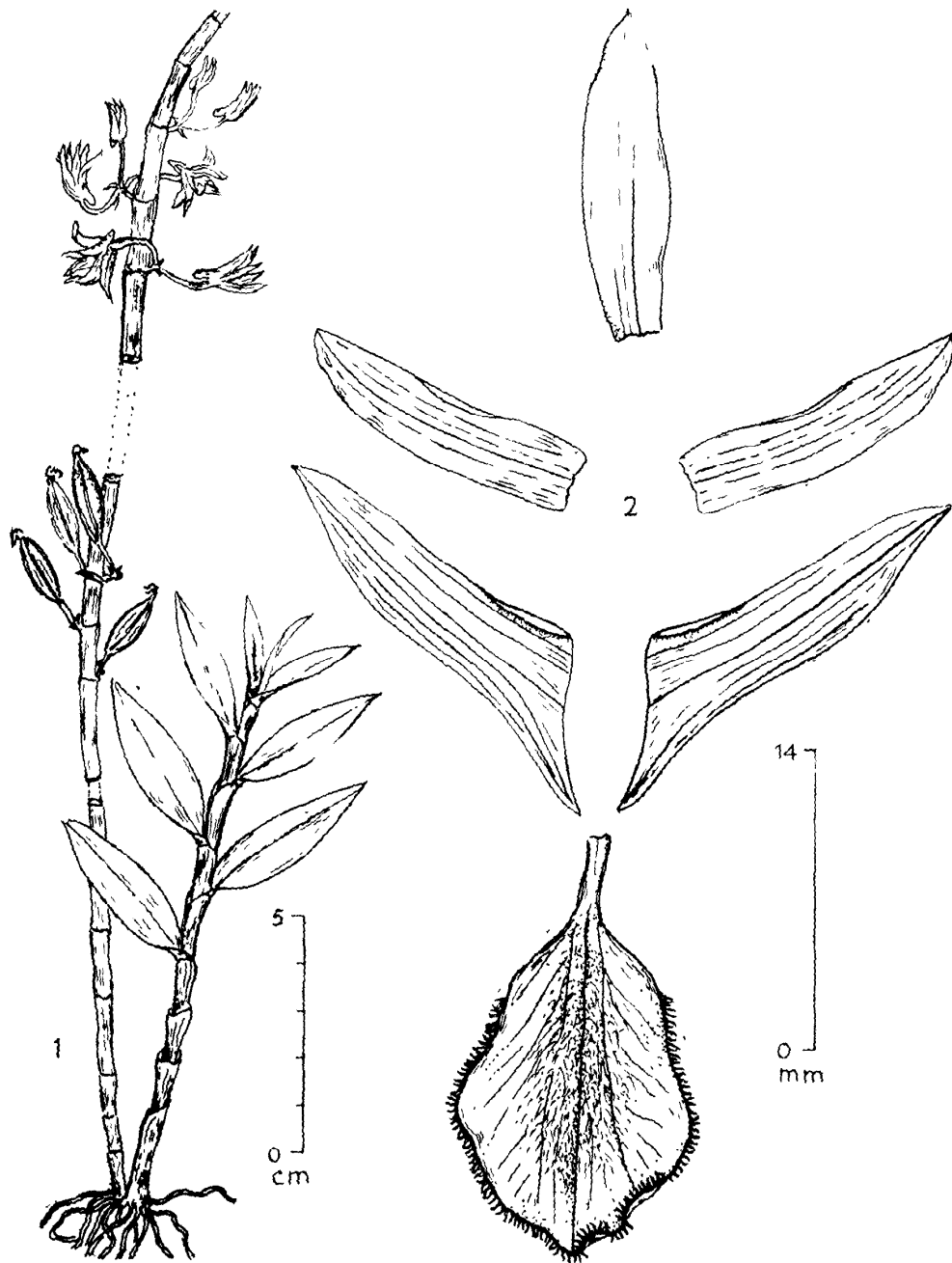


PLATE 74

Fig. 1-2. *Dendrobium macrostachyum* Lindl. 1. Habit; 2. Sepals, Petals and Lip (spread out)

Drooping herbs, caespitose; young stem with leaves, more or less erect. *Leaves* alternate, distichous, 2.0–9.0 × 1.0–2.4 cm, lanceolate, acute at tip, shortly sheathing at base, mouth of the sheath infundibular. *Stem* slender, stick-like, plurinodal, *ca* 60 cm long, leafless when flowering. *Flowers* pale yellowish green, 2 or 3 from the node on a condensed peduncle. *Bracts* *ca* 2.5 × 2.0 mm, scaly, lanceolate, acute, much shorter than the pedicel. *Ovary* with pedicel 1.6–1.8 cm long. *Perianth* more or less spreading. *Dorsal sepal* *ca* 13 × 3 mm, elliptic-lanceolate, acute, 3-nerved. *Lateral sepals* *ca* 16 × 9 mm, obliquely lanceolate, acute, 7-nerved. *Lateral petals* *ca* 14 × 4 mm, linear lanceolate, acute 4-nerved; mentum conspicuous, projecting downwards, *ca* 6 mm long. *Lip* *ca* 18 × 10 mm, panduriform, abruptly narrowed into a long stalk (*ca* 4 mm), side margins erect, distal margins more or less crenulate, hairy on the dorsal side along the median zone, margins irregularly, finely fimbriate. *Young fruits* *ca* 5 cm long, long-stalked, ellipsoid, ridged, with marcescent perianths.

Flowering: September. *Fruiting*: February, September.

Barber 2037; *Sharma* 36095; *Vajravelu* 39758, 41852, 43734. Fairly common: Devala, Maasikadu, Cherambadi-Erumadu, Kuzhivayal R. F., Kolkarea; Alt. 8–1500 m.

36. ERIA Lindl.

- | | | |
|--|-----|-------------------------|
| 1a. Stem slender, long (more than 10 cm), with 2 leaves at the apex of the terminal pseudobulb | ... | 1. <i>E. pauciflora</i> |
| 1b. Stem ovoid-discoid or oblong; leaves 2–5 (or more) in the fresh shoot | | |
| 2a. Pseudobulbs discoid-ovoid, many in spreading clusters, with two well developed leaves ... | | |
| 3a. Flowers solitary | ... | 2. <i>E. reticosa</i> |
| 3b. Flowers in racemes | ... | |
| 4a. Inflorescence often flexous, perianth parts with acuminate tips; lip narrowly lanceolate | ... | 3. <i>E. nana</i> |
| 4b. Inflorescence strict; perianth obtuse-acute; lip sub-orbicular or ovate-lanceolate | ... | |
| 5a. Leaves 3 or more, basal ones being reduced; scape, and pedicel with ovary brown pubescent; lip sub-orbicular | ... | 4. <i>E. albiflora</i> |
| 5b. Leaves 2 only; scape, and pedicel with ovary glabrous; lip ovate-lanceolate | ... | 5. <i>E. dalzelli</i> |

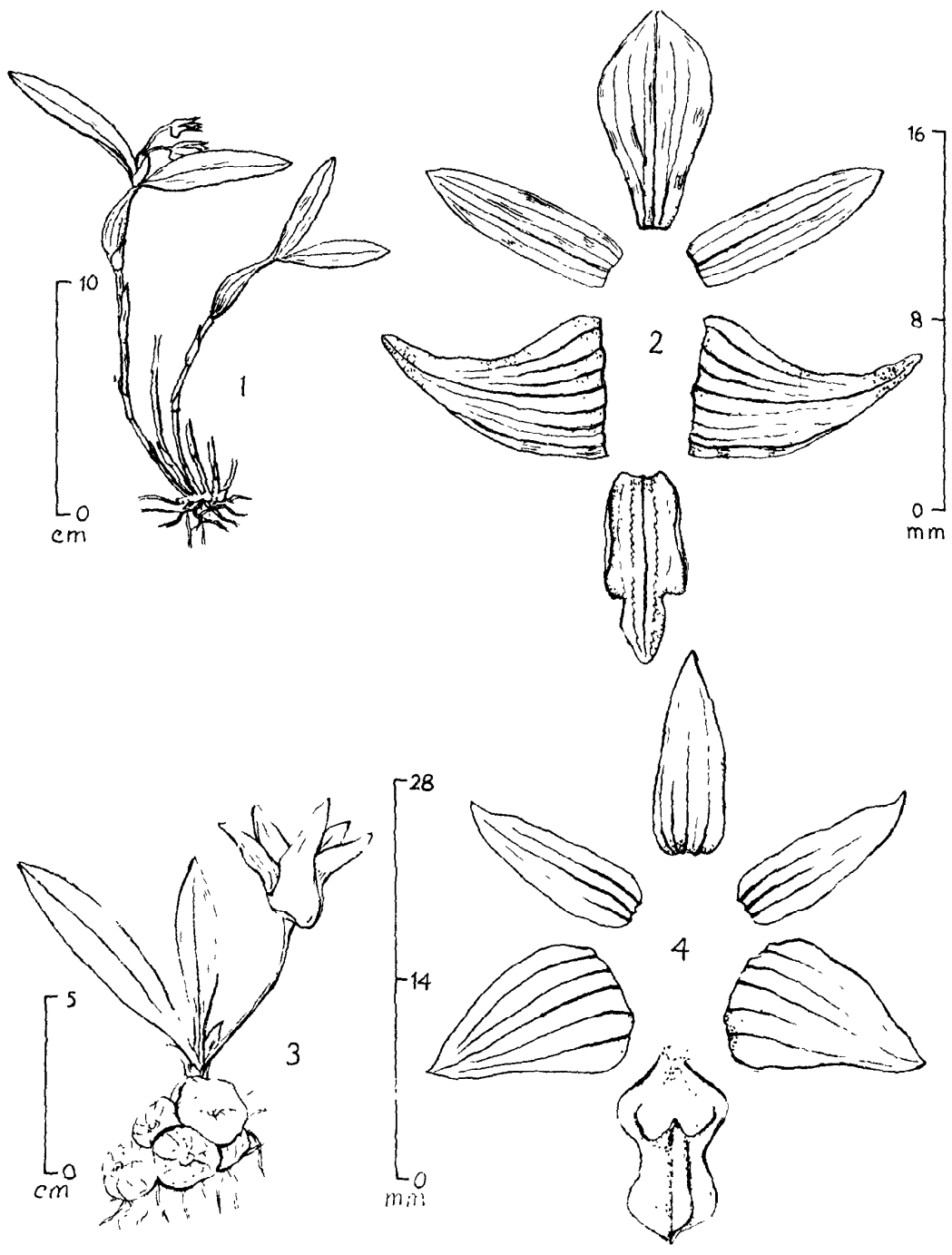


PLATE 75

Fig. 1-2. *Eria pauciflora* Lindl. 1. Habit; 2. Sepals, Petals and Lip. Fig. 3-4. *E. relicosa* Wt.; 3. Habit; 4. Sepals, Petals and Lip (spread out)

- 2b Pseudobulbs oblong, a few, caespitose with five or more well developed leaves ...
- 6a. Lip 3-nerved, shorter than lateral petals; sepals hairy without; pseudobulbs almost naked ... *E. polystachya*
- 6b. Lip 5-nerved, as long as the lateral petals; sepals glabrous; pseudobulbs covered by sheathing bracts ... *E. mysorensis*
1. *Eria pauciflora* Wight, Ic. 5(1) : 4. t. 1636. 1854; Hook. f., Fl. Brit. Ind. 5 : 799. 1890; Fischer in Fl. Pres. Madras 1425. 1928. (Repr. ed. 3 : 996. 1957). **Pl. 75, Figs. 1-2.**

Lithophytic herbs, caespitose, stem clavate with long slender plurinodal stalk like portion 3.5–13.5 cm long and a pseudobulbous tip bearing 2 leaves. Lower nodes with scaly leaves. *Leaves* 3.8–7.6 × 1.0–1.4 cm, oblong, narrow and articulate at base, obtuse at tip. *Inflorescence* 1–3 flowered from tube-like sheath, terminal; flowers white, long pedicellate. *Bracts* ca 5 × 2 mm, ovate-lanceolate, *Ovary* with pedicel 1.2–1.4 cm long. *Dorsal sepal* ca 8.7 × 3.0 mm, lanceolate, obtuse, 5-nerved, sparsely gland-dotted. *Lateral sepals* ca 9 × 6 mm, obliquely lanceolate, broad at base, obtuse, 5-nerved, sparsely-gland dotted. *Lateral petals* ca 8.5 × 2.5 mm, oblong-lanceolate, obtuse, 3-nerved, sparsely gland-dotted. *Lip* ca 8 mm, long, sessile, guitar-shaped in outline, cuneate at base, more or less rhomboid at the distal half, ca 5 mm broad at base, ca 4 mm broad towards the apex. There are 2 auricular transverse lamellae one on each side at the basal half on the upper side and an erect median narrow longitudinal lamella at the distal half, lateral nerves flabellate on the lower half.

Flowering : July, September & November.

Gamble 13169; *Shrama* 36022; *Vajravelu* 24398; Not common; Coonoor, Kodanad, Katery falls : Alt. 1600–2000 m.

2. *E. reticosa* Wight, Ic. 5(1) : 41. t. 1637. 1851; Hook. f., Fl. Brit. Ind. 5 : 787. 1890; Sant. & Kapad., Orch. Bombay 146. t. 34. 1966. **Pl. 75, Figs. 3-4.**

Aggregate, pseudobulbous, small herbs, on tree trunks and branches. Old pseudobulbs small, 6–16 mm across, orbicular, depressed, enclosed in a reticulate sac. Fresh shoot small, lateral from beneath the old pseudobulb, with a few sheathing scales at the base. *Leaves* 2, 1.5–6.5 × 0.5–1.2 cm, ovate-oblong or elliptic, narrowed into a short base, obtuse at tip. *Flowers* white, solitary, erect, from the axil of the scales, large, 2.5–3.6 cm across. *Bracts* 6 × 5 mm, broadly ovate-orbicular, acute-mucronate, sheathing at base. *Ovary* with pedicel 4–5 cm long. *Dorsal sepal* 14.0–17.5 × 4.0–5.0 mm, linear-oblong, obtuse, 5-nerved. *Lateral sepals* 16–18 × 12–13 mm, falcate with broad base, obtuse at tip, 7-nerved, attached to the column. *Lateral petals* 14.0 × 4.0–4.5 mm, shorter than sepals, oblong, obtuse, 5-nerved. *Lip* oblong, trilobed, as long as the petals or slightly longer than it, 13–17 mm long, with 2 median longitudinal crested ridges, 6.5–7.0 mm broad across the lateral lobes; sidelobes narrowly auricular, erect; midlobe ovate, porrect. *Fruits* oblong, ca 1.5 cm long, ridged, with marcescent perianths.

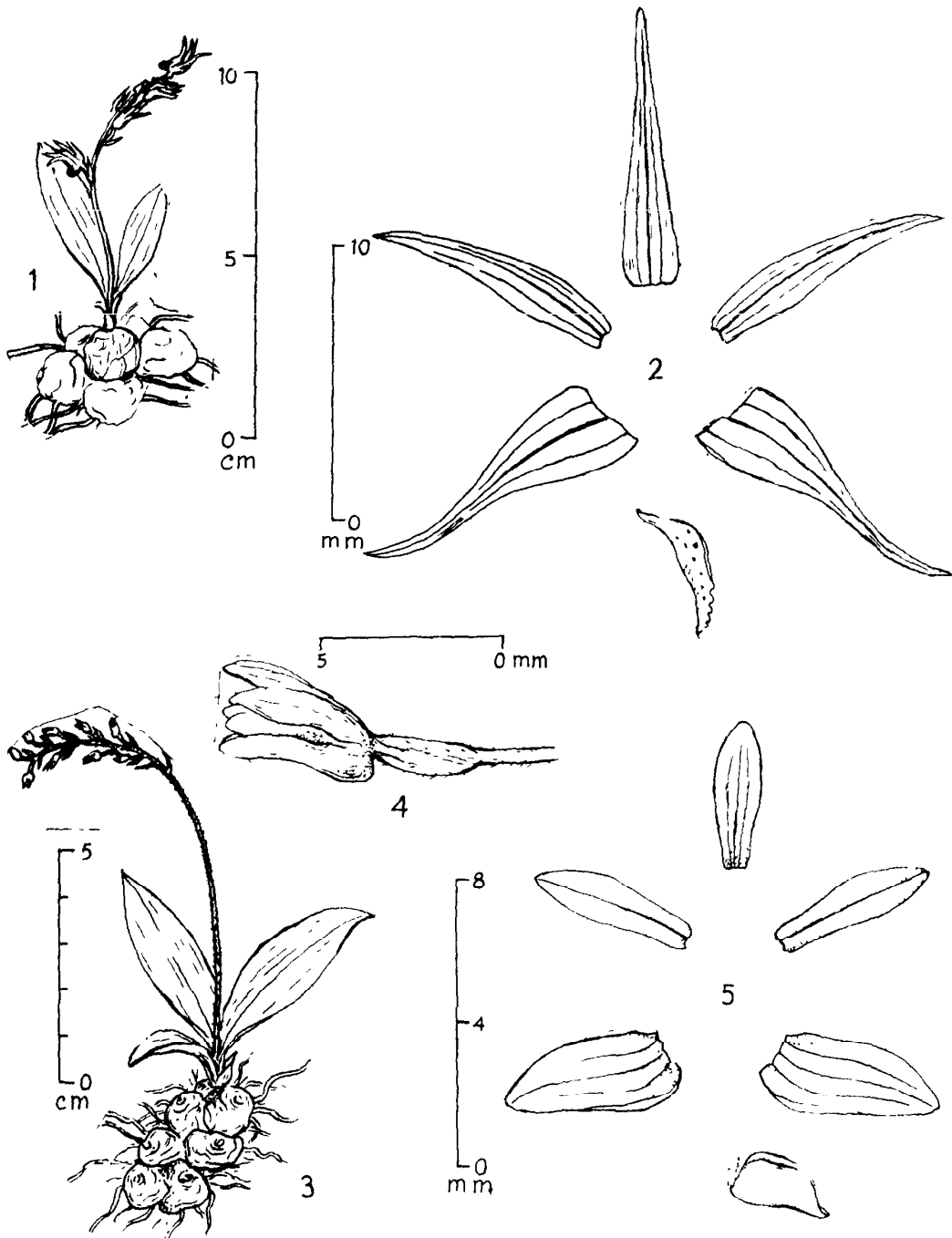


PLATE 76

Fig. 1-2. *Eria nana* A. Rich. 1. Habit; 2. Sepals, Petals and Lip (lateral view) Fig. 3-5. *E. albiflora* Rolfe. 3. Habit; 4. Flower; 5. Sepals, Petals and lip (lateral view)

Flowering & Fruiting: May-November.

Anon. (MH Acc. Nos. 50288, 50291); *Barber* 694; *Ellis* 34642, 38489; *Lawson s. n.* (MH Acc. Nos. 50285, 50289, 50289, 50290); *Rangachari* 15551; *Sharma* 35893; *Vajravelu* 36836. Common: Ooty, Pykara, Coonoor, Kodanad; Alt. 1900–2100 m.

Hooker on the basis of lip trilobed or entire separates *E. reticosa* from another, *E. braccata* Lindl. Fischer considers these two as conspecific, but treats under *E. braccata* Lindl. However, as per I.C.B.N. 1978, *E. reticosa* Wt. has priority.

3. *E. nana* A. Rich. in Ann Sci. Nat. Ser. 2. 15 : 19. 1841; Hook. f., Fl. Brit. Ind. 5 : 789. 1890; Fyson, Fl. Nilgiri & Pulney Hill-tops 1 : 387. & 2. t. 244. 1915; Fischer in Fl. Pres. Madras 1425. 1928 (Repr. ed. 3 : 996. 1957). *Dendrobium filiforme* Wight, Ic. 5(1) : 5. t. 1642. 1851 (lower right hand figure). **Pl. 76, Figs. 1-2.**

Herbs, spreading; pseudobulbs densely crowded, rounded and flat, 5–11 mm across, netted on the surface. *Leaves* 2 or 3 per bulb, sessile, 0.7–5.0 × 0.5–1.2 cm, oblanceolate-oblong, narrowed into short sheathing base, acute-obtuse, cuspidate at tip. *Inflorescence* slender racemes, 3–8 cm long, terminal, arising in between the leaves. Inflorescence axis filiform, erect, flexuous-zigzag with a short or long terete scape. *Flowers* 5–8, secund or sub-secund, well spaced, greenish yellow. *Bracts* 3.0–5.0 × 1.0–2.5 mm, cymbiform, triangular, shortly acuminate, longer than the ovary and embracing it, persistent, fruiting bracts larger. *Ovary* with pedicel ca 2 mm long. *Perianth* sparsely gland-dotted or not, marcescent, more or less spreading, closely trinerved in the middle. *Dorsal sepal* 9–10 × ca 2 mm, narrowly lanceolate, acuminate. *Lateral sepals* as long as the dorsal, but broader towards the base (ca 3 mm), falcately lanceolate, acuminate at tip, attached to the long foot of the column forming a saccate mentum. *Lateral petals* shorter and narrower than the sepals, 8.0–9.0 × ca 1.5 mm, lanceolate, acuminate. *Lip* ca 5.0 × 1.5 mm, narrowly lanceolate, abruptly narrowed into a short claw, conduplicate, much smaller than the perianths, sparsely gland dotted, closely trinerved along the median line, papillose externally about 2–3 of the distal end; margins crenulate at distal end, tip more or less reflexed, obtuse, the claw with a swollen callus on the upper surface. *Young fruits* pyriform, ca 6 mm long.

Flowering & Fruiting: July-October.

Ellis 34763; *Lawson s. n.* (MH Acc. Nos. 50246, 50296, 50300); *Sharma* 35920; *Subramanyam* 10585; *Vivekananthan* 43044. Fairly common: Doddabetta, Avalanche, T.R. Bazaar Shola, Naduvattam-Gudalur road, Bangihalla; Alt. 1600–2175 m.

4. *E. albiflora* Rolfe in Kew Bull. 79 : 170. 1893; Fischer in Fl. Pres. Madras 1425. 1928 (Repr. ed. 3 : 996. 1957). **Pl. 76, Figs. 3-5.**

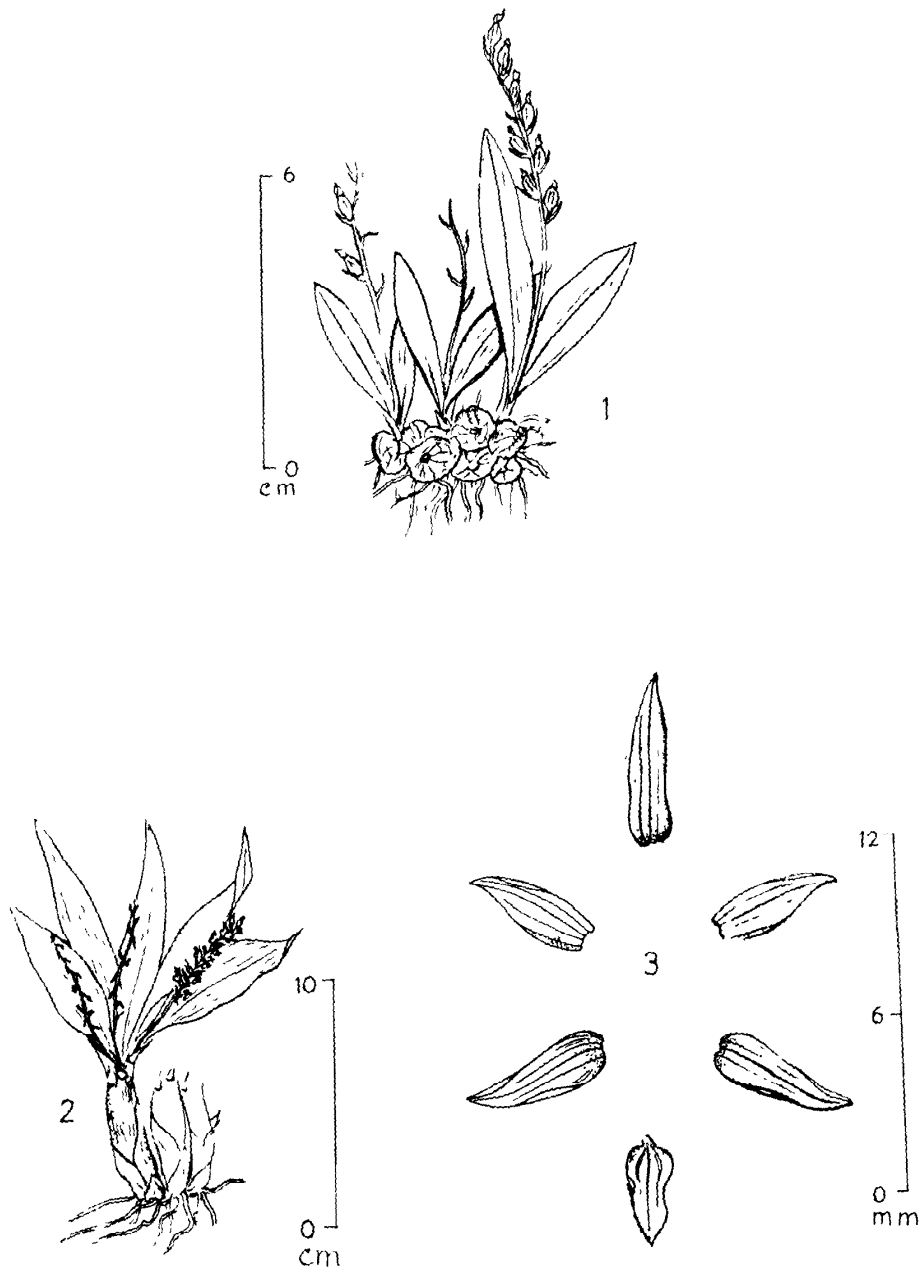


PLATE 77

Fig. 1. *Eria dalzelli* (Hook.) Lindl. 1. Habit (in fruits) Fig. 2-3. *E. polystachya* A. Rich.
2. Habit; 3. Sepals and Lip

Herbs, pseudobulbs aggregate, globose-ovoid, 4–12 mm across with small white scaly spots and without leaves. Roots long, slender, many. Fresh shoots lateral, with a few sheathing scales and with usually 3 leaves. *Leaves* 2.0–6.0 × 0.7–1.3 cm, elliptic-lanceolate, abruptly narrowed into a short or long sheathing base, acute at tip. *Inflorescence* racemes 5–10 cm long, terminal, with long, erect, slender scape; flowering portion arcuate; scape and pedicel with ovary brown pubescent. *Flowers* white, many, lax, scattered, distinctly pedicellate. *Bracts* 3.0–4.0 × 1.5 mm, cymbiform, persistent, longer than the pedicel, suberect. *Ovary* with pedicel 5–6 mm long. Perianth sparsely gland-dotted. *Dorsal sepals* 3.5–4.0 × 1.0–1.5 cm, oblong-lanceolate, obtuse, trinerved. *Lateral sepals* 3.5–4.5 × ca 2 mm, obliquely lanceolate-ovate, obtuse, trinerved. *Lateral petals* 2.5–3.5 × ca 1 mm, ligulate-ovate, obtuse, trinerved. *Lip* ca 2.5 mm long, sub-orbicular, conduplicate, beaked at the tip, ca 1.2 mm broad when folded, attached to the foot of the column, sparsely gland-dotted.

Flowering: July.

Barber 681, Ootacamund; *Ellis* 34762, T.R. Bazaar; Alt. ca 2050 m.

5. *E. dalzellii* (Hook.) Lindl., J. Linn. Soc. 3 : 47. 1858 (*nom. et syn. tantum, non descr.*); Hook. f., Fl. Brit. Ind. 5 : 789. 1890; Fischer in Fl. Pres. Madras 1425. 1928 (Repr. ed. 3 : 996. 1957); Sant. & Kapad., Orch. Bombay 151. t. 35. 1966. *Dendrobium dalzellii* Hook., J. Bot. 4 : 292. 1852. *D. fimbriatum* Dalz. J. Bot. 4 : 292. 1852, *non* Hook. 1825 *nec* Lindl. 1830. *D. filiforme* Wight, Ic. 5(1) : 5. t. 1642. 1851 (central and top left hand figs.). *Eria dalzellii* (Hook.) Lindl. var. *fimbriata* (Dalz.) Hook. f., F. Brit. Ind. 5 : 789. 1899. Pl. 77, Fig. 1.

Pseudobulbs clustered, discoid, 8–10 mm across, fresh shoots lateral. *Leaves* 2, 1.0–6.5 × 0.5–1.0 mm, linear-oblong or obovate, narrowed into a short sheathing base, mucronate at tip. *Racemes* 3–9 cm long, erect, generally secund or subsecund; peduncles 3 cm long, usually slightly curved. *Flowers* pale creamy yellow, faintly perfumed. *Bracts* 3–6 mm long, 0.5–1.0 mm broad at base, lanceolate, acuminate, erect, curved at apex, persistent. *Ovary* and pedicel ca 2 mm long. *Sepals* and *petals* 6.0 × 1.5–3.0 cm, triangular-ovate to lanceolate, acute or sub-acuminate, 3-nerved; margin entire with hyaline, stalked glands. *Mentum* ca 0.5 mm long, rounded pale orange-yellow. *Lateral petals* slightly narrower than sepals and rounded at base. *Lip* 3.0–4.0 × ca 1.5 mm, ovate-lanceolate, falcate, concave in basal half, straight upwards, minutely papillate, panduriform on spreading, the basal part broad, ovate with edges entire, incurved and 2 fairly thick yellowish orange ridges which unite in the middle of lip and pass as one furrow into much smaller, rounded apical lobe; the edges of midlobe somewhat crenulate and slightly decurved. *Fruit* ca 5 mm long, ribbed with marcescent perianth.

Fruiting: October.

The description of inflorescence and flower is from the available literature as they could not be collected in flowering condition.

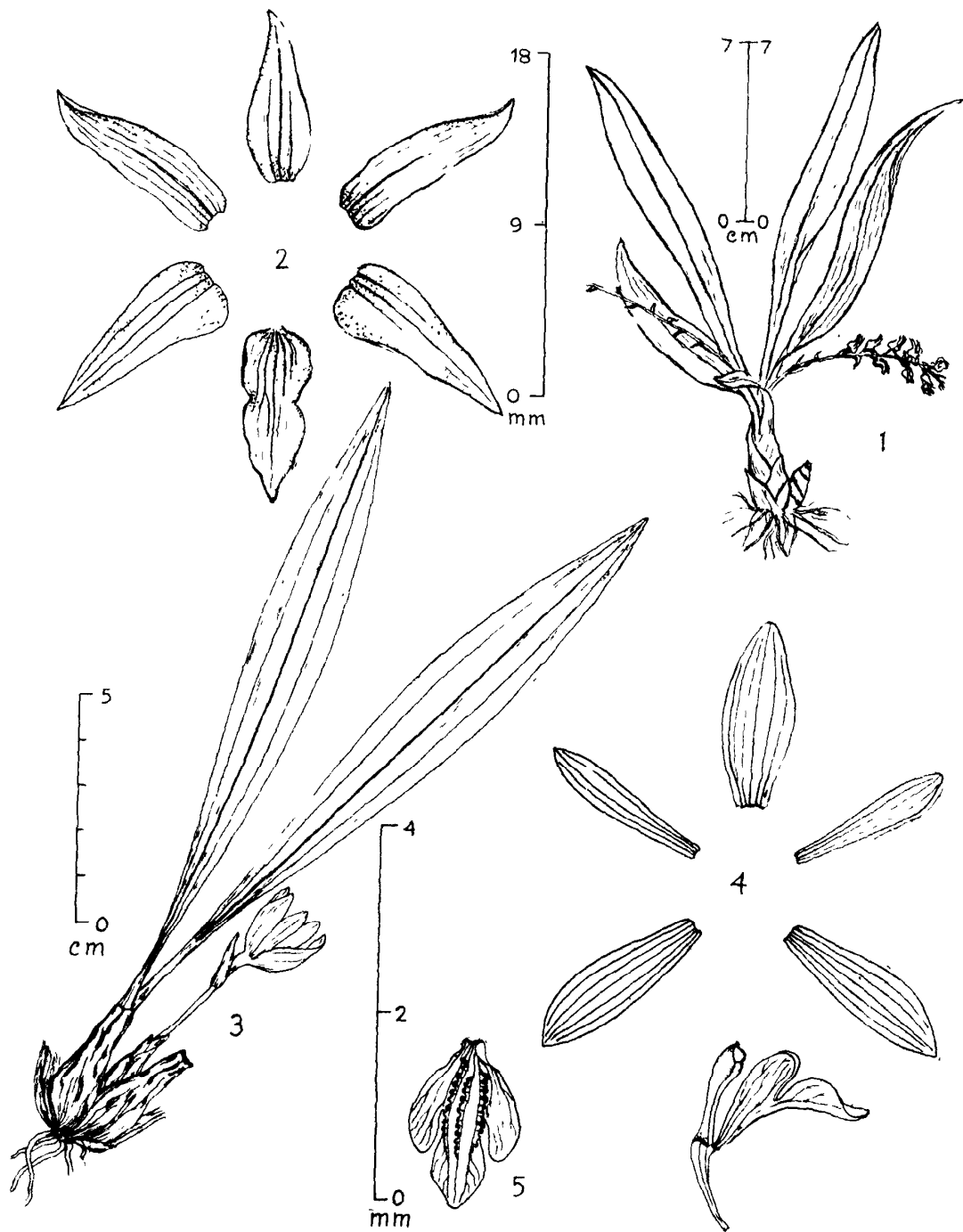


PLATE 78

Fig. 1-2. *Eria mysorensis* Lindl. 1. Habit; 2. Sepals, Petals and Lip Fig. 3-5. *Coelogyne uniflora* Lindl. 3. Habit, 4. Sepals, Petals and lip (side view) with ovary and column, 5. lip (dorsal view)

Barber 2040, Devala-Wyanad; *Ellis* 43252, Pandiar Dam-Nadugani Alt ca 800 m.

6. *E. polystachya* A. Rich. in Ann. Sci. Nat. Ser. 2. 15 : 20. t. 9. 1841; Wight, Ic. 5(1) : 4. t. 1635. 1851 (*E. pubescens* on the plate); Hook. f., Fl. Brit. Ind. 5 : 792. 1890; Fischer in Fl. Pres. Madras 1425. 1928 (Repr. ed. 3 : 996. 1957).
Pl. 77, Figs. 2-3.

Pseudobulbs caespitose, enveloped by sheathing scales; sheathing scales elongate, oblong, 5-7 cm long, sub-cylindric, wrinkled, plurinodal, basal nodes longer; upper nodes congested, bearing 5 or more leaves; matured pseudobulbs bereft of scales but with leaves. *Leaves* crowded, 7.0-13.0 × 1.5-2.7 cm, narrowly lanceolate-elliptic or oblong, unequal in size, articulate at base, obtuse at tip. *Inflorescence* short racemes, 6-8 cm long, dense, axillary, from the leaf-axil and axils of the upper scales; inflorescence axis and pedicel with ovary pubescent. *Flowers* light yellow or creamy white, many. *Bracts* 5.0-9.0 × 1.5-2.5 mm, lanceolate, acuminate, reflexed, longer than the pedicel with ovary. *Ovary* with pedicel ca 4 mm long. *Perianth* sparsely gland-dotted, sepals sparsely hairy outside. *Dorsal sepal* 6.0-7.0 × ca 1.5 mm, linear-oblong, obtuse at tip, 3-nerved. *Lateral petals* 5.0-5.5 × ca 2 mm, oblong, obtuse at tip, 3-nerved. *Lip* 4 mm long, 1.7-2.0 mm broad towards the base, shorter than petals, lanceolate, sub-panduriform, with an obscure claw, 3-nerved, lateral nerves thickened towards the base. *Column* short. *Young fruits* 1.9 cm long with stalk, greenish pink, with marcescent perianth.

Flowering & Fruiting: October, November.

Anon (MH Acc. Nos. 50304, 50305, 50307); *Vajravelu* 36840 : Naduvattam, Kodanad shola; Alt. ca 1950 m.

7. *E. mysorensis* Lindl. in Journ. Linn. Soc. 3 : 54. 1858; Hook. f. Fl. Brit. Ind. 5 : 793. 1890; Sant. & Kapad. Orch. Bombay 149. 1966. *E. pubescens* Wight, Ic. 5(1) : 4. t. 1634. 1851. (*E. polystachya* on the plate); Hook. f. l. c.; Fischer in Fl. Pres. Madras 3 : 1425. 1928 (Repr. ed. 3 : 996. 1957).

Pl. 78, Figs. 1-2.

Pseudobulbs caespitose, covered by sheathing scales, older ones naked, bereft of leaves and scales, conical, wrinkled, more or less 3 noded, 2.0-4.5 × 1.3 × 1.5 cm. *Leaves* usually 4, equitant; 14.0-28.0 × 2.0-2.6 cm, clustered at apex of the bulb, unequal in length, linear-narrowly elliptic, narrowed into a long sheathing base, obtuse at tip, prominently parallel nerved, white-dotted. *Inflorescence* more or less drooping racemes, many flowered, lax, axillary, shorter than the leaves, 11-14 cm long, inflorescence axis sparsely pubescent. *Flowers* white, quite large, shortly pedicelled; pedicel and ovary pubescent, 6-8 mm long. *Perianth* sparsely gland dotted. *Bracts* 0.9-1.2 × 0.2-0.3 cm, lanceolate, acuminate, 3-5 nerved, foliaceous, reflexed, gland-dotted, persistent, longer than the ovary. *Dorsal sepal* ca 9.0 × 2.2 mm, lanceolate, acute at tip, 5-nerved. *Lateral sepals* as long as the dorsal, but

slightly broader at base (3.5 mm), lanceolate, acute at tip, 3-5 nerved. *Lateral petals* ca 7.5 × 3.0 mm, ovate-lanceolate, acute at tip, 3-nerved. *Lip* ca 7.7 × 3.0 mm, subequal with petals, subcordate, obscurely clawed at base, with a constriction about the middle, sub-panduriform, 5-nerved, margin thin, wavy; foot long, incurved.

Flowering: July & October.

Meebold 10618, Kulhutti; *Subramanyam* 10428, Devarshola; Alt. 1100-1800 m.

37. COELOGYNE Lindl.

The species of this genus are quite common in evergreen forests at high altitude, usually as epiphytes, rarely as lithophytes. The inflorescence is produced at the tip of the fresh shoot which later on develops into a pseudobulb covered by persisting scales or scale fibres and with terminal twin leaves and persisting infructescence axis with or without fruits.

- | | | |
|---|-----|---------------------------|
| 1a. Flowers usually single (rarely 2) | ... | 1. <i>C. uniflora</i> |
| 1b. Flowers usually more than 3 (or 3) | | |
| 2a. Scape with only tightly imbricating bracts at the base; lip 2-lamellate | | |
| 3a. Plants large (pseudobulb plus leaves ca 40 cm); lamella erect, entire; midlobe of the lip sub-elliptic, narrowed at base; obtuse at tip | ... | 2. <i>C. mossiae</i> |
| 3b. Plants small (pseudobulb plus leaves up to 15 cm); lamella crisped; midlobe of the lip more or less orbicular, retuse or mucronate at tip | ... | 3. <i>C. breviscapa</i> |
| 2b. Scape with two large terminal leaves in addition to the imbricating bracts below; lip 3-lamellate | | |
| 4a. Plants large (pseudobulb ca 5 cm long; leaves 5.0-27.0 × 1.6-4.5 cm); flowers large; dorsal sepal ca 27 mm long; midlobe of lip triangular | ... | 4. <i>C. nervosa</i> |
| 4b. Plants small (pseudobulb ca 2 cm long; leaves 2.0-16.0 × 0.6-2.0 cm); flowers small; dorsal sepal ca 7 mm long; midlobe of lip suborbicular | ... | 5. <i>C. odoratissima</i> |

1. *Coelogyne uniflora* Lindl., Gen. & Sp. Orch. 42. 1830; Hook. f., Fl. Brit. Ind. 5 : 842. 1890; King & Pantl. in Ann. Roy. Bot. Gard. Cal. 8 : 138. t. 192. 1898; Fischer in Fl. Pres. Madras 1430. 1928 (Repr. ed. 3 : 1000. 1957).

Pl. 77, Figs. 3-5

Pseudobulbs in clusters, narrowly oblong-ovoid, 2.3-3.5 × 0.7-1.0 cm, with persisting, sheathing scale fibres at the base. *Leaves* 2 per pseudobulb, 12.1-

15.5 × 1.2–2.0 cm, narrowly elliptic, acute, shortly acuminate, narrowed into a petiole. *Flowers* solitary (rarely 2), terminal on the scape, arising laterally from the base of the pseudobulb, white with yellowish streaks at the base of the lip; scape *ca* 3.5 cm long, covered by imbricating scales. *Bracts ca* 13 × 0.5 cm, cymbiform, broadly ovate-lanceolate, acute. *Ovary* with pedicel *ca* 1 cm long. *Dorsal sepal ca* 2.0 × 0.8 cm, oblong, obtuse, 5-nerved. *Lateral sepals ca* 2.1 × 0.65 cm, oblong, obtuse, keeled at tip externally, spreading, 5-nerved. *Lateral petals ca* 1.9 × 0.35 cm, spathulate-oblong, obtuse, much narrower than the sepals. *Lip ca* 1.8 cm long, trilobed, with three erect crisped lamellae; sidelobes erect, *ca* 1.3 × 0.4 cm, oblong rounded at tip, midlobe *ca* 1.1 × 0.55 cm, ovate-elliptic, obtuse. *Column ca* 1.0 cm long, winged.

Flowering: December.

Rathakrishnan 15701, BSI Garden, Coimbatore; Alt. *ca* 467 m.

Hooker *loc. cit.* has included this species under doubtful ones and reports its distribution in tropical Himalayas. Fischer *loc. cit.* includes this species based on the collection of *Proudlock* from Nilgiris, but it is not represented in MH. Thus the present description is drawn from specimen, obtained from departmental garden where it is grown without specific mention of the locality of its original collection.

On comparison with the diagrams and description of *C. uniflora* Lindl. as given in King & Pantl. *loc. cit.* the specimens from the South show distinct petiole, scape much longer than the pseudobulb, lateral petals narrow, spathulate-oblong and sidelobes of the lip with rounded apex; instead of petals broadly lanceolate and sidelobe of the lip with acute apex. Hence the correct identity of either the South Indian ones or the Himalayan ones is doubtful and to be re-established by further comparative study with type material.

Presence of a large bract as long as or longer than the ovary instead of very small bract, coupled with large side lobes for the lip instead of small acute ones, at once separate this species from that which Hooker (*loc. cit.*) treats under the doubtful one.

As the genus *Panisea* is characterised by the presence of a curiously sigmoid bent of the narrow claw at the base of the lip and by the absence of lobes and lamella for the lip (King & Pantl., 1898), the specimens under study can never be treated under *Panisea*.

2. ***C. mossiae*** Rolfe in Kew Bull. 1894 : 156. 1894; Fyson, Fl. Nilgiri & Pulney Hill-tops 1 : 391; 2 : t. 247. 1915 & 3 : 110. 1920; Fischer in Fl. Pres. Madras 1430. 1928 (Repr. ed. 3 : 1000. 1957). **Pl. 79, Figs. 1-2.**

Epiphytes or lithophytes; pseudobulbs conical, 6.0–8.0 × 2.0–2.5 cm, wrinkled, covered by sheathing scales and loose fibres at the base. *Leaves* 2 per pseudobulb, 27.8–36.5 × 2.9–4.1 cm, oblong-elliptic, obtuse; narrowed



PLATE 79

Fig. 1-2a. *Coelogyne mossiac* Rolfe. 1. Habit; 2. Sepals, Petals and lip (side view); 2a. lip (Dorsal view)

towards the base. *Inflorescence* racemes, lateral to the pseudobulb, 24–27 cm long. *Scape* covered by imbricating scales towards the base. *Flowers* 6–8, fragrant. *Bracts* large, 2.5–4.8 × 1.0–2.1 cm, cymbiform, scarious, persistent. *Ovary* with pedicel 1.7–2.4 cm. *Perianth* spreading, many nerved. *Dorsal sepal* 2.3–3.1 × 0.8–1.1 cm, ovate-oblong, obtuse. *Lateral sepals* 2.3–3.2 × 0.8–1.0 cm, narrowly oblong, obtuse, median nerve keeled externally. *Lateral petals* 2.1–2.9 × 0.9–1.1 cm, elliptic, obtuse, subequal with the sepals. *Lip* 1.8–2.0 cm long, shorter than other parts, trilobed with two erect, entire lamellae on either side of the median nerve, 1.2–1.4 cm broad across the sidelobes; sidelobes 1.2–1.5 × 0.4–0.5 cm, erect, embracing the column, oblong, obtuse; midlobe 0.6–1.2 × 0.6–0.7 cm, sub-elliptic with a short or long narrow base. *Column* ca 1.6 cm long, winged, more or less acute.

Flowering: February.

Shetty 31780; Alt. ca 1950 m.

The above description is based on the materials collected from neighbouring areas as the plant could not be collected from Nilgiris. This seems to be the largest *Coelogyne* species in the Nilgiris.

3. *C. breviscapa* Lindl., Fol. Orch. Coelogyne 4. 1853; Hook. f., Fl. Brit. Ind. 5 : 833. 1890, *pro parte*; Fischer in Fl. Pres. Madras 1430. 1928 (Repr. ed. 3 : 1000. 1957). **Pl. 80, Figs. 1–2.**

Creeping; pseudobulbs erect, 2.0–4.5 × 0.6–1.2 cm, narrowly oblong, serially arranged on horizontal creeping stem at short intervals, covered by sheathing scales. *Leaves* 2, on mature pseudobulbs, 5.5–9.5 × ca 1.4 cm, linear-elliptic, acute at tip, narrowed into a short, keeled petiole. *Inflorescence* racemes arising from the base of the pseudobulb at the apex of the creeping stem, 7–11 cm long, lax, 4–7 flowered; scape short, terete, slender, covered by many imbricating scales at base. *Flowers* white, scented. *Bracts* ca 2.1 × 0.9 cm, large, cucullate, ovate-lanceolate, acute, scarious. *Ovary* with pedicel ca 1.3 cm. *Dorsal sepal* 13.0 × 4.5 mm, lanceolate-oblong, obtuse-acute, 5 or 6 nerved, median nerve ridged. *Lateral sepals* as long as the dorsal, ca 4 mm broad, lanceolate-oblong, obtuse-acute, 5-nerved, median nerve prominent. *Lateral petals* ca 12 × 2 mm, much narrower than the sepals, linear, obtuse, obscurely 3-nerved. *Lip* ca 12 mm long, ca 5 mm broad across the sidelobes, oblong, trilobed, with 2 erect, crisped lamellae on either side of the median nerve; sidelobes auricular, embracing the column, obtuse; midlobe more or less orbicular, retuse or mucronate at tip. *Column* ca 7 mm long, winged and hooded. *Fruits* ellipsoid, ca 3 cm long with pedicel, with marcescent perianth.

Flowering: April–May. *Fruiting*: January.

Vajravelu 39676, Kodanad; *Rathakrishnan* 38048, Singara Range forest.

4. *C. nervosa* A. Rich. in Ann. Sci. Nat. Ser. 2. 15 : 16. 1841; Fyson, Fl. Nilgiri & Pulney Hill-tops 1 : 390 & 2 : t. 246. 1915; Fischer in Fl. Pres.

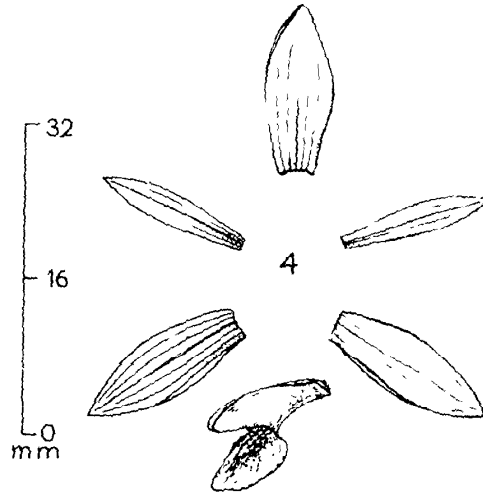
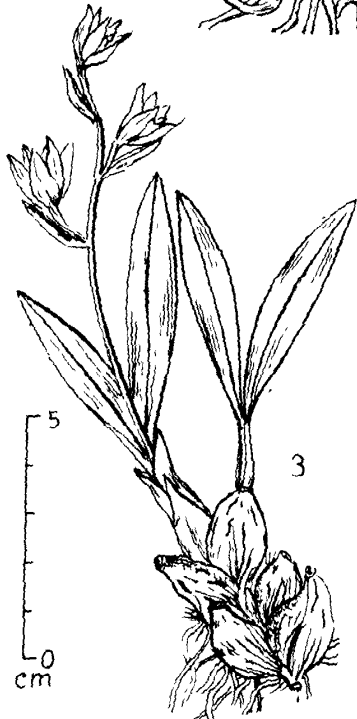
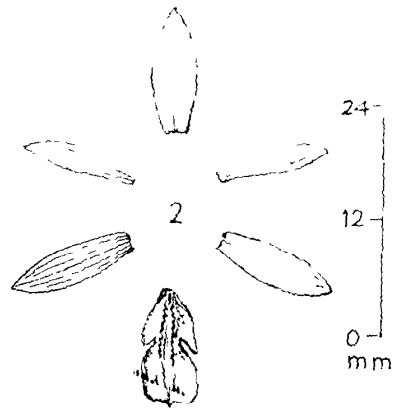
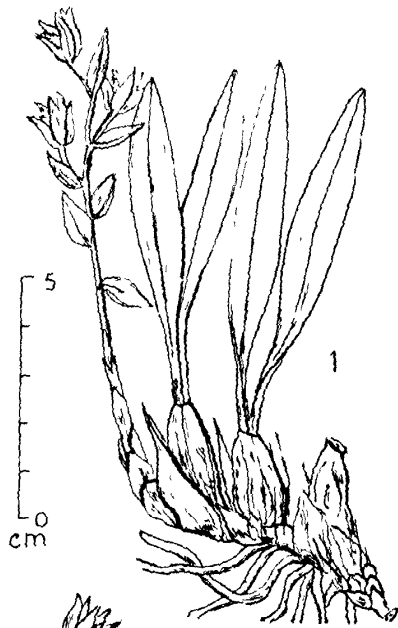


PLATE 80

Fig. 1-2. *Coelogyne breviscapa* Linn. 1. Habit; 2. Sepals, Petals and Lip. Fig 3-4 *C. Odora-tissima* Lindl.; 3. Habit; 4. Sepals, Petals and Lip.

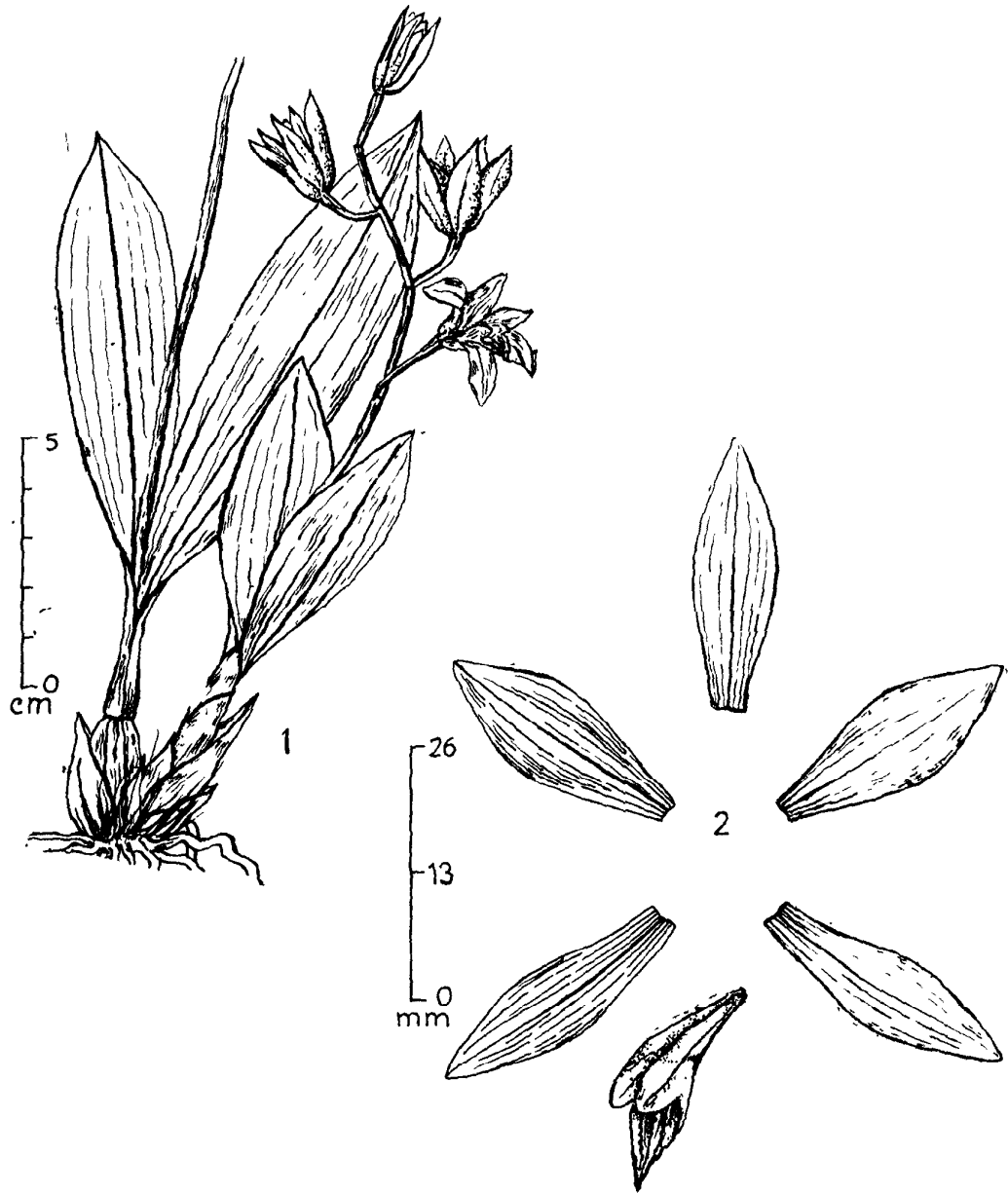


PLATE 81

Fig. 1-2. *Coelogyne nervosa* A. Rich. 1. Habit, 2. Sepals, Petals and Lip.

Madras 1430. 1928 (Repr. ed. 3 : 1000 1957). *C. corrugata* Wight, Ic. 5(1) : 5 t. 1639. 1851; Hook. f., Fl. Brit. Ind. 5 : 835. 1890.

Pl. 81, Figs. 1-2.

Creeping epiphytes (rarely lithophytes), 8-12 cm high with inflorescences; pseudobulbs broadly oblong-ovoid, 3-6 × 2-3 cm, serially arranged, 2-leaved, old bulbs covered by dried scales and fibres, rugose. Fresh shoots arise from the sides of the old bulbs, covered by large, erect, imbricating, sheathing bracts and bear 2 leaves at apex and an inflorescence in between them. *Leaves* 5.0-27.0 × 1.6-4.5 cm, elliptic, acute, narrowed into a keeled petiole, punctate. *Inflorescence* racemes suberect, 10-23 cm long; scape terete, naked. *Flowers* large, white. *Bracts* 2.0-2.5 × 0.8-1.0 cm, lanceolate, scarious, deciduous. *Ovary* with pedicel ca 1.8 cm long. *Dorsal sepal* ca 27.0 × 8.5 mm, elliptic-oblong, acute, many nerved, median nerve prominent. *Lateral sepals* as long as the dorsal, ca 8 mm broad, elliptic, oblique at base, acute, many nerved, median nerve prominent, ending in a subterminal cusp on the dorsal side. *Lateral petals* ca 26.0 × 9.5 mm, elliptic, acute, 3-nerved, median nerve prominent. *Lip* ca 23 mm long, ca 15 mm broad across the sidelobes, trilobed, with 3 longitudinal, erect, crisped lamellae; sidelobes erect, oblong, obtuse, embracing the column, yellowish within; midlobe lanceolate, margin obscurely crenulate. *Column* ca 1.7 cm long, erect, winged on either side, apex hooded. *Fruits* ellipsoid, ca 5.5 cm long with pedicel.

Flowering: June-August. *Fruiting*: January, June.

Joseph 10098; *Ellis* 34711; *Lawson s. n.* (MH Acc. No 50353); *Sharma* 35794; *Shetty* 34451; *Subramanyam* 10513; *Vajravelu* 35083, 39674; *Wight s. n.* (MH Acc No. 505320). Common: Kotagiri, Kulkutty, Kodanad, Naduvattam, Pakkasura hills, Pykara; Alt. 1675-2220 m.

5. *C. odoratissima* Lindl., Gen. & Sp. Orch. 41. 1830; Wight, Ic. 5(1) : 5. t. 1640. 1851; Hook. f., Fl. Brit. Ind. 5 : 834. 1890; Fyson, Fl. Nilgiri & Pulney Hill-tops 1 : 389 & 2^f: t. 245. 1915; Fischer in Fl. Pres. Madras 1430. 1928 (Repr. ed 3 : 1000. 1957 incl. var. *angustifolia*); *Sharma & Rathakr.* in Bull. Bot. Surv. Ind. 13 : 351. 1971. Pl. 80, Figs. 3-4.

Pseudobulbs in clusters, 1.0-2.8 × 0.5-1.5 cm, ovoid-conical. Fresh shoots short, produced from the sides of the old bulbs, covered by brown, imbricating bracts at base and bear 2 small, tender leaves and inflorescence in between. *Leaves* vary in size and shape, 2.0-16.0 × 0.6-2.0 cm, elliptic-linear, acute. *Inflorescence* racemes 5-10 cm long, one per pseudobulb, lax, 2 or 3 flowered; scape slender, terete, naked. *Flowers* white, fragrant. *Bracts* ca 1.2-1.7 × 0.3-0.4 cm, longer than pedicel with ovary, lanceolate, acute, 7-nerved, light brown scarious, persistent. *Ovary* with pedicel ca 1 cm long. *Dorsal sepal* ca 17 × 7 mm, oblong, subob-luseta acute, 5-nerved, median nerve thickened into a cusp dorsally. *Lateral sepals* ca 18 × 6 mm, oblong, acute, 5-nerved, median nerve prominent, ending in a subterminal cusp on the dorsal side. *Lateral petals* ca 6 × 3 mm, linear-elliptic, oblique, obtuse, 3-nerved. *Lip* ca 16 mm long, 14 mm

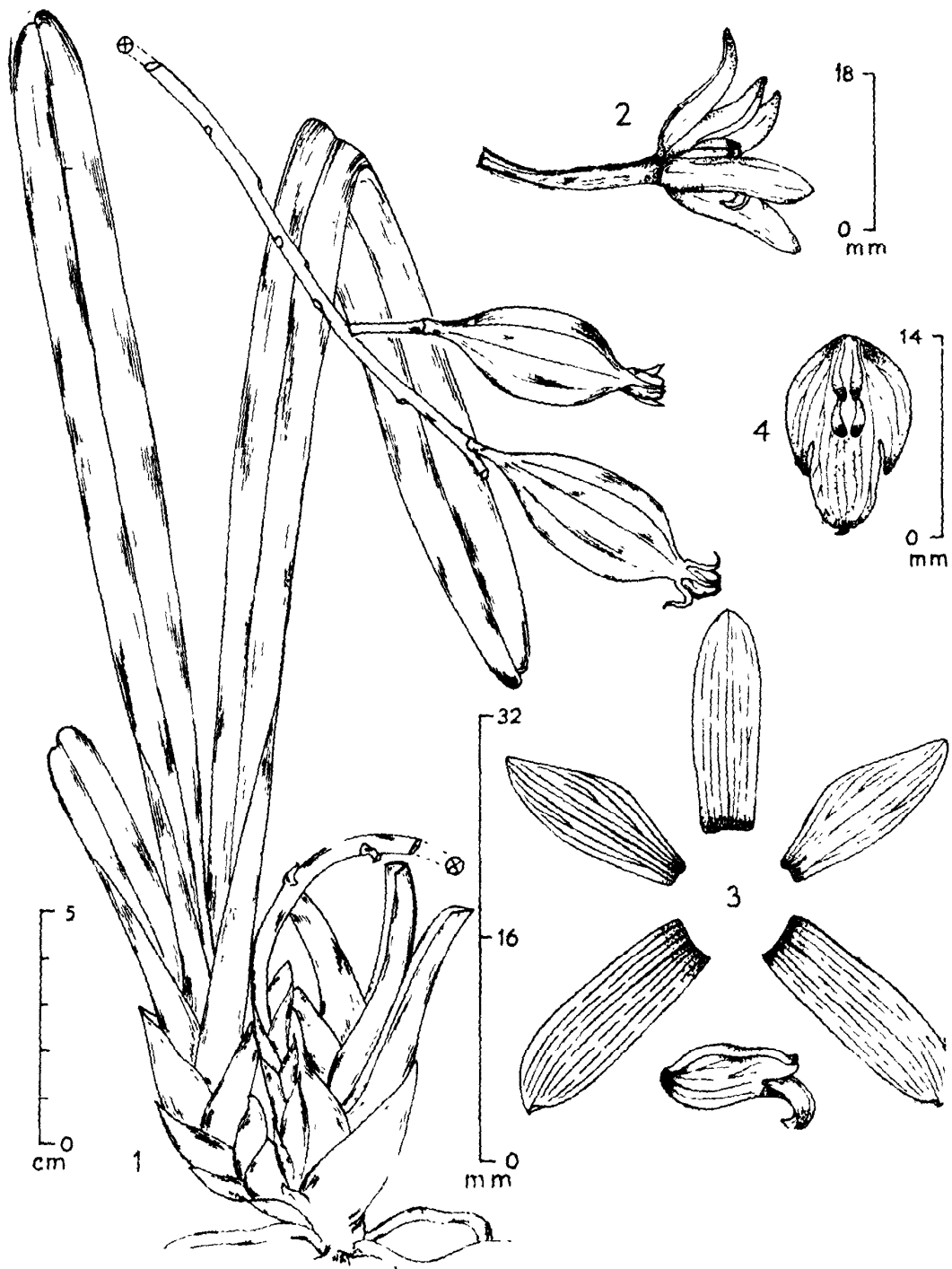


PLATE 82

Fig. 1-4. *Cymbidium aloifolium* Sw. 1. Habit; 2. Flower; 3. Sepals, Petals and Lip (side view); 4. Lip (Spread out)

broad across the side lobes, trilobed, with 3 longitudinal, erect, crisped lamellae; sidelobes obliquely-oblong, erect, obtuse, embracing the column; midlobe sub-orbicular, broadly elliptic, obtuse margins obscurely crenulate. *Column* ca 1.1 mm long, erect, winged on either side, apex hooded. *Fruits* ellipsoid, ca 3.3 cm long with pedicel, with marcescent perianth.

Flowering: January-May. *Fruiting*: February, May, June, October.

Ellis 37858, 38445, 38491; *Lawson s. n.* (MH Acc. Nos. 50247, 50344, 50345); *Rangachari s. n.* (MH Acc. Nos. 50348, 50350); *Rathakrishnan* 38082; *Sharma* 39873; *Shetty* 11917, 34107; *Vivekanathan* 40703, 40724, 43046; *Wight* 2066. Very common: Avalanche, Naduvattam, Doddabetta, Pykara, Nilgiri peak, T.R. Bazaar shola, Lakkadi, Mudimundu, Bangihalla, Kollimund; Alt. 1800-2475 m.

Coelogyne angustifolia of A. Richard and so treated by Fischer *loc. cit.* is conspecific with above species which had been proved by study of plants under cultivation by Sharma & Rathakrishnan.

38. CYMBIDIUM Sw.

***Cymbidium aloifolium* (L.) Sw.** in Nov. Act. Soc. Upsal. 6 : 73. 1799; Wight, Ic. 5(1) : 11. t. 1687-88. 1851; Hook. f., Fl. Brit. Ind. 6 : 10. 1890, *pro parte*; King & Pantl. in Ann. Roy. Bot. Gard. Cal. 8 : 189. t. 252. 1898; Fischer in Fl. Pres. Madras 1436. 1928 (Repr. ed. 3 : 1004. 1957); Sant. & Kapad., Orch. Bombay 206. 1966; Seth & Cribb in Arditti (ed.), Orch. Biol. 3 : 295. 1984. *Epidendrum aloifolium* L., Sp. Pl. 2 : 953. 1753. *Cymbidium erectum* Wight, Ic. 5(1) : 21. t. 1753. 1851. **Pl. 82, Figs. 1-4.**

Robust herbs, with swollen base covered by imbricating leaf bases and scales. *Leaves* alternate, distichous, closely imbricating, thick, 12.0-74.0 × 1.6-3.1 cm, narrow, keeled, unequally cleft at tip, sheathing and articulate at base. *Inflorescence* many flowered racemes, 29-38 cm long, pendulous, lateral, with large imbricating, sheathing bracts at base. *Flowers* conspicuous, creamy white with maroon bands. *Bracts* 3-5 × ca 2 mm, ovate-oblong, rounded at tip, much smaller than ovary. *Ovary* and pedicel ca 2 cm long. *Dorsal sepal* 16-18 × 5-6 mm, oblong, obtuse. *Lateral sepals* 18.0-19.0 × 5.5-6.0 mm, slightly broader than dorsal sepal, oblong, obtuse. *Lateral petals* 15.0-16.0 × 5.0-5.5 mm, shorter than sepals, obliquely lanceolate-elliptic, obtuse. *Lip* adnate to the short foot of the column, dark maroon, trilobed, 14-15 mm long, 8-10 mm long, 8-10 mm broad across the sidelobes; sidelobes narrow, erect, obtuse, pointing forwards; midlobe 7.0-8.0 × 5.0-5.5 mm, ovate-oblong, finely sinuate at margin, reflexed with recurved mucronate tip. There are two parallel elongate ridges broken and disconnected about the middle on the dorsal side in between the sidelobes. *Column* 8-9 mm long, with short foot (ca 3 mm). *Fruits* ellipsoid-globose, 7-9 cm long with stalk, with marcescent perianth. *Fruiting axis* 36-47 cm long.

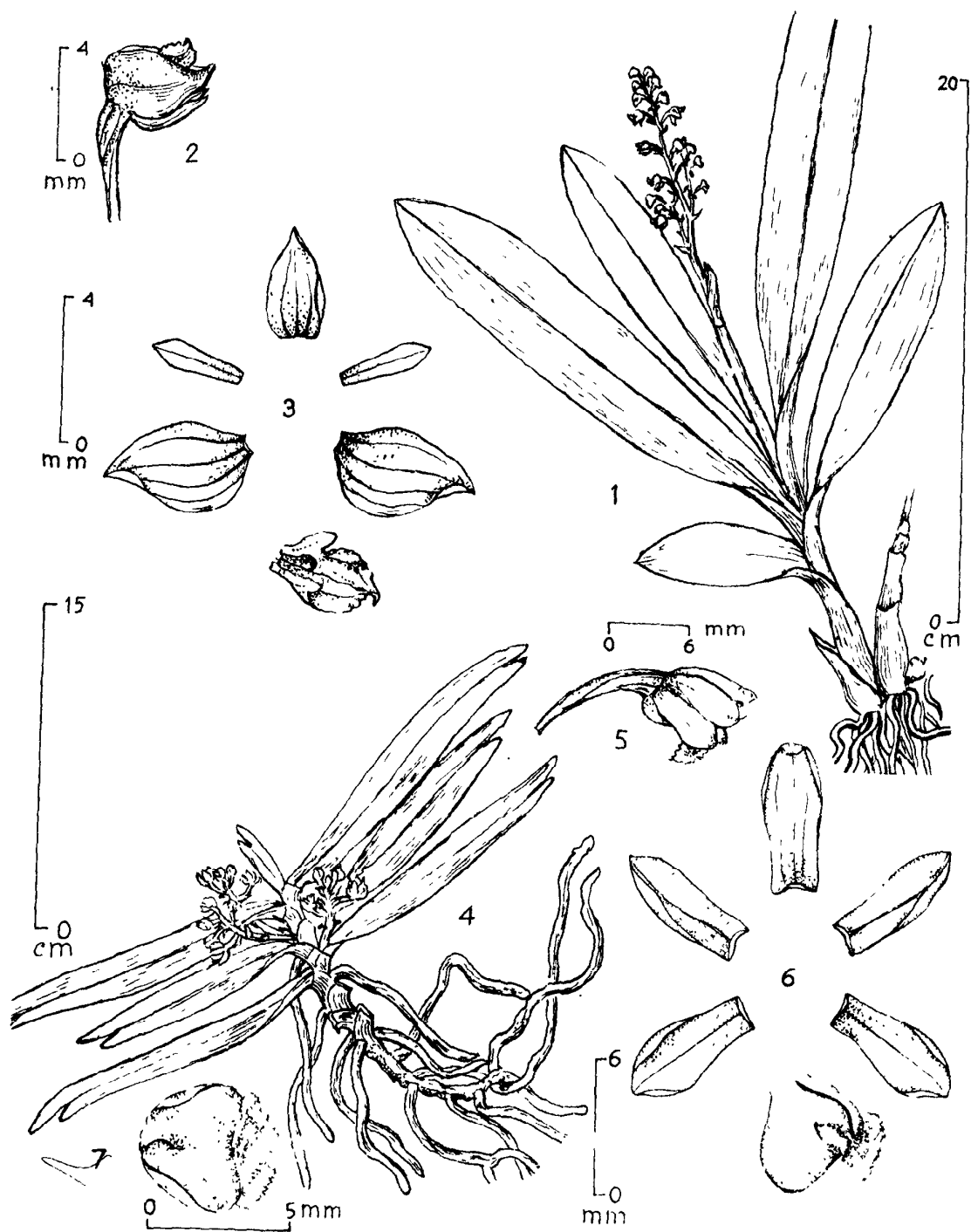


PLATE 83

Fig. 1-3. *Polystachya concreta* (Jacq.) Garay & Sweet 1. Habit; 2. Flower; 3. Sepals, Petals and Lip. Figs. 4-7. *Gastrochilus acaulis* (Lindl.) Ktze; 4. Habit; 5. Flower (side view); 6. Sepals, Petals and Lip; 7. Sac cut open showing callus

Flowering & fruiting: April-July.

Varjavelu 41853, 45061; *Wight s. n.* (MH Acc. Nos. 50473, 50474). Coonoor: Alt. 650-880 m.

39. POLYSTACHYA Hook.

Polystachya concreta (Jacq.) Garay & Sweet in Revista Soc. Colomb. Orquideol. 9 : 206. 1974. *Epidendrum concretum* Jacq., Enum. Pl. Carib. 30. 1750. *Onychium flavescens* Bl., Bijdr. 325. 1825. *Polystachya flavescens* (Bl.) J.J. Sm., Fl. Buitz. 6 : 284. f. 218. 1905; Sant. & Kapad., Orch. Bombay 186. 1966. *P. luteola* Hook., Exot. Fl. t. 103. 1825; Wight, Ic. 5 (1) : 10. t. 1678. 1851. *P. purpurea* Wight, l.c. t. 1679. 1851; Hook. f., Fl. Brit. Ind. 6 : 21. 1890; Fischer in Fl. Pres. Madras 1437. 1928 (Repr. ed. 3 : 1005. 1957). *P. wightii* Reichb. f., Walp. Ann. 6 : 640. 1864; Hook. f., l.c.; Fischer l.c. **Pl. 83, Figs. 1-3.**

Herbs, 12-29 cm high with inflorescence. *Pseudobulbs* ovoid, serially arranged. *Stem* short, covered by sheathing bracts and sheathing base of leaves at base. *Leaves* 4 or 5, 6.0-25.0 × 1.2-3.2 cm, alternate, distichous, oblong-elliptic to lanceolate, narrowed into sheathing petiole, articulate at base, obtuse-acute. *Inflorescence* panicles 8-20 cm long, with 2 or 3 long tubular sheaths. *Flowers* pale brown with faint foetid smell; non-resupinate. *Bracts* 2.0-5.0 × 0.7-2.0 mm, lanceolate, acuminate, persistent. *Ovary* with pedicel ca 4 mm long. *Perianths* not opening fully. *Dorsal sepal* ca 3.0 × 1.7 mm, ovate, acute. *Lateral sepals* ca 4 × 3 mm, broadly ovate, oblique at base, acute, apex recurved. *Lateral petals* ca 2.7 × 0.7 mm, much narrower than sepals, linear-ob lanceolate, apiculate. *Lip* ca 3.2 mm long, 3 mm broad across the sidelobes, superior, hinged to the short foot of the column, concealed by lateral sepals, trilobed, superior, hinged to the short foot of the column, concealed by lateral sepals, trilobed, with an erect median ridge towards the base; sidelobes erect, obtuse; midlobe oblong-suborbicular, crenulate, acute, more or less reflexed. *Column* short, prolonged into short foot.

Flowering: May, July. *Fruiting*: July, August.

Anon. (MH Acc. Nos. 50497, 50498); *Barnes* 1239; *Sharma* 35514; *Subba Rao* 41509; *Subramanyam* 10552; *Vajravelu* 43119: Northern hay R.F., Bimaka shola, Kariyashola, Cherambadi-Choladi river; Alt. 950-1200 m.

Hooker & Fischer *loc. cit.* treat *P. purpurea* and *P. wightii* as two distinct species based on slight differences. Nevertheless Hooker expressed his suspicion of the former species as only a variety of the latter. Subsequent workers, Santapau & Kapadia *loc. cit.*, consider them as one and the same species. After a critical study of a large number of specimens, the author also concludes that they are conspecific, with a wide range of disparity in the size of the plant, leaves, in the length of the inflorescence and extent of branching.

40. DIPLOCENTRUM Lindl

Diplocentrum recurvum Lindl. in Bot. Reg. sub. t. 1522. 1832; Hook. f., Fl. Brit. Ind. 6 : 78. 1890; Fischer in Fl. Pres. Madras : 1449. 1928 (Repr. ed. 3. 1013. 1957); Wight, Ic. 5(1) : 10. t. 1680. 1851. *D. longifolium* Wight, Ic. 5(1) : 10. t. 1681. 1851. **Pl. 83, Figs. 1-2.**

Herbs. *Stem* short, 7-13 cm long, thick, sheathed. *Leaves* many, alternate, distichous, 4.5-13.0 × 10.8-1.4 cm, linear-oblong, conduplicate, apex unequally bilobed, recurved. *Inflorescence* panicles, axillary, 12-22 cm long, scape with 3 or 4 sterile sheathing bracts, lateral branches short. *Flowers* small, pale red, faintly fragrant. *Bracts* minute, ca 1 mm long, persistent. *Dorsal sepal* ca 3.0 × 1.7 mm, ovate-lanceolate, obtuse, concave. *Lateral sepals* 3-4 × ca 2 mm, obliquely lanceolate, obtuse, more or less concave, median nerve thickened into a subterminal cusp. *Lateral petals* ca 2.5 × 1.2 mm, ovate, obtuse, one-nerved. *Lip* ca 4.5 × 2.0 mm, ligulate, entire, porrect, margins up-curved. There is a conspicuous, longitudinal median callus at base, concave, 2-spurred; spurs conical, inflexed, ca 2.5 mm long. *Column* stout with thick margins. *Fruits* pyriform, ca 1.5 cm long, with marcescent perianth.

Flowering & Fruiting : July.

Beddome s. n. (MH Acc. No. 51060), Nilgiris; *Subba Rao* 41586, near Kambatti, Alt. ca 1600 m.

41. GASTROCHILUS D. Don

Gastrochilus acaulis (Lindl.) Kuntze, Rev. Gen. Pl. 2 : 661. 1891. *Cleisostoma acaulis* Lindl., Gen. & Sp. Orch. 227. 1833. *Saccolabium acule* (Lindl.) Hook. f., Fl. Brit. Ind. 6 : 61. 1890. **Pl. 83, Figs. 4-7.**

Dwarf plant with wiry roots. *Leaves* alternate, distichous, 5.5-18.0 × 0.7-1.8 cm, flat, linear-oblong, narrow, sheathing and articulate at base, apex unequally bilobed. *Inflorescence* corymbose, lateral, shorter than leaves, 1.5-4.0 cm long, peduncle short with bracts. *Flowers* many, green with pink patches. *Bracts* 3.0-3.5 × 2.0-3.0 mm, broadly ovate, concave, obtuse. *Ovary* with pedicel ca 1.1 cm long. *Perianth* thick and fleshy. *Dorsal sepal* ca 6.7 × 0.3 mm, oblong-oblancheolate, obtuse, concave. *Lateral sepals* 6 × 3 mm, oblong-oblancheolate, obtuse, concave, more or less ridged on the dorsal side. *Lateral petals* ca 6 × 3 mm, oblong-obovate, cuneate, obtuse. *Lip* adnate to the base of the column, gibbous, 5-6 mm long up to the tip of the midlobe, thick, fleshy, with rounded margin, retuse at tip, with submarginal, narrow, semilunar, irregularly erose, reflexed, flap like apical lobe; apical lobe 4.0-5.0 × 1.2-3.0 mm. There is an erect, ovate-oblong callus at the bottom. *Fruits* ellipsoid, ca 2.6 cm long with pedicel, winged, with marcescent perianth.

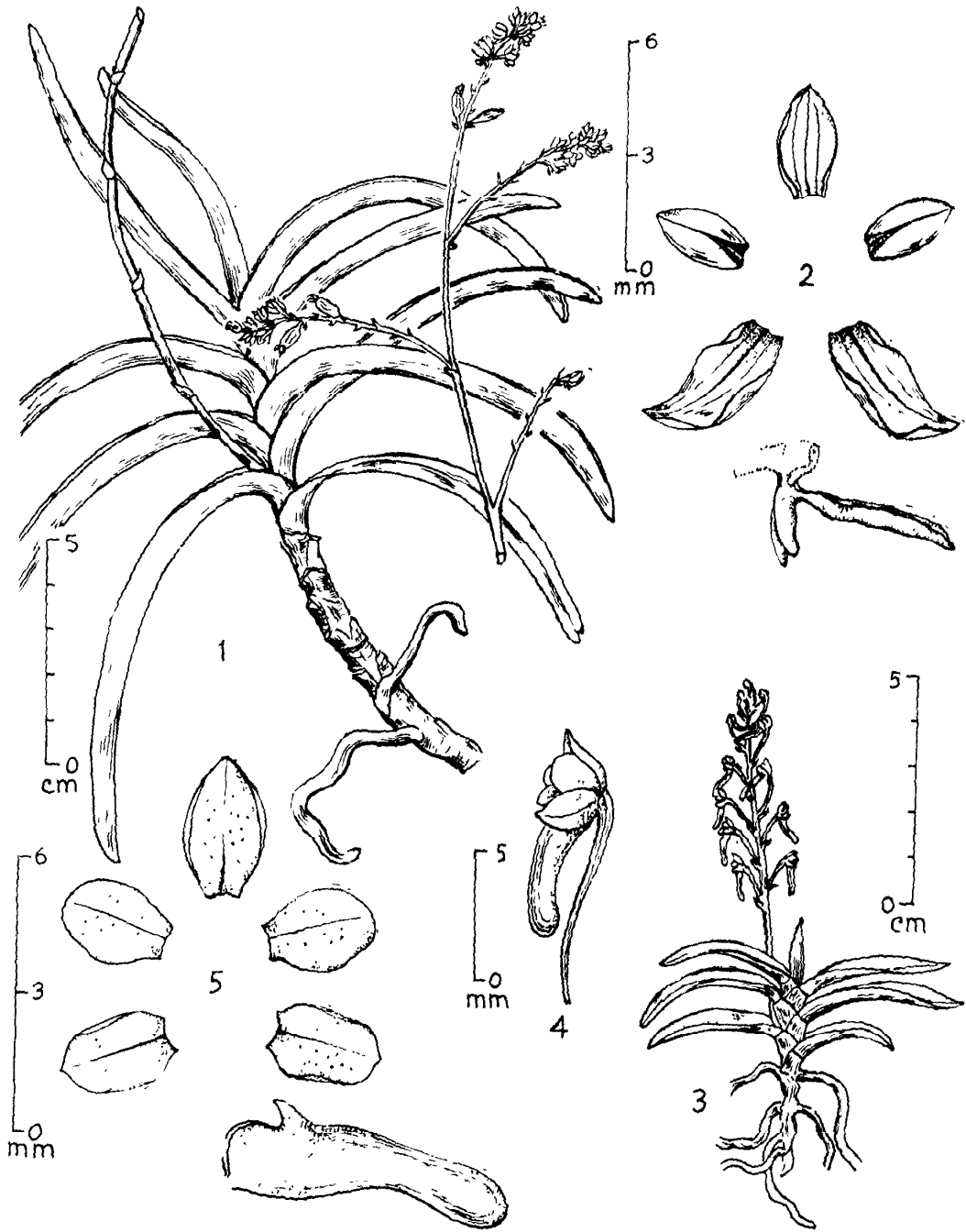


PLATE 84

Fig. 1-2. *Diplocentrum recurvum* Lindl. 1. Habit, with detached inflorescence. Figs. 3-5. *Robiquetia Josephiana* Manilal & Sathish; 3. Habit; 4. Flower (lateral view); 5. Sepals, Petals and Lip.

Flowering : January, May. *Fruiting* : September, November.

Shrma 36093; *Vajravelu* 38264, 39643, 42885. Fairly common : Kanavari R.F., Kilkotagiri, Kodanad, Erumadu, Cherambdi forest; Alt. 875–1700 m.

42. ROBIQUETIA Gaud.

Robiquetia josephiana Manilal & Sathish in Orch. Rev. 92 (1901) : 293. 1984.

Saccolabium roseum sensu Joseph in J. Ind. Bot. Soc. 41 : 297. 1962, *non* Lindl. 1833. *Malleola rosea auct. non* (Lindl.) Schltr. 1903 : Joseph, Orch. Nilgiris 125. 1982. **Pl. 84. Figs. 3–5.**

Small herbs with white flowers, 3.5–8.0 cm tall with inflorescence. Roots many, thick. *Leaves* alternate, distichous, 1.0–4.5 × 0.4–0.5 cm, linear, thick, oblique and acute at tip, articulate at base, grooved along the dorsal side. *Inflorescence* racemes, 3.5–7.5 cm long, longer than leaves, erect, extra-axillary, scape with 1 or 2 sterile bracts. *Flowers* white, spur purplish pink. *Bracts* minute, 1–2 mm long, lanceolate, acuminate. *Ovary* with pedicel *ca* 0.8–1.0 cm long. *Dorsal sepal* *ca* 3 × 2 mm, ovate, concave, obtuse, gland-dotted, 1-nerved. *Lateral sepals* *ca* 2.5 × 1.5–1.9 mm, subequal with the dorsal, oblong-ovate, obtuse, gland-dotted, 1-nerved. *Lateral petals* *ca* 2.5 × 1.7 mm, ovate-orbicular, obtuse-rounded, gland-dotted, 1-nerved. *Lip* trilobed, side-lobes rounded 1.0 × 1.2 mm, midlobe a triangular tooth, *ca* 0.5 mm long, slightly incurved. *Spur* *ca* 5.2–7.0 mm long, infundibuliform, laterally compressed, constricted, naked inside.

Flowering : October–November.

Ellis 43312; *Joseph* 17477, Naduvattam; Alt. 1300–1600 m.

43. THRIXSPERMUM Lour.

Thrixspermum musciflorum Rao & Joseph var. *nilagiricum* Joseph & Vajravelu in Indian Forester 107(10) : 648. 1–5. 1981.

Pl. 85, Figs. 1–5.

Small, erect herbs *ca* 1.5 cm high, in clusters or not. Roots many, very long, slender, well appressed and twining on the twigs. *Leaves* 1.7–11.0 × 0.2–0.4 cm, subterete, 3–7, distichous, equitant, jointed at base, channelled on the upper side, acute at tip. *Inflorescence* 1.8–12.5 cm long, 2–4 per plant, erect with long scape; flowers restricted to the apex in a condensed spike, usually longer than the leaves, axillary, from the lower nodes. *Scape* strict, slender, cylindrical, swollen towards the top. *Spikes* 2–8 mm long (rarely forked), elongating slightly during fruiting. *Bracts* *ca* 2 × 1 mm, ovate-triangular, thin and acute at tips, thick at base, setaceous, more or less crowded at apex, persistent, many, sterile. *Flowers* *ca* 1.2 cm across, a few, white with blotches on the lip, blossoming one at a time in the morning and closing in the evening, lasting for a day, sessile. *Ovary* very short, 3–7 mm long, sessile, elongating remarkably

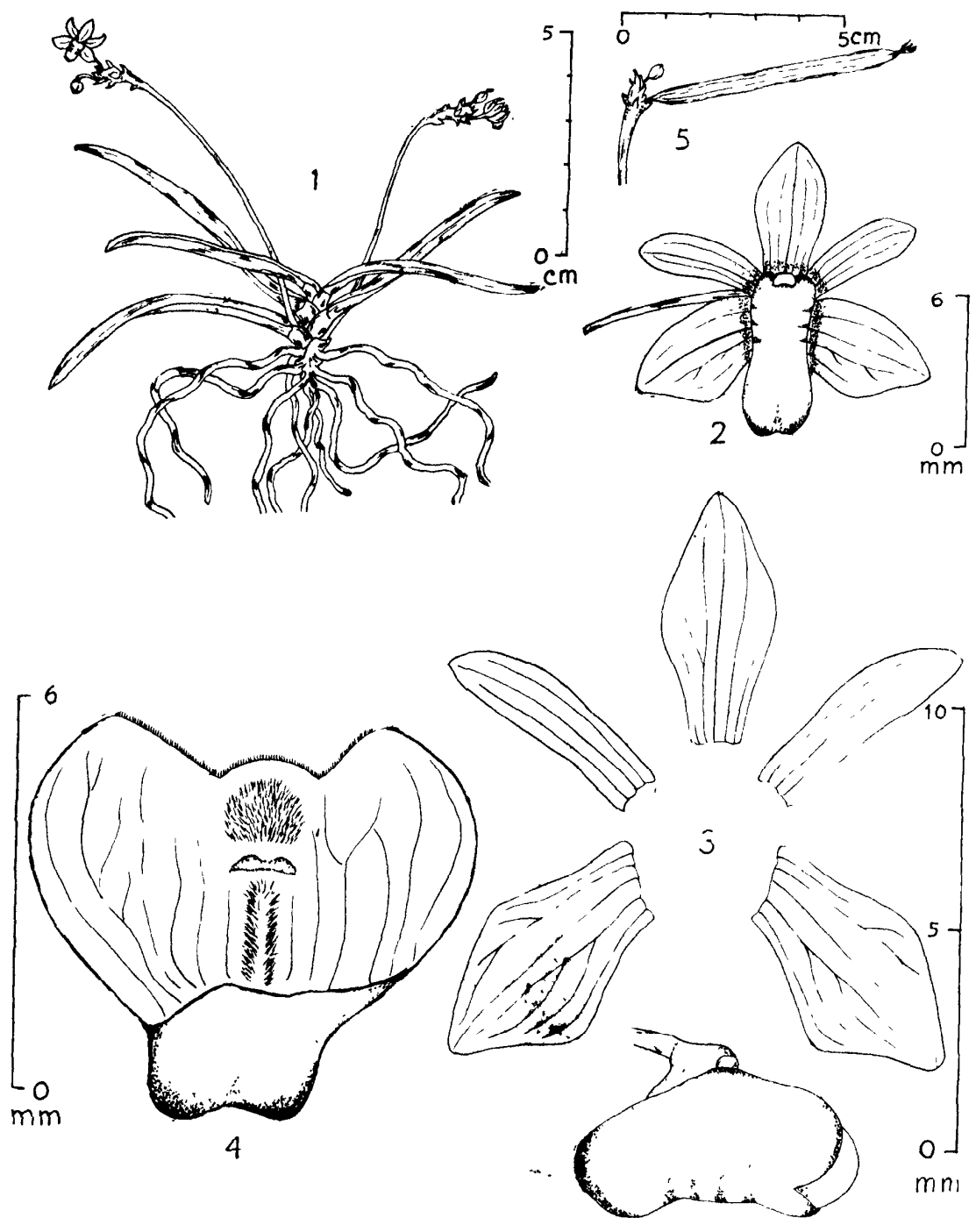


PLATE 85

Fig. 1-4. *Thrixspermum musciflorum* var. *nilagiricum* Joseph et Vajravelu 1. Habit; 2. Flower; 3. Sepals, Petals and Lip; 4. Lip (Spread out); 5. Fruit.

after anthesis. *Sepals* and petals sparsely gland-dotted, spreading. *Sepals* subequal, white; 5-nerved. *Dorsal sepal* 5.5–6.0 × 2.5–3.0 mm, broadly elliptic, obtuse, little narrower than the lateral. *Lateral sepals* 5.0–5.5 × 2.7–3.5 mm, broader and as long as or little shorter than the dorsal sepal, obliquely ovate, obtuse-acute. *Lateral petals* 5.0–5.5 × 1.2–2.0 mm, narrowly oblanceolate-ligulate, about half as broad as the dorsal sepal, sparsely gland-dotted, 3-nerved. *Lip* 6.0–7.5 mm long from spur to the tip, ca 3 mm broad at the sides, gibbous, conspicuous, held vertically, 3-lobed, spurred, pinkish brown bands on the sides of the spur and yellow blotches at the bottom of it, glandular hairy along the median zone. There is an erect median horizontal small callus (1 mm across) having a shallow sinus, at the mouth of the spur also a prominent longitudinal median ridge from this callus running down up to the bottom of spur; this ridge beset with long erect gland-tipped hairs; sidelobes 2.0–2.5 mm broad, erect, auricular; midlobe obsolete, narrow, forming a rim, inflexed; margins orange yellow, fringed with short glandular hairs; *spur* short, broader than long 2.0–2.5 × 3.0–3.5 mm or didymous, scrotiform, yellow blotches at the bottom and also pinkish horizontal bands on the sides within and also with a few blotches on the wall towards the mouth. Pollinia 4, in 2 pairs with elastic caudicles. *Fruits* 1.5–6.0 × 0.2–0.3 cm, elongate, narrow, beaked with marcescent perianth, triquetrous, subsessile.

Flowering & Fruiting ; June-September.

Joseph 39282; *Vajravelu* 44950 : Ronning town forests ; Alt. ca 500 m.

The occurrence of this genus in South India is established for the first time through this variety.

44. COTTONIA Wight

Cottonia peduncularis (Lindl.) Reichb. f., in Cat. Orch. Schiller. 52. 1857; Sant. & Kapad., Orch. Bombay 222. 1966 *Vanda peduncularis* Lindl., Gen. & Sp. Orch. 216. 1833. *C. macrostachya* Wight Ic. 5(1) : 21. t. 1755. 1852; Hook. f., Fl. Brit. Ind. 6 : 26. 1890; Fischer in Fl. Pres. Madras 1439. 1928 (Repr. ed. 3 : 1006. 1957). **Pl. 86. Figs. 1–4.**

Herbs. *Stem* 10–15 cm long, sheathed. *Leaves* alternate, distichous, 7.0–14.0 × 0.9–1.3 cm, linear, keeled, unequally cleft at apex, sheathing and articulate at base. *Inflorescence* erect panicles, much longer than leaves, sparsely branching, fruiting axis 63–77 cm long, with tubular bracts at intervals. *Flowers* restricted to the apex of the branches of peduncle. *Flowers* light yellow with maroon shade. *Bracts* minute, ca 1.5 mm long, ovate, obtuse. *Ovary* with pedicel ca 1.4 cm long. *Perianth* strongly reflexed over the ovary, fleshy. *Dorsal sepal* ca 9.0 × 4.5 mm, obovate-oblanceolate, concave on the upper half, obtuse, with recurved apex. *Lateral sepals* ca 8 × 5 mm, obovate-oblong, concave, obtuse, reflexed at the tip, 5-nerved, with prominent median nerve. *Lateral petals* ca 8.0–9.0 × 3.5–4.0 mm, oblanceolate-spathulate, obtuse, uneven at margin towards the apex. *Lip* ca 1.4 cm long, fleshy porrect, with upturned

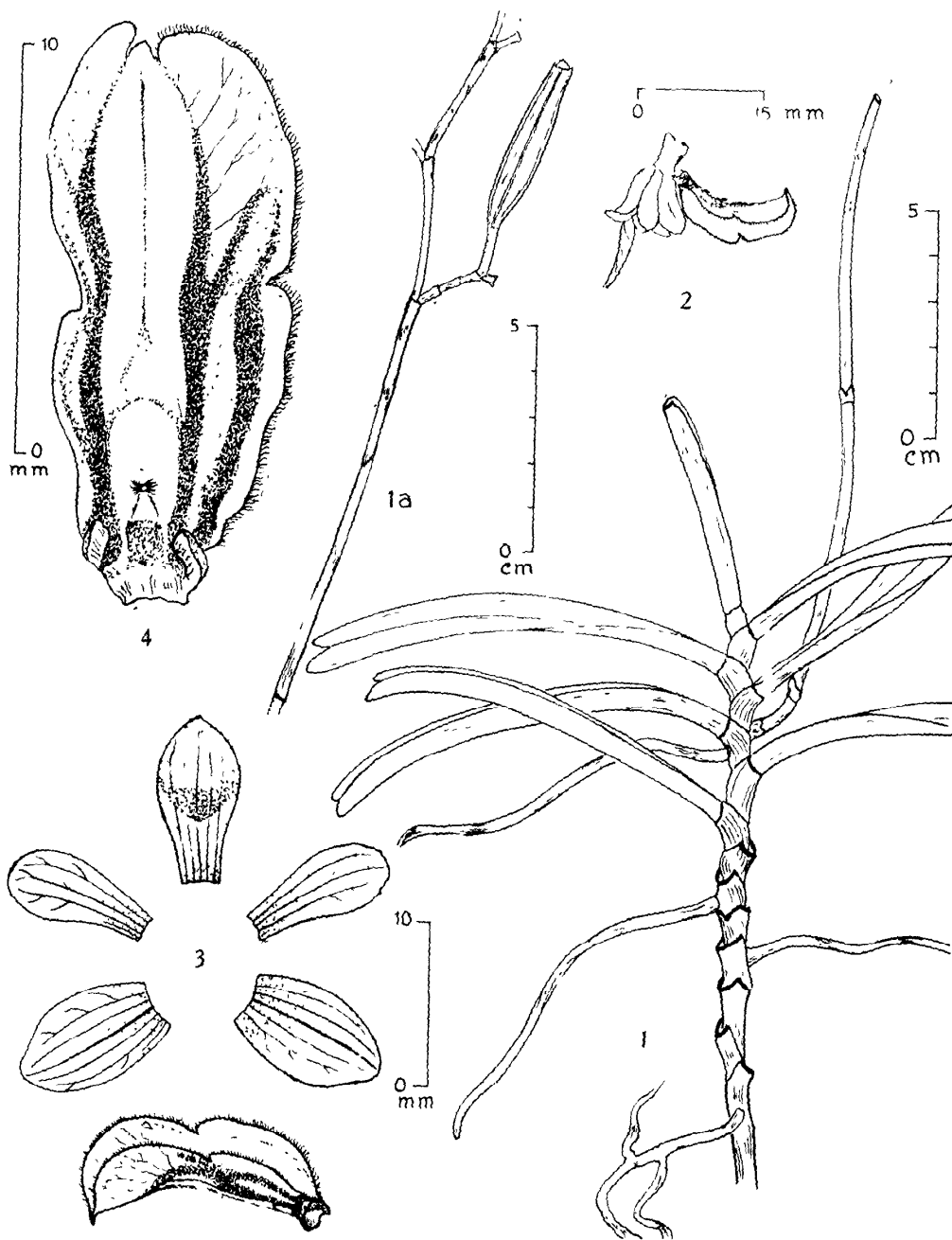


PLATE 86

Fig. 1-4. *Cottonia peaucularis* (Lindl.) Reichb. f. 1. Habit; 1a. Infructescence; 2. Flower (side-view); 3. Sepals, Petals and Lip (side-view); 4. Lip (Spread out)

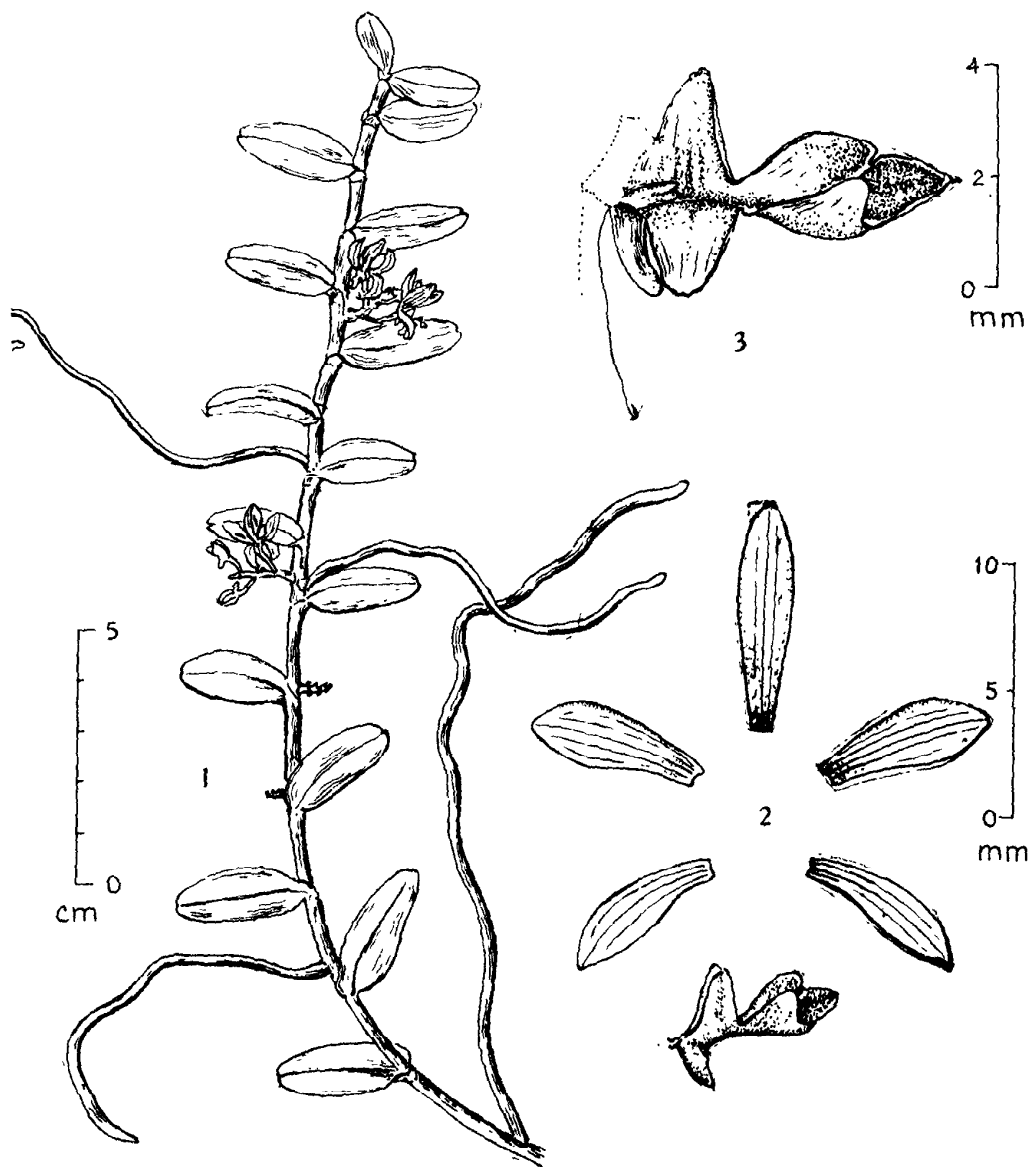


PLATE 87

Fig. 1-3. *Trichoglottis tenera* (Lindl.) Schltr. 1. Portion of the stem; 2. Sepals, Petals and Lip (side-view); 3. Lip with one side lobe bent out.

upper half, obscurely 3-lobed with 2 auricular, erect, calli at the base; concave at the base, roofed by slightly projecting callus; on the callus, there is an erect penicillate stump at the base; margins curved downwards, shortly villous. There are longitudinal maroon streaks on either side of the median glabrous zone; streaks puberulous. Midlobe with a broad sinus and a triangular mucro in the centre. *Column* 5 × 4 mm, stout, angled towards apex, puberulous. *Fruits* ca 7 cm long, narrow, ridged.

Flowering : March. *Fruiting* : July.

Vajravelu 41780, Gudalur-Killur; Alt. ca 800 m.

45. TRICHOGLOTTIS Bl.

Trichoglottis tenera (Lindl.) Schltr. in Bull. Herb. Boiss. Ser. 2.6 : 471. 1906. *Oeceoclades tenera* Lindl., Gen & Sp. Orch. 236. 1833; Wight, Ic. 5(1) : 10. t. 1683. 1851. *Oeonia alata* A. Rich. in Ann. Sci. Nat. Ser. 2.15 : 67. t. 11. 1841. *Cleisostoma tenerum* (Lindl) Hook. f., Fl. Brit. Ind. 6 : 73. 1890; Fyson Fl. Nilgiri & Pulney Hill-tops 3 : 111. t. 516. 1920; Fischer in Pres. Madras 1448. 1928. (Repr. ed. 3 : 1012. 1957);

Pl. 87. Figs. 1-3.

Stem scandent, slender, about 30 cm long, with very long wiry aerial roots. *Leaves* alternate, distichous, 1.5-5.0 × 0.7-1.5 cm, bifarious, oblong, obtuse or notched at tip. *Inflorescence* extra axillary, flowers few (3 or 4) on short stout peduncle. *Flowers* greenish with yellow shade. *Bracts* very small, ca 1 mm long, ovate, acute. *Ovary* with pedicel ca 6 mm long. *Dorsal sepal* 9.0-9.7 × 2.2-3.0 mm, oblanceolate, obtuse. *Lateral sepals* 7.0-8.0 × 1.9-2.5 mm, oblanceolate-elliptic, subfalcate, obtuse-subacute. *Lateral petals* 7.0-8.0 × ca 2.5 mm, oblanceolate, obtuse. *Lip* trilobed, ca 7 mm long, 6 mm broad across sidelobes; sidelobes conical, large, obtuse or erose at tip, midlobe fleshy, ca 4 mm long, trilobulate, lateral lobules more or less rounded, midlobule broadly lanceolate, more fleshy, narrowly winged on the lower side. There is a large median forked callus or lamella at the base of the tip. *Spur* conical, ca 2 mm long, septate within. *Fruits* ellipsoid, winged, ca 3.2 cm long.

Flowering : April & May. *Fruiting* : March-May, August, October, December.

Deb 31622; *Ellis* 38466, 43327; *Rathakrishnan* 38072; *Shetty* 37579 : Naduvattam-Gudalur forest, Carriott shola, Avalanche; Alt. 1700-2000 m.

46. VANDA R. Br.

1a. Stem long, slender, scandent; leaves scattered, obscurely unequally cleft or emarginate at the tip ...

1. *V. spathulata*

1b. Stem short, erect, caespitose : leaves crowded, praemorse at the tip

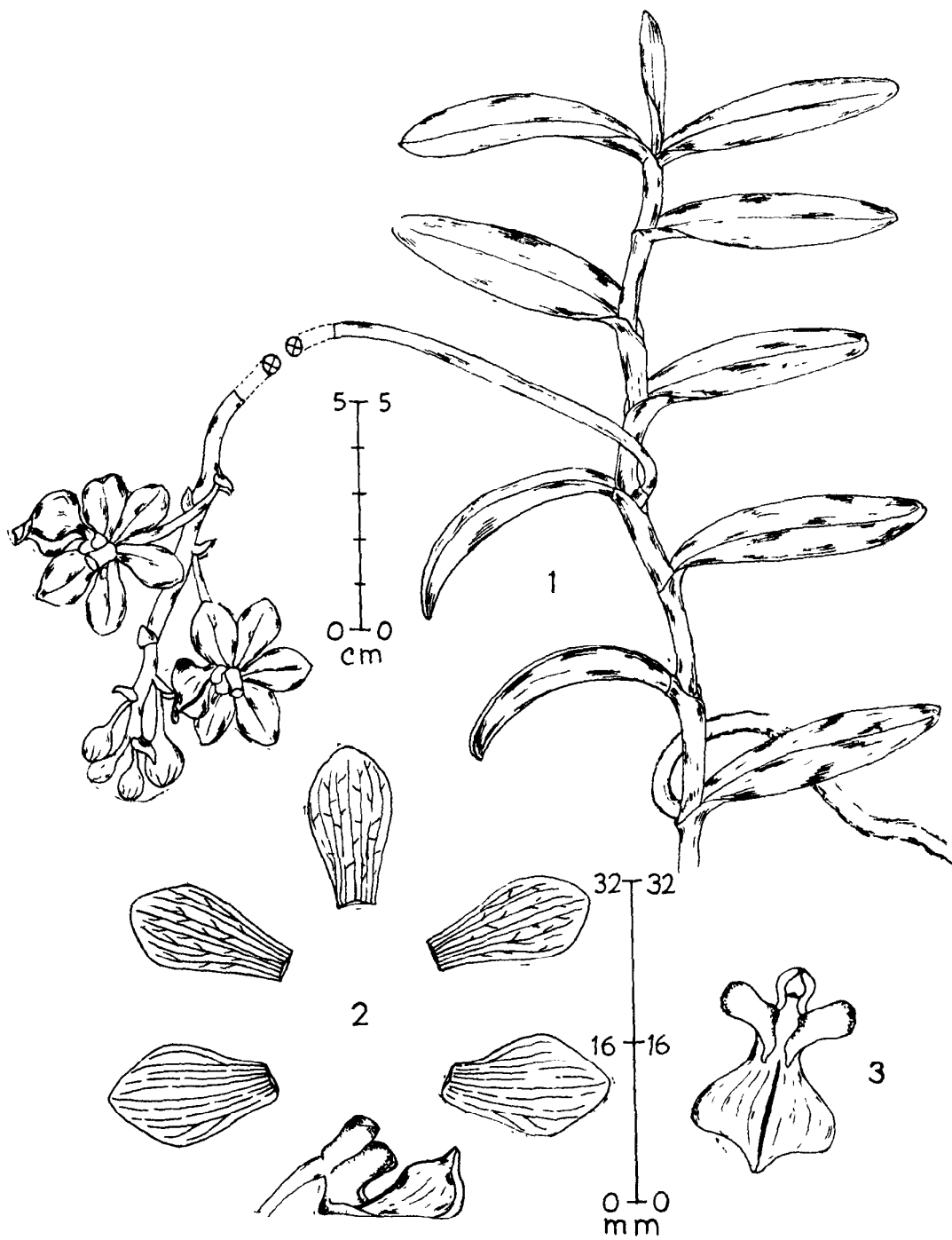


PLATE 88

Fig. 1-3. *Vanda Spathulata* Spreng. 1. Habit; 2. Sepals, Petals and Lip (side-view); 3. Lip (Front view).



PLATE 89

Fig. 1-2. *Vanda tessellata* (Roxb.) Hook. ex G. Don. 1. Habit; 2. Sepals, Petals and Lip (lateral view).

- 2a. Flowers large, *ca* 5 cm across ; perianths strongly wavy along the margin ; spur conical, papillose within ... 2. *V. tessellata*
- 2b. Flowers small, *ca* 1.2 cm across ; perianths not wavy; spur short, vermiform at tip, naked within ... 3. *V. testacea*

1. ***Vanda spathulata*** (L.) Spreng., Syst. Veg. 3 : 719. 1826 ; Wight, Ic. 3(2) : 10. t. 915. 1844 ; Fischer in Fl. Pres. Madras 1444. 1928 (Repr. ed. 3 : 1010. 1957). *Epidendrum spathulatum* L., Sp. Pl. 952. 1753. **Pl. 88, Figs. 1-2.**

Long, scandent epiphytes (more than 1 metre) with long, wiry, ashy brown aerial roots along the stem. *Leaves* alternate, distichous, scattered, 3.7-8.0 × 1.11-8 cm, linear-oblong, une-qually slightly cleft at tip or emarginate. *Inflorescence* long racemes, *ca* 39 cm long, leaf opposed. *Flowers* few, restricted to the apex, yellow, long pedicellate. *Bracts* 4-6 × 4-5 mm, broadly ovate, obtuse. *Ovary* with pedicel 2.3-3.4 cm long. *Dorsal sepal* 1.6-17 × 10-11 mm, oblanceolate, slightly oblique at base, obtuse. *Lateral petals* 15-18 × 9-10 mm, oblanceolate-spathulate, obtuse. *Lip* trilobed, 17 mm long from the tip of the spur to the tip of the midlobe ; sidelobes much smaller than midlobe, erect *ca* 8 mm long, *ca* 5 mm broad at base ; midlobe porrect, 1.1 × 1.5 cm, flabellate, thick, obscurely trilobulate, abruptly narrowed to-wards the base into a short claw. *Spur* very short, conical *ca* 2 cm long, naked inside. *Young fruits* oblongfusiforms, *ca* 4 cm long (pedicel *ca* 3.5 cm long), ribbed, with marcescent perianth.

Flowering : July. *Vajravelu* 46358, upper Geddhai Alt. *ca* 1050 m.

V. tessellata (Roxb.) Hook. ex G. Don in Loud. Hort. Brit. 372. 1830 ; Fischer in Fl. Pres. Madras 1445. 1928 (Repr. ed. 3 : 1010. 1957) ; Sant. & Kapad., Orch. Bombay 220. t. 51. 1966. *Epidendrum tessellatum* Roxb., Cor. Pl. 1 : 34 t. 42. 1795. *Vanda roxburghii* R. Br. in Bot. Reg. 6. t. 516. 1822 ; Wight Ic. 3(2) : 10. t. 916. 1844 ; Hook. f., Fl. Brit. Ind. 6 : 52. 1890.

Pl. 89, Figs. 1-2

Stem *ca* 30 cm high erect, thick, sheathed. *Leaves* alternate, distichous, 9.0-17.0 × 1.2-2.6 cm, linear, keeled, articulate at base, praemorse at tip, coriaceous. *Inflorescence* racemes axillary, longer than leaves, 15-25 cm long, upto 10-flowered, zigzag, scape stout, erect, with 4 or 5 sterile sheathing bracts. *Flowers* large, *ca* 5 cm across, yellowish green, with bluish tinge, scented. *Bracts* *ca* 3 × 5 mm, suborbicular, obtuse. *Ovary* with pedicel *ca* 4.5 cm long ; ovary narrowly 6-winged. *Perianths* strongly wavy, leathery, many nerved, median nerve conspicuous on the external surface. *Dorsal sepal* *ca* 2.6 × 1.5 cm, oblong, obtuse. *Lateral sepals* *ca* 2.7 × 1.5 cm, oblong, obtuse. *Lateral petals* *ca* 2.3 × 1.3 cm, oblong, shorter than sepals, obtuse. *Lip* shorter than the perianths, yellow, with pink midlobe, trilobed, spurred, *ca* 9 mm broad across the sidelobules ; deflexed, sulcate dorsally ; midlobule solid, short *spur* *ca* 7 mm long, conical, papillose with. *Fruit* 4.5-11.0 cm long (pedicel 1.5-3.5 cm long), oblong, winged, with marcescent perianths.

Flowering : June. *Fruiting* : June, November.

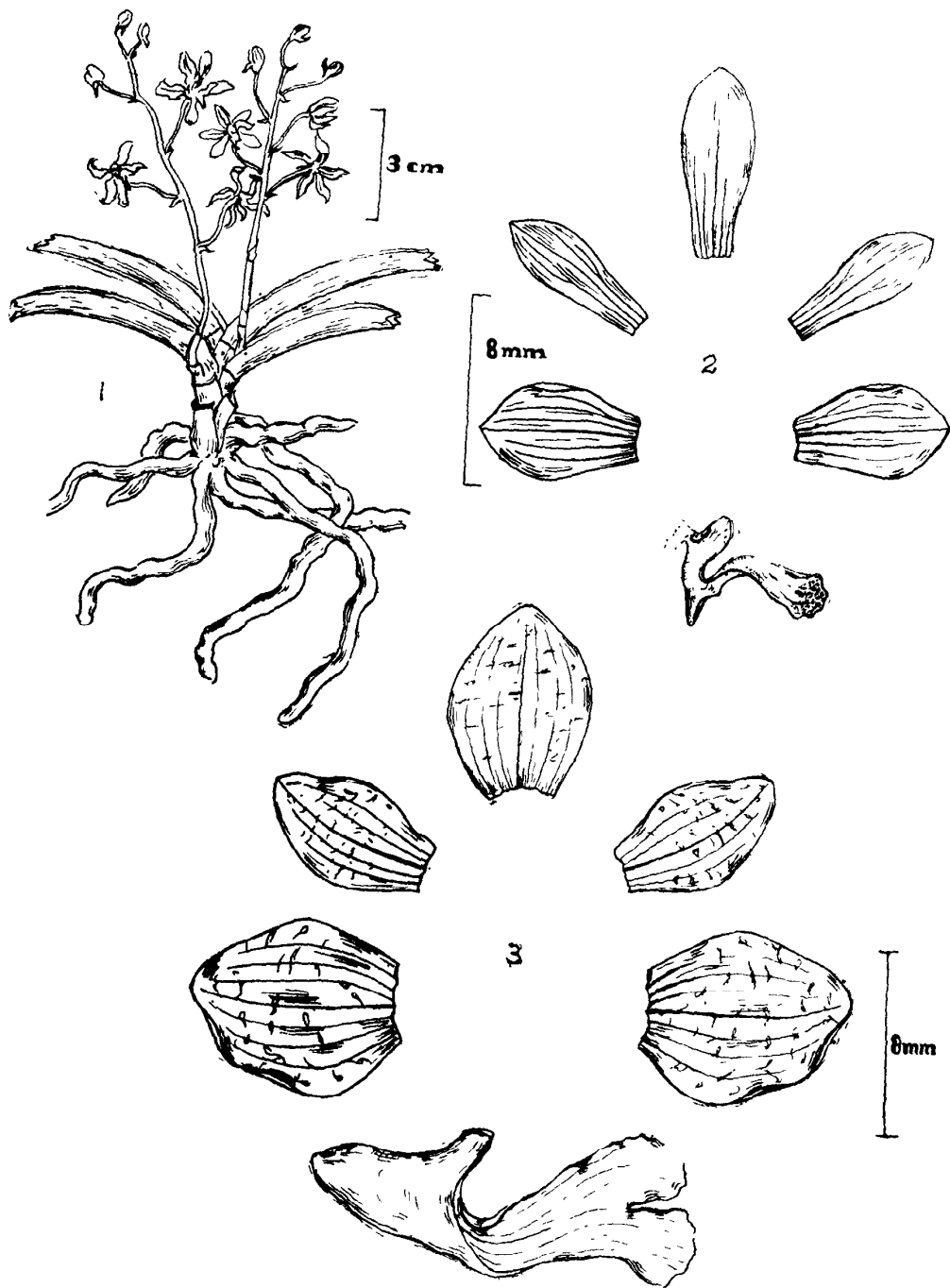


PLATE 90

Fig. 1-2. *Vanda testacea* (Lindl.) Reichb. f. 1. Habit; 2. Sepals, Petals and Lip (lateral view). Figs 3. *Rhynchostylis retusa* (L.) Bl.-Sepals, Petals and lip.

Lawson s. n (MH Acc No 50577), Doddabetta; *Vajravelu* 36736, 45035, Thengumarada, Parali forest; Alt. ca 500 m.

V. testacea (Lindl.) Reichb. f. in Gard. Chron. 2 : 166. 1877; Sant. & Kapad., Orch. Bombay 219. 1966. *Aerides testaceum* Lindl., Gen. & Sp. Orch. 238. 1833. *V. parviflora* Lindl. in Bot. Reg. 30. (misc); 45. 1844; Wight Ic. 5(1) : 8. t. 1669. 1851; Hook. f., Fl. Brit. Ind. 6 : 50. 1890; King & Pantl. in Ann. Roy. Bot. Gard. Cal. 8 : 215. t. 236. 1898; Fischer in Fl. Pres. Madras 1444. 1928 (Repr. ed. 3 : 1010 : 1957). **Pl. 90, Figs. 1-2.**

Stem 3–22 cm long, thick, sheathed. *Leaves* alternate, distichous, 2.5–25.0 × 0.8–1.7 cm, linear, keeled, praemorse at tip, sheathing and articulate at base, coriaceous. *Inflorescence* racemes, 2 or more per plant, axillary, erect, 0.7–12.0 cm long, fruiting axis elongates (7–41 cm), scape thick, terete with few sterile sheathing bracts. *Flowers* yellow, long pedicellate. *Bracts* small, ca 2 × 2 mm, ovate, acute. *Ovary* with pedicel ca 1.5 cm long. *Dorsal sepal* 8 × 3 mm, oblong-oblongate, obtuse. *Lateral sepals* ca 6.5 × 4.0 mm, obovate, obtuse. *Lateral petals* ca 7.0 × 2.5 mm spatulate-oblongate, obtuse. *Lip* trilobed, reflexed, spurred; sidelobes erect, ca 2.0 × 1.5 mm, falcately ovate-lanceolate, outer margin of the lateral lobes much longer than the inner margin, midlobe oblong-ligulate, ca 5 × 2 mm, thick, 2–ridged on the dorsal side, warty, apex dilated, truncate or retuse or obscurely lobulate, crenulate. *Spur* short, ca 2 mm long, projecting into vermiform tip. *Column* short, ca 2 mm long. *Fruits* oblong-fusiform, ca 6 cm long with pedicel, winged.

Flowering : March-May. *Fruiting* : February-August.

Rathakrishnan 37969; *Sharma* 35452, 39869; *Subba Rao* 36175, 40534; *Vajravelu* 38335, 43576, 44992; *Vivekananthan* 40786. Common : Moyar bank, Bokkapuram R.F., Avarihalla R.F., Anakatty, Iduhatti, Kunjapanai, Nellithorai slopes, Karkudi; Alt. 400–1900 m.

V. wightii Reichb. f. in Walp. Ann. 6 : 54–1890; Fischer in Fl. Pres. Madras 1445. 1928 (Repr. ed. 3 : 1010. 1957).

This species could not be collected either from Nilgiris or from neighbouring areas, even though it is reported to have been collected from Nilgiris by Wight. Hooker deals it under the group unknown to him. Fischer deals with it giving the following characters by which it is distinguished from the allied ones.

Leaves narrowly ligulate, unequally, acutely 2-lobed, more than 30 cm long; scapes few-flowered; sidelobes of lip subquadrate; midlobe broadly ovate, obtusely 2-lobed, disk with 2 thick ridges, pilose at the base of the ridges and sidelobes; spur conical, column slender for the genus.

47. RHYNCHOSTYLIS Blume

Rhynchostylis retusa (L.) Bl., Bijdr. 286. t. 49. 1825; Hook. f., Fl. Brit. Ind. 6 : 32. 1890; King & Pantl. in Ann. Roy. Bot. Gard. Cal. 8 : 213. t. 284.

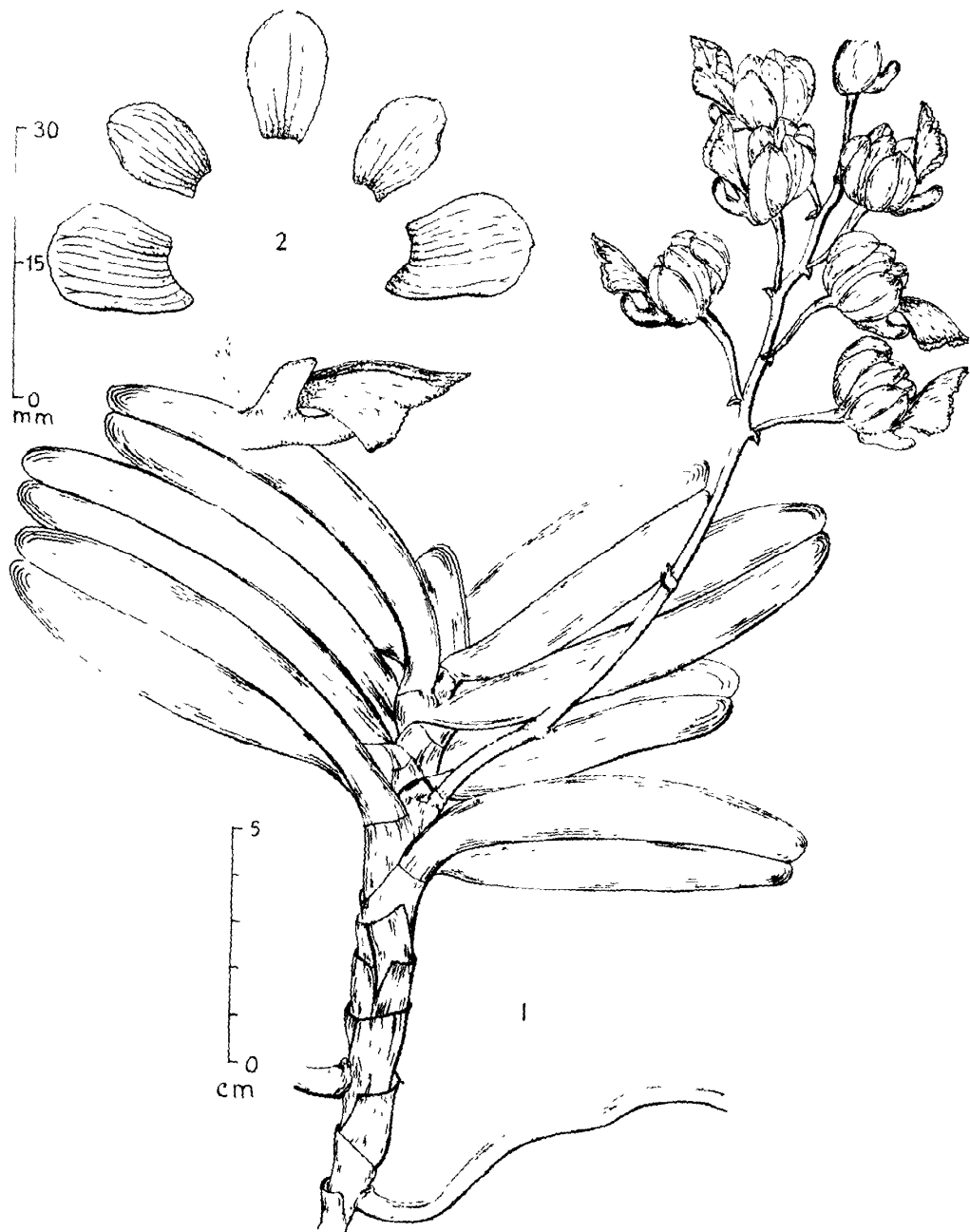


PLATE 91

Fig. 1-2. *Aerides crista* Lindl. 1. Habit; 2. Sepals, Petals and Lip.

1898; Fischer in Fl. Pres. Madras 1440. 1928 (Repr. ed. 3 : 1007. 1957); Sant. & Kapad. Orch. Bombay 211. 1966. *Epidendrum retusam* L., Sp. Pl. 953. 1753. *Saccolabium guttatum* Lindl., Gen. & Sp. Orch. 220. 1833; Wight, Ic. 5(1) : 19. t. 1745-6. 1852. **Pl. 90, Fig. 3.**

Stout herbs, with long, thick spreading roots. *Stem* 11-20 cm long, woody, covered by persistent sheathing bases of the fallen leaves. *Leaves* alternate, distichous, 15.5-19.0 × 1.8-3.0 cm, dense, linear, praemorse at apex, more or less conduplicate, articulate and sheathing at base. *Inflorescence* long, drooping racemes, 32-41 cm long, axillary, scape with 4 or 5 sterile sheathing bracts. *Flowers* large, dense, pinkish. *Bracts* 4-5 × 3-4 mm, ovate-lanceolate, acute at tip, persistent. *Ovary* with pedicel 1.2-1.5 cm long. *Dorsal sepal* ca 8 × 6 mm, suborbicular, obtuse, 5-7 nerved. *Lateral sepals* ca 9.0 × 7.5 mm, larger than the dorsal, obliquely ovate, obtuse, faintly 5-7 nerved. *Lateral petals* ca 7.5 × 4.5 mm, ovate-elliptic, obtuse, narrower than the sepals. *Lip* ca 10 × 4 mm, spurred, bent inwards, deeply cleft at tip; spur laterally compressed, large, ca 6 mm long, wide mouthed, ca 5 mm broad, pubescent within. *Fruits* ca 2 mm long, oblong-obovoid, long stalked, more or less ridged.

Flowering : April-July. *Fruiting* : August-September.

Vajravelu 41714, way to Sultan Battery; 42876, Thallur forest; Alt. 875 m.

One of the most elegant of the epiphytic orchids with long pendulous racemes

48. AERIDES LOUR.

- | | | |
|--|-----|----------------------|
| 1a. Flowers large, ca 2.5 cm across; midlobe triangular, erose; spur projecting forward below the lip, sub-cylindric | ... | 1. <i>A. crispa</i> |
| 1b. Flowers small, ca 1.3 cm across; midlobe ovate, entire; spur projecting downwards, more or less funnel shaped | ... | 2. <i>A. ringens</i> |

1. *A. crispa* Lindl., Gen. & Sp. Orch. 239. 1833; Hook. f., Fl. Brit. Ind. 6 : 45 1890; Fyson, Fl. Nilgiri & Pulney Hill-tops 1 : 394 & 2 : t. 248. 1915; Fischer in Fl. Pres. Madras 1442. 1928 (Repr. ed. 3 : 1008. 1957); Sant. & Kapad. Orch. Bombay 122. 1966; *A. lindleyana* Wight Ic. 5(1) : 9. t. 1677. 1851.

Pl. 91, Figs. 1-2.

Robust, epiphytes (rarely lithophytes); velamen roots long, stout. *Stems* 10-25 cm long, clothed by bases of fallen leaves. *Leaves* 7.0-12.0 × 2.3-2.7 cm, thick, oblong, articulate and sheathing at base, unequally forked at apex. *Inflorescence* racemes, 13-38 cm long, simple, one or more per plant in the axils of the lower leaves, lax flowered; peduncle with few sterile bracts. *Flowers* pinkish white, sweet scented, long pedicellate, restricted towards the distal end. *Bracts* 3-5 × 4-6 mm, triangular-ovate, acute. *Ovary* with pedicel 1.4-2.0 cm long. *Sepals* minutely denticulate. *Dorsal sepal* ca 15 × 7 mm, oblong-oblan-

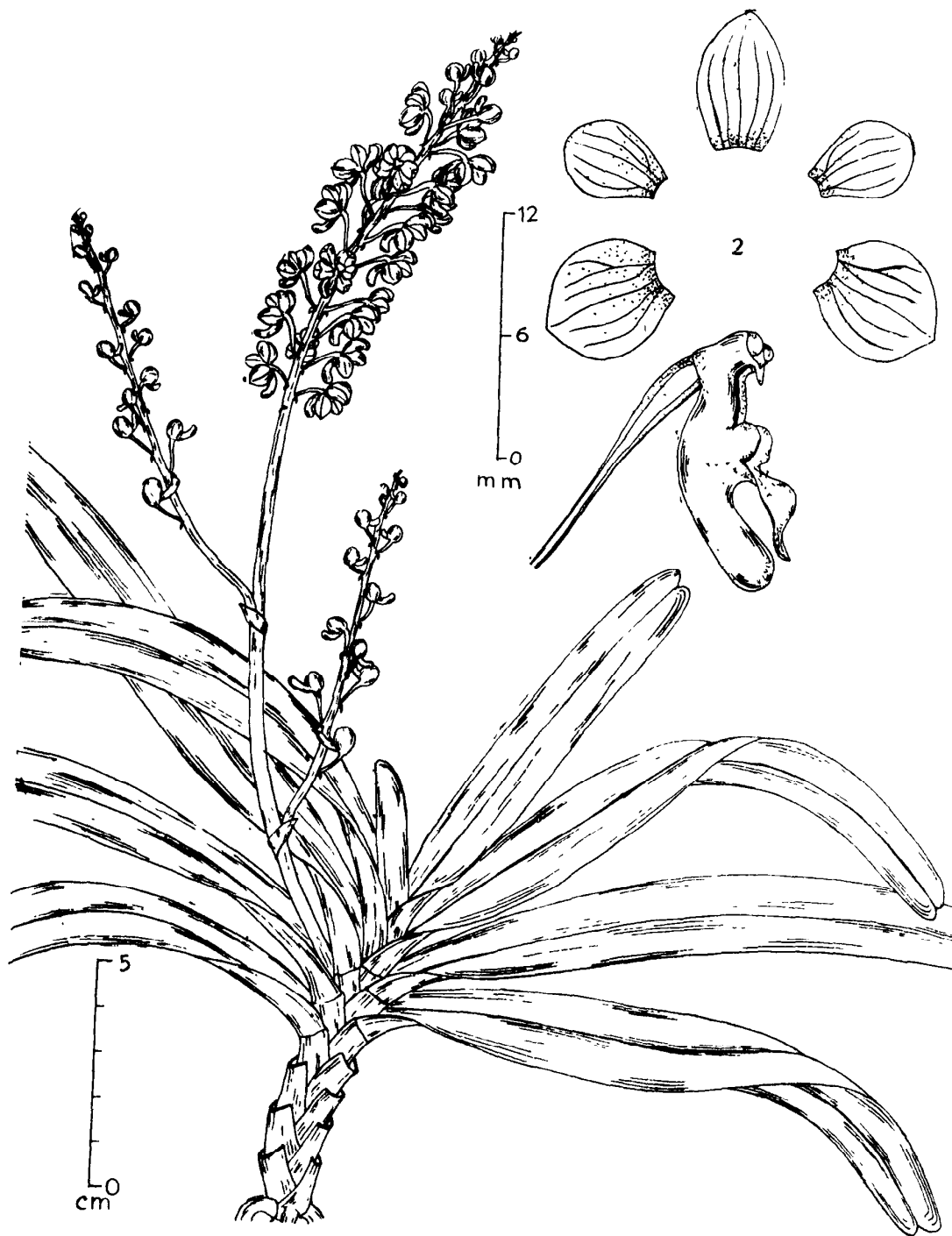


PLATE 92

Fig. 1-2. *Aerides ringens* (Lindl.) Fischer 1. Habit; 2. Sepals, Petals and Lip with column and ovary

ceolate, obtuse, 9-nerved. *Lateral sepals* ca 13.5 × 9.0 mm, obliquely oblong, obtuse, 7-nerved. *Lateral petals* ca 11.0 × 6.5 mm, obovate, slightly oblique at base, obtuse at tip, minutely denticulate along the margin, 5-nerved. *Lip* trilobed, shortly clawed, bent at the claw; lateral lobes ca 5 × 4 mm, oblong, obtuse, erect, slightly crenulate; midlobe ca 19 × 17 mm, broadly ovate, obscurely trilobulate, erose along the margin with 2 fleshy calli at the mouth of the spur. *Spur* 7 × 6 mm, projecting forward and concealed by the lip.

Flowering : April, May-November. *Fruiting* : February.

Anon. s.n. (MH Acc. Nos. 50534, 50537); *Lawson s.n.* (MH Acc. No. 50249, 50533); *Rathakrishnan* 38049; *Sebastine* 3300; *Vajravelu* 38277, 43121, 43771. Common : Avalanche, Ooty, Parkside R.F., Singara R.F. Kodanad, Choladi river-Cherambadi, Rockwood R.F. etc.; Alt. 950-2000 n,

2. *A. ringens* (Lindl.) Fischer in Bull. Misc. Inform. 1928 : 284. 1928 & in Fl. Pres. Madras 1442. 1928. (Repr. ed. 3 : 1008. 1957); Sant. & Kapad., Orch. Bombay 119. 1966. *Saccolabium ringens* Lindl., Gen. & Sp. Orch. 221. 1833. *Aerides radicata* A. Rich., Ann. Sci. Nat. Bot. ser. 2, 15 : 65. 1841; Hook. f., Fl. Brit. Ind. 6 : 46, 1890. *Saccolabium paniculatum* Wight, Ic. 5(1) : 9. t. 1676. 1851. *S. rubrum auct. non* Lindl. : Wight, Ic. 5(1) : t. 1673. 1851. *Aerides lineare* Hook. f., l. c. 1890. **P. 92, Figs. 1-2.**

Robust epiphytes, *Stem* thick with persistent sheathing base of the leaves. *Leaves* alternate, distichous, articulate and sheathing at base, 6.5-24.5 × 1.0-2.5 cm, linear, unequally cleft at apex, conduplicate, in the axils of the upper leaves, erect, rigid, lax flowered. *Peduncle* thick, terete with few sterile bracts at long intervals. *Flowers* pink or mauve, long pedicellate. *Bracts* ca 3 × 2 mm, small, triangular, acute. *Ovary* with pedicel 1.0 × -1.7 cm long. *Dorsal sepal* ca 6.5 × 40 mm, oblong, obtuse. *Lateral sepals* ca 6.0 × 5.5 mm, broader than the dorsal sepal, orbicular-obovate, attached to the sides of the foot of the column. *Lateral petals* ca 5.5 × 4.0 mm, shorter than the sepals, spreading, obovate-orbicular, obtuse. *Lip* trilobed, spurred, dark pink; sidelobes small, ca 1.5 × 2.0 mm, erect, obtuse; midlobe ovate, ca 7 × 4 mm, obtuse, with a median, ovoid, cleft callus at the mouth of the spur. *Spur* ca 6 mm long, bent forward, infundibuliform, obtuse at apex. *Fruits* ca 3 cm long, obovoid-oblong (ribbed).

Flowering : March-July. *Fruiting* : January, March, July-November.

Deb 31560, 31604 : *Ellis* 38484, 43282 : *Lawson s.n.* (MH Acc. No. 50555) : *Rangachari* 15252, 15256; *Rathakrishnan* 38051; *Sebastine* 3292; *Sharma* 35897; *Shetty* 34103; *Subramanyam* 10553; *Vajravelu* 34999, 36797, 38225, 38427, 39651, 41756, 42871, 44985; *Vivekanathan* 40385; *Wight s.n.* (MH Acc. No. 51054). Very common : Gudalur Cherambadi area, Kunnakombai, Kundha, Lakkadi, karia shola, Kodanad shola, Curzon valley; Alt. 600-2275.

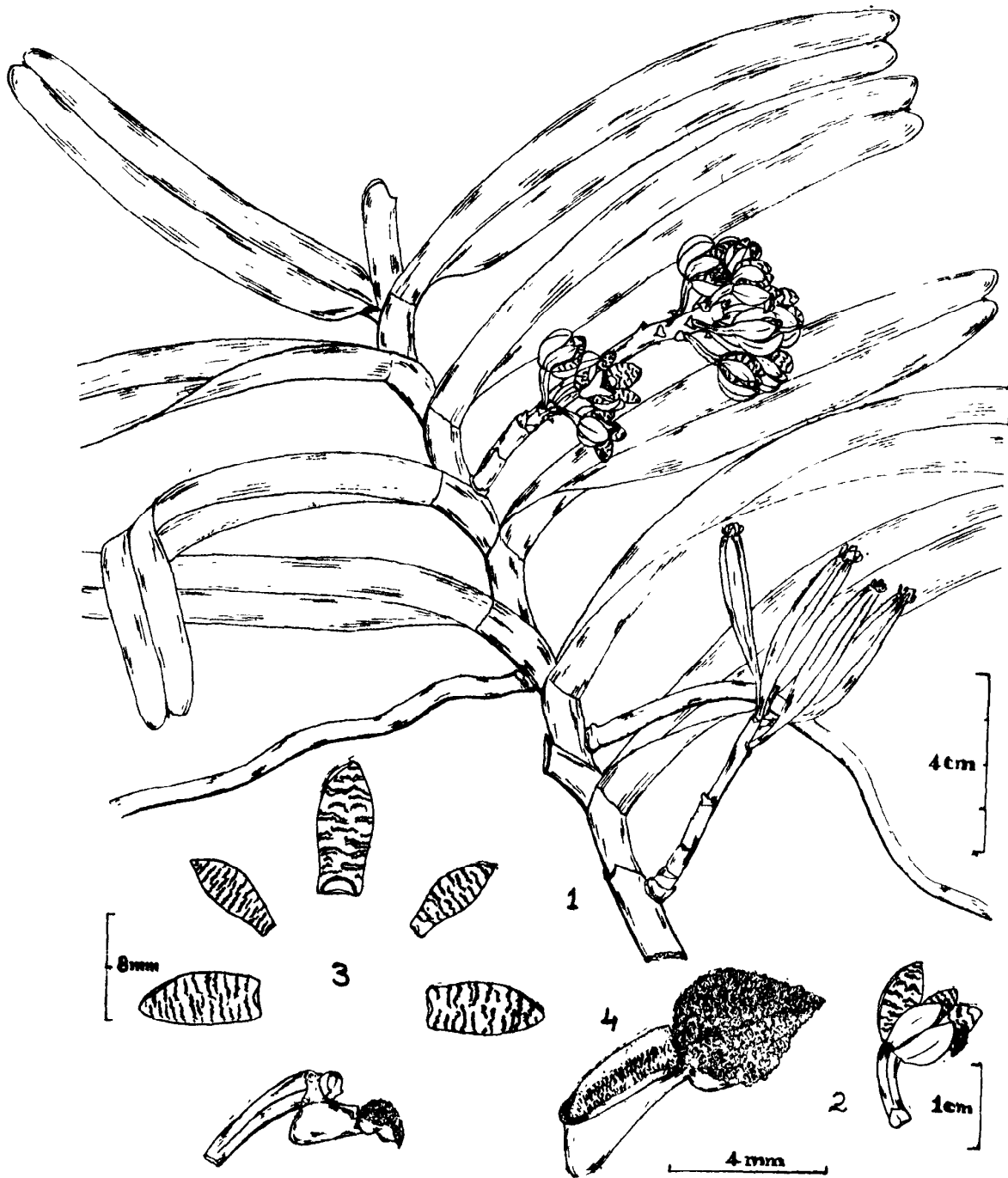


PLATE 93

Fig. 1-4. *Acampe praemorsa* (Roxb.) Blatt & McC. 1. Habit; 2. Flower; 3. Sepals, Petals and Lip with ovary and column. 4. Lip (sub dorsal view)

49. ACAMPE Lindl.

Acampe praemorsa (Roxb.) Blatt. & McC. in Journ. Bomb. Nat. Hist. Soc. 35 : 495. 1932; Sant. & Kapad., Orch Bombay 233. t. 54. 1966. *Epidendrum praemorsum* Roxb. Cor. Pl. 34. t. 43. 1795. *Saccolabium praemorsum* (Roxb.) Hook. f., Fl. Brit. Ind. 6 : 1890. *Acampe wightiana* Lindl., Fol. Orch. *Acampe* 2. 1853; Fischer in Fl. Pres. Madras 1447, 1928 (Repr. ed. 3 : 1011, 1957). *Saccolabium wightianum* (Lindl.) Hook. f. Fl. Brit. Ind. 6 : 1890.

Pl. 93, Fgs. 1-4.

Robust plant with stout stem, ca 30 cm long, covered by sheathing bases of leaves, with persisting old inflorescence axis and long stout aerial roots from among the leaves. *Leaves* alternate distichous, large, coriaceous, 12-28 × 2-3 cm, oblong, channeled, unequally deeply cleft at apex. *Inflorescence* short, erect, corymbose panicles, 6-10 cm long, leaf opposed, peduncle stout with several cupular sheathing bracts. *Flowers* dense, not wide opening, yellow, mildly sweet scented. *Bracts* ca 3.0 × 3.5 mm, broadly ovate, obtuse, persistent. *Ovary* with pedicel ca 10 mm long. *Perianths* fleshy with horizontal dark purplish streaks. *Dorsal sepal* ca 10.5 × 4.5 mm, obovate-oblong, obtuse with a mucro. *Lateral sepal* ca 9.0 × 4.0 mm, oblong-ovate, obtuse. *Lateral petals* ca 7.5 × 3.0 mm, oblanceolate-spathulate, obtuse. *Lip* ca 8 mm long, fleshy, trilobed, saccate at base; sidelobes small, narrow, erect, thick; midlobe ca 4 × 4 mm, ligulate, ovate-oblong, more or less reflexed, obtuse, fleshy, irregularly crenulate at margins, tuberculate on the upper surface; base saccate, long slender, papillose within. *Column* short, stout, ca 2 mm long, with two small terminal horns, on each side. *Fruits* subsessile, erect, more or less in cluster, subcylindric, longitudinally ribbed; young fruits ca 5 cm long.

Flowering : May. *Fruiting* : June.

Vajravelu 45021, Nellithorai forest : Alt. ca 350 m.

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