



The Orchids of Nepal Himalaya

by

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&

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with 247 plates and 2 maps



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Preface

It has been our aim to collate all information about orchids in Nepal and make available to those interested in the study of these interesting plants. We are conscious of the many limitations. That we have ventured on this task might look somewhat rash when we know that to depend on the material available in a single herbarium and to use it for investigation is indeed scientifically unsatisfactory. In the present work all the specimens housed in the Herbarium, Botanical Survey of Nepal, Department of Medicinal Plants, H.M's Government of Nepal, Kathmandu, have been studied in as much detail as has been possible and figures drawn therefrom. For identifying the orchids that they see or collect, we have attempted to construct keys for those specimens that are actually present in the herbarium. Such taxa as are not present in the Herbarium, Botanical Survey of Nepal, but only reported from the country, have also been included; however their descriptions are based on classical works; full references and figures of such taxa have been avoided.

Although the system is over 50 years old and different systems have been proposed by authorities, such as Dressler & Dodge (1960); Vermeulen (1966); Brieger (1970); Garay (1972) and Dressler (1981), we have, on our part followed Schlechter (1926). For the beginner, as we have felt, it is easy to locate the tribe, series and subseries to which the plant he is handling belongs. Admittedly the Subfamily ending as also the endings of the Divisions, Tribes, Series and Subtribes do not conform to Article 19 of the International Code of Botanical Nomenclature, and we have no authority either to effect any changes as long as a particular System is followed. We have, following Schultes & Pease (1963), indicated the subtribe after each genus. This has been an added advantage to us, for they have followed Schlechter with slight alterations.

Having strongly felt that a considerable amount of spadework can be done on the basis of the material already at hand in the Herbarium, Botanical Survey of Nepal (KATH), we have embarked on it, depending on this group of plants, as it is clear that a knowledge of the orchid flora, as of the flora in general, is insufficient. We are beginners in the field and are aware of our shortcomings. Added to those are the meagre facilities offered by our library. And quite reasonably one might doubt the justification for publishing this work preliminary in nature, but we have been imbued with the thought that it's publication should inspire others to enter the field. Our attempt may be of some encouragement to future nepalese scientists and to a new generation of nepalese botanists. Quite extensive studies have been made and published of the orchid flora of the surrounding areas - Sikkim and Bhutan on the east and north-western Himalaya including Simla on the west, but very little information is available on the orchid flora of Nepal Himalaya. It is hoped that this work will be able to fill the gap, even if not to one's entire satisfaction, and serve as an impetus.

To Dr. Samar B. Malla, Director General, and Dr. Saman B. Rajbhandary, Deputy Director, Department of Medicinal Plants, His Majesty's Government, Nepal, we express our grateful thanks for the loan of the specimens from the Herbarium, Botanical Survey of Nepal, for our study at the University of Kalyani, India. To Professor G. Seidenfaden, Copenhagen, we are deeply indebted for his valuable suggestions, which we have incorporated to the best of our ability. Failure to follow each and every suggestion or its omission is entirely due to our shortcomings. Dr. Pushpa R. Sakya, Herbarium, Botanical Survey of Nepal, and Dr. Gour G. Maity, Botanical Survey of India, have been extending their fullest cooperation, so also Dr. Ajit K. Midya and Dr. Pralayendra Pal, both of whom even at their personal inconvenience have rendered unstinted help. To them all we offer our sincere thanks.

Kalyani - 741235, India, April 1983.

M.L. Banerji & Prabha Pradhan.

Introduction

HISTORICAL - The Kingdom of Nepal occupies about one-third of the Himalayas, extending from 80° 15' to 88° 10' E. and 26° 20' to 30° 10' N. The length is about 840 kms. and the breadth varies from 144 to 224 kms.; the area is approximately 141,000 sq.kms. Botanical explorations of Nepal began in 1802, when Francis Buchanan (later Hamilton) went to Kathmandu as a member of the British Mission to the Nepalese Court. He was there for one year i.e. from March 1802 to March 1803, during which time he assembled a valuable collection of plant specimens. Based on the collection of Buchanan Hamilton, David Don recorded 650 species in his *Prodromus Flora Nepalensis*, published in 1825, wherein, some 51 species of orchids were described

Nathaniel Wallich went to Kathmandu in December, 1820 and stayed there until about November 7th, 1821 nearly for one year as is evidenced from letters to him by Gardner, preserved in the Botanic Gardens, Calcutta and also mentioned by Burkill (1910). Wallich induced pilgrims and the local people to bring plants from different parts of the kingdom, thus his collections were more extensive than Buchanan Hamilton's. Wallich's *Tentament Florae Nepalensis* appeared in 1824-26. In this work many orchids were included, most of them having been described by Wallich himself. For a long period the specimens of Buchanan Hamilton and of Wallich were the only nepalese plant specimens available to the botanists and the scientific world.

During the winter of 1848, J.D. Hooker visited the Tamur valley in eastern Nepal and made extensive collections, this was followed by the visits by Schlaginweit brothers in 1857 and J. Scully in 1876, but their stay in Kathmandu valley was for short periods. Nearly after 30 years, I.H. Burkill visited in 1907 and followed the same route to Kathmandu and on to Gossainkund that was covered by Wallich in 1820 and collected, as Burkill himself says, "the same plants in the same spots" even at a period 87 years apart. Sir Clive Wigram, the then British Resident, encouraged and induced one Lal Dhowj and later N.K. Sharma to collect plant specimens and seeds; this was during the period 1927-37. These specimens are present in different herbaria as collections of 'Wigram and Sharma'. In the spring of 1929 with the permission and co-operation of the Nepalese Government a botanical party consisting of Basant Lal Gupta and Bis Ram of Forest Research Institute, Dehra Dun, entered Nepal being joined by Major Lal Dhowj. They made a small collection of 500 species. Similarly, Gimlott and Maries who were in the British Residency at different times, collected plant specimens, and in the herbaria of Kew and Calcutta there are to be found some sheets under their names, though not many.

In 1928, the British Museum (Natural History) prepared a list of plants known from Nepal till then, which appeared as an Appendix to Landon's *NEPAL* (1928). This list covered 148 species of orchids from the country, however, it did not include the species collected by Lal Dhowj and N.K. Sharma.

Nepal remained a closed country to foreigners till 1949, when H.W. Tilman with a mountaineering party went to Langtang Himal; Oleg Polunin was a member who collected botanical specimens extensively. The list of plants collected by Polunin is given in Tilman's *NEPAL HIMALAYA* (1952). D.G. Lowndes, was also associated with mountaineering parties, and made plant collection in 1950. Undoubtedly many mountaineering expeditions and tourists besides botanical parties who have visited some part of Nepal during the past 30 years, have brought back a collection of plant specimens no matter big or small. But major botanical expeditions have been sponsored by the British Museum and the Royal Horticultural Society, London, and they have been in the field since 1952 for months together. Polunin, Sykes and Williams were in the field in 1952 and the collections made by them goes under "PSW" as distributed by the British Museum, while collections made by Stainton, Sykes and Williams in 1954 is indicated as "SSW". The most important individual - J.D.A. Stainton collected from all parts of the country. He was in the field in 1954, 1956, every year from 1962 to 71, 1974 and 1975. Many species have been named after him.

A. Zimmermann was the botanist member of the Swiss expedition to Mt. Everest. He collected some 2000 specimens along the route and from Namchebazar area in 1952 and 1954. Meanwhile botanical expedi-

tions were organised by some Universities of Japan such as Kyoto, Tokyo, Chiba, and others. Scientific results of the Kyoto University expedition to Nepal during 1952-53 was published in 1955 under the title 'Fauna and Flora of Nepal Himalaya'. Therein are recorded 33 species of orchids. Three valuable volumes edited by H. Hara and by H. Ohashi - 'The Flora of Eastern Himalayas' (1966; 2nd report 1971; 3rd report 1975) have been the outcome of botanical expeditions organised by the University of Tokyo to eastern Nepal, Sikkim and Bhutan and their specimens are usually indicated as "TI". In these Reports some 139 species over 48 genera of orchids collected in Nepal are mentioned.

M.L. Banerji set his foot on the nepalese soil in April 1948, and in years that followed, he has been visiting the country year after year for botanical collections. Besides other publications on the flora of Nepal, in a series of ten papers Banerji & Thapa (1969-1975) recorded 194 orchid species. Similarly, G.A.C. Herklots who was in Kathmandu laying out the Botanical garden, has also made significant contributions towards the orchid flora of Nepal.

The Botanical Survey under the Department of Medicinal Plants, His Majesty's Government of Nepal, since its inception in 1960, has been exploring the country. A map showing the routes of the enthusiastic botanists of the department of Medicinal Plants as given by Dobremez et al. (1972 - Fig. 5) or by Hara et al. (1978 - Fig. 6) will convince one of the extensive explorations carried over the entire country during the past years. Thus, it can be confidently said that the collection of orchid specimens housed in the Herbarium, Department of Medicinal Plants at Kathmandu (KATH) is a representative one.

A complete bibliography about Nepal and plant collectors in Nepal is available in "Bibliographie du Nepal", Vol. 3 - Botanique (1972) by Dobremez et al. and "An enumeration of the Flowering Plants of Nepal", Vol. 1 (1978) by Hara et al.

PRESENT - The splendid works by J.D. Hooker; George King and R. Pantling and J.F. Duthie on the orchids of the Himalayas published in different volumes of the Annals of the Royal Botanic Garden, Calcutta, have served to give us impetus to attempt a work on the orchids of Nepal.

One of us (P.P.) as a scholar of the British Council to the British Museum (Nat. Hist.) in 1970 was assigned the task to work out the undetermined specimens of orchids collected from Nepal, present in the Museum. This, then greatly added to our zeal and jest. We soon realized the urgent need for a detailed work on the orchids of the country.

Figures have been drawn by one of us (MLB) assisted by Mrs Sikha Chatterjee, and are strictly to the measurements and carefully following the magnifications. Hooker's remarks (Ann. Roy. Bot. Gard. Calcutta, Vol. 5, p. ii) "they err in manifesting that tendency to enlarge, which is a besetting sin of Indian botanical artists; and that the analyses leave much to be desired in the matter of proportion and accuracy" has always been wringing in our minds. As figures have been drawn from herbarium material and under camera lucida, possibly there have been some which may be asymmetrical due to pressing and preservation. We must admit that it has been nearly impossible at times when dealing with herbarium material of *Bulbophyllum* sect. *Cirrhopetalum* (Lindl.) Reichb. f. while trying to study the level of connation of the lateral sepals.

The classification followed is that proposed by R. Schlechter (Notizbl. Bot. Gartn. Berlin, 9(88): 590, 1926), and the subtribes that have been indicated after each genus are according to Schultes and Pease (1963), with the idea that it will help in a better understanding of the relationships of the genera. For those genera where more than one species is represented in the herbarium, short keys to the species are given, however no keys to the genera are provided. As mentioned elsewhere, we have given a short description to those taxa that have been reported from Nepal by other workers. As regards the nomenclature, we have consulted Hara, Stern & Williams (1978) besides the exhaustive and most critical works of Seidenfaden and tried to bring it up-to-date. Full reference has been given of the basionyms, and such synonyms that have reference to Nepalese orchids have been restricted to. The genera have been arranged alphabetically within each tribe for easy reference. The result has been that 247 species have been described and illustrated. However, we estimate 340 to 350 species spread over 86 to 88 genera to represent the orchid flora of Nepal.

One most intriguing aspect has been the detection of absence of such taxa in the Herbarium of the Botanical Survey for which Nepal has been indicated to be the type locality as the Wallichian Type was therefrom or some other important collection as of Buch.-Ham. or Hooker or even Gardner, which means in other words 1820 or 1848 collection. This, then, raises a suspicion in our minds that some

species may have disappeared altogether. This suspicion becomes stronger when one reads in Hara et al. (p. 22, 1978) "only one or two specimens representative of the taxon enumerated and also types, if from Nepal, are cited for each of these regions, even though numerous other gatherings may be available". But they give, in most cases, the recent collections of the British and Japanese botanists.

As is evident from the most recent work by Hara et al. there are some species the presence of which in Nepal has been under doubt, either because of uncertain identity of material or the locality in Nepal has not been traced, or may be some other cause. Some such species have been collected by Nepalese botanists in recent years and their identity has been checked over and over, so that, we can now positively say that the presence of these species in Nepal is beyond any doubt. For example, *Eulophia explanata* Lindl. has been collected once; *Eulophia flava* (Lindl.) Hk. f. has also been collected once; *Gastrochilus inconspicuus* (Hk. f.) Kze. has been collected four times, *Habenaria digitata* Lindl. thrice and *Oberonia falconeri* Hk. f. five times. Further, Hara et al. record some species on the basis of Banerji & Thapa's reports. A number of such species have also been collected in recent years by the staff of Botanical Survey of Nepal, and such species are - *Bulbophyllum elatum* (Hk. f.) J.J. Sm. once; *Chiloschista lunifera* (Reichb. f.) J.J. Sm. ex Holttum, five gatherings; *Dendrobium nobile* Lindl. three gatherings; *Eria bractescens* Lindl. twice; *Eria coronaria* (Lindl.) Reichb. f. (as *Trichoma suaveis* Lindl.) five times; *Eria pubescens* (Hk.) Lindl. ex Steud. thrice; *Malaxis khasiana* (Hk. f.) Hara once; and *Sunipia racemose* (Sm.) Tang & Wang twice.

It has been of interest that 'Morung' has been an unidentified locality of Nepal. In fact Morung is a district in the kingdom of Nepal. In days bygone it was a common custom to indicate a place by the name of the district and Kathmandu was popularly known as 'Nepal'. Toni Hagen (p. 97, 1960) has also mentioned the same. Thus, we infer that *Peristylus hamiltonianus* (Lindl.) Lindl. and *Eulophia explanata* Lindl. had been collected from some locality in the district of Morung of Nepal. However, the disappearance of some species cannot be completely ruled out as a result of heavy deforestation over years which has had its effect on rainfall regime with increasing deterioration of the climate.

Distribution of the Orchids in Nepal

Some interesting observations have been made on the distribution of the orchid species along the length of the Nepal Himalayas, as well as on their altitudinal distribution. This observation of ours may be at variance with the published data.

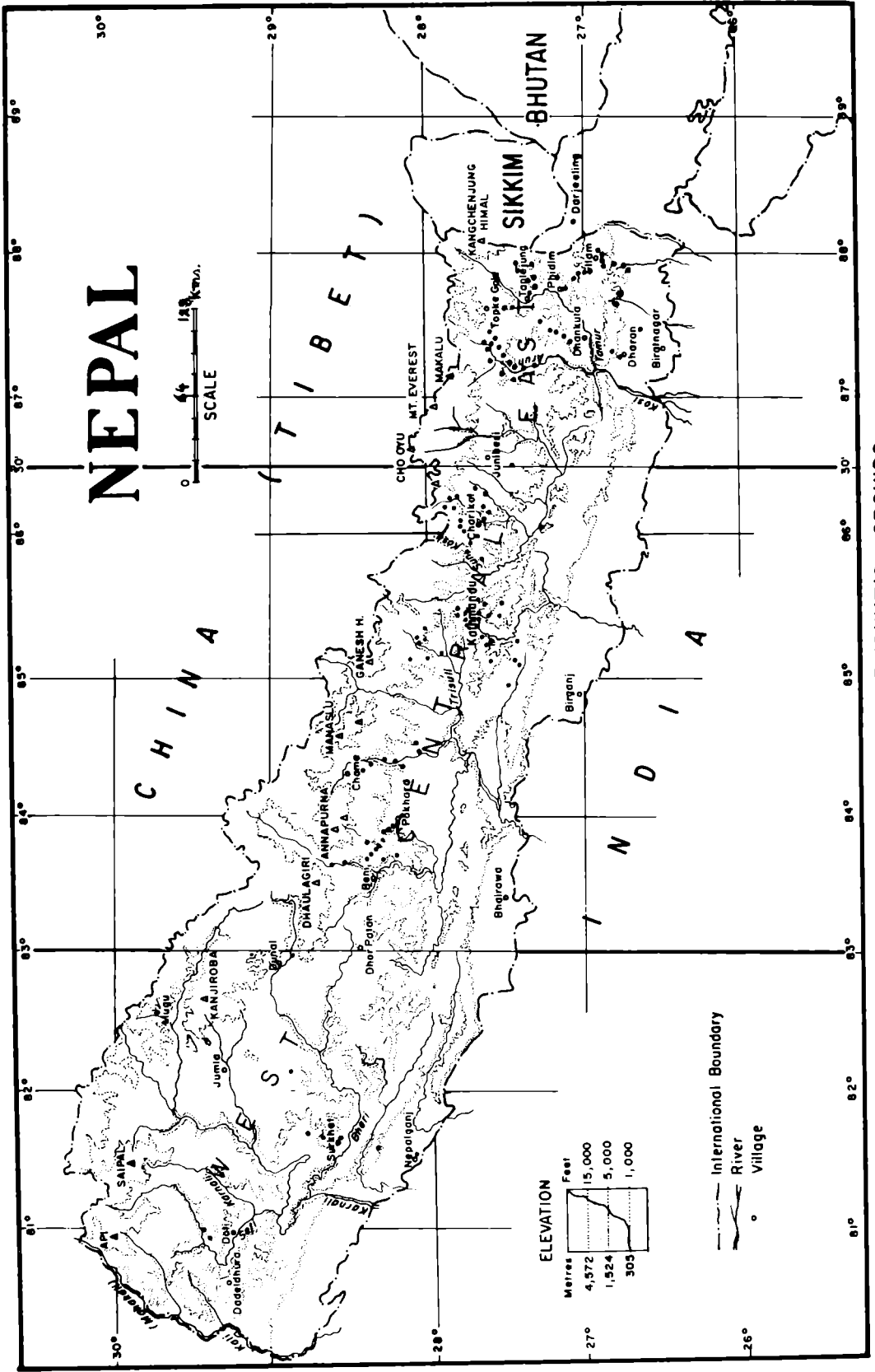
The Nepal Himalayas have been divided into three subdivisions by Mason (1934 & 1955). Stern (1960) has also used these division in his work on *Allium* and *Milula* of Central and Eastern Himalaya, and he has further suggested some modifications to Mason's thought about the divisions of Nepal Himalaya. Dobremez (1970) dealing on the Biogeographie of Central Nepal, takes 83° to 85° long and 27°.15 to 29°.15 lat. as the area. This corresponds to the Gandaki Section of Mason [Dhaulagiri to Kathmandu.... 82° 59'E. to 85°12'E.]. Thus according to Dobremez (1972), four phytogeographical subdivisions are recognised 'Domain ouest-nepalais'; 'Domain nord-ouest-nepalais'; 'Domain centre-nepalais'; and 'Domain est-nepalais'. Stainton (1964) while discussing the distribution of *Quercus* and *Juniperus* divides the Nepal Himalaya into W. Nepal, C. Nepal and E. Nepal. He (1972) has also recognised six main geographical divisions - terai; dun valley and foot hills; the midland southern sides of the main Himalayan ranges; the Humla-Jumla area in the north-west; dry river valleys; inner valleys; the arid zone with much of the character of the Tibetan plateau. Banerji (1963, 1973) while discussing the phytogeography of Nepal has also followed Stern (loc. cit.), which may given as -

Western Nepal (from the Kumaon frontier to 83° E. — corresponding to Mason's Karnali Section).

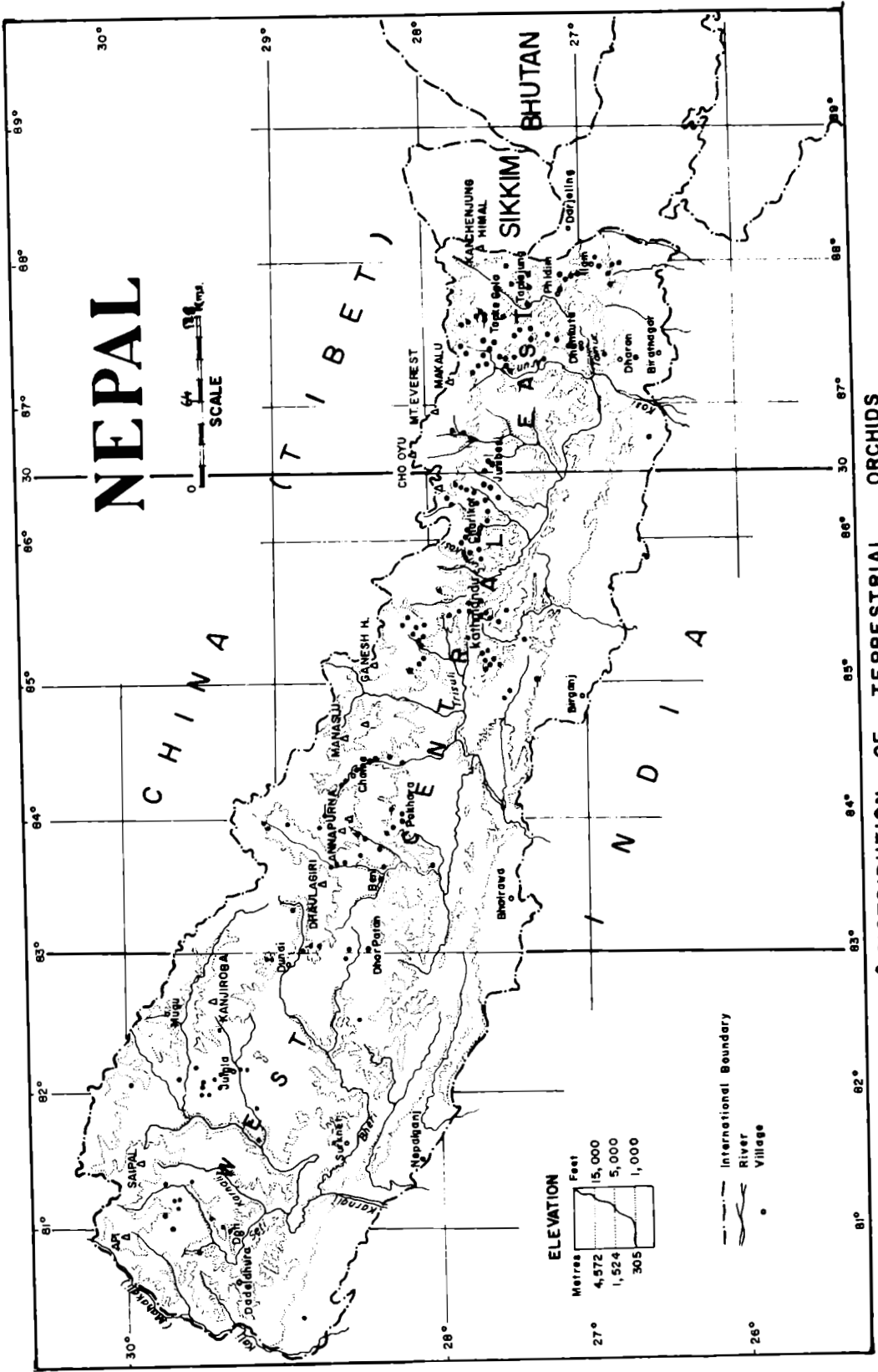
Central Nepal (from 83°E. to 86°E. — corresponding to Mason's Gandaki section which is from Dhaulagiri to Kathmandu i.e., 82°59'E. to 85°12'E.).

Eastern Nepal (from 86°30'E. to Sikkim frontier — corresponding to Mason's Kosi section).

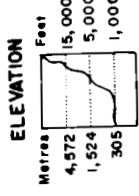
A) On the basis of this division of the Nepal Himalaya, the species of orchids that appear to be restricted to West Nepal are — *Dactylorhiza hatagirea* (D. Don) Soo; *Habenaria intermedia* D. Don; *Habenaria marginata* Coleb.; *Dendrobium primulinum* Lindl.; *Eulophia herbacea* Lindl.; *Liparis cathcartii* Hk. f.; *Oreorchis foliosa* (Lindl.) Lindl.; and *Vanda tessellata* (Roxb.) Hook.



● DISTRIBUTION OF EPIPHYTIC ORCHIDS



NEPAL



- International Boundary
- River
- Village

• DISTRIBUTION OF TERRESTRIAL ORCHIDS

B) Similarly there are some 55 species that are restricted to the central part of the country; these being *Bulbophyllum cylindraceum* Lindl.; *B. elatum* (Hk. f.) J.J. Sm.; *B. hirtum* (Sm.) Lindl. ex Wall.; *B. leopardinum* (Wall.) Lindl. ex Wall.; *B. odoratissimum* (Sm.) Lindl. ex Wall.; *B. secundum* Hk. f.; *B. triste* Reichb. f.; *B. umbellatum* Lindl.; *B. xylophyllum* Pars. & Reichb. f.; *Calanthe plantaginea* Lindl.; *C. puberula* Lindl.; *Cleisostoma filiforme* (Lindl.) Garay; *Coelogyne flaccida* Lindl.; *C. fuscescens* Lindl.; *Cymbidium cyperifolium* Wall.; *C. lancifolium* Hk. f.; *C. longifolium* D. Don; *Dendrobium bicameratum* Lindl.; *D. candidum* Wall. ex Lindl.; *D. denneanum* Kerr.; *D. hookerianum* Lindl.; *D. monticola* P.F. Hunt & Summerh.; *Diplomeria hirsuta* (Lindl.) Lindl. *Eria amica* Reichb. f.; *E. carinata* Gibs. ex Griff.; *Eulophia explanata* Lindl. *E. hormusjii* Duthie; *E. mackinnonii* Duthie; *E. obtusa* (Lindl.) Hk. f.; *Gastrochilus acutifolius* (Lindl.) Kuntze; *G. distichus* (Lindl.) Kuntze; *G. inconspicuum* (Hk. f.) Kze.; *Goodyera foliosa* (Lindl.) Benth. ex Hk. f.; *G. fusca* Hk. f.; *G. hemsleyana* King & Pantl.; *G. schlechtendaliana* Reichb. f.; *Habenaria furcifera* Lindl.; *H. stenopetala* Lindl.; *Herminium monorchis* (Linn.) R. Br.; *Liparis bootanensis* Griff.; *L. perpusilla* Hk. f.; *L. petiolata* (D. Don) P.F. Hunt & Summerh.; *Monomeria barbata* Lindl.; *Neotianthe calcicola* (W.W. Sm.) Schlechtr.; *N. cucullata* (L.) Schlechtr.; *Nervilia carinata* (Roxb.) Schltr.; *Oberonia falcata* King & Pantl.; *O. prainiana* King & Pantl.; *O. pyrulifera* Lindl.; *Peristylus elisabethae* (Duthie) Gupta; *P. lawii* Wight; *Spathoglottis ixioides* (D. Don) Lindl.; *Sunipia bicolor* Lindl.; *S. paleacea* (Lindl.) P.F. Hunt; *Thelasis longifolia* Hk. f. and *Vanda alpina* Lindl.

C) There are a number of species (49) that are restricted to east Nepal and are common to Sikkim and Bhutan. These species are *Agrostophyllum khasianum* Griff.; *Bulbophyllum bisetum* Lindl.; *B. eublepharum* Reichb. f.; *B. sarcophyllum* (King & Pantl.) J.J. Sm.; *B. sikkimense* (King & Pantl.) J.J. Sm.; *B. wallichii* Reichb. f.; *B. rolfei* (Kze.) Seidenf.; *Calanthe brevicornu* Lindl.; *C. chloroleuca* Lindl.; *Cleisostoma racemiferum* (Lindl.) Garay; *Cymbidium devonianum* Paxton; *C. hookerianum* Reichb. f.; *Dendrobium anceps* Sw.; *D. chrysanthum* Wall. ex Lindl.; *D. farmeri* Paxt.; *D. formosum* Roxb.; *D. moschatum* (Buch.-Ham.) Sw.; *D. nobile* Lindl.; *Diphylax ureolata* (Cl.) Hk. f.; *Ephemerantha macraei* (Lindl.) P.F. Hunt & Summerh.; *Epigeneium fuscescens* (Griff.) Summerh.; *Epipactis veratrifolia* Boiss. & Hohen.; *Eria acervata* Lindl.; *E. bractescens* Lindl.; *E. discolor* Lindl.; *E. muscicola* (Lindl.) Lindl.; *Esmeralda clarkei* Reichb. f.; *Galearis spathulata* (Lindl.) P.F. Hunt; *Galeola lindleyana* (Hk. f. & Th.) Hara; *Nervilia crispata* (Bl.) Schltr.; *Oberonia brachystachys* Lindl.; *O. iridifolia* (Roxb.) Lindl.; *O. pachyphylla* King & Pantl.; *Papilionanthe uniflora* (Lindl.) Garay; *Pelatantheria insectifera* (Reichb. f.) Ridl.; *Peristylus constrictus* (Lindl.) Lindl.; *P. nematocaulon* (Hk. f.) comb. nov.; *P. parishii* Reichb. f.; *Phalaenopsis mannii* Reichb. f.; *Platanthera bakeriana* (King & Pantl.) Kranzl.; *P. sikkimensis* (Hk. f.) Kranzl.; *Podochilus cultratus* Lindl.; *Porpax meirax* (Par. & Reichb. f.) King & Pantl.; *Sunipia racemosa* (Sm.) Tang & Wang; *Vanda testacea* (Lindl.) Reichb. f. and *Zeuxine flava* (Lindl.) Trimen.

D) There are some 19 species that extend from west to central Nepal, and they are - *Calanthe tricarinata* Lindl.; *Cryptochilus luteus* Lindl.; *Cypripedium cordigerum* D. Don; *C. himalaicum* Rolfe apud Hemsl.; *Epipactis helleborine* (Lindl.) Crantz.; *E. royleana* Lindl.; *Eria spicata* (D. Don) Hand.-Mazz.; *Habenaria aitchisonii* Reichb. f. apud. Aitch.; *H. arietina* Hk. f.; *H. commelinifolia* (Roxb.) Wall. ex Lindl.; *Hemipilia cordifolia* Lindl.; *Herminium macrophyllum* (D. Don) Dandy; *Liparis glossula* Reichb. f.; *Neottia listeroides* Lindl.; *Neotianthe secundiflora* (Hk. f.) Schltr.; *Pecteilis triflora* (D. don) Tang & Wang; *Peristylus prainii* (Hk. f.) Kranzl.; *Platanthera arcuata* Lindl. and *P. edgeworthii* (Hk. f. ex Collett) Gupta.

E) Similarly some 86 species that are restricted to the region that may be designated as central and east Nepal (i.e. 83 °E. to Sikkim frontier), these are *Acampe papillosa* (Lindl.) Lindl.; *A. rigida* (Buch.-Ham. ex Sm.) P.F. Hunt; *Agrostophyllum callosum* Reichb. f.; *Anthogonium gracile* Wall. ex Lindl.; *Arundina graminifolia* (D. Don) Hochr.; *Ascocentrum ampullaceum* (Roxb.) Schltr.; *Bulbophyllum affine* Lindl.; *B. careyanum* (Hk. f.) Spr.; *B. caudatum* Lindl.; *B. guttulatum* Wall. ex Hk. f.; *B. polyrhizum* Lindl.; *B. reptans* (Lindl.) Lindl.; *B. retusiusculum* Reichb. f.; *B. viridiflorum* (Hk. f.) Schltr.; *Calanthe alpina* Hk. f. ex Lindl.; *C. mannii* Hk. f.; *C. truliformis* King & Pantl.; *Chiloschista lunifera* (Reichb. f.) J.J. Sm.; *Coelogyne corymbosa* Lindl.; *C. cristata* Lindl.; *C. flavida* Hk. f. ex Lindl.; *C. nitida* (Wall. mss) Lindl.; *C. stricta* (D. Don) Schltr.; *Cryptochilus sanguineus* Wall.; *Cymbidium erythraeum* Lindl.; *C. iridioides* D. Don.; *Dendrobium amoenum* Wall. ex Lindl.; *D. aphyllum* (Roxb.) G.E.C. Fischer; *D. densiflorum* Lindl.; *D. fimbriatum* Hk. f.; *D. heterocarpum* Wall. ex Lindl.; *D. longicornu* Lindl.; *D. porphyrochilum* Lindl.; *Epigeneium amplum* (Lindl.) Summerh.; *Eria coronaria* (Lindl.) Reichb. f.; *E. excavata*

Lindl.; *E. graminifolia* Lindl.; *E. pubescens* (Hk. f.) Steud.; *Gastrochilus calceolaris* (Sm.) D. Don; *Geodorum pallidum* D. Don; *Goodyera repens* (Linn.) R. Br.; *Habenaria dentata* (Sw.) Schlecht.; *H. digitata* Lindl.; *H. diphylla* Dalz.; *Herminium mackinnonii* Duthie; *H. monophyllum* (D. Don) P.F. Hunt & Summerh.; *H. quinquelobum* King & Pantl.; *Kingidium taenialis* (Lindl.) P.F. Hunt; *Liparis deflexa* Hk. f.; *L. duthiei* Hk. f.; *L. resupinata* Ridl.; *L. viridiflora* (Bl.) Lindl.; *Luisia zeylanica* Lindl.; *Malaxis acuminata* D. Don; *M. acuminata* f. *biloba* (Lindl.) Tuyama; *M. latifolia* Sm.; *Oberonia acaulis* W. Griff.; *O. caulescens* Lindl.; *O. ensiformis* (Sm.) Lindl.; *O. obcordata* Lindl.; *Oreorchis micrantha* Lindl.; *Ornithochilus difformis* (Wall. ex Lindl.) Schltr.; *Otochilus albus* Lindl.; *O. fuscus* Lindl.; *O. lancilabius* Seidenf.; *Panisea demissa* (D. Don) Pfitz.; *P. uniflora* (Lindl.) Lindl.; *Peristylus aristatus* Lindl.; *P. densus* (Lindl.) Sant. & Kapad.; *P. goodyeroides* (D. Don) Lindl.; *Pholidota articulata* Lindl.; *P. griffithii* Hk. f.; *P. imbricata* Hk. f.; *P. protracta* Hk. f.; *Platanthera clavigera* Lindl.; *P. exelliana* Soo; *P. stenantha* Hk. f.) Soo; *Pleione hookeriana* (Lindl.) J. Moore; *P. humilis* (Sm.) D. Don; *P. praecox* (Sm.) D. Don; *Satyrium ciliatum* Lindl.; *Smitinandia micrantha* (Lindl.) Holttum; *Tipularia josephii* Reichb. f. ex Lindl.; *Vanda cristata* Lindl.; *Vandopsis undulata* (Lindl.) J.J. Sm.; and *Zeuxine strateumatica* (Linn.) Schltr.

F) There are only 24 species that extend over the entire country i.e. from east to west over the central part. These are — *Aerides multiflora* Roxb.; *Aerides odorata* Lour.; *Brachycorythis obcordata* (Lindl.) Summerh.; *Cephalanthera longifolia* (Linn.) Fritsch; *Cymbidium aloifolium* (L.) Swartz; *Dendrobium eriaeflorum* Griff.; *Gymnadenia orchidis* Lindl.; *Habenaria pectinata* D. Don; *Herminium duthiei* Hk. f.; *H. josephii* Reichb. f.; *H. lanceum* (Thunbg.) Vuijk.; *Liparis nervosa* (Thunbg.) Lindl.; *Malaxis cylindrostachya* (Lindl.) Ktz.; *M. muscifera* (Lindl.) Ktz.; *Oberonia falconeri* Hk. f.; *O. pachyrachis* Reichb. f. ex Hk. f.; *Pecteilis gigantea* (J.E. Sm.) Raf.; *Peristylus fallax* Lindl.; *Platanthera latilabris* Lindl.; *Poneorchis chusua* (D. Don) Soo; *Rhynchostylis retusa* (Linn.) Bl.; *Satyrium nepalsense* D. Don; *Spranthes sinensis* (Pers.) Ames; and *Thunia alba* (Lindl.) Reichb. f.

The distribution of *Habenaria plantaginea* Lindl. is rather peculiar. In the Herbarium, Government of Nepal (KATH) there are five gatherings, out of which four are from east Nepal and one from west Nepal. The species has not been collected from any locality in central Nepal over the past twenty years.

The distribution of the orchids over the country distinctly indicates the eastern Himalayan species abound in east Nepal while in west Nepal those species that are found in Kumaon and Gharwal or further west are to be met with. The abundance of epiphytic species in east Nepal is indicated in Map 1. Occurrence of epiphytic species is far less in west Nepal due to the drier conditions. Terrestrial species are also abundantly present in eastern parts of the country, and west of 84°E they not only decrease but in general the occurrence of orchids as a whole sharply declines. Distribution of terrestrial species over east, central and west Nepal is shown in Map 2. Division into east Nepal, central Nepal and west Nepal has resulted in a better understanding of plant distribution within the country. The distribution of orchids along the entire length of the kingdom of Nepal may briefly be summarised as:

- Sikkim frontier to 86°30'E - abundance of epiphytic and terrestrial species;
- 86°30'E to 83°E - a gradual decline in both the epiphytic and terrestrial species;
- 83°E to Kumaon frontier - a sudden decline in epiphytic species; terrestrial species though present, are far less.

That longitude 83°E may be taken as the boundary between the botanical provinces of Eastern Himalaya and Western Himalaya by the preponderance of differing elements is more fully supported by the distribution pattern of epiphytic and terrestrial orchid species.

An attempt to the altitudinal distribution of species has been made and the findings are tabulated below:

I Subtropical	- below 1000 m.	= 59 species	
II Warm temperate	- between 1000-2000 m.	= 85 species	
III Cold temperate	- between 2500-3200 m.	= 23 species	
	- between 3200-4000 m.	= 15 species	they being—

Cypripedium cordigerum D. Don; *Cypripedium himalaicum* Rolfe apud Hemsl.; *Dactylorhiza hatagirea* (D. Don) Soo; *Goodyera fusca* (Lindl.) Hook. f.; *Gymnadenia orchidis* Lindl.; *Herminium duthiei* Hook. f.; *Herminium josephii* Reichb. f.; *Herminium monorchis* (L.); R. Br.; *Liparis glossula* Reichb. f.; *Malaxis muscifera* (Lindl.) Ktz.; *Neottianthe calcicola* (W.W. Sm.) Schltr.; *Peristylus nematocaulon*

(Hk. f.) comb. nov.; *Platanthera bakeriana* (King & Pantl.) Kranzl.; *Platanthera exelliana* Soo; *Poneorchis chusua* (D. Don) Soo.

IV Artic zone - between 4000-5000 m. = *Galearis spathulata* (Lindl.) P.F. Hunt; *Herminium duthiei* Hk. f.; *H. josephii* Reich.f.

There are some species that have a wide altitudinal range, for example:

<i>Arundina graminifolia</i> (D. Don) Hochr. extends from	1-2500 m.
<i>Goodyera repens</i> (Linn.) R. Br.	2-4000 m., however 2500-3200 m. is the most favourable belt for the species.
<i>Herminium lanceum</i> (Thunbg. ex Sm.) Vuijk.	1-3200 m. with 1-2500 m. as the most favourable belt.
<i>Malaxis cylindrostachya</i> (Lindl.) Ktz.	2-4000 m., the most favourable altitudinal belt is 2-3200 m.
<i>Platanthera latilabris</i> Lindl.	2-4000 m. with the most favourable altitude being 2-2500 m.
<i>Satyrium nepalensis</i> D. Don	1-4000 m. the greatest profusion of the species is found at 1-2500 m.
<i>Spiranthes sinensis</i> (Pers.) Ames	1-3200 m. with the most favourable altitude for the species being 1-2500 m. altitude.

Most of the orchid species have an altitudinal range of 1000 m. There are few species which seem to have a very restricted range; such species with very restricted range of distribution are:

Ascocentrum ampullaceum (Roxb.) Schltr.; *Dendrobium candidum* Wall. ex Lindl.; *Eria discolor* Lindl.; *Eria graminifolia* Lindl.; *Neottianthe calcicola* (W.W. Sm.) Schltr.; *Neottianthe cucullata* (Linn.) Schltr.; *Neottianthe secundiflora* (Hk. f.) Schltr.; *Pecteilis triflora* (D. Don) Tang & Wang and *Peristylus elisabethae* (Duthie) Gupta, have a range of just 1-200 m. However there may be some more, but definitely very few, which are so selective in habitat.

Abbreviations - authors and journals

For economy of space, titles of journals and names of more frequently occurring authors have been cut down from the conventional abbreviations to shorter or even mere initials, they are as follows:

B. B. & V.	Baehni, Ch., C.E.B. Bonner, and S. Vautier in <i>Candollea</i> Vol. 13; 1951.
B. 19	Banerji, M.L. in <i>Candollea</i> , Vol. 19; 1964.
B. 55	dto, in Journ. Bombay Natural History Society, Vol. 55; 1958.
B. & T.	Banerji, M.L. and B.B. Thapa, <i>ibid.</i> Vol. 66, 67, 68, 69, 70, 72 & 73; 1969-73, 1975.
Burk.	Burkill, I.H. in Records of the Botanical Survey of India, Vol. 4; 1910.
Coll.	Collett, H. <i>Flora Simlensis</i> , 1921.
D.	Duthie, J.F. in <i>Annals Royal Botanic Garden, Calcutta</i> , Vol. 9; 1906.
Don.	Don, D. <i>Prodromus Florae Nepalensis</i> , 1825.
Dept. Med. Pl.	Department of Medicinal Plants, Nepal, Bulletin 2; 1969.
H. et al.	Hara, H., W.T. Stern & L.H.J. Williams, An enumeration of the flowering plants of Nepal - I; 30-58, 1978.
Herk.	Herklots, G.A.C. <i>Orchid Review</i> , Vol. 28-86; 1970-1978.
Hk. f.	Hooker, J.D. in <i>Flora British India</i> , Vols. 5 & 6, 1890 and <i>Annals Royal Botanic Garden, Calcutta</i> , Vol. 5; 1895.
K. & P.	King, G. & R. Pantling in <i>Annals Royal Botanic Garden, Calcutta</i> , Vol. 8; 1898.
Kit.	Kitamura, S. in <i>Kihara's Fauna and Flora of Nepal Himalayas</i> 1955.
P.	Parker. R.N.. <i>Forest Bulletin (Dehra Dun)</i> N.S. 76; 1931.
S.	Schilling, A.D. in <i>Journal Royal Horticultural Society</i> , Vol. 94; 1969.
Seidenf.	<i>Seidenfaden</i> in <i>Dansk. Bot. Arkiv.</i> 27; 29; 31; 32; 33; 34; <i>Bot. Tidsskrft.</i> 64; 65; 68; 70; 71; and <i>Op. Bot.</i> 62.
T.	Tuyama, T. in <i>Hara, Flora of Eastern Himalaya</i> , 1966; in <i>Hara, Flora of Eastern Himalaya</i> , 2nd Report, 1971; in <i>Ohasi, Flora of Eastern Himalaya</i> , 3rd Report, 1975.
Wall.	Wallich, N. <i>Tentament Florae Nepalensis</i> . 1824-1826.

As each and every plate has not been given a legend but only alphabets are given under each figure besides its magnification, an explanation is necessary. The explanation of the alphabets is as:

A	for either an entire plant or a part thereof
B	for buds
B ₁	front view of a flower
B ₂	Side view of a flower
B ₃	Side view of the flower with the lip only
C	Floral parts dissected and arranged as they are in the natural condition (as far as possible)
C ₁	Lip (natural or magnified to show the details)
C ₂	Floral bract
D	Full length of the column
D ₁	Anther and/or anther cap
D ₂	Pollinia

CYPRIPEDIUM Linn. (Cypripedioideae). From *Cypris*, the Greek for Venus, and *pedilon* a slipper (sandal); referring to the shape of the lip. Terrestrial herbs with a leafy stem or stemless. Leaves two or more and plicate. Flowers large usually solitary or few; sepals free or the laterals connate and placed under the lip. Lip with side lobes small, mid lobe very large, saccate and inflated. Anthers two, one on each side of the staminode.

Key to the species of Cypripedium

- Leaves two, apparently opposite; floral bracts lanceolate, much longer than the short ovary. *elegans*.
 Leaves more than two (three or more) —
 Floral bracts leaf-like, 3-10 cm. long; lip white with a few purple spots. Plants c 30-60 cm. *cordigerum*.
 Floral bracts narrowly elliptic, slightly concave, longer than the flower. Lip purplish. Plants c 30-45 cm. *himalaicum*.

Plate 1

Cypripedium cordigerum D. Don, Prodr. Fl. Nep. 37, 1825; Hk. f. 6:170, 1890; D.203, t.151, 1906; Kit.99, 1955; H. et al. 38, 1978.

Stem stout or slender, puberulous, 25-50 cm. tall. Leaves several scattered, 7-16 cm. by 4.5-10 cm., broadly elliptic - lanceolate to orbicular, acute, membranous, plicate. Flower solitary c 8.5 cm. in diam., bracteate, bract leaf-like, 4.5-8.5 cm. long; sepals unequal, dorsal ovate - acuminate, 4.4 cm., concave, lateral sepals slightly shorter, 4.2 cm., connate but split at the apex; petals narrowly lanceolate, 4.4 cm. long, acuminate. Lip oblong, 2.5-2.8 cm., white with purple spots. Staminode ovate - oblong, 9 mm. long. Ovary fusiform, glandular pubescent.

Flowering time - June.

Altitudinal range - 3050-3505 m.

Distributional pattern - west & central Nepal.

Specimens in Herbarium - 4 gatherings.

Specimens studied - 2.

Chr. No. n = 10 (Mehra & Vij, Taxon, 19:108, 1970).

2n = 20 (Mehra & Kashyap, ibid. 27:226, 1978; Mehra & Pandita, ibid. 28:405, 1979).

Remarks - Duthie gives the lateral sepals as longer than the dorsal sepal but we find them shorter.



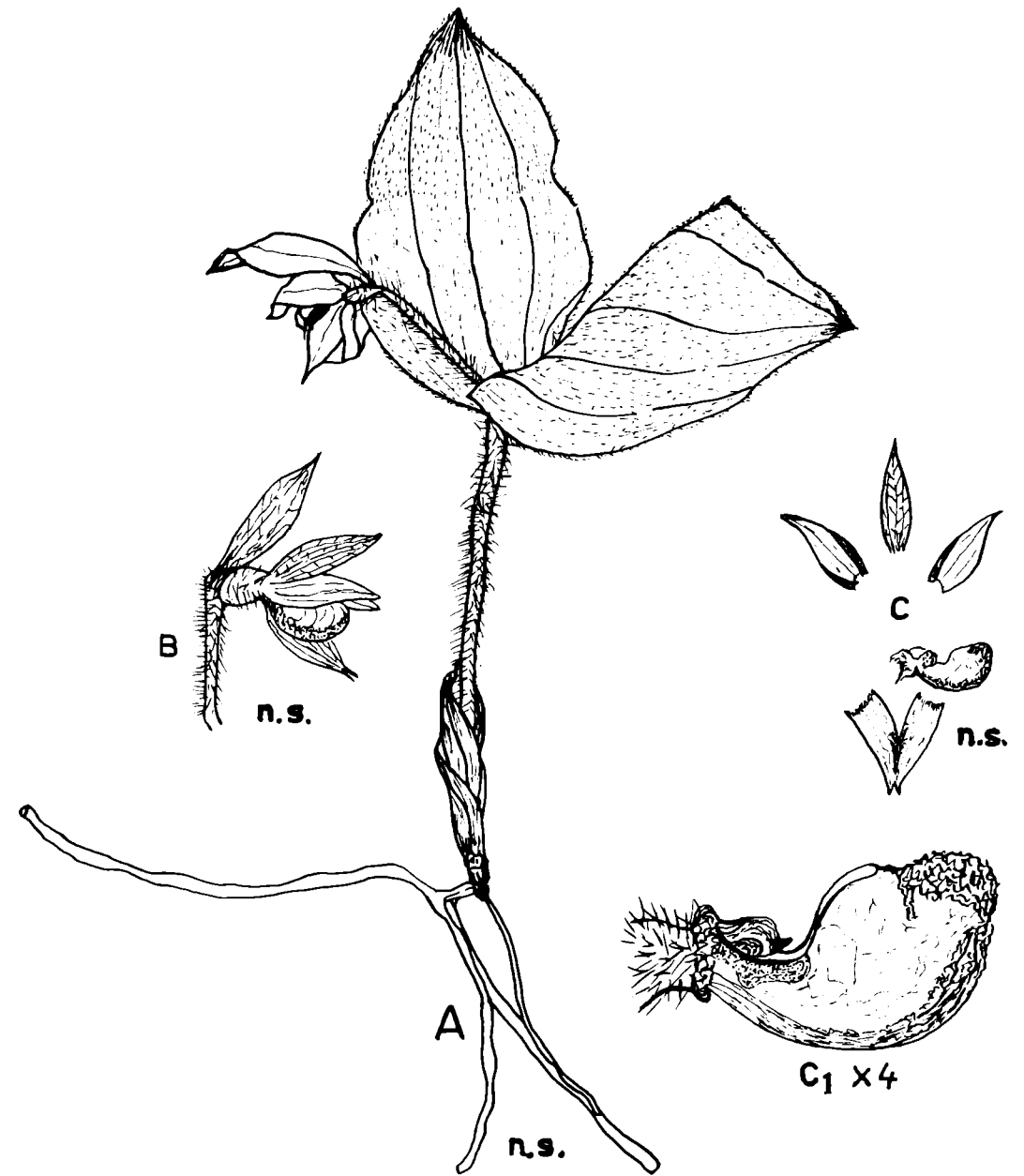


Plate 2

Cypripedium elegans Reichb. f. in Flora 59:561, 1886; Hk. f. 6:169, 1890; K. & P. 341, t.446, 1898; Kit. 100, 1955; T.3:140, t.7-f. c, 1975; H. et al. 38, 1978.

Stem pubescent, c 15 cm. high, bearing a lax sheath at the base and 2 leaves at the apex. Leaves opposite, orbicular-ovate, 6-7 cm. by 3.5-8 cm., sessile plicate. Flower solitary, c 2.5 cm. vertically, brownish with darker lines, bract ovate-lanceolate, c 2.4 cm. long, sepals unequal, dorsal sepal narrowly ovate, 1.6 cm. long, lateral sepals united under the lip, c 1.8 cm. long, apices free; petals lanceolate, 1.5 cm. long, concave, spreading, apices curved inwards and overlapping each other. Lip shorter than the sepals, 1.1 cm. long, sides abruptly folded inwards, upper surface with 3 crenulate, wavy ridges. Staminode elliptic, 2 mm. long, ovary ovoid, pubescent.

Flowering time - July.

Altitudinal range - \pm 3050 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 1 gathering.

Specimen studied - 1.

Chr. No.



Plate 3

Cypripedium himalaicum Rolfe apud Hemsl. in J. Linn. Soc. Bot. 29:319, 1892; K. & P. 342, t.448, 1898; S. 94:230, 1969; H. et al. 38, 1978.

Stem clothed at base by 3 or 4 tubular sheaths, 20-28 cm. high, upper part of stem pubescent; leaves 3 or rarely 4, unequal, lowermost being the smallest, oblong-elliptic to broadly elliptic, 6-9.5 cm. by 2.5-4.5 cm., base sheathing. Flower solitary, deep pink lip with a purple tint, c 6 cm. in diam.; dorsal sepal broadly ovate, 3 cm. long, acuminate, lateral sepals about the same length, connate under the lip; apices free; petals oblong, 3 cm. long, acute, spreading. Lip 2.5 cm. long, ventricose, mouth wide, crenate, pendent. Staminode broadly ovate, c 9 mm. long, slightly cordate at the base. Ovary fusiform, pubescent.

Flowering time - June-July.

Altitudinal range - 3655-3970 m.

Distributional pattern - west & central Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No. $2n = 20$ (Mehra & Kashyap, Taxon, 27:226, 1978).

APOSTASIA Bl. (Apostasioideae). Because of its very different floral structure it is suggested that it might be separated from most of the orchids.

Terrestrial herbs with a short caudex; leaves narrow and strongly nerved. Flowers small having sepals, petals and lip all alike and of equal length. Anthers two at the side of the staminode, staminode erect and behind the stigma.

Apostasia wallichii R. Br.

Stem 30-60 cm. high; leaves linear-lanceolate. Inflorescence a panicle, decurved; flowers c 6 mm. in diam., yellow, subsecund; anthers two unequal and versatile; staminode adnate to the style.

ANOECTOCHILUS Bl. (Erythrodeae). Referring to the lip which is adnate to the column but which, through a sharp bend in the isthmus, has its blades spreading to give the appearance of openness. These are terrestrial herbs with a creeping stem. Flowers in glandular-pubescent spikes. Lip adnate to the base of the column.

Lin & Hsu (1976) advocate that *Anoectochilus* Bl. and *Odontochilus* Bl. should be kept separated. Seidenfaden (1978) has preferred to list the Thai species under *Anoectochilus*. As our species are embraced, we follow Seidenfaden.

Anoectochilus abbreviata (Lindl.) Seidenf. (= **Odontochilus abbreviatus** (Lindl.) Tang & Wang)

Inflorescence a spike, puberulous; flowers pinkish; ovary not hairy; epichile much reduced, not bipartite hardly 1 mm. long and broad. Median keel in sac low at basal part, split into two and raised near the base of the claw; claw with no lateral teeth. Spur small saccate.

Anoectochilus burmannicus Rolfe, (= **Odontochilus crispus** (Lindl.) Hk. f.)

Inflorescence 10-12 flowered; flowers with lip yellow and ovary hairy. Claw of lip without teeth or fringes, quite entire; spur pointing away from ovary.

Anoectochilus lanceolatus Lindl. (= **Odontochilus lanceolatus** (Lindl.) Bl.)

Inflorescence many flowered; flowers with lip yellow and ovary not hairy. Epichile of lip with a V shaped sinus; claw with fringes c 5-6 mm. long, spur small, saccate.

Anoectochilus roxburghii (Wall.) Lindl.

Inflorescence few flowered. Ovary hairy; claw of lip with long fringes c 5-6 mm. long; spur pointing forwards in a wide angle to the ovary.

BRACHYCORYTHIS Lindl. (Platanthereae). Mostly terrestrial but rarely epiphytic orchids. Stem erect; concentration of leaves towards the base. Floral bracts larger than flowers and very similar to the normal leaves. Dorsal sepal erect, and at the axil of the sheathing leaf; the petals having a tendency of being adnate to the lower part of the column. Lip with the hypochile saccate, cymbiform, epichile turned abruptly downwards.

Plate 4

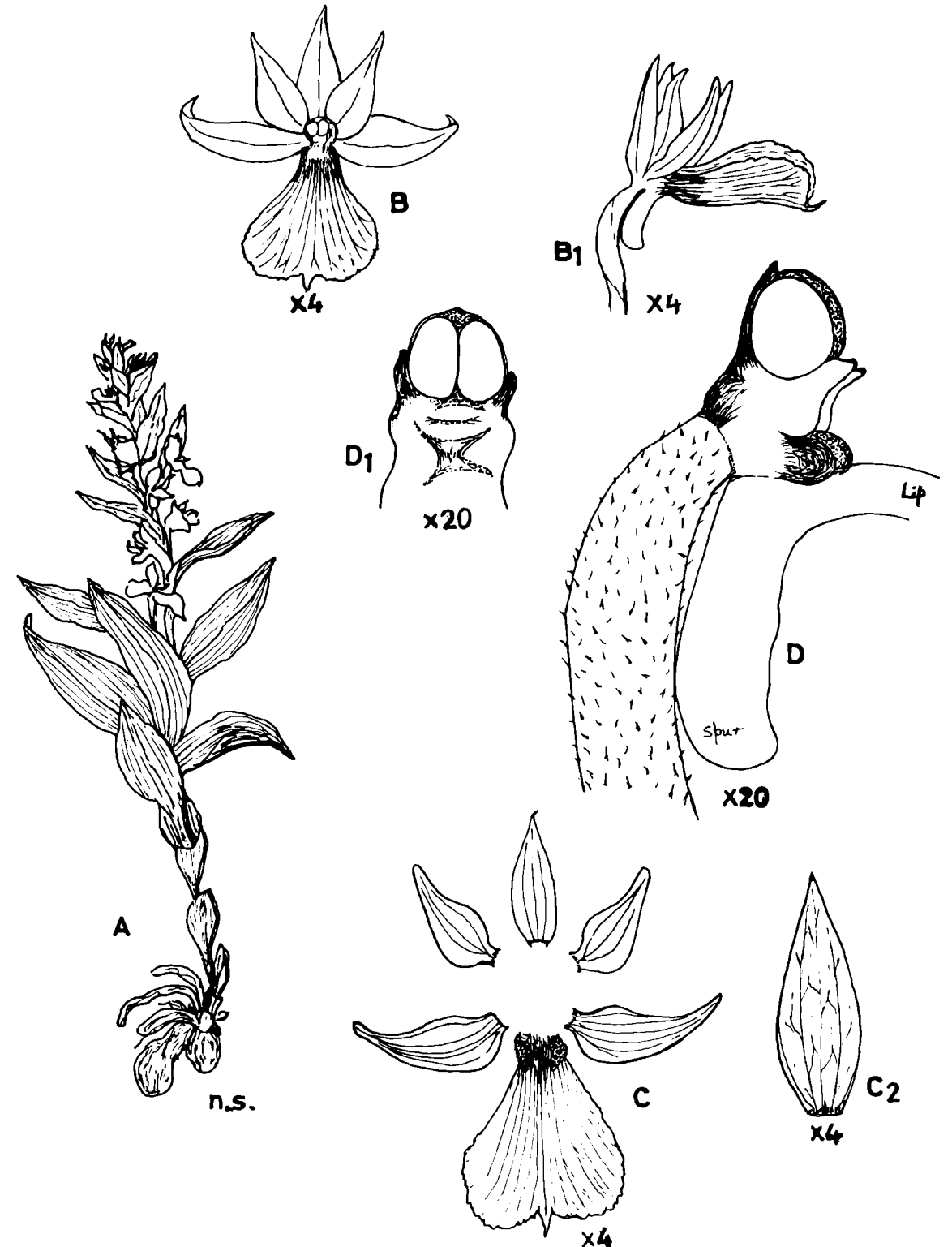
Brachycorythis obcordata (Lindl.) Summerh. in Kew Bull. 1955:243, 1955; H. et al. 32, 1978.

= *Platanthera obcordata* Lindl. Gen. Sp. Orchid Pl. 290, 1835.

= *Habenaria galeandra* auct. non Benth. : Hk. f. 6:113, 1890; B. & T. 72:35, 1975.

= *Habenaria obcordata* (Lindl.) Fyson : T. 3:153, 1975.

Terrestrial. Tubers globose or oblong. Plants 5-24 cm., usually 15-18 cm. high, glabrous or puberulous usually purple tinged, lower portion of stem bearing a few loose leaf sheaths. Leaves usually 2.5-5 cm. by 1-1.8 cm., oblong-lanceolate or elliptic-lanceolate, sessile, blunt or subacute. Spike usually 3-8 cm. long, lower floral bracts oblong-ovate, twice as long as the flowers, upper lanceolate and gradually



diminishing upwards. Flowers c 1-1.2 cm. across, pink to pale purple. Dorsal sepal erect, ovate-lanceolate, 6 mm. long, lateral sepals 7 mm., ovate-lanceolate, falcate, spreading and acuminate. Petals a little shorter than the sepals 5 mm., ovate-lanceolate, sub-falcate, partly conniving with the dorsal sepal. Lip broadly triangular, obcordate, 9 mm., long, mucronate, base shortly, sides erect, puberulous; spur short about half as long as the ovary, stout and conical. Staminodes distinct and curved forwards. Ovary curved and puberulous.

Flowering time - July to August.

Altitudinal range - 1300-2638 m.

Distributional pattern - mostly in western & central Nepal, extending eastwards.

Collection in Herbarium - 23 gatherings.

Specimens studied - 4.

Chr. No. $n = 21$ (Vij et al. Taxon, 25:640, 1976 as *Habenaria galeandra*.)

$2n = 42$ (Mehra & Kashyap, ibid. 27:226, 1978 as *Brachycorythis obcordata*.)

also $2n = 38$ (Jorapet, ibid. 29:546, 1980 as *Phyllomphax obcordata*.)

Remarks - *Brachycorythis* proper has spurless flowers but according to Kranzlin no line of demarcation can be drawn between spurred and spurless species. There being a nomenclatural tangle, we have followed Hara.

COELOGLOSSUM Hartm. (Platanthereae). From the form of the lip which is hollow. Previously many species were treated under the genus *Habenaria* Willd. The significant characters are lip quadrate, trilobed, lobes almost equal to each other; spur very short, bilobed and saccate. The stigmatic surface is flat, not conjoined.

Coeloglossum viride (Linn.) Hartm.

Stem c 7.5 to 10 cm. high; leaves 3-4, narrowly oblong, gradually becoming smaller upwards. Inflorescence a lax spike of 7-8 flowers, floral bracts oblanceolate or oblong-lanceolate, exceeding the ovaries, green. Flowers 5-6 mm. in diam., sepals and petals striped with dark red; sepals cucullate at their apices; petals equalling the dorsal sepal. Lip linear-oblong, widened towards the apex, pale brown, apex broadly emarginate yet trilobed, midlobe very small while sidelobes divergent and exceeding the midlobe; spur short, about half the length of the ovary.

DACTYLORHIZA Necker, (Platanthereae). The genus derives its name for the digitately divided underground parts.

Plate 5

Dactylorhiza hatagirea (D. Don) Soo, Non. Nov. Gen. *Dactylorhiza* 5:4, 1962, H. et al. 38, 1978.

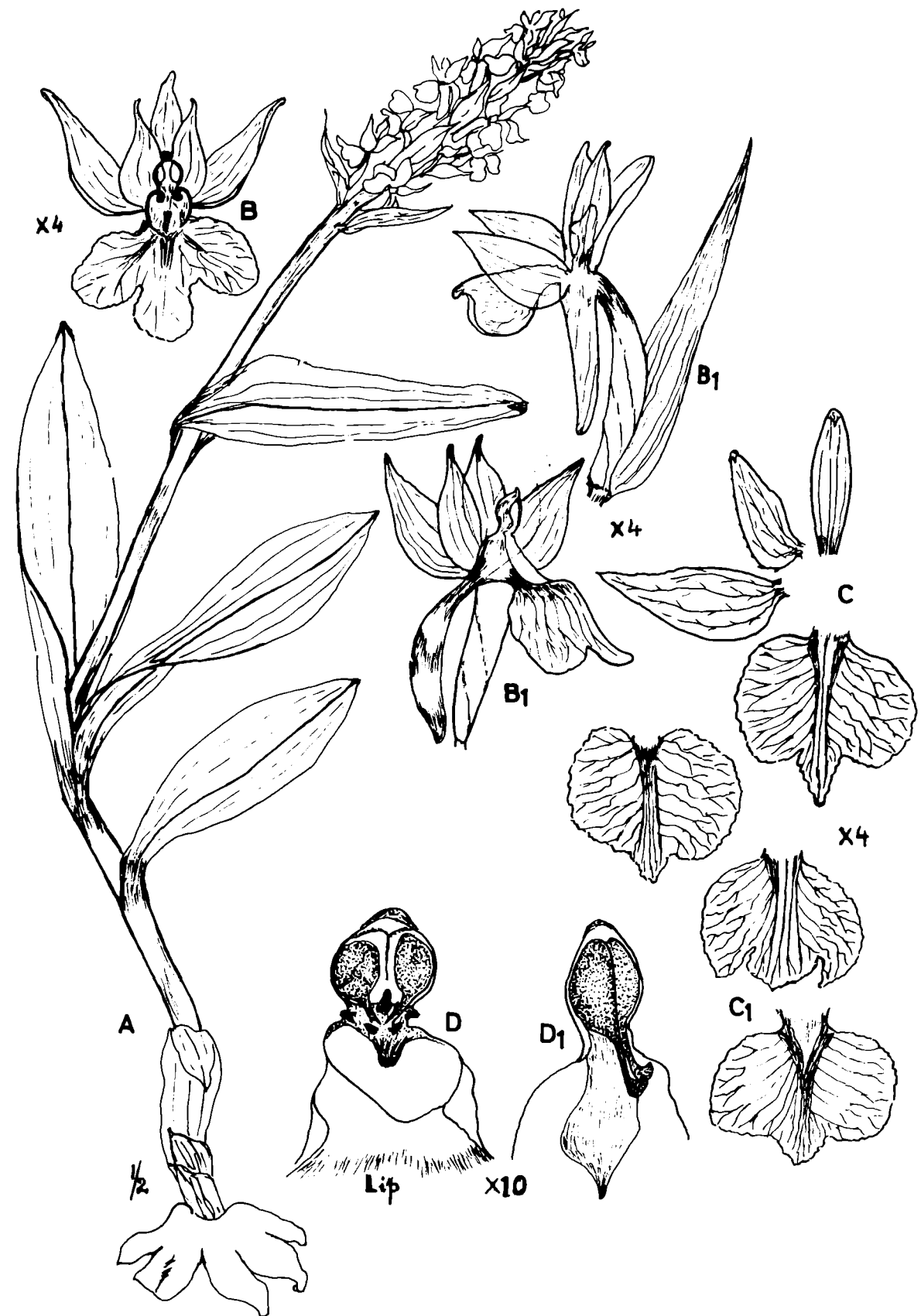
= *Orchis hatagirea* D. Don, Prodr. Fl. Nep. 23, 1825.

= *Orchis latifolia* auct non L. : Hk. f. 6:127, 1890; D. 172, 1906; Coll. 499, 1921; P. 76; 1931; B. & T. 73:151, 1975.

Plants 30-60 cm. high with tuberous roots which are divided into 3-5 finger-like lobes, stem robust, leafy throughout or the lower portion bearing a few scales. Leaves oblong-lanceolate, 12-17 cm. by 2.5-3.5 cm., obtuse, sheathing base. Spike 12-20 cm. long, dense flowered, floral bracts 2-2.5 cm. long, narrowly lanceolate, much exceeding the flowers, gradually becoming smaller higher up. Flowers usually 1.6 cm. across from tip of dorsal sepal to the apex of the lip, pink to purple. Sepals unequal, dorsal sepal oblong, 8 mm. long, forming a hood with the petals, lateral sepals ovate-lanceolate, subfalcate, c 10 mm. long, spreading. Petals oblong ovate, 7 mm., base oblique, faintly serrulate, apex apiculate. Lip adnate to the column, deltoid or orbicular or even obscurely 3-lobed, turned downwards, crenate, pink spotted; spur straight, cylindric, nearly as long as the ovary. Anthers adnate, cells diverging; caudicles attached to viscid glands enclosed in a pouch overhanging the stigma; staminodes small process-like. Stigma bilobed.

Flowering time - June.

Altitudinal range - 3100-3408 m.



Distributional pattern - west Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No. $2n = 40 \text{ \& } 80$ (Mehra & Pandita, Taxon, 27:388, 1978).

DIPHYLAX Hook. f. (Habenarieae). Terrestrial plants with one large leaf, subradical. Raceme decurved with small secund flowers. Lip entire and spur short, fusiform. Anther with a setiform staminode on each side as long as itself. "Two slender spurs of the column, one on each side of the anther" is the character due to which the genus is named.

Plate 6

Diphylax urceolata (C.B. Cl.) Hook. f. Ic. Pl. 19:t. 1865, 1889; H. et al. 40, 1978.

= *Habenaria urceolata* C.B. Cl. Journ. Linn. Soc. 25:73, t.30, 1889; Hk. f. 6:165, 1890; K. & P. 316, t.415, 1898; D.187, 1906; B. 19:218, 1964 et 55:267, 1958; B. & T. 72:37, 1975.

Plant 9-15 cm. high, stem curved with a single sheath at the base. Leaf usually solitary, 3-7.5 cm. by 6-2 cm., narrowly elliptic-oblong, obtuse, sheathing at base, bracts several. lower-most leaf-like. Raceme 1.5-5 cm. long, decurved, lax flowered, secund, flowers 9 mm. long, longer than the ovaries, white or rosy; floral bracts 7 mm. long, longer than the ovary. Sepals nearly equal, erect, dorsal sepal elliptic, 6 mm. long, blunt, lateral sepals falcately oblong, 6 mm. long, acute; petals as long as the sepals or shorter, oblong, narrow at the base. Lip as long as the petals, 5 mm. long, decurved beyond the middle, slightly concave, thicker towards the apex, margin serrulate; spur shorter than the sepals, 3 mm. long, neck constricted, inflated. Anther cells approximating; staminodes parallel to the anther-cells and exceeding them, filiform, apices free. Column elongated, apex pointed.

Flowering time - September.

Altitudinal range - 2743-3048 m.

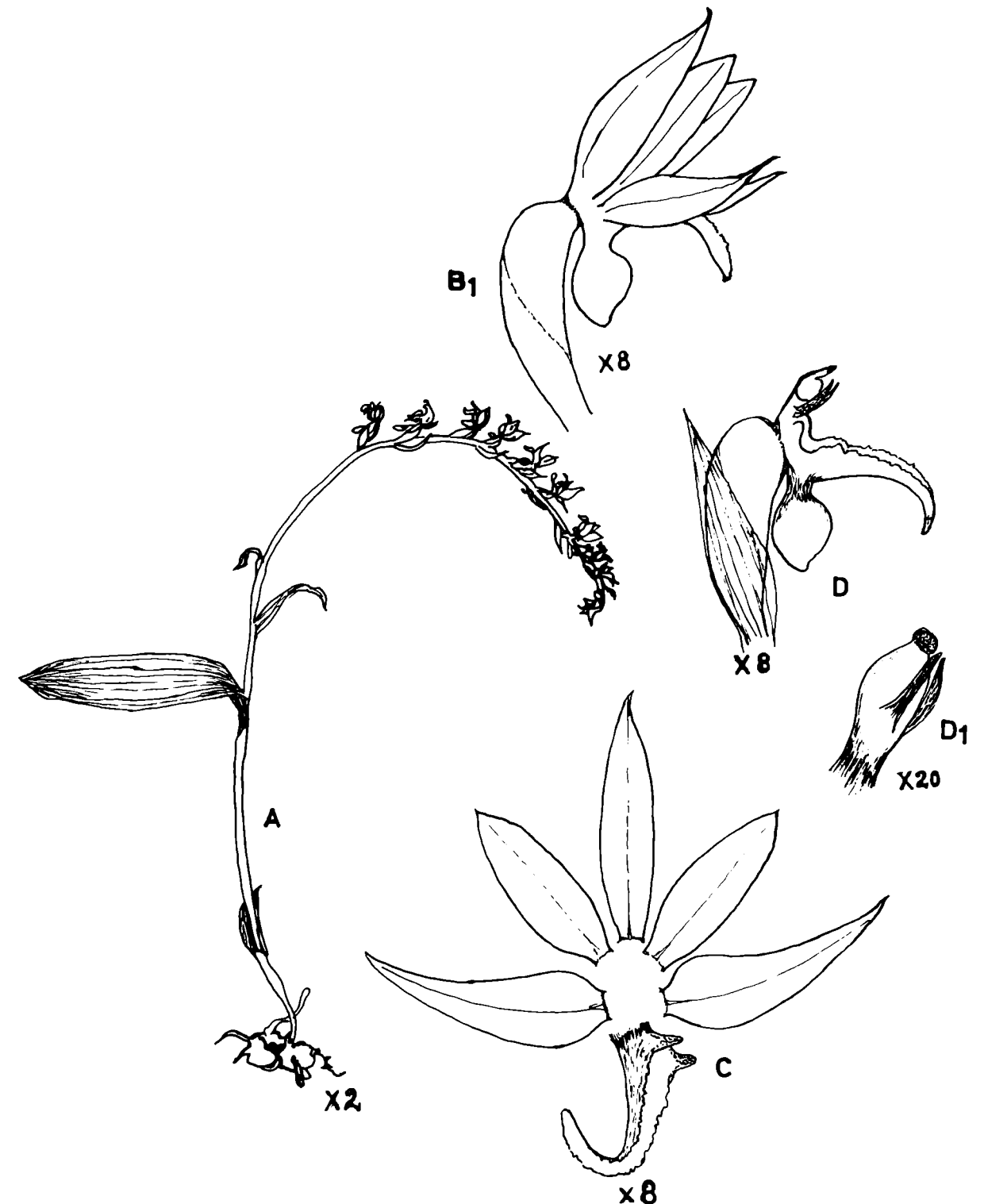
Distributional pattern - eastern Nepal.

Collection in Herbarium - 2.

Specimens studied and dissected - 2.

Chr. No.

Remarks - Specimens have been collected as epiphytes on mossy trunks of *Rhododendron barbatum* & others.



DIPLOMERIS Don, (Habenariae). These are terrestrial, small, 1-2 leaved orchids, stiff hairs scattered on both surfaces. Flowers are large, solitary sometimes 2 on a scape. Sepals are smaller than the petals, which are broad. Lip is suborbicular or cuneately orbicular.

Diplomeris pulchellus D. Don.

Rootstock creeping, stem short glabrous; leaves usually two, ensiform. Inflorescence equalling the leaves; flower solitary, white; petals much larger; lip broadly obcordata, spur curved and thickened beyond the middle.

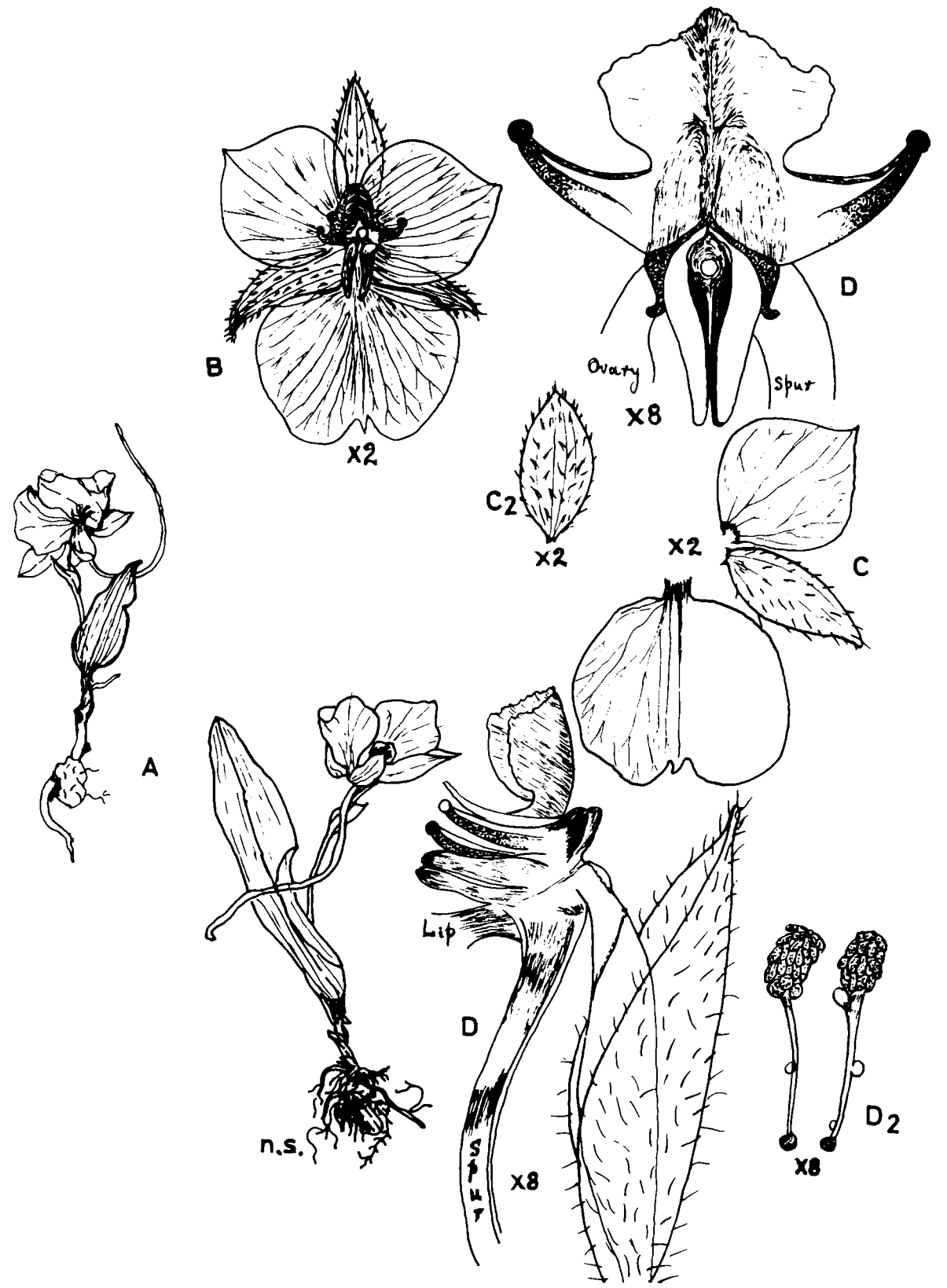


Plate 7

Diplomeris hirsuta (Lindl.) Lindl., Gen. Sp. Orchid Pl. 330, 1835; Hk. f. 6:167, 1890; K. & P. 337, t.443, 1898; T.3:141, t.7a, b, 1975; H. et al. 40, 1978.

= *Diplochilus hirsutus* Lindl. in Edw. Bot. Regist. 18:sub t.1499, 1832.

Terrestrial. Tubers globose. Plants 3-9 cm. high, stem very short; leaf solitary, sometimes with a second leaf, radical 3 to 7.5 cm. by 2 to 3 cm., oblong or oblong-lanceolate, lamina base minutely cordate, stiff hairs scattered on both surfaces. Scape 1 flowered; flower white, c 2.5 cm. in diam.; floral bract ovato-oblong 1 cm. long, sheathing, pubescent. Sepals equal, ovate-oblong, 1.5 cm. long, 5 nerved, dorsal sepal broader than the lateral sepals, sparsely pubescent. Petals much larger, orbicular-reniform, 1.5 cm. by 1.6 cm., apex slightly acute. Lip suborbicular with a short claw 2.1 cm. by 2.2 cm., apex mucronate, mid-rib somewhat thickened; spur infundibuliform at the mouth, curved, c 4 cm. long, about 3-4 times longer than the ovary. Anther cells on each side and behind the imperfect stigma, triangular, very long horizontal tubes pointing forwards; staminodes 2, small, oblong, rugulose, each at the lower part of the outer surface of the anther cell; pollinia with very long and curved caudicles. Column short, infertile stigma thin, very large, erect, ovate-rotund, irregularly lobed along the edges, surface concave; fertile stigmas two, parallel and concate, lying by their inner edges below the mouth of the spur.

Flowering time - August.

Altitudinal range - 1370-1830 m.

Distributional pattern - central Nepal.

Collection in Herbarium - 3 gatherings.

Specimen studied - 1.

Chr. No. n = 21 (Mehra & Kashyap, Taxon, 25:492, 1976).

2n = 42 (Vij, Gupta & Garg, ibid. 25:634, 1976).

Remarks - This orchid appears to be rare on the basis of collection housed in the herbarium.

GALEARIS Rafin. (Platanthereae). The name alludes to the helmet-like appearance of the connivent petals and sepals which form a hood over the column. *Galearis* can readily be distinguished from *Orchis* and *Dactylorhiza* by its lack of tubers, possessing only a rhizome with fleshy roots; two bursicles, divergent anther cells. Hara et al. (1978, p.43) prefer to follow Hunt (1971, p.172) in recognising the genus *Galearis* while Vermeulen and Seidenfaden & Arora (1982) accept the genus *Aorchis*.

Galearis stracheyi (Hk. f.) P.F. Hunt.

Leaf solitary, radical, elliptic or obovate. Spike few flowered; floral bracts leafy. Lip longer than the sepals, broadly cuneate, 3-lobed to the middle, lobes obtuse; spur equalling the ovary, incurved.

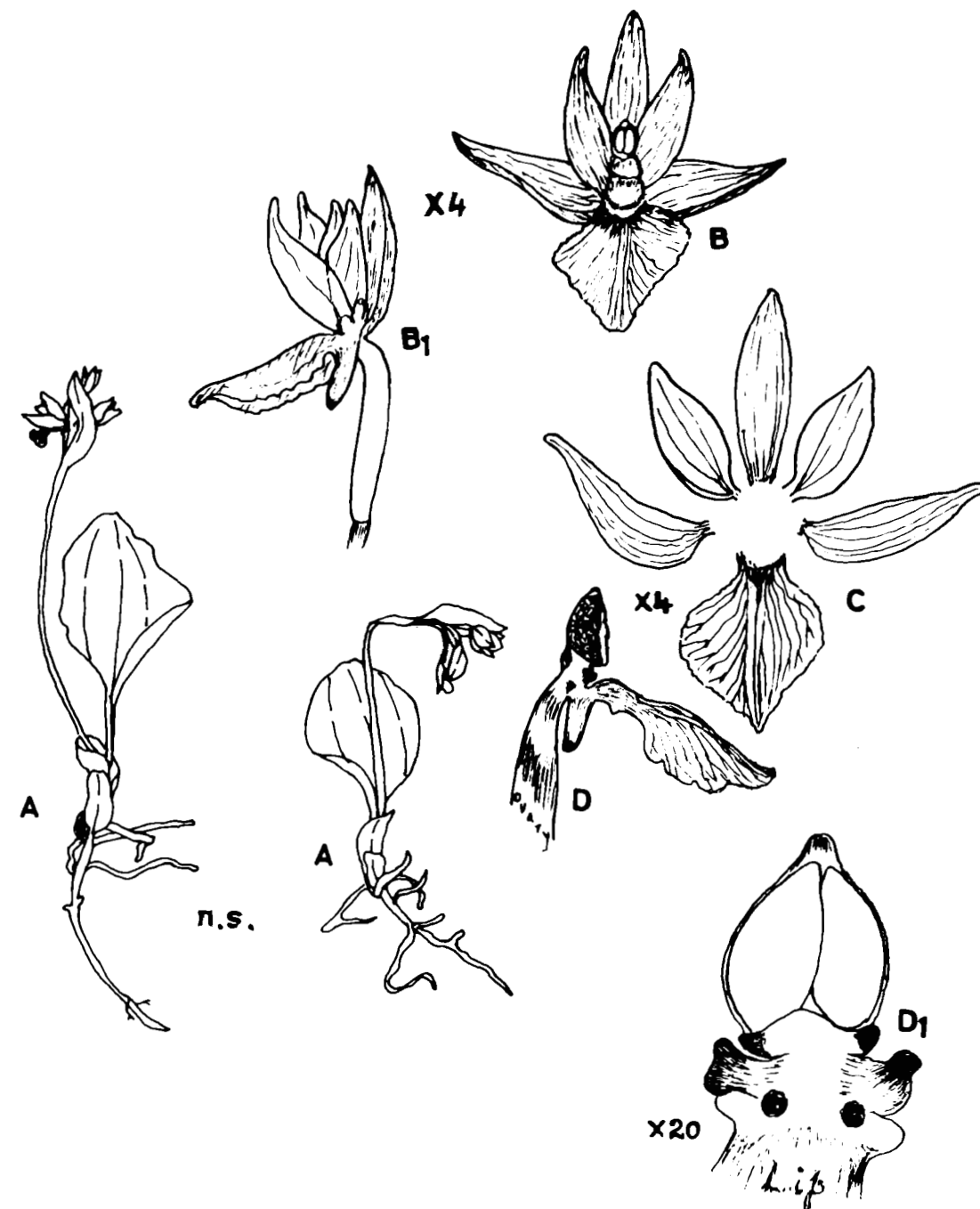


Plate 8

Galearis spathulata (Lindl.) P.F. Hunt, Kew Bull. 26:172, 1971; H. et al. 43, 1978.

= *Gymnadenia spathulata* Lindl. Gen. Sp. Orchid Pl. 280, 1835.

= *Orchis spathulata* (Lindl.) Reichb. f. : Hk. f. 6:127, 1890; K. & P. 301, t.400, 1898.

Terrestrial. Plants 4.5-8.5 cm. high, one or two loose sheaths at the base. Leaf solitary at the base of the stem, subsessile or petioled, elliptic, 2.8-5.2 cm. by .9-2.4 cm.; lamina gradually tapering into the petiole, stem above the leaf long, slender and naked. Spike 1-4 flowered; floral bracts lanceolate, much larger than the flowers. Flower 1.6 cm. in diam., deep purple; sepals unequal, dorsal sepal oblong 8 mm. by 2 mm., obtuse, lateral sepals oblong-lanceolate, 8 mm. by 2.5 mm., sub-acute, spreading. Petals broadly elliptic, subfalcate, shorter than the sepals, 7 mm. by 3 mm. erect, oblique apex. Lip broadly ovate to deltoid, usually 8 mm. by 5 mm., wings directed downwards, edges sub-undulate, upper surface with numerous shallow grooves along the veins running to the apex, base of lip thickened at the mouth of the spur; spur 2 mm. long, about half as long as the ovary, cylindrical and straight. Staminodes small and rugulose. Stigma prominent attached to the margin of the column and interior to the staminodes, elliptic and widened.

Flowering time - June.

Altitudinal range - 4115 m.

Distributional pattern - so far collected from east Nepal only.

Collection Herbarium - 1 gathering.

Specimen studied - 1.

Chr. No.

Remarks - There is difference of opinion about the generic concept of the *Orchis* group. Hara et al. (loc. cit) follow Hunt (loc. cit); we have followed Hunt and Hara.

GYMNADENIA R. Br. (Platanthereae). The name of the genus is derived from the sticky disk of the pollinia which are set free on each side of the rostellum and not in a pouch. The species of *Gymnadenia* are often included in *Habenaria* Willd., from which they are separated on technical details. The root system consists of two or more tubers at base of the stem, with a few fleshy roots above them. The rather juicy stems are furnished towards the base with a few leaves, and terminate in a raceme.

***Gymnadenia conopsea* R. Br.**

Inflorescence rather long and dense flowered, flowers fragrant; sepals reddish-lilac, lateral sepals spreading; petals linear-lanceolate and slightly united with the dorsal sepal. Lip red, with 3 rounded lobes, side lobes fimbriate; spur twice as long as the ovary.

[This species has some resemblance to *H. dentata* (Sw.) Schltr.]

Plate 9

***Gymnadenia orchidis* Lindl.** Gen. Sp. Orchid Pl. 278, 1835; Dept. Med. Pl. 2:133, t.1969; H. et al. 45, 1978.

= *Habenaria orchidis* (Lindl.) Hk. f. 6:142, 1890.

= *Orchis habenarioides* K. & P. 302, t.401, 1896; D.172, 1906; B. B. & V. 13:224, 1951; B. & T. 73:149, 1975.

Terrestrial, entire plants 25-60 cm. tall, leafy, stout. Leaves 3 to 8 usually 4 or 6, elliptic-oblong to linear oblong, 5-12 cm. by 3.5 cm., stem above the leaves bearing 2 or 3 lanceolate bracts. Spike densely flowered. Flowers 6-10 mm. across, pink with a faint sweet smell; floral bracts lanceolate, longer than the curved shortly-beaked ovary. Dorsal sepals, elliptic, 3-6 mm. by 2-3 mm., erect forming a hood with the petals, puberulous, lateral sepals broadly ovate to ovate-lanceolate, 3.5-6 mm. by 2-3 mm., puberulous, spreading and somewhat reflexed. Petals ovate-rotund or rhombic-orbicular, sides unequal at the base, 3-6 mm. by 2-3.5 mm. Lip broadly oblong, truncate at the base and united with the base of the column, much variable in shape and size, usually 6 mm. long and 3 lobed at the broad apex, apical lobe prominent; spur 7-17 mm. long, equalling or larger than the ovary which is 7-11 mm. long, curved. Column short and broad, 2 mm. by 2.5 mm. Anther cells distant from one another; staminodes rugulose, prominent on either side of the caudicles; pollinia broadly elliptic, caudicles stout and short. Stigmatic processes large forming a transverse band.

Flowering time - June to July.

Altitudinal range - 1352-3962 m.

Distributional pattern - all over Nepal from east to west but more in central part.

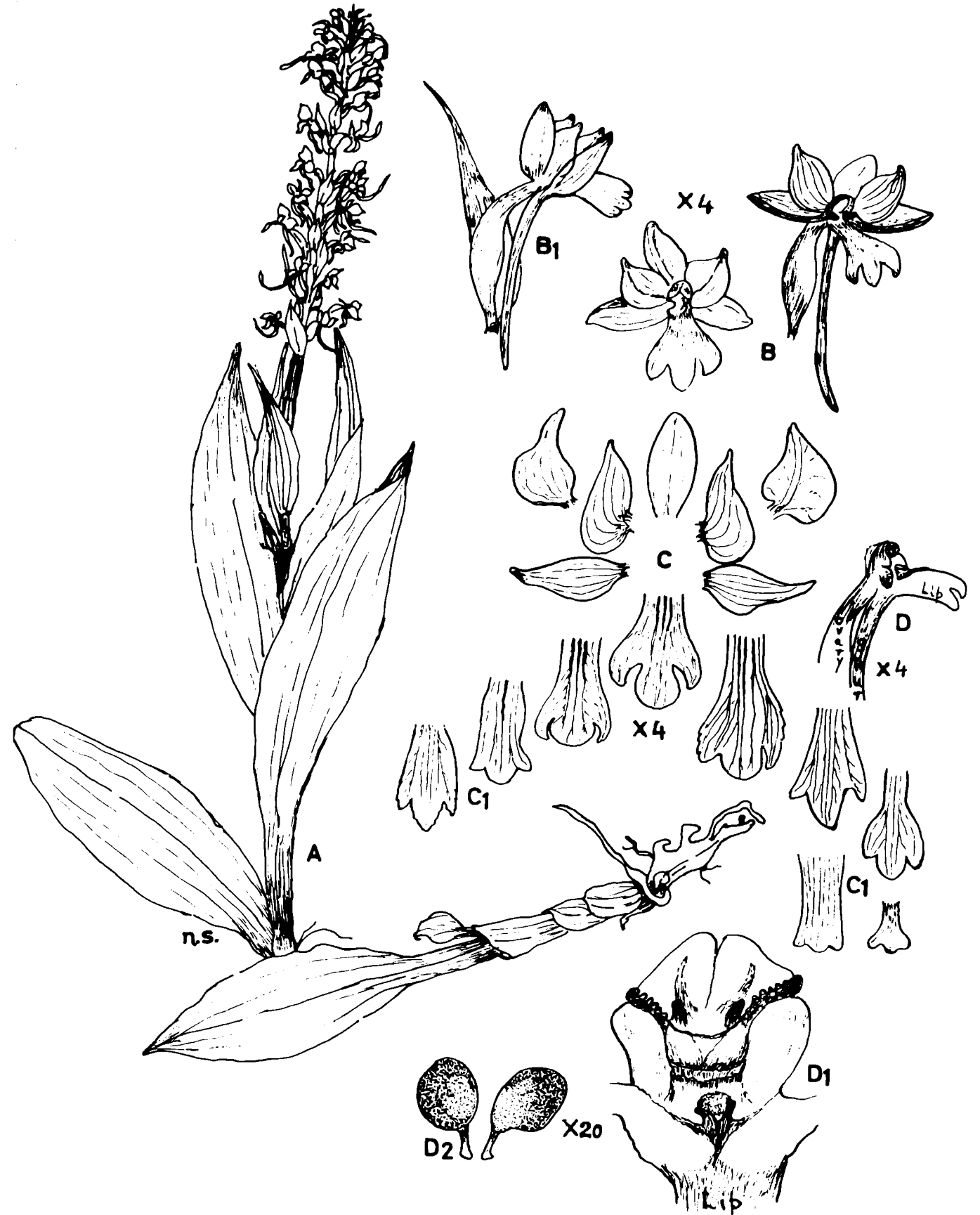
Collection in Herbarium - 15 gatherings.

Specimen studied - 15.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:110, 1970).

2n = 40 (Mehra & Kashyap, ibid. 28:407, 1979) (all as *Orchis habenarioides*.)

Remarks - There is a great deal of variation in the number of leaves on a plant. Also, the lip is very variable, with faintly 3 lobed apex to those with deeply 3 lobed apex, further the mid lobe may be equal to the side lobes. The lateral petals also exhibit variations in shape and size.



HABENARIA Willd. (Habenarieae). One of the largest genera of orchids. Terrestrial plants, usually growing from tubers, rarely from a short rhizome; stem simple and erect, bearing few from basal and cauline leaves which are thin usually broad and sheathing at the base. Inflorescence is terminal, usually fairly long of many small or large flowers. The dorsal sepal and petals usually form a hood over the column; the lateral sepals usually spreading or reflexed; lip spurred and the blade variously shaped-simple, 3 lobed or 3 partite. Column short consisting mainly of anther, usually with a small auricle on either side; pollinia 2, separate, clavate or pyriform, the caudicles enclosed in long or short often prominent tubes and separated more or less widely by the rostellum. Stigmas 2, usually separated convex or on elongated processes on either side of the column.

Habenaria dicerias Schltr.

Terrestrial, 25-35 cm. tall; leaves 2 near the base, suborbicular. glabrous. Inflorescence a cylindrical spike densely flowered, finely puberulous; floral bracts equalling or a little shorter than the ovary, lanceolate. Flowers small green; dorsal sepal ovate, erect, lateral pair falcate-oblong, reflexed; petals equalling the lateral sepals, obliquely lanceolate, erect. Lip trifid, segments linear, midlobe deflexed.

Habenaria longifolia Buch.-Ham. ex Lindl.

Stem 25-45 cm. tall; leaves scattered, erect, linear. Raceme laxly few flowered; floral bracts longer than the curved ovary. Flowers white; dorsal sepal smaller than the lateral pair; petals equalling the dorsal sepal; lip flabelliform deeply 3-lobed, twice or thrice the length of the lateral sepals, side lobes semicircular, mid lobe linear and shorter than the side lobes; spur twice as long as the ovary.

Habenaria pubescens Lindl.

Stem 30-45 cm. tall; stout, leafy towards the base; leaves elliptic-lanceolate. Racemes many flowered, pubescent; floral bracts shorter than the curved ovary, ciliolate. Dorsal sepal hemispheric equalling the ovate lateral sepals; petals linear; lip much longer than the sepals, tripartite, segments linear; spur equaling the curved ovary.

Habenaria reniformis (D. Don) Hk. f.

Small plants with usually 2 or rarely 3 leaves; leaves flattened along the surface of soil. Raceme wiry, 4-6 flowered; floral bracts much shorter than the ovary. Flowers small, green; sepals and petals c 4 mm.; lip entire or 3-partite with segments slender; spur c 4-5 mm. long.

Artificial key to the species of *Habenaria*

- 1 Petals bipartite; lip 3-lobed or 3-partite —
 - 2 Spur equalling the ovary and turned upwards. Floral bracts equalling the ovary. Petals produced as a wing near the base. *stenopetala*
 - 2* Spur shorter than the ovary. Floral bracts longer than the ovary. Petals deeply bipartite. *digitata*
- 1* Petals entire —
 - 3 Side lobes of lip broad and the apical lobe narrow —
 - 4 Side lobes of lip cuneate or rounded, edges fimbriate or crenate. *dentata*
 - 4* Side lobes of lip deeply pectinate —
 - 5 Anther tubes short; spur as long as the ovary, stout, funnel-shaped. Lateral sepals erect. *pectinata*
 - 5* Anther tubes long; spur longer than the ovary —
 - 6 Stigmas spreading; petals gibbous at the base. Lateral sepals horizontal. *arietina*
 - 6* Stigmas curved upwards and inwards. Petals not gibbous at base, apices overlapping. Lateral sepals recurved. *intermedia*
 - 4** Side lobes of lip entire. Petals forming a hood with the dorsal sepal. Spur longer than the ovary. *plantaginea*
 - 3* Side segments of lip narrow, usually filiform —
- 7 Lateral segments longer than the mid segment —
 - 8 Spur not longer than the ovary —
 - 9 Floral bracts shorter than the ovary. Lateral segments of lip spreading. Petals not forming a hood with the dorsal sepal —
 - 10 Lateral segments of lip spreading. *aitchisoni*
 - 10* Lateral segments of lip spreading but spirally twisted at the tips. *diphylla*
 - 9* Floral bracts equalling the ovary. Petals forming a hood with the dorsal sepal. *marginata*
 - 8* Spur longer than the ovary. *furcifera*
- 7* Lateral segments of lip shorter than the mid segment —
 - 11 Spur half as long as ovary, curved from the middle. Ovary ciliolate on the ridges. Stem triquetrous, angles fimbriate. Anther tubes long and spreading. *malleifera*
 - 11* Spur much longer than ovary, apex clavate. Ovary and stem glabrous. Anther tubes long straight. *commelinifolia*

Plate 10

Habenaria aitchisonii Reichb. f. apud Aitch. in Trans. Linn. Soc. Bot. ser. 2,3:113, 1886; Hk. f. 6:152, 1890; D.186, 1906; Kit.102, 1955; B. & T. 72:32, 1975; H. et al. 45, 1978.

Tubers oblong, about 2 cm. long, Plant c 25-30 cm. high. Leaves two, subopposite, sessile, orbicular or broadly ovate, c 7 cm. long, cuspidate. Raceme 12-16 cm. long lax many flowered; floral bracts linear lanceolate 7-8 mm. long, shorter than the ovary. Flowers greenish or yellowish green, c 8 cm. in diam; sepals subequal, dorsal ovate 5 mm. by 2.5 mm. erect, concave forming a hood, lateral sepals wide-spreading, reflexed, obliquely lanceolate acute. Petals erect broadly lanceolate falcate, 5 by 2 mm., acute. Lip equalling or a little longer than the sepals, c 8 mm. long, divided at base into three linear lobes, mid lobe straight, lateral lobes longer, spreading, and with tips recurved; spur curved forwards, clavate at the apex, 7-9 mm. long, shorter than the curved ovary. Anther short, broad, cells nearly parallel, caudicles very short. Stigmatic processes large, thick and prominent.

Flowering time - July to August.

Altitudinal range - 2700-3700 m.

Distributional pattern - west & central Nepal.

Collection in Herbarium - 5 gatherings.

Specimens studied - 5.

Chr. No. n = 21 (Mehra & Vij, Taxon, 19:109, 1970).

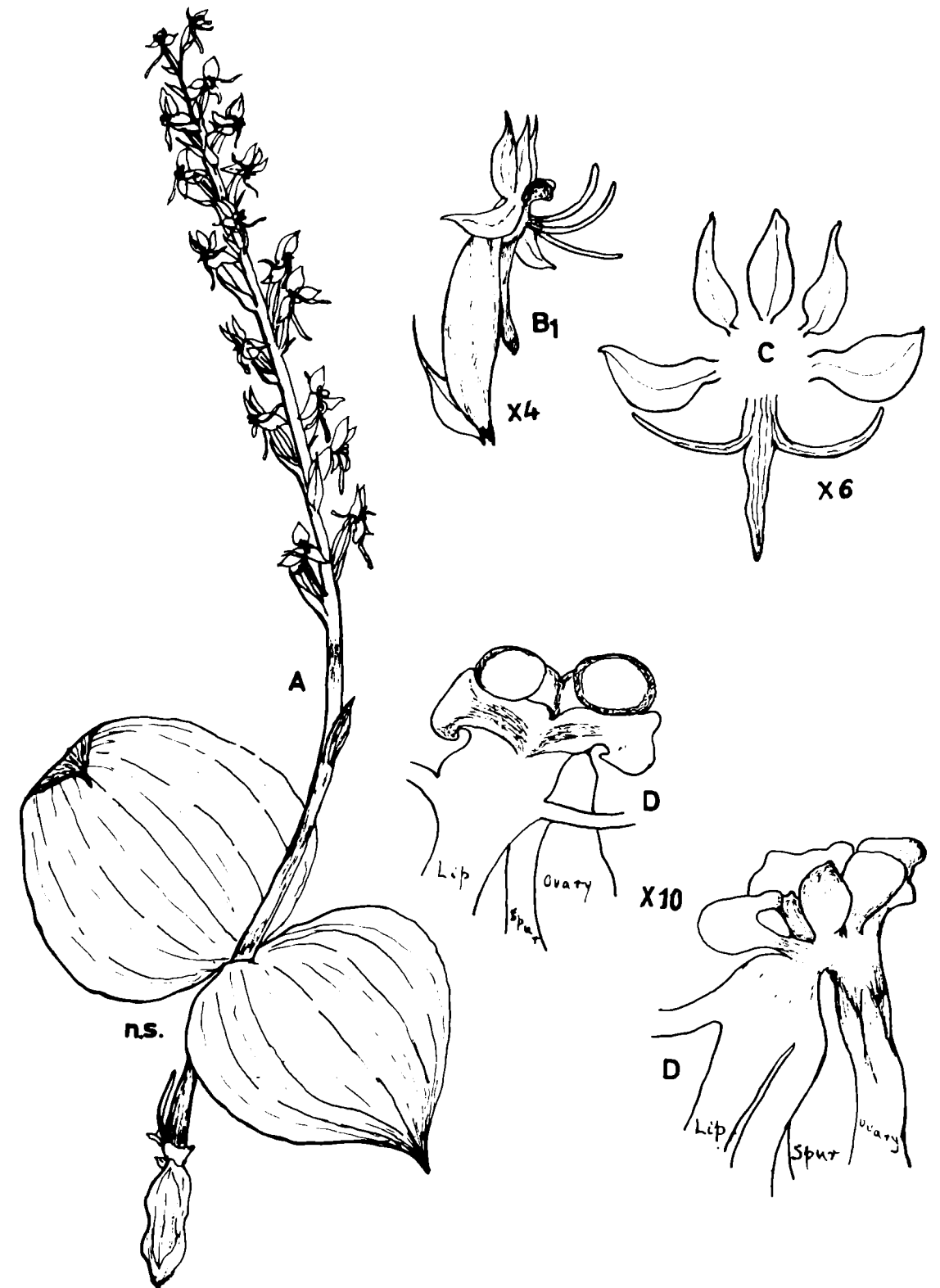


Plate 11

Habenaria arietina Hk. f. Fl. Brit. Ind. 6:138, 1890; K. & P. 311, t.407, 1898; D.180, 1906; T.2:188, 1971 et 3:147, 1975 (arienata); B. & T. 72:32, 1975; H. et al. 45, 1978.

= *H. pectinata* v. *arietina* (Hk. f.) Ktz.

Tubers oblong. Plants robust, 35-45 cm. high; leaves ovato-lanceolate or oblong-lanceolate, 9-16 cm. by 2-3.5 cm., amplexicaul, strongly 3-nerved, acuminate. Raceme 12.5-20 cm. long, rarely longer, dense flowered; floral bracts longer than the ovary, lower foliaceous, middle 2.6-4 cm. long, linear-lanceolate. Flowers green or greenish-white, c 2.5-3.7 cm. in diam., fragrant; sepals subequal, oblong-elliptic, dorsal sepal elliptic, 20 mm., erect forming a hood, gibbously dilated, lateral sepals subfalcate, 18 mm. by 5 mm., ciliolate. Petals broader than the sepals, 15-18 mm. by 6 mm., dilated at the base, erect and adpressed to the dorsal sepal, puberulous. Lip three lobed for about ¼ of its length, base to midlobe 2 cm. long, midlobe shorter than the sidelobes, sidelobes pectinate with fewer teeth; spur usually longer than the ovary, c 2.5-3 cm. long, laterally compressed and tip swollen. Anther cells divergent, tubes long and upright. Stigmatic processes long and recurved.

Flowering time - July to September.

Altitudinal range - 1830-2745 m.

Distributional pattern - west and central Nepal.

Collection in Herbarium - 11 gatherings.

Specimens studied - 11.

Chr. No. n = 21 + 0 - 2B (Mehra & Kashyap, Taxon, 25:492, 1976 as *H. pectinata* Lindl.)

2n = 42 (Mehra & Kashyap, Taxon, 30:507, 1981 as *H. arietina*).

Remarks - Based on a careful study of the materials at hand we are inclined to feel that this species is different from *H. ensifolia* Lindl. and *H. pectinata* (Sm.) D. Don. We tabulate the characters of the three species, as they strike us

H. arietina Hk. f.

Lip - Side lobes pectinate, teeth fewer. Division of the lip ¾ or ½ from the base. Mid-lobe of lip shorter.

Spur - Rather longer than the ovary, also equalling the ovary.

H. ensifolia Lindl.

Lip - Side lobes pectinate, teeth fewer. Division of the lip ¼ from base or nearly at the base. Mid-lobe of lip shortest and thickest.

Spur - Shorter than the ovary, also equalling, geniculate.

H. pectinata (Sm.) D. Don.

Lip - Side lobes pectinate, teeth many. Division of the lip - nearly at base. Mid-lobe of lip rather longer than the side-lobe.

Spur - Rather longer than the ovary.

These three species have resemblances to each other. *H. arietina* has a much greater resemblance to *H. ensifolia* than it has to *H. pectinata* according to Duthei (loc. cit.). Collett remarks that *H. arietina* is usually confounded with *H. pectinata*. Further he has also remarked that *H. ensifolia* has been incorrectly associated with *H. pectinata* by Hooker in Fl. Brit. Ind. All this has lead us to make a comparative study of these three species and record our views.

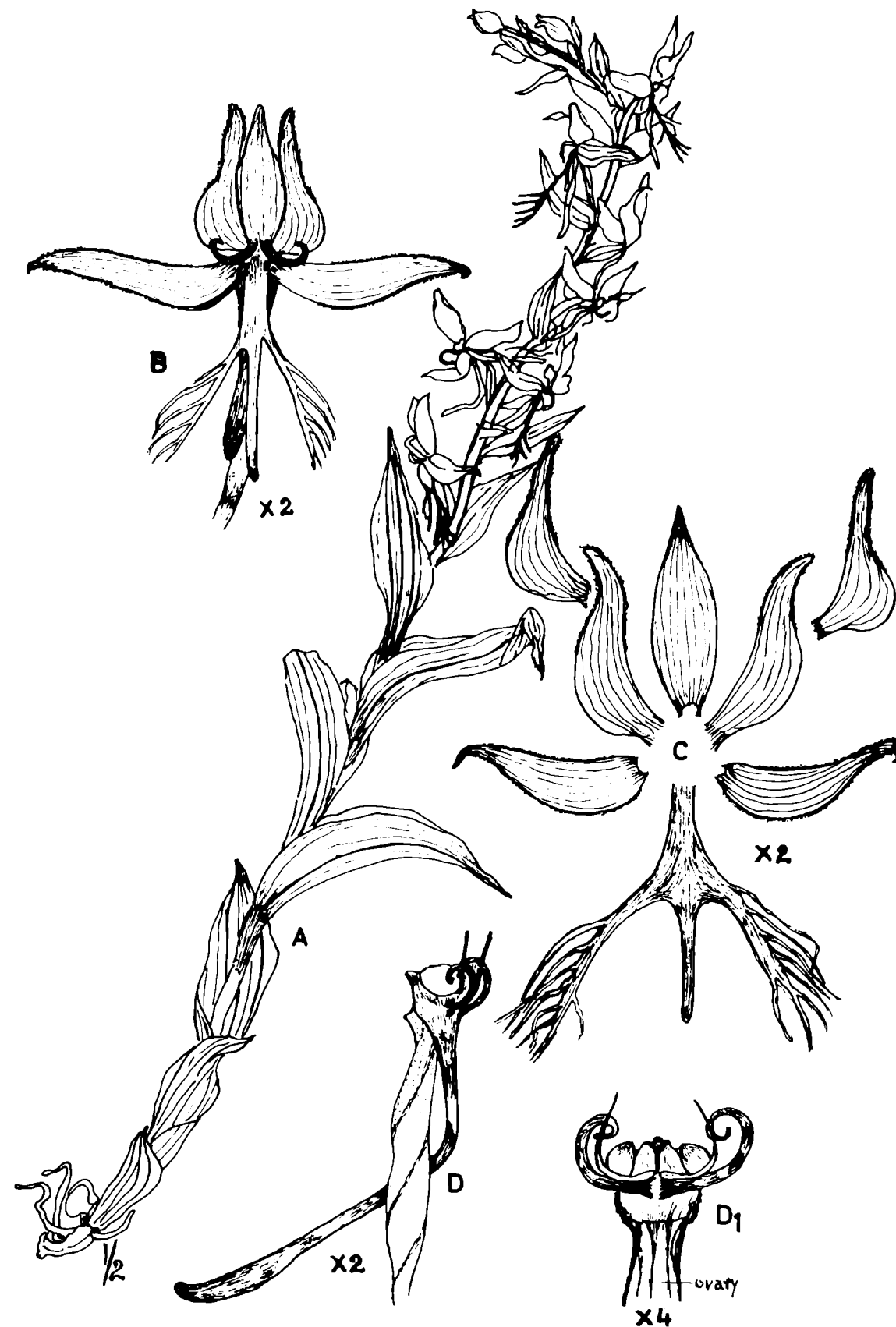


Plate 12

Habenaria commelinifolia (Roxb.) Wall. ex Lindl. Gen. Sp. Orchid Pl.325, 1835; Hk. f. 6:143, 1890; D.183, t.134, 1906; T.3:149, 1975; Seidenf. 31(3):89, 51, 1977; H. et al. 45, 1978.

= *Orchis commelinaefolia* Roxb. Fl. Ind. ed 2,3:451, 1832.

Tubers ellipsoid 6-8 cm. long. Plants 65-85 cm high, lower portion of stem having 2-3 loose sheaths. Leaves oblong or oblong-lanceolate, 8-15 cm. by 1.6-2.5 cm., subcoriaceous, acute or subspinescent at the apex; bracts between the leaves and floriferous region linear-lanceolate, ciliolate. Spike c 10-17 cm. long, many flowered, lax; floral bracts shorter or equalling the ovary, 2-2.5 cm. long, scaberulous on both surfaces, ciliolate along the margins. Flowers 1.5-2 cm. in diam., white; dorsal sepal small, saccate, scaberulous, with a short recurved beak, lateral sepals gibbously hatchet-shaped, beaked, 9 mm. long scaberulous, veins deeply arched. Petals unequally oblong, smaller than the lateral sepals, 6 mm. long. Lip divided into 3 long slender segments near the base, mid segment channelled, longer than the lateral segments, 3.5 cm. long from the point of bifurcation, scaberulous; lateral segments curved downwards 3 cm. long from the point of bifurcation; spur very long c 4.5-6.5 cm., slender and curved, funnel-shaped at the upper end, apex clavate. Anther cells distant and diverging, caudicles very long. Stigma processes long, clavate.

Flowering time - August.

Altitudinal range - 3-950 m.

Distributional pattern - west and central Nepal.

Collections in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. n = 21 (Vij, Gupta & Garg, Taxon, 25:634, 1976);

2n = 42 (Mehra & Kashyap, ibid. 27:226, 1978; Kulkarni, ibid. 28:392, 1979; Singh, ibid. 30:704, 1981).

Remarks - This species seems to be rare as it has been collected only twice by the staff of KATH.



Plate 13

Habenaria dentata (Swartz.) Schlecht. in Fedde, Report. Beih. 4:125, 1919; Kit. 103, 1955; T. 437, 1966 et 3:150, 1975; B. & T. 72:35, 1975; Seidenf. 31(3):98, f. 60, 1977; H. et al. 45, 1978.

= *Orchis dentata* Sw. Vet. Akad. nya Handl. 21:207, 1800.

= *Habenaria geniculata* D. Don, 25, 1825; Hk. f. 6:136, 1890; K. & P. 309 t. 405, f. 1-3 1898.

Tubers ellipsoid c 2 cm. long, pubescent. Plants 30-75 cm. tall, lower part of stem sheathed, middle leafy, and upper bracteate. Leaves oblong-elliptic, 5-10 cm. by 2-2.5 cm., 5-7 nerved, acute, base forming a tubular sheath; bracts lanceolate, 4.5-2.5 cm. long, lanceolate, acute, becoming narrower and diminishing in length upwards. Raceme 5-10 cm. long, laxly flowered; floral bracts lanceolate as long as the fusiform ovary or slightly shorter, 1.5-2 cm. long; flowers white, c 2-2.5 cm. across. Sepals sub-equal, dorsal sepal broadly ovate 8-10 mm. by 4-5 mm., ovate, acute, lateral sepals sub-erect 1-1.2 cm. by 4-6 mm., broadly ovate, acute. Petals linear-oblong, curved inwards, shorter than the sepals 7-9 mm. by 2-3 mm. broad, acute to acuminate. Lip longer than sepals variable in size and shape, sub-orbicular or broadly obcordate, sidelobes cuneate or rounded, fimbriate or crenate, 1.3-1.7 cm. by 1.1-1.4 cm., mid-lobe small and much shorter, tongue-shaped; spur longer than the ovary 3.5-4 cm. long, geniculate, infundibuliform at the base. Anther cells distant, divaricate, tubes elongated and curved inwards. Stigmas two, clavate, falcate; rostellum short and broad.

Flowering time - September to October.

Altitudinal range - 1060-2285 m.

Distributional pattern - east and central Nepal.

Collection in Herbarium - 2 gatherings.

Specimen studied - 2.

Chr. No. $n = 42$ (Mehra & Viji, Taxon, 19:109, 1970 as *Habenaria geniculata*).

$2n = 84$ (Mehra & Segal, ibid. 23:803, 1974 as *H. geniculata*).

Remarks - Our material is the typical variety. No spurless material (var. *ecalcarata*) has been collected.

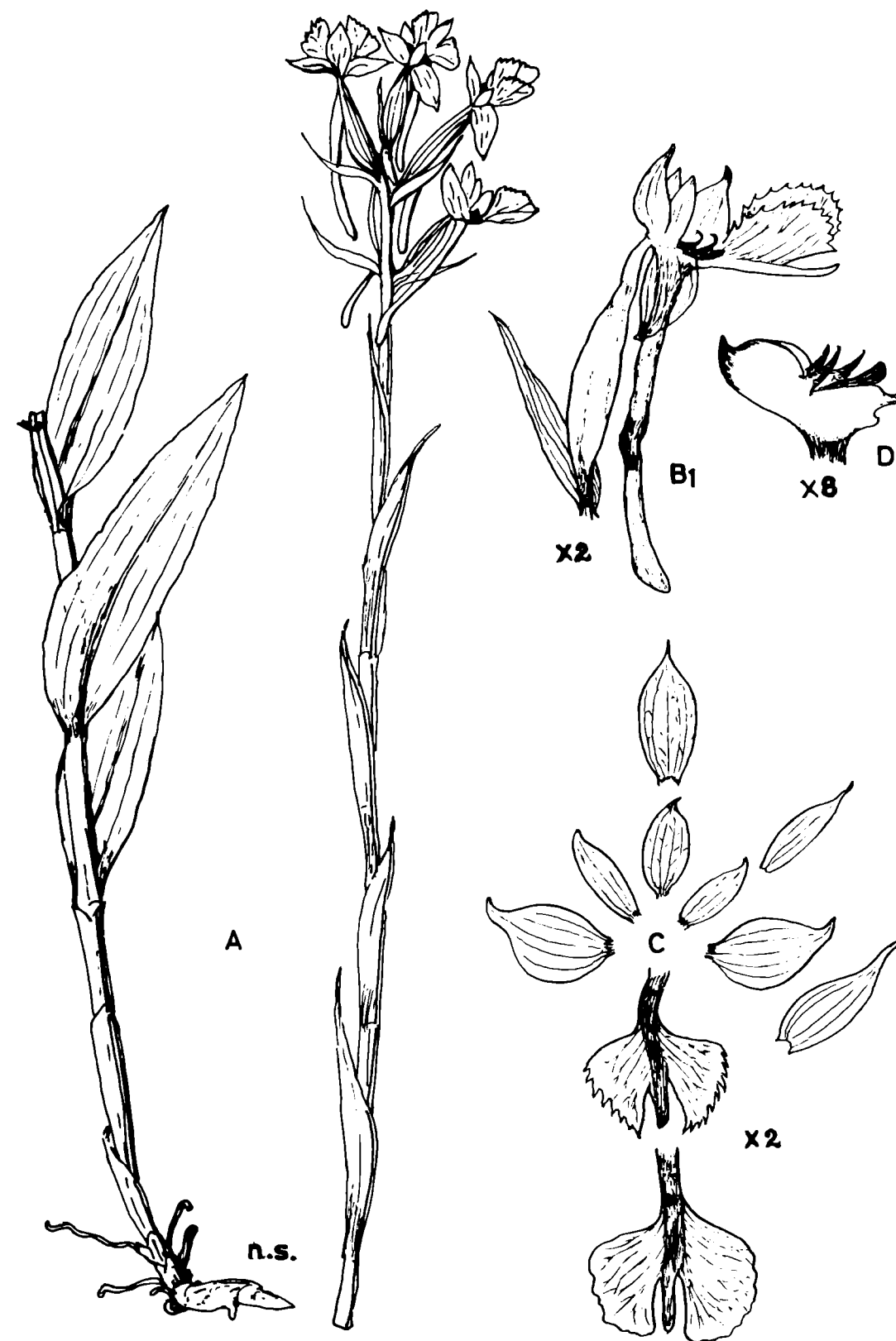


Plate 14

Habenaria digitata Lindl. Gen. Sp. Orchid Pl.307, 1835; Hk. f. 6:134, 1890; D.177, 1906; H. et al. 45, 1978.

Tubers 2.2 cm. long, oblong. Plants 30-45 cm. high, stout, lower portion of stem clothed with sheaths. Leaves at about the middle of the stem, oblong-lanceolate or ovate-lanceolate, 4-11 cm. by 2.5-4.2 cm., margin undulate, acuminate. Raceme lax but many flowered, 7-13 cm. long; floral bracts lanceolate, longer than the ovary, 2 cm. long; flowers c 1.25-1.6 cm. in diam., greenish-white; sepals unequal, dorsal sepal erect, suborbicular 6 mm. by 6 mm., apex recurved, minutely pustulate, lateral sepals longer, 1 cm. by 3 mm., lanceolate, subfalcate, deflexed tips filiform and recurved. Petals deeply two-partite, each segment linear, white but tips greenish. Lip 3-partite, midlobe linear, straight and longer than the laterals, lateral lobes longer than the petals, decurved; spur shorter than the ovary, clavate, 1.2 cm. long. Anther cells distant, divaricate, incurved tubes; staminodes tuberculate and situated at the base of each anther-lobe on the outside; pollinia 2, obliquely ovate in outline; caudicles slender and dilated at the base. Stigmatic processes narrowly oblong, blunt and recurved.

Flowering time - June to July.

Altitudinal range - 1380 m.

Distributional pattern - east and central Nepal.

Collection in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No. $n = 21$ (Vij et al., Taxon, 25:634, 1976).

Remarks - The margin of the leaf is faintly undulate in all our specimens. It appears from the published literature that the presence of this species in Nepal has been under doubt.

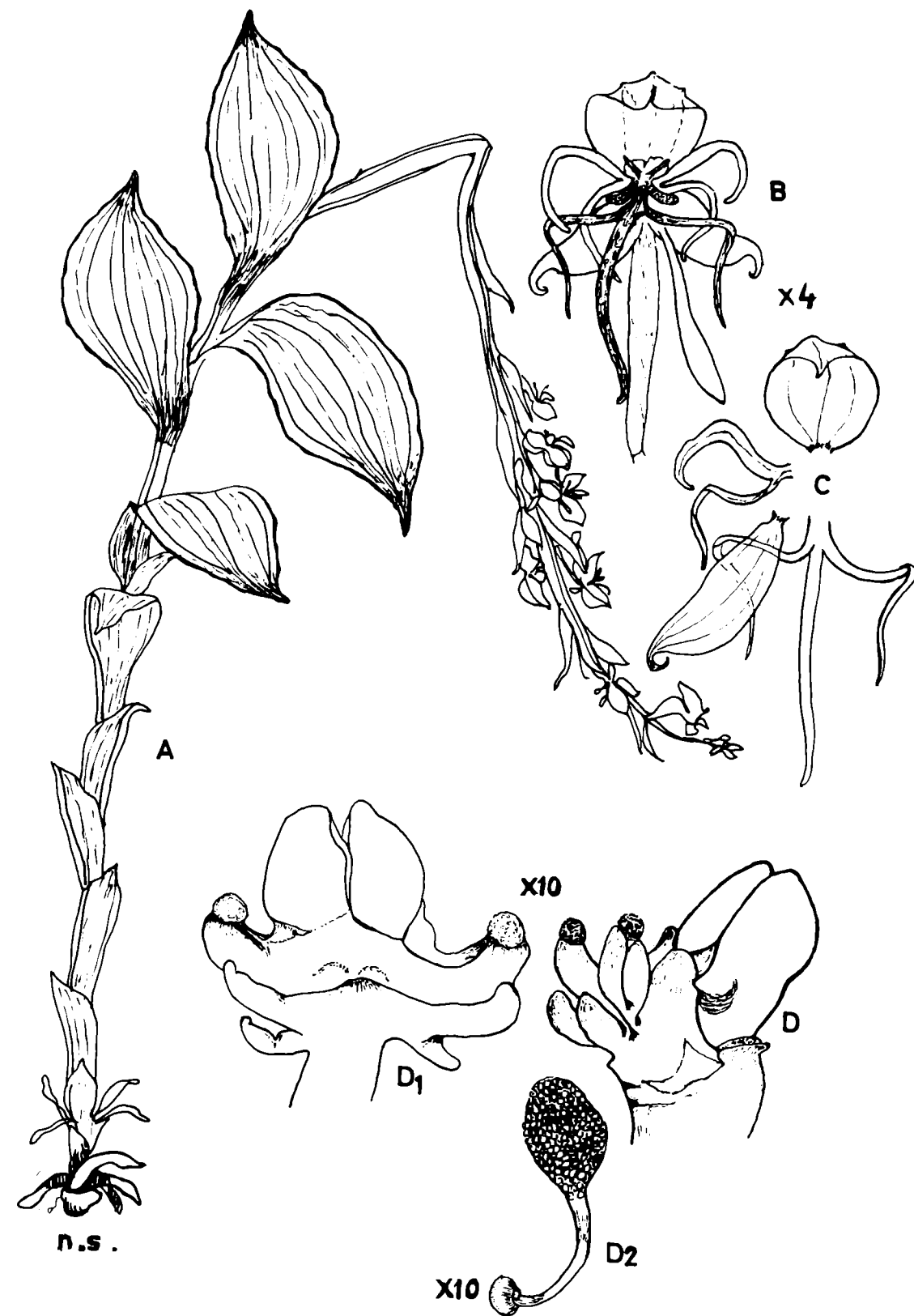


Plate 15

Habenaria diphylla Dalz. in Hook. Journ. Bot. 2:262, 1850; D.156, 1906.

Tubers small, c 1 cm. long, elongate. Plants 10-17.5 cm. high; leaves radical one or two, orbicular, cordate at base, 2.5-2.7 cm. in diam. Scape slender, laxly many flowered in the upper half, lower half with distant lanceolate bracts, sheathing and acuminate, flowering bracts much shorter than the curved ovary, lanceolate, 6 mm. long. Flowers white, c 9 mm. in diam.; sepals subequal, 3-nerved, dorsal sepal erect, ovate, concave, 5 mm. by 3 mm. acute, lateral sepals obliquely ovate, 5 mm. by 2 mm., deflexed, acuminate. Petals erect and forming a hood with the dorsal sepal, 5 mm. by 1 mm., subfalcate, linear. Lip much longer than the lateral sepals, 3-partite, segments filiform, side segments spreading at right angles to the mid segment, twisted at the tips, mid segment deflexed and short; spur 5 mm. long, shorter than the ovary, dilated towards the apex. Anther cells distant, tubes short; pollinia obliquely attached to the caudicles; staminodes large with incurved tips. Stigmatic processes clavate and elongate.

Flowering time - August to September.

Altitudinal range - 610-1675 m.

Distributional pattern - east and central Nepal.

Collections in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. $2n = 108$ (Jorapur, Taxon, 29:546, 1980).

Remarks - This species is a new record for Nepal.

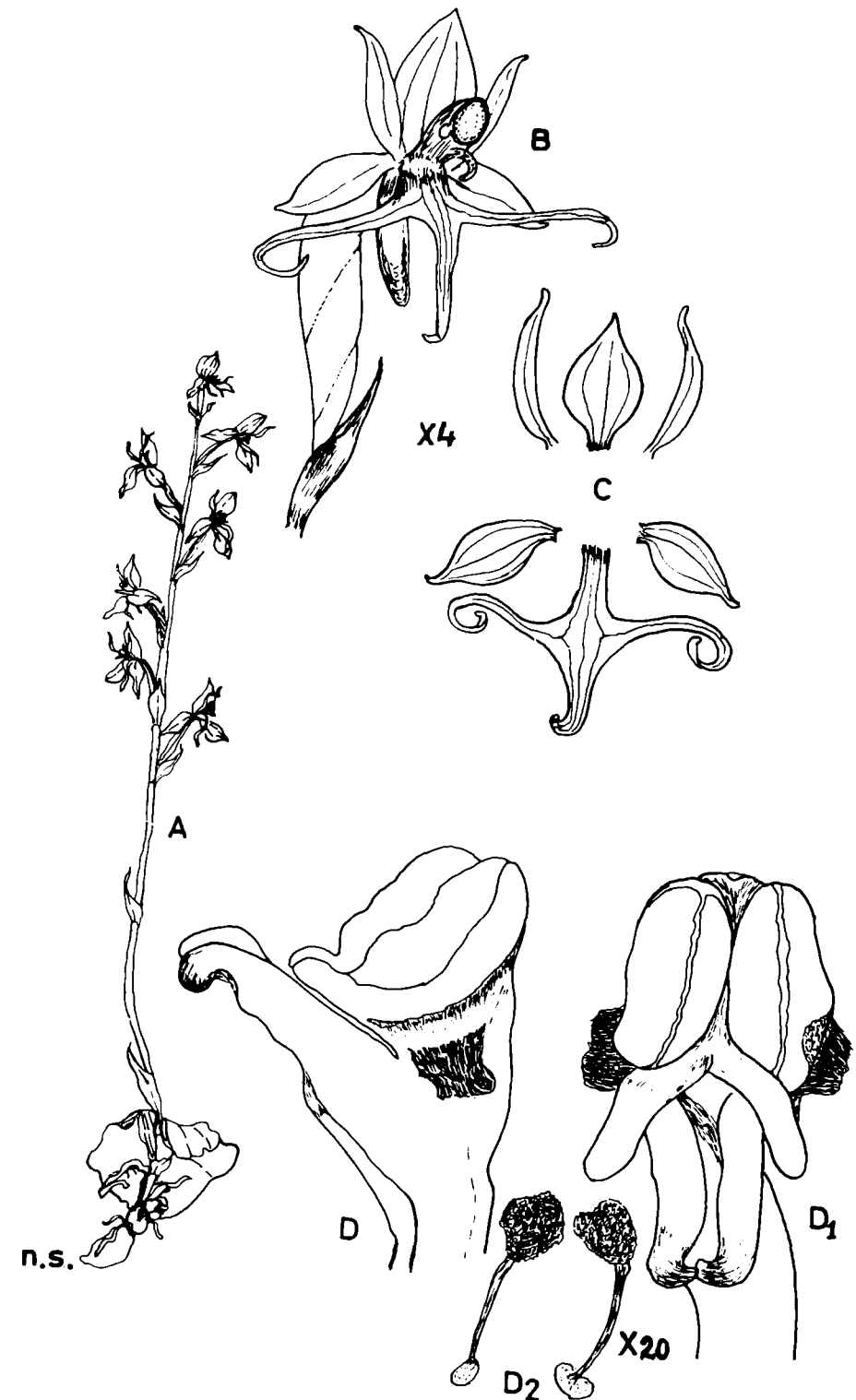


Plate 16

Habenaria furcifera Lindl., Gen. Sp. Orchid Pl. 319, 1835; Hk. f. 6:149, 1890; K. & P. 313, t.410, 1898; D.184, 1906; Seidenf. 31(3):118, f.72, 1977; H. et al. 45, 1978.

Plants usually 25-45 cm., high sometimes smaller, stem sheathing near the base. Leaves crowded below the middle of the stem, c 6-10 cm. by 1.5-3 cm. narrowly elliptic, slightly narrowed towards the sheathing base, upper part of stem bracteate; bracts lanceolate becoming gradually smaller upwards. Raceme 12-18 cm., long many flowered but lax; floral bracts linear-lanceolate, 1 cm. long, hardly as long as the shortly stalked ovary. Flowers green, c 1.2 cm. in diam.; sepals unequal, dorsal sepal concave, ovate-oblong, 4.2 mm. long, lateral sepals slightly longer, 4.5 mm. long, broadly lanceolate, faintly falcate, spreading. Petals as long as the dorsal sepal, oblong, retuse, along with the dorsal sepal forming a hood over the column. Lip longer than the lateral sepals, divided to the base into three filiform segments, mid segment blunt straight and stout, lateral segments filiform, curved and diverging, longer than the mid segment; spur very slender, much longer than the ovary, c 1.4 cm. long, curved towards the apex. Anthers small, tubes short, curved upwards.

Flowering time - August - September.

Altitudinal range - c 2285 m.

Distributional pattern - central Nepal.

Collection in Herbarium - 1gathering.

Specimen studied - 1.

Chr. No.



Plate 17

Habenaria intermedia D. Don, Prodr. Fl. Nep. 24, 1825; Hk. f. 6:138, 1890; D.180, t.131, 1906; Kit. 103, 1955; T.3:152, 1975; B. & T. 72:36, 1975; H et al. 45, 1978.

Tuber 4 cm. long, oblong. Plants 20-50 cm., stem with 2 or 3 sheaths at the base. Leaves scattered, ovate-oblong, 5.5-9 cm. by 2-3.5 cm., nerves 5-7 prominent beneath, acuminate, rounded at the base. Racemes few flowered; floral bracts broadly lanceolate, acuminate, equalling or longer than the ovary, 3.6-5.5 cm. long. Flowers c 5 cm. in diam., white. Sepals unequal, persistent, dorsal sepal ovate-lanceolate. 2.8 by 1.1 cm., recurved at the apex, lateral sepals falcately lanceolate 3.2 mm. by 9 mm. spreading, tip reflexed, narrower than the petals. Petals as long as the dorsal sepal, overlapping at the apices and closely pressed to the dorsal sepal, falcate, margin minutely ciliolate. Lip longer than the sepals, papillose at the base, 3-lobed to about 2/3rd of its length, midlobe linear, c 3 cm., long from the point of division, side lobes deeply pectinate; spur stout, exceeding the ovary, 5.5-6 cm. long, curved, swollen towards the tip. Anther cells with long filiform tubes which are erect. Stigmatic processes slender, incurved, papillose, white but tips green.

Flowering time - July.

Altitudinal range - 1900-3000 m.

Distributional pattern - west Nepal.

Collection in Herbarium - 6 gatherings.

Specimens studied - 2.

Chr. No. n = 21 (Vij et al., Taxon 25:634, 1976).

2n = 42 (Arora, *ibid.* 17:199, 1968; Mehra & Kashyap, *ibid.* 28:407, 1979; Vij et al., *ibid.* 30:512, 1981).

Remarks - The leaves of our specimens are smaller than those as given in published literature.

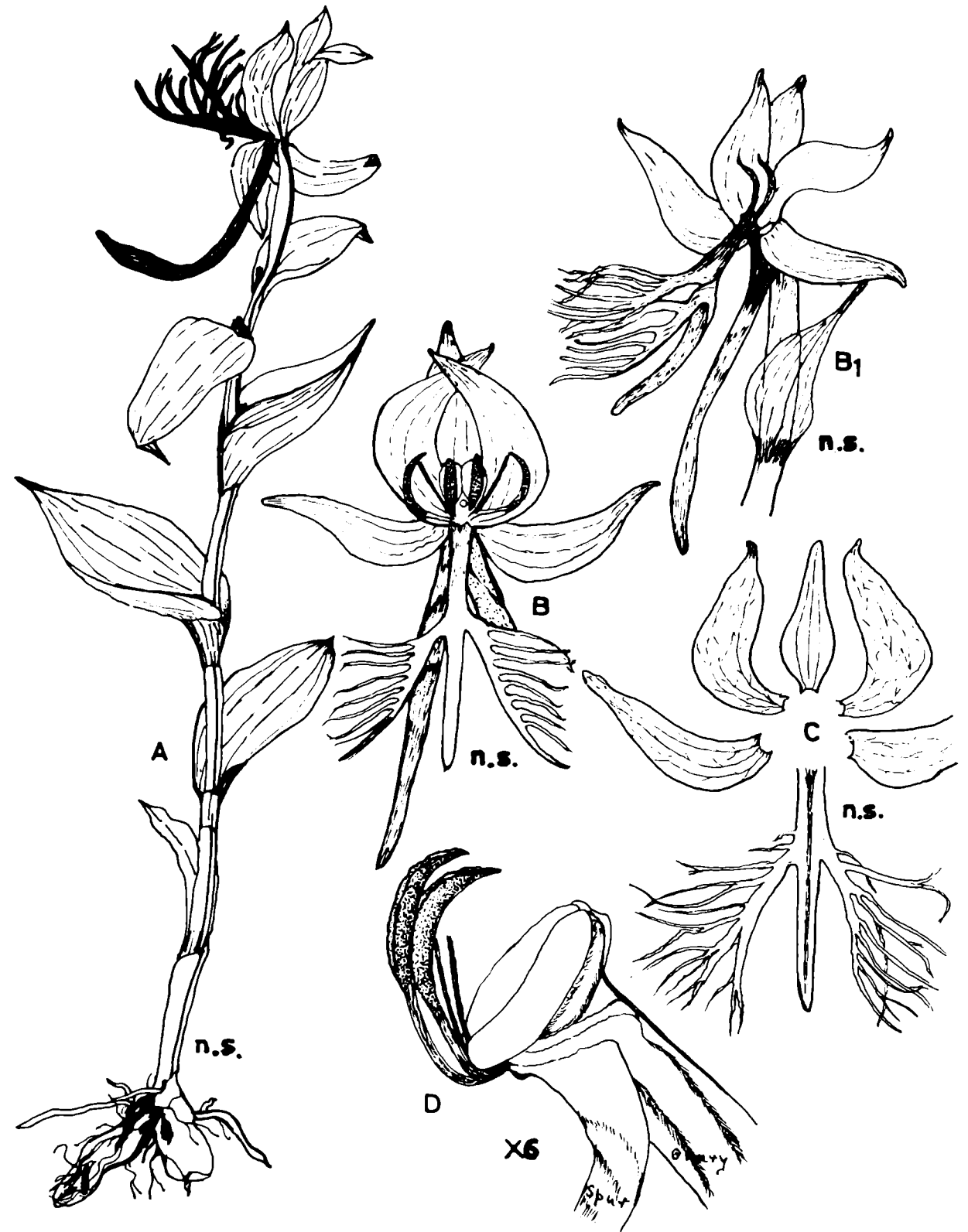


Plate 18

Habenaria malleifera Hk. f. Fl. Brit. Ind. 6:143, 1890; K. & P. 313, t.411, 1898; Seidenf. 31(3):95, f.57, 1977.

Tubers c 6 cm. long, narrowly oblong. Robust plants, c 35-45 cm. tall, lower part sheathed, middle with leaves, upper angled, angles fimbriate. Leaves narrowly elliptic 9-17 cm. by 2.5-4.5 cm., acute, base with wide or short sheath; bracts lanceolate, gradually becoming smaller upwards. Spike 12-20 cm. long, lax, few flowered generally 10-12, triquetrous, rachis with laciniate hairy processes; floral bracts broadly lanceolate, 1.6 cm. long equalling or slightly exceeding the ovary, ciliolate. Flowers c 1.5 cm. in diam., pale greenish; sepals unequal, dorsal orbicular, hooded and incumbent on the column, 4 mm. long, lateral sepals large, gibbously triangular, 6 mm. long, oblong, reflexed. Petals much smaller, triangular, 2 mm. long subacute. Lip longer than the sepals, divided at the base into three filiform segments, mid segment usually the longest and most flexuose, lateral segments more or less straight; spur about half as long as the ovary, curved at the middle, apex globose. Anther with very long spreading tube; staminodes adnate on the sides; pollinia elliptic; caudicles long, straight and dilated at the apex. Stigmas two elliptic, lying above the entrance of the spur; ovary sessile, beaked, ciliolate on the ridges.

Flowering time - August.

Altitudinal range - c 2145 m.

Distributional pattern - east Nepal.

Collection in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

Remarks - In our specimens the leaves are smaller than the measurements given by Hooker. This is a new record for Nepal.

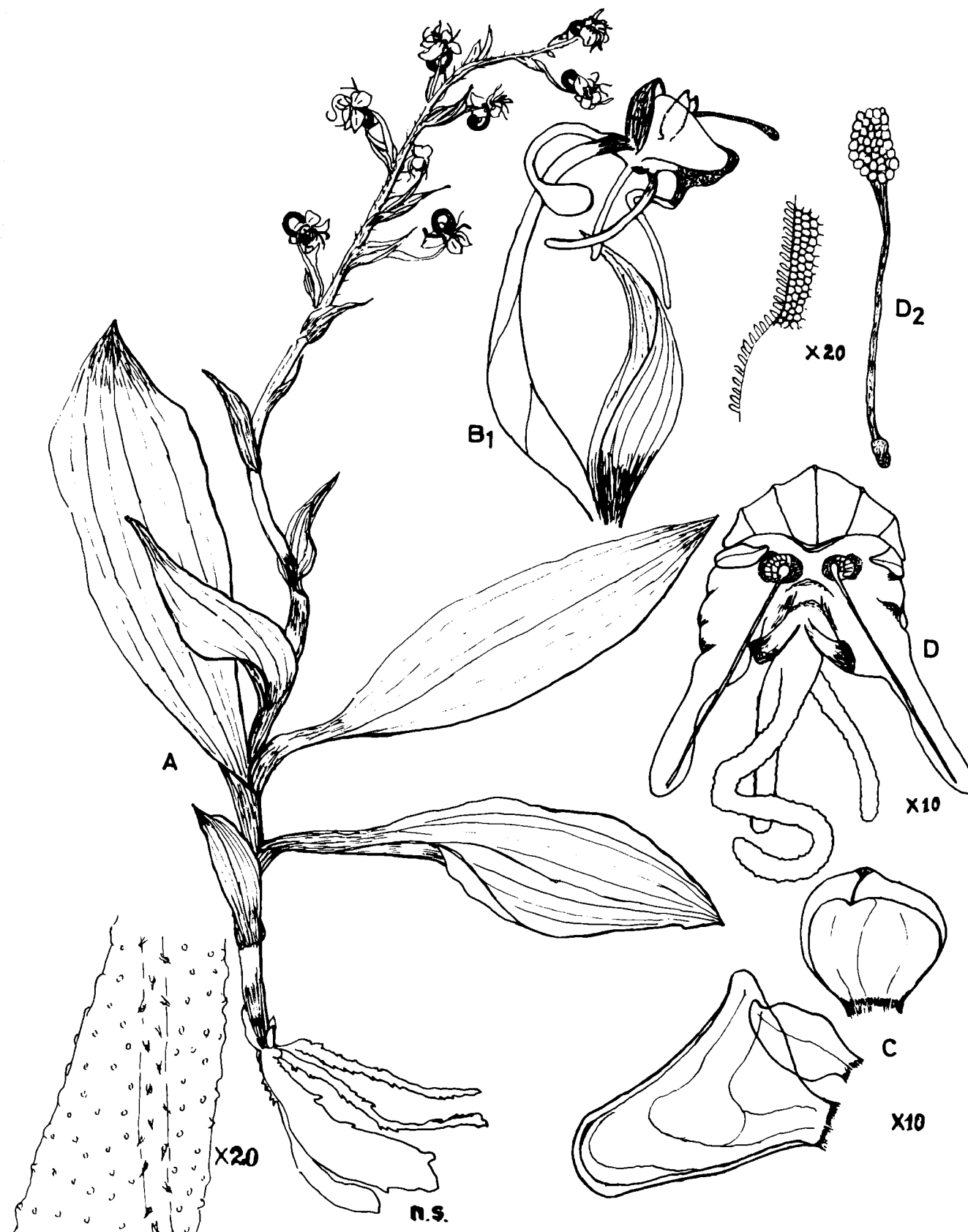


Plate 19

Habenaria marginata Colebr. in Hook. Exot. Fl. 2:t.136, 1824; Hk. f. 6:150, 1890; D.184, t.136, 1906; Coll. 504, 1921; H. et al. 45, 1978.

Tubers small and cylindric. Plants 11.5-22 cm. high, stem reduced and subscapigerous. Leaves sub-radical, sessile, oblong, or linear-oblong, 3-12 cm. by 1.2-2.5 cm.; bracts erect, lanceolate, 1.5-3.5 cm. long, gradually reducing in size upwards. Spike 5-10 cm. long, many flowered; floral bracts lanceolate, 1.3-1.5 cm. long nearly equalling the ovary, ciliolate along the margins. Flowers 1.5 cm. in diam., greenish-yellow; sepals subequal, dorsal sepal erect, broadly ovate, 8 mm. by 6 mm. erect, laterals sub-falcate, oblong-lanceolate, 9 mm. by 3 mm., spreading, tips reflexed. Petals falcate, oblong, 8 mm. by 4 mm., erect forming a hood with the dorsal sepal. Lip longer than the sepals, 3-partite at the base, mid-segment shorter and broader, margin slightly reflexed, lateral segments long and narrow with filiform and curved apex; spur equalling the curved ovary, 1.3-1.5 cm. long. Anther cells with funnel-shaped tubes. Stigmatic processes long and adnate to the base of the column.

Flowering time - August.

Altitudinal range - 1900 m.

Distributional pattern - west Nepal.

Collection in Herbarium - 1 gathering.

Chr. No. $n = 21$ (Arora, Taxon, 20:785, 1971).

$2n = 42$ (Mehra & Kashyap, ibid. 25:492, 1976; Jorapur, ibid. 29:546, 1980; Singh, ibid. 30:704, 1981).

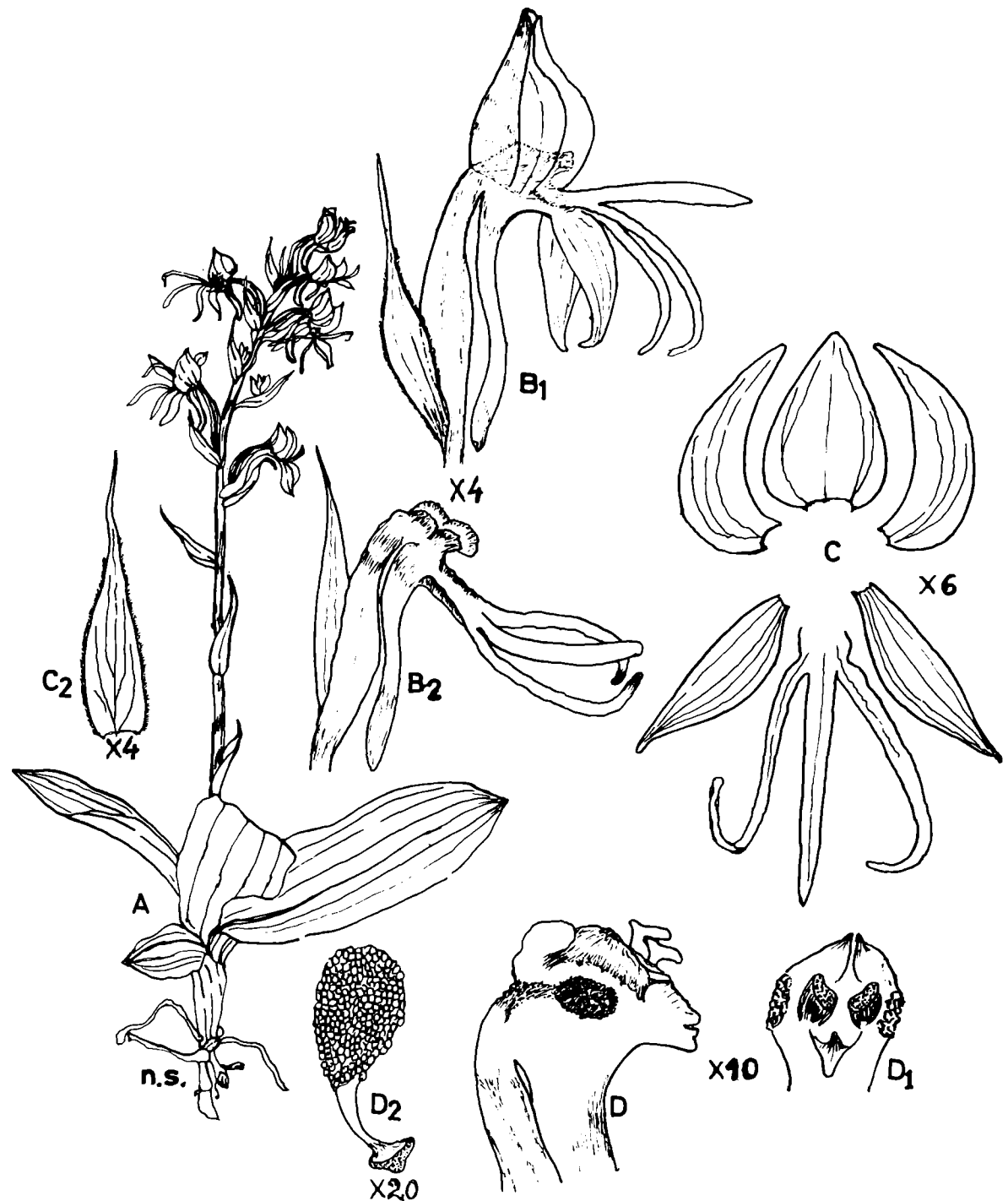


Plate 20

Habenaria pectinata (J.E.Sm.) D. Don, Prodr. Fl. Nep. 24, 1825; Hk. f. 6:137, 1890; K. & P. 310, t.406, 1898; D.178, t.130, 1906; Coll. 501, 1921; B.B. & V. 13:224, 1951; Kit. 103, 1955; T.3:153, 1975; B. & T. 72:36, 1975; H. et al. 46, 1978.

= *Orchis pectinata* J.E. Sm., Exot. Bot. 2:77, t.99, 1805.

Plant robust 30-60 cm. high, lower part covered by sheaths. Leaves linear-lanceolate, c 8-16 cm. by 1.5-2.5 cm., strongly 7-nerved, acuminate, base sheathing, gradually becoming smaller. Raceme 8 to 15 cm. long, flowers c 4.0 cm. across; floral bracts linear lanceolate, 2.5-5 cm., longer than the ovary. Sepals unequal, green, dorsal sepal lanceolate, 1.7 cm. by 6 mm., erect, lateral sepals wider, subfalcate, 1.7 cm. long, erect, apex acute and recurved. Petals white, forming a hood with the dorsal sepal, linear oblong, 1.6 cm. by 4 mm., falcate, acute, glabrous, outer margins ciliolate. Lip longer than the sepals, 3-partite nearly to the base, mid segment linear, longer than the side segments, c 2 cm. long from the point of division; side segments deeply fringed, comb-like in the outer margins; spur as long or longer than the ovary, 2-2.5 cm. geniculate, swollen at the tip. Anther cells broad and large with very long lobes. Stigmatic processes linear, c 4 mm. long, curved upwards.

Flowering time - July to September sometimes extending to early October.

Altitudinal range - 1675-2700 m.

Distributional pattern - east, mostly central, west Nepal.

Collection in Herbarium - 12 gatherings.

Specimens studied - 12.

Chr. No. $n = 21$ (Vij et al., Taxon, 25:640, 1970 as *H. ensifolia*; Vij et al., ibid. 30:512, 1981 as *H. ensifolia*).

$2n = 42$ (Arora, Taxon, 17:199, 1968; Mehra & Kashyap, ibid. 28:407, 1979; both as *H. pectinata* Don).

Remarks - There seems to be a great variation in the height of the plant. The lateral petals also exhibit variation in shape & size, so also the lip in its size of the mid segment.

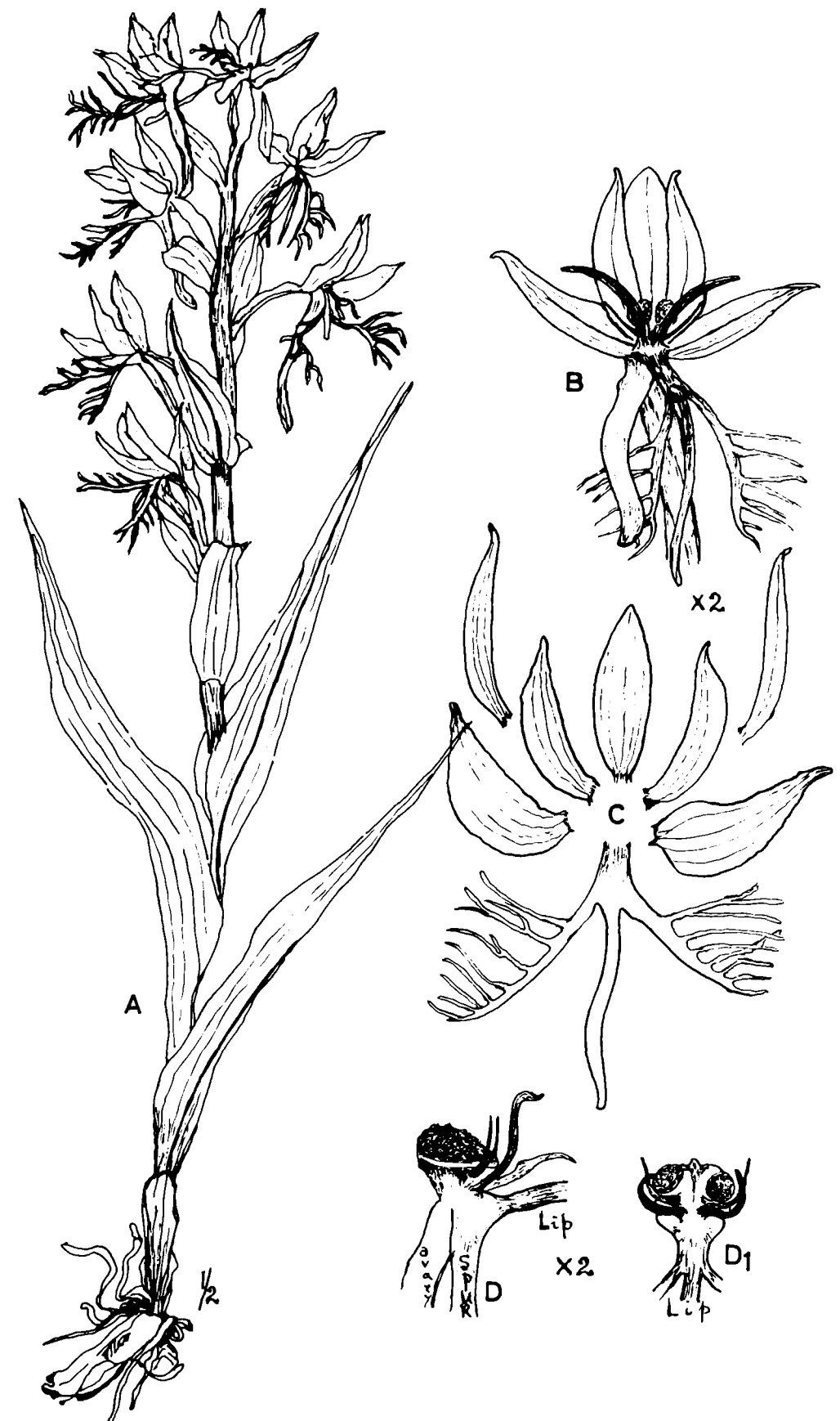


Plate 21

Habenaria plantaginea Lindl., Gen. Sp. Orchid Pl. 323, 1835; Hk. f. 6:141, 1890; D.181, t.132, 1906; B.55:267, 1958; B. & T. 72:36, 1975; H. et al. 46, 1978.

Tubers about 2 cm., ellipsoid. Plants 12.5-32 cm.; leaves 4 or 5, radical, 7.5-10 cm. by 1.8-2.8 cm. narrowly oblong or lanceolate, acute, membranous; bracts lanceolate, acuminate, lower ones large and leaf-like. Spike slender, 5-10 cm. long, laxly flowered; floral bracts 7 mm. long, lanceolate, acuminate, nearly half as long as the ovary. Flowers c 1.2 cm. in diam., white. Sepals subequal, strongly 3-nerved, dorsal sepal erect, ovate-oblong 5 mm. long, broader than the lateral sepals, lateral sepals falcately oblong 6 mm. long, spreading. Petals linear-lanceolate, 5 mm. long, adpressed to the dorsal sepal and forming a hood with it. Lip 3-lobed, flabelliform nearly twice as long as the lateral sepals, c 1 cm. by 1 cm., midlobe linear-oblong, a little shorter than the laterals, deflexed, side lobes semi-ovate, entire or slightly wavy; spur longer than the ovary even 2½ times, slender. Anthers cells divergent, tubes upcurved and short; pollinia ellipsoid; caudicles curved, combined when young; staminodes prominent. Stigmatic processes large and fleshy; rostellum triangular.

Flowering time - September.

Altitudinal range - 305-760 m.

Distributional pattern - east and west Nepal.

Collection in Herbarium - 5 gatherings.

Specimens studied - 3.

Chr. No. n = 21 (Arora, Taxon, 17:200, 1968; Mehra & Kashyap, ibid. 25:492, 1976; Vij et al., ibid. 25:640, 1976).

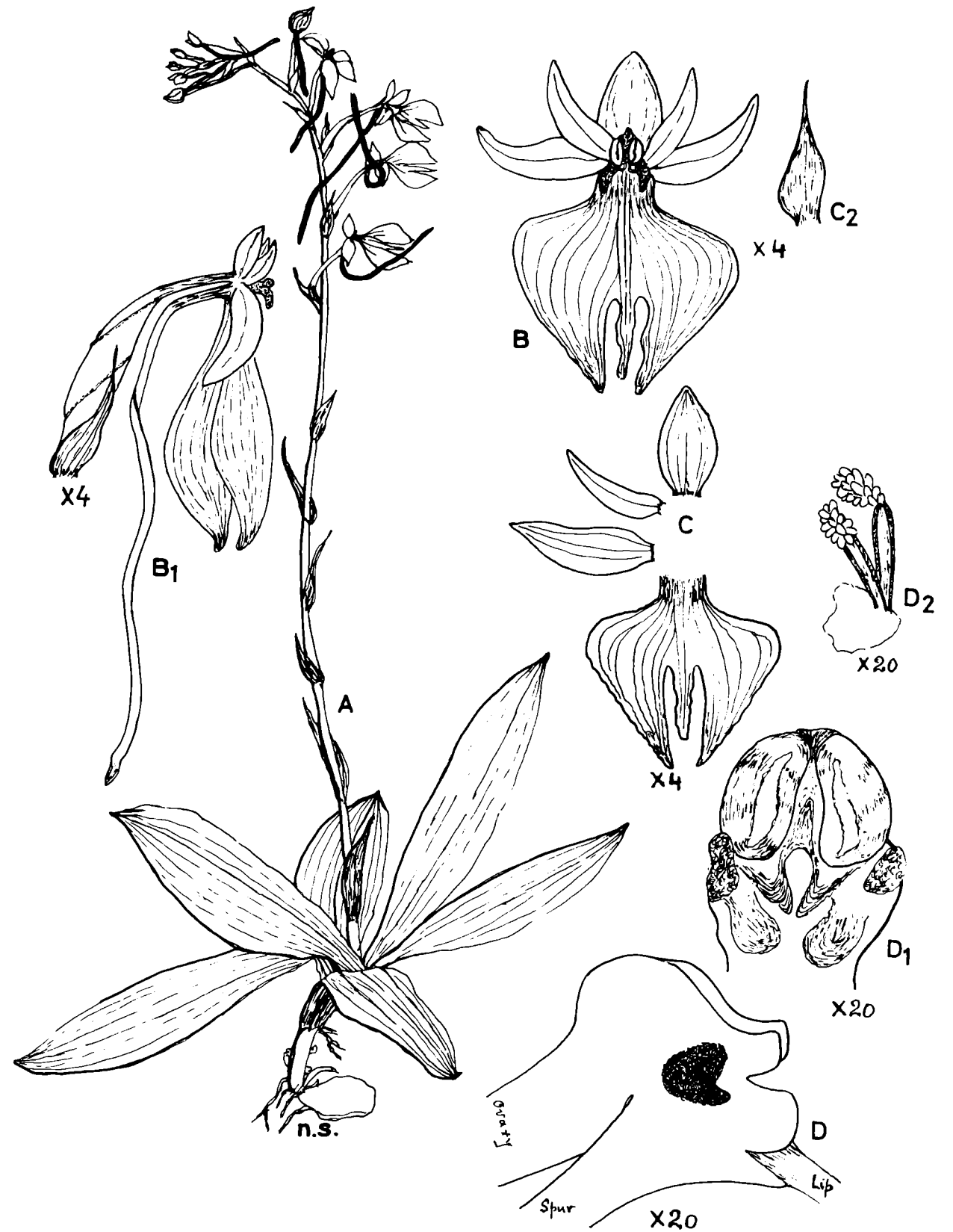


Plate 22

Habenaria stenopetala Lindl. Gen. Sp. Orchid Pl. 319, 1835; Hk. f. 6:134, 1890; K. & P. 308, t.404, 1898; T.439, 1966 et 3:156, 1975; Dept. Med. Pl. 1:48, 1967; B. & T. 72:37, 1975; Herk. 85:147, f.136, 1977; H. et al. 46, 1978.

Tubers c 2.5 cm. Plants 45 to 90 cm. tall, stout, nearly lower half of stem clothed with sheaths, upper part leafy. Leaves membranous, oblong-lanceolate to ovate-lanceolate, c 8-15 cm. by 2.5-4 cm. margin slightly undulate, acute or acuminate, amplexicaul and sheathing; bract-like leaves few, lanceolate, 3.5 cm. long. Raceme 10 to 20 cm. long; flowers crowded, c 2.5 cm. in diam. greenish; floral bracts lanceolate, as long as the ovary, 1.5 cm. long. Sepals subequal, oblong-lanceolate, c 1.2 cm. long, acuminate, spreading and reflexed, lateral sepals subfalcate. Petals shorter than the sepals, 9 mm. long, linear-lanceolate, produced downwards as a wing. Lip hastately 3-partite, length from base to tip 1.2 cm., segments filiform, mid segment horizontal, fleshy, lateral segments shorter than the mid segment, segments spreading also fleshy; spur as long as the ovary 1.4-1.6 cm. long, slender, upturned. Anther cells parallel, tubes long; pollinia oblong, caudicles long and slender; staminodes situated externally to the anther cells and stigma, rugulose. Stigmas oblong, blunt apices, situated at the mouth of the spur.

Flowering time - August.

Altitudinal range - 2135-2450 m.

Distributional pattern - central Nepal.

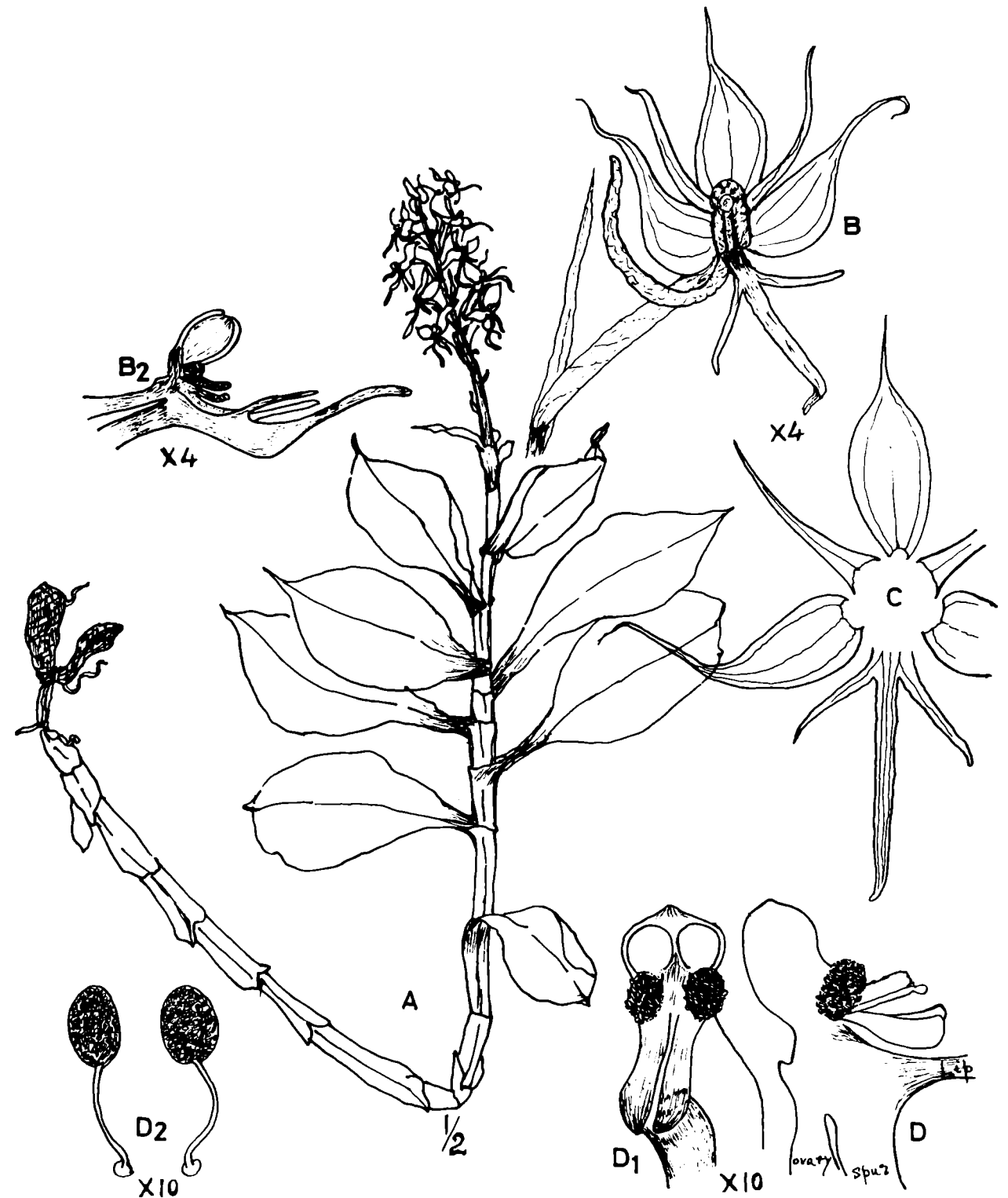
Collection in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. $n = 21$ (Vij et al. Taxon, 25:640, 1976).

$2n = 42$ (Singh, ibid. 3:704, 1981).

Remarks - The apices of the sepals in our specimens are more or less caudate-acuminate and not just acuminate as given by King & Pantling.



HEMIPILIA Lindl. (Platanthereae). These are singularly attractive terrestrial orchids. The name probably alludes to the sparsely hirsute lip of the type species. According to Hawkes, the flowers closely simulate superficially at least some sort of *Habenaria*. However, they are tuberous herbs with a single broad radical leaf. The flowers are in lax racemes. The lip is obscurely 3-lobed and the spur is trumpet-shaped.

Plate 23

Hemipilia cordifolia Lindl. Gen. Sp. Orchid Pl. 296, 1835; Hk. f. 6:167, 1890; D.200, t.150, 1906; Coll. 506, 1927; B. & T. 72:39, 1975; H. et al. 46, 1978.

Tubers oblong to ovoid. Plants 15-30 cm. high, bearing a single leaf at the base. Leaf broadly ovate, cordate at base, 5.5-8.5 cm. by 4.5-6.8 cm., fleshy amplexicaul, many nerved. Racemes 6-8.5 cm. long few to many flowered, lax; flowers purple, c 1.0-1.2 cm. across; floral bracts about half the length of the curved & beaked ovary or slightly exceeding, 6-10 mm. long. Sepals subequal, dorsal erect, ovate-lanceolate, 5 mm. long, blunt, inflexed tip, laterals spreading, falcate or falcately oblong 5 mm. long, slightly broader than the dorsal sepal. Petals smaller than the sepals, 4.5 mm. long, and slightly broader than the lateral sepals, 3 mm., erect forming a hood with the dorsal sepal, broadly ovate, subacute. Lip obscurely trilobed, 8 mm. long, sidelobes rounded and reflexed; midlobe broad, subcrenate or even lobed at the apex; spur shorter than the ovary, curved, tip faintly 2-lobed and upturned. Anther cells distant; pollinia obliquely clavate, caudicles curved and dilated upwards. Rostellum broad, projecting from between the anther cells. Stigma on the column below the anther.

Flowering time - July to August.

Altitudinal range - 1830-2790 m.

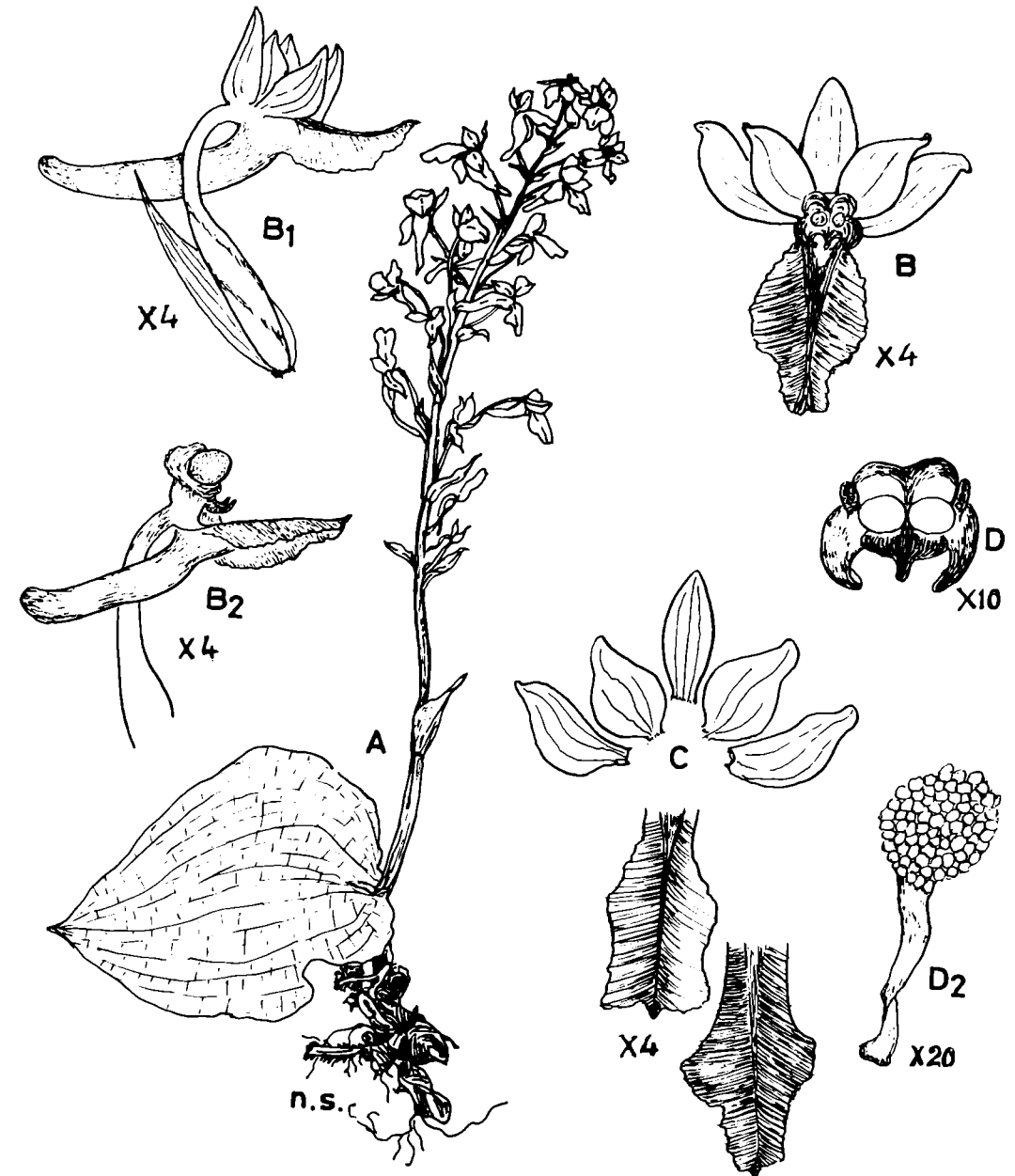
Distributional pattern - west and central Nepal.

Collections in Herbarium - 4 gatherings.

Specimens studied - 2.

Chr. No. $2n = 42$ (Mehra & Kashyap, Taxon, 30:507, 1981).

Remarks - The shape of the lip is variable, the side-lobes may be broad and rounded or smaller and directed outwards or may be even obscure.



HERMINIUM R. Br. (Habenarieae). The name possibly refers to the stunted staminodia. *Herminium* is a genus of mostly small flowered, rather insignificant terrestrial orchids. Although rare in cultivation, these allies of *Habenaria* Willd. are attractive. Plants are small, erect, tuberous herbs with oblong tubers and with a solitary or few leaves. The *Herminia* can be distinguished from *Habenarias* by the characteristic lip which is never with a spur but is sometimes provided with a saccate or gibbous base; column is very short and the stigma is 2-1-lobed. It is mentioned by Hooker that the Indian *Herminia* attain the greatest elevation of any orchid. In Nepal Himalayas, *Herminia* attain an elevation of 4000-4225 m.

***Herminium pugioniforme* Lindl. ex Hk. f.**

Plants c 12-18 cm high, stem with one or two minute sheaths at the base; leaf solitary, oblong-oblongate. Flowers minute. Lip not lobed, narrowly oblong-triangular, as long as the sepals, base expanded and excavated into two deep oval pits, anterior part linear-oblong.

Artificial key to the species of *Herminium*

- 1 Lip entire —
 - 2 Lip equalling or shorter than sepals —
 - 3 Lip as long as the sepals, orbicular-ovate or broadly ovate, entire or subcrenulate; small saccate spur at base. Leaves mostly 2 or 3, and a little above the base. *duthiei*.
 - 3* Lip entire, shorter than the sepals, slightly saccate at base, margin ciliolate, terminal portion upturned. Leaf solitary. *monophyllum*.
 - 2* Lip longer than the sepals, triangular and bluntly acuminate, edges subcrenulate, tip faintly depressed at base. Leaves mostly 2 near or at the base. *josephii*.
- 1* Lip 3-lobed —
 - 4 Petals subconnivent with the dorsal sepal —
 - 5 Lip as long as the sepals, concave at the base, mid lobe the longest. Petals obliquely-ligulate with tips fleshy. *monorchis*.
 - 5* Lip much longer than the sepals, broad not fleshy, deeply 3-lobed near the apex, mid lobe shorter than the curved filiform lateral lobes. Sepals connivent. *lanceum*.
 - 4* Sepals and petals spreading —
 - 6 Lip triangularly ovate-lanceolate, blunt, basal half broad with long narrow crenulate lateral lobes, distinctly saccate. *macrophyllum*.
 - 6* Lip trifid, longer than the petals, lower portion thick, mid lobe shorter than the filiform side lobes. *mackinnonii*.
- 1** Lip 5-lobed, basal lobes minute, side lobes near the apex, sometimes elongate, lip longer than broad, not fleshy. Sepals spreading. *quinguelobum*.

Plate 24

***Herminium duthiei* Hk. f. Fl. Brit. Ind. 6:130, 1890; D.199, t.147, 1906; H. et al. 46, 1978.**

Plants 6 to 25 cm. high with ellipsoid tubers. Leaves mostly 2 or 3 above the base of the stem, linear or oblanceolate 3-10.5 cm. by 4-15 mm., acuminate, shorter than the scape. Scape stout, naked, curved; spike 5-10 cm., subsecund, many flowered; floral bracts much shorter than the curved ovary, 1 mm. long. Flowers deflexed c 4 mm. in diam., pale green or green. Sepals unequal, obtuse, dorsal sepal broadly oblong, 2 mm. long, lateral sepals smaller, subfalcate. Petals ovate to ovato-lanceolate, 2.25 mm. long, acute, fleshy. Lip as long as or shorter than the sepals, broadly ovate or orbicular-ovate, entire, subcrenulate obtuse or subacute; spur small saccate.

Flowering time - June to early August.

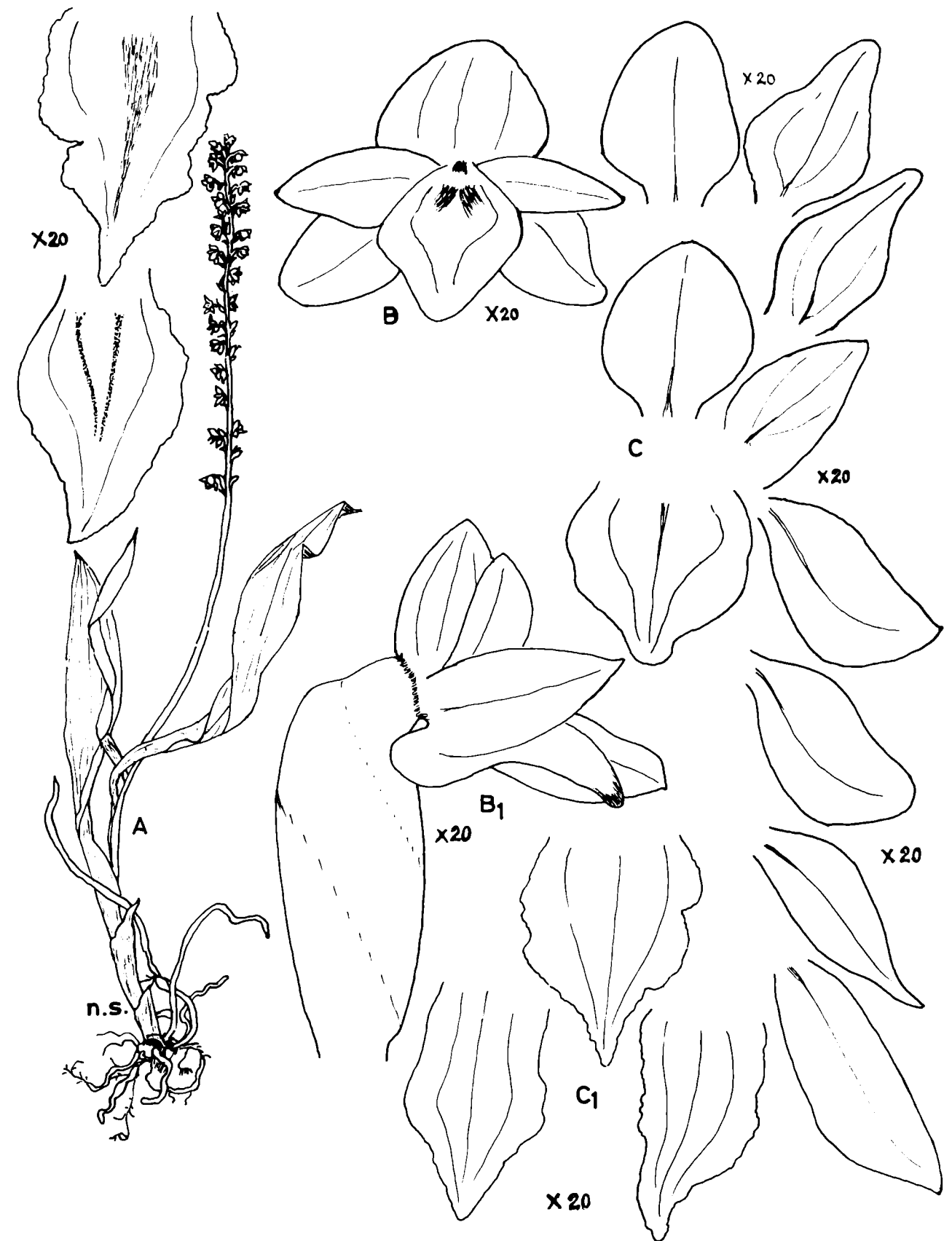
Altitudinal range - ± 2640-4100 m.

Distributional pattern - east, central and western Nepal.

Collection in Herbarium - 12 gatherings.

Specimens studied - 12.

Chr. No. n = 20 (Mehra & Kashyap, Taxon, 25:492, 1976).



Remarks - There is great variation in the shape of the lateral sepals, lateral petals and the lip. The lateral sepals vary from broadly oblong to oblong-lanceolate. Similarly, the lateral petals may be ovate to ovate-lanceolate. The lip shows still more variations i.e., from broadly-ovate or orbicular-ovate it gradually leads to elliptic or oblong shape; its margin is usually entire but may be wavy or subcrenulate. Hooker (loc. cit.) mentions of the lip only as "variable in form". The saccate lip is the most characteristic feature of this species. The size of the lip, its shape and foliage leaves above the base, are of secondary importance to us although Hooker laid emphasis on it.

Plate 25

Herminium josephii Reichb. f. Flora 55, 276, 1872; Hk. f. 6:129, 1890; K. & P. 335, t.441, 1898; T.3:156, 1975; H. et al. 46, 1978.

Entire plant 6 to 25 cm. in height with subglobose tubers. Leaves two near the base, subopposite or sometimes three, rarely one, 3-11.5 by .5-1.5 cm., narrow elliptic-oblong to lanceolate, acute or acuminate. Spike 2 to 10 cm. long, densely flowered; floral bracts 1.5 mm. long, smaller than the beaked ovary, oblong. Flowers 4 mm. in diameter, green. Sepals unequal, dorsal subovate-elliptic, 2.5 mm. long, variable in shape and size, blunt, lateral sepals shorter, 2.2 mm. long, oblong, sub-falcate, suberect (not spreading), apex sub-acute. Petals triangular-lanceolate, longer than the lateral sepals, 2.5 mm. long, variable in shape and size, conniving with the sepals into a hood fleshy at the tip. Lip flat, fleshy, longer than the sepals, 3.5 mm. long, broadly ovate, very variable in shape and size, claw short and broad, abruptly acuminate, edges sub-crenulate, a small semi-lunar pit at the base.

Flowering time - July - August.

Altitudinal range - 3500-4000 m.

Distributional pattern - east, central and west Nepal.

Collection in Herbarium - 14 gatherings.

Specimens studied - 14.

Chr. No. $n = 19$ (Mehra & Vij, Taxon, 19:109, 1970).

Remarks - The lip shows a range of variation - from broadly-ovate in the typical specimens it may be elliptic. Similarly the margin which is subcrenulate may be confined to the apical portion only. Lateral petals also show variation in shape and size.



Plate 26

Herminium lanceum (Thunb. ex Sw.) Vuijk in Blumea 11:228, 1961; T. 2:190, 1971 et 3:157, 1975; Seidenf. 31(3):20 f.7, 1977; H. et al. 46, 1978.

= *Ophrys lancea* Thunb. ex Swartz in Kongl. Vetensk. Acad. Nya Handl. Stockh. 21:233, 1800.

= *Herminium angustifolium* (Lindl.) Benth. ex C.B. Cl. : Hk. f. 6:129, 1890; K. & P. 332, t.434, 1898; D.197, 1906; Kit. 103, 1955; B.55:267, 1958; T.439, 1966; B. & T. 72:39, 1975.

Plant 20 to 70 cm. tall with small ellipsoid tubers, lower part of stem covered by tubular sheaths. Leaves two or three, 5-22 cm. long, linear or linear-lanceolate, acuminate, stem above the leaves bearing two or three linear bracts. Spike 8.5 to 25 cm. long, many flowered; floral bracts 4-6 mm., linear-lanceolate, acuminate, equalling or shorter than ovary. Flowers decurved, 4-5 mm. in diam., green. Sepals faintly sub-equal, 3 mm. long, oblong, obtuse, dorsal sepal connivent with the petals to form a hood, lateral sepals spreading. Petals as long as the sepals but narrowly linear. Lip much longer than the sepals, 5mm. long, deflexed, lower half minutely auriculate with 2 concavities, the anterior half trifid, side-lobes long, filiform and curved inwards, mid-lobe very short and bent backwards.

Flowering time - July to October.

Altitudinal range - 1070-2900 m.

Distributional pattern - east, central and west Nepal. In central Nepal the species is very common.

Collection in Herbarium - 33 gatherings.

Specimen studied - 5.

Chr. No. n = 19 (Mehra & Vij, Taxon, 19:109, 1970 as *H. angustifolium*; Mehra & Sehgal, ibid. 29:349, 1980 as *H. lanceum*; Vij, Sekhar & Kuthalia, ibid. 30:512, 1981 as *H. angustifolium*).

also n = 21 (Arora, ibid. 20:785, 1971 as *H. lanceum*).

also n = 38 (Mehra & Vij, ibid. 19:109, 1970 as *H. angustifolium*).

Remarks - This species has very strong resemblance to *H. mackinnonii*. The differences as they appear to us, are given after the treatment of *H. mackinnonii*.



Plate 27

Herminium mackinnonii Duthie, Journ. As. Soc. Beng 71(2):44, 1902 et Ann. Roy Bot. Gard. 8:197, t.149, 1906; H. et al. 46, 1978.

Whole plant c 15-35 cm. high with narrow oblong tubers, lower portion of the stem covered by tubular sheaths. Leaves mostly 2, linear-lanceolate, 10-16 cm. by .7-1.2 cm., acute or acuminate with a loose amplexicaul tubular base. Spike c 5-12 cm. long, many flowered; bracts 4-7 mm. long, broadly lanceolate, equalling or a little shorter than the ovary. Flowers spreading, c 5-6 mm. in diam., green. Sepals equal, sub-erect, ovate-oblong 3 mm. long acute, green. Petals as long as the sepals, linear-lanceolate, divergent. Lip longer than the petals, white, delexed near its base, margins reflexed, lower portion thick, trifold near the middle, mid lobe lanceolate, obtuse, shorter than the curved, filiform side lobes, side lobes divergent.

Flowering time - August to October.

Altitudinal range - 1220-2745 m.

Distributional pattern - central and east Nepal.

Collection in Herbarium - 9 gatherings.

Specimens studied - 9.

Chr. No.

Remarks - This species very closely resembles *H. lanceum* but is a distinct entity. When two species are placed side by side the differences become prominent. However the most significant difference of distinction between the two is the character of the lip as a whole and the lobes in particular.

According to Duthie the plants of *H. mackinnonii* are smaller and more delicate than *H. lanceum*; have fewer shorter and broader leaves; the flowering spike is shorter, the petals and lip are white, and the mid lobe is much longer. The shape of the ovary is also very different. However, the differences that strike us are tubulated below.

H. lanceum

- i) The apex of the lateral petal is rounded;
- ii) The lip is not very broad at the lower half and has two concavities at the base;
- iii) The mid lobe is $\frac{1}{4}$ th the side lobes and is bent backwards;
- iv) The side lobes are converging;
- v) The ovary is cylindrical and a distinct beak cannot be made out.

H. mackinnonii

- The apex of the lateral petal is pointed;
- The lip is very broad at the lower half and has only one semilunar concavity at the base;
- The mid lobe is about $\frac{1}{3}$ rd the side lobes and is turned upwards;
- The side lobes are diverging, may be widely divergent;
- The ovary is tumid with a narrow beak.

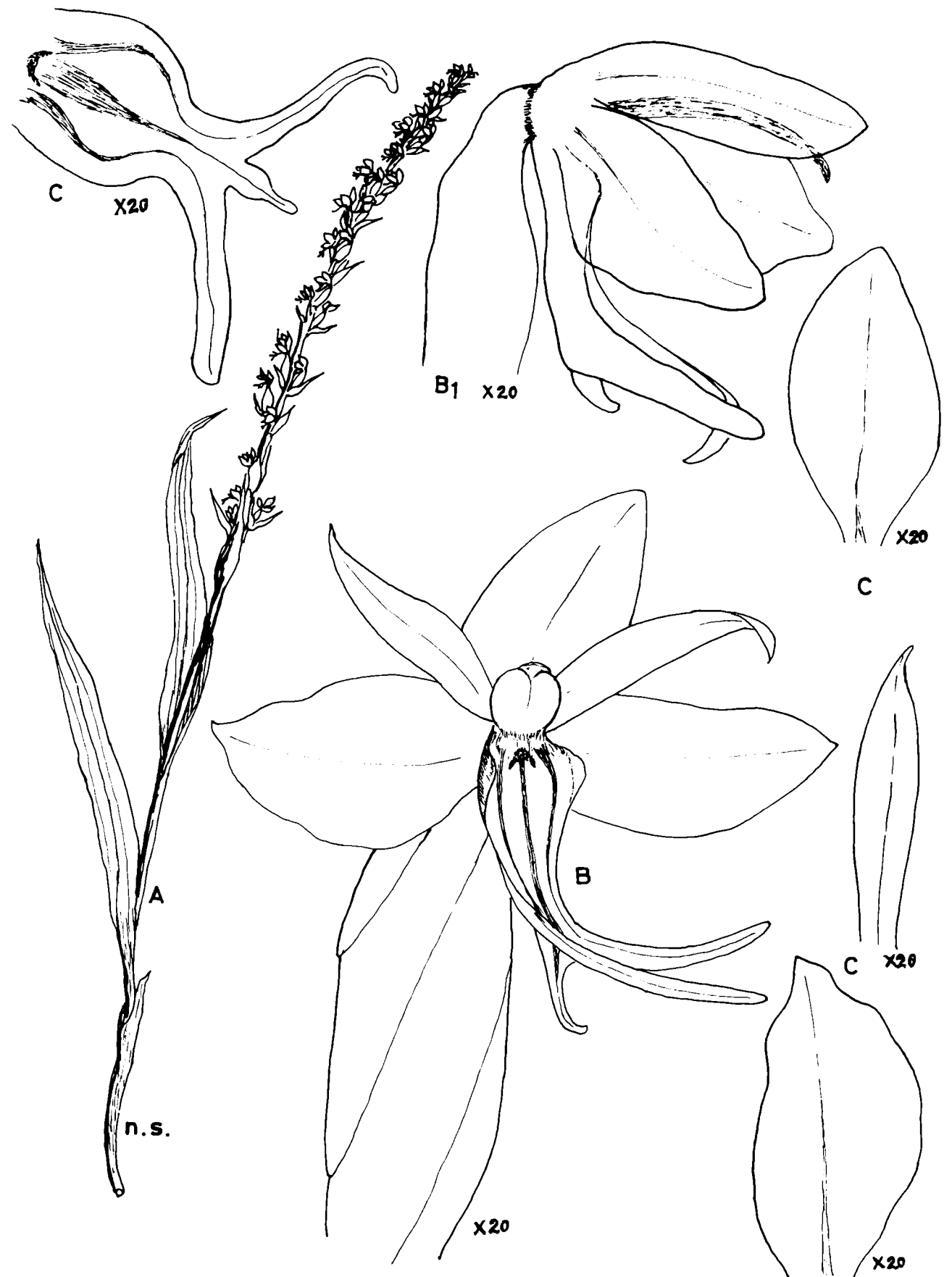


Plate 28

Herminium macrophyllum (D. Don) Dandy in Jour. Bot. 70:328, 1932; H. et al. 46, 1978.

= *Neottia macrophylla* D. Don, Prodr. Fl. Nep. 27, 1825.

= *Herminium congestum* Lindl. : Hk. f. 6:130, 1890; K. & P. 335, t.440, 1898; D.198, 1906; B.B. &V. 13:224, 1951; Kit. 103, 1955; T.3:156, 1975; B. & T. 72:40, 1975.

Plants 10-20 cm. high with sub-globose tubers, lower portion of stem with 1 or 2 loose sheaths. Leaves two or three near the base of the stem, narrowly oblong-elliptic or oblanceolate, 9-10 cm. long. Spike 3-8 cm. long densely flowered; floral bracts 1.5 mm. long, ovate, much shorter than the ovary. Flowers c 3.5-4 mm. in diam., decurved, green. Sepal sub-equal, dorsal sepal broadly ovate, 3.5 mm. long, obtuse, lateral sepals narrower, oblong 1.5 mm. long, subfalcate, subacute and spreading. Petals a little longer than the sepals, obliquely lanceolate, crenulate, acute. Lip longer than the sepals, fleshy, triangularly ovato-lanceolate, obtuse, apical lobe crenulate, side lobes very narrow and crenulate; spur saccate.

Flowering time - July to September.

Altitudinal range - 1830-3800 m.

Distributional pattern - central and west Nepal.

Collection in the Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No. $n = 20$ (Mehra & Kashyap, Taxon, 30:507, 1981 as *H. congestum*).

Remarks - In our specimens the margins of the lateral petals are crenulate, so also the apical lobe of the lip is crenulate along with the side lobes.

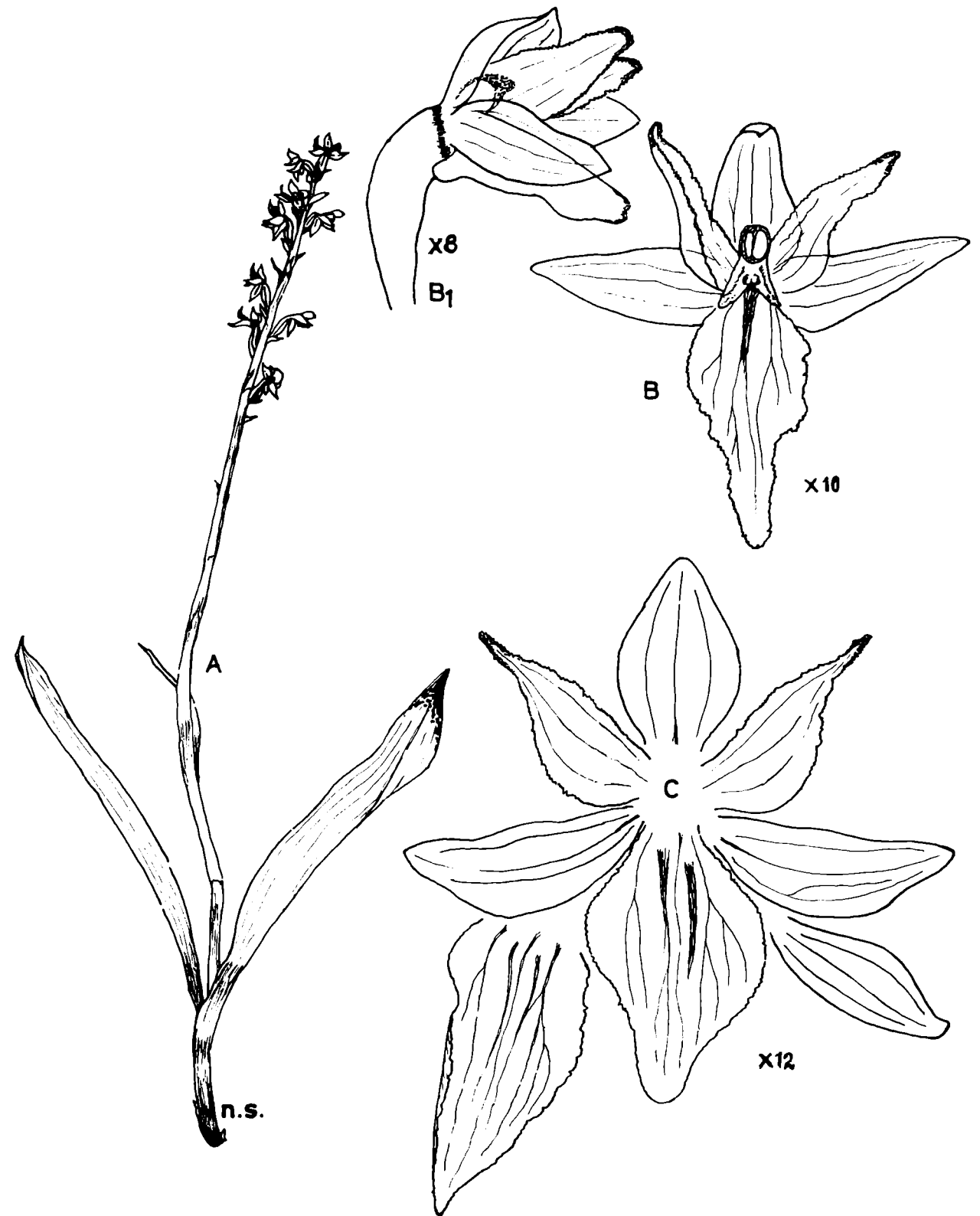


Plate 29

Herminium monophyllum (D. Don) P.F. Hunt & Summerh. in Kew Bull. 20:51, 1966; T.3:157, 1975; B. & T. 72:40, 1975, H. et al. 47, 1978.

= *Neottia monophylla* D. Don, Prodr. Fl. Nep. 27, 1825.

= *Herminium gramineum* Lindl. : Hk. f. 6:131, 1890; D.200, t.148, 1906; B.55:267, 1955.

Plants 4.5-15 cm. high with oblong or subglobose, unequal tubers, a single loose sheath at the base. Leaf solitary, narrowly lanceolate, 3.5-7.5 cm. long, acute, shorter than the inflorescence. Spike 2.5-8 cm. long, laxly flowered; floral bracts c 5 mm. long equalling or shorter than the curved ovary. Flowers 5 mm. in diam., secund, yellowish-green. Sepals subequal, dorsal sepal 2 mm. long, oblong or broadly ovate, lateral sepals ovate 2.5 mm. long, obtuse and spreading. Petals equalling the lateral sepals, sub-falcate and linear-oblong, obtuse, margin in the upper half faintly crenulate, fleshy, erect, yellow. Lip entire, shorter or equalling the lateral sepals, ovate-acuminate, faintly saccate at base, curved, concave, terminal part bright yellow, upturned with reflexed edges.

Flowering time - July to September.

Altitudinal range - 1675-2640 m.

Distributional pattern - central and east Nepal.

Collection in the Herbarium - 9 gatherings.

Specimens studied - 9.

Chr. No. $n = 20$ (Arora, Taxon, 17:200 as *H. gramineum*).

$2n = 36$ (Mehra & Kashyap, ibid. 27:226, 1978 as *H. gramineum*).

Remarks - The subulate floral bract exceeds the length of the ovary in the lower flowers, while in the upper flowers it is either equalling or shorter than the ovary.

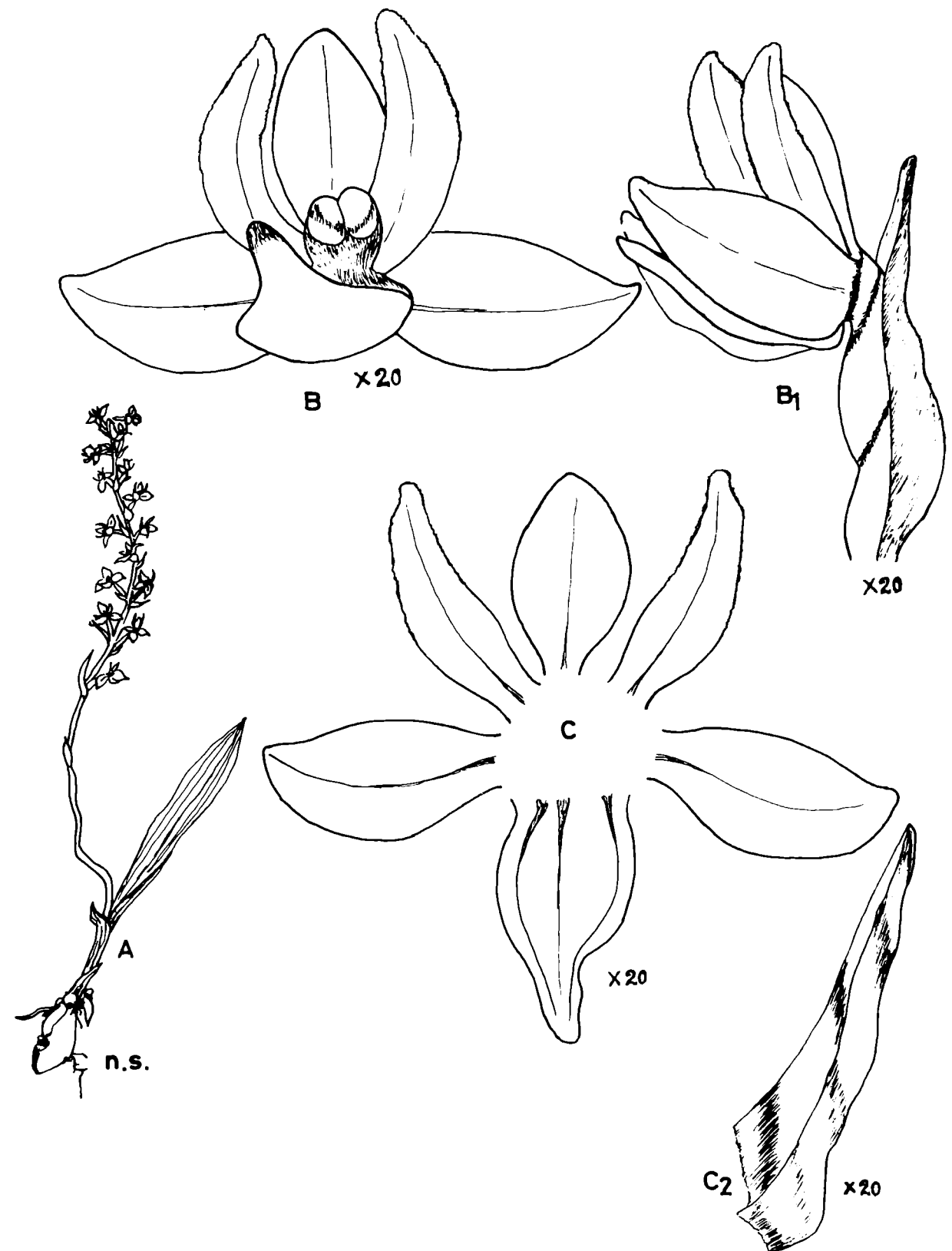


Plate 30

Herminium monorchis (L.) R. Br. in Ait. Hort. Kew. ed.2, 5:191, 1813; Hk. f. 6:128, 1890; D.196, t.146, 1906; H. et al. 47, 1978.

= *Ophrys monorchis* L. Sp. Pl. 947, 1753.

Plants 5-15 cm. high with ellipsoid or globose tubers rarely with a sheath at the base. Leaves 2 or 3, near the base of the stem, 2.5-5.5 cm. by 1.7-1.3 cm., oblong-lanceolate or lanceolate, acute. Spike 2.5 to 5 cm. long, densely few flowered; bracts lanceolate 5 mm. long equalling or shorter than the ovary. Flowers 4 mm. in diam., decurved; yellowish-green, faintly scented. Sepals sub-equal, dorsal sepal 2.5 mm. long, oblong, obtuse, lateral sepals narrower, 3 mm. long, subfalcate, subacute. Petals 4 mm. long subcon- nivent with sepals, obliquely oblong-ligulate, tips fleshy. Lip as long as petals, base concave, 3 fid, lobes narrow, mid lobe the longest, tip fleshy.

Flowering time - July to August.

Altitudinal range - 3350-4225 m.

Distributional pattern - central Nepal.

Collection in the Herbarium - 8 gatherings.

Specimens studied - 8.

Chr. No.

Remarks - In the shape and size of the lateral petals there is some variation. The lip also shows variations in being narrower and having the sides lobes convergent.

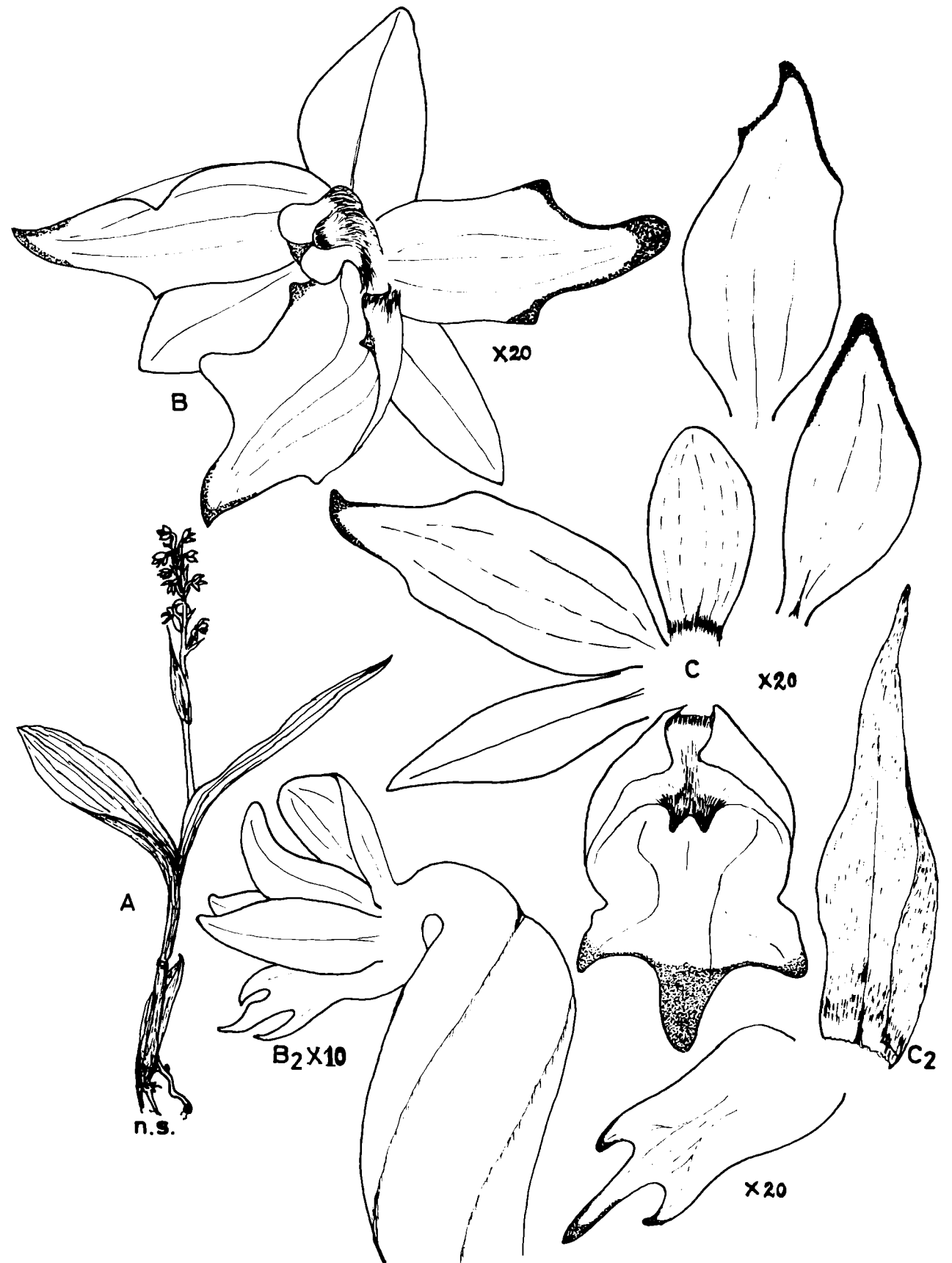


Plate 31

Herminium quinquelobus King & Pantl. Journ. As. Soc. Beng. 65(2):130 et Ann. Roy Bot. Gard. 8:332, t.435, 1898; T. 3:157, 1975; H. et al. 47, 1978.

Plants 10-25 cm. tall with oblong tubers which are 2-3 cm. long, lower part of stem covered by 2 convolute sheaths. Leaves 2 at about the middle of stem, 12-13.5 cm. by .7-1.3 cm., linear-oblong, acute. A linear bract, 4-4.5 cm. long above the leaves. Spike 8-13 cm. long, laxly flowered; floral bracts 5-7 mm. long, equalling the ovary. Flowers c 5 mm. diam. (anterio-posterior), green. Sepals subequal, 2.5-3.5 mm. ovato-oblong, spreading. Petals equalling the sepals, linear-acuminate, spreading. Lip longer than the sepals; two basal auricles, main part with a contracted terminal lobe and 2 lateral lobes at the apex (lip 5-lobed including the 2 auricles), variable in size of the terminal and 2 lateral lobes.

Flowering time - September to October.

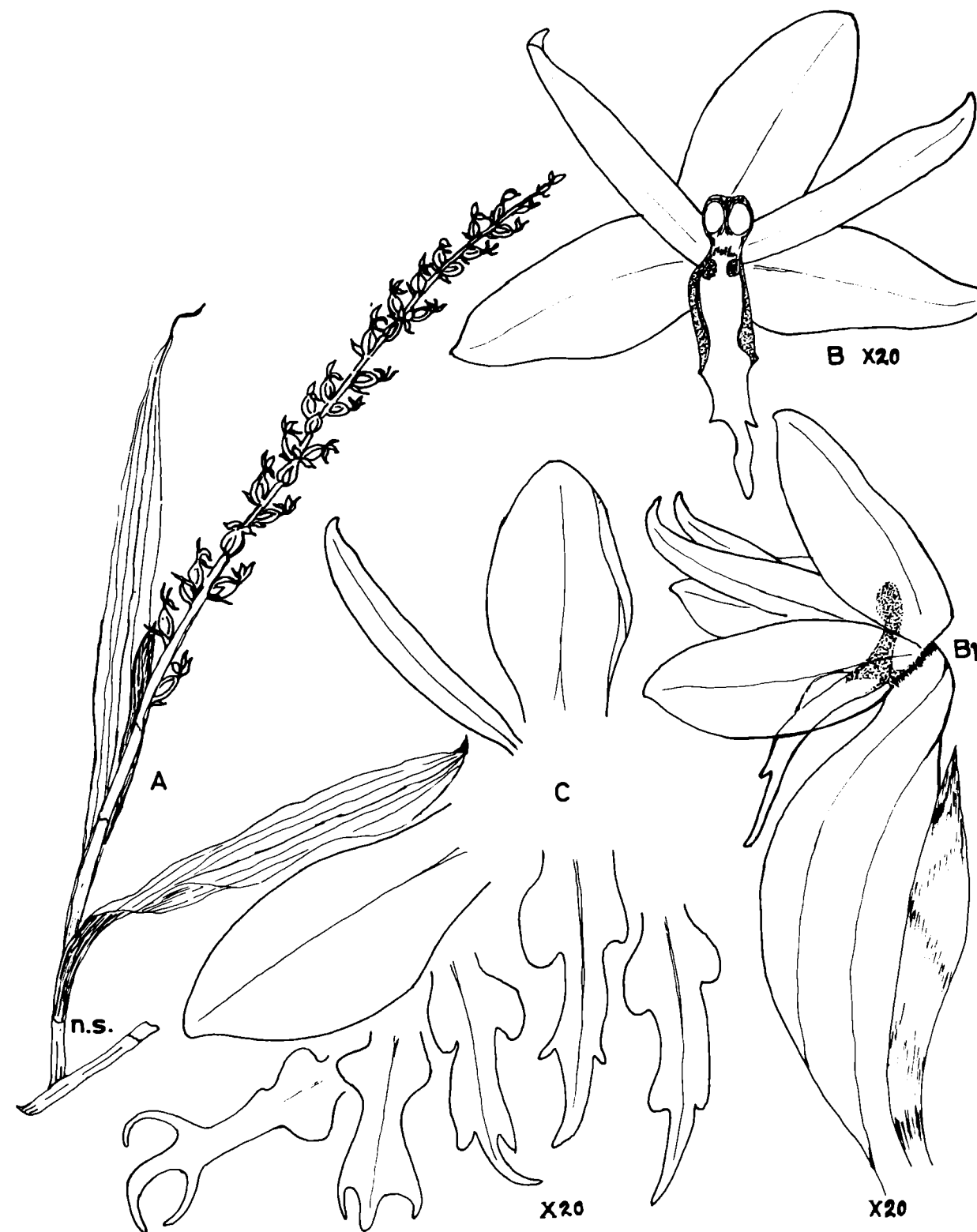
Altitudinal range - 2290-3200 m.

Distributional pattern - east and central Nepal.

Specimens in the Herbarium - 4 gatherings.

Specimens studied - 4.

Chr. No. n = 19 (Mehra & Vij, Taxon, 19:109, 1970).



NEOTTIANTHE Schltr. (Platanthereae). Terrestrial plants with usually 2 leaves and small, secund flowers. The flowers have a superficial resemblance to the flowers of the species of *Neottia*. Lip is 3-lobed with inflated spur which is curved forwards; rostellum is 2-lobed and the stigmatic processes are small.

Key to the species of Neottianthe

- Floral bract equalling the ovary; lip 3-lobed at about the middle, nearly straight. Leaves 2 at the base. *cucullata*.
 Floral bract exceeding the ovary —
 Lip bent downwards, spur tapering downwards, faintly incurved. *calcicola*.
 Lip boatshaped, spur conoidal, curved forwards. Spike many flowered. *secundiflora*.

Plate 32

Neottianthe calcicola (W.W. Sm.) Schlecht. in Acta Horti. Gothoburg. 1:136, 1924; H. et al. 49, 1978.

= *Habenaria secundiflora* Hk. f. 6:165, 1890 p.p.

= *Gymnadenia calcicola* W.W. Sm. Notes Roy Bot. Gard. Edin. 88:188, 1924.

Plants 8-12 cm. long, erect or slightly curved. Leaves 2, lanceolate or oblanceolate to sublinear, 4-8 cm. by .5-1 cm. obtuse to acute. Spike 4 cm. long, usually 6-12 flowered; floral bracts ovato-lanceolate, 1-1.2 cm. long, smaller than the flowers but exceeding the ovary. Flowers secund; sepals c 7 mm. long obliquely lanceolate, acute; petals smaller than the sepals, 5 mm. long, linear. Lip about 7 mm. long, 3-lobed at the middle or near the base, lobes linear, mid lobe 4 mm. long, side lobes c 3 mm. long, bent downwards; spur c 5 mm. long, faintly incurved, apex contracted.

Flowering time - August.

Altitudinal range - 3700-3800 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 2 gathering.

Specimens studied - 2.

Chr. No.

Remarks - On a study of limited specimens, it is felt that there is variability in size of the flowers and lobing of the lip.

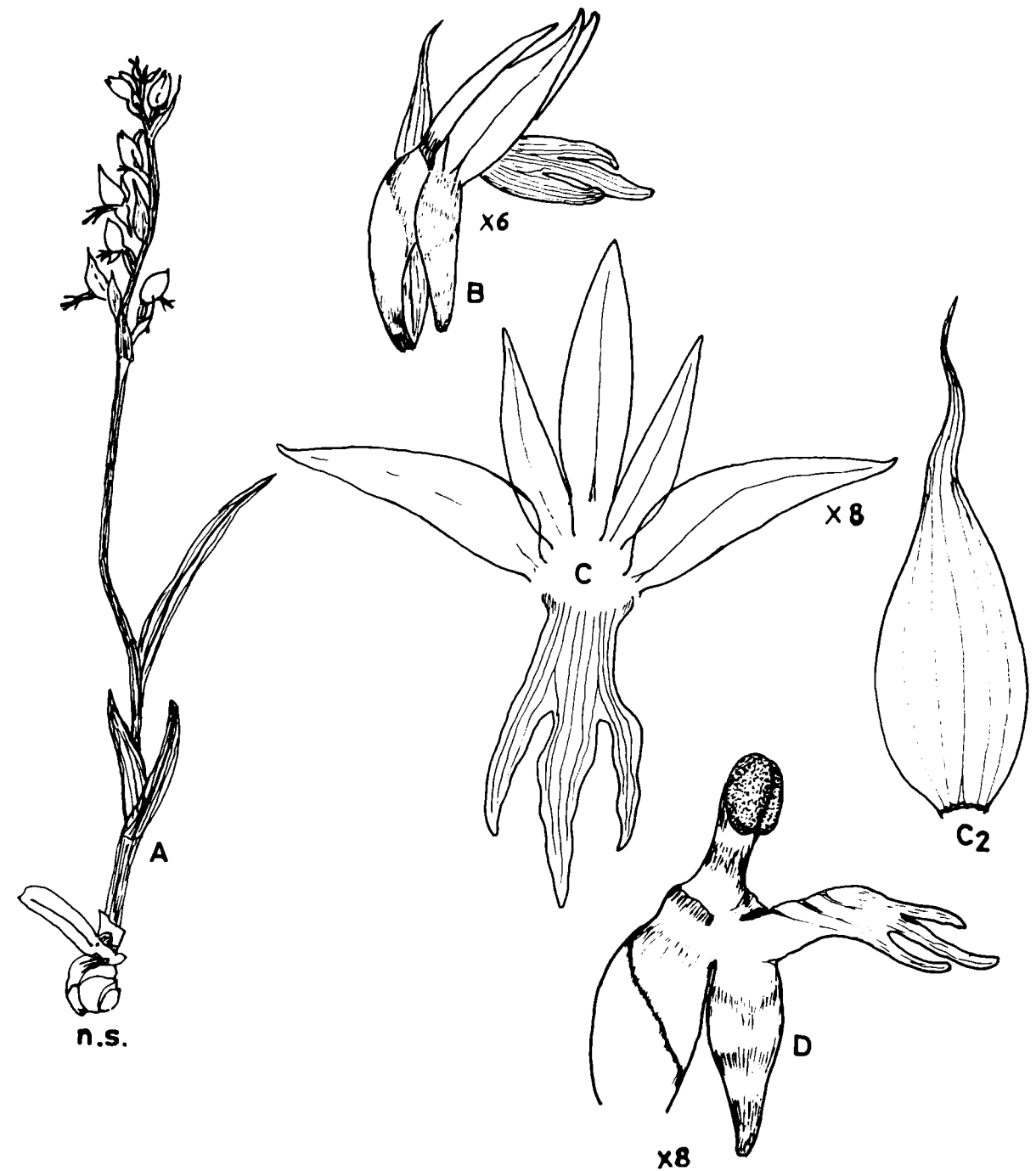


Plate 33

Neottianthe cucullata (L.) Schlecht. in Fedde. Rept 16:292, 1919; H. et al. 49, 1978.

= *Orchis cucullata* L. Sp. Pl. 939, 1753.

Plants 10-20 cm. in height, usually 15 cm., erect; leaves 2 at the base, oblong, elliptic to oval, 3-4.5 cm. by .8-1 cm., acute to obtuse. Spike 4-6.5 cm. long, usually 8-10 flowered; floral bracts 5 mm. long, equalling the ovary. Flowers secund, pinkish; sepals unequal, dorsal sepal 3.5 mm. long reflexed, lateral sepals 4.5 mm. long, subfalcate more or less erect and enclosing the petals. Petals linear-lanceolate, 3 mm. long. Lip c 4.5 mm. equalling the lateral sepals, 3-lobed at about the middle, nearly straight, lobes linear, mid lobe longer than the side lobes; spur c 4 mm. long, curved forwards.

Flowering time - August.

Altitudinal range - \pm 3000-3200 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No.

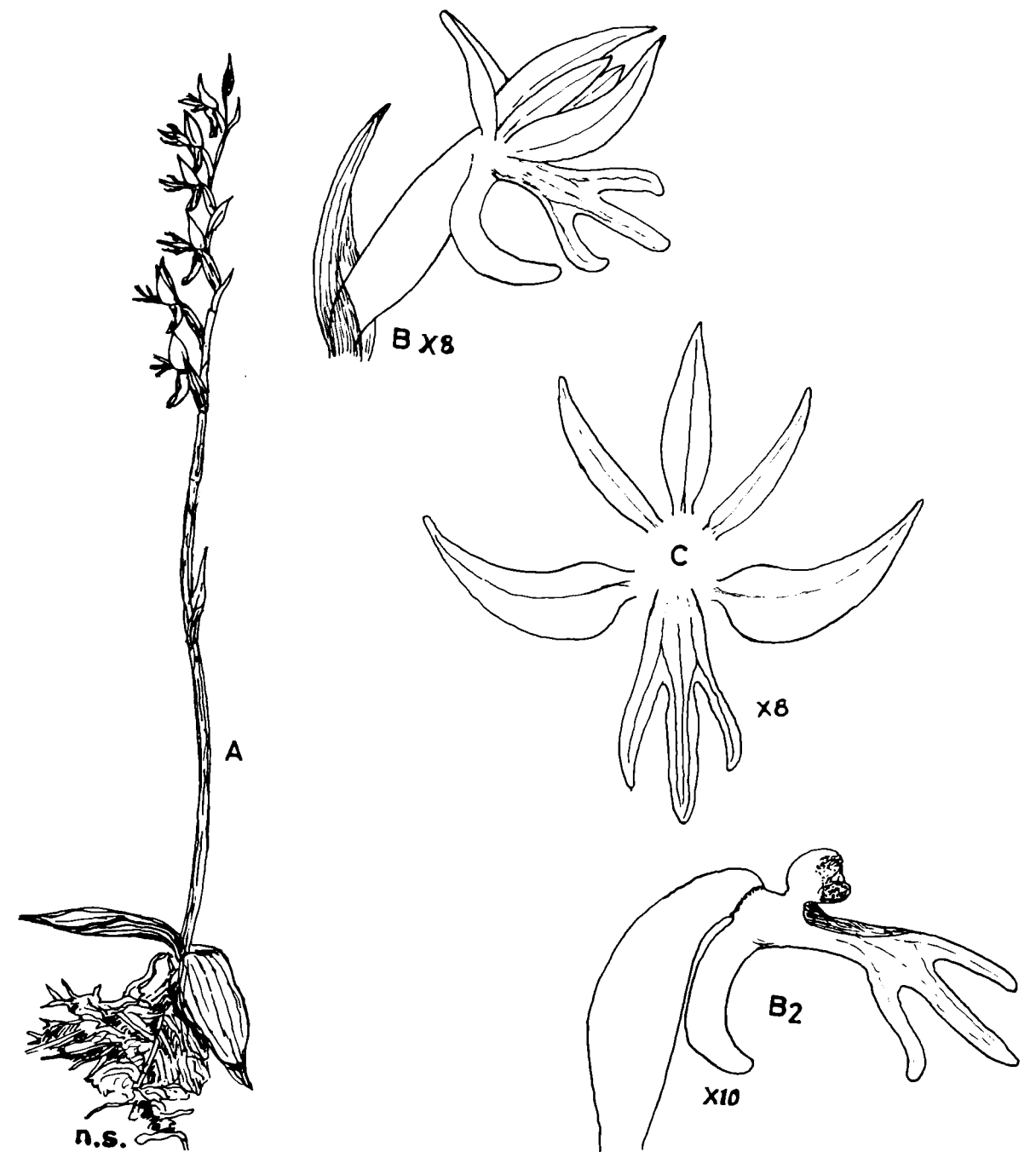


Plate 34

***Neottianthe secundiflora* (Hk. f.) Schlecht. in Fedde, Repert, 16:291, 1919; H. et al. 49, 1978.**

= *Habenaria secundiflora* Hk. f. Fl. Brit. Ind. 6:165, 1890; K. & P. 330, t.433, 1898; T.3:154, 1975.

Plants 10-30 cm. high with 2-3 leaves; leaves linear, 5-11.5 cm. by .5-1.2 cm., acute. Spike 8-12 cm. long, many flowered; floral bracts linear-lanceolate 2 cm. long and exceeding the flowers. Flowers secund, pink; sepal unequal, dorsal sepal enclosing the petals and the lateral sepals forming a hood, dorsal sepal 5 mm. long. Lip 3-lobed at the anterior half, boat shaped a little longer than the sepals; spur conoidal, 3 mm. long, curved forwards, slightly shorter than the ovary.

Flowering time - August to September.

Altitudinal range - ± 2800-2900 m.

Distributional pattern - central and west Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No.

Remarks - On the study of a limited number of specimens, it is felt that the number of leaves is 2 to 3.



PECTEILIS Rafin. (Habenarieae). Because of the pectinate lateral lobes of the lip, the genus has been given the name *Pecteilis*. Also the lip's lateral lobes resemble a comb (pectein). Terrestrial. Flowers large in spikes. Sepals unequal, free and the lateral ones more or less spreading, petals narrower than the dorsal sepal and appressed to it. Labellum 3-lobed, column short and continuous with the lip, spur long. Clinandrium distinct with short anther lobes which are adnate to the rostellum.

Artificial key to the species of *Pecteilis*

Lip as long as the lateral sepals, lateral lobes deeply pectinate; spur more than twice the length of the ovary. Flowers 8-10 cm. in diam. *gigantea*.

Lip very long, lateral lobes semi-oblong, hatchet-shaped; spur as long as or longer than the ovary, tip slightly thickened. Flowers c 3 cm. in diam. *triflora*.

Plate 35

***Pecteilis gigantea* (J.E. Sm.) Raf. Fl. Tellur 2:38, 1837.**

= *Orchis gigantea* Sm., Exot. Bot. 2:79, t.100, 1906; Wall. 6, 1824.

= *Habenaria gigantea* (Sm.) D. Don, 24, 1825.

= *Habenaria susannae* auct, non (L.) Bl. : Hk. f. 6:137, 1890; D. 178, t.129, 1906.

= *Platanthera susannae* auct, non (L.) Lindl. : B. & T. 72:41, 1975.

= *Pecteilis susannae* (L.) Raf. : H. et al. 52, 1978.

Plants 50-85 cm. tall, stem stout and with many sheaths at the base. Leaves mostly on the middle part of the stem, sheathing, 5-15 by 2.5-4 cm., ovate-oblong, acute, upper leaves smaller and bract-like. Raceme very short, 3-5 flowered; floral bracts foliaceous, longer than the ovary. Flowers 8-10 cm. in diam., white, fragrant. Sepals spreading, subequal, broad; dorsal sepal suborbicular, 3.6 by 3.4 cm., acute, lateral sepals subquadrately oblong, 4 by 2 cm., obtuse. Petals linear-falcate, 3.6 cm. long, acute, thick. Lip as long as the lateral sepals, fleshy, mid lobe spatulate, margin recurved, lateral lobes broad, truncate, deeply pectinate; spur more than twice the length of the ovary, 11.5-14 cm. long. Anther massive and broad, tubes adnate to the sides of the column, long; pollinia curved and with long caudicles; staminodes prominent. Stigmatic processes large and not projecting.

Flowering time - August to September.

Altitudinal range - 1500-1830 m.

Distributional pattern - east, central and west Nepal.

Collection in the Herbarium - 6 gatherings.

Specimens studied - 2 specimens.

Chr. No. n = 21 (Mehra & Kashyap, Taxon, 28:407, 1979 as *H. susannae*).

2n = 42 (Arora, ibid. 17:200, 1968 also Jorapur & Garg, ibid. 29:547, 1980 as *Platanthera susannae*).

Remarks - According to Vujik (1965) *P. gigantea* (J.E. Sm.) Raf. occurs in the Northwestern Himalaya while *P. susannae* (L.) Raf. is widespread all over eastern Asia. However he prefers to keep the genus *Platanthera*. We are thankful to Prof. Seidenfaden for the correct identity of our plant.

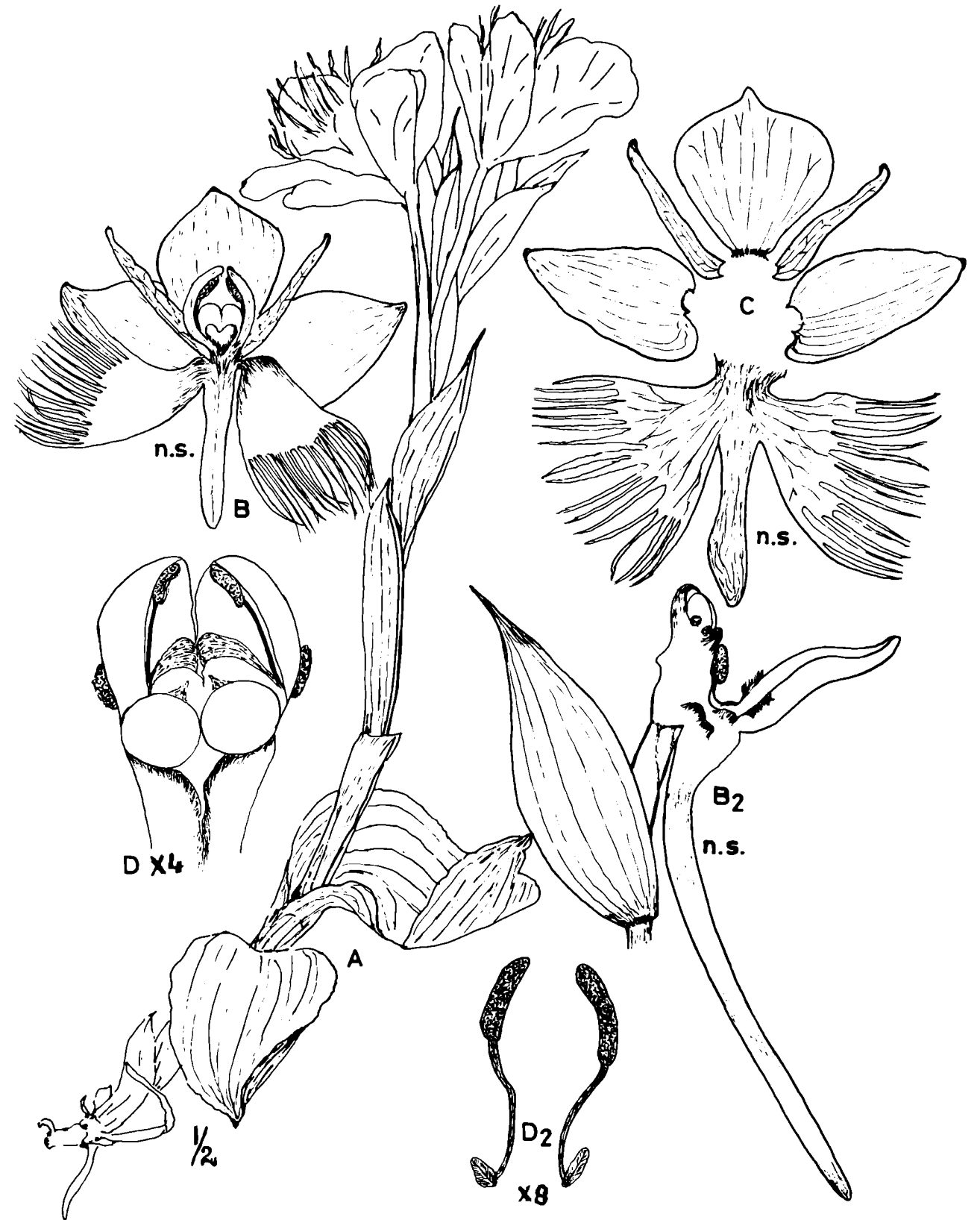


Plate 36

Pecteilis triflora (D. Don) Tang & Wang in Acta Phytotax. Sinc. 1:62, 1951; H. et al. 52, 1978.

= *Habenaria triflora* D. Don, Prodr. Fl. Nep. 25, 1825; Hk. f. 6:142, 1890; D. 182, t. 133, 1906; B. & T. 72:37, f. 3, 1975; Herk. 85:150, f. 137, 1977.

Plants c 25-40 cm. high, stem rather stout, terete, loose sheaths at the base, leafy throughout. Leaves 3.5-8.5 cm. by 1.5-2 cm., oblong-lanceolate or ovate-lanceolate, acute, upper leaves narrower and acuminate, gradually leading to floral bracts, keeled. Flowers 1 to 3, c 3 cm. across, white; sepals subequal, dorsal sepal ovate 1.5 by 1.3 cm., lateral sepals oblong-ovate, 1.5 by 1 cm. Petals small, 7 mm. long, linear, 1 nerved. Lip very large, flabelliform, 3-partite from the middle, gibbous at the base, lateral lobes semi-oblong, hatchet-shaped, crenulate, midlobe a little shorter and linear; spur very slender, as long as or longer than the ovary, slightly thickened at the tip. Anther very large and broad, tubes short; staminodes spreading. Stigmas inconspicuous.

Flowering time - August.

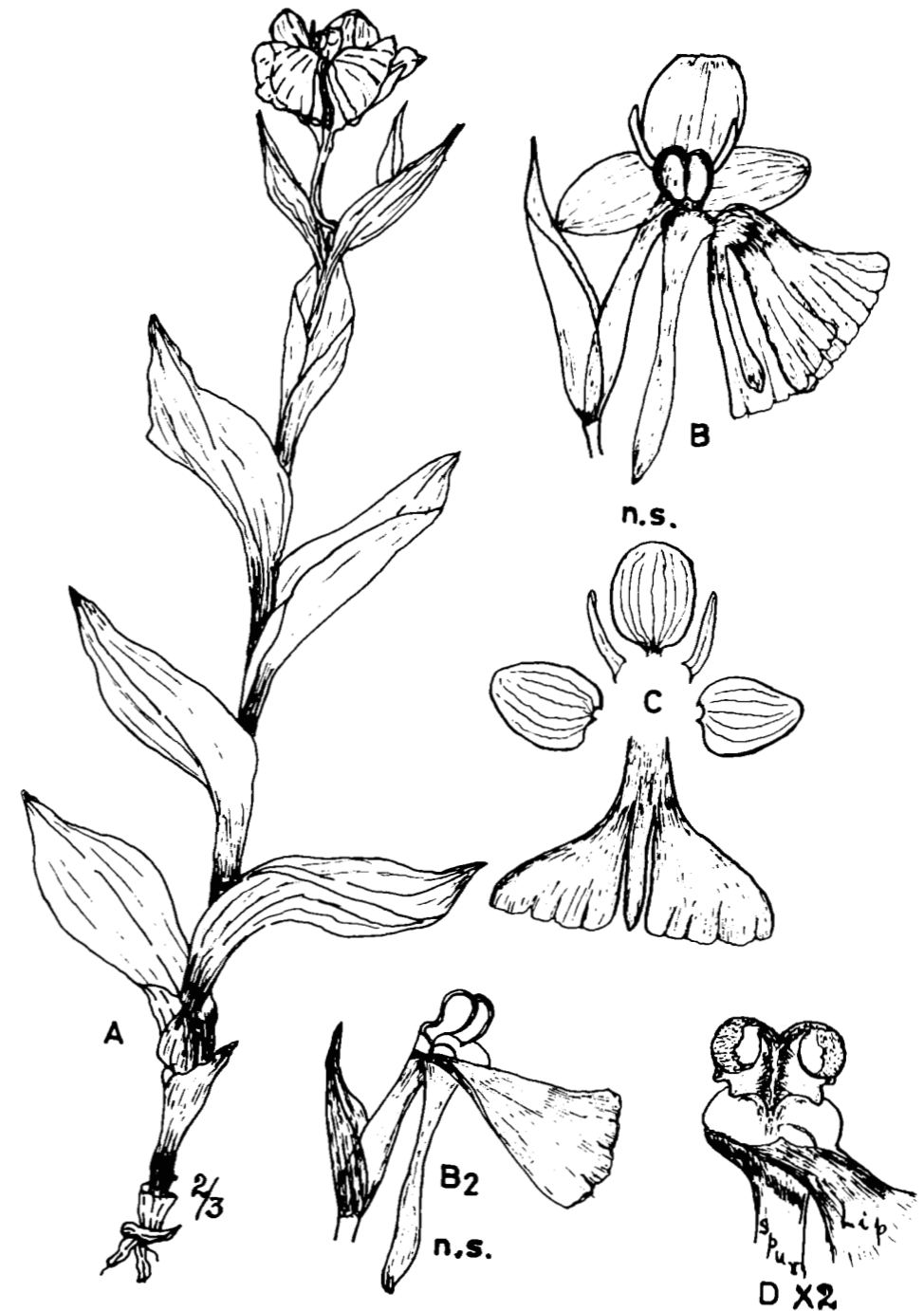
Altitudinal range - 1000-1200 m.

Distributional pattern - central and west Nepal.

Specimens in the Herbarium - 3 gatherings.

Specimens studied - 1.

Chr. No. $2n = 42$ (Mehra & Kashyap, Taxon, 27:226, 1978 as *H. triflora*).



PERISTYLUS Bl. (Habenarieae). These are terrestrial orchids with linear-lanceolate or linear-elliptic leaves. Flowers are small in racemes; sepals and petals free; petals fleshy and slightly broader than the sepals. Labellum is continuous with the column, free or faintly adnate to it; column short and without a foot. The stigmas are convex and entirely united to the base of the lip and to the auricles of the column.

Peristylus albomarginata (King & Pantl.) comb. nov.

= *Habenaria albomarginata* King & Pantl.

Plants not exceeding 20 cm. with two leaves. Sepals longer than the petals, green with white margin, other parts of the flower white; lip deeply 3 fid, midlobe longer than the lateral lobes; spur horizontal, shorter than the ovary; stigmas conjoined into a narrow reniform horizontal band.

Peristylus hamiltonianus (Lindl.) Lindl.

Leaves clustered at middle of stem, linear-lanceolate, c 16 cm. long. Inflorescence dense, floral bracts much longer than the flowers, c 12-18 mm. long. Dorsal sepal 2.7 mm. long. Lip tripartite shorter than the petals, midlobe obtuse, short with broad base side lobes not threadlike linear, of the same length or shorter.

Peristylus richardianus Wight,

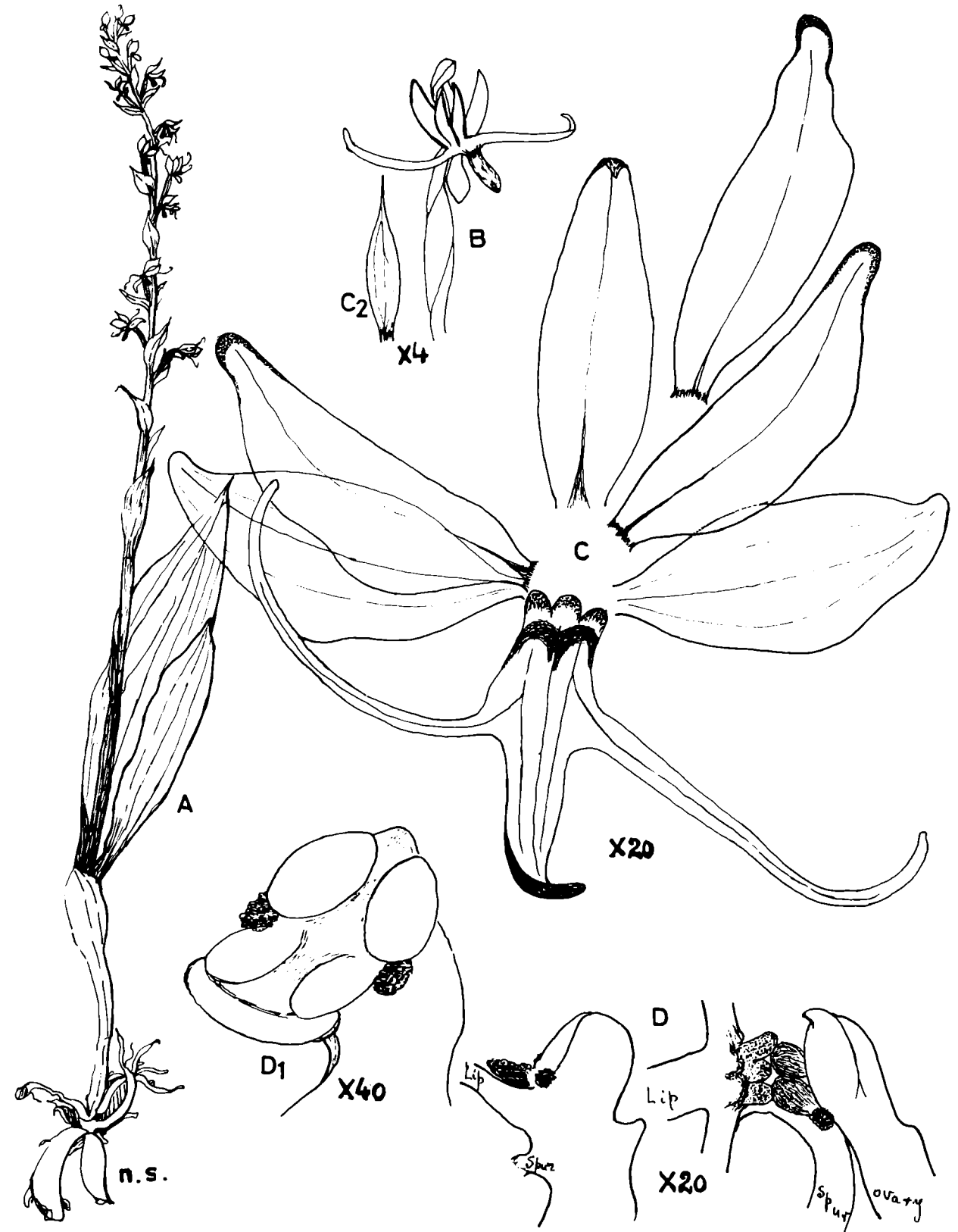
Leaves slender, lanceolate, 6-7 cm. long evenly scattered along the stem. Bracts as long as or longer than the ovary. Lip tripartite, side lobes threadlike, longer than the midlobe; transverse ridge at base of epichile, broad; spur clavate and about as long as the dorsal sepal, c 4-5 mm.

Artificial key to the species of Peristylus

- 1 Lip 3-lobed —
 - 2 Lip shorter or equalling the sepals, hastately 3-lobed about the middle —
 - 3 Lateral lobes of lip spreading —
 - 4 Lateral lobes linear and widely spreading, basal part of lip troughshaped. Petals thick at tips. *elisabethae*.
 - 4* Lateral lobes of lip blunt and slightly divergent, basal part of lip flat. Petals not thick at tips. *fallax*.
 - 3* Lateral lobes of lip near the apex. Petals thick at the tips. Plants with leaves clustered about the middle of stem. *lawii*.
 - 2* Lip longer (or rarely equalling) than the sepals —
 - 5 Lip indistinctly 3-lobed, side lobes subulate, mid lobe narrowly oblong, slightly tapering and bent. *densus*.
 - 5* Lip distinctly 3-lobed —
 - 6 Lip 3-lobed at its anterior half, side lobes linear-oblong, diverging —
 - 7 Side lobes filiform and horizontally spreading, much longer than the mid lobe. Floral bracts shorter than the ovary. *aristatus*.
 - 7* Side lobes linear-oblong, falcate with apices diverging and slightly longer than the mid lobe —
 - 8 Floral bracts equalling the ovary. Lip broadly triangular; spur subglobular with a vertical groove in the middle (testicular). *goodyeroides*.
 - 8* Floral bracts longer or equalling the ovary. Lip more or less rhomboid; spur broadly globular, slightly curved. *constrictus*.
 - 6* Lip 3-lobed near the apex, side lobes short and pointed forwards —
 - 9 Plant with 3-5 leaves about the middle of the stem. Flowers densely crowded. Spur small and saccate. *prainii*.
 - 9* Plants with 3-5 leaves close together, as if in a whorl. Flowers not densely crowded. Spur fusiform. *parishii*.
 - 1* Lip entire, thickened at the anterior end, slightly curved. Tips of petals thickened. *nematocaulon*.

Plate 37

Peristylus aristatus Lindl., Gen. Sp. Orchid Pl. 300, 1835; Seidenf. 31(3):35, f.14, 1977; H. et al. 52, 1978.



= *Habenaria aristata* (Lindl.) Hk. f. in Trimen : Hk. f. 6:158, 1890 p.p.; B. & T. 72:33, 1975.

Plants 30-35 cm. high, very slender, lower part with many sheaths, leafy near the middle and upper half with bracts. Leaves 3-5, unequal, middle one the largest, elliptic-lanceolate, 5-8.5 cm. by 1-1.8 cm., slightly narrowed to the base which is sheathed, acute; bracts lanceolate, 1.5-1.1 cm. long, gradually diminishing in size. Spike 5-11.5 cm. long, slender, laxly many flowered; floral bracts broadly lanceolate, 5-8 mm., shorter or equalling the ovary. Flowers small, c 5 mm. in diam., greenish; sepals unequal, 4 mm. long, entire, dorsal sepal lanceolate, apex recurved, lateral sepals broadly lanceolate, turned upwards, spreading; petals equalling the sepals, conniving with the dorsal sepal to form a hood, falcately ovato-lanceolate, oblique at base. Lip longer than the sepals, hastately tri-partite, mid lobe linear, obtuse, tip slightly turned upwards, lateral lobes filiform, horizontally spread; spur fusiform, shorter than the ovary. Anther cells small; pollinia obovoid, caudicles short; staminodes on ridges above the stigmas. Stigmas narrowly oblong, situated on the sides of the mouth the spur.

Flowering time - August.

Altitudinal range - 1675-2290 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. $n = 21$ (Mehra & Viji, Taxon, 19:109, 1970).

also $n = 61$ (Mehra & Sehgal, *ibid.* 23:803, 1974)

$2n = 46$ (Jorapur & Garg, *ibid.* 29:547, 1980)

(all as *Habenaria aristata*).

Remarks - According to Seidenfaden (*Dansk. Bot. Arkiv.* 31(3):35 et 41, 1977) the Khasia plants called as *Habenaria aristata* by Hooker should be called as *Peristylus gracilis* Bl. and the Sikkim plants as *Peristylus tipulifera* (Par. & Reichb. f.) Mukerji. We are inclined to regard our plant as *P. aristatus* Lindl. because of the strong resemblance of the lip and the side view of the column and lip with the figures given by Seidenfaden.

Plate 38

Peristylus constrictus (Lindl.) Lindl. Gen. Sp. Orchid. Pl. 300, 1835; Seidenf. 31(3); 46, f.20, 1977; H. et al. 52, 1978.

= *Herminium constrictum* Lindl. Bot. Reg. Sub. T.1449, 1832.

= *Habenaria constricta* (Lindl.) Hk. f., 6:161, 1890; K. & P. 325, t.429, 1898; D.193, 1906; B. & T. 72:33, 1975.

Plant 50-70 cm. high, stout, lower half of the stem covered by sheaths. Leaves 3 or 5, whorled near the summit of the stem, ovate-elliptic, 7-15 cm. by 2.5-6.5 cm., acuminate, amplexicaul; bracts few, linear-lanceolate, acuminate gradually diminishing in size. Spike 10-30 cm. long, densely flowered; floral bracts 1.3-1.8 cm. long, as long as or longer than the ovary, lanceolate. Flowers 1.6-2.0 cm. across; sepals subequal, ciliolate, oblong 8 mm. long, dorsal sepal conduplicate, lateral sepals spreading, margin involute, brownish. Petals larger than the sepals, 1 cm. long, obliquely ovato-oblong, acuminate, base oblique, somewhat gibbous on the lower side, directed in front of the dorsal sepal. Lip as long as the petals, deeply 3-lobed at the anterior half, midlobe shorter than the lateral lobes, tapering, lateral lobes linear, falcate, apices divergent; spur much shorter than the sepals, broadly globular. Anther cells close together, tubes absent; pollinia obovoid, caudicles short; staminodes oblong. Stigma oblong, diverging.

Flowering time - June.

Altitudinal range - ± 570 m.

Distributional pattern - east Nepal.

Specimens in the Herbarium - 1 gathering.

Specimen studied - 1.

Chr. No. $n = 21$ (Arora, Taxon, 20:785, 1971 as *Habenaria constricta*).

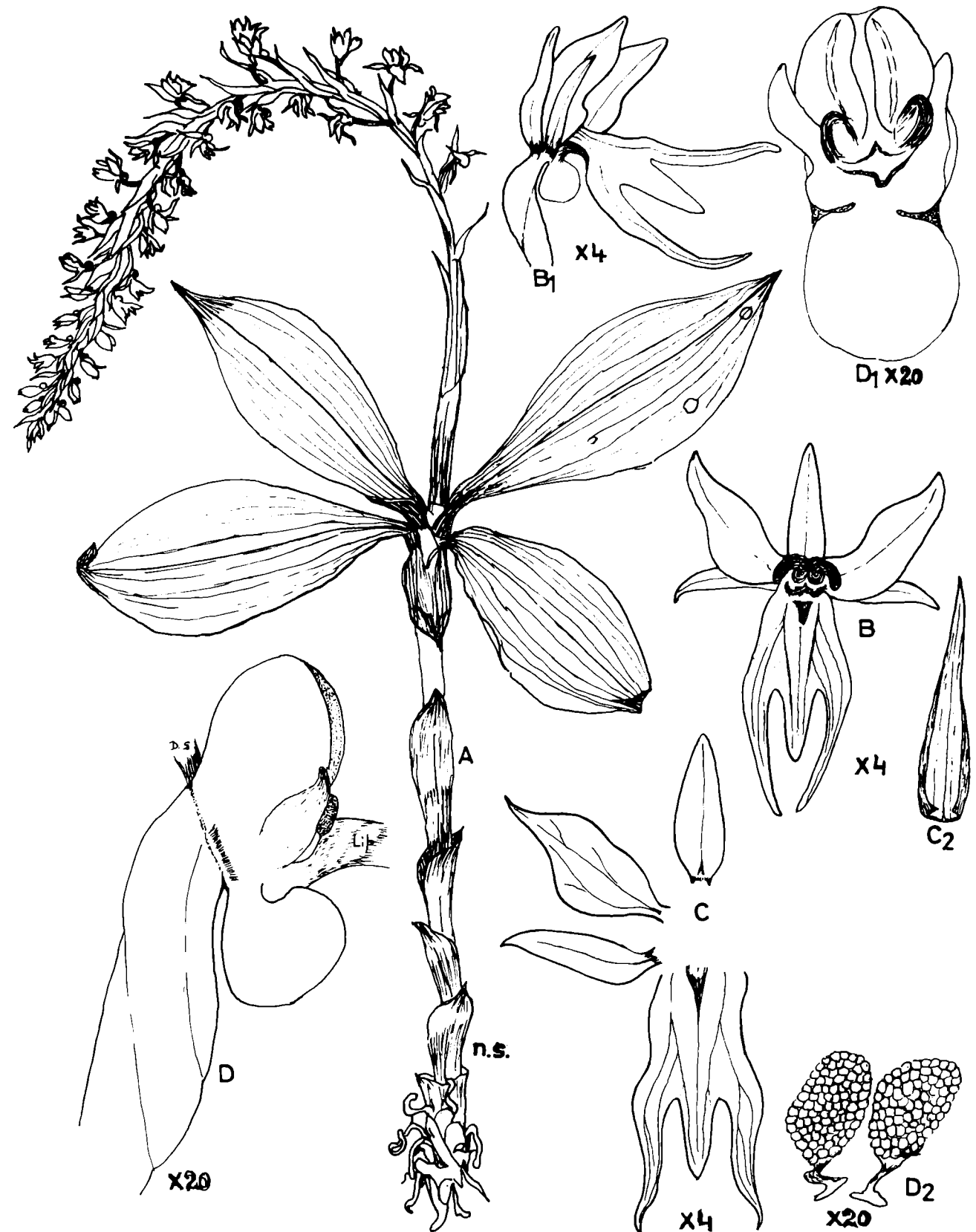


Plate 39

Peristylus densus (Lindl.) Santapau & Kapadia, Journ. Bom. Nat. Hist. Soc. 57(1):128, 1960; Seidenf. 31(3):32, f.12, 1977.

= *Coeloglossum densum* Lindl. Gen. Sp. Orchid Pl. 302, 1835.

= *Habenaria stenostachya* Benth. : Hk. f. 6:156, 1890.

Plants 30-40 cm. tall with sheaths in the lower part. Leaves grouped on the lower third of the stem, sheathing, 4-7 by 1-2 cm., oblong-lanceolate or elliptic or elliptic-lanceolate, acute, above the leaves bracts present gradually becoming smaller, lanceolate. Spike laxly many flowered, 10-15 cm. long; floral bracts longer or equalling the ovary upwards, usually 1.4-.8 cm. long, linear-lanceolate. Flowers c 7 mm. across, greenish, subsecund; sepals unequal, dorsal sepal 4.5 by 1.25 mm., ovate oblong, concave, obtuse, lateral sepals 5 by 1.25 mm., lanceolate, subfalcate, margins incurved. Petals slightly shorter than the sepals, 4 by 1.5 mm., suboblique, ovate-oblong, erect, obtuse. Lip 3-lobed, hollowed at the base, mid lobe narrowly oblong, bent downwards, apex tapering, side lobes subulate, spreading; spur c 3 mm. long, about 1/3rd the length of the ovary, slightly curved, swollen. Anther cells parallel; staminodes prominent.

Flowering time - August.

Altitudinal range - 2135-2745 m.

Distributional pattern - central and east Nepal.

Specimens in the Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No.

Remarks - The basal part of the lip may be expanded into two additional lobes, so that the lip seems to have 5-lobes. This is a new record.

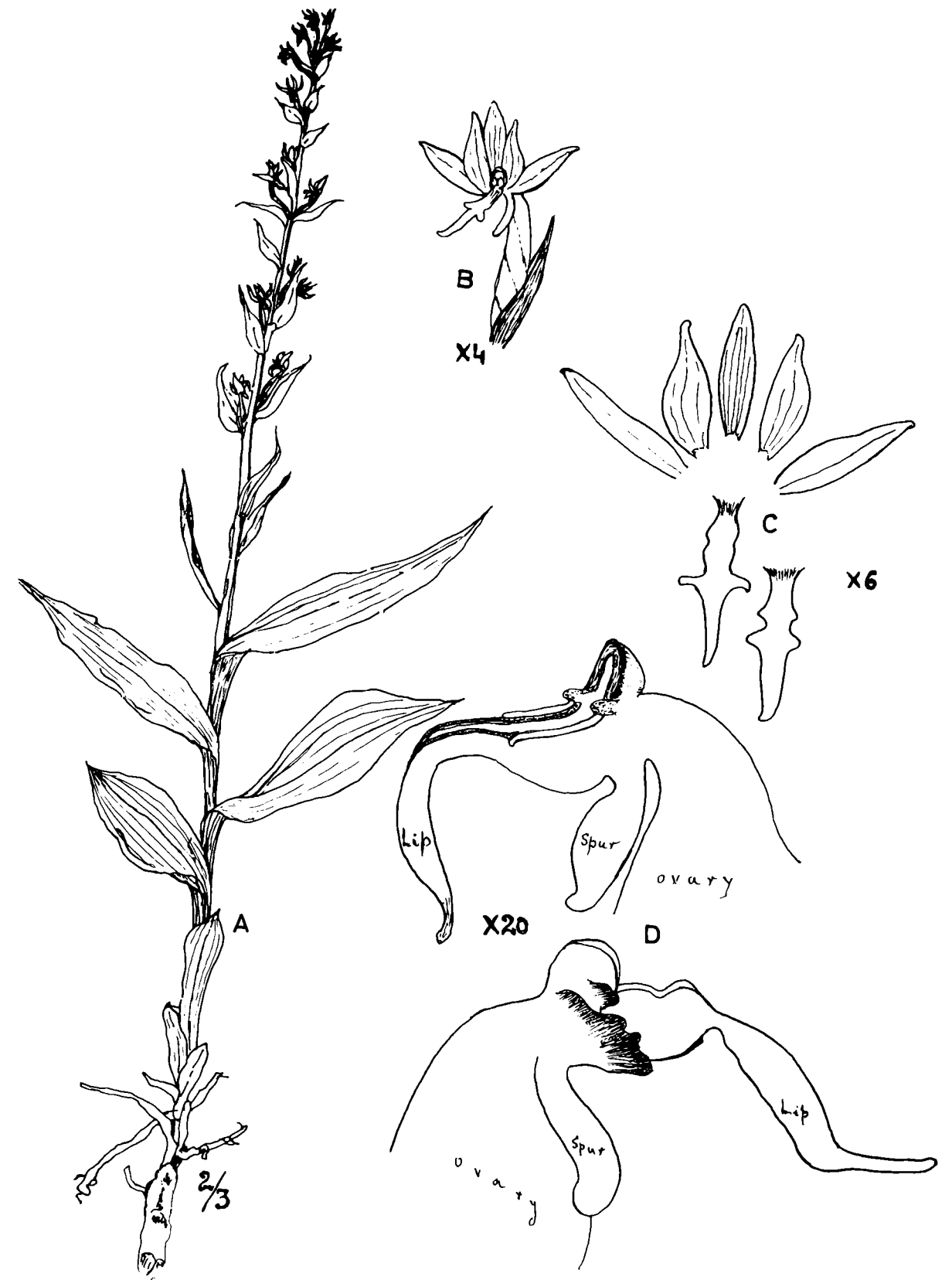


Plate 40

Peristylus elisabethae (Duthie) Gupta Fl. Nainital, 351, 1968; H. et al. 52, 1978.

= *Habenaria elisabethae* Duthie, Journ. As. Soc. Beng. 71, pt. ii, 44, 1902, et 9:191, t.142, 1906; T.3:150, 1975.

Plants 15 to 35 cm. tall, with one or two sheaths at the base. Leaves 2 or 3 near the base of the stem 6-12 by 1-2 cm., lanceolate, acuminate, bracts lanceolate. Spike 10-15 cm. long slender, many flowered; floral bracts lanceolate .6-1 cm. about half as long as the ovary. Flowers small, c 5 mm. in diam., deflexed, green. Sepals subequal, erect, connivent, dorsal sepal ovate, 2.5 mm. long, concave, lateral sepals 3 mm. long obliquely ovate, obtuse. Petals a little longer than the dorsal sepal, connivent, obliquely ovate, tips fleshy. Lip longer than the sepals, 4 mm. long, 3-lobed from the middle, basal part trough-shaped, thick, midlobe oblong, as long as the lateral lobes but broader, lateral lobes linear, spreading; spur short, ovate or obovate. Anther cells lying side by side; pollinia with a short caudicle; staminodes prominent. Stigmatic process clavate.

Flowering time - July to September.

Altitudinal range - 2800-3050 m.

Distributional range - central Nepal.

Specimens in the Herbarium - 5 gatherings.

Specimens studied - 5.

Chr. No. $2n = 42$ (Vij, et al., Taxon, 25:634, 1976 as *Habenaria elisabethae*).

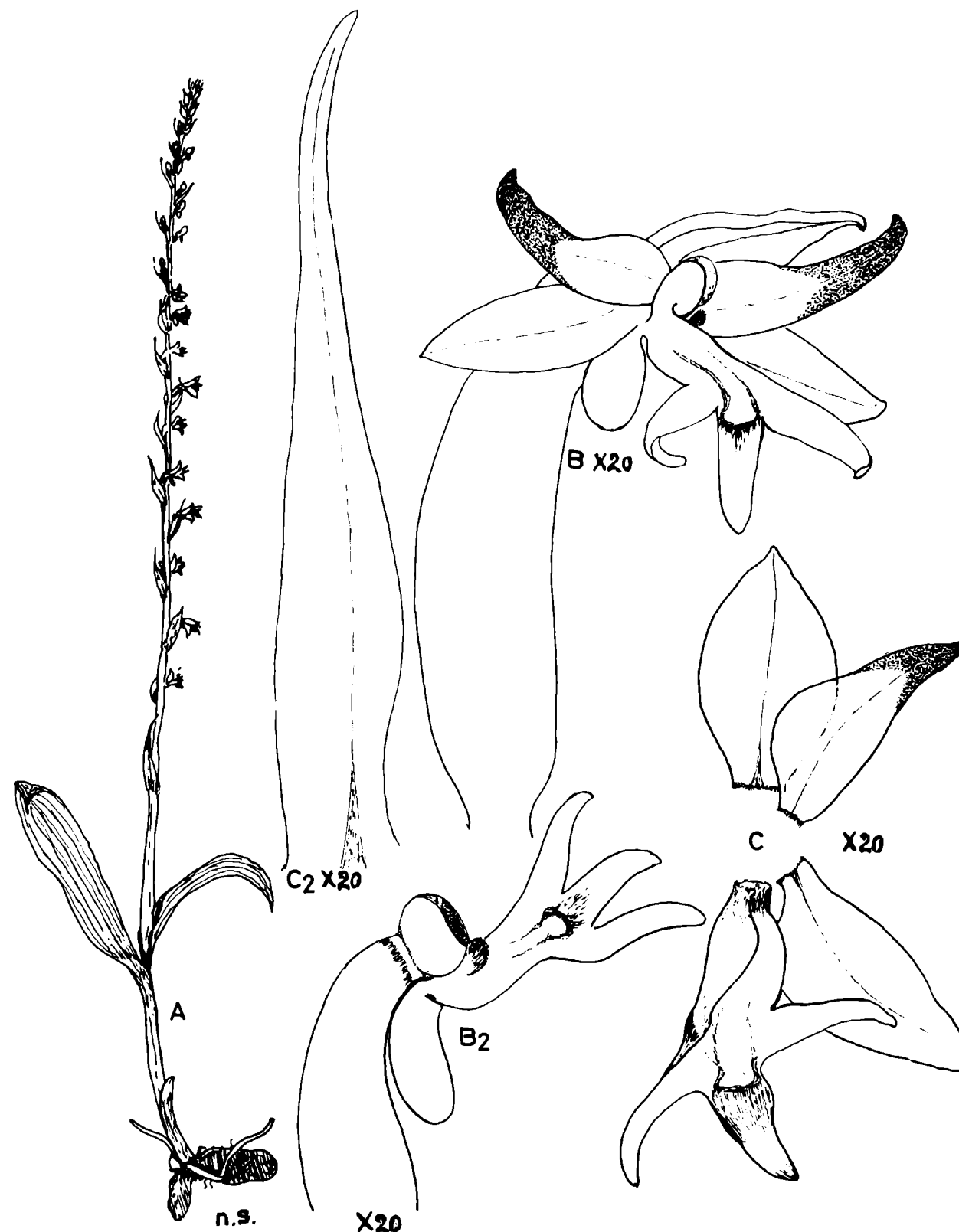


Plate 41

Peristylus fallax Lindl. Gen. Sp. Orchid Pl. 298, 1835; H. et al. 52, 1978.

= *Herminium fallax* Hk. f. 6:129, 1890; T.440, 1966.

= *Habenaria fallax* (Lindl.) K. & P. 325, t.428, 1898; Kit 103, 1955; T.3:150, 1975; B. & T. 72:35, 1975.

Plants 14-35 cm. high, stem with two sheaths at the base. Leaf solitary, rarely two; narrowly elliptic, linear-lanceolate, 5-15 cm. by .8-2 cm., acute, tapering towards the base; single lanceolate bract. Spike lax flowered, 3-19.5 cm. long; floral bracts 5-8 mm. long lanceolate, longer or equalling the decurved ovary. Flowers 7 mm. in diam., green; sepals subequal, ovate-lanceolate, 4 mm. long, dorsal sepal connivent with the petals forming a hood, lateral sepals erect, not spreading. Petals variable in size 2.5-3 mm. long, oblong with blunt apex. Lip variable but usually about the size of the sepals, fleshy, hastately 3-lobed from the middle, mid-lobe longer, obtuse, deflexed, entire or subcrenulate, side-lobes slightly diverging; spur saccate. Anther cells near one another; pollinia with short caudicles; staminodes small. Stigmatic processes two, oblong and close to one another.

Flowering time - July to September.

Altitudinal range - 2000-3700 m.

Distributional pattern - east, central and west Nepal.

Specimens in the Herbarium - 9 gatherings.

Specimens studied - 8.

Chr. No. n = 21 (Mehra & Vij, Taxon, 19:109, 1970 as *Habenaria fallax*)

also n = 17 (Mehra & Sehgal, ibid. 23:803, 1974 as *Herminium fallax*)

2n = 30 (Mehra & Kashyap, ibid. 27:226, 1978 as *Habenaria fallax*).

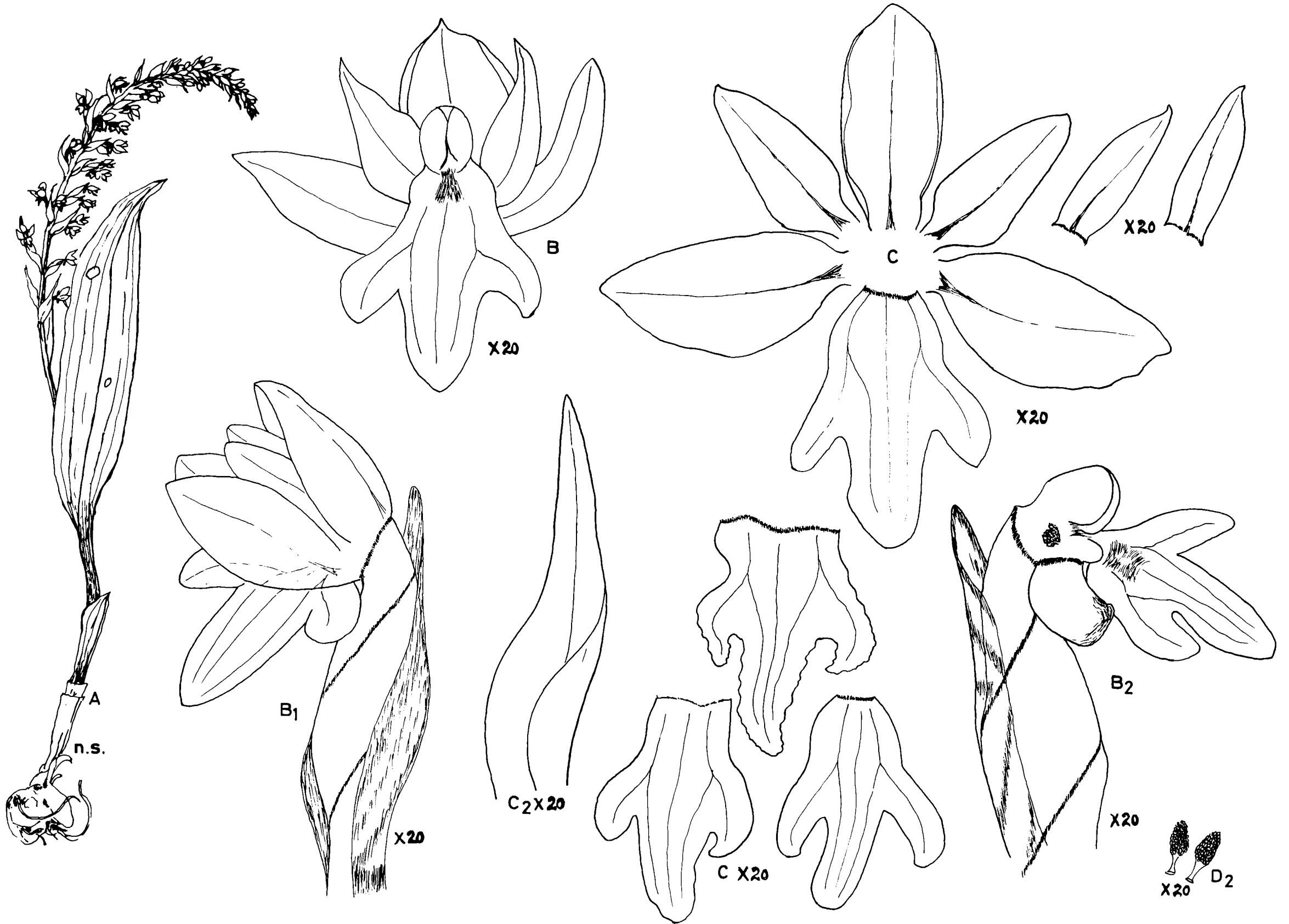


Plate 42

Peristylus goodyeroides (D. Don) Lindl. Gen. Sp. Orchid Pl. 229, 1835; Seidenf. 31(3):53, f.25, 1977; H. et al. 52, 1978.

= *Habenaria goodyeroides* D. Don, Prodr. Fl. Nep. 25, 1825; Hk. f. 6, 161, 1890; K. & P. 326, t.430, 1898; Coll. 505, 1921; T.438, 1966, et 3:150, 1975; B. & T. 72:35, 1975.

Plants 30-70 cm. tall, stem clothed with sheaths at the base. Leaves close together near the middle of the stem, ovate or ovate-elliptic, 6-15 cm. by 2.5-7.5 cm., acute, sheathing base. Spike 10-25 cm. long, densely flowered; floral bracts linear-lanceolate, 1.2-1.5 cm. long, as long as the ovary. Flowers small, 8-10 mm. across, yellowish green. Sepals unequal, apiculate, dorsal broad, ovate-lanceolate, 6 by 3 mm. concave, conniving with the petals forming a hood, laterals oblong, narrower than the dorsal sepal. Petals as long as the sepals but broader, trapeziform. Lip longer than the petals, broadly triangular, 3-lobed, with an oblong depression at the base, midlobe broad with a blunt apex, lateral lobes linear oblong, falcate, diverging, slightly longer than the midlobe; spur small, subglobular, saccate and with a vertical groove in the middle. Anther cells parallel, lying near one another; pollinia pyriform with very short caudicles; staminodes prominent, directed outwards. Stigmas two, large and lying beneath the staminodes.

Flowering time - June to August.

Altitudinal range - 300-1675 m.

Distributional pattern - central and east Nepal.

Specimens in the herbarium - 15 gatherings.

Specimens studied - 9.

Chr. No. $n = 21$ (Arora, Taxon 17:200, 1968 as *Peristylus goodyeroides*).

also $n = 23$ (Mehra & Vij, ibid. 19:109, 1970 as *Habenaria goodyeroides*).

$2n = 42$ (Mehra & Kashyap, ibid. 27:226, 1978).

also $2n = 46 + 1 - 3B$ (Mehra & Sehgal, ibid. 29:349, 1980).

also $2n = 46$ (Jorapur & Garg, ibid. 29:547, 1980 - all as *Peristylus goodyeroides*).

Remarks - Seidenfaden & Smitinand (vide p.52) in the Orchids of Thailand say "we include for the time being under *P. goodyeroides* Ldl. *P. constrictus* Ldl. and *P. parishii* Rehb. f. as well as *Habenaria glaucescens* Ridl." According to our observation there are clear differences. Superficially this species strongly resembles *P. constrictus* but can be differentiated from it on a number of characters e.g., (a) the leaves are not whorled; (b) there are usually no bracts above the leaves; (c) lip is widely different, (d) at the base of the lip there is an oblong depression and (e) there is a vertical groove on the spur.

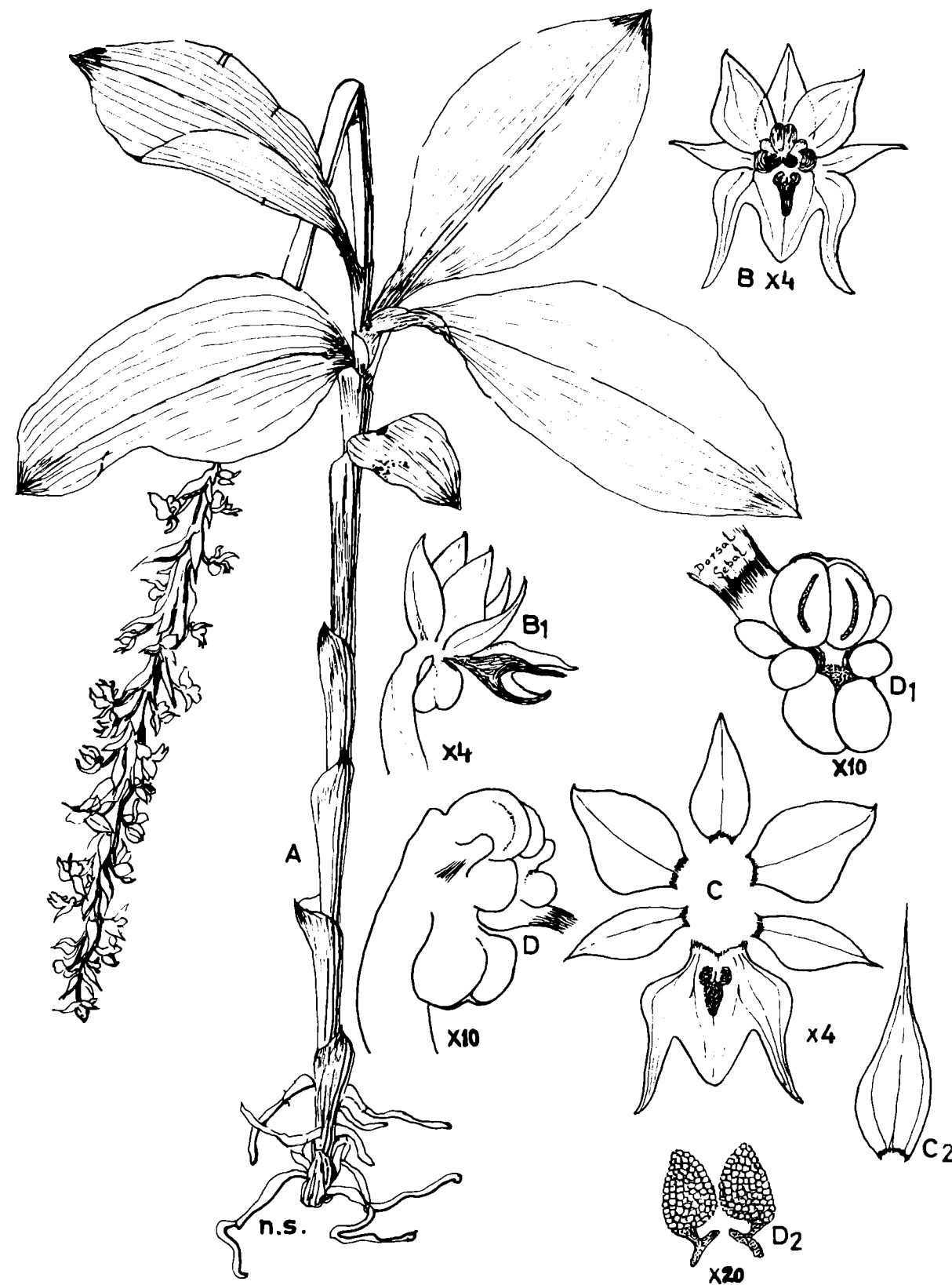


Plate 43

Peristylus lawii Wight, Icon. Pl. Ind. Qr. 5(1):12, t.1695, 1851; H. et al. 53, 1978.

= *Habenaria lawii* (Wight) Hk. f. 6:162, 1890; D.192, t.143, 1906.

Stem 15-25 cm. high, slender, few sheaths at the base. Leaves usually 3-5 about the middle of the stem, narrow lanceolate or elliptic, 6-12.5 cm. by 8-10 mm., acute; bracts above the leaf absent. Spike 5-8.5 cm. long, somewhat laxly flowered; floral bracts 6-10 mm. long, ovate-lanceolate, longer than the ovary, acuminate. Flowers very small, c 5 mm. in diam., white; sepals equal, 3 mm. long, apex rounded, dorsal sepal oblong, lateral sepals faintly subfalcately oblong. Petals fleshy, connivent with the sepals, equalling the sepals but slightly broader, obliquely ovate. Lip as long as the sepals, broadly 3 fid near the apex, mid lobe slightly longer than the laterals, a short ridge at the base; spur small, scroti-form. Anther cells parallel; staminodes prominent.

Flowering time - August.

Altitudinal range - ± 750 m.

Distributional pattern - central Nepal.

Specimens in the herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. $2n = 42$ (Mehra & Kashyap, Taxon, 27:226, 1978 as *Habenaria lawii*; and Singh, ibid. 30:705, 1981 as *Peristylus lawii*).

also $2n = 46$ (Garg, ibid. 29:547, 1980 as *P. lawii*).

Remarks - Santapan & Kapadia (J.B.N.H.S. 57:134, 1980) give the lateral lobes of the lip as slightly longer than the mid lobe. In our specimen all the flowers examined have the mid lobe longer than the side lobes.



Plate 44

Peristylus nematocaulon (Hk. f.) comb. nov. prop.

= *Habenaria nematocaulon* Hk. f. 6:154, 1890; K. & P. 316, t.416, 1898.

Plants 15-20 cm. high, slender stem with one or two short tubular sheath at the base. Leaves one rarely two, then widely separate, 2-4 cm. by .6-1.6 cm., elliptic-oblong, subacute, sheathing at base; one to 3 lanceolate bracts above the leaf. Spike c 3.75 cm. long, slender, densely flowered; floral bracts linear 4-6 mm. long, longer than the ovary. Flowers very small c 4 mm. in diam. Sepals subequal, linear-lanceolate, connivent; petals as long as sepals but broader, triangular-lanceolate, acuminate, subfalcate, tips thickened. Lip entire, as long as the sepals and petals, oblong-lanceolate, thickened at the anterior end; spur shorter than the lip, usually half or less, slightly curved and stout. Anther cells parallel and touching each other; pollinia with very short caudicles; staminodes not prominent.

Flowering time - August.

Altitudinal range - \pm 3600 m.

Distributional pattern - east Nepal.

Specimens in the herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

Remarks - Hooker (p. 154) mentions of erect sepals, minute flowers and short spur are those of sect. *Peristylus* to which this species is perhaps referable. Under his sect. *Peristylus* the lip is usually 3 partite or 3 fid, however, *H. brevilobe* has entire lip (p.132).

In the entire material at our disposal, the sepals are spreading and not erect; the petals are fleshy and the lip is entire. Having considered all characters we are inclined to place this taxon under the genus *Peristylus* as was expressed by Hooker himself (sect. *Peristylus*).

Incidentally, this is a new record for Nepal, particularly in view of the facts that have been given by Hooker and in addition we mention of the anther cells lie parallel and close to one another; the absence of tubes and the caudicles are very small as significant characters.

The resupination of the ovary is remarkable with the result that the spur is pushed upwards.

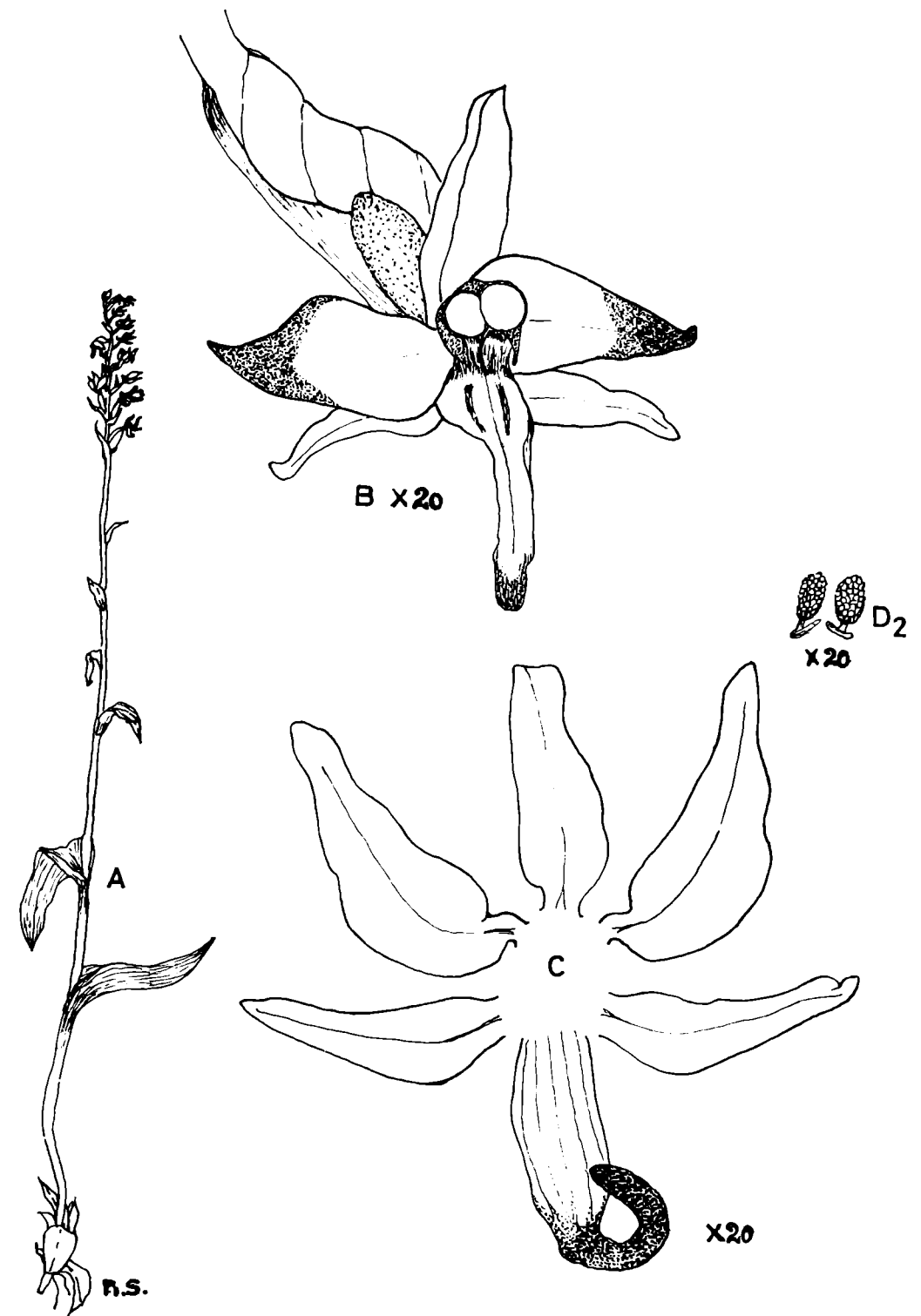


Plate 45

Peristylus parishii Reichb. f. in Trans. Linn. Soc. 30:139, 1874; Seidenf. 31(3):52, f.24, 1977.

= *Habenaria parishii* Hk. f. 6:161, 1890; K. & P. 323, t.426, 1898.

Plants 30 to 50 cm. tall, lower part of stem covered by lax sheaths. Leaves three to five, close together as if in a whorl, ovate-elliptic, 7-16 cm. by 2.5-5 cm., acute, broad sheathing base, a few lanceolate bracts above the leaves. Spike 10-28 cm. long, many flowered, not densely crowded; floral bract lanceolate, acuminate, usually longer than the ovary. Flowers c 7 mm. in diam., closely applied to the rachis. Sepals unequal, brown tinted, dorsal sepal 2.8 mm. long, ovate, lateral sepals narrowly oblong 3.25 mm. long, spreading. Petals larger and broader than the sepals, broadly ovate. Lip shortly 3-lobed beyond the middle and slightly longer than the petals, midlobe curved, apex deflexed, side lobes triangular with apices directed forwards or oblong; spur 2 mm. long, shorter than the sepal, straight, fusiform. Anther cells parallel and touching one another; pollinia with short caudicles; staminodes prominent, rugulose. Stigma curved inwards and touching each other.

Flowering time - June.

Altitudinal range - ± 610 m.

Distributional pattern - east Nepal.

Specimens in the Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

Remarks - Although Hooker had placed the taxon under his sect. *Peristylus* and given Reichb.'s as a synonym, we are inclined to adopt Reichb.'s name and include the species under the genus *Peristylus*. According to Seidenfaden & Smitinand (1961) there is probably very little to distinguish this taxon from *P. goodyeroides* Lindl. To us the shape of the lip, the side lobes pointed forwards and the shape of the spur are distinctive (as has been given in the key).

This is a new record for Nepal.

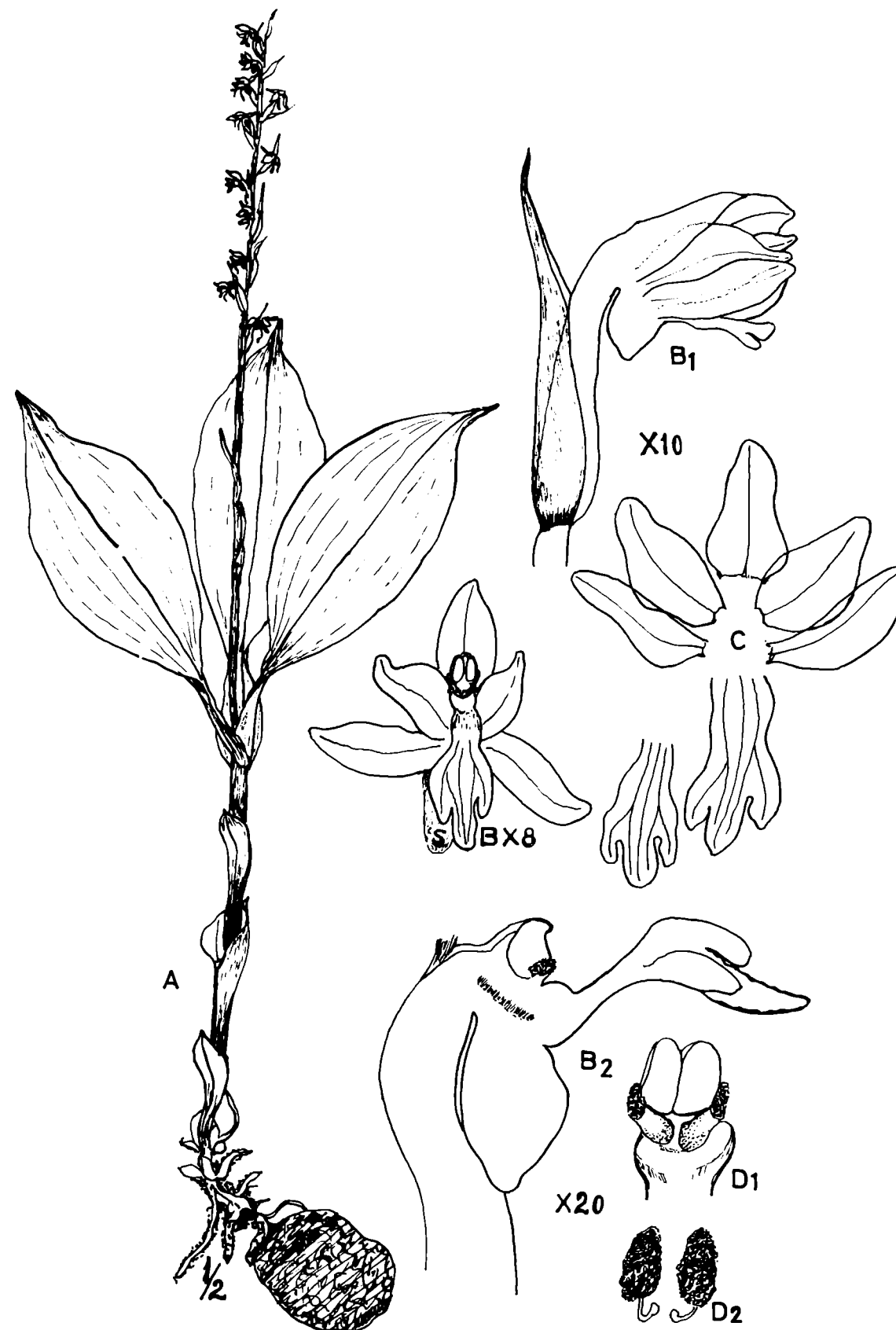


Plate 46

Peristylus prainii (Hk. f.) Kranzl. Orch. Gen. & Sp. 1:514, 1897; Seidenf. 31(3):48, f.22, 1977.

= *Habenaria prainii* Hk. f. Fl. Brit. Ind. 6:159, 1890; K. & P. 329, 1898.

Plants 20-50 cm. tall, stem with many loose sheaths at base. Leaves 3-5 about the middle of the stem, middle ones the largest, 3.5-6.5 cm. by 1.75-2.5 cm., oblong or ovato-oblong, acute, narrow towards the base, sheathing; bracts 1 or 2, lanceolate. Spike 4-12 cm. long, densely crowded; floral bracts lanceolate, 4-8 mm. long acuminate as long as or longer than the ovary. Flowers c 7 mm. in diam., white. Sepals subequal in shape, elliptic, not spreading, dorsal sepal concave 3 mm. long, oblong, lateral sepals faintly concave, oblong and subfalcate; petals shorter than the sepals, broadly ovato-elliptic, gibbous at the middle, fleshy, apex obtuse, base obliquely cut. Lip longer than the sepals, 3-lobed at the apex, midlobe broadly oblong, side lobes shorter, oblong pointed forwards; spur as a small sac at the base of the lip. Anther cells parallel, near one another; pollinia with very short caudicles; staminodes large. Stigmas two below the staminodes.

Flowering time - July to August.

Altitudinal range - ± 2100 m.

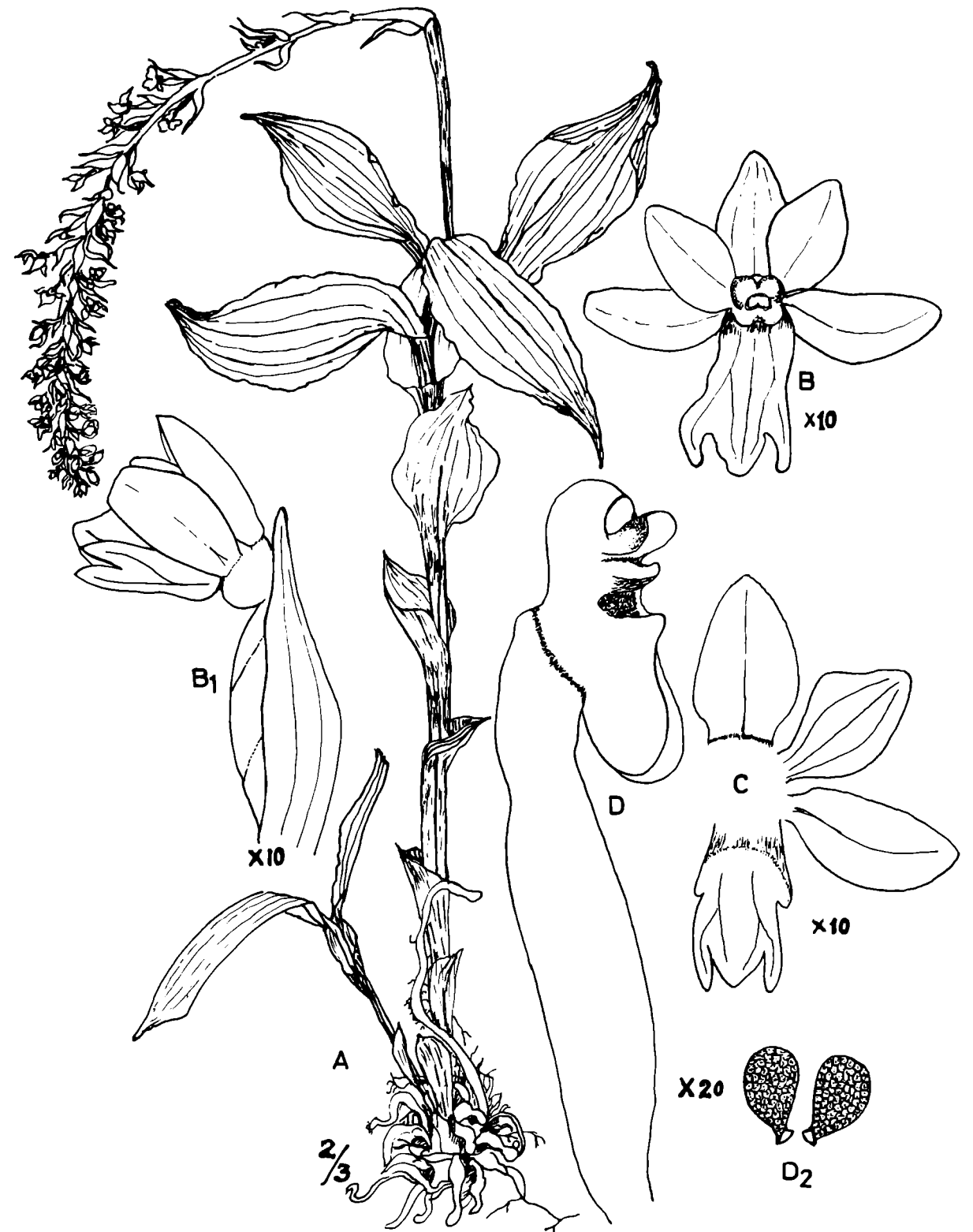
Distributional pattern - west and central Nepal.

Specimens in the Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No.

Remarks - This is a new record for Nepal.



PLATANThERA L.C. Rich. (Platanthereae). The name refers to the unusual width of the anthers. This group of terrestrial orchids has been in the past included in *Habenaria* Willd. J.J. Smith (1905) divides *Habenaria* into three genera - *Platanthera*, *Peristylus* and *Habenaria* proper. Schlechter (1926) recognises only two divisions - *Peristylus* and *Habenaria*. According to Holttum (1953) though such divisions may appear distinct in a limited number of species, they are said not to be sharply separable when all the known species are considered. Summerhayes (1951) split the group into distinct genera. Santapau & Kapadia (1960) regard *Platanthera* and *Peristylus* as genera which are independent from *Habenaria*. In *Platanthera* the stigmatic surface is flat usually continuous but sometimes slightly divided beneath the rostellum. Seidenfaden (1977) recognises separate (independent) genera.

Platanthera biermanniana (King & Pantl.) Kranz.

Stem stout; leaves 4 to 5 scattered, lanceolate veins prominent. Inflorescence sparsely flowered; flowers c 8 mm. long, sepals with oblique bases connivent with triangular petals forming a hood; lip fleshy, decurved, linear-oblong, tooth-like sidelobes, spur about as long as the lip but shorter than the sepals.

Platanthera juncea (King & Pantl.) Kranz.

Slender plants with a solitary leaf near the base of the stem. Inflorescence few flowered; flowers c 2-3 mm. long; dorsal sepal broader, laterals spreading; petals linear-oblong with incurved apex. Lip as long as the sepals; spur shorter, compressed and slightly curved.

Platanthera leptocaulon (Hk. f.) Soo,

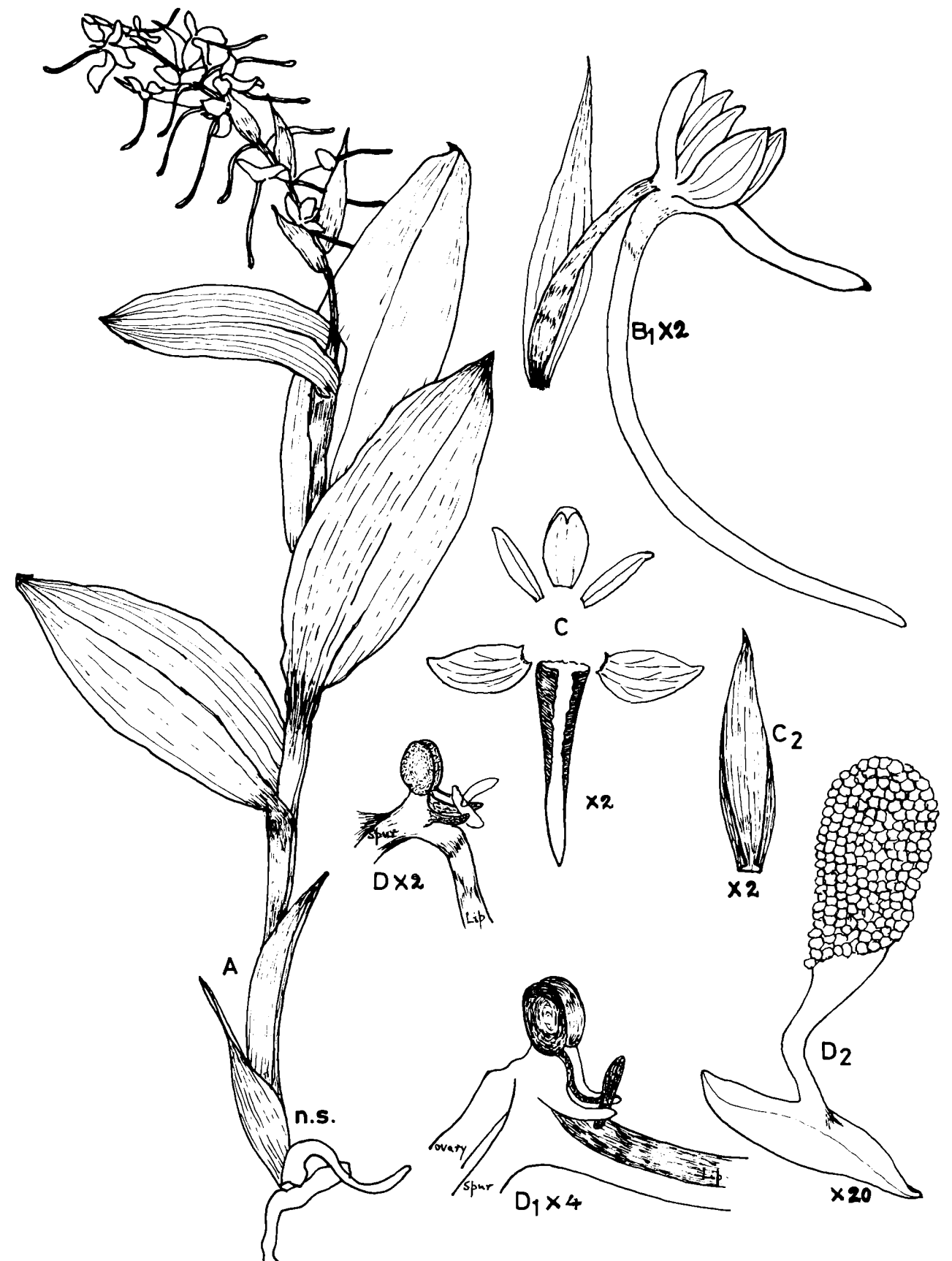
Plants 20-40 cm. high, stem slender; leaves two, unequal, lower leaf larger and narrowly elliptic. Raceme laxly few flowered; floral bracts equalling or shorter than the curved ovary. Flowers green; dorsal sepal connivent with the petals, lateral sepals reflexed; petals broader than the sepals, fleshy, base broad; lip fleshy, oblong-lanceolate, longer than the sepals; spur much longer than the ovary, slightly curved inwards.

Artificial key to the species of *Platanthera*

- 1 Stigmatic surface large —
 - 2 Stem leafy upwards —
 - 3 Lip longer than the lateral sepals —
 - 4 Spur much longer than the ovary, upturned; lip with 1 callus. Petals erect. *edgeworthii*.
 - 4* Spur a little longer than the ovary —
 - 5 Petals equalling the lateral sepals; lip tapering at the base. Petals spreading. Stigmas two, separate. *latilabris*.
 - 5* Petals bigger than the sepals; lip lanceolate. Stigma transverse. Petals erect. *stenanthu*.
 - 3* Lip equalling the lateral sepals —
 - 6 Spur twice as long as the ovary. Bracts much longer than the ovary. Dorsal sepal and petals conniving. Spike lax flowered. *bakeriana*.
 - 6* Spur half as long as the ovary. Bracts a little longer than the ovary. Dorsal sepal erect. Spike dense flowered. *clavigera*.
 - 2* Leaf solitary at or below the middle of the stem. Lip not deflexed, with margins slightly upturned near the base. Spur much longer than the ovary. *exelliana*.
- 1* No Stigmatic processes —
 - 7 Petals equalling the lateral sepals; dorsal sepal cuculate. Spur longer than the ovary; lip slightly exceeding the sepals. *sikkimensis*.
 - 7* Petals smaller than the lateral sepals; dorsal sepal broadly ovate. Spur many times longer than the ovary; lip twice as long as the sepals. *arcuata*.

Plate 47

Platanthera arcuata Lindl. Gen. Sp. Orchid Pl. 289, 1835; H. et al. 54, 1978.
 = *Habenaria arcuata* (Lindl.) Hk. f. 6:155, 1890; D. 190, 1906; T. 2:188, 1971 et 3:147, 1975.



Stem very thick and leafy; leaves 7.5-12 cm. by 2-4 cm., oblong-lanceolate, base sheathing, subacute. Spike 6-14 cm., laxly many flowered; floral bracts linear-lanceolate, 2-4 cm. long, lower ones much longer than the ovaries. Flowers large, 1.5 cm. diam., white. Sepals subequal, c 9 mm. long, dorsal sepal cucullate and beaked, lateral sepals larger, oblong, deflexed. Petals small, 7.5 mm. long, linear, membranous. Lip about twice as long as the sepals, 2.2 cm. long, puberulous, margins reflexed, auricled at the base; spur long, 5-6.5 cm. long, curved. Anther cells divergent, tubes erect; pollinia with short and stout caudicles, gland very large.

Flowering time - June-July.

Altitudinal range - \pm 2300-2800 m.

Distributional pattern - west and central Nepal.

Collection in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No.

Plate 48

***Platanthera bakeriana* (King & Pantl.) Kranzlin, Orch. Gen. Sp. 1:632, 1899; H. et al. 54, 1978.**

= *Habenaria bakeriana* King & Pantl. Journ. Asiat. Soc. Bengal. 65:132, 1895 et 8:314, t.4B, 1898.

Plant 30-45 cm. high, stem with a few sheaths at the base: leaves scattered, lower ones oblong, sheathing, 7-10 cm. by 4 cm., upper linear-lanceolate, becoming smaller in size upwards. Spike c 10 cm. long, lax flowered; floral bracts linear-lanceolate 3-2.5 cm. long, diminishing in size upwards, much longer than the ovary. Flowers c 1 cm. in diam. greenish. Sepals oblong-ovate, dorsal sepal connivent with the petals to form a hood, 4-6 mm. long, 2-2.5 mm. broad, lateral sepals reflexed. Petals as long as the sepals, broadly ovate, oblique, base broad. Lip entire, equalling the lateral sepals, oblong, slightly broader towards the base, fleshy; spur twice as long as the ovary, slender, cylindric, curved forwards. Anther close to one another; staminodes obovate lying transversely. Stigmas forming a bilobed mass.

Flowering time - June.

Altitudinal range - \pm 3350 m.

Distributional pattern - east Nepal.

Collection in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

Remarks - Petals, lateral sepals and the lip are of variable shape and size.

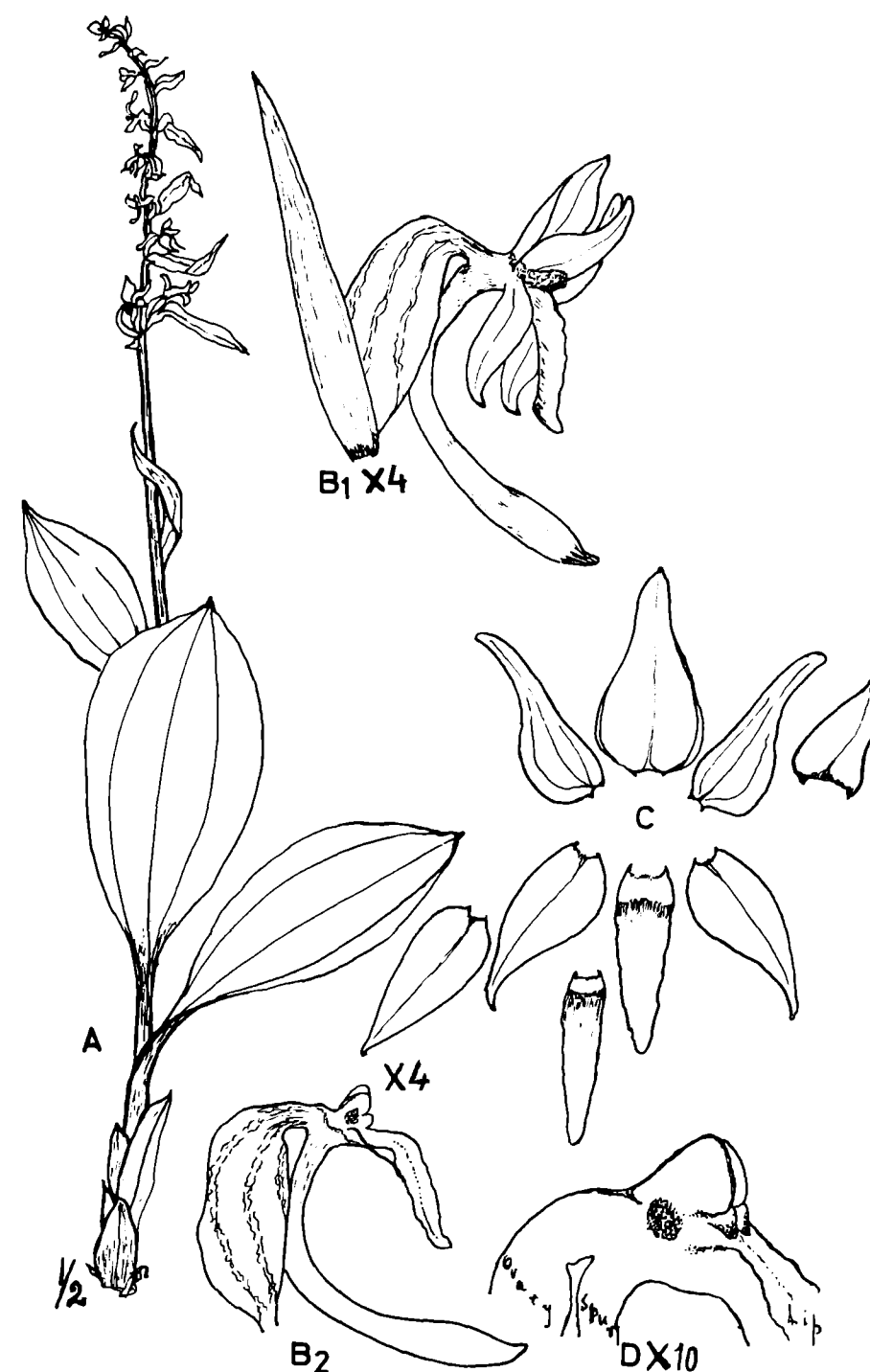


Plate 49

Platanthera clavigera Lindl. Gen. Sp. Orchid Pl. 289, 1835; H. et al. 54, 1978.

= *Habenaria densa* Wall. ex Lindl. : Hk. f. 6:153, 1890; K. & P. 319, t.420, 1898; Kit. 103, 1955; T. 437, 1966; 2:189, 1971 et 3:149, 1975; B. & T. 72:33, 1975.

Plants 30-90 cm. tall, stem covered by loose sheaths at the lower part. Leaves usually 3-5, narrowly elliptic, or ovate-lanceolate, 6-16 by 2-5 cm., acuminate or acute, sheath long; bracts few, linear-lanceolate, gradually becoming smaller upwards. Spike 10 to 45 cm. long, densely flowered; floral bracts lanceolate, longer than the ovary 1-1.5 cm. long, acuminate, ciliolate. Flowers c 8 mm. across, green; sepals subequal, elliptic-oblong, obtuse, ciliolate, thick; dorsal sepal 3 mm. long erect, concave, lateral sepals narrower 4 mm. long, reflexed. Petals nearly as long as the dorsal sepal, elliptic-oblong, margins fleshy except the dorsal margin which is thin and overlapped by the dorsal sepal, base oblique. Lip as long as the sepals 4 mm. long, linear, obtuse with a transverse callus at its base; spur half as long as the ovary, 4 mm., clavate but laterally compressed. Anther cells distant; staminodes large. Stigmas two, small, suborbicular.

Flowering time - July to September.

Altitudinal range - 2200-2720 m.

Distributional pattern - east and central Nepal.

Collection in herbarium - 15 gatherings.

Specimens studied - 14.

Chr. No. n = 23 and 24 (Mehra & Vij, Taxon, 19:109, 1970 as *Habenaria densa*)

also n = 22 (Mehra & Kashyap, ibid. 28:407, 1979 as *H. densa*)

also n = 21 (Vij et al., ibid. 30:512, 1981 as *H. densa*).

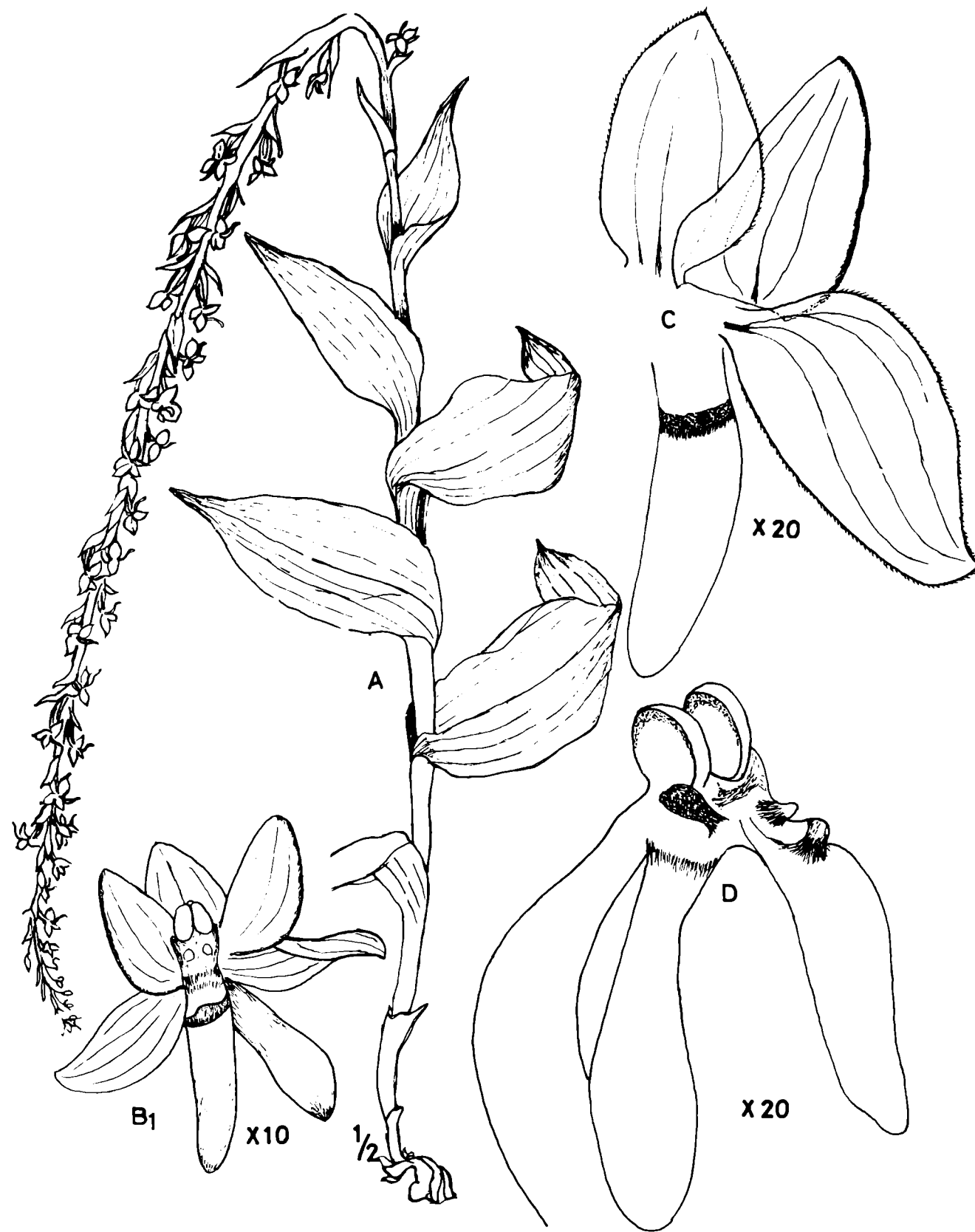


Plate 50

Platanthera edgeworthii (Hk. f. ex Collett) R.K. Gupta, Fl. Nainitalensis 349, 1968.

= *Habenaria edgeworthii* Hk. f. ex Collett, Fl. Siml. 504, f.166, 1902; D.187, t.139, 1906.

Plants 25-60 cm. tall, stem stout, leafy, many loose sheaths at base, upper one subfoliaceous. Leaves oblong-lanceolate or ovate usually 4 to 10.5 cm. by 2-4 cm., acute or acuminate, rather fleshy, gradually diminishing in size upwards. Spike 7.5-25 cm. long, many flowers on a stout rachis; floral bracts lanceolate acuminate, lower bracts longer than the ovary, 2.3 cm. long, gradually diminishing in size till the uppermost shorter than the ovary. Flowers crowded, usually 1 cm. across, deflexed in bud, yellowish green. Sepals subequal, minutely ciliolate, dorsal sepal erect, c 3 mm., suborbicular, concave, lateral sepals larger, c 5 cm. obliquely ovate, deflexed. Petals erect, obliquely triangular, base broad, c 4 mm., thick, apex curved inwards and along with the dorsal sepal forming a hood (not connivent). Lip longer than the lateral sepals, yellow, basal portion thick, claw channelled; spur much longer than the ovary, curved upwards. Anther cells distant; staminodes elongated. Stigmatic arms oblong.

Flowering time - July-August.

Altitudinal range - 1830-3048 m.

Distributional pattern - west and central Nepal.

Collection in Herbarium - 11 gatherings.

Specimens studied - 11.

Chr. No. n = 21 (Arora, Taxon, 17:199, 1968 as *Habenaria edgeworthii*)

also n = 42 (Mehra & Kashyap, ibid. 25:492, 1976 and Vij, et al., ibid. 25; 634, 1976 as *H. edgeworthii*).

2n = 84 (Vij, et al., ibid. 30:512, 1981 as *H. edgeworthii*).

Remarks - This is a new record for Nepal. Some specimens have less flowers which are of a bigger size. In such flowers the sepals, petals and the lip are bigger than the usual size.

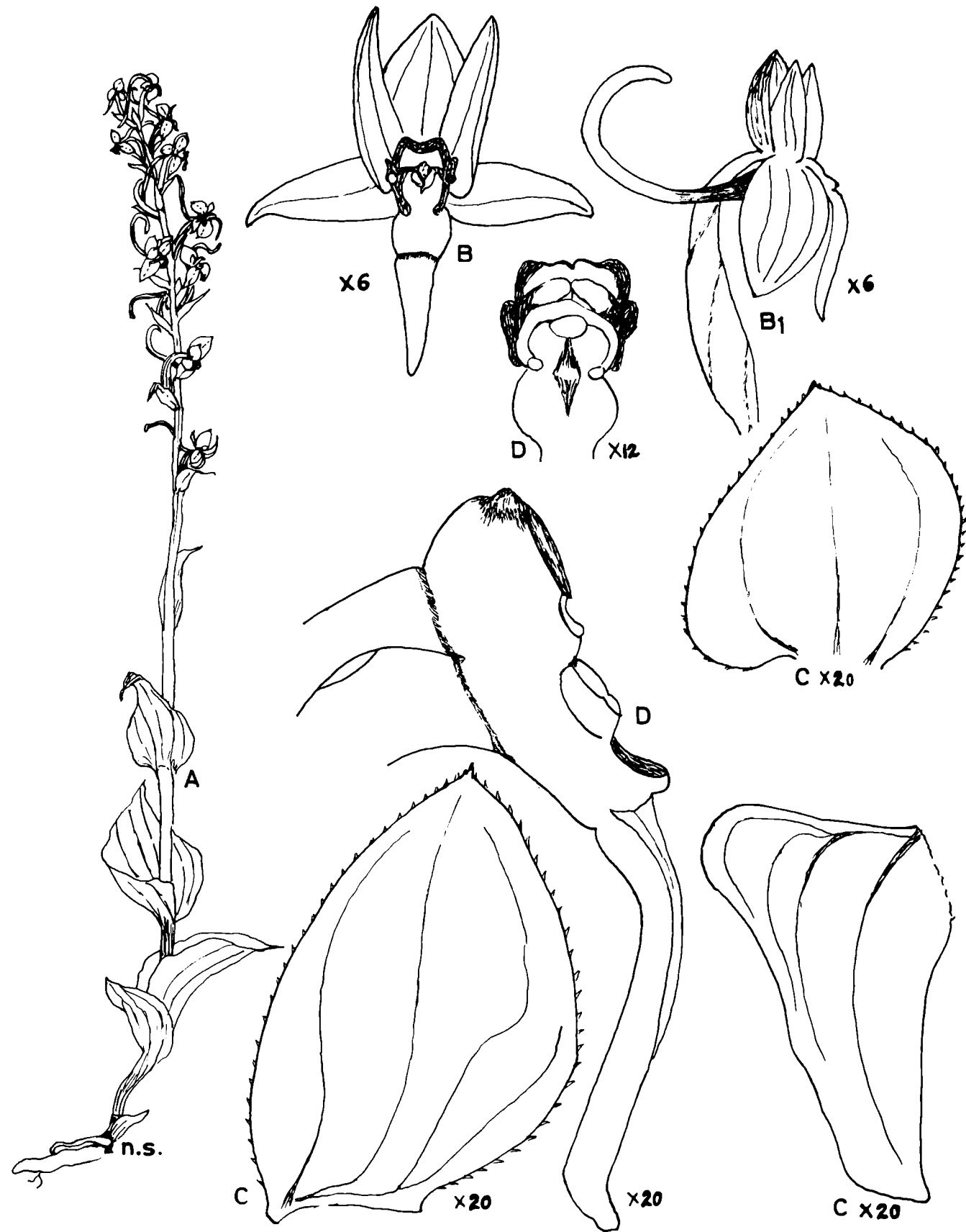


Plate 51

Platanthera exelliana Soo in Ann. Hist. nat. Mus. Natl. Hung. 26:359, 1929; H. et al. 54, 1978.

= *Habenaria oligantha* Hk. f. 6:154, 1890; K. & P. 320, 1898.

Plants 20 to 35 cm. high, stem sheathed at the base. Leaf usually solitary, oblong-ob lanceolate, 4-10 cm. by 1-3.5 cm., obtuse, sheathing base, bract one to three, linear-lanceolate, acuminate. Spike 5 to 10 cm. long, lax flowered; floral bracts linear-lanceolate, acuminate, 3 cm. long, lower ones much longer than the ovary and gradually becoming smaller but always exceeding the ovary. Flowers 1 cm. across, greenish yellow. Sepals subequal, c 4 mm., elliptic-oblong, margin minutely ciliolate, dorsal sepal and petals connivent forming a hood, lateral sepals reflexed. Petals equalling the sepals, 4 mm. long, ovate, base truncated and somewhat gibbous at one side, fleshy. Lip ovate-lanceolate, crenulate, margins slightly upturned at the base, longer than the sepals; spur as long as or longer than the ovary, 1.4-1.8 cm. long, cylindric but slightly wider at the apex. Anther cells parallel and separate; staminodes large and globose. Stigmas globose but pointed at apex.

Flowering time - July-August.

Altitudinal range - 3500-3800 m.

Distributional pattern - central and east Nepal.

Collection in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No.

Remarks - The margin of the lip is crenulate and not entire as mentioned in literature.

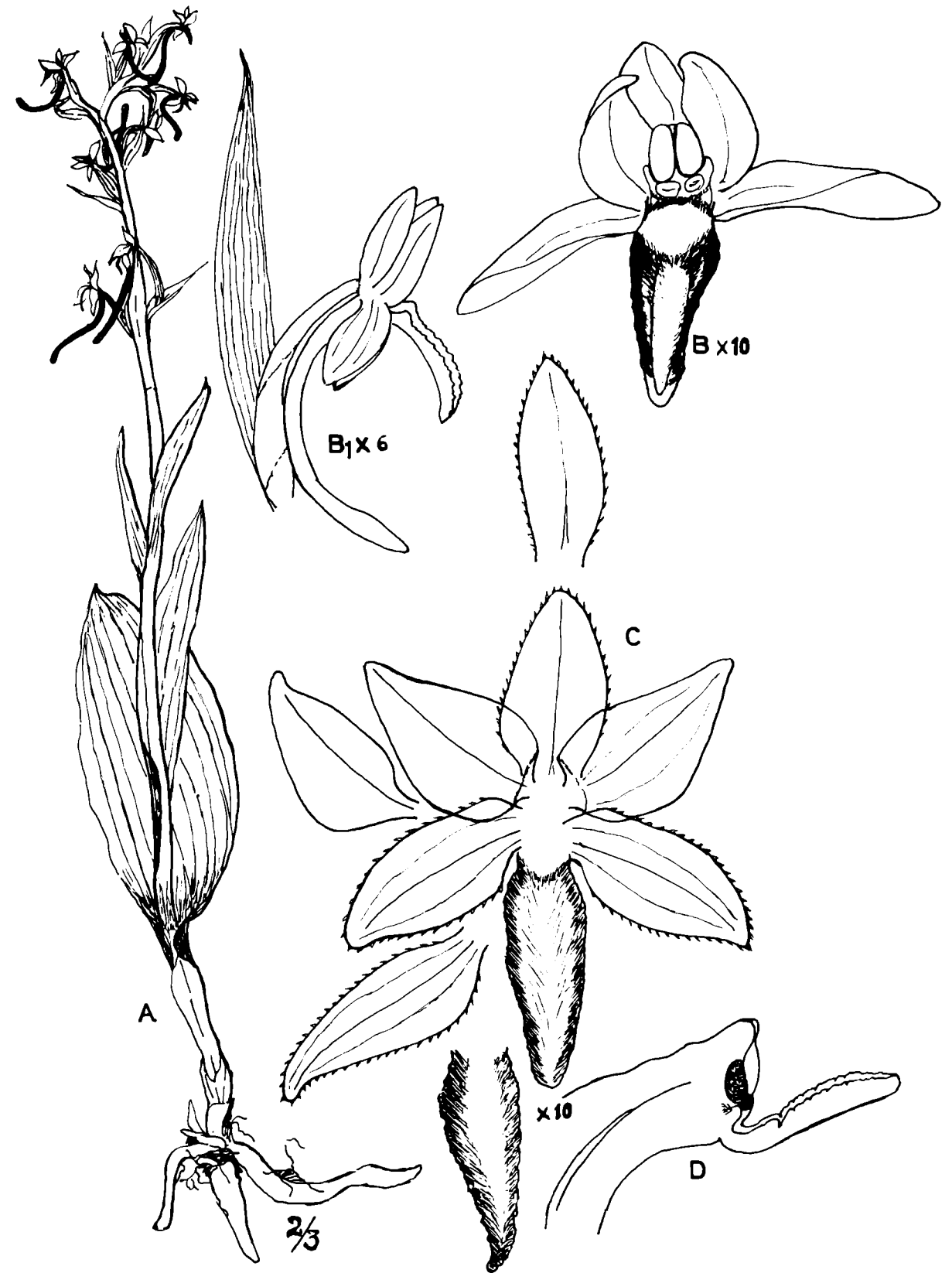


Plate 52

Platanthera latilabris Lindl. Gen. Sp. Orchid Pl. 289, 1835; T.3:152, 1975; H. et al. 54, 1978.

= *Habenaria latilabris* (Lindl.) Hk. f. 6:153, 1890; K. & P. 321, t.423, 1898; T.438, 1966, et 2:189, 1971; B. & T. 72:36, 1975. Plants 20-50 cm. tall, stem naked at the base. Leaves usually three to five, largest 5-10 cm. by 2-4 cm., elliptic-oblong, acute, sheathing base; bracts lanceolate, c 2.5 cm. long, acuminate. Spike 6.5 to 20 cm. long, lax flowered; floral bracts lanceolate 1.3-1.8 cm. long, acuminate, a bit longer than the ovary. Flowers c 1 cm. across greenish; sepals unequal, ciliolate, dorsal sepal broadly ovate or orbicular, 3-4 mm. long, concave, lateral sepals narrower, ovate lanceolate, 4-6 mm. long, reflexed; petals equalling the lateral sepals lanceolate or even linear, base broadly triangular and gibbous on one side, fleshy. Lip entire, longer than the sepals, 7 mm. long, linear-oblong, tapering at the apex, base with a broad claw; spur longer than the ovary, 1-1.6 cm. long, slender, slightly curved. Anther cells distant and parallel; staminodes globular. Stigmas two separate.

Flowering time - July-August.

Altitudinal range - 1525-3300 m.

Distributional pattern - mostly central and west Nepal; very few in east Nepal.

Collection in Herbarium - 32 gatherings.

Specimens studied - 11.

Chr. No. n = 21 (Vij et al., Taxon, 25:634, 1976; Malla et al., ibid. 27:519, 1978 also Vij et al., ibid. 30:512, 1981 all as *Habenaria latilabris*).

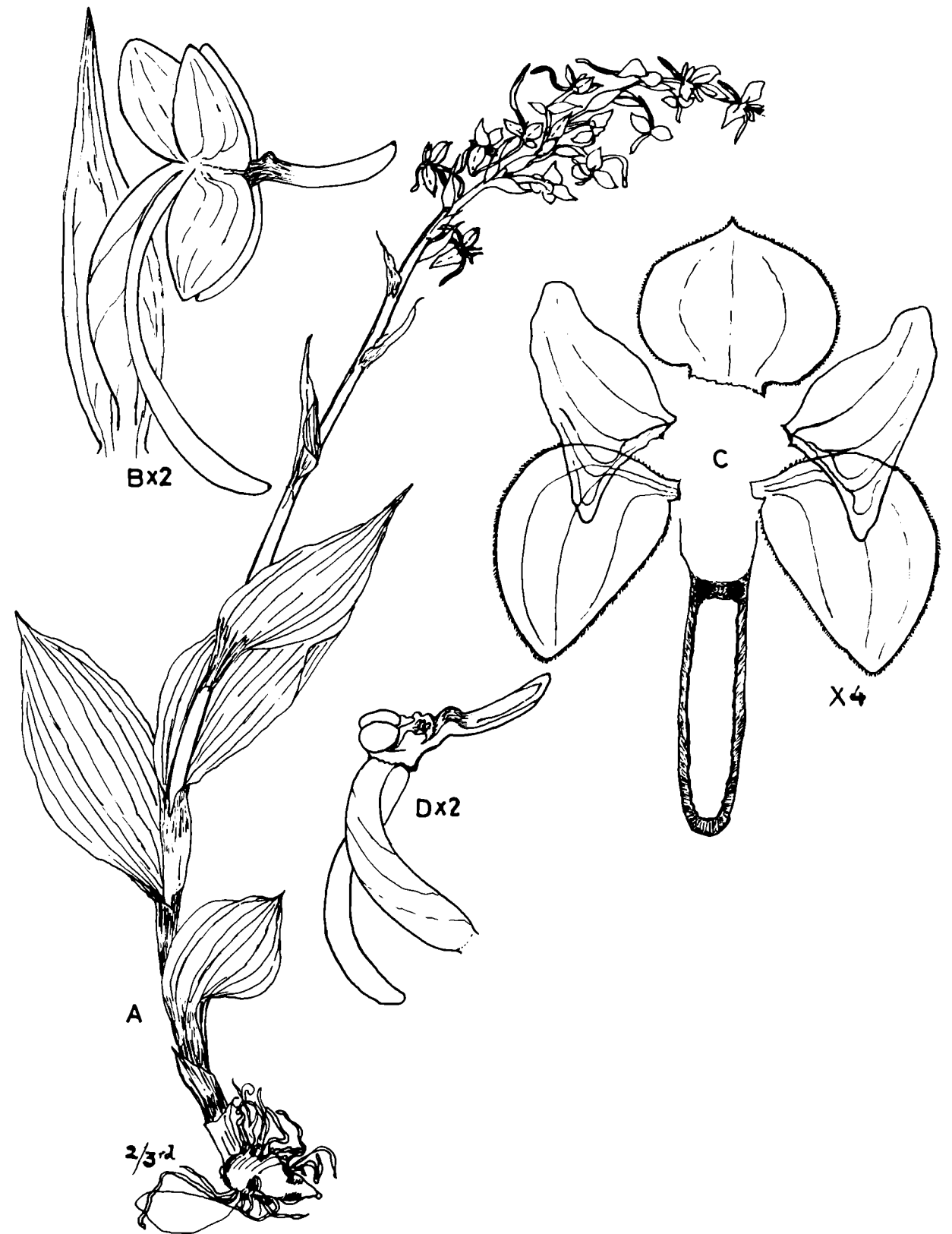


Plate 53

Platanthera sikkimensis (Hk. f.) Kranzlin, Orchid Gen. Sp. 1:621, 1899; H. et al. 54, 1978.

= *Habenaria sikkimensis* Hk. f. Fl. Brit. Ind. 6:155, 1890; K. & P. 317, t.417, 1898; T.3:154, 1975.

Plants 20-30 cm. high, stem having one or two sheaths at the base. Leaves two, unequal, upper smaller, elliptic-oblong, 6.5-10 cm. by 1-3.2 cm., acute, sheathing. Spike 6.5-9 cm., laxly flowered; floral bracts large, foliaceous, linear, 1.2 to 3.5 cm. long, many times longer than the ovary, lower ones revolute. Flowers c 1.2 cm. across, green. Sepals unequal, dorsal sepal more or less triangular with a broad base, 8 mm. long, lateral sepals slightly longer, 9 mm., lanceolate, acute, revolute. Petals equalling the lateral sepals, falcately lanceolate, reflexed, gibbous at base. Lip straight, 1.2 cm. long, lanceolate, entire, caudate-acuminate; spur much longer than the ovary, 1.2-1.5 cm. long, curved, cylindric but mouth infundibuliform. Anther cells separate, converging at the apex, with long tubes; staminodes elongate and parallel to the anther tubes; pollinia elliptic; caudicles curved and long. Stigmas large and united above the mouth of the spur.

Flowering time - July.

Altitudinal range - \pm 2850 m.

Distributional pattern - east Nepal.

Collections in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No.

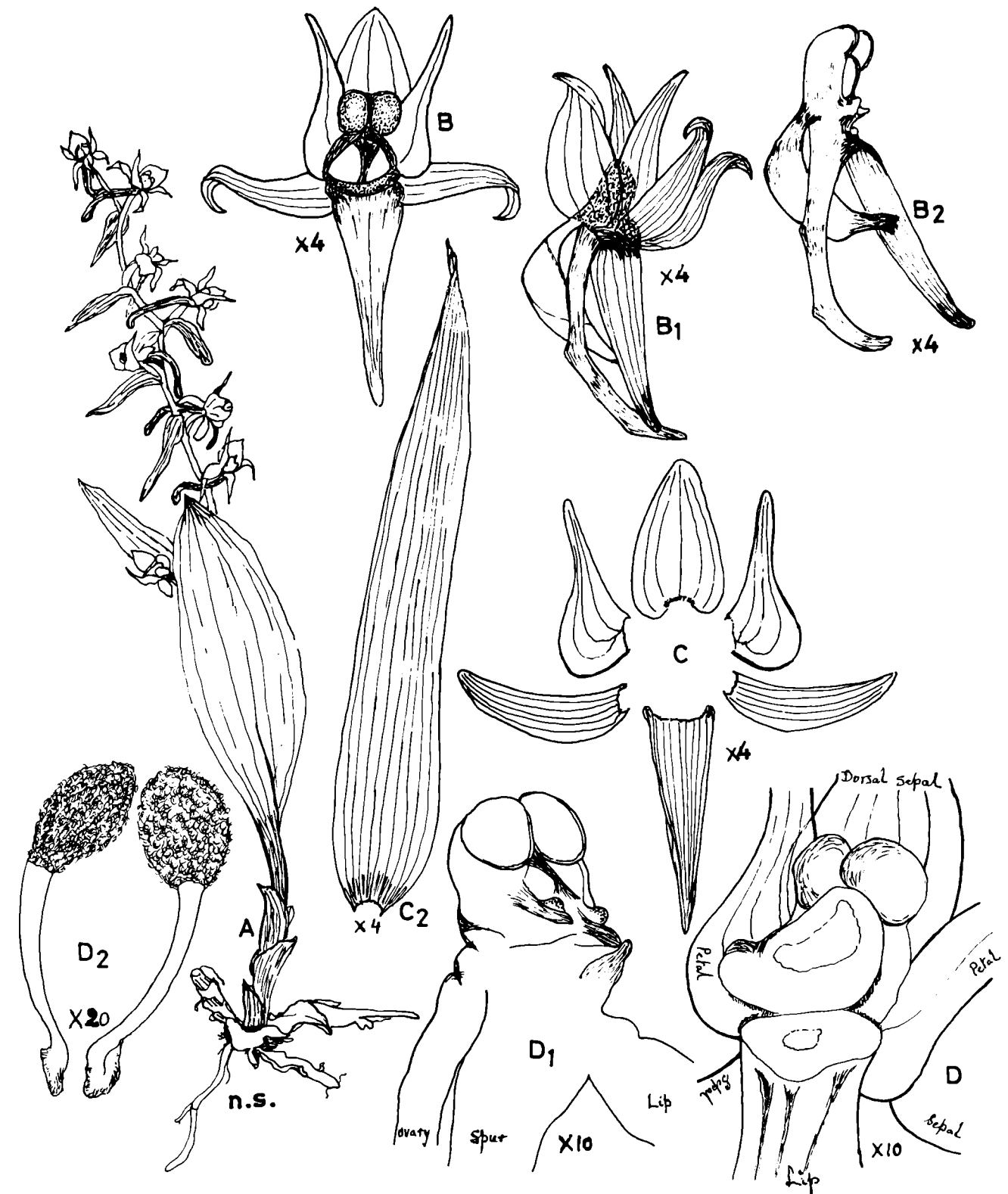


Plate 54

Platanthera stenantha (Hk. f.) Soo in Ann. Hist. nat. Mus. Natl. Hung. 26:363, 1929; H. et al. 54, 1978.

= *Habenaria stenantha* Hk. f. Fl. Brit. Ind. 6:153, 1890; K. & P. 314, t.412, 1898; T.3:154, 1975; B. & T. 72:37, 1975.

Plants 30-60 cm. tall, stem stout and sheathed at the base; leaves few, lowest the largest, oblong-lanceolate to oblong-oblancheolate, 10 to 20 cm. by 3-4.5 cm. acute, long sheathing base; bracts lanceolate, 2.5-3 cm. long, becoming smaller upwards. Spike 7.5 to 20 cm. long, laxly flowered; floral bracts linear-lanceolate, as long as the ovary 1-1.5 cm. long but becoming smaller upwards. Flowers c 1.5 cm. across, greenish. Sepals, 3-nerved, unequal, dorsal sepal 5 mm. long, concave, broadly ovate, obtuse, lateral sepals longer, 6 mm. long, oblong-lanceolate, reflexed; petals longer than the dorsal sepal 7 mm. long, linear, erect. Lip longer than the sepals 8 mm. lanceolate, entire, blunt; spur longer than the ovary, 1.5-2 cm. curved, slender, cylindric, dilated towards the tip. Anther cells converging; staminodes elongate; pollinia broadly elliptic clavate with short caudicles. Stigmas joined into a transverse mass.

Flowering time - August to September.

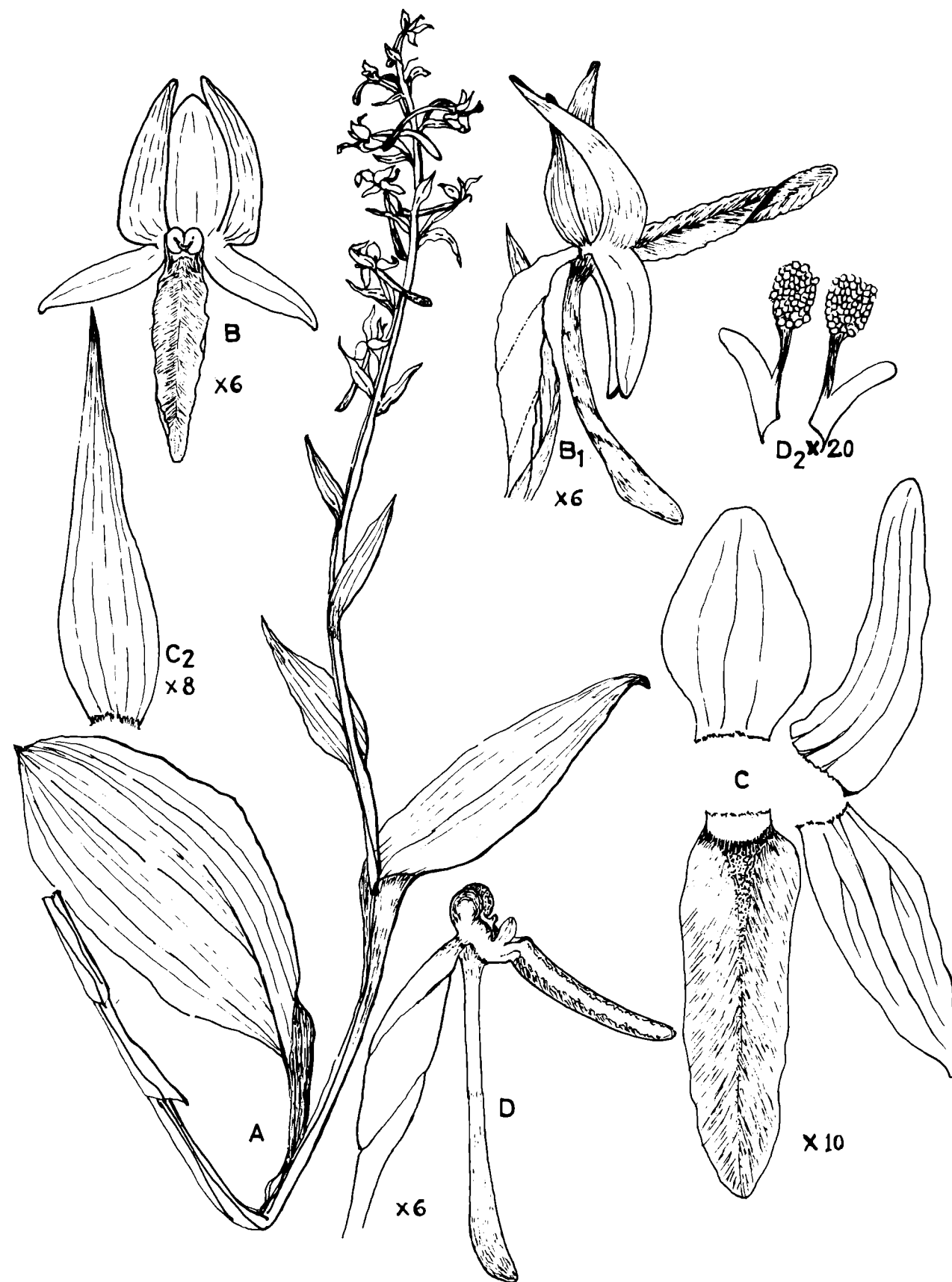
Altitudinal range - 1875-2745 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 4 gatherings.

Specimens studied - 4.

Chr. No.



PONERORCHIS Reichb. f. (Platanthereae) 'Poneros' in greek means miserable, good for nothing. Are these good for nothing orchids because of the small habit? Soo (1966), Hunt (1971) and Vermeulen (1972) recognise a series of separate genera for the *Orchis* group.

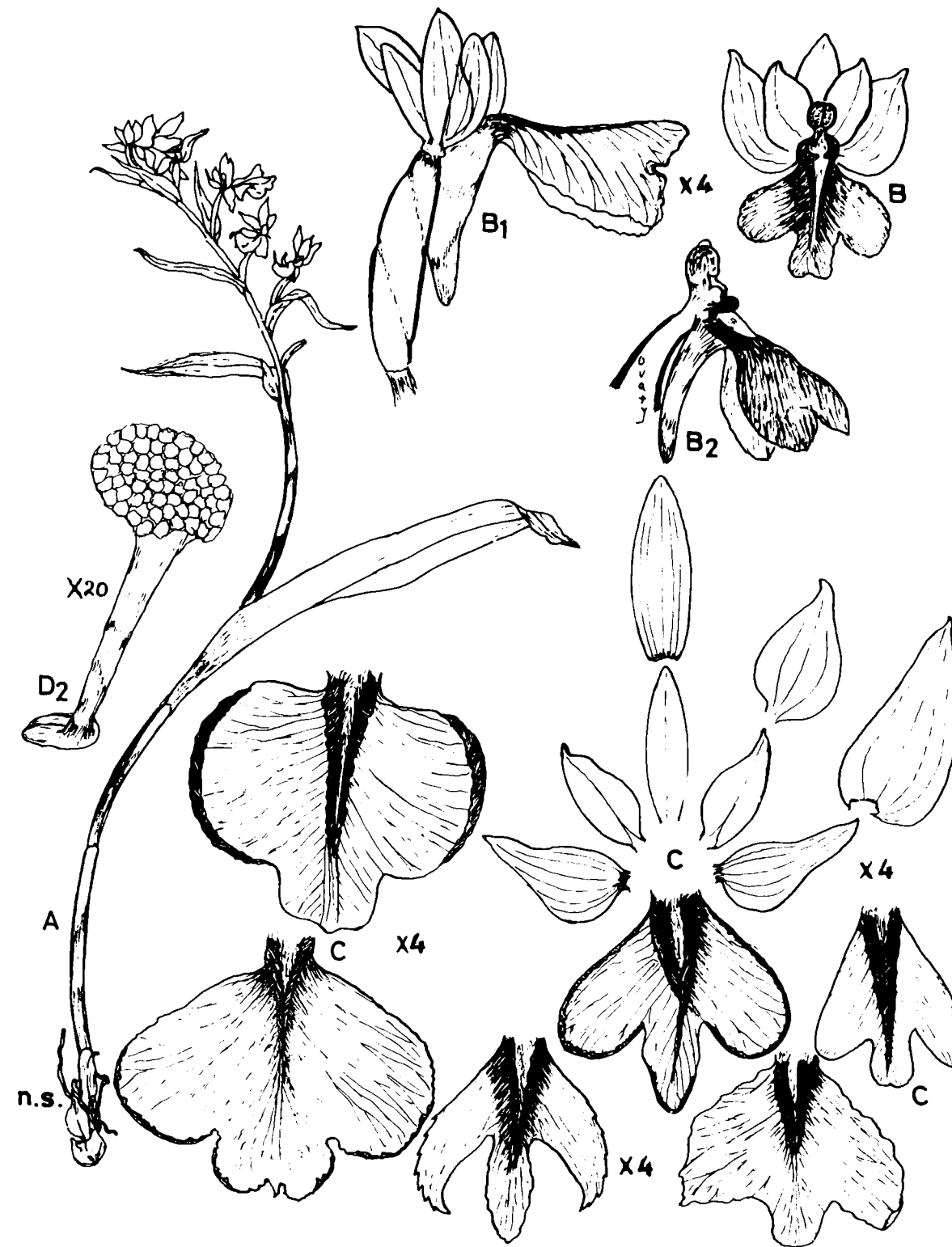


Plate 55

Ponerorchis chusua (D. Don) Soo in Acta Bot. Acad. Sci. Hung. 12:352, 1966; H. et al. 55, 1978.

= *Orchis chusua* D. Don, Prod. Fl. Nep. 23, 1825; Hk. f. 6:127, 1890; K. & P. 303, t.402, 1898; D.173, 1906; B.B. & V. 13:224, 1959; Kit. 104, 1955; T.2:191, 1971; B. & T. 73:149, 1975.

Plants 10-30 cm. tall with small elliptic tuber, lower part of stem with 1 or 2 tubular sheaths. Leaf usually one, linear-oblong or linear-lanceolate, 3-10.5 cm. by 4-8 mm., acute or acuminate, the second leaf when present, much smaller than the first and usually a little below the flowering region. Spike 2.5-7 cm. laxly flowered, usually 4-6 flowers; floral bracts lanceolate exceeding the ovary, 1.2-3 cm. long, lowest c 3 times the length of the ovary. Flowers 1.5-2 cm. in diam., purple or pink; sepals subequal, dorsal sepal oblong, c 8 mm. long, blunt, erect, lateral sepals recurved, oblong-lanceolate, 9 mm. long. Petals broadly ovate or obliquely ovoid, c 7 mm. long, erect and parallel. Lip longer than the sepals deeply 3-lobed, usually lobes equal, oblong, usually the margins involute, lateral lobes diverging but very variable in shape and size; spur stout, clavate as long as or a little smaller than the ovary. Anthers parallel; pollinia ovoid-globose with a tapering caudicle; staminodes large and ovate. Stigmas united.

Flowering time - July to August.

Altitudinal range - 2600-4120 m.

Distributional pattern - west, central and east Nepal.

Specimens in Herbarium - 30 gatherings.

Specimens studied 10.

Chr. No.

Remarks - Sepals, petals and lip vary greatly in size and shape.

SATYRIUM Sw. (Satyriaceae). Presumed to possess aphrodisiacal properties. Terrestrial leafy orchids with the root system consisting of several ovoid or globular tubers with numerous fleshy roots. When the large tubers perish after producing the flowering system, the smaller tubers gradually increase in size and later produce flowering stems.

Artificial key to the species of Satyrium

Spurs usually longer than the ovary. Sepals ciliolate. *nepalense*.
 Spurs very small. Sepals ciliate. *ciliatum*.

Plate 56

Satyrium ciliatum Lindl. Gen. Sp. Orchid Pl. 341, 1838; H. et al. 56, 1978.

= *S. nepalensis* v. *ciliata* (Lindl.) Hk. f. Fl. Brit. Ind. 6:168, 1890; K. & P. 339, t.444 bis, 1898; B. & T. 72:42, 1975.

Plants c 20-40 cm. in height, stem glabrous, sheathed at the base. Leaves few, lanceolate, 10-20 cm. by 2-3.5 cm. broad, sheathing. Spike 4-10 cm. long, dense flowered; floral bracts lanceolate, 1-2.5 cm. long, much exceeding the flowers deflexed. Flowers c 10 mm. in diam. pink. Sepals subequal, 5 mm. long, margin ciliate; petals linear, 4 mm. long, erose. Lip strongly keeled at the back, concave; spurs two, smaller or equalling the sepals, but smaller than the ovary. Anther cells distant; pollinia with slender curved caudicles; Staminodes rugulose. Stigma convex.

Flowering time - August-September.

Altitudinal range - 2240-3350 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 5 gatherings.

Specimens studied - 4.

Chr. No.

Remarks - Although in published literature it is given that the plants are smaller in size than *S. nepalense*, many specimens housed in Nepal Herbarium are equal in size and even robust than *S. nepalense*.

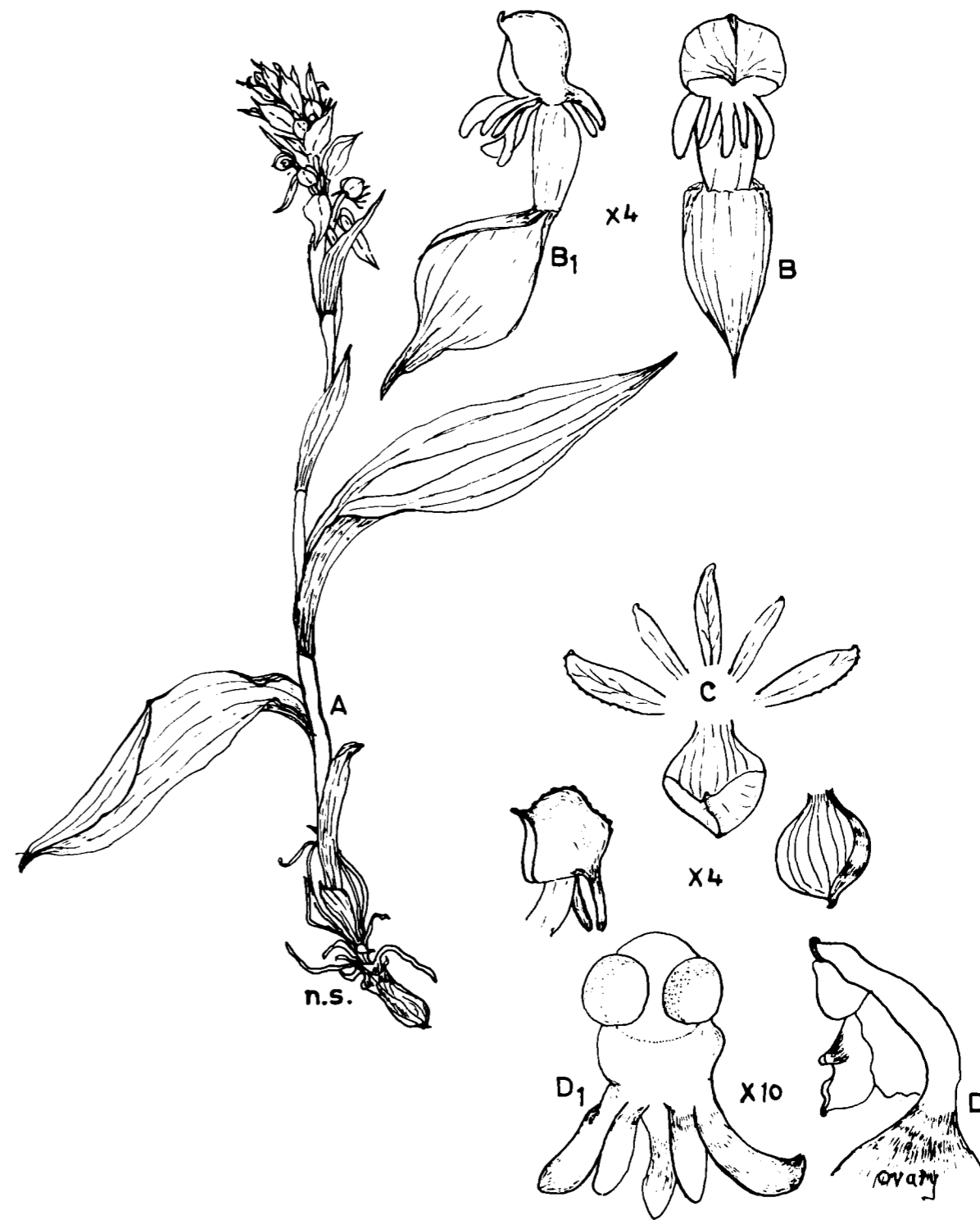


Plate 57

Satyrium nepalense D. Don, Prodr. Fl. Nep. 26, 1825; Hk. f. 6:168, 1890, K. & P. 338, t.444, 1898; D. 201, 1906; Kit. 104, 1955; B. 55:268, 1958; T. 450, 1960; Dept. Med. Pl. 2:135, 1969; T. 2:194, 1971 et 3:164, 1975; B. & T. 72:41, 1975; Herk. 85:150, f. 138, 1977; H. et al. 56, 1978.

Plants 20-60 cm. tall, stem glabrous, sheathed at the base; leaves few, from oblong to linear-oblong, fleshy, sheathing. Spike up to 15 cm., dense flowered; floral bracts oblong-lanceolate, much longer than the flower, spreading or even recurved. Flowers 10 to 12 mm. in diam., from dark pink to white, fragrant; sepals subequal, linear-oblong, ciliolate, spreading and recurved, dorsal sepal 5 mm. long, lateral sepals 6 mm. long. Petals rather narrower than the sepals. Lip broadly oblong, concave, strongly keeled at the back; spur two, longer than the sepals and as long as the ovary. Anthers distant from each other, at a lower level than the stigma; pollinia pyriform, each with a curved caudicle and a thick discoid gland; staminodes rugulose. Stigma projecting forwards above the anthers.

Flowering time - July to early October.

Altitudinal range - 1525-3650 m.

Distributional pattern - mostly in central and east Nepal, also in west Nepal.

Specimens in Herbarium - 44 gatherings.

Specimens studied - 3.

Chr. No. $n = 41$ (Mehra & Sehgal, Taxon, 29:349, 1980).

$2n = 82$ (Jorapur, ibid. 29:546, 1980).

also $2n = 123$ (Vij et al., ibid. 25:641, 1976 and Vij et al., ibid. 30:512, 1981).



APHYLLORCHIS Bl. (Cephalanthereae). Due to the lack of leaves the genus is named as such.

These are leafless saprophytes with a stem that in some species may reach one meter or more, the lower half is enveloped by sheaths and the upper half has few to many flowers. Floral bracts are usually persistent, linear and recurved.

Aphyllorchis parviflora King & Pantl.

Stem erect, with a few sheathing bracts. Inflorescence many flowered; floral bracts lanceolate and shorter than the ovary, not reflexed. Flower c 2 mm. across with an untwisted ovary; lip superior, ovate, base broad, obscurely lobed and concave.

ARUNDINA Bl. (Sobralieae?). These are terrestrial orchids, some 1-2 m. tall and having reed-like stems, because of which the genus gets the name. Leaves are numerous membraneous and narrow. Flowers are large in racemes, with petals broader than the sepals. Labellum is large, semi-funnel shaped enclosing the column, which is long, slender and narrowly winged. Foot is however absent.

Plate 58

Arundina graminifolia (D. Don) Hochr. in Bull. New York Bot. Gard. 6:270, 1910; Kit. 98, 1955; T. 425, 1966 et 2:177, 1971; Dept. Med. Pl. 2:130, 1969; B. & T. 70:331, t.1, 1973; H. et al. 32, 1978.

= *Bletia graminifolia* D. Don, Prodr. Fl. Nep. 29, 1825.

= *Arundinia bambusifolia* Lindl. : Hk. f. 5:857, 1890; K. & P. 113, t.156, 1898; Burk. 133, 1910.

Terrestrial, stem stout woody, erect, c 1-2 m. tall. Leaves narrowly oblong-lanceolate, 15-28 cm. by 1-2 cm., acuminate, sheathing base. Inflorescence a simple raceme or branched with flowers at the end of the branchlets; floral bracts persistent, keeled. Flowers few, large 7-7.5 cm. across, pink to purple; sepals subequal, oblong, 4.2 cm. long, dorsal sepal erect, lateral sepals spreading. Petals rhomboid-elliptic, longer and broader than the sepals, 4.5 cm. by 1.2 cm., acute. Lip rosy purple cucullate, base convolute, mouth expanded, subquadrate, recurved margin, apex broad and deeply bifid, surface corrugated and with three lamellae. Column slender 2.7 cm. long and narrowly winged. Anther cells 4.

Flowering time - July to September.

Altitudinal range - 450-2290 m.

Distributional pattern - central and east Nepal.

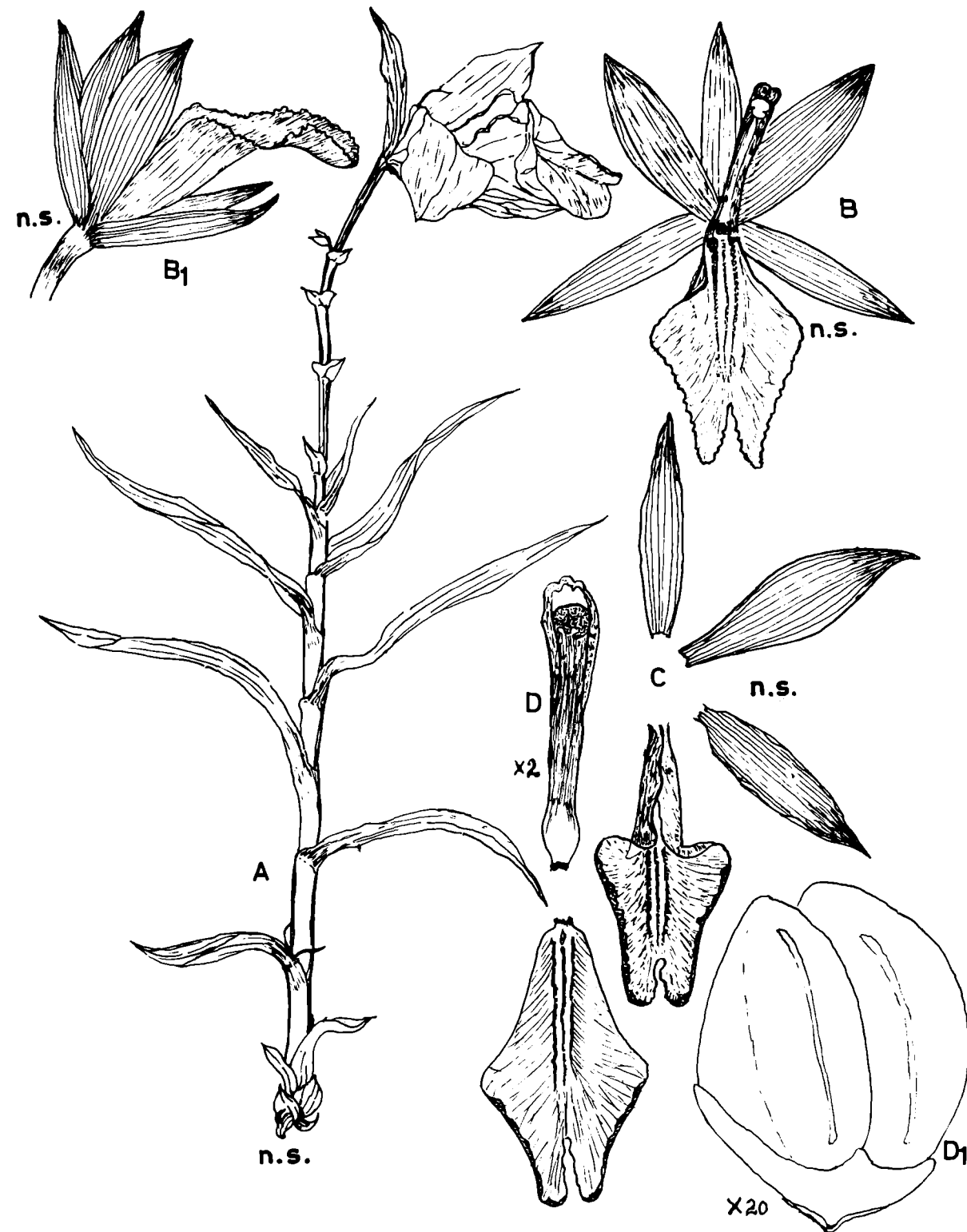
Specimens in Herbarium - 9 gatherings.

Specimens studied - 2.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:106, 1970 as *A. graminifolia*;
Mehra & Sehgal, ibid. 29:348, 1980 as *A. bambusifolia*).

also n = 21 (Mehra & Sehgal, ibid. 24:512, 1975 as *A. bambusifolia*).

Remarks - Schultes & Pease (1963) follow the classification of Schlechter with some modifications. They have placed this genus under Polychondreae - Sobraliinae while Schlechter has it in Kerosphaerae - Thuniinae. As we have indicated the subtribes following Schultes & Pease, this genus is placed under Polychondreae.



CEPHALANTHERA L.C. Rich. (Cephalanthereae). The name refers to the stipitate head-shaped anther. Stem creeping and subterranean (rhizome like), roots tuberous when the plant is leafless or they may fibrous when the stem is leafy. Lower leaves lanceolate while the upper ones are linear. Flowers suberect in racemes; sepals and petals equal; labellum hidden within the sepals. Hypochile 2-lobed, epichile short and ridged.

Plate 59

Cephalanthera longifolia (L.) Fritsch in Oesterr. Bot. Zeitschr. 38:81, 1888; H. et al. 35, 1978.

= *Serapias helleborine* var. *longifolia* L. Sp. Pl. 950, 1753.

= *Cephalanthera ensifolia* Rich. : Hk. f. 6:125, 1890; K. & P. 271, t.362, 1898; Kit. 99, 1955; T. 2:180, t. 8c, 1971; B. & T. 70:331, 1973

Terrestrial, plants 30-45 cm. tall; leafy with a creeping stem and fibrous roots; lower leaves lanceolate 5-12.5 cm. long while the upper ones linear. Racemes 4-14 cm. long, laxly flowered; floral bracts ovate-lanceolate, 3-5 mm. long, shorter than the ovary. Flowers 8-15, c 12-15 mm. long, white or lip spotted with yellow. Sepals equal, 1 cm., lanceolate, acute; petals elliptic, 8.5 mm., obtuse. Lip divided into a hypochile and epichile, hypochile concave or saccate embracing the column, epichile short, triangular, obtuse, 5-ridged, often marked with yellow spots. Column long 7.5 mm., cylindrical; anthers erect. Stigma on anterior sides.

Flowering time - May to June.

Altitudinal range - 1980-3200 m.

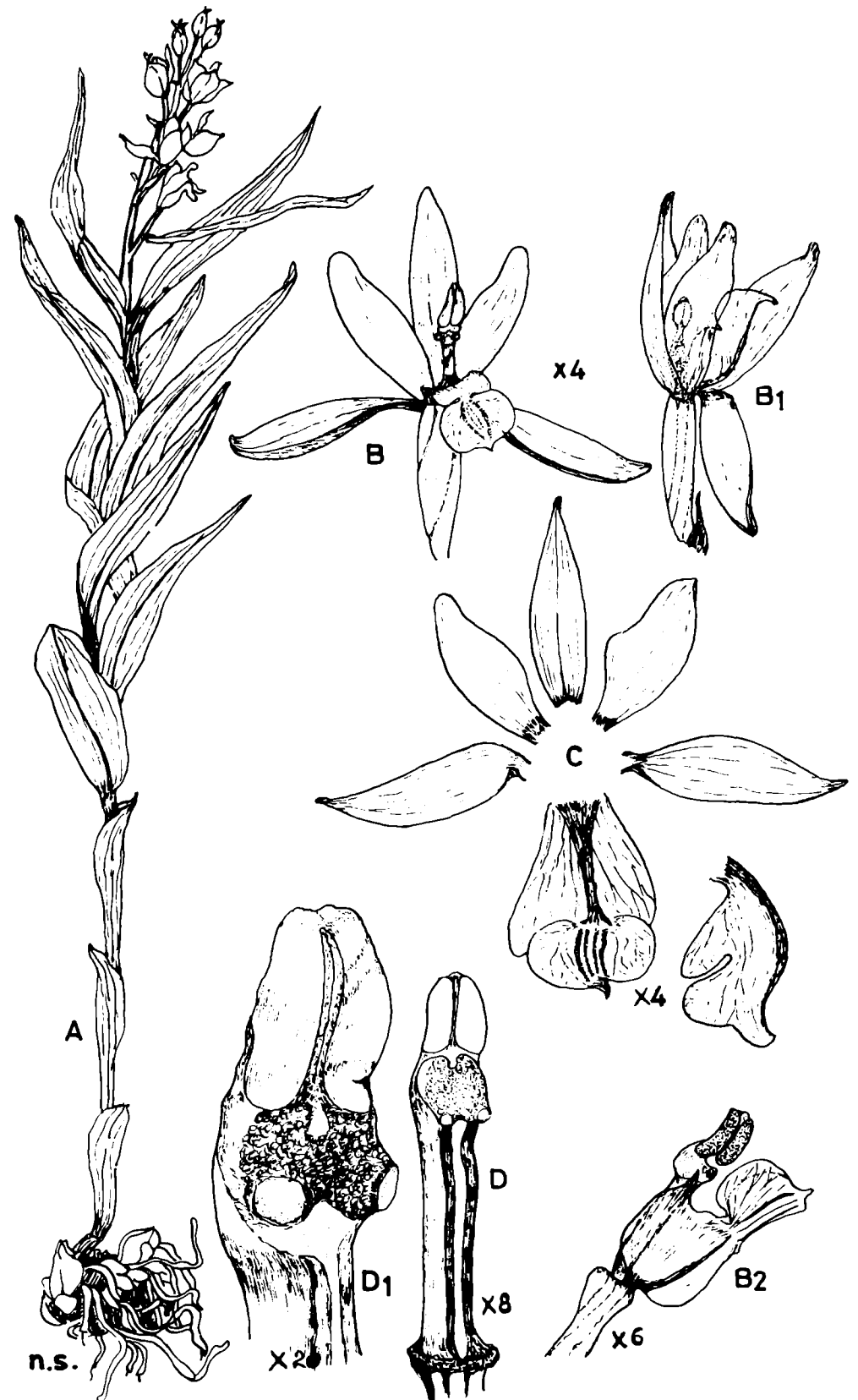
Distributional pattern - east, central and west Nepal.

Specimens in Herbarium - 9 gatherings.

Specimens studied - 9.

Chr. No. n = 17 (Malla et al. Taxon, 27:55, 1978 as *C. ensifolia*).

2n = 32 (Mehra & Vij, ibid. 19:107, 1970 as *C. ensifolia*;
Mehra & Kashyap ibid. 27:226, 1978 as *C. longifolia*;
Murin & Majovsk, ibid. 27:379, 1978 as *C. longifolia*;
Vij et al. ibid. 30:512, 1981 as *C. ensifolia*).



CHEIROSTYLIS Bl. (Erythrodeae). The lobed clinandrium bears a fanciful resemblance to a hand. The sepals are connate in a gibbous based tube to the middle.

Cheirostylis griffithii Lindl.

Stem decumbent, succulent, glabrous; leaves withered at flowering time, ovate, petiole expanded into a hyaline sheath. Inflorescence of 1-3 large flowers; flowers white; sepals connate to the middle into a tube; petals narrowly oblong. Lip with a reniform laciniated limb, base saccate, apical lobe orbicular.

EPIPACTIS Linn. (Cephalanthereae). Large terrestrial erect orchids with sessile leaves. Flowers in racemes, pendulous and arise in the axils of leafy bracts. The lip is short, sessile on the base of the column. This orchid differs from *Cephalanthera* in structural details of the flower which are rather larger and showy.

Artificial key to the species of Epipactis

- Flowers in dense racemes; hypochile globular-saccate, epichile ovate-cordate. Ovary papillate. *helleborine*.
- Flowers distant —
- Hypochile trough shaped, epichile lanceolate. Sepals pubescent. Ovary tomentose. *veratrifolia*.
- Hypochile broadly saccate, epichile ovate-lanceolate. Sepals glabrous. Ovary sparsely tomentose. *royleana*.

Plate 60

Epipactis helleborine (L.) Crantz, Stirp. Austric. ed 2, 2:467, 1769; T. 3:143, 1975; H. et al. 41, 1978.

- = *Serapias helleborine* L. Sp. Pl. 949, 1753.
- = *Epipactis consimilis* D. Don, 28, 1825.
- = *Epipactis latifolia* (L.) All. : Hk. f. 6:125, 1890; K. & P. 271, t. 363, 1898; D. 169, 1906.

Plants 30 to 90 cm. high, stem puberulous in the upper parts but glabrous lower down. Leaves sub-orbicular, ovato-lanceolate or even broadly elliptic, 5-13 cm. by 2.5-8 cm., margin ciliolate. Raceme densely flowered, 8-16 cm. long; upper floral bracts linear-lanceolate. 1.2-3 cm. long, longer than the ovary but lower bracts leaf-like, 4.5-6 cm. long, ovate-lanceolate. Flowers subsessile, c. 12 mm. across green; sepals subequal, lanceolate, dorsal sepal 8 mm. long, lateral sepals 9 mm. long. Petals similar but smaller. Lip shorter than the petals 6 mm. long, hypochile globularly saccate, epichile as long as or shorter, broadly cordate with erose margins, two globose calli near the base. Column very short, narrowed to the base. Anther erect; staminodes triangular. Stigma prominent, broad on the anterior side. Ovary surface sparsely papillate.

Flowering time - July to August.

Altitudinal range - 2600-3200 m.

Distributional pattern - west and central Nepal.

Specimens in Herbarium - 11 gatherings.

Specimens studied - 11.

- Chr. No. 2n = 38 (Love & Love, Taxon, 18:312, 1969 as *E. helleborine*).
- also 2n = 40 (Mehra & Vij, ibid. 19:108, 1970 as *E. latifolia*;
- Murin & Majovsk, ibid. 27:379, 1978 as *E. helleborine*;
- Mehra & Kashyap, ibid. 28:407, 1979 as *E. latifolia*;
- Vij et al. ibid. 30:512, 1981 as *E. latifolia*).

Remarks - The size of the sepals, petals and lip is variable.

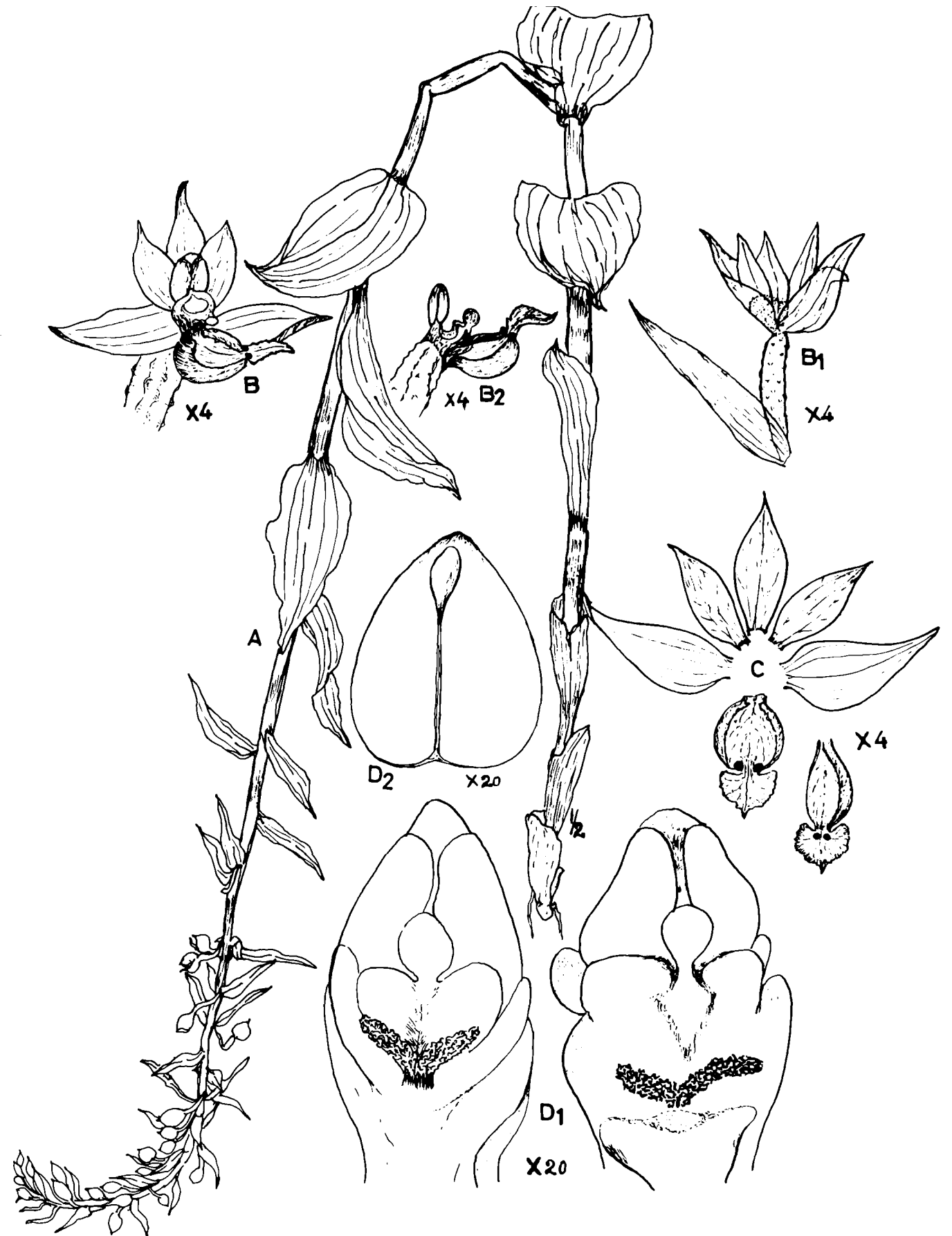




Plate 61

***Epipactis gigantea* Doug. ex Hk. Fl. Bor. Am. 2:202, 1839.**

= *E. royleana* Lindl. : Hk. f. 6, 126, 1890; Kit. 101, 1955; B. & T. 70:332, 1973, H. et al. 41, 1978.

= *E. gigantea* auct. non Douglas : D. 162, 1906.

Plants 30-70 cm. high, stem covered by broad loose sheaths at the base; leaves ovate-lanceolate to linear-lanceolate, 5-12 cm. by 2-4.5 cm., margin and nerves scabrous. Racemes laxly flowered, 9.5-16 cm. long; floral bracts 1.3-3 cm. long, exceeding the ovary, lower ones large and leaf-like. Flowers drooping and distant, c 2.5 cm. in diam. pink or purple; sepals and petals connivent. Sepals with reddish veins, dorsal erect and broadly ovate 1.3 cm. long, laterals ovate-lanceolate, 1-4 cm. long; petals shorter, obliquely ovate, 1.1 cm. long, veins reddish. Lip longer than the sepals, hypochoile large, 9 mm. by 1.4 cm., saccate, much broader than the epichile, epichile ovate or ovate-lanceolate. Column stout with two lateral horns below the clinandrium. Anthers erect. Ovary puberulous.

Flowering time - July.

Altitudinal range - 2900-3200 m.

Distributional pattern - west and central Nepal.

Specimens in Herbarium - 7 gatherings.

Specimens studied - 4.

Chr. No. n = 30 (Nichaus & Wang, Taxon, 20:354, 1971 as *Epipactis gigantea*).

2n = 40 (Mehra & Pandita, ibid. 27:388, 1978 as *E. royleana*).

Plate 62

Epipactis veratrifolia Boiss. & Hohen. in Boiss., *Diagn. Pl. Or. Nov.* 2(13):11, 1853, H. et al. 41, 1978.

= *E. consimilis* auct. non D. Don : Hk. f. 6:126, 1890; K. & P. 272, t.364, 1898; Park. 76:8, 1931; B. & T. 70:322, 1973.

Plants 40 to 50 cm. high, stem glabrous throughout; leaves 10-21 cm., lanceolate, upper leaves becoming narrow. Raceme 10-15 cm., lax flowered, rachis tomentose; floral bracts variable, lower leafy and gradually becoming smaller upwards. Flowers large 20-25 mm. across, long pedicelled, distant, brown. Sepals unequal, concave, spreading and pubescent, dorsal sepal 1.5 cm. long, lanceolate, laterals twice as wide; petals ovate, 1.5 cm. long, mid rib thickened. Lip as long as the sepals and petals, hypochile 5 mm. long, narrow, oblong, trough shaped, bearing granular calli inside, epichile longer, lanceolate, side-lobes erect, a raised mesial line which disappears near the apex. Column stout, much curved. Anther erect. Stigma large with two glands on the lower side; ovary densely pubescent.

Flowering time - March to May.

Altitudinal range - \pm 1830 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. $2n = 40$ (Arora, *Taxon*, 17:199 as *E. veratrifolia*;
Mehra & Kashyap, *ibid.* 28:407, 1979 as *E. consimilis*;
Vij et al., *ibid.* 30:512, 1981 as *E. consimilis*).



EPIPOGIUM Gmel. (Epipogoneae). Referring to the turned up lip which has a fanciful resemblance to a beard and which was so called in early botany. May be that the name has reference to the glandular hairs on the lip. These are terrestrial leafless fleshy saprophytic brown coloured herbs, roots coralloid. Few flowered erect racemes; sepals and petals slightly differing; lip adherent to base of the column, 3-lobed, base broad concave having a longitudinal ridge and with a short spur.

Epipogium aphyllum (F.W. Schmidt.) Sw.

Plants of a faint yellow colour. Flowers c 1.8 cm. across with red streaks on the spur. Lip large, 3-lobed, three short and two long ridges; sidelobes large and round, apical lobe deflexed; spur as long as the lip.

Epipogium roseum (D. Don) Lindl.

Plants of pale yellow colour. Flowers drooping; lip with a broad base, entire, apex apiculate, two or three ridges; spur much shorter than the lip, saccate.

GOODYERA R. Br. (Erythrodeae). The genus is named after an english botanist - J. Goodyer. These are known as 'rattle-snake plantains', a name being given because of the mottlings on the foliage. These are terrestrial leafy orchids with stem decumbent or creeping. Leaves are usually thick, petiolate and with a sheath. Flowers are small, often in twisted spikes; sepals often pubescent outside, dorsal sepal concave and along with the petals forming a hood over the column. Stigma is broad and undivided.

Goodyera biflora (Lindl.) Hk. f.

Stem short, leafy; leaves petiolate, ovate. Inflorescence rachis stout, equalling the leaves, pubescent; floral bracts shorter than the flowers. Flowers large, secund; dorsal sepal recurved. laterals straight; petals linear, lip saccate at base, beak twice as long as the sac, sac setose within.

Goodyera cordata (Lindl.) Nicols. reduced to *G. viridiflora* (Bl.) Bl. (see Seidenf. 32(2):20, 1978).

Goodyera viridiflora (Bl.) Bl.

Plants to 30 cm. high, usually much smaller; leaf petioles short, leaves 5 cm. long, obliquely ovate cordate. Inflorescence with 1-4(8) flowers, rather large; dorsal sepal 12-15 mm. long, lateral sepals spreading.

Goodyera vittata (Lindl.) Benth. ex Hk. f.

Stem stout and covered by tubular leaf-sheaths. Leaves ovate-lanceolate, shortly petioled. Petals united by their apices; lip with an elongate sac at the base, setose within, apical lobe bilamellate.

Artificial key to the species of Goodyera

- 1 Lip within setose and tubercled —
 - 2 Stem small, leaves few —
 - 3 Ovary not hairy —
 - 4* Sepals hairy..... *hemsleyana*.
 - 3* Ovary hairy..... *schlechtendaliana*.
 - 2* Stem stout; leaves many; ovary not hairy..... *procera*.
 - 1* Lip smooth or lamellate; ovary hairy —
 - 5 Bracts hairy..... *fusca*.
 - 5* Bracts not hairy..... *repens*.

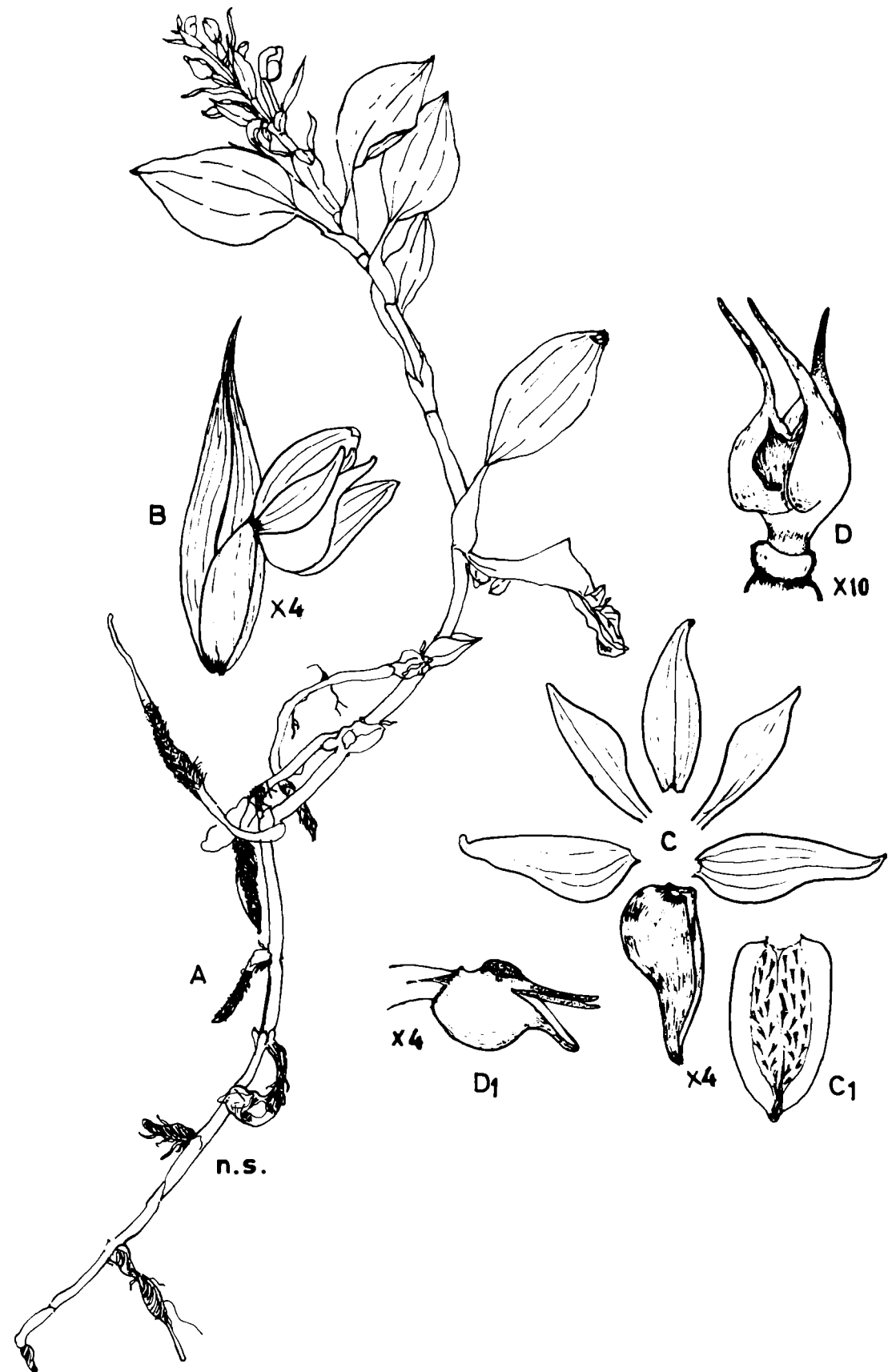


Plate 63

Goodyera foliosa (Lindl.) Benth. ex Clarke, J. Linn. Soc. 25:73, 1889; Hk. f. 6:113, 1890; K. & P. 281, t.374, 1898; D. 166, 1906; T.435, 1966; B. & T. 70:333, 1973; Seidenf. 32(2):29, f.12, 1978; H. et al. 44, 1978.

= *Georchis foliosa* Lindl. Gen. Sp. Orchid Pl. 496, 1840.

Plants 10-20 cm. tall, stem decumbent, rooting at nodes, leaves distant, ovato-lanceolate, 3.5-6.2 cm. by 1.4-2.5 cm., oblique, 3 to 5-nerved, margin undulate; petiole 1.3-2.4 cm. long slightly expanded forming a sheath. Inflorescence 3.5-6 cm., sparsely pubescent; floral bracts lanceolate, 1.4-1.8 cm. long, acuminate, exceeding the flowers. Flowers numerous, crowded, light pink; sepals subequal, ovate-oblong, connivent at the base, dorsal sepal 8 mm. long forming a hood with the petals, lateral sepals 9 mm. long. Petals obliquely rhomboid 8 mm. long, base clawed, apex acute. Lip as long as the lateral sepals, 9 mm. long, base subglobular, sac-like, hispid or setose within, apical lobe contracted, oblong. Rosteller arms slender and very long. Anther erect and oblanceolate. Stigma concave and orbicular.

Flowering time - September.

Altitudinal range - ± 2290 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

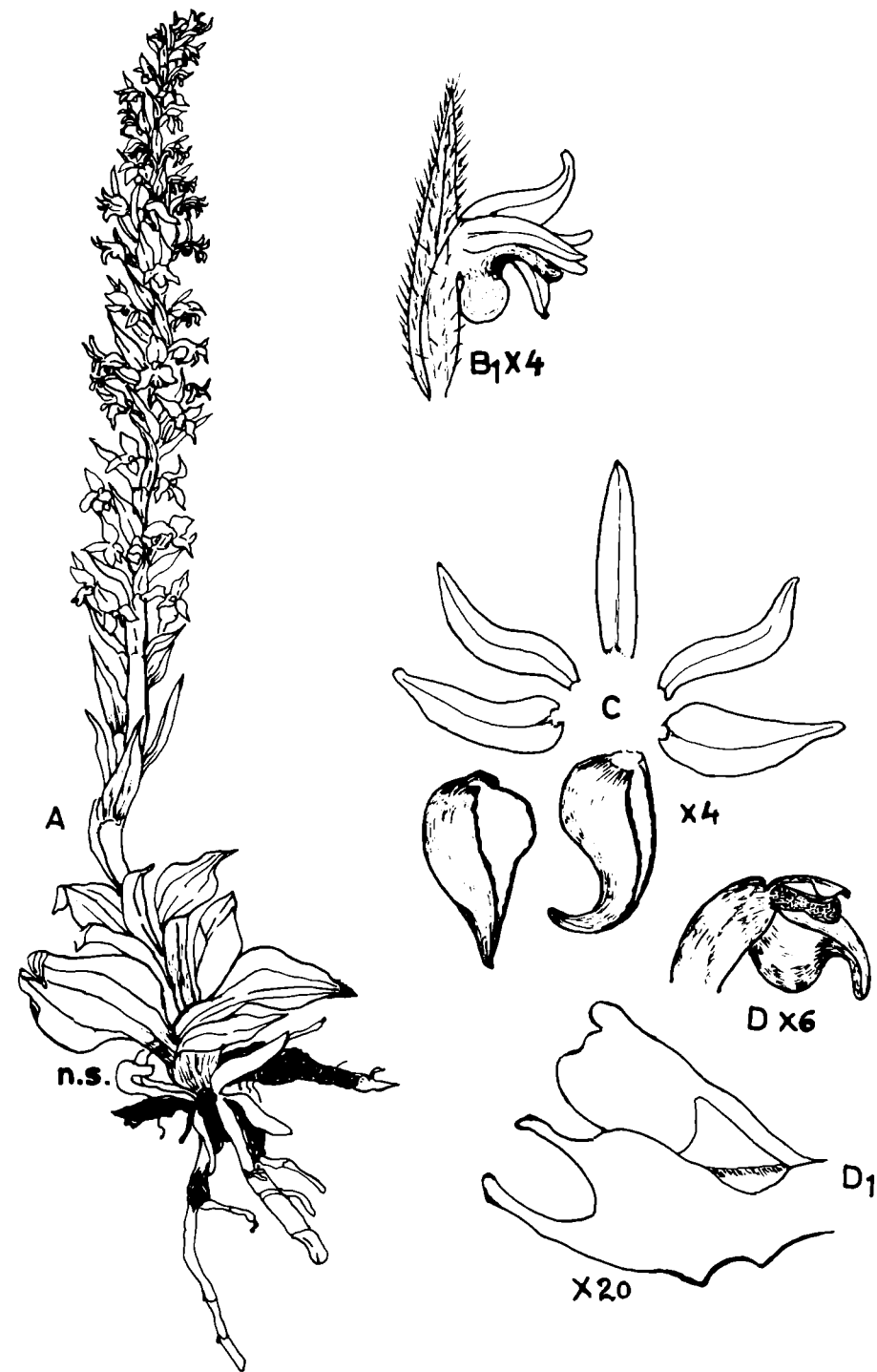


Plate 64

Goodyera fusca (Lindl.) Hk. f., Fl. Brit. Ind. 6:112, 1890; K. & P. 280, t.371, 1890; D.166, 1906; H. et al. 44, 1978.

= *Aetheria fusca* Lindl. Gen. Sp. Orchid Pl. 491, 1840.

Plants robust, 20-35 cm. high with densely tufted roots, and stem pubescent. Leaves radical, broadly ovate, 2.5-4 cm. long; margins revolute, subacute; petiole broad and very short, sheathing base wide. Upper part of stem bearing large oblong bracts, 2.5-2 cm. long. Inflorescence c 12 cm. long, rachis, bracts and ovaries pubescent; floral bracts ovate-oblong, .9-1.2 cm. long, exceeding the flowers. Flowers densely crowded, white with apex of lip being green; sepals subequal, oblong, connivent; dorsal sepal 8 mm. long, lateral sepals 7 mm. long. Petals linear oblong, falcate, 7 mm. long. Lip equalling the sepals, saccate basal part protruding the base of sepals, suddenly contracted into a linear beaked apical lobe, deflexed. Column broad and short; rostellar arms subulate and long. Stigma concave.

Flowering time - September.

Altitudinal range - ± 3800 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. 2n = 32 + 28 (Mehra & Kashyap, Taxon, 30:507, 1981).

Remarks - The stem is pubescent in our specimen and not glabrous as given in literature.

Plate 65

Goodyera hemsleyana King & Pantl. in Journ. Asiat. Soc. Bengal 64(2):342, 1896 et Ann. Roy Bot. Gard. Calcut. 8:281, t.373, 1898; B. & T. 70:333, 1973; H. et al. 44, 1978.

Entire plant c 15 cm., lower part of stem enveloped in leaf sheaths and with few thick roots. Leaves 3-5, unequal, broadly ovate, largest leaf 5 cm. long, dark green with white reticulations; petiole short. Inflorescence c 7.5 cm. long, bracteate in the lower portion; floral bracts lanceolate 13 mm. long, exceeding the flowers. Flowers lax, subsecund with sepal tips pink; sepals, 10 mm. long, sparsely hairy, dorsal sepal oblong, lanceolate, lateral sepals ovate, acuminate. Petals oblong-lanceolate 9 mm. long, falcate. Lip oblong, 6 mm. long, apical lobe oblong with a tooth on each side of the mouth of the subsaccate base, sac setose within. Pollinia elongate, caudicle short with a long narrow lanceolate gland.

Flowering time - August.

Altitudinal range - \pm 2135 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

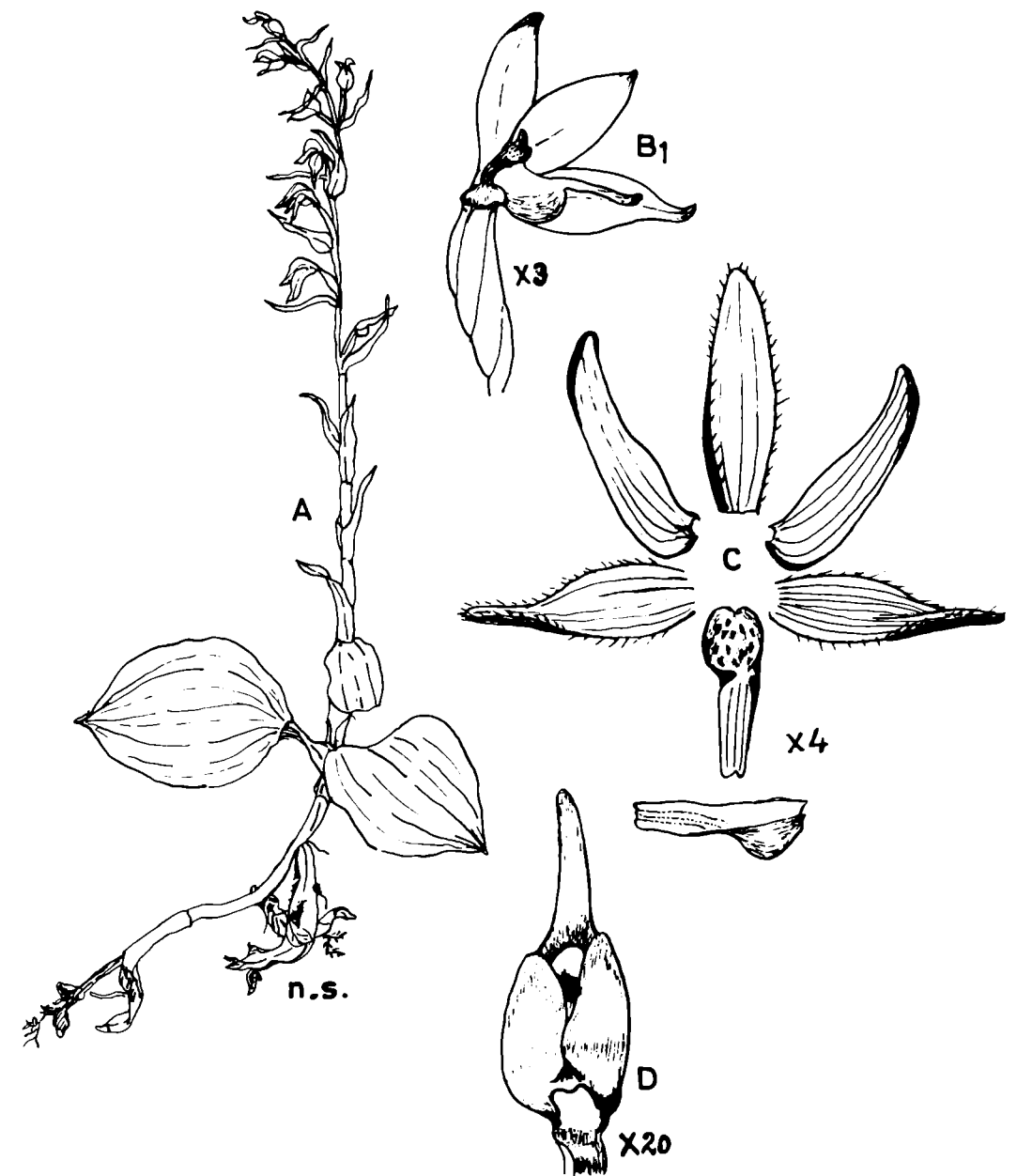


Plate 66

Goodyera procera (Ker-Gawl.) Hk. Exot. Fl. 1 : t. 39, 1823; D. Don, 28, 1825; Hk. f. 6:111, 1890; K. & P. 282, t.378, 1898; D. 165, 1906; T. 436, 1966; B. & T. 70:333, t.2, 1973; Seidenf. 32(2):22, t.8, 1978; H. et al. 44, 1978.

= *Neottia procera* Wall. ex Ker-Gawl. in Edw. Bot. Regist. 8 : t.639, 1822.

Plants c 60-70 cm. tall, stem stout, lower part covered by lax sheaths, upper part leafy; roots thick and tufted. Leaves many suberect, ovate-elliptic or elliptic, 7-14 cm. by 2-4.5 cm., acute or acuminate; petiole long, 4-6 cm. long, stout, broadly sheathing. Inflorescence c 18 cm. long, bearing several lanceolate bracts; floral bracts 5 mm. long, equalling or slightly smaller than the flowers, pubescent along the margins. Flowers subglobose, white, fragrant; sepals subequal, broadly ovate, 2.5 mm. long. Petals cuneate or spatulate, edges slightly erose-dentate, clawed. Lip shorter than the sepals, 2 mm. long, saccate base and a small decurved triangular apical lobe, saccate base setose within. Column very short, a depression below the anticonic stigma.

Flowering time - June.

Altitudinal range -

Distributional pattern - east Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

Remarks - The species is not very common being occasionally met with. Banerji & Thapa (loc. cit.) collected the plant also in east Nepal and record the flowering time as in June.

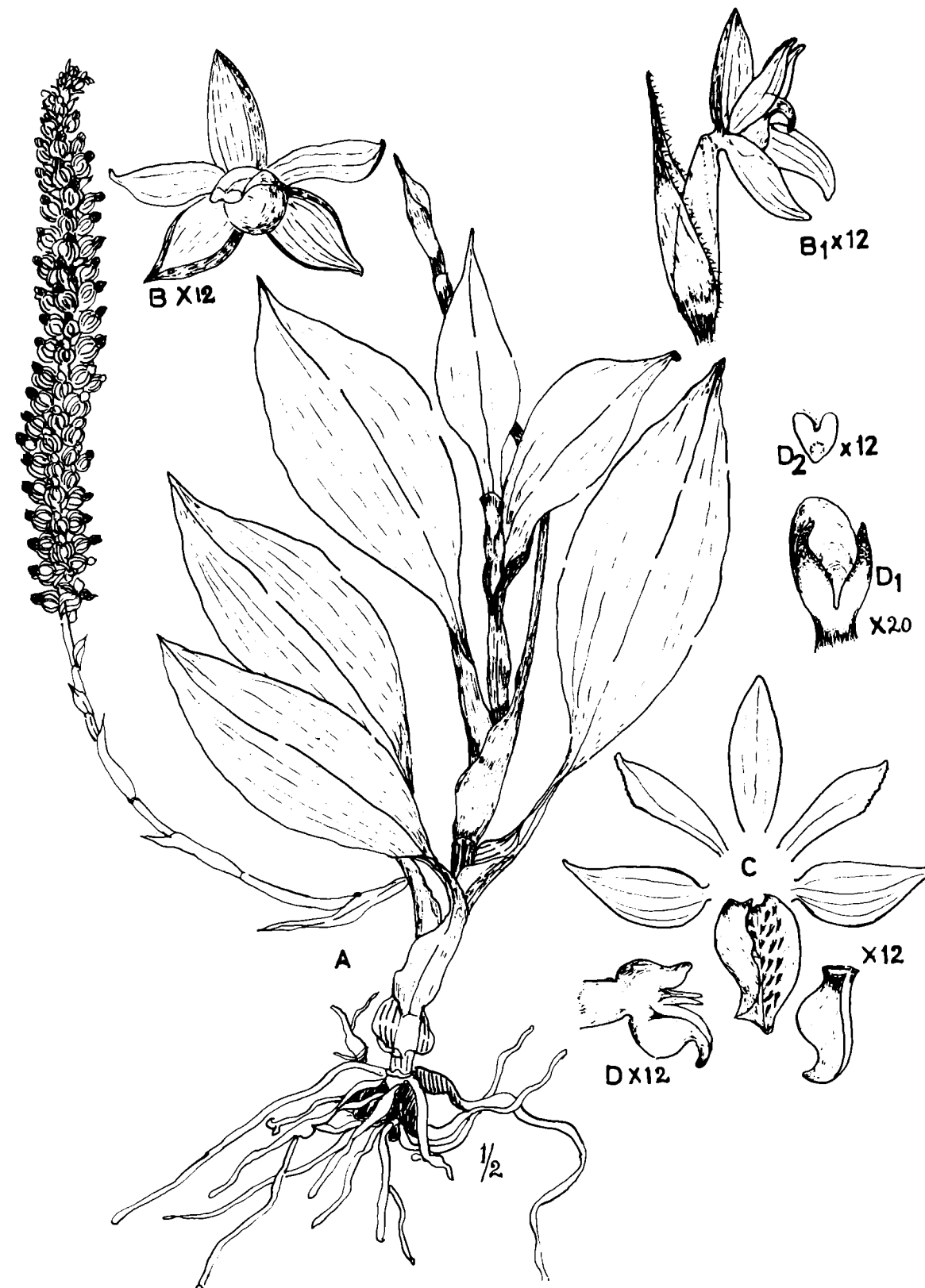


Plate 67

Goodyera repens (L.) R. Br. in Aiton. Hort. Kew. ed 2,5:198, 1813; Hk. f. 6:111, 1890 (p.p.) K. & P. 279, t.370, 1898; D. 165, 1906; T. 436, 1966 et 3:146, 1975; B. & T. 70:334, 1973; H. et al. 44, 1978.

= *Satyrium repens* L. Sp. Pl. 945, 1753.

Usually 12-25 cm. high with glabrous stem and leaves in the lower part. Leaves ovate-elliptic 2-5 cm. by 9-12 mm., with beautiful white reticulations, shortly petioled. Inflorescence usually 5-7 cm. long, rarely up to 15 cm., often twisted, pubescent; bracts on the lower part linear 3-1.5 cm. long; floral bracts linear-lanceolate, .8-15 mm. long, equalling or slightly exceeding the flowers. Flowers many, dense, subsecund, globular; sepals unequal, connivent, dorsal sepal oblong, 3 mm. long, lateral sepals oblong-lanceolate, 4 mm. long, Petals equalling the dorsal sepal and smaller than the lateral sepals, obliquely cuneate-oblong, falcate, edges slightly erose-dentate. Lip smaller than the lateral sepals, 3-4 mm. long, saccate at the base, apical lobe short, ovate, edges somewhat undulate, saccate base without any tubercles or setae within but smooth. Column short; stigma orbicular and rostellum shield shaped, arms short.

Flowering time - July to August.

Altitudinal range - 2000-3600 m.

Distributional pattern - central and west Nepal.

Specimens in Herbarium - 18 gatherings.

Specimens studied - 6.

Chr. No. $2n = 30$ (Mehra & Pandita, Taxon, 28:405, 1979 and Vij et al., ibid. 30:512, 1981).

Remarks - The flowers are variable in size, thus sepals, petals and the lip are also variable.

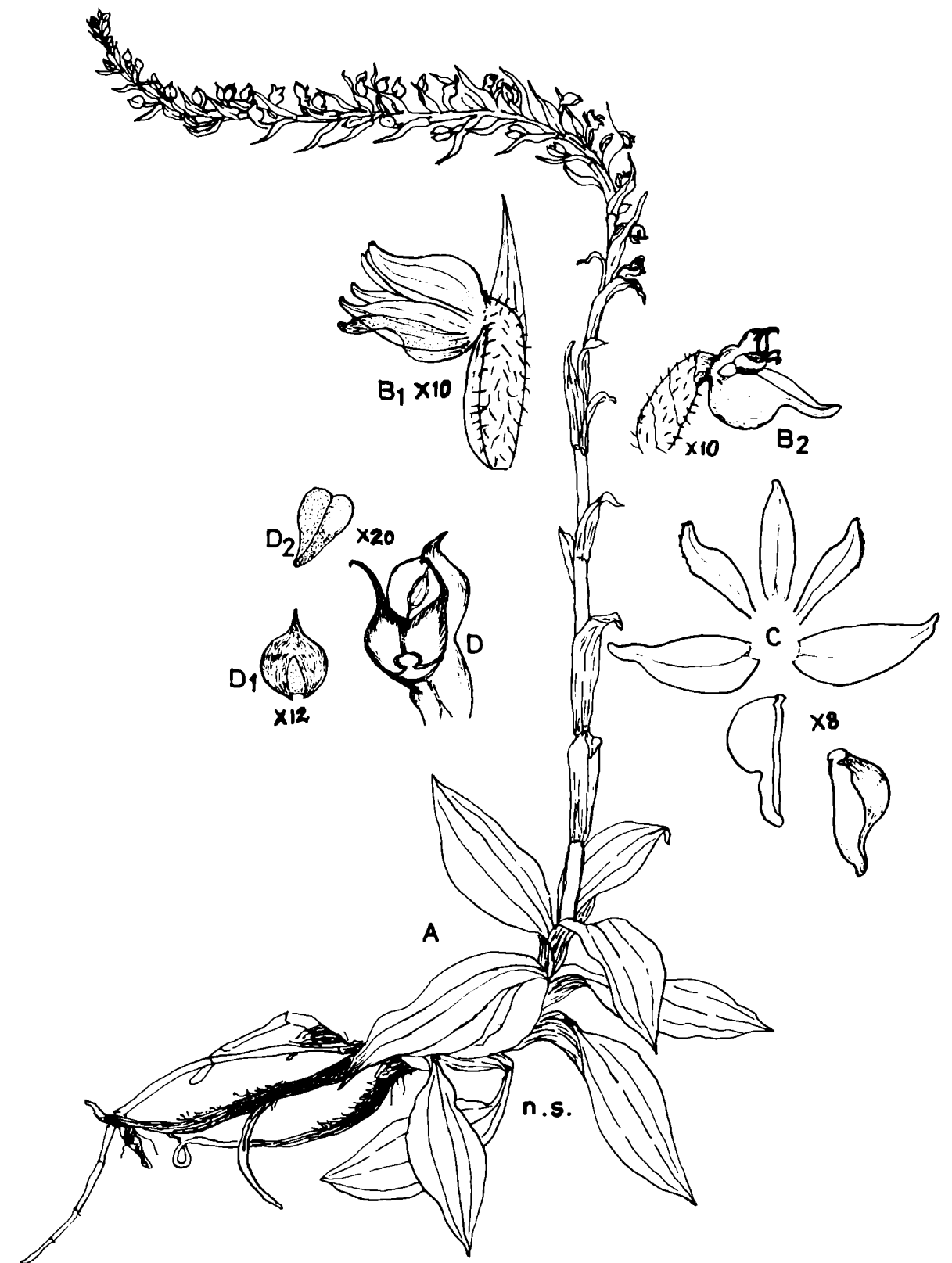


Plate 68

Goodyera schlechtendaliana Reichb. f., Linnaea 22:861, 1849; Seidenf. 32(2):26, f.11, 1978.

= *G. secundiflora* auct. non. Griff. : Hk. f. 6:113, 1890; K. & P. 288, 376, 1898; T. 2:188, 1971; B. & T. 70:334, 1973.
 = *G. hispida* auct. non. Linn. : T. 486, 1966.

Plants 20-25 cm. high, slender, pubescent, with subradical leaves. Leaves scattered, ovate to ovato-oblong, 3.5-7.5 cm. by 1.5-2.5 cm., mottled; petioles 1.2-2.5 cm. long, sheathing. Inflorescence 5-11 cm. long, bearing several bracts, linear-lanceolate, gradually becoming smaller upwards, 2.5-1.5 cm.; floral bracts shorter than the flowers but equalling the ovary, 8-14 mm. long, pubescent. Flowers lax, secund, pubescent; sepals unequal, pubescent, dorsal sepal oblong, 7 mm. long, lateral sepals subgibbous, spreading. Petals falcately oblanceolate 7 mm. long, apex obliquely beaked. Lip saccate at the base, apical lobe ovate, saccate base with setae inside. Column short; rostellar arms slender and long.

Flowering time - September.

Altitudinal range - ± 2200 m.

Distributional pattern - central Nepal.

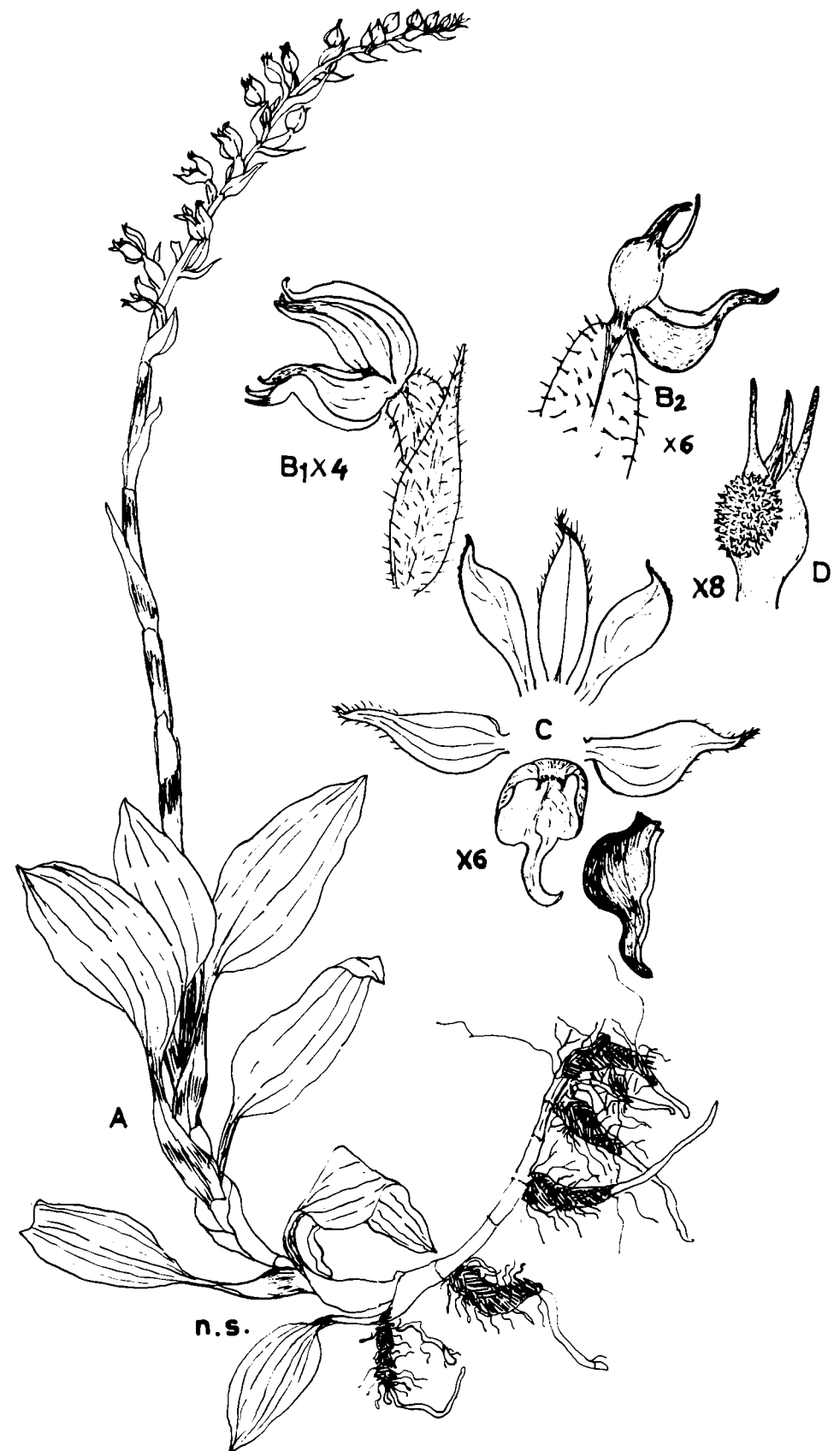
Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. n = 15 (Mehra & Sehgal, Taxon, 23:803, 1974)

also n = 15 + 1B (Mehra & Sehgal, ibid. 29:349, 1980).

Remarks - This species is also not common. The Japanese botanists had only one gathering from east Nepal (Yoksum - below Bakkim) in May, 1960. Our specimen is from central Nepal.



LISTERA R. Br. (Listereae). This genus is named after an english physician - Martin Lister. These orchids are known as "Tway blades" in the United States. These are rather insignificant terrestrial orchids with two leaves and fibrous roots. Flowers are small in racemes with sepals and petals spreading; lip is pendulous from the base of the column, usually longer than the sepals.

Listera nepalensis Balak.

Erect slender herb, 6-20 cm. tall; leaves sessile, ovate-cordate to reniform, glabrous. Inflorescence a 4-12 flowered raceme, glandular-puberulous; floral bracts ovate-acuminate, shorter than ovary, scarious. Flowers pale green; dorsal sepal ovate-lanceolate, erect, lateral pair also ovate-lanceolate but slightly reflexed; petals linear-lanceolate. Lip 3 to 4 times as long as the lateral sepals, linear-lanceolate, broad at the middle, apex shortly bifid.

Listera tenuis Lindl.

Plant 10-15 cm. high, bearing elliptic-ovate leaves near the raceme. Lip longer than the sepals and petals, cuneately obcordate, apex of lip bi-fid, lobules rounded; column more or less straight.

Plate 69

Listera pinetorum Lindl. in Journ. Proc. Linn. Soc. Bot. 1:175, 1875; Hk. f. 6:104, 1890; K. & P. 256, t.338, 1898; B. & T. 70:335, 1973; T. 3:160, 1975; H. et al. 48, 1978.

Plants 30-40 cm. tall, slender, lower ¼ of stem naked. Leaves 2, opposite or subopposite, much nearer the raceme, broadly cordate, 4.5-6.5 cm. long and equally broad, acute or acuminate. Flowering scape hairy, 3-8 flowered; floral bracts small, ovate-lanceolate, c 2 mm. long appressed to the rachis. Flowers c 1.2 cm. long, decurved, greenish brown; sepals subequal, ovate-oblong, spreading, dorsal sepal 4.5 mm. long, lateral sepals 5 mm. long, subfalcate. Petals shorter than the sepals, linear-oblong. Lip about twice as long as the sepals, c 1 cm. long, obovate-oblong, narrowed to the base, flat, deeply two at the anterior half, lobes oblique, sinus narrow with almost parallel sides, upper surface with two small calli near the base whence runs a raised dark line up to the base of the process situated at the sinus. Column long, cylindric, curved forwards; rostellum blunt.

Flowering time - May.

Altitudinal range - ± 2600 m.

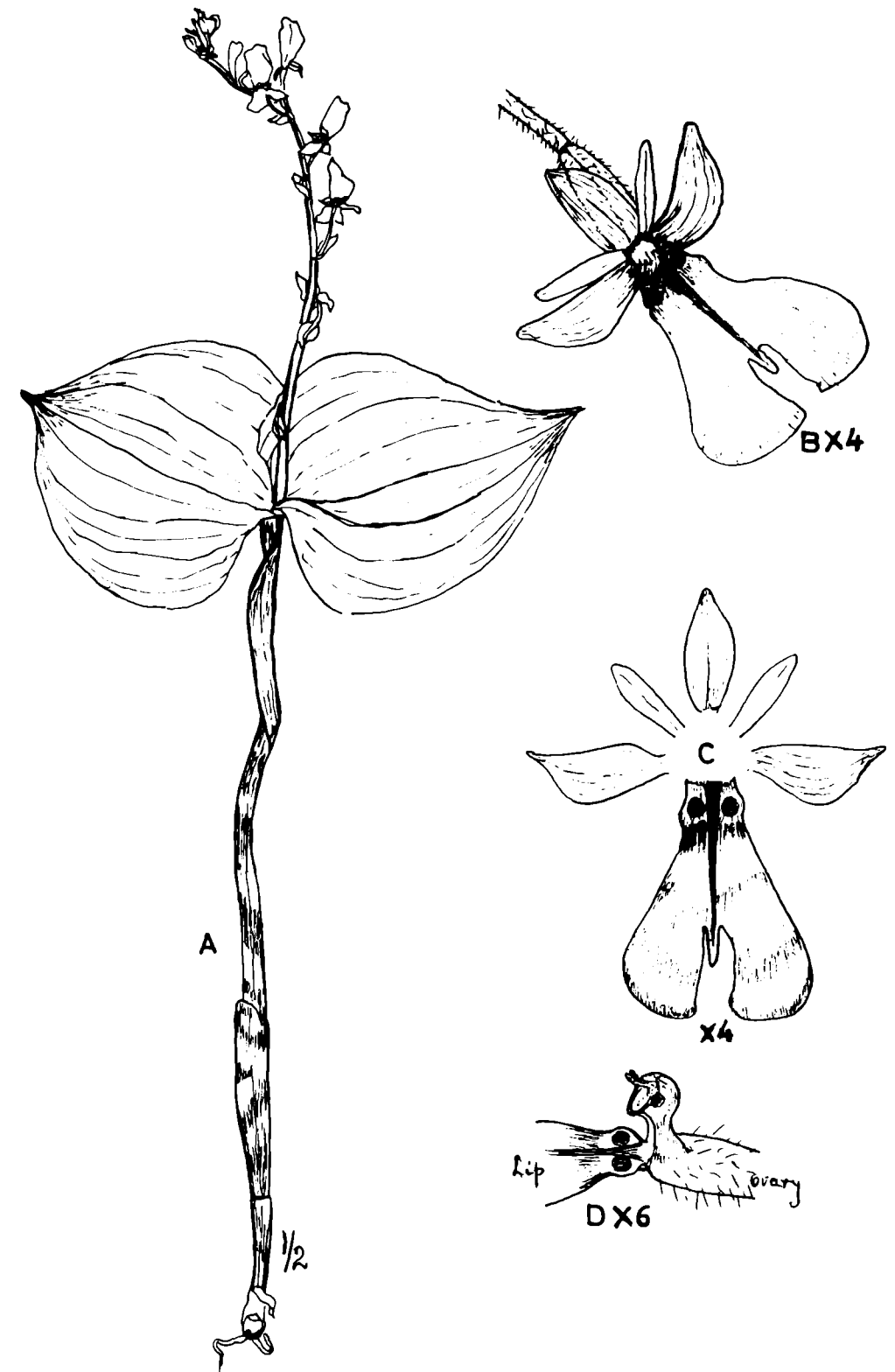
Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:109, 1970 and Vij et al., ibid. 25:641, 1975).

Remarks - The specimens are much bigger in size as given by Hooker (loc. cit.) and King & Pantling (loc. cit.).



MYRMECHIS Bl. (Erythrodeae). Refers to a fanciful resemblance of the small flowers to ants. The stem has numerous small leaves and the flowers are few, erect.

Myrmechis pumila (Hk. f.) Tang & Wang.

Stem with scapes ascending from a prostrate part; leaves small, rather thick, ovate and margin undulate. Inflorescence 1 to 3 laxly flowered, pubescent; flowers white; sepals cohering; petals as long as the sepals; lip longer than the sepals, shallow sac at the base, claw long, crenulate, apical lobe divided into two diverging lobules.

NEOTTIA Linn. (Listereae). Referring to the popular fancy that the short rootstock concealed by the large cluster of long fleshy roots resembles a bird's nest. These are peculiar plants with fleshy stems, on which the leaves are reduced to tiny sheathing scales or the plants are leafless. The stem is laxly sheathed and the flowers are in an apical raceme.

Plate 70

Neottia listeroides Lindl. in Royle, Ill. Bot Himal. 1:368, 1839; Hk. f. 6:103, 1890; H. et al. 49, 1978.

= *Listera lindleyana* (Decne.) King & Pantl. 258, t. 343, 1898.

Whole plant 16-35 cm., robust also slender, with fibrous roots from a small root-stock, stem bearing a number of loose sheaths all along the length. Leaves reduced to brown scales. Raceme lax flowered, pubescent; floral bracts ovato-lanceolate 4-6 mm. long. Flowers small, c 8 mm. long, greenish; sepals subequal, concave, elliptic-ovate, dorsal sepal 3 mm. long, lateral sepal c 3.5 mm. long. Petals smaller, linear, blunt. Lip twice as long as the sepals, 7 mm. long, base adnate to the foot of the column, linear-oblong, cleft into two lobes at the anterior 1/3rd with a small process at its apex, mid rib broad, dark. Column short, c 3 mm., curved, prolonged into a process covering the stigma.

Flowering time - July to August.

Altitudinal range - 2700-3200 m.

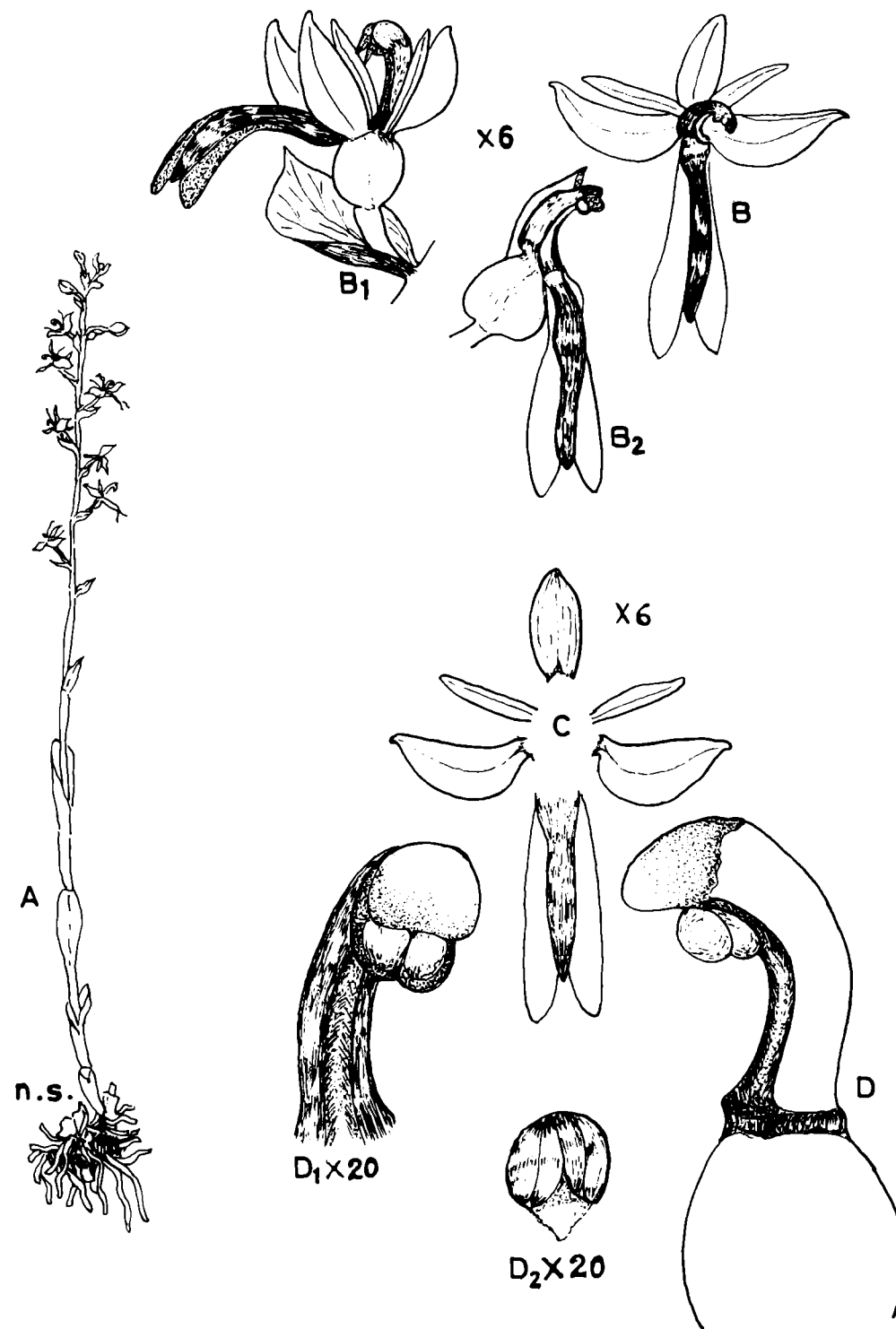
Distributional pattern - west and central Nepal.

Specimens in Herbarium - 5 gatherings.

Specimens studied - 5.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:110, 1970 as *Neottia listeroides*; Vij et al., ibid. 25:635, 1976 as *Listera lindleyana*).

2n = 40 (Mehra & Pandita, Taxon, 28:405, 1979; Mehra & Kashyap, ibid. 28:407, 1979; Vij et al. ibid. 30:512, 1981 all as *N. listeroides*).



NERVILIA Comm. ex Gaud. (Pogonieae) Descriptive of the nervous leaves. Perennial tuberous orchid with solitary leaf; coming to leaf after flowering. Tubers globose with small warty knobs. Leaf one, broadly cordate or orbicular. Sepals and petals subequal, spreading; lip adnate to the base of the column and embracing the same at the basal region. Schlechter and later Santapau & Kapadia (1961) consider *Nervilia* Comm. ex Gaud. as a distinct genus "primarily differing from *Pogonia* Juss. by having the production of their flowers before the leaves and by having a separate stem which bears no leaves but may have scales or scaly sheaths".

Nervilia aragoana Gaudich.

Inflorescence having 3 or more flowers; flowers with sepals less than 2.5 cm. long; lip more or less hairy, especially along the two lateral veins, not convolute but with margins slightly raised.

Nervilia gammieana (Hk. f.) Schltr.

Inflorescence of three or more flowers. Sepals usually 2.5 cm. or more long, sepals and petals c 6 mm. wide. Lip more or less hairy especially along the two central ridges, midlobe nearly orbicular, margin erose, hypochile forming a distinct sac surrounded by the oblique bases of the lateral sepals, the lower half convolute round the column; sidelobes short and directed forwards near the apex, disc with 2 parallel central ridges while expanded apart with 3 ridges.

Nervilia scottii (Reichb. f.) Schltr.

Seidenfaden (32(2):164, 1978) treats this as a synonym of *N. aragoana* Gaud. but on examination of drawings and comparing the descriptions, we feel that the lip of materials named as such have the lip subconvolute and the disc is with 3 parallel lamellae which are hispid.

Artificial key to the species of *Nervilia*

Flowering scape 1-2 flowered; floral bracts long, exceeding the ovary; terminal lobe of lip more or less deltoid with serrate margin, upper surface sericeous..... *carinata*.
 Flowering scape 1 flowered; floral bracts very small; terminal lobe of lip suborbicular with fimbriate margins..... *prainiana*.

Plate 71

Nervilia carinata (Roxb.) Schltr. Engl. Bot. Jahrb. 45:404, 1911.

= *Epipactis carinata* Roxb., Fl. Ind. 3:454, 1882.
 = *Pogonia carinata* Lindl. : Hk. f. 6:121, 1890.

Tubers globose, aphyllous but the scape bearing 3-4 loose sheaths. Scape 7-12 cm. tall, bearing 1 or 2 flowers, rarely 3; floral bracts slightly exceeding the pedicelled ovary. Flowers c 2 cm. long; sepals equal, linear-lanceolate, dorsal sepal, 1.1 cm. long, lateral sepals 1.4 cm. long spreading. Petals linear-lanceolate, 1 cm. long, spreading. Lip 1.5 cm. long, straight, trough shaped, not saccate at the base, 3-lobed above the middle, side lobes directed outwards and not upwards, apical lobe with serrate margin, upper surface sericeous (softly hairy), purple veined. Column 8 mm. long, very slightly curved and dilated at the apex.

Flowering time - April.

Altitudinal range - 200-390 m.

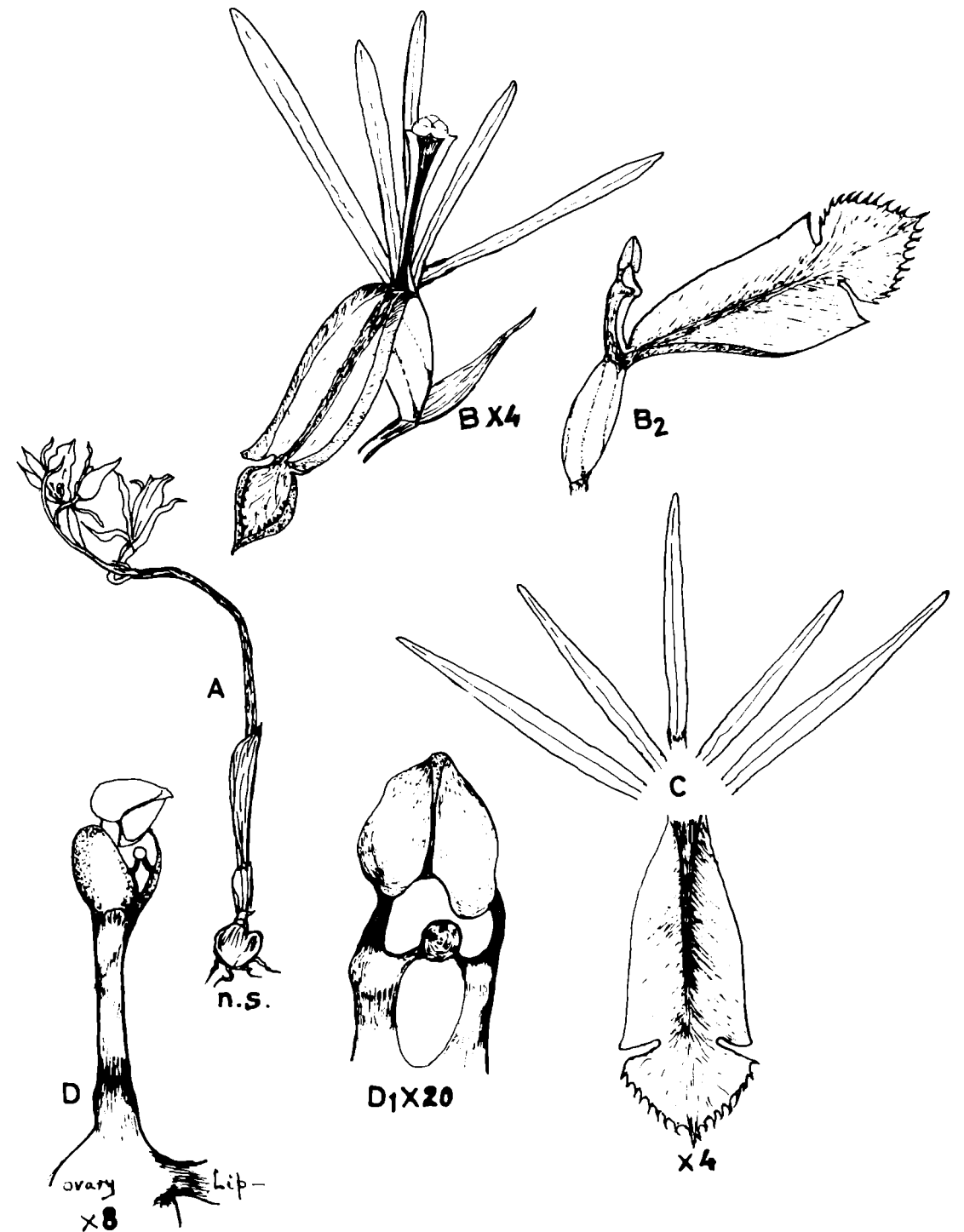
Distributional pattern - central Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No.

Remarks - Our specimens being in flowering condition, the leaves are absent, as such description of the leaf is not given, further our specimens are smaller than the size given in published literature. Seidenfaden (1978) after a comprehensive study of herbarium material from the adjacent areas including India, Indonesia and the Pacific has given up the hope of being able to clarify the taxonomical and nomen-



clatural problems around *Nervilia aragoana* Gaud. He has cited a number of synonyms some being *Epipactis carinata* Roxb., *Pogonia carinata* Lindl.; *Pogonia scottii* Bl.; *Nervilia scottii* (Reichb. f.) Schltr.; and *Nervilia carinata* (Reichb.) Schltr., besides *Epipactis flabelliformis* Buch.-Ham., *Pogonia flabelliformis* Lindl. and *Nervilia flabelliformis* (Lindl.) Tang & Wang.

Based on our study of limited material and careful examination of figures given, we are inclined to agree that material named as *Epipactis flabelliformis* Buch.-Ham., *Pogonia flabelliformis* Lindl. and *Nervilia flabelliformis* (Lindl.) Tang & Wang do have the lip which is flat, its upper surface with many hairs, further the lip is 3-lobed near the middle, the side lobes being erect and the margin slightly undulate. Further, the floral bracts are more than twice as long as the ovary.

Materials that have been named as *Epipactis carinata* Roxb., *Pogonia carinata* Lindl. and *Nervilia carinata* (Roxb.) Schltr. do have the lip straight, trough shaped and not saccate at the base. The upper surface of the lip is hairy and is 3-lobed the middle. Bracts are just twice as long as the ovary.

Specimens named as *gammieana* have the lip slightly saccate at the base and the lower half is convolute round the column. The side lobes are short and directed forwards near the apex. Further, the disc has 2 parallel central ridges while in the expanded part there are 3 ridges, the surface is hairy.

What has been identified and named as *Pogonia scottii* Bl. and *Nervilia scottii* (Reichb. f.) Schltr. has the lip subconvolute and the disc is with 3 parallel lamellae which are hispid.

Although the characters of one taxon merge partly with those of another taxon, we are inclined to take that the characters of *Nervilia aragoana* Gaud. embraces those of *Epipactis flabelliformis*, *Pogonia flabelliformis* and *Nervilia flabelliformis*, which are correctly treated as synonyms.

Nervilia carinata (Roxb.) Schltr. (Syn. *Epipactis carinata* Roxb. *Pogonia carinata* Lindl.) does not seem to be the same as *Nervilia aragoana* Gaud. (Syn. *Epipactis flabelliformis* Buch.-Ham.; *Pogonia flabelliformis* Lindl.; *Nervilia flabelliformis* (Lindl.) Tang & Wang).

This is a new record for Nepal.

Plate 72

Nervilia prainiana (King & Pantl.) Seidenf. Dansk. Bot. Arkiv. 32(2):149, f.91, 1978.

= *Pogonia prainiana* King & Pantl. Journ. Asiat. Soc. Beng. 65:129, 1896 et 8:267 t.355, 1898.

= *Nervilia crispata* (Bl.) Schltr. : H. et al. 50, 1978.

Tuber globular, aphyllous but the scape bearing 3-5 sheaths and upper bract-like, c 2.5 cm. long. (Leaf orbicular, reniform, plicate, c 3.5 cm. broad; petiole c 2.5 cm. long).

Scape 8-18 cm. long, bearing only 1 flower; floral bract very small, c 2 mm. long; flowers 2.5-3 cm. long; sepals equal, narrowly oblong, 1.9 cm. long. Petals linear-lanceolate, 1.7 cm. long, not spreading but directed forwards. Lip equalling the sepals, 1.9 cm. long, lower part convolute around the column, 3-lobed near the apex, side lobes short, narrowly triangular, terminal lobe sub-orbicular with fimbriate margin and disc with seven densely glandular pubescent lines, purple towards the apex. Column clavate 8 mm. long; stigmas oblong.

Flowering time - June.

Altitudinal range - ± 245-395 m.

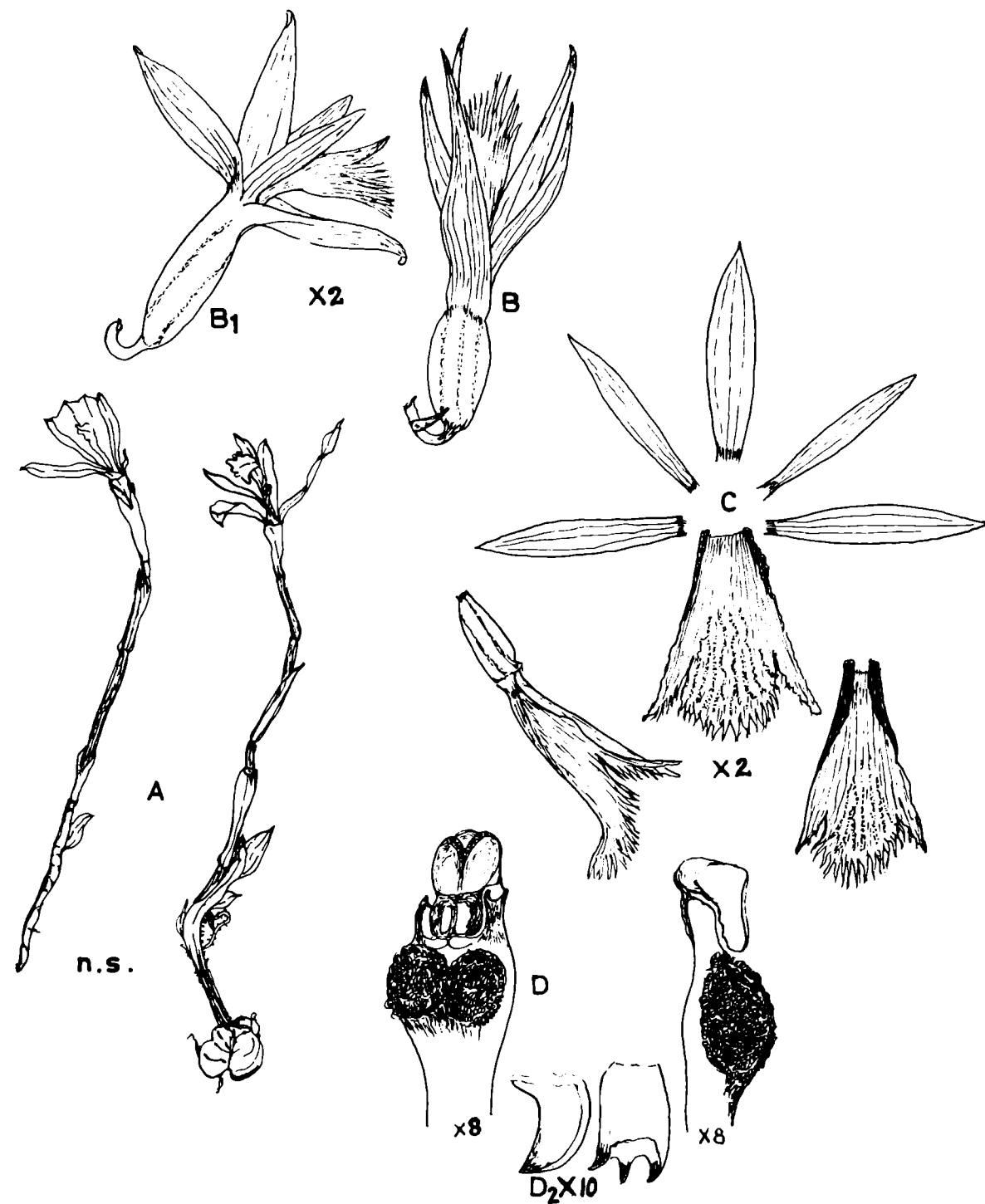
Distributional pattern - east Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No.

Remarks - Our specimens have been collected at a much lower altitude than given by King & Pantling, or by Hara et al.



SPIRANTHES L.C. Rich. (Spirantheae). The name is derived from the twisted inflorescence. Terrestrial leafy orchids with tuberous roots. Flowers are small, in spirally twisted spikes, due to which the genus gets the name. Sepals more or less connate with the petals forming a hood, the lateral sepals are gibbous at base, thus the spur is short or saccate. The floral bracts are longer than the ovary.

Plate 73

Spiranthes sinensis (Pers.) Ames, Orchid 2:53, 1908; Kit. 104, 1955; T.451, 1966; Dept. Med. Pl. 2:135, 1969; B. & T. 70:336, 1973; Seidenf. 32(2):105, f.65, 1978; H. et al. 56, 1978.

- = *Neottia sinensis* Pers., Syn. 2:511, 1807.
- = *Neottia australis* R.Br. : D. Don, 27, 1825.
- = *Spiranthes australis* (R.Br.) Lindl. : Hk. f. 6:102, 1890, K. & P. 278, t.369, 1898; D.163, 1906; Coll. 495, 1921.

Entire plant 12-40 cm. high with tuberous roots and stem slender or stout. Leaves clustered at the base of the stem, 4-6, linear-lanceolate or oblanceolate, 3-9.5 cm. by 3-6 mm., upper bract-like, sheathing, c 1.2 cm. long. Spike 4-6.5 cm. long, rachis glandular-pubescent; floral bracts ovate, c 6 mm. long, much exceeding the ovary. Flowers spirally arranged, densely crowded, pink or white, secund; sepals subequal, ovate-oblong, acute, dorsal sepal 3 mm. long, lateral sepals c 3.3 mm. long. Petals smaller than the lateral sepals c 3 mm. long, linear. Lip oblong, dilated at base and apex being constricted 1/3rd from apex, base sub-saccate, biglandular, apex subquadrate, truncate, margin undulate. Column short, prolonged upwards into a flat pointed process overhanging the circular stigma.

Flowering time - May to October.

Altitudinal range - 1675-3200 m.

Specimens in Herbarium - 34 gatherings.

Specimens studied - 5.

Chr. No. n = 15 also 16 (Mehra & Vij, Taxon, 19:110, 1970 as *S. australis*).

2n = 30 (Vij et al. ibid. 30:512, 1981 as *S. australis*).

Remarks - Flowers during spring are white and those appearing in autumn are pink.



THUNIA Reichb. f. (Sobralieae). The orchid is named after Count Von Thun Hohenstein of Bohemia. These are terrestrial with a tall and fleshy stem, leaves are numerous, membranous and thin. The inflorescence is terminal, bracts persistent and the flowers turn brown or remain white on drying. This genus had been included under *Phaius* (or *Phajus*) by many authors, but Reichenbach f. distinguishes between *Thunia* and *Phaius*.

Plate 74

Thunia alba (Lindl.) Reichb. f. in Bot. Zeit. 10:764, 1852; Kit. 104, 1955; T. 451, 1966 et 3:164, 1975; B. & T. 70:337, 1973, Herk. 86:231, f. 163, 1978; H. et al. 57, 1978.

= *Phaius albus* Lindl. in Wall. Pl. Asiat. Rar. 2:85, t.198, 1831, et in Curtis, Bot. Mag. 69; t. 3991, 1843; Hk. f. 5; 818, 1890; op. cit. 6:192, 1890; K. & P. 110, t. 153, 1898.

Stem stout, densely tufted 30-50 cm. tall, bearing many tubular sheaths and leafy from slightly swollen base. Leaves distichous, narrowly elliptic-lanceolate or oblong-lanceolate, 10-28 cm. by 1.8-3.8 cm. sessile, acuminate. Racemes terminal, 4-8 flowered; floral bracts large 4-6 cm. long, chartaceous, cymbiform, equalling or exceeding the long-stalked ovary. Flowers distichous, large, c 8 cm. in diam. when opened, white; sepals subequal, narrowly oblong 4 cm. long, erecto-patent. Petals slightly longer than the sepals, 4.6 cm. long, slightly narrower, erecto-patent. Lip broadly oblong-pandurate, base with a short spur, basal half convolute, anterior cucullate, slightly acuminate and with unequally dentate or fimbriate, undulate edges, upper surface with 7-9 dentate ridges and with purple lines. Column 3.4 cm. long, winged near the apex, foot very short. Anthers oblong.

Flowering time - June-August.

Altitudinal range - 550-1676 m.

Distributional pattern - east, central and west Nepal.

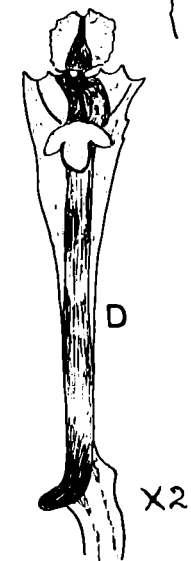
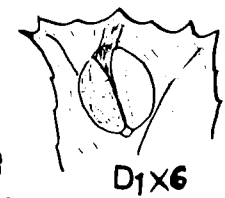
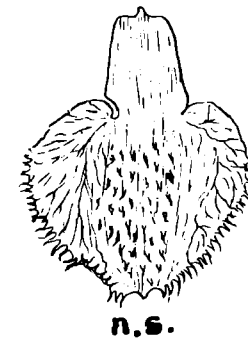
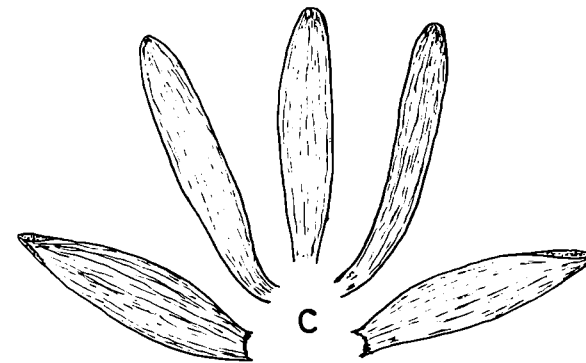
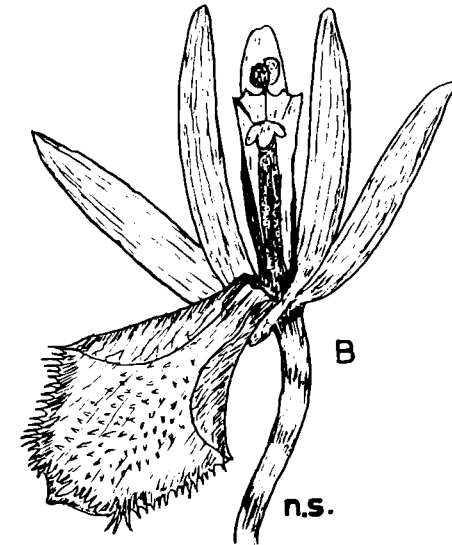
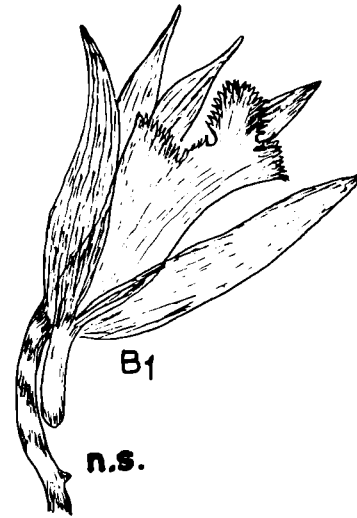
Specimens in Herbarium - 5 gatherings.

Specimens studied - 2.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:111, 1970; Mehra & Kashyap, *ibid.* 27:226, 1978; Mehra & Sehgal *ibid.* 27:389, 1978, all as *Thunia alba*).

2n = 42 (Vij et al., *ibid.* 30:512, 1981 as *Phaius albus*).

Remarks - According to Schlechter's classification this genus should be placed under Kerosphaere - Thuniinae, but we have followed Schultes & Pease to indicate the subtribes as already mentioned elsewhere.



ZEUXINE Lindl. (Erythrodeae). The name refers to the partial union of the lip and the column, and possibly also to the growing together of the pollinia. Terrestrial with succulent glabrous stem and membranous leaves. Flowers small in spikes. The dorsal sepal is concave and with the petals forms a hood on the column. The genus can readily be distinguished in the field by the character of the leaves and the stigmas being two.

Zeuxine goodyeroides Lindl.

Leaves oblong-ovate. Epichile not bilobulate, margin introflexed, sac bidentate within; column faintly winged below.

Zeuxine longilabris (Lindl.) Benth. ex Hk. f.

Lobules of lip not much divergent forming a V when flattened down, broadening from a narrower base, obliquely ovate, irregularly dented at their apex.

Zeuxine nervosa (Wall. ex Lindl.) Benth. ex Cl.

Leaves ovate-lanceolate, usually with a broad pale band along midline, sometimes green suffused with silver grey. Epichile small, not much protruding between lateral sepals. Wings on column irregularly broad triangular.

Artificial key to the species of Zeuxine

Leaves sessile, linear-lanceolate; scape dense flowered. Apical lobe of lip suborbicular. *strateumatica*

Leaves shortly petioled sheath inflated, hyaline; scape lax flowered; bracts exceeding the ovary. Apical lobe of lip bi-lobulate. *flava*.

Plate 75

Zeuxine flava (Wall. ex Lindl.) Benth. ex Hk. f. Fl. Brit. Ind. 6:108, 1890; K.&P. 289, t. 386, 1898; T. 452, 1966 et 2:195, 1971; B. & T. 70:337, 1973; Seidenf. 32(2):84, f.52, 1978; H. et al. 58, 1978.

= *Monochilus flavum* Wall. ex Lindl. Gen. Sp. Orchid Pl. 487, 1830.

Plants 15-25 cm. tall, stem slender, lower 1/3rd covered with sheaths, higher up 3 or 4 leaves. Leaves ovate or ovate-lanceolate, 3-6 cm. by 1-1.5 cm. with expanded sheaths. Spike 2-4.2 cm. sparsely flowered; floral bracts lanceolate, 5-8 mm. long, as long as or longer than the ovary. Flowers very small, c 5 mm. in diam., yellow; sepals unequal, ovate-oblong, dorsal sepal 3.5 mm. long, lateral sepals 3 mm. long. Petals equalling the lateral sepals, narrowly oblong-elliptic. Lip longer than the sepals, 4.5 mm., cymbiform at the base with two calli in its folds, anterior lobe broadly obovate or hatchet-shaped, divided into two subquadrate terminal lobules. Column short, stout, apex curved; rostellum long. Stigmas small, one on each side of the anther.

Flowering time - April.

Altitudinal range - 1220-1830. m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No.

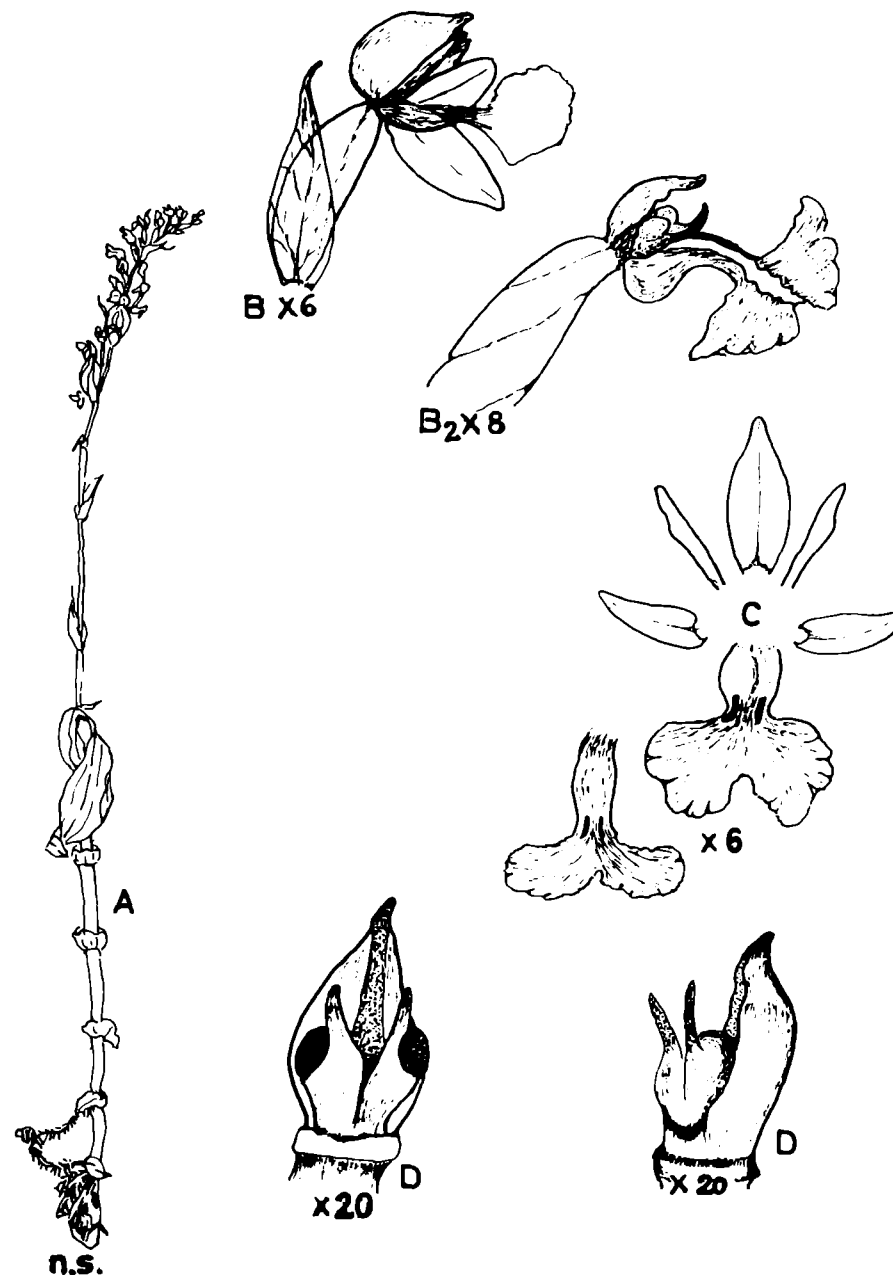


Plate 76

Zeuxine strateumatica (L.) Schltr. in Fedde Repert., Beih. 1:77, 1911; B. & T. 70:338, 1973; Seidenf. 32(2):79, f.48, 1978; H. et al. 58, 1978.

= *Orchis strateumatica* L. Sp. Pl. 943, 1753.

= *Zeuxine sulcata* (Roxb.) Lindl. : Hk. f. 6:106, 1890; K. & P. 286, t. 381, 1898; D. 168, 1906.

Plants 4.5-11 cm. high, lower part of stem having a few sheaths and upper part leafy. Leaves few or many linear sessile, gradually passing into linear bracts. Racemes 1-3 cm. long, densely flowered; floral bracts ovate-lanceolate, 8-10 mm. long, much longer than the ovary. Flowers c 9 mm. in diam., white; sepals unequal, dorsal sepal ovate, concave, 5 mm. long, lateral sepals obliquely lanceolate, 4 mm. long, connivent. Petals equalling the dorsal sepal, falcately oblong, united with the dorsal sepal forming a hood over the column. Lip as long as the lateral sepal, with a cymbiform sac at its base, having two pointed teeth and two narrow lamellae near the mid rib, apical lobe short, subquadrate, entire and with a convexity within the outer angles. Column very short, with two wings at the apex covering the anthers; rostellar arms short, stout and parallel. Anther short, ovate, beaked; pollinia pyriform.

Flowering time - January to February.

Altitudinal range - 230-1220 m.

Distributional pattern - central and east Nepal.

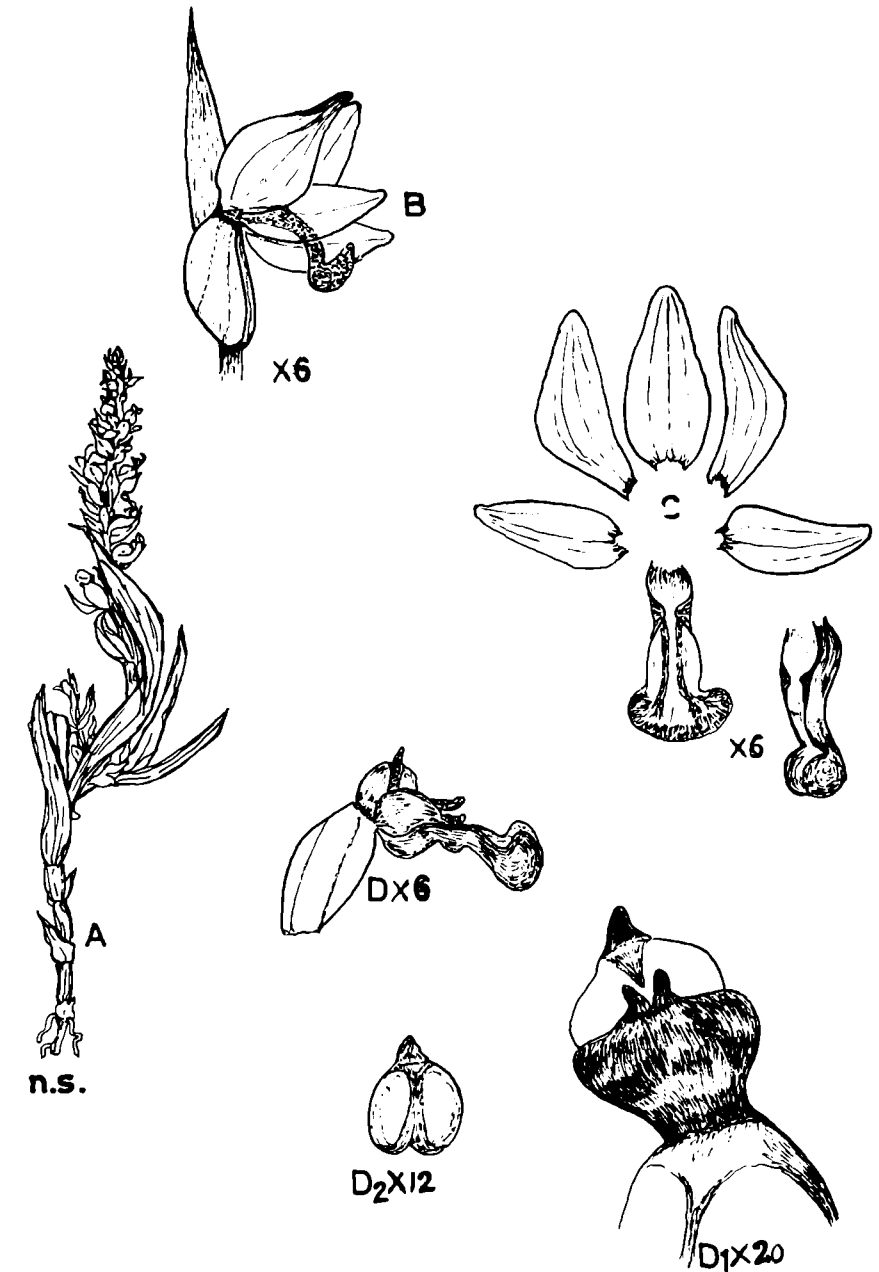
Specimens in Herbarium - 5 gatherings.

Specimens studied - 5.

Chr. No. n = 10, 11, 20 & 50 (Mehra & Viji, Taxon, 19:111, 1970).

2n = 50 (Mehra & Viji, Taxon, 19:111, 1970; Singh., ibid. 30:705, 1981).

Remarks - Our specimens are much smaller than the height given in other works.



AGROSTOPHYLLUM Bl. (Glomereae). The genus gets its name from the grass-like leaves of most of the species. The plants have a leafy stem with leaves distichous and linear, persistent flattened sheaths. Flowers are very small, crowded in terminal heads; bracts being long and paleaceous. Lateral sepals are broader and adnate to the foot of the column. Lip is adnate to the foot, which is stout and more thickened above. The genus is placed under subtribe Glomereae by Schultes & Pease, but Hawkes names the subtribe as Glomerinae.

Artificial key to the species of Agrostophyllum

Petals linear oblong; floral bracts spathaceous; side lobes of lip incurved. Upper part of column kidney shaped. *hasianum*.
 Petals broadly elliptic; floral bracts lanceolate; side lobes of lip erect. Upper part of column broad. *callosum*.

Plate 77

Agrostophyllum callosum Reichb. f. in Seem., Fl. Viti. 296, 1868; Hk. f. 5:824, 1890; K.&P. 155, t.212, 1898; B. 19:218, 1964; T. 425, 1966 et 2:177, 1971; B. & T. 68:661, 1971; H. et al. 31, 1978.

Stems 30-50 cm. arising from a stout branched rhizome. Leaves many, sessile, linear-oblong, 11-17 cm. by 6-10 mm., apex notched. Flowers small, crowded in sessile terminal head, c 6 mm. in diam., pink; floral bracts paleaceous or spathaceous, 7 mm. long equalling the ovary; sepals equal, ovate, c 4 mm. long; petals broadly elliptic, c 3 mm. long, obtuse, erose. Lip 3-lobed, broadly ovate or oblong, obscurely 3-lobed, 4 mm. long, side lobes broad, rounded, apical lobe decurved, apex emarginate or somewhat obcordate, erose; basal callus large, divided, lobes diverging, each ending in a thickened blunt point opposite the sinus separating the apical part from the basal lobes. Column stout 3 mm. long, with a short foot. Pollinia elongate-clavate, attached by elastic threads to a globular viscus.

Flowering time - May to August.

Altitudinal range - 1275-2440 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 5 gatherings.

Specimens studied - 2.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19(1):106, 1970).

2n = 38 (Mehra & Sehgal, Taxon, 27(4):388, 1978).

Remarks - The lip exhibits great variations in size as well as in shape.

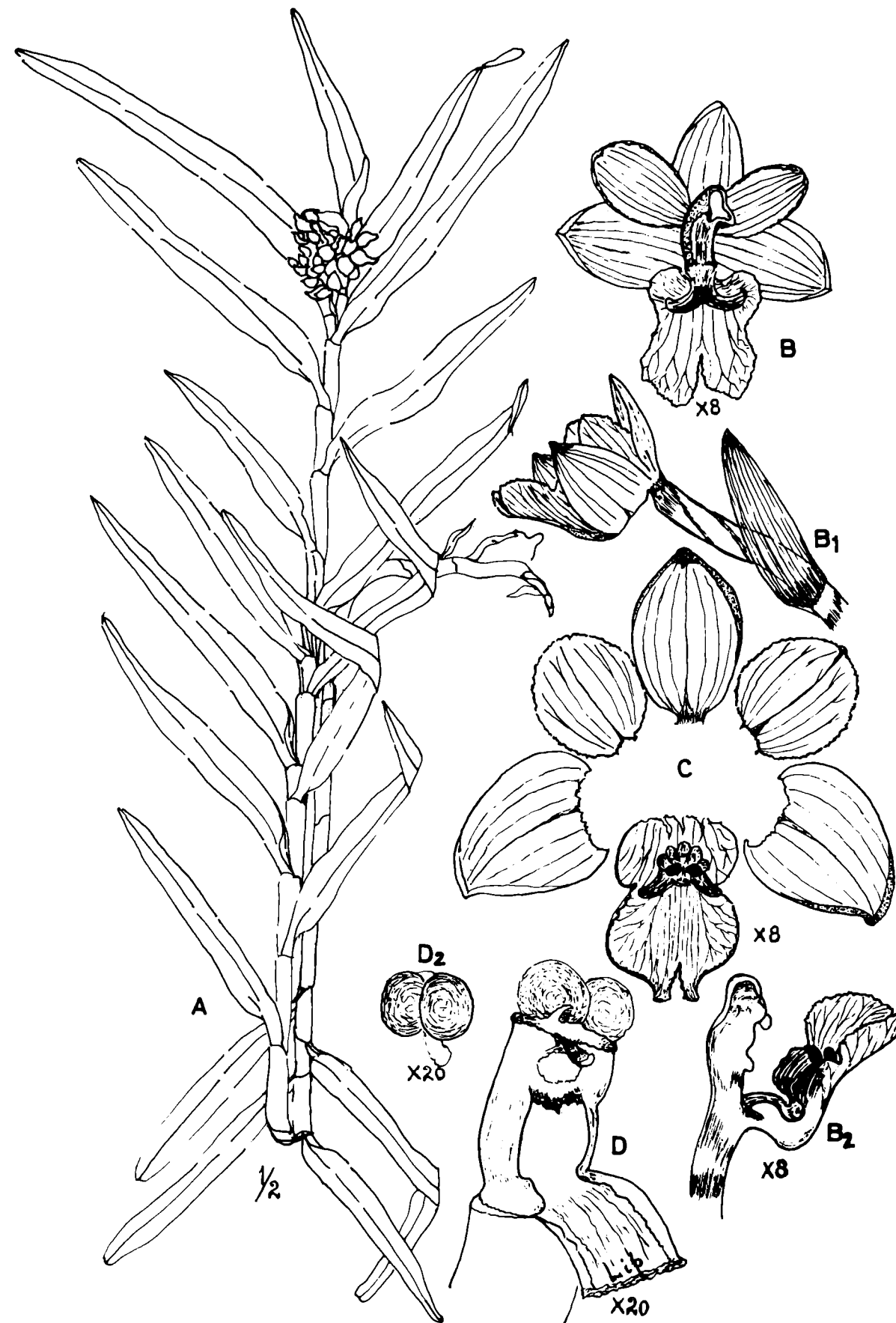


Plate 78

Agrostophyllum khasianum Griff. in Calc. Journ. nat. Hist. 4:378, t. 19, 1844; Hk. f. 5:824, 1890; K. & P. 154, t. 210, 1898.

Stem tufted, much compressed, having several unequal sheaths in the lower part. Leaves few on the upper part of the stem, thick, almost petioled, narrowly oblong, 10.5-20 cm. by 1.8-2.5 cm., base contracted. Flowers small, c 6 mm. in diam., crowded in a head which bears many pedicels each bearing two flowers enclosed in a membranous sheath, white with pale yellow patches on the epichile; floral bracts lanceolate, c 6 mm. long, shorter than the ovary. Sepals equal, oblong, c 3 mm. long, lateral sepals oblique; petals shorter than the sepals, narrowly oblong, acute, margins recurved. Lip constricted in the middle, hypochile concave, epichile broader, reniform, minutely notched at the apex or broadly apiculate, edges undulate, attached by a small base to the hypochile. Column broad, a constriction and the processes below the stigma, foot absent.

Flowering time - September.

Altitudinal range - 610 m.

Distributional pattern - east Nepal.

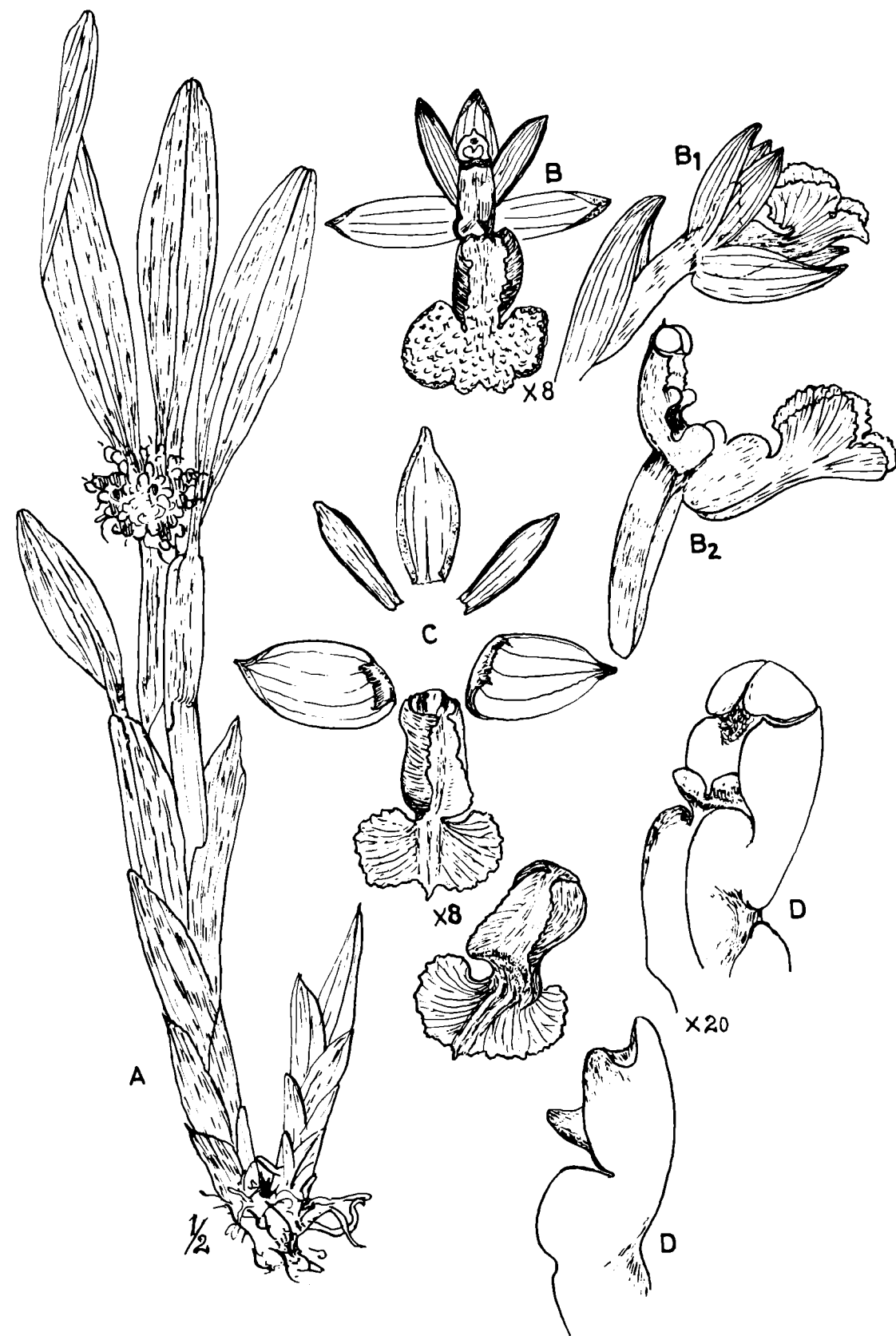
Specimens in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19(1):106, 1970).

n = 24 (Mehra & Sehgal, ibid. 29:348, 1980).

Remarks - The surface of the epichile is usually venose but it may also be papillate. This is a new record for Nepal.



CERATOSTYLIS Bl. (Glomereae). Because usually fleshy column which may have a horny appearance. These are epiphytic low herbs with tufted stems. Flowers are minute, solitary or few having a gibbous or short spur-like mentum.

Ceratostylis himalaica Hk. f.

Densely tufted, prostrate, clothed with scarios brown sheaths; leaves fleshy, linear-lanceolate. Inflorescence 1 occasionally 2 flowered, flowers pale yellow pubescent; lateral sepals broader than the dorsal, incurved; petals equalling the sepals. Lip fleshy, obscurely 3-lobed, tip yellow and papillose.

COELOGYNE Lindl. (Coelogyneae). The name is suggestive of the deeply excavated stigma in the genus. Epiphytic, pseudobulbs with usually two plicate, coriaceous or membranous leaves. Flowers and leaves coaetaneous; flowers in racemes or on short scapes. Sepals usually very concave, mentum or spur absent. Petals usually much narrower than the sepals. Labellum 3-lobed, lateral lobes broader, erect on both sides of the column, long, winged or hooded round the tip. Anthers pendulous by short filaments, tip resting on a large rostellum which is divaricate.

Coelogyne fuliginosa W.J. Hook.

Habit and character of *C. ovalis* but inflorescence with 3-4 flowers. Dorsal sepal c 3 cm. long; lip dark brown, midlobe c 17 mm. broad, two lamellae wavy on the epichile but low and straight on the hypochile, also two short lateral lamellae on the epichile.

Coelogyne longipes Lindl.

Pseudobulbs long and slender; leaves petioled. Inflorescence as long as the leaves; flowers small, yellow; lip contracted at the saccate base, midlobe very broadly obcordate, sidelobes rounded, lamellae running down nearly to the base, converging towards the apex. Column very broadly winged but narrowing downwards.

Coelogyne prolifera Lindl.

Pseudobulbs distant on the rhizome; leaves with very small petioles. Inflorescence many flowered, sepals brownish yellow to orange yellow; lip dark brownish or yellow at the centre, midlobe orbicular with retuse apex, margin finely toothed or entire, side lobes short obtuse; two lamellae run down nearly to the base of the hypochile; column winged which broadens upwards.

Coelogyne punctulata Lindl.

The lip of this species is very much like the lip of *C. nitida* - the apical lobe being ovate and rounded side lobes but in size it is bigger in this species. Besides, the lamellae which extend to the base are laminate and crenulate.

This species is often confused with *C. nitida*.

Artificial key to the species of *Coelogyne*

- 1 Flowers from an undeveloped pseudobulb at the base of the old pseudobulb; sheaths of the scape all basal —
 - 2 Racemes pendulous or decurved, many or few flowered —
 - 3 Flowers c 3.8 cm. in diam.; side lobes of lip round and disk with 3 ridges. *flaccida*.
 - 3* Flowers large, c 7-9 cm. in diam.; side lobes of lip large, rounded with yellow fimbriate lamellae between them; mid lobe with 2 broad yellow plates. *crispata*.
 - 2* Racemes erect or inclined, rarely drooping, many or few flowered —
 - 4 Lip white, with 4 yellow spots, side lobes erose, mid lobe ovate or ovato-lanceolate, disk with 3 ridges. *corymbosa*.
 - 4* Lip white with confluent orange or yellow areas; side lobes finely serrulate, mid lobe ovate, disk with 2 ridges. *nitida*.
 - 4** Lip spotted with brown; side lobes elongate, mid lobe clawed, orbicular, disk with 3 brownish ridges. *fuscescens*.
- 1* Flowers from the top of mature pseudobulbs—
 - 5 Scape sheathed at the base only. Lip white or yellowish, surface and margin of lobes with long brown hairs. *ovalis*.
 - 5* Scape with distichous imbricating sheaths below the racemes only —
 - 6 Flowers large, c 3.5 cm. in diam.; lip white with yellow blotches, side lobes narrow, mid lobe rounded-ovate. *stricta*.
 - 6* Flowers small, c 1.5 cm. in diam.; lip white, side lobes obtuse, mid lobe obcordate. *flavida*.

Plate 79

Coelogyne corymbosa Lindl. Fol. Orchid, Coelogyne : 7, 1854; Hk. f. 5:831, 1890 et 6:194, 1890; K. & P. 134, t.185, 1898; T.428, 1966 et 2:181, 1971 et 3:140, 1975; B. & T. 66:578, t.1, 1969; H. et al. 36, 1978.

Pseudobulbs crowded on a stout rhizome, ovoid or obovoid, partly sheathed at the base. Leaves narrowly elliptic-oblong, 9-21 cm. by 1.6-3 cm., sessile. Scape shorter or longer than the leaves, peduncle enclosed by large sheath, decurved. Flowers 3 or 4, large, 5.5-6 cm. in diam., white fragrant; floral bracts lanceolate, as long as the stalked ovary, falling off as the flowers mature. Sepals equal, lanceolate, c 3.2 cm. long, dorsal sepal broader; petals rather narrower, lanceolate, c 3 cm. long. Lip white, oblong, lateral lobes broad erose, terminal lobe ovate, middle part with 4 yellow spots, disc with 3 lamellae. Column 1.6 cm. long, curved and slightly winged at the apex.

Flowering time - March to May.

Altitudinal range - 1830-2900 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 13 gatherings.

Specimens studied - 3.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:107, 1970).

2n = 38 (Mehra & Sehgal, ibid. 29:348, 1980).

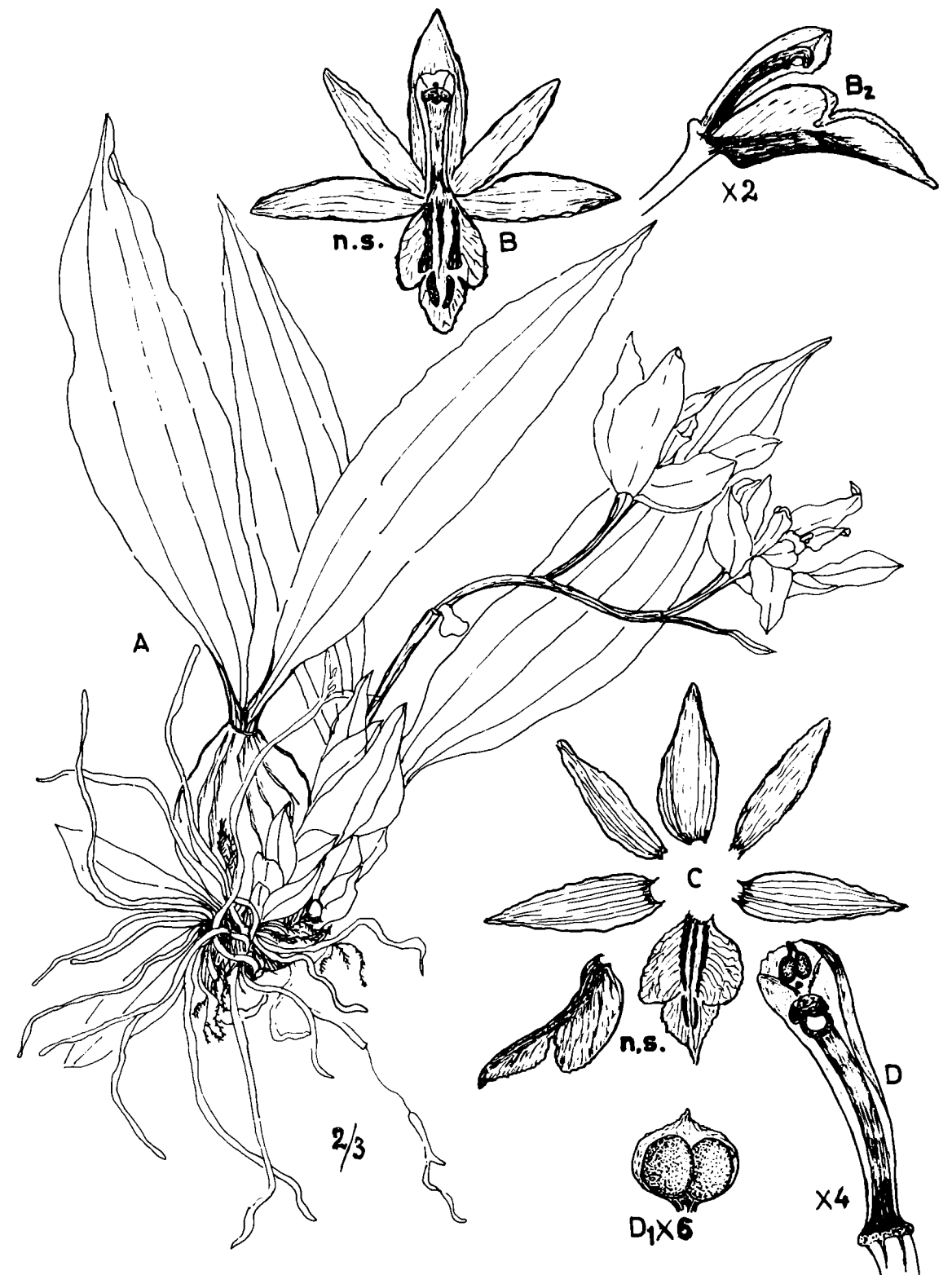


Plate 80

Coelogyne cristata Lindl. Collect. Bot. sub. t.33, 1824; Hk.f. 5:829, 1890 et 6:193, 1890; K. & P. 133, t.184, 1898; Kit. 99, t.10, 1955; T.429, 1966 et 2:181, 1971; Dept. Med. Pl. 2:131, 1969; B. & T. 66:578, t.2, 1969; Herk. 78:118, 1970; H. et al. 36, 1978.

= *Cymbidium speciosissimum* D. Don, 35, 1825.

Pseudobulb distant, rising from a long, stout rhizome, ovoid-cylindric, sheathed at the base. Leaves sessile, linear-oblong, 14-29 cm. by 1.8-2.3 cm., narrowed towards the base. Scape pendulous, few flowered, usually equalling the leaves, sheathed by numerous small bracts. Flowers large, 7-9 cm. across, white; floral bracts oblong, 3.5-4.5 cm. long, concave, as long as or longer than the ovary, persistent. Sepals equal, oblong-lanceolate 5.8 cm. long margin undulate erecto-patent; petals shorter than the sepals, 5.2 cm., ovate-lanceolate, undulate, erecto-patent. Lip oblong, large 4.5 cm. long rounded lateral lobes rose, terminal lobe separated by an isthmus, orbicular, with 2 broad yellow lamellae; disc with 4 yellow fimbriate lamellae. Column 2.7 cm. long, apex hooded due to the wing, straight.

Flowering time - March to April.

Altitudinal range - 1675-2450 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 17 gatherings.

Specimens studied - 4.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:107, 1970).

also n = 40 (Mehra & Vij, Taxon, 19:107, 1970).

2n = 40 (Gearld, ibid. 22:285, 1973; Vij et al., ibid. 25:634, 1976; Mehra & Kashyap, ibid. 27:226, 1978).

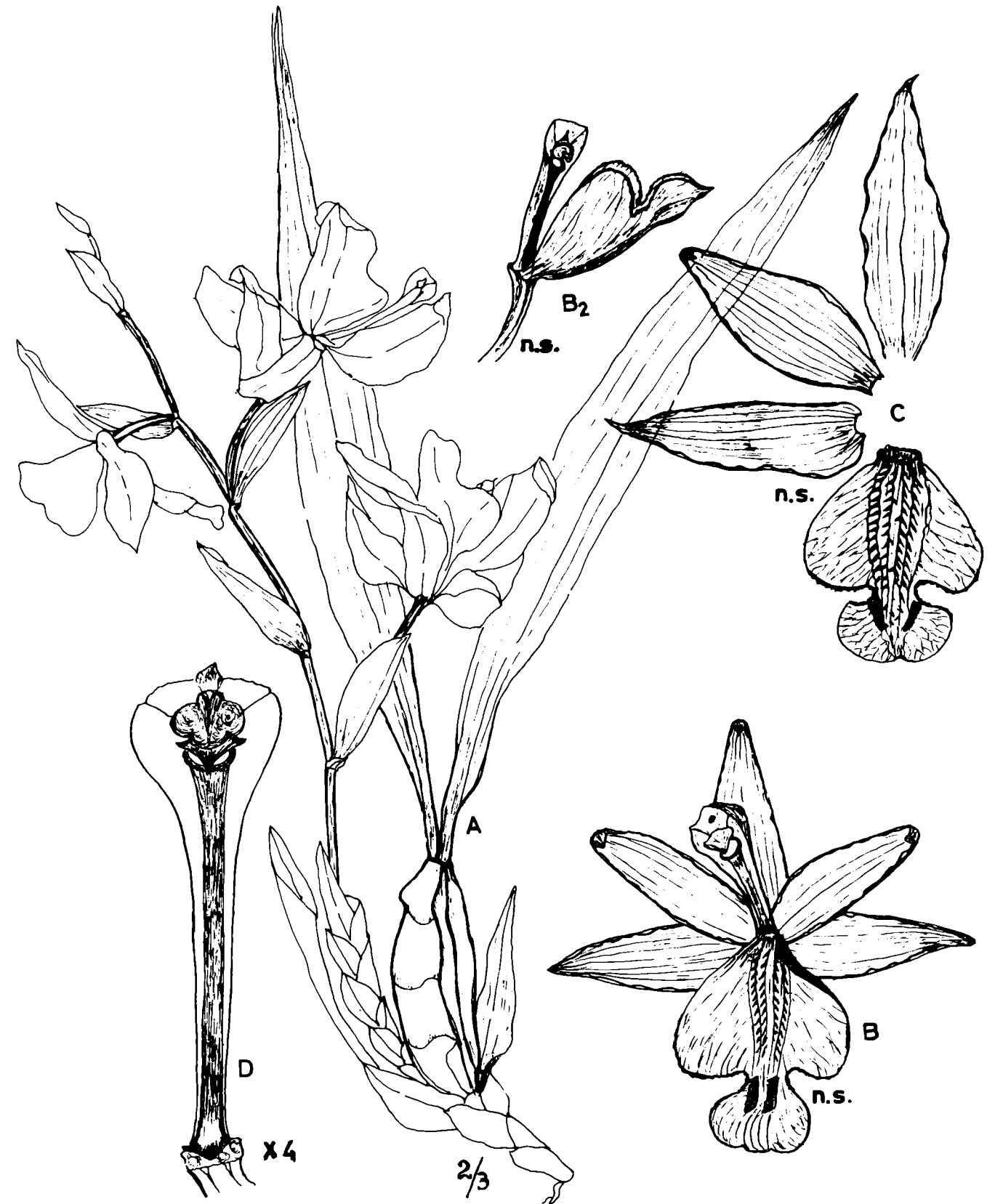


Plate 81

Coelogyne flaccida Lindl. Gen. Sp. Orchid Pl. 39, 1830; Hk. f. 5:829, 1890; K. & P. 8:133, t.183, 1898; B. & T. 66:574, t.4, 1969; Seidenf. 29(4):38, 1975; H. et al. 36, 1978.

Pseudobulbs elongate, ovoid-cylindric, sheaths large, coriaceous, brown. Leaves with long and channelled petiole, linear-lanceolate, or narrowly oblong, 11-15 cm. by 1.8-2 cm. Scape from the base of the pseudobulbs, decurved, laxly many flowered, as long as the leaves. Flowers c 3.8 cm. in diam., white, faint small; floral bracts obovate, cymbiform, 1.5 cm. long, caducous. Sepals subequal, oblong-lanceolate, spreading, 2.1 cm. long dorsal sepal broader; petals narrower and shorter than the sepal, 1.9 cm. long. Lip oblong, 3-lobed near the apex, side lobes large, rounded, apices acute, erose, terminal lobe oblong and slightly reflexed; disc with 3 yellow flexuose ridges between the side lobes. Column 1.5 cm. long, straight, wings enlarged at the apex and slightly crenulate.

Flowering time - April.

Altitudinal range - 925-1220 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:107, 1970; Mehra & Sehgal, ibid. 29:348, 1980).

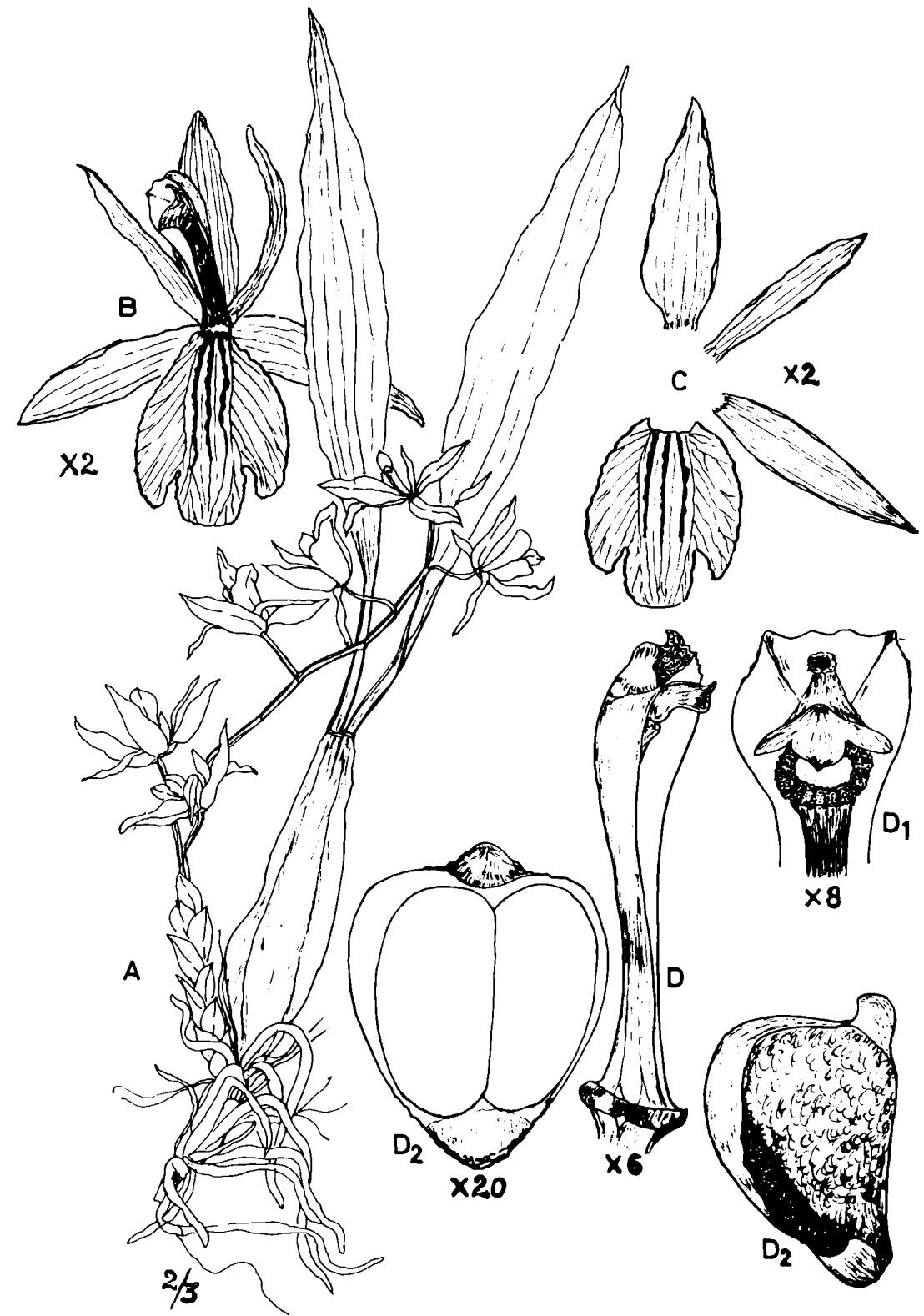


Plate 82

Coelogyne flavida Wall. ex Lindl. Fol. Orch. Coelogyne 10, 1854; Hk. f. 5:839, 1890; K. & P. 138, t.191, 1898; B. 19:218, 1964; T.429, 1966 et 2:181, 1971; S. 94:224, 1969; B. & T. 64:580, t.5, 1969; Seidenf. 29(4):82, f. 36-38, 1975; H. et al. 36, 1978.

Pseudobulbs elongate-ovoid on a slender scaly rhizome. Leaves petioled, elliptic-oblong, 8-15 cm. by 1.8-3 cm. Scape terminal several small imbricate scales just under the flowers, laxly flowered, suberect. Flowers 8-10, c 1.5 cm. in diam., yellow; floral bracts large, scarious, broadly ovate, 9 mm., longer than the ovary, caducous. Sepals subequal, spreading, ovate, c 7.5 mm., dorsal sepal a little broader; petals linear, as long as the sepals, spreading. Lip oblong, 3-lobed, basal half concave, side-lobes small, oblong, terminal lobe cuneately obcordate, decurved, separated from the lateral lobes by broad sinuses; disc faintly 2 ridged. Column c 5 mm. long, straight.

Flowering time - May to June.

Altitudinal range - 1220-2100 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 13 gatherings.

Specimens studied - 5.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:107, 1970).



Plate 83

Coelogyne fuscescens Lindl. Gen. Sp. Orchid Pl. 41, 1830; Hk. f. 5:833, 1890; K. & P. 132, t. 181, 1898; B. & T. 66:580, t.6, 1969; Herk. 80:189, f. 153, 1972; Seidenf. 29(4):26, t.7, 1975; H. et al. 36, 1978.

Pseudobulbs long, narrow, furrowed on a stout rhizome, sheathed at the base. Leaves shortly petioled, elliptic 14-19 cm. by 4-5.5 cm., plicate. Scape shorter than the leaves, suberect or drooping, usually 4-8 flowered, covered for about half the length by sheaths. Flowers c 6 cm. in diam., usually pale yellowish or yellowish brown; floral bracts broadly ovate, longer than the ovary, caducous. Sepals subequal, erectopate, oblong-lanceolate, 3.6 cm. long, dorsal sepal broader; petals linear, reflexed, as long as the sepals. Lip oblong, 3.1 cm. long, basal half concave, with two rounded recurved side lobes, edges fimbriate, mid lobe large, orbicular or broadly ovate, not separated from basal part by any constriction, margin undulate; disk with 3 lamellae or ridges. Column c 2 cm. long, curved, slightly winged.

Flowering time - September to November.

Altitudinal range - 1200-1830 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 4 gatherings.

Specimens studied - 2.

Chr. No. $n = 20$ (Mehra & Vij, Taxon, 19:107, 1970).

Remarks - The plant occurring in Nepal belongs to var. *fuscescens* on the character of the side lobes.

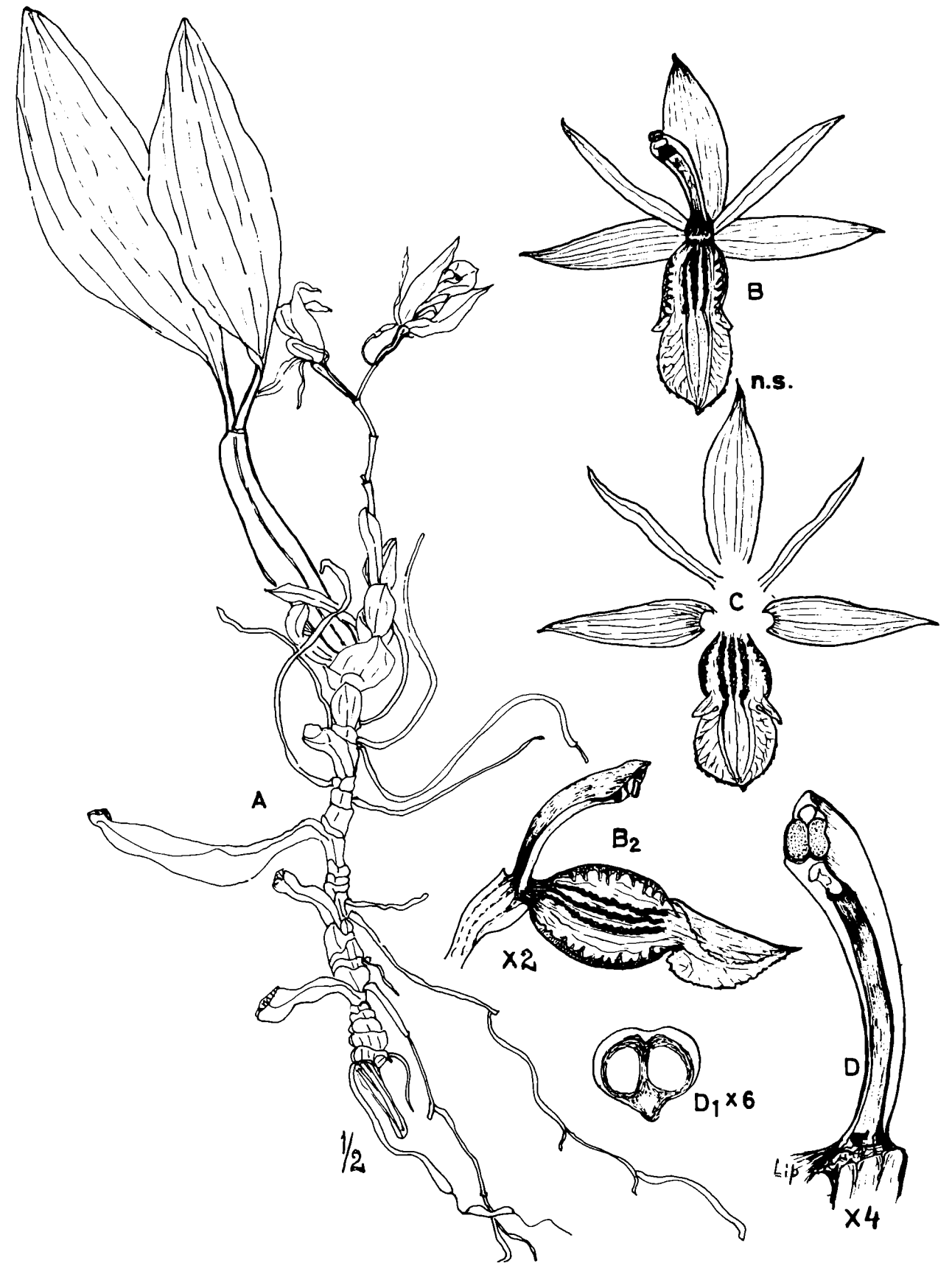


Plate 84

Coelogyne nitida (Wall. mss) Lindl. Coll. Bot. sub t.33, 1822; Seidenf. 29(4):53, t.20, 1975.

= *Cymbidium nitidum* Wall. ex D. Don, Prodr. Fl. Nep. 35, 1825.

= *Coelogyne ochracea* Lindl. : Hk. f. 5:831, 1890; K.&P. 132, t.182, 1898; T. 112, 1966 et 2:183, 1971; Dept. Med. Pl. 2:132, 1969; B. & T. 66:580, t.7, 1969, H. et al. 36, 1978.

Pseudobulbs on a stout rhizome, oblong or cylindrical, 7.5-10 cm. long, furrowed. Leaves petiolate, elliptic-lanceolate, or narrowly oblong, 11.5-17 cm. by 2-3.5 cm. acute; petiole 2.5-6 cm. long, channelled. Scape arising from the base of the old pseudobulbs, base covered by scales, erect, shorter than the leaves but later becoming longer, 6-8 flowered. Flowers white, 3.5-4 cm. in diam.; floral bracts oblong 2.5-3 cm. long, sheathing, longer than the ovary, caducous. Sepals subequal, ovate-lanceolate, 2.6 cm. long, spreading, dorsal sepal broader than the lateral sepals; petals narrower than the sepals, linear-lanceolate, 2.5 cm. long. Lip oblong, constricted near the middle, side lobes large, rounded, incurved, margin serrulate, mid lobe round to oblong, or broadly ovate; disc with two ridges, two confluent yellow spots at the base of the mid lobe. Column 1.4 cm. long, slightly curved, wings gradually expanding upwards.

Flowering time - May-June.

Altitudinal range - 1375-2300 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 12 gatherings.

Specimens studied - 6.

Chr. No. $n = 20$ (Mehra & Vij, Taxon, 19:107, 1970).

Remarks - In some flowers the disc has 3 ridges; some specimens have been collected from a much lower altitude than given in published literature.

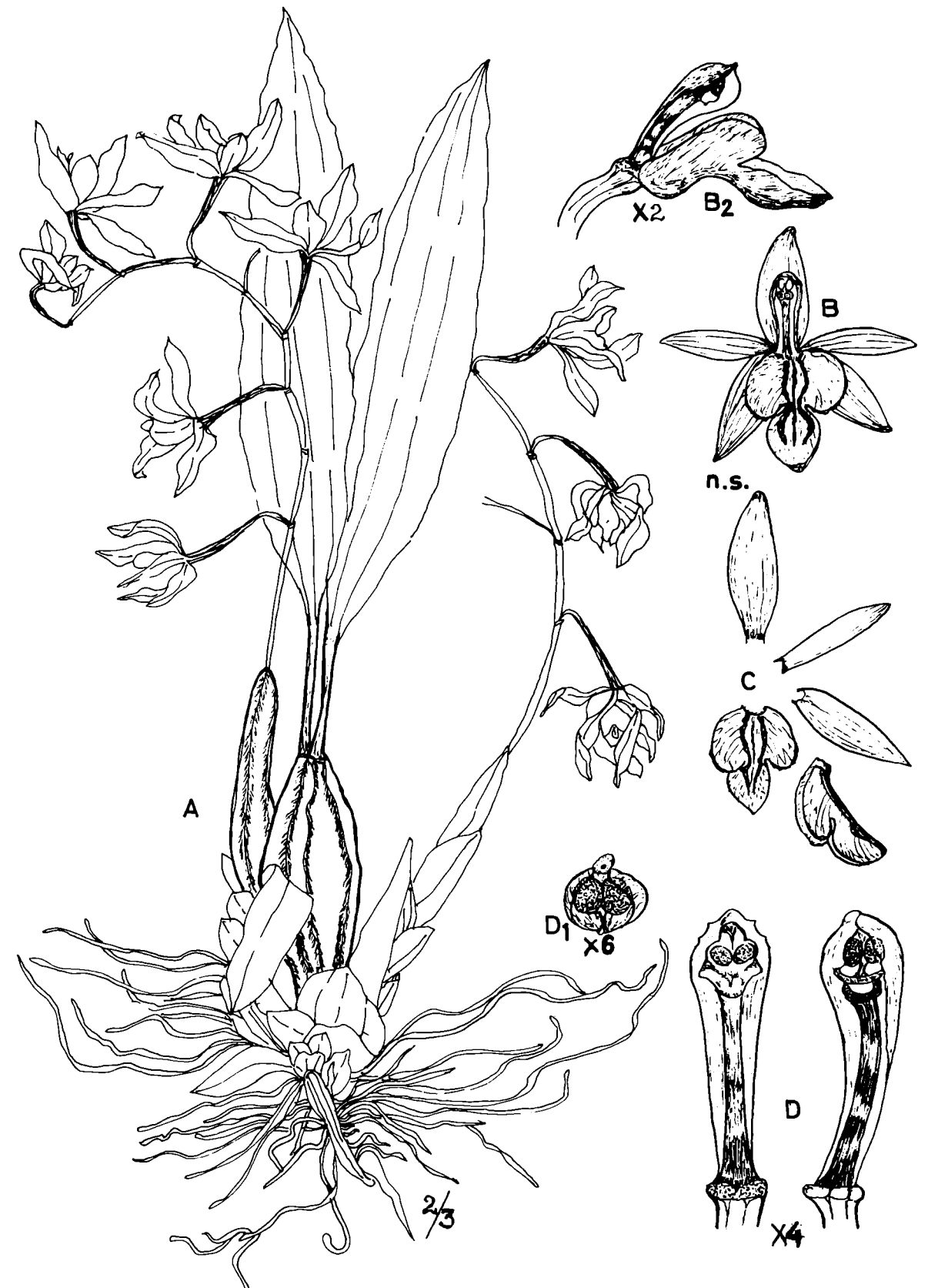


Plate 85

Coelogyne ovalis Lindl. in Edw. Bot. Regist. 24; 91, Misc. 171, 1838; Hk. f. 5:836, 1890; K. & P. 135, t.187, 1898; D. 113, 1906; B. & T. 66:580, t.8, 1969; Seidenf. 29(4):23, t.6, 1975; H. et al. 36, 1978.

Pseudobulbs arising at distances from a stout, sheathed rhizome, long, cylindrical. Leaves shortly petioled, elliptic, oblong, 10-15 cm. by 2-4 cm. tapering at the base; petiole c 1 cm. long. Scape terminal, equalling the leaves, erect, usually 1-3 flowered. Flowers c 5.5 cm. in diam., yellowish brown; floral bracts ovate-lanceolate, coriaceous, 2.8-3.2 cm. long, caducous. Sepals subequal, ovate-lanceolate, 3.5 cm. long spreading dorsal sepal slightly broader; petals filiform or linear, 3.2 cm. long, shorter than the sepals, spreading. Lip oblong, as long as the sepals, lateral lobes narrow, recurved, mid-lobe broadly ovate or broadly oblong, margin and upper surface with stiff black hairs; disc with two lamellae extending from base to apex. Column 1.7 cm. long, slightly curved, wings broadened upwards and crenulate at the top.

Flowering time - September - November.

Altitudinal range - 1370-2135 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 4 gatherings.

Specimens studied - 4.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:107, 1970).

2n = 40 (Mehra & Sehgal, ibid. 29:348, 1980; Mehra & Kashyap, ibid. 30:507, 1981).

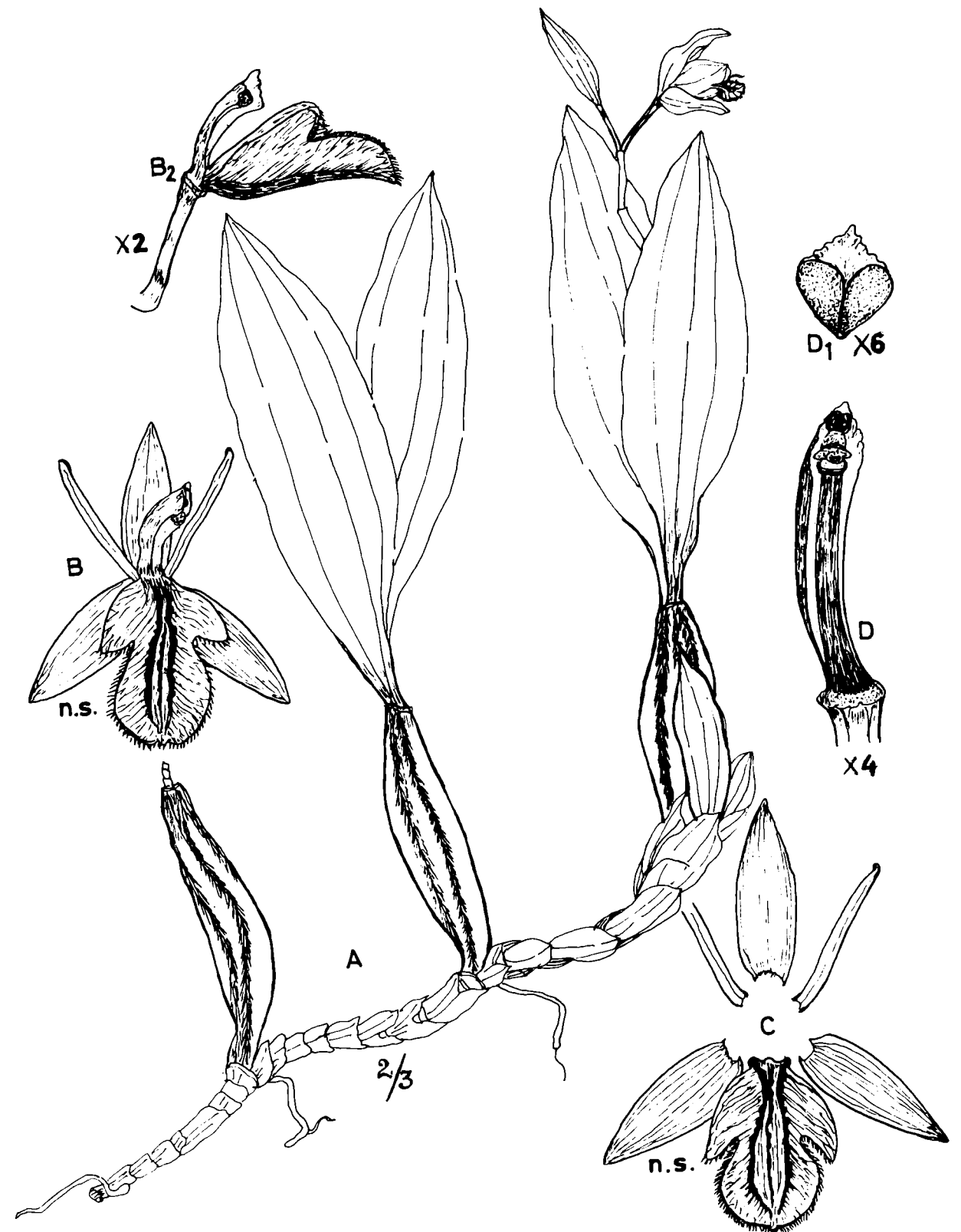


Plate 86

***Coelogyne stricta* (D. Don) Schltr.** In Fedde, Repert. Beih. 4:184, 300, 1919; H. et al. 37, 1978.

= *Cymbidium strictum* D. Don, Prodr. Fl. Nep. 35, 1825.

= *Coelogyne elata* Lindl. : Hk. f. 5:838, 1890; K. & P. 136, t. 188, 1898; D. 114, 1906; T. 429, 1966 et 2:181, 1971; B. & T. 66:578, t. 3, 1969; Herk. 78:118, 1970.

Pseudobulbs arising on a very stout sheathed rhizome, oblong-cylindric, sheathed at the base. Leaves long petioled, narrowly elliptic-oblong, 15-26 cm. by 3-5 cm. narrowed at the base; petiole 3.5-6 mm. Scape arising from the apex of the pseudobulbs, stout, shorter than the leaves or exceeding them, many flowered, imbricate sheaths below the flower. Flowers subsecund, white, c 3.5 cm. in diam., unpleasant smell; floral bracts ovate-elliptic, 1.8 cm. long, longer than the ovary, caducous. Sepals subequal, oblong-lanceolate, 1.9 cm. long, spreading, dorsal sepal broader; petals as long as the sepals, narrower, linear-lanceolate, spreading. Lip shorter than the sepals, oblong, side-lobes narrow, entire, mid lobe rounded ovate, irregularly erose and undulate, base of lip slightly folded inwards; disc with 2 crenulate lamellae extending from base to apex. Column 1.2 cm. long, slightly curved, wing much broadened upwards.

Flowering time - April to May.

Altitudinal range - 1830-2135 m.

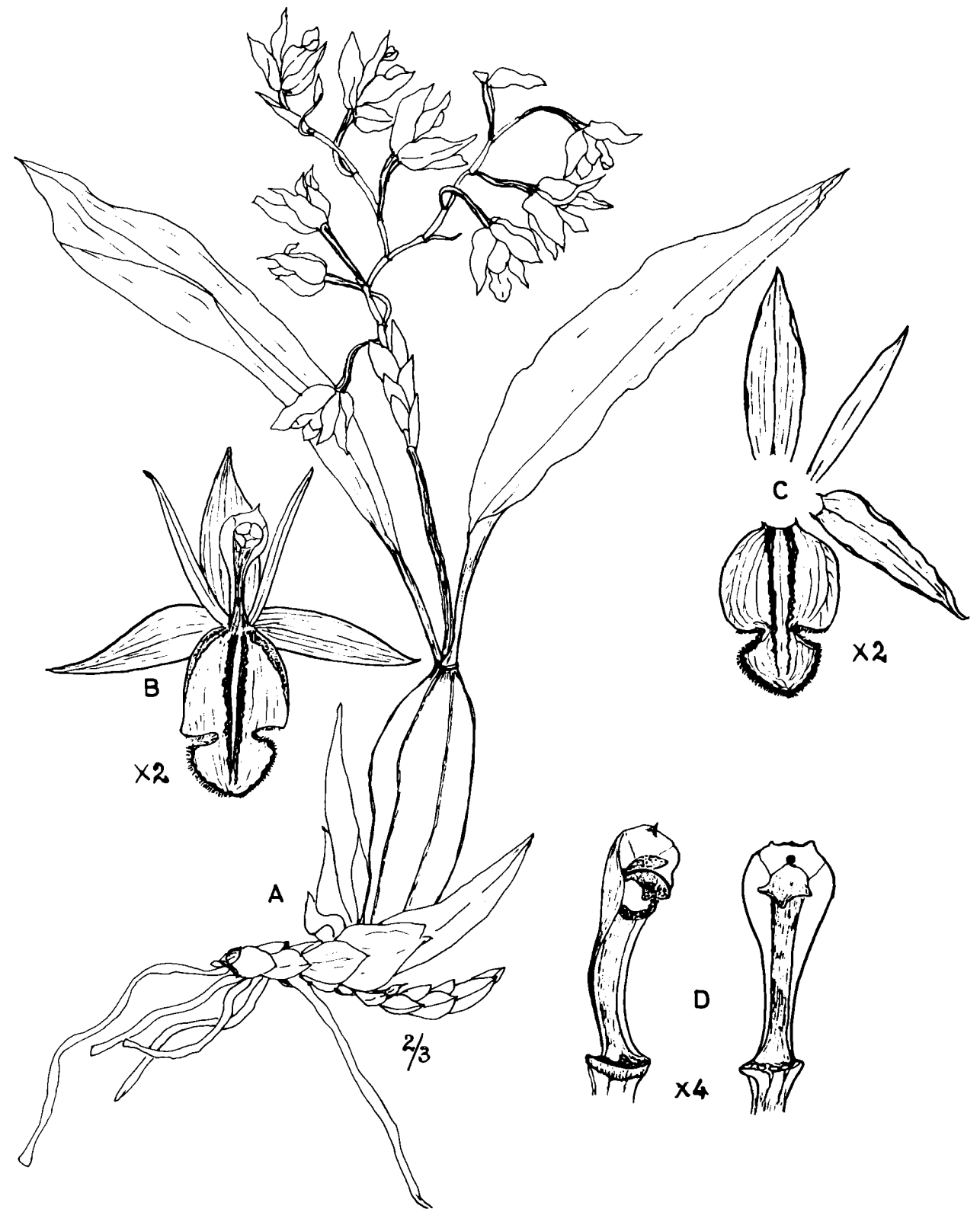
Distributional pattern - central and east Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:107, 1970; et Arora, ibid. 20:785, 1971 as *C. alata*).

2n = 40 (Mehra & Kashyap, ibid. 27:226, 1978 as *C. stricta*).



CRYPTOCHILUS Wall. (Dendrobieae). The name is derived from the lip which is obscured from view by the urceolate calyx. Low epiphytes with crowded pseudobulbs. Leaves 2 or 1, coriaceous. Flowers in a terminal scape, densely and distichously arranged, smaller than the persistent bracts. Sepals connate into an urceolate or gibbous tube; petals narrow; lip included; column erect with the apex dilated and toothed.

Artificial key to the species of *Cryptochilus*

Flowers yellow; calyx-tube urceolate; petals oblique. Pollinia yellow. *luteus*.
 Flowers orange at base, red above; calyx-tube slightly gibbous; petals oblanceolate. Pollinia green. *sanguinous*.

Plate 87

Cryptochilus luteus Lindl. Journ. Proc. Linn. Soc. Bot. 3:21, 1859; Hk. f. 5:827, 1890; K. & P. 163, t.221, 1898; T.430, 1966; B. & T. 68:661, 1972; H. et al. 37, 1978.

Pseudobulbs crowded, oblong or cylindric. Leaves narrowly elliptic, 7.5-13 cm. by 1.2-2.1 cm., tapering into petioles, acute; petioles 1-2.7 cm. long. Scape from a young pseudobulb, peduncle usually long, racemes 4.5-8.5 cm. long. Flowers numerous and dense in two rows, subglobular, yellow; floral bracts linear-lanceolate, much longer than the flowers, persistent. Sepals connate in an equally 3-lobed urceolate tube with the triangular apices free; petals narrow and obliquely rhomboid. Lip oblong, slightly expanded, thickened towards the apex and curved at the base. Column short, bifid at the apex, foot short; rostellum emarginate.

Flowering time - July to September.

Altitudinal range - ± 2300 m.

Distributional pattern - west and central Nepal.

Specimens in Herbarium - 2 gathering.

Specimens studied - 2.

Chr. No. n = 19 (Mehra & Vij, Taxon, 19:107, 1970).



Plate 88

Cryptochilus sanguineus Wall. Tent. Fl. Nep. 36, t.26, 1826; Hk. f. 5:827; 1890; K. & P. 163, t.220, 1898; T.430, 1966; Herk. 79:229, f.297, 1971; B. & T. 68; 661, 1972; H. et al. 37, 1978.

Pseudobulbs crowded, ovoid to elliptic, variable, adult pseudobulb sheathed. Leaves linear-oblong, stoutly petioled, lower ensiform, 14-18 cm. by 2-4 cm.; petiole 1.5 cm. long, scape stout, naked, peduncle longer than the leaves, spike 6.5-12 cm. long. Flowers secund in two rows, not very dense; floral bracts nearly as long as the flowers. Sepals connate into an equally 3-lobed tube, slightly gibbous, puberulous; petals oblanceolate. Lip oblong, slightly deflexed from the curved base, entire. Column stout and short, foot short.

Flowering time - May to July.

Altitudinal range - 1065-1675 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. $n = 19$ (Mehra & Vij, Taxon, 19:107, 1970 et Mehra & Sehgal, ibid. 29-348, 1980).



DENDROBIUM Sw. (Dendrobieae). The name meaning "living on a tree" refers to the epiphytic habit of the genus.

Schlechter estimated the total number of species of *Dendrobium* (in a broad sense) at 900, and of *Eria* at 400, and these two genera to constitute almost the whole of the tribe Dendrobieae. However, there have been some readjustments in the generic limits of *Dendrobium*, and Summerhayes (Kew Bull. 1957) adopted the name *Epigenium* Gagnep. and discarded *Katherinea* Hawkes, and *Sarcopodium* Lindl. considering that *Epigenium*, *Sarcopodium* and *Katherinea* are congeneric. Balakrishnan & Chowdhury (Bull. bot. Surv. Ind. 8:312-328, 1966) feel that *Epigenium* and *Katherinea* are two distinct genera with clear differences.

The genus *Desmotrichium* was established by Blume in 1825 but Pfitzer (Pflanzfam. II, 6:173, 1889) has treated it as a section of *Dendrobium*. This arrangement had been accepted by Schlechter, J.J. Smith, and Holtum although Kranzlin (Pflanzfam. I:343-358, 1910) had restored the genus. For the name *Desmotrichium*, which has been conserved as a genus of the *Phaeophyta*, Hunt & Summerhayes proposed a new name - *Ephemerantha* for the orchid genus (Taxon, 10:102, 1961).

In a broad sense, the characters of the tribe Dendrobieae may be given as plants which are nearly all epiphytic, of sympodial growth, each branch of the sympodium bearing one or more leaves; its stem thin or fleshy throughout or fleshy in part. Leaves of various shape, joined at the base. Inflorescence usually lateral of one to many flowers which sometimes appear singly or in succession; lateral sepals more or less triangular in shape with their bases joined to the column-foot, thus, forming a mentum. Petals are either smaller or larger than the sepals, usually thinner. Lip more or less 3-lobed, the base often long and narrow, joined to the end of the column-foot and sometimes partly to the sides of the column-foot, often with longitudinal keels; column with distinct foot which is often longer than the column. Anthers usually attached at the apex of the column by the filament, pollinia 4, in two pairs, with or without caudicle, and rostellum small.

Dendrobium denudans D. Don.

Plants 15-30 cm. high; many leaved but often the lower leaves deciduous; narrowly oblong. Inflorescence leaf-opposed; flowers 15-20 mm. in diam., sepals not wide spreading; petals smaller than the sepals. Lip much shorter than the sepals, decurved, side lobes serrate or even lacinate, apical lobe with a triangular apex which is much decurved, margin serrate.

Dendrobium floribundum D. Don.

Stem few leaved; leaves linear. Inflorescence longer than the leafing stem, many flowered; flowers light pink; sepals with elongated base; lip oval, more or less flat, margin serrulate.

Dendrobium gibsonii Lindl.

Stem cylindrical, leaves ovate-lanceolate, base rounded. Inflorescence many flowered, pendulous, basal sheaths few and tubular; floral bracts short. Flowers 3-4 cm. across; lip orbicular-reniform, upper surface villose, margin subfimbriate.

Dendrobium parviflorum D. Don.

Stem short; leaves few, lanceolate. Inflorescence many flowered; floral bracts lanceolate, small; flowers small; sepals and petals lanceolate; lip oblong, concave, margin crenulate.

Dendrobium peguanum Lindl.

Pseudobulbs growing as a tuft, globular; leaves two terminal, linear oblong, sessile. Inflorescence terminal, much shorter than the leaves floral bracts equalling or exceeding the ovary; flowers solitary, two or three; lip obovoid-deltoid, decurved about the middle, apical lobe broadly triangular, side lobes narrow margin wavy or serrulate.

Dendrobium pulchellum Roxb. ex Lindl.

Plants with terete stem, c 30-90 cm., pendulous; leaves linear-lanceolate. Flowers 1 or 2 on a very short peduncle arising from leafless stems, white or pale yellow with purple tipped sepals and lip; petals ciliate along the margin, lip orbicular-cordate, base short and convolute, mentum saccate, densely fimbriate.

Artificial key to the species of Dendrobium

- 1 Inflorescence terminal or both terminal and lateral —
 - 2 Stem simple or nearly so, often a small pseudobulb; flowers small; petals not broader than the dorsal sepal —
 - 3 Side lobes of lip strongly inciso-serrate —
 - 4 Racemes many flowered; lip as long as the sepals. *eriaeflorum*.
 - 4* Racemes short, erect, 3-5 flowered; lip shorter than the sepals. *monticola*.
 - 3* Side lobes of lip entire or crenulate; lip brown purple, ovate; bracts equalling the ovary. Plants small. *porphyrochilum*.
 - 2* Stem rather short, tufted, suberect. Flowers solitary or racemose, often large —
 - 5 Mentum as long as the dorsal sepal; mid lobe small, orbicular, fringed with 3 wrinkled ridges. *longicornu*.
 - 5* Mentum large, saccate; lip short, broadly truncate. *bicameratum*.
 - 5** Mentum half as long as the dorsal sepal; mid lobe retuse, apiculate, disk with 2 ridges. *formosum*.
- 1* Inflorescence lateral on the stem or pseudobulb —
 - 6 Stem flattened; leaves shortly ensiform, distichous, imbricating. Flowers on the leafless extremities of the branches, minute, greenish. *anceps*.
 - 6* Stem tufted, elongate, stout or slender, distichous. Flowers usually large in pairs, fascicles or racemes —
 - 7 Mentum short, conical or rounded. Lip not calceolar —
 - 8 Petals as narrow as the sepals or narrower —
 - 9 Lip narrower than broad. Flowers 2.5-3.0 cm. in diam., fragrant. *candidum*.
 - 9* Lip as broad as long. Flowers c 6 cm. in diam. *primulinum*.
 - 8* Petals broader than the sepals. Lip narrower than broad —
 - 10 Flowers 1-3 on a short peduncle; lip recurved, base with sides incurved. *heterocarpum*.
 - 10* Flowers 2-3 on a short peduncle; lip clawed, margin undulate. *amoenum*.
 - 8** Petals much broader than the sepals; lip as long as or broader, margin of lip entire or erose —
 - 11 Lip orbicular, hairy inside; flowers c 5 cm. in diam. *aphyllum*.
 - 11* Lip broad, ovate and pubescent —
 - 12 Flowers c 3.5 cm. in diam.; margin of lip wavy. *crepidatum*.
 - 12* Flowers 6-7 cm. in diam.; base of lip slightly convolute. *nobile*.
 - 7* Mentum short. Lip not calceolare. Stem often swollen at the base—
 - 13 Stem terete. Lip orbicular, margin fimbriate or subfimbriate —
 - 14 Lip deeply fimbriate with a deep purple blotch; flowers c 5 cm. in diam. —
 - 15 Fimbria smooth. *fimbriatum*.
 - 15* Fimbria glochidiate. *hookerianum*.
 - 14* Lip subfimbriate, with 2 brown spots; flowers smaller. *denneanum*.
 - 14** Lip clawed, orbicular, margin toothed; two deep red spots. *chrysanthum*.
 - 13* Stem clavate. Flowers crowded on decurved racemes; petals much broader than sepals —
 - 16 Lip large, funnel-shaped, very hairy. Flowers white or yellow. *densiflorus*.
 - 16* Lip orbicular, lateral folds pubescent. Flowers pink or golden yellow tinted with pink. *farmeri*.
 - 7** Mentum short. Lip calceolare, fimbriate with 2 purple blotches. Flowers light yellow. *moschatum*.

Plate 89

Dendrobium amoenum Wall. ex Lindl. Gen. Sp. Orchid Pl. 78, 1830; Hk. f. 5:738, 1890; K. & P. 49, t.69, 1898; D. 98, 1906; B. & T. 67:14, t.1, 1970; T.2:184, 1971; Herk. 1:290, f.185, 1973; H. et al. 38, 1978.

Stem pendulous, slender, 25-65 cm., thickened at the nodes; leaves oblong-lanceolate, 5.5-11.5 cm. by 7-15 mm. slightly oblique, acute. Flowers 2 or 3 on very short peduncles arising from the nodes of leafless stem, c 3.5 cm. in diam., sepals and petals white with tips darker; bracts on the peduncle imbricate; floral bracts ovate much shorter than the ovary, 4 mm. Sepals oblong-lanceolate, dorsal sepal 2.2 cm. by 5 mm., obtuse, lateral sepals broader; petals larger, broadly ovate, 2.5 cm. by 1.1 cm., obtuse. Lip as long as the lateral sepals, 2.8 cm., oblong-ovate as spread out but side lobes rounded, convolute, margin undulate, terminal lobe orbicular, margin undulate, puberulous on both surfaces, mentum conical, stout. Column 3 mm. long, broad at apex, foot 7 mm. long, tapering, flat in the upper part, two calli in the lower part with a thickened line occupying the centre. Anther minutely papillose.

Flowering time - May to July.

Altitudinal range - 1220-2000 m.

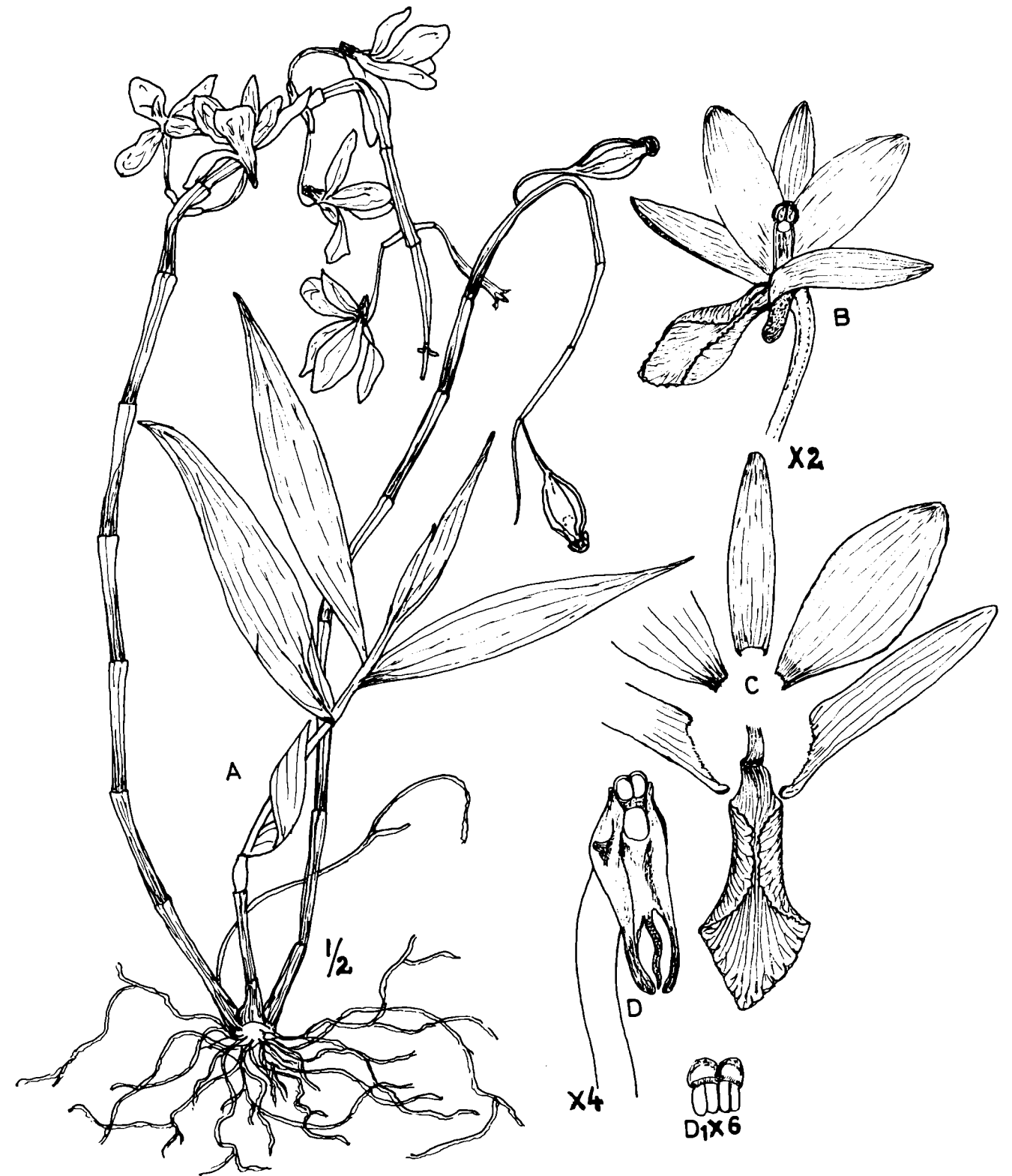
Distributional pattern - east and central Nepal.

Specimens in Herbarium - 18 gatherings.

Specimens studied - 10.

Chr. No. $n = 20$ (Mehra & Vij, Taxon, 19:108, 1970; Arora, ibid. 20:785, 1971; Vij et al. ibid. 25:634, 1976).

Remarks - The edges of the side lobes are also undulate.



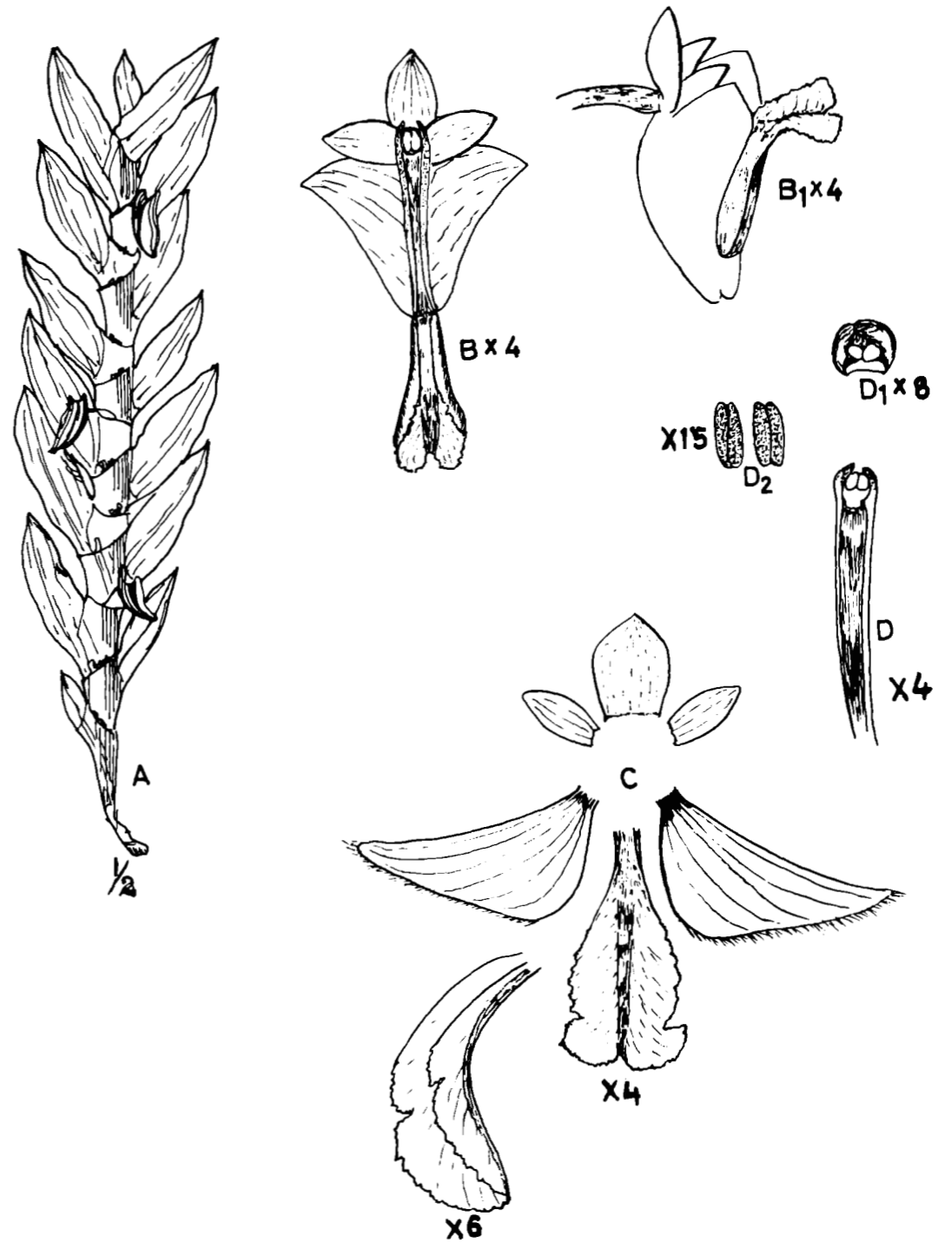


Plate 90

Dendrobium anceps Swartz in Kongl. Vetensk. Acad. Nya. Handl. 21:246, 1800; Hk. f. 5:724, 1890; K. & P. 41, t.54, 1898; B. 19:218, 1964; T. 431, 1966; B. & T. 67:143, t. 2, 1970; H. et al. 38, 1978.

Stem compressed and flattened, 15-40 cm.; leaves fleshy, ovate-lanceolate or lanceolate, 2.5-4.5 cm. by 6-13 mm., striated when dry. Flowers solitary axillary, shortly pedicelled, 1.2 cm. in diam., yellowish-green; floral bracts c 2 mm. long, much shorter than the ovary; sepals unequal, dorsal sepal erect, elliptic, 6 mm. by 4 mm., lateral sepals longer and broader than the dorsal, 8 mm. by 6 mm. at the broad region; petals much shorter than the sepals, broadly elliptic, 5 mm. by 2 mm., blunt. Lip cuneately oblong, obscurely 3-lobed, 1.2 cm. long, concave, margin crenulate all along, mid-lobe with a broad 2-lobed apex; mentum equalling the lateral sepals, blunt. Column flat; foot elongate, 1 cm. long, flat. Anther orbicular with a lip.

Flowering time - April to June.

Altitudinal range - 200-600 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 6 gatherings.

Specimens studied - 4.

Chr. No. $n = 19 + 0 - 2B$ (Mehra & Vij, Taxon, 19:108, 1970).

Remarks - The margin of the lip is crenulate all along and not entire in the lower part as given by King & Pantl. (loc. cit.).

Plate 91

Dendrobium aphyllum (Roxb.) G.E.C. Fischer in Gamble, Fl. Presid. Madras 3:1416, 1973; Herk. 81:359, f. 218, 1973; H. et al. 38, 1978.

= *Limodorum aphyllum* Roxb. Pl. Corom. 1:34, t.41, 1795.

= *Dendrobium pierardii* Roxb. ex Hook. : Hk. f. 5:738, 1890; K. & P. 51, t. 82, 1898; D. 97, 1906; B. 19:218, 1964; T.433. 1966; 2:185, 1971 et 3:140, 1975; B. & T. 67:145, 1970.

Stems pendulous, slender, 20-40 cm. long, slightly swollen at the nodes; leaves sessile, lanceolate to ovate-lanceolate, 5-8 cm. by 1.5-2.5 cm. acuminate, caducous. Flowers 4-4.5 cm. in diam., solitary or 2 or 3 from short peduncles arising at nodes of leafless stem; bracts of peduncles minute, often caducous; floral bracts c 3 mm. long, much shorter than the ovary. Sepals subequal, oblong-lanceolate, subacute, purple, dorsal sepal 2.4 cm. by 7 mm., lateral 2.7 cm. by 6 mm.; petals broader than the sepals 1.1 cm., oblong or elliptic-oblong, blunt. Lip orbicular, cuculate, 3 cm. long and 2.1 cm. broad, claw short, convolute forming a tube near the base, fimbriate in the lower part and erose margin at the upper part, surface pubescent and yellow, mentum short, 4 mm. Column broad, 4.5 mm. long, foot 4.5 mm. with transverse nectary. Anther with curved lip.

Flowering time - April to May.

Altitudinal range - 200-1220 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 12 gatherings.

Specimens studied - 6.

Chr. No. n = 19 (Mehra & Kashyap, Taxon, 28:407, 1979; Mehra & Sehgal, ibid. 29:343, 1980).
2n = 38 (Sarkar et al., ibid. 27:520, 1978 as *D. pierardii*).

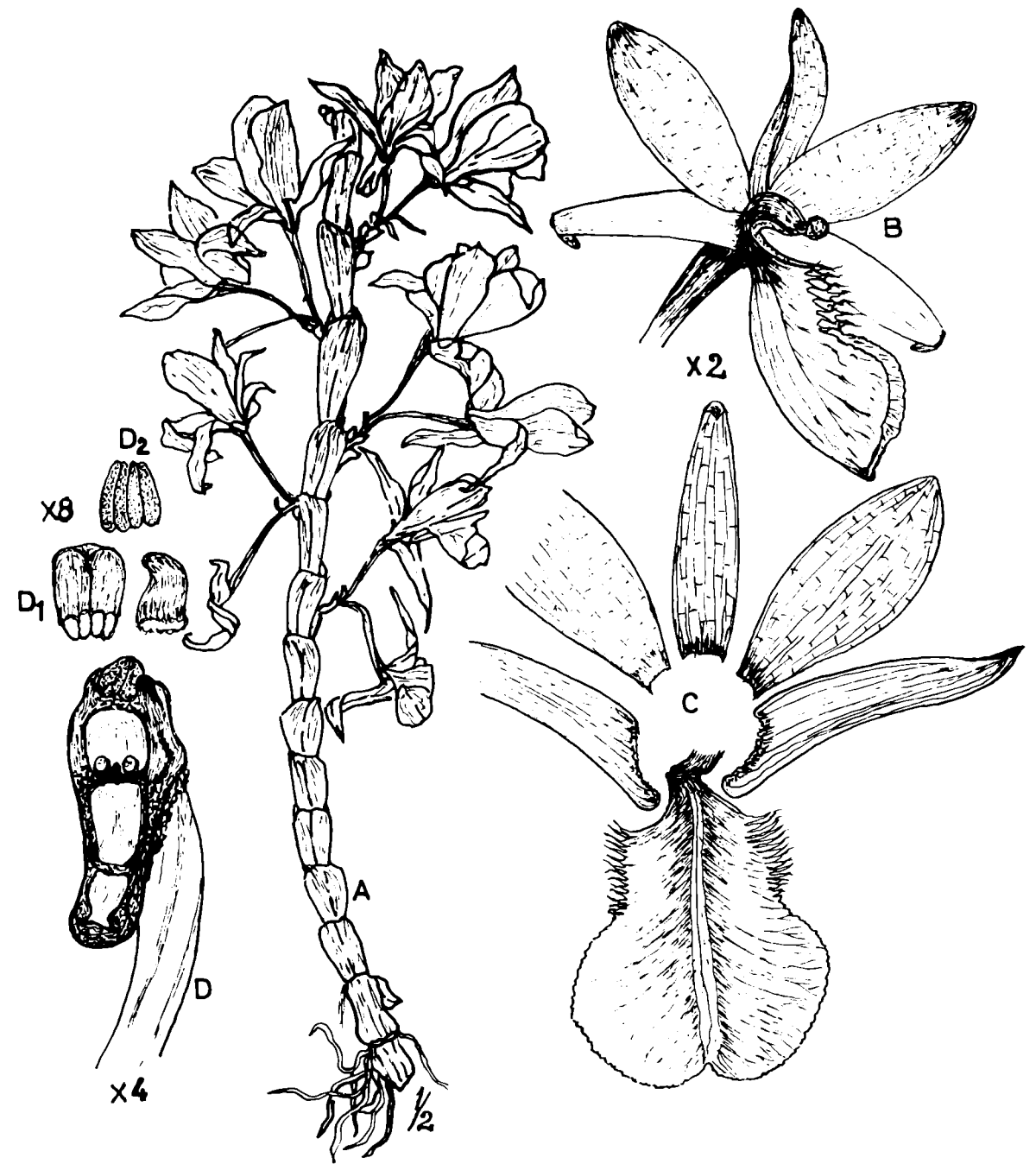


Plate 92

Dendrobium bicameratum Lindl. in Edw. Bot. Regist. 25, Misc.:59, 1839; Hk. f. 5:729, 1890; K. & P. 42, t.56, 1898; D. 95, 1906; Dept. Med. Pl. 2:132, 1969; H. et al. 39, 1978.

Stem clavate, fusiform or usually elongate, 10-40 cm. Leaves elliptic-oblong to elliptic-lanceolate, 7-10 cm. by 1.8-2 cm., apex obliquely bifid. Flowers .9-1.2 cm. in diam., densely crowded on a short rachis forming a capitate raceme, either lateral or subterminal; floral bracts c 3 mm. long, shorter than the ovary, sheathing. Sepals unequal, concave, yellow, dorsal sepal ovate-lanceolate 7 mm. by 3 mm., lateral sepals triangular, 6 mm. by 6 mm.; petals ovate-lanceolate, equalling the sepals, yellowish with purple spots and stripes. Lip small, fleshy, broadly triangular or flattening, 5 mm. long, 3-lobed, side lobes spreading, triangular, erect acute, pink, mid lobe small, truncate, fleshy; disc caruncled, yellow; mentum urceolate. Column short, 2 mm. long, foot 3 mm. long, 3 lamellate. Anther 2 mm. long, pollinia 1 mm. long.

Flowering time - July - August.

Altitudinal range - ± 2135-2440 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. n = 19 (Vij et al. Taxon, 25:634, 1976).

2n = 38 (Arora, Taxon, 17:199, 1968 and
also 2n = 38 Mehra & Kashyap, ibid. 27:226, 1978).

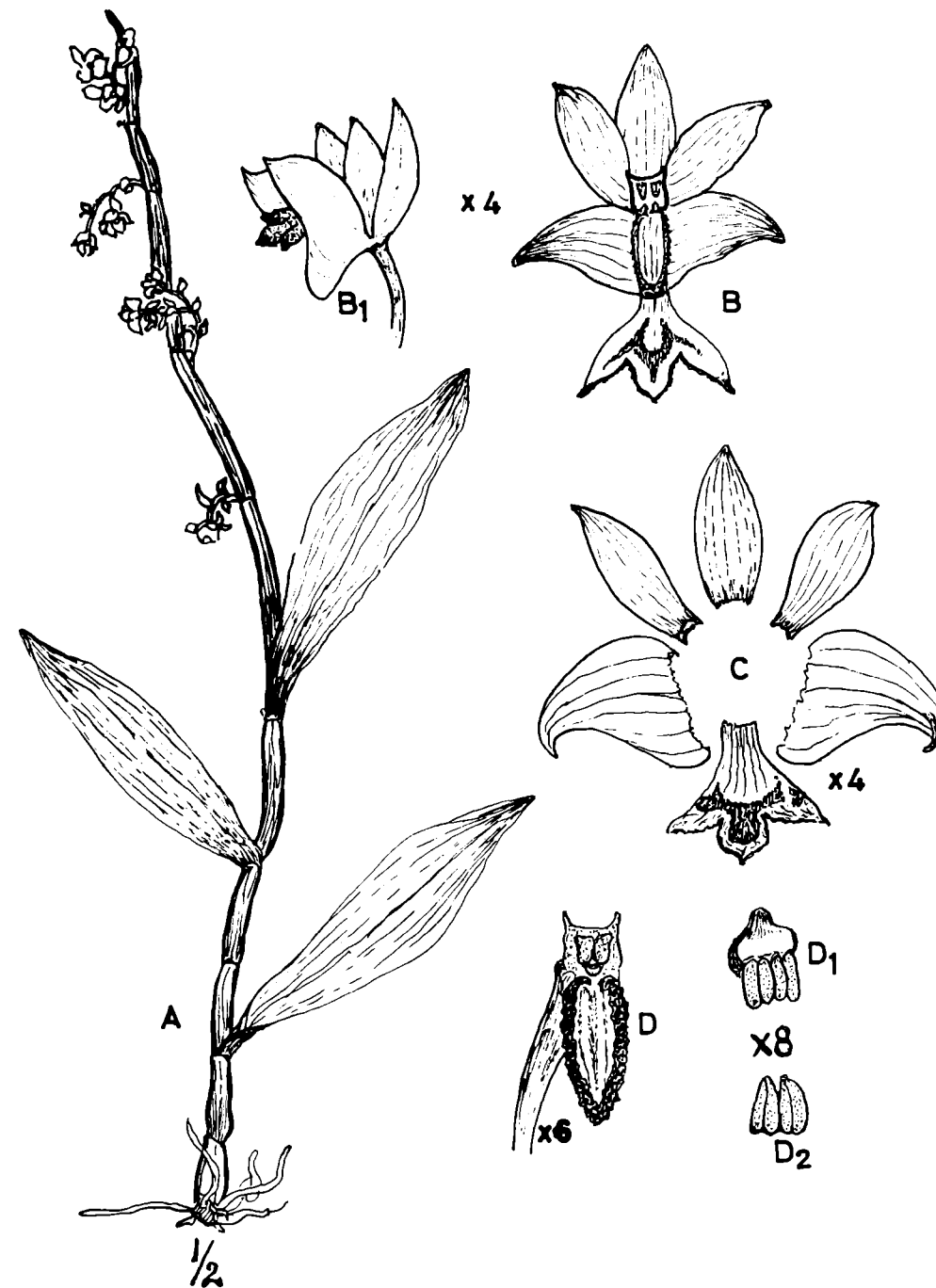


Plate 93

Dendrobium candidum Wall. ex Lindl. in Edw., Bot. Regist. 24, Misc., 54, 1838; Hk. f. 5:735, 1890; K. & P. 49, t.68, 1898; D.100, 1906; T. 431, 1966; B. & T. 67, 143, 1970; Herk. 81:320, f.195, 1973; H. et al. 39, 1978.

Stem slender, flexuous, cylindric 15-25 cm., erect; leaves lanceolate, 5-8 cm. by .6-1.2 cm., apex obtuse and obliquely bifid. Flowers c 3.5 cm. in diam. on leafless stem, 2-3 on a short peduncle, white, fragrant, sheaths of peduncle c 6 mm. hyaline; floral bract 8 mm. long, shorter than the ovary. Sepals unequal, dorsal oblong, 2 cm. by 5 mm., lateral sepals broadly lanceolate, subfalcate, 2 cm. by 7 mm.; petal similar to sepals but broader, 8 mm., apex more acute. Lip as long as the sepals, oblong-lanceolate or narrowly trapeziform with cuneate base and apex abruptly acute, 1.9 cm. long, side lobes near the middle, incurved, rounded; disc with an elongated callus; mentum broad and short. Column short, c 4 mm. long, foot broad, deeply excavated, c 4 mm. Anther large and suborbicular.

Flowering time - April to May.

Altitudinal range - ± 2135-2300 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 2.

Chr. No. n = 19 (Malla et al. Taxon, 26:444, 1977).

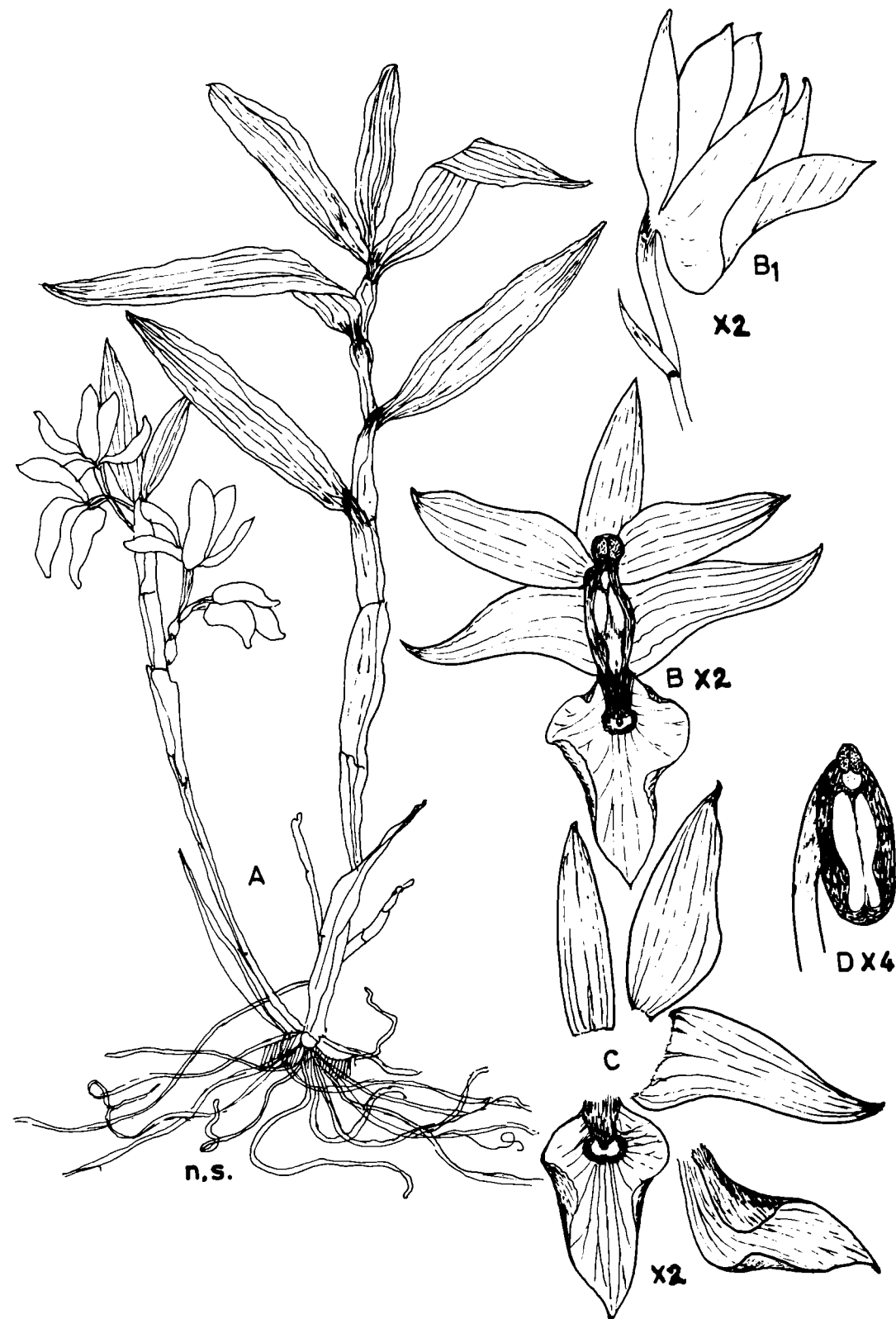


Plate 94

Dendrobium chrysanthum Wall. ex Lindl. in Edw., Bot. Regist. 15 : t.1299 et Gen. Sp. Orchid Pl. 80, 1830; Hk. f. 5:747, 1890; K. & P. 55, t.77, 1898; D. 102, 1906; B. & T. 67:143, t. 3, 1970; T. 2:184, 1971; H. et al. 39, 1978.

Stems pendulous, 60-80 cm., ribbed; leaves caducous, lanceolate, 7.5-17 cm. by 2.1-3.5 cm., acuminate, base round and sheathing. Flowers rather fleshy, yellow, 3.5-4.5 cm. in diam., in fascicles of 2-4 on very short peduncles arising on leafy as well as leafless stems; bracts small; floral bracts c 4 mm. long, scarious. Sepals subequal, concave, fleshy, dorsal ovate-oblong 2.3 cm. by 1 cm., obtuse, lateral sepals ovate-lanceolate 2.2 cm. by 9 mm., subfalcate, obtuse; petals ovate-orbicular, 2.3 cm. by 1.8 cm., concave, erose. Lip orbicular-oblong or reniform, 2.1 cm. by 2 cm., concave and folded along the margins, sub-fimbriate, two deep purple spots in the middle, pubescent, abruptly clawed; mentum short and wide. Column broad and concave 5 mm. long; foot 4 mm. long with a transverse ridge at the lower end. Anther 3 ridged on the anterior surface; pollinia oblong, 1.5 mm. long.

Flowering time - August to October.

Altitudinal range - 1375-1675 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 6 gatherings.

Specimens studied - 4.

Chr. No. n = 20 (Mehra & Sehgal, Taxon, 25:646, 1976).

2n = 38 (Vij et al. Taxon, 25:634, 1976;

also 2n = 40 Mehra & Kashyap, ibid. 27:226, 1978).

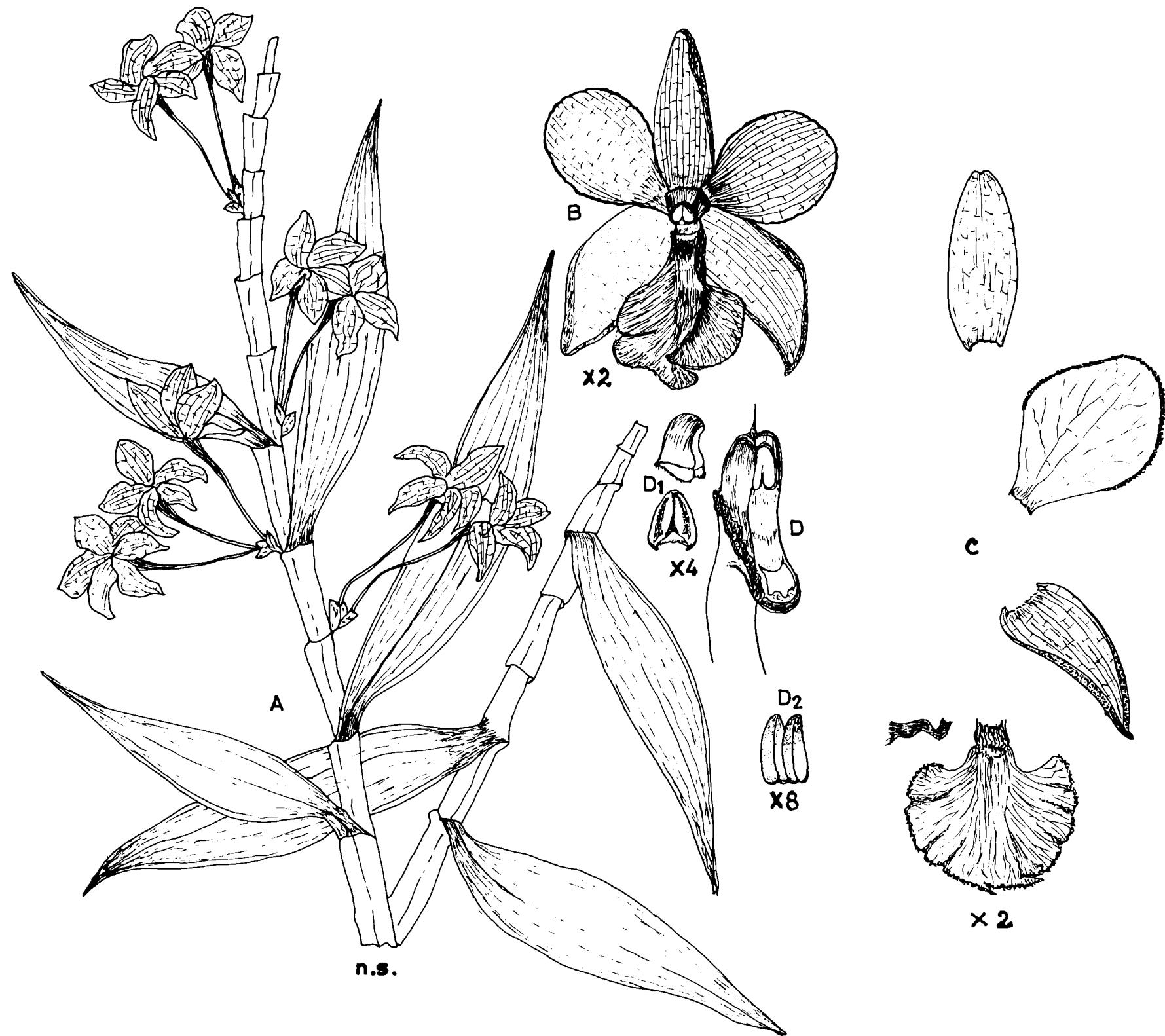


Plate 95

Dendrobium crepidatum Lindl. & Paxton, Fl. Gard., 1:63, 1850-51; Hk. f. 5:740, 1890; K. & P. 48, t.66, 1898; D. 99, 1906; B. & T. 67:143, t.4, 1970; Herk. 81:320, f.196, 1973; H. et al. 39, 1978.

Stem pendulous, 15-20 cm., striated, thin loose scarios sheaths over the old parts; leaves linear-lanceolate or lanceolate, 4.5-11.5 cm. by 8-12 mm., acuminate. Flowers 2-2.5 cm. in diam., solitary, 2 or 3 on short peduncles arising on leafless stems at swollen nodes, pinkish or white, waxy; pedicel purplish; bracts small. Sepals subequal, dorsal sepal oblong, 1.1 cm. by 4 mm., erect, lateral sepals broader, obtuse; petals obovate, equalling the sepals but broader. Lip broadly obovate or orbicular 1.4 cm. by 9 mm., shortly clawed, a transverse ridge at the claw, margin wavy, ciliolate; mentum short. Column 3 mm. long and 4 mm. broad, very short, foot c 2 mm., curved at the lower end, excavated.

Flowering time - April - May.

Altitudinal range - c 900 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

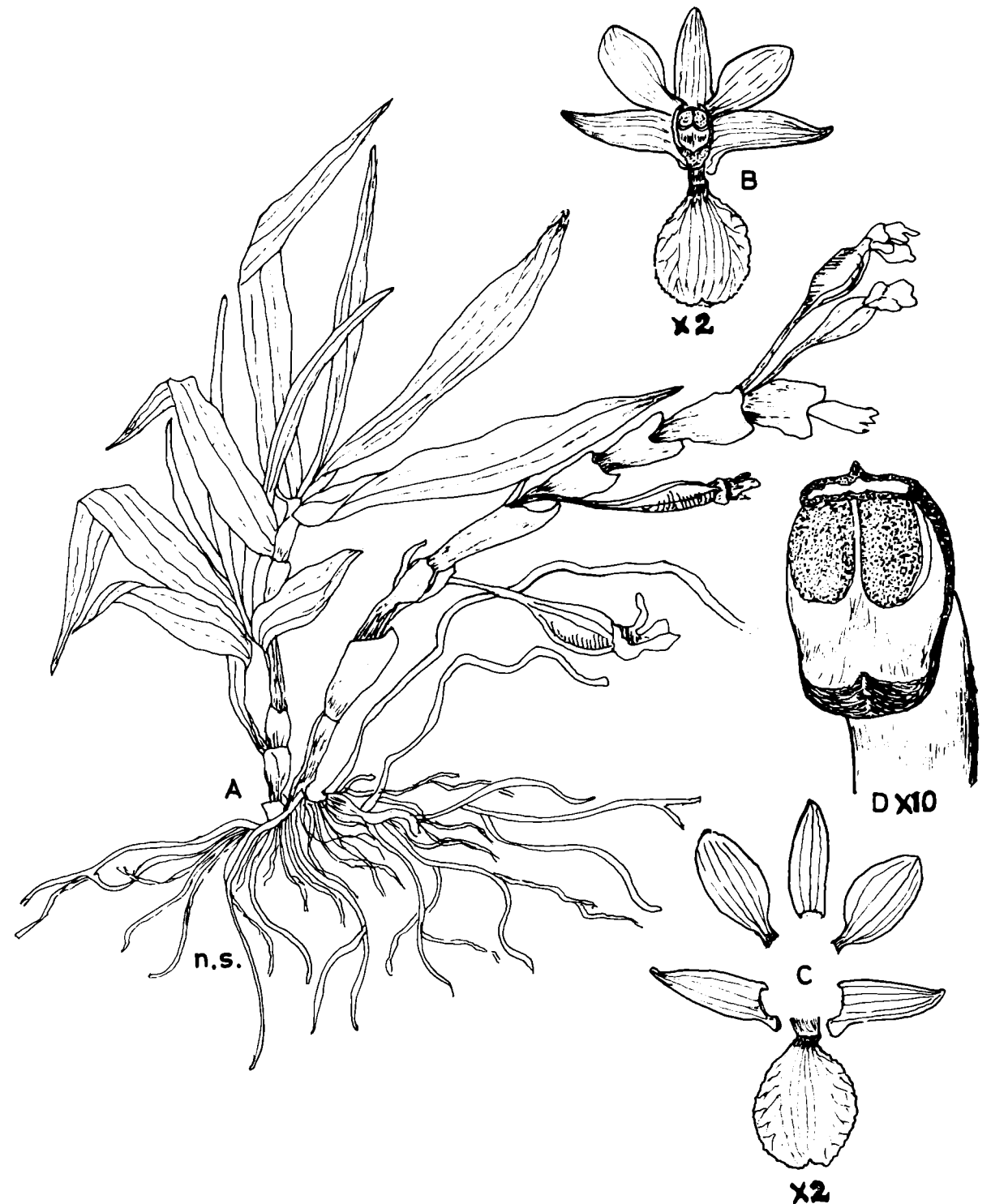


Plate 96

Dendrobium denneanum Kerr. in J. Siam Soc., Nat. Hist. Suppl. 9:229, 1933; H. et al. 39, 1978.

= *D. clavatum* Wall. ex Lindl. : Hk. f. 5:746, 1890; K. & P. 53, t. 60, 1898; D. 100, 1906; B. & T. 67:143, 1970; Herk. 81:357, f. 219, 1973.

Stems stout, 40-65 cm., leafy stem smooth while the leafless one vertically ridged; leaves narrowly oblong, 8.5-13.5 cm. by 1.8-3 cm., coriaceous, apex slightly notched. Flowers few, large 4.5-5.5 cm. in diam., glossy, yellow on racemes from leafless stems; racemes 8-13 cm. long decurved bearing several tubular membraceous sheaths; floral bracts oblong, 2.1-2.4 cm. long shorter than the ovary. Sepals subequal, dorsal sepal oblong, 2.2 cm. by 1.1 cm., acute, lateral sepals oblong and subfalcate, 2.7 cm. by 1 cm., acute; petals broader than the sepals, broadly ovate, 2.3 cm. by 1.3 cm., rounded. Lip orbicular reniform with a narrow and slightly convoluted lower part which leads to a claw, 2.4 cm. long, anterior part expanded, margin fimbriate and undulate, apex retuse, upper surface tomentose and with a dark purple reniform patch, lower part slightly raised in the middle, margin entire; mentum short. Column 5 mm. long; foot 4 mm. long with a nectary at the base. Anther 4 mm. long with a conical cap; pollinia 2 mm. long.

Flowering time - June.

Altitudinal range - c 2135 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. n = 19 (Mehra & Vij, Taxon, 19:108, 1970; Malla et al., ibid, 27:519, 1978 as *D. clavatum*

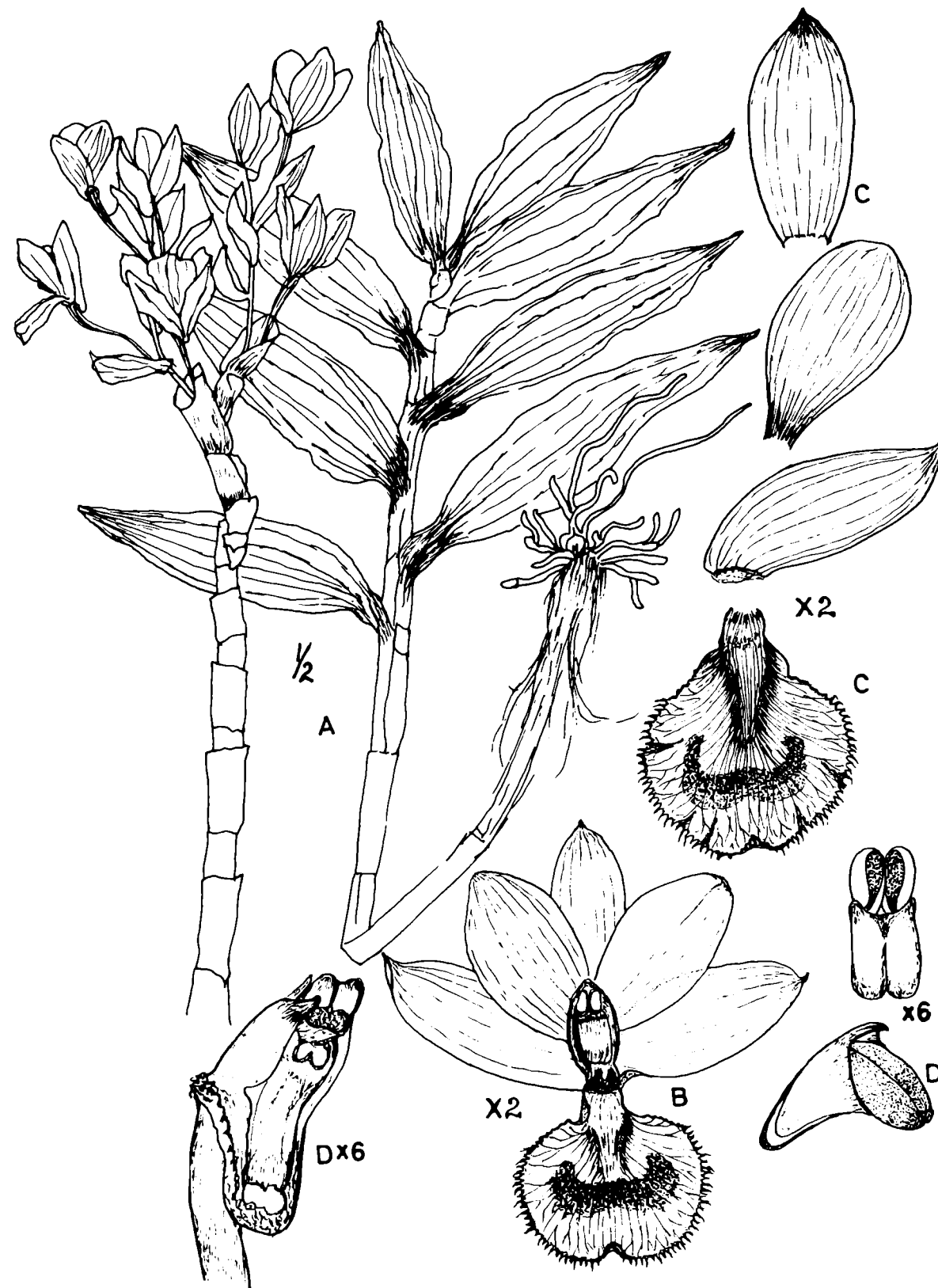


Plate 97

Dendrobium densiflorum Lindl. in Wall., Pl. Asiat. Rarior. 1:34, t.40, 1830; Hk. f. 5:748, 1890; K. & P. 56, t.79, 1898; Kit. 102, t.11, 1955; T. 432, 1966, et 2:184, 1971; Herk. 81:58, f.37, 1973; H. et al. 39, 1978.

Stem pendulous, clavate, faintly 4angled, 20-45 cm.; leaves oblong-lanceolate to ovate-lanceolate, 10-16 by 2-5 cm., subterminal, narrowed at the base, acute. Flowers densely crowd on a raceme; 3-4 cm. in diam., light yellow; peduncle stout, decurved, 12-24 cm., long; floral bracts 1.5-1.7 cm. long, oblong, twisted, margins revolute, membranous. Sepals subequal, concave, dorsal sepal ovate-elliptic, 1.8 cm. by 1.1 cm., obtuse, lateral sepals oblong or oblong-elliptic, 2.1 cm. by 1 cm. obtuse; petals ovate-orbicular, 1.7 by 1.5 cm., erose. Lip large, funnel-shaped or orbicular-rhomboid, 2.1 cm., orange yellow, base abruptly narrowed to a short claw, basal half convolute, apical half spreading with retuse apex, entire surface pubescent, margin fimbriate and slightly revolute; mentum large and round. Column broad, 4 mm. long with a large concavity; foot 5 mm. long, concave and with nectaries. Anther cone-like.

Flowering time - April.

Altitudinal range - 1000-1830 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 4 gatherings.

Specimens studied - 4.

Chr. No. $n = 20 + 1 - 2B$ (Mehra & Vij, Taxon, 19:108, 1970;
also $n = 20$ Mehra & Sehgal, ibid. 25:646, 1976).

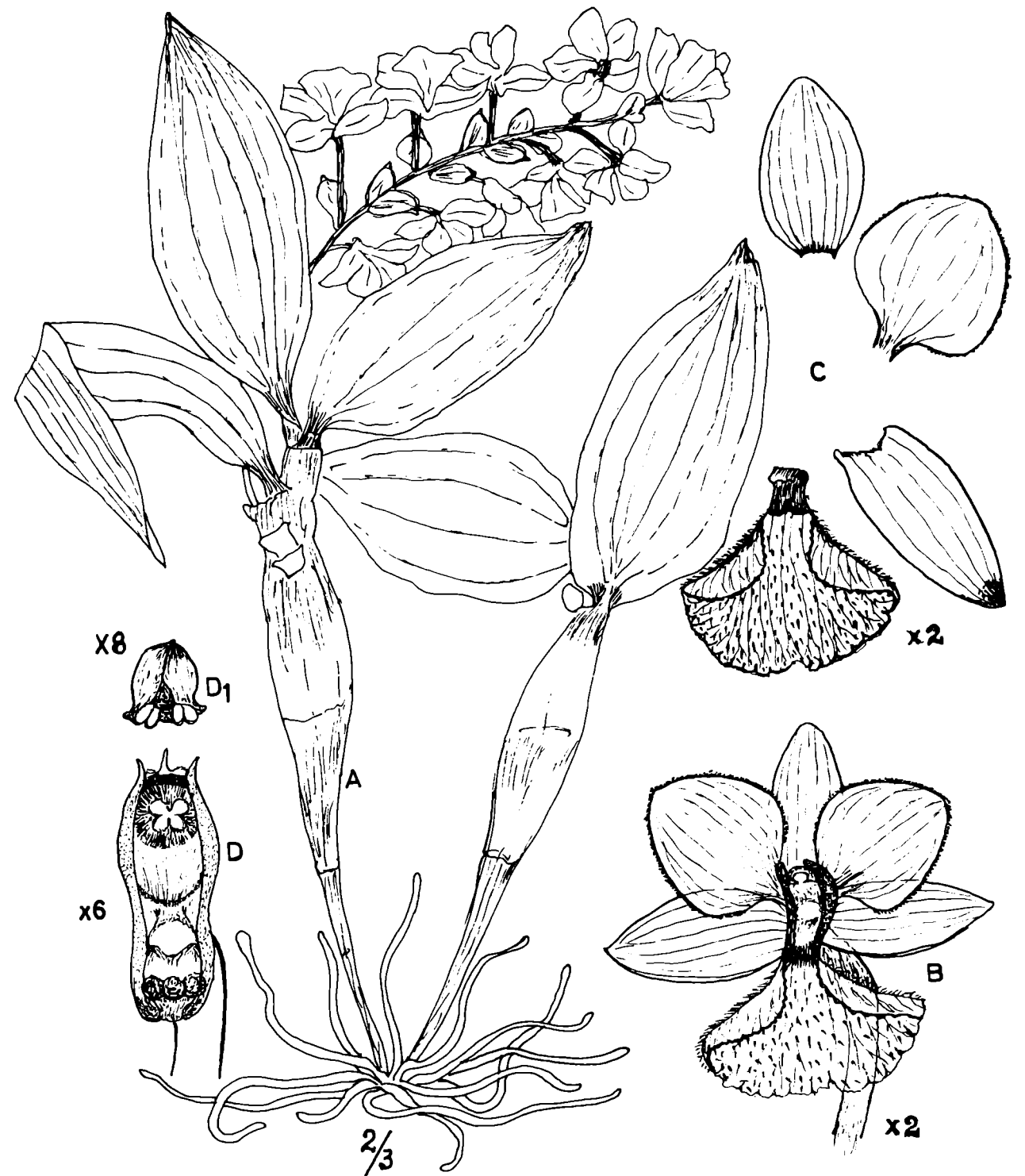


Plate 98

Dendrobium eriaeflorum Griff, Icon. Pl. Asiat. t.307, 1851; Hk. f. 5:715, 1890; K. & P. 44, t.61, 1898; T.432, 1966, 2:184, 1971 et 3:140, 1975; B. & T. 67:144, 1970 et 73:151, 1975; H. et al. 39, 1978.

Stem erect, 5-19 cm., thick at the base; leaves linear-lanceolate, oblique, 2.5-5 cm. by 5-10 mm. broad, apex blunt or notched. Flowers many, nodding, 1.5-1.8 cm. in diam., light yellow, white or pinkish with purple veins, on leaf opposed axillary racemes which exceed the length of leaves; floral bracts lanceolate, minute, much shorter than the ovary. Sepals unequal, dorsal sepal lanceolate 8 mm. by 2 mm., lateral sepals larger 8 mm. by 4 mm. broad at base, falcate, acute; petals linear-lanceolate equalling the sepals but much narrower 1 mm., parallel to the column. Lip broadly oblong-ovate, sessile, curved from the narrow base, very concave, 7 mm long, side-lobes narrow, inciso-serrate, mid lobe shorter, much recurved with a mesial crest from base to apex, inciso-serrate; mentum incurved and obtuse. Column 2 mm. long; foot at right angles, 6 mm. long.

Flowering time - July to September.

Altitudinal range - 1300-2300 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 10 gatherings.

Specimens studied - 10.

Chr. No.

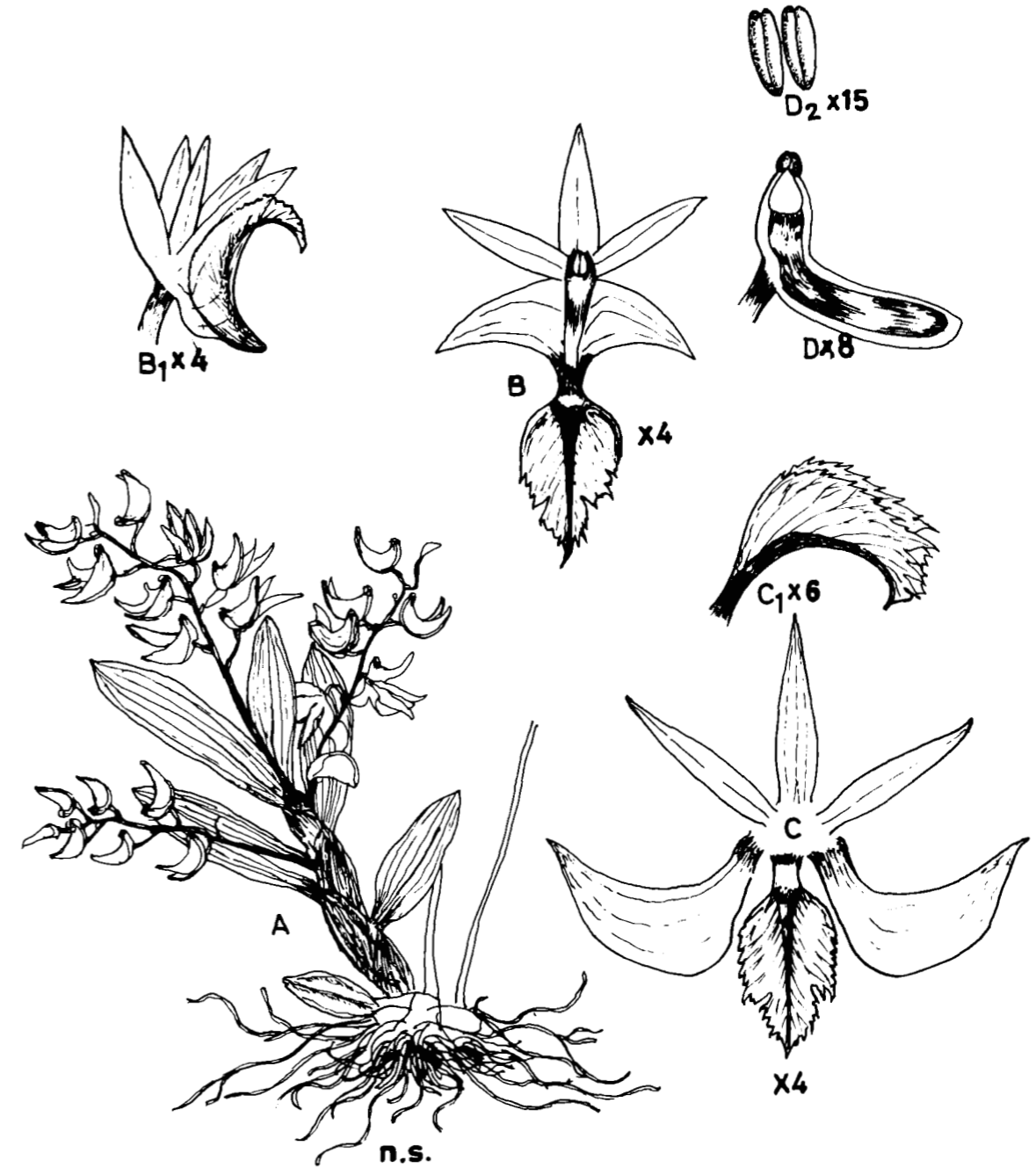


Plate 99

Dendrobium farmeri Paxton, Mag. Bot. 15:241, 1849, et Fl. Gard. 3:104, 1852; Hk. f. 5:750, 1890; K. & P. 57, t.80, 1898.

Stem erect, clavate, 20-40 cm., 4-5 grooved narrower in lower part; leaves 2-3, oblong-lanceolate or elliptic-lanceolate, 15 cm. by 6.5 cm., subterminal, base slightly narrow, coriaceous, striate. Flowers many, c 5 cm. in diam., light purple to white, laxly on subterminal, decurved and pendulous racemes, much longer than the leaves; floral bracts 7-9 mm., much shorter than the ovary. Sepals unequal, dorsal sepal ovate-oblong, 2.3 cm. by 1 cm., slightly concave, rounded, lateral sepals elliptic-oblong, 2.6 cm. by 1.2 cm. acute; petals much broader than the sepals, broadly ovate, shortly stalked, 2.3 cm. by 1.7 cm., erose. Lip orbicular with a small claw and lateral margin inflexed, 2.1 cm. by 1.2 cm., surface pubescent, yellow, margin of the lower half fimbriate while the upper half erose; mentum short and rounded. Column short, 4 mm. long; foot shorter c 3 mm.

Flowering time - April.

Altitudinal range - \pm 600 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

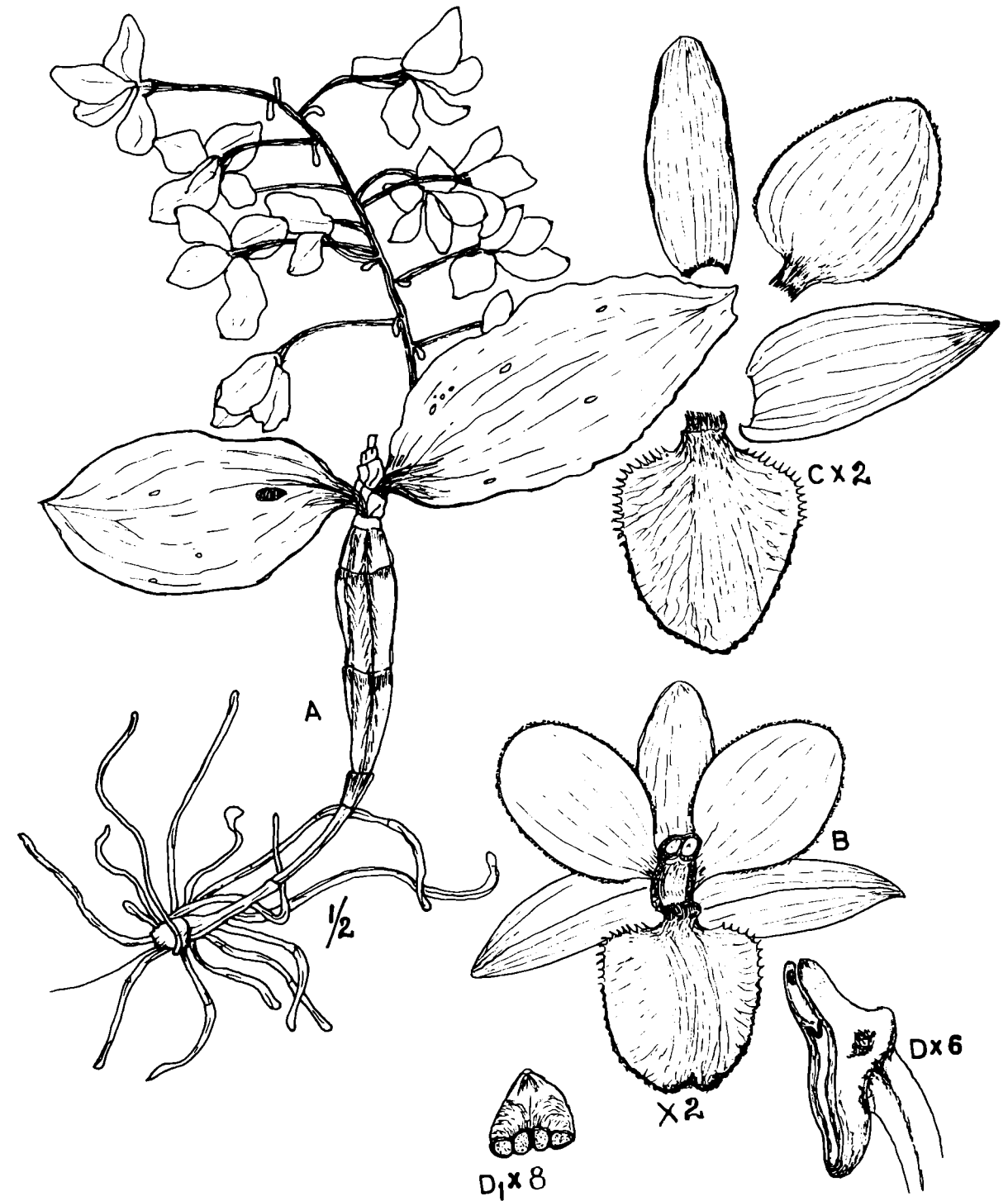


Plate 100

***Dendrobium fimbriatum* Hk.**, Exot. Fl. 1:t.71, 1823; f. 5:745, 1890; K. & P. 58, t.82, 1898; D. 102, 1906; Herk. 82:69, f.32, 1974 (var. *oculatum*), H. et al. 39, 1978.

Stem suberect, 45-70 cm., slightly thickened at the nodes; leaves oblong-lanceolate, 7.5-14.5 cm. by 1.6-2.7 cm., narrow at the base. Flowers 7-12 of 4.5-5.5 cm. diam. on a long, pendulous raceme arising from leafy stems; floral bracts small, 4 mm. long. Sepals subequal, yellow, dorsal sepal elliptic-oblong 2.2 cm. by 1 cm., rounded, entire, lateral sepals oblong, 2.4 cm. by 9 mm. rounded, entire; petals broader than the sepals, suborbicular, 2.3 cm. by 1.5 cm., erose, yellow. Lip orbicular, 2.7 cm. by 2.3 cm., undulate, equally deeply fimbriate, golden yellow with an orbicular dark purple blotch in the centre, base truncate and shortly clawed; mentum broad, rounded, 4 mm. Column broad, 4 mm. long; foot 3 mm. long, nectary sub-orbicular at the lower end. Anther obliquely conical; pollinia 2 mm. narrowly oblong.

Flowering time - April, rarely June.

Altitudinal range - 1375-2135 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 5 gatherings.

Specimens studied - 5.

Chr. No. $n = 20$ (Arora, Taxon, 20:785, 1971).

$2n = 38 + 2B$ (Vij et al. *ibid.* 25:640, 1976).

Remarks - Some of the specimens have smaller flowers. The deep coloured blotch on the lip is smaller in size in some flowers. Probably flowers without a blotch are rare, so that, the typical form as described by Hk. f. does not occur in Nepal.

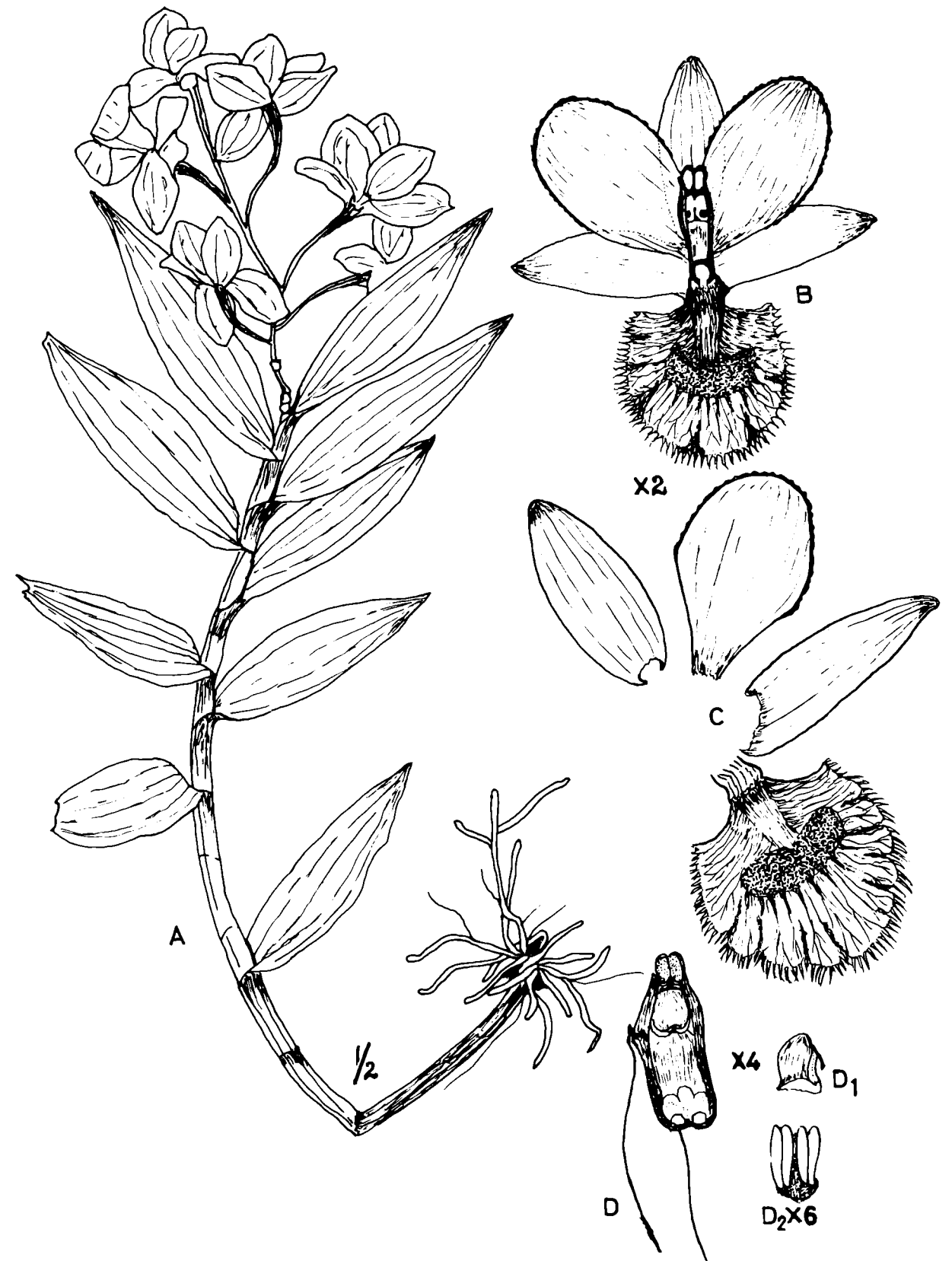


Plate 101

Dendrobium formosum Roxb. ex Lindl. in Wall Pl. Asiat. Rarior, 1:34, t.39, 1830; Hk.f. 5:721, 1890; K. & P. 47, t.65, 1898; B. & T. 67:144, 1970; Herk. 81:186, f.122, 1973; H. et al. 39, 1978.

Stem stout, erect, 20-40 cm., sheaths pubescent; leaves oblong, 6.5-11.5 by 2-3 cm., semi-amplexicaule. Flowers white, 7.5-8.5 cm. in diam., few on short terminal or lateral erect racemes; floral bracts ovate, c 5 mm. long, much shorter than the ovary, sheathing. Sepals subequal, dorsal sepal elliptic-oblong, 4.5 cm. by 1.4 cm. erect, slightly concave, lateral sepals oblong-lanceolate, 2.5 cm. by 1.6 cm., subfalcate, keeled, spreading; petals suborbicular, 5 cm. by 3.3 cm., cuspidata, undulate. Lip broadly obovate or obcuneate, 6 cm. long, side lobes rounded, entire, mid lobe dilated, apex broad, retuse, minutely mucronate, undulate (not fimbriate); disc with two yellow tubercled ridges; mentum conical, 2 cm. long. Column broad, c 8 mm. by 8 mm.; foot long, contracted at apex. Anther quadrate; pollinia narrowly oblong, 2.5 mm.

Flowering time - June.

Altitudinal range - ± 660 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No.

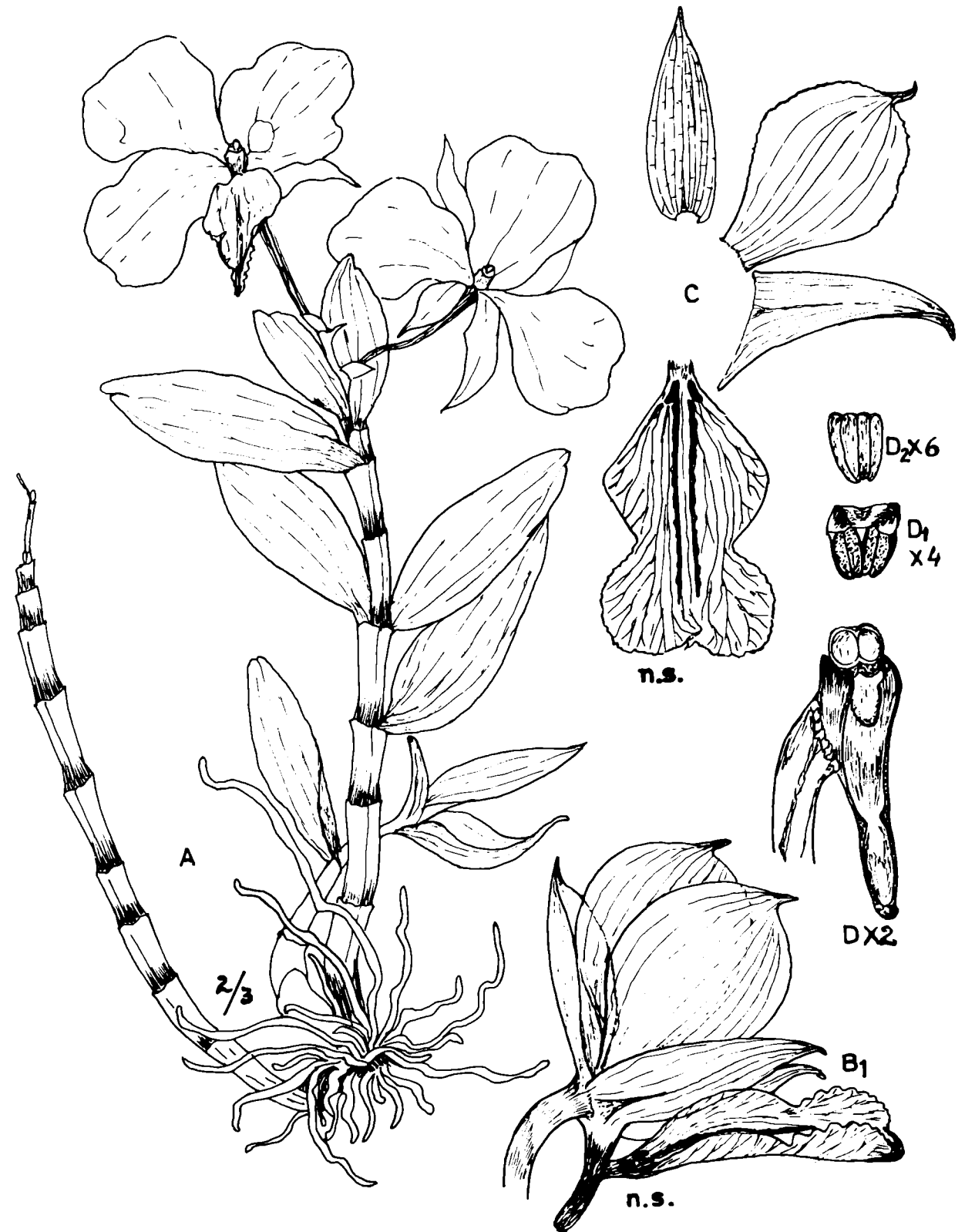


Plate 102

Dendrobium heterocarpum Wall. ex Lindl. Gen. Sp. Orchid Pl. 78, 1830; Hk. f. 5:737, 1890; K. & P. 53, t.74, 1898; B. & T. 67:144, 1970; T. 2:185, 1971; H. et al. 39, 1978.

= *D. aureum* Lindl. : Herk. 81:291, f.186, 1973.

Stem subclavate, suberect, 15-30 cm. ribbed; leaves narrowly elliptic-oblong or oblong-lanceolate, 7.5-13 cm. by 1-2.1 cm., tip oblique. Flowers 1-3 on very short peduncle arising on leafless stem, 5-6 cm. in diam., white or pale yellow, sweet smelling; floral bract broad, 5-8 mm. convolute, much shorter than the ovary. Sepals subequal, dorsal sepal linear-oblong, 3 cm. by 9 mm., erect, lateral sepals lanceolate, 3.3 cm. by 1.2 cm. at the base, spreading, acute; petals equalling the dorsal sepal, broadly lanceolate, 3 cm. by 1.2 cm. Lip rhombate, 3.3 cm. by 2.2 cm., side convolute, margin undulate, decurved; disc papillose-pubescent, red or purplish lines radiating and speckled with red spots; mentum large and conical. Column short, 4 mm. long, broad at the lower end; foot long, 9 mm. tapering, excavated, with a median raised line. Anther cap-like with a groove on the upper surface; pollinia very narrow, 1.5 mm. long.

Flowering time - April to May also July to August.

Altitudinal range - 1525-2135 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 7 gatherings.

Specimens studied - 5.

Chr. No. $n = 20$ (Mehra & Sehgal, Taxon, 25:646, 1976).

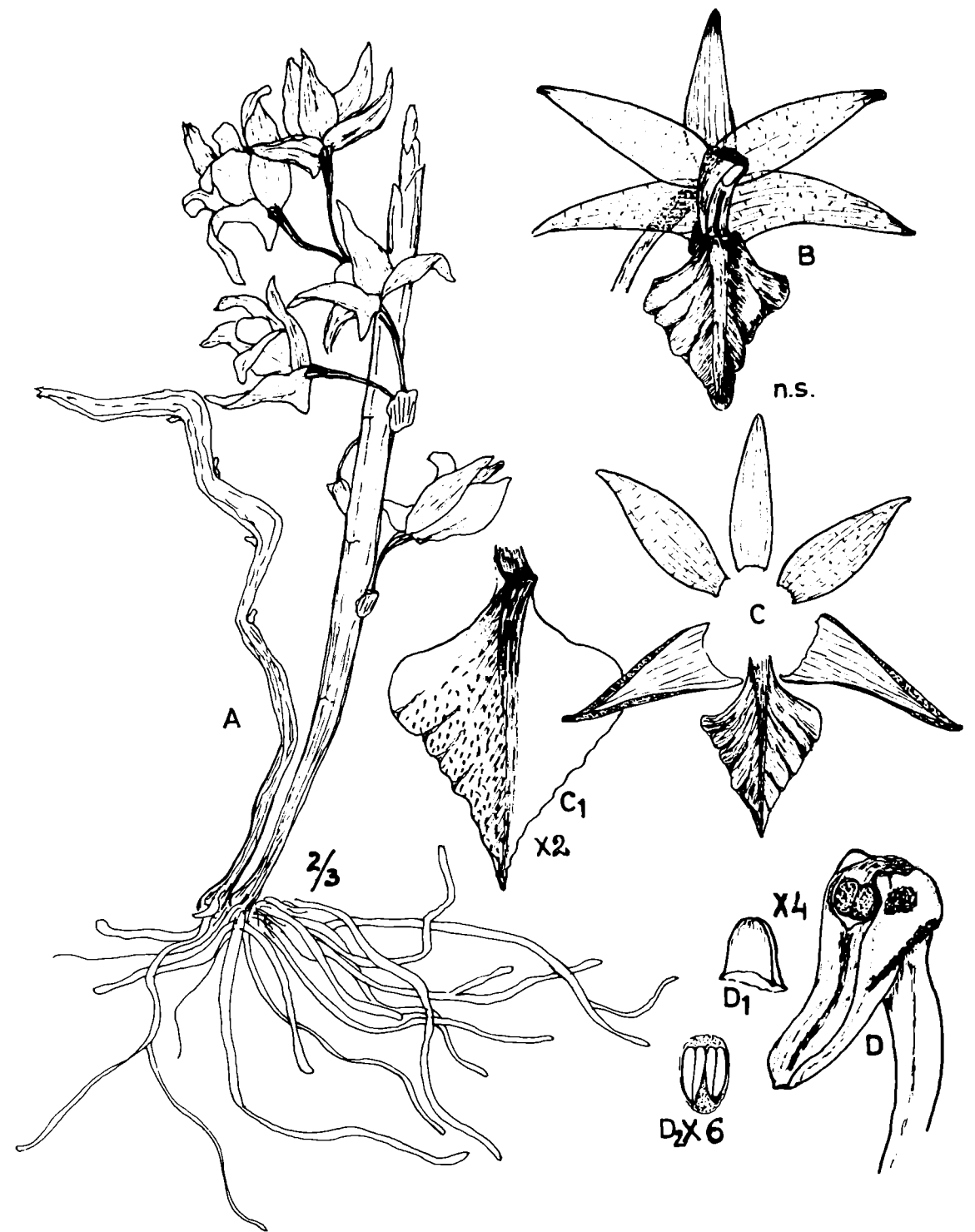


Plate 103

Dendrobium hookerianum Lindl. Journ. Linn. Soc. 3:8, 1859; Hk. f. 5:745, 1890; K. & P. 59, t.83, 1898.

Stem pendulous, 100 cm., thick at the nodes; leaves oblong-lanceolate, 7.5-10 cm. by 2.2-3 cm., acute. Flowers 2-4 on pendulous racemes from leafy stem, golden yellow, c 5 cm. in diam.; floral bracts minute, 4 mm. long. Sepals subequal, dorsal sepals elliptic-oblong, 2.5 cm. by 1.1 cm., entire, acute, lateral sepals oblong-lanceolate, 3 cm. by 1 cm., spreading, acute; petals broadly ovate, 2.9 cm. by 1.7 cm., denticulate. Lip orbicular but a little drawn out at the apex, base cuneate, deeply fringed, fringes long and minutely glochidiate; disc prominent, one reniform purple blotch; mentum short and rounded. Column short, 5 mm., long, 4 mm. broad; foot 5 mm. long, nectary at the lower and with two small calli. Anther conical, 5 mm. long; pollinia oblong, 2 mm. long.

Flowering time - June.

Altitudinal range - \pm 1980 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. $2n = 40$ (Mehra & Sehgal, Taxon, 25:646, 1976;
Mehra & Sehgal, ibid. 29:348, 1980).

Remarks - On the lip there is a single crescent (reniform) shaped deep purple blotch in our specimen and not two as given by Hooker (loc. cit.) or King & Pantling (loc. cit.). This is a new record for Nepal.

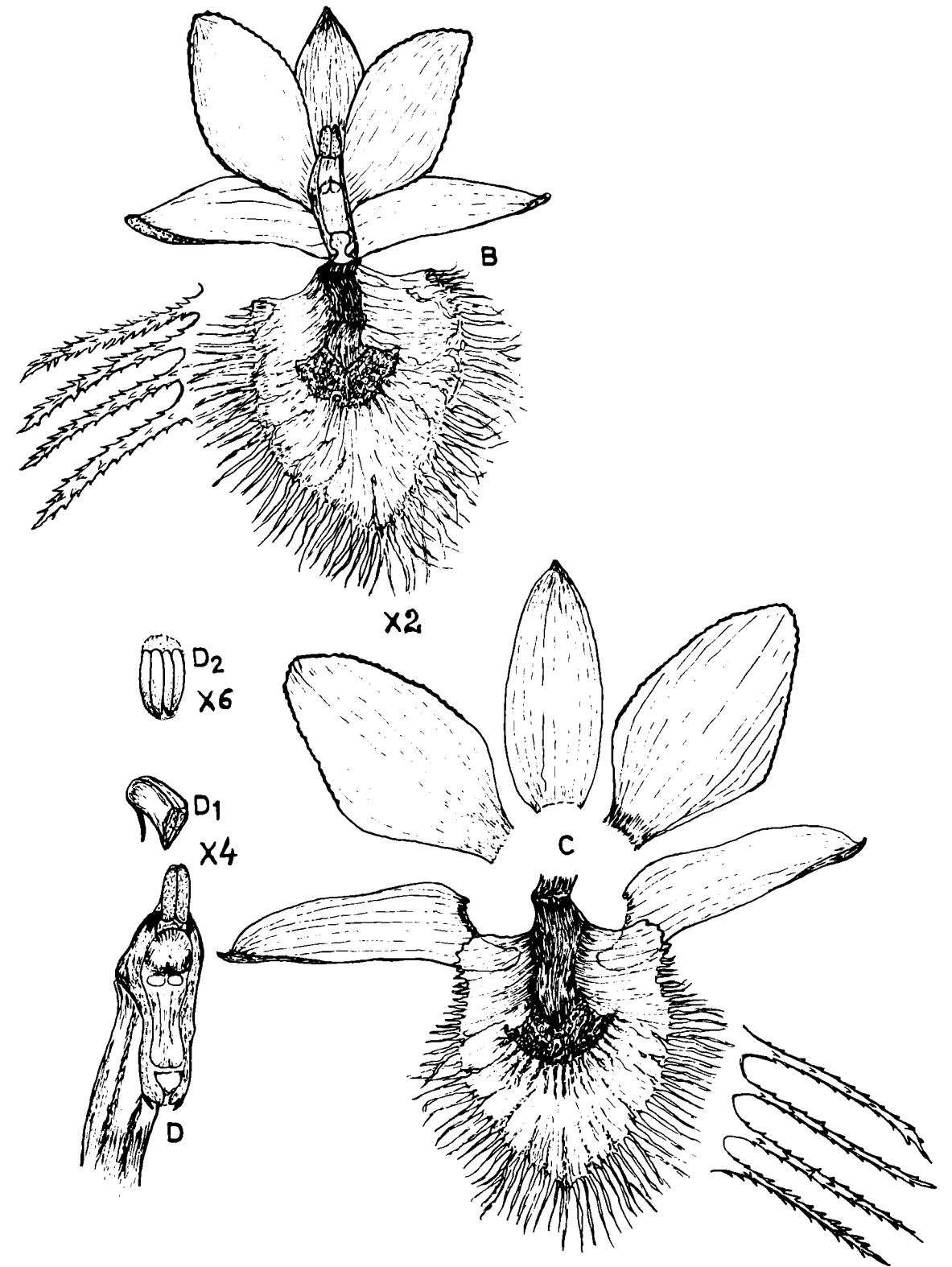


Plate 104

Dendrobium longicornu Lindl. in Edw., Bot. Regist. 16:t.1315, 1830; Hk. f. 5:720, 1890; K. & P. 46, t.64, 1898; T.432, 1966 et 2:185, 1971; Dept. Med. Pl. 2:133, 1969; B. & T. 67:145, t.5, 1970; Herk. 81:224, f.140, 1973; H. et al. 40, 1978.

Stem slender, tufted, 15-35 cm. erect, covered by black hairs; leaves linear-lanceolate, 3.5-7 cm. by 8-12 mm., slightly hairy, apex obliquely 2 fid. Flowers white, solitary or on short peduncle, either lateral or terminal, 3.5-4 cm. in diam.; floral bracts lanceolate, 1-1.5 cm. long, shorter than the ovary, hairy. Sepals unequal, dorsal sepal ovate-lanceolate, 2.4 cm. by 8 mm., acuminate, lateral sepals lanceolate, 2.4 cm. by 10 mm., acuminate and recurved; petals narrower, linear-lanceolate, 2.5 cm. by 4 mm., acuminate. Lip broadly triangular (on spreading) 5 cm. base to apex, 3-lobed, a broad ridge running from base to apex, side lobes rounded, more or less truncate, margin faintly wavy, prominently veined, apical lobe suborbicular, fimbriate, fimbriae not very long, disk with 3 crenate ridges; mentum slender, funnel-shaped and straight (spurlike) 2.5-3 cm. long. Column short, 4 mm. long; foot gradually tapering downwards, 2.5-3 cm. long, excavated. Anther with truncate lip, 3.5 mm. by 2.5 mm., fringed; pollinia 2 mm. long.

Flowering time - March and again October to December.

Altitudinal range - 1375-2900 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 13 gatherings.

Specimens studied - 8.

Chr. No. n = 19 (Mehra & Sehgal, Taxon, 25:646, 1976; Malla et al., ibid. 26:444, 1977; Mehra & Sehgal, ibid. 29:349, 1970).

Remarks - King & Pantling (loc. cit.) mention of the apex of the broad ridge divided into 3 or 4 short branches, but we have not found such a condition.



Plate 105

Dendrobium monticola P.F. Hunt & Summerh. in *Taxon*, 10:110, 1961; P.F. Hunt. *Kew Bull.* 24:90, 1970; H. et al. 40, 1978.

= *D. pusillum* D. Don, 35, 1825.

= *D. alpestre* Lindl. : Hk. f. 5:715, 1890; D.96, t.97, 1906; Kit. 102, 1955; B. & T. 67:141, 1970.

Plants 3-11 cm. high; pseudo-bulbs elongate; leaves linear-lanceolate, 1.5-4 cm. by 3-7 mm., acuminate, coriaceous. Flowers 3-7 on leaf-opposed erect racemes which exceed the length of leaves, 1.2-1.8 cm. in diam., white with purple striped lip; floral bracts subulate, 2 mm. long, subpersistent. Sepals unequal, dorsal sepal lanceolate, 7 mm. long, acuminate erect, lateral sepals falcately lanceolate, 8 mm. by 6 mm., acuminate, spreading; petals linear-lanceolate, 8 mm. acuminate, erect. Lip decurved, concave, oblong-obovate and 8 mm. long when flattened out, yellowish with deep purple veins, side-lobes erect, deeply inciso-serrate, mid lobe small, much recurved, crisp, serrate, margin, disc with a 3-lamellate mesial crest extending from base of lip to middle of mid lobe; mentum short and obtuse. Column 3 mm. long; foot 6 mm. long, at a right angle, upper part excavated, surface blotched with purple, edges papillose.

Flowering time - July to October.

Altitudinal range - 1525-2135 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 4 gatherings.

Specimens studied - 4.

Chr. No. n = 20 (Arora, *Taxon*, 17:199, 1968; Mehra & Kashyap, *ibid.* 25:492, 1976; Vij et al. *ibid.* 25:634, 1976 - all as *D. alpestre*).

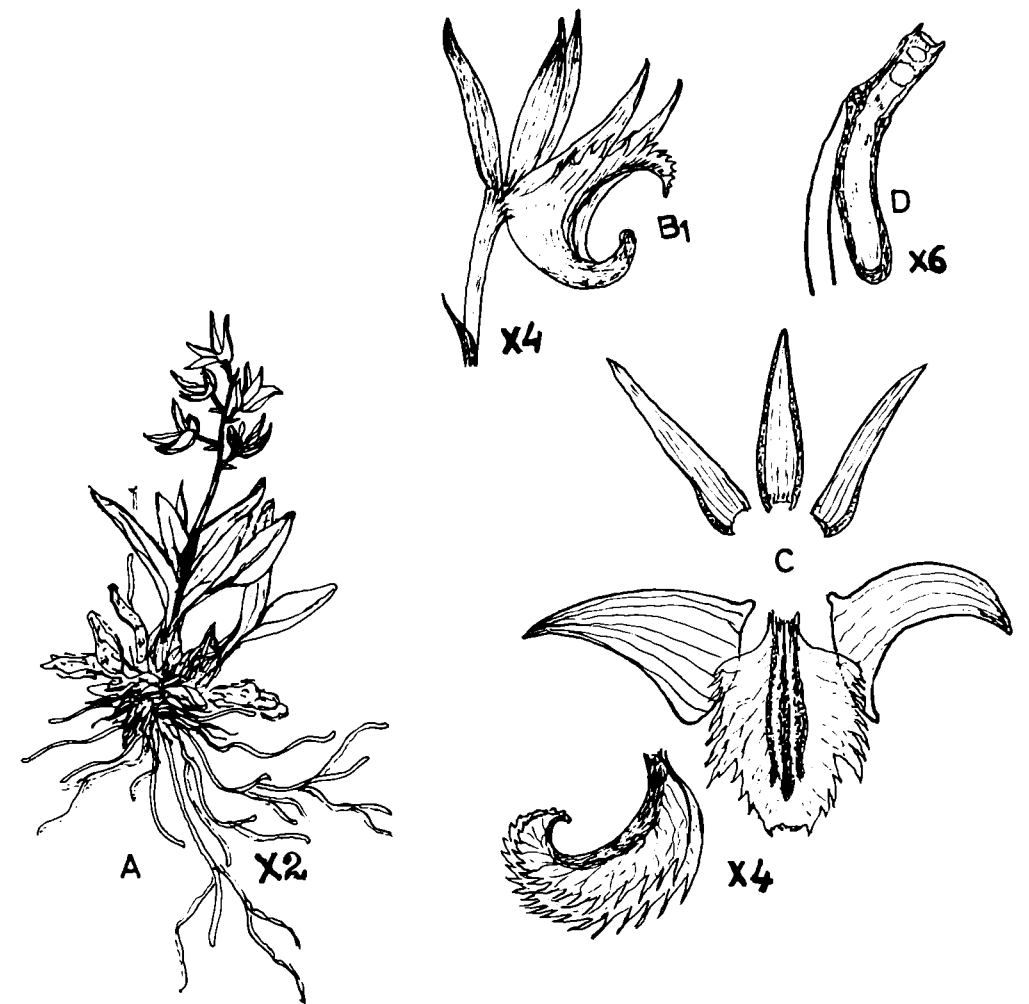


Plate 106

Dendrobium moschatum (Buch.-Ham.) Swartz in Schrader, Neu. J. Bot. 1:94, 1805; K. & P. 60, t.84, 1898; B. & T. 67:145, 1970; Herk. 82:114, f.57, 1974; H. et al. 40, 1978.

= *Epidendrum moschatum* Buch.-Ham. in Symes. Acc. Emb. Kingd. Ava, 478, t.1800.

= *D. calceolaria* Carey ex Hook. : Hk. f. 5:744, 1890.

Stem tufted, stout, 90-180 cm., erect; leaves ovate-oblong or lanceolate, 7.5-11.5 cm. by 2-3.5 cm. coriaceous, obliquely notched. Flowers 6-16, laxly on a deflexed raceme arising near the apex of a leafy or leafless stem, large 6-7.5 cm. in diam., white or purplish with golden yellow lip; floral bracts lanceolate 1.1-1.7 cm. long. Sepals subequal elliptic-oblong slightly concave, dorsal sepal 4.2 cm. by 1.6 cm., erect, lateral sepals 4.9 cm. by 1.4 cm. spreading; petals longer and broader than the sepals, broadly ovate, 4.4 cm. by 2.6 cm., obtuse, spreading. Lip shorter than the sepals, calceolar pyriform or subglobular with an open mouth 3.2 cm. with folded margin, yellow, two purple blotches inside, margins incurved and fimbriate, outer surface pubescent; mentum stout. Column short and broad 4 mm. by 3 mm.; foot 6 mm. long, widened at the lower end with a transverse nectary. Anther 5 mm. long, lip erose; pollinia 2 mm. long.

Flowering time - June.

Altitudinal range - \pm 1980 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. n = 19 (Vij et al. Taxon, 25:634, 1976).

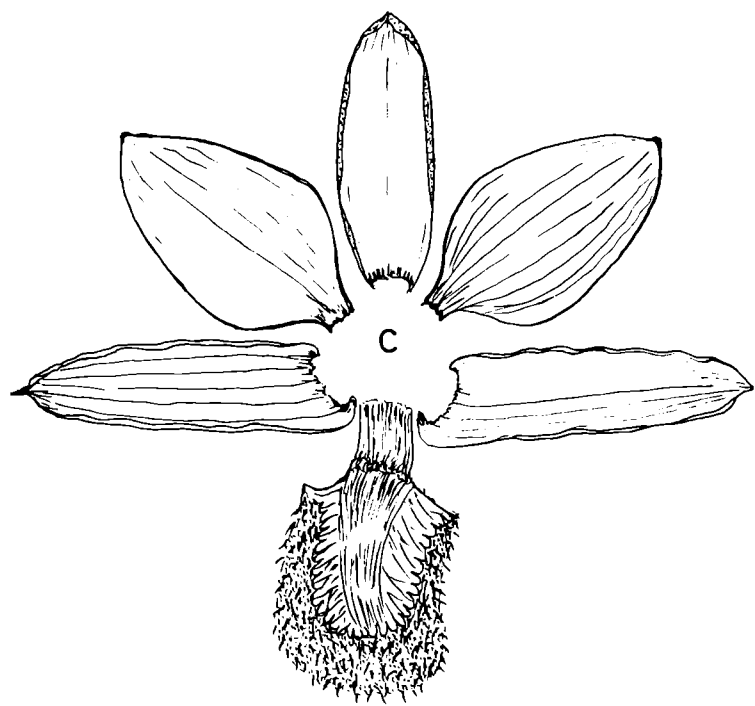
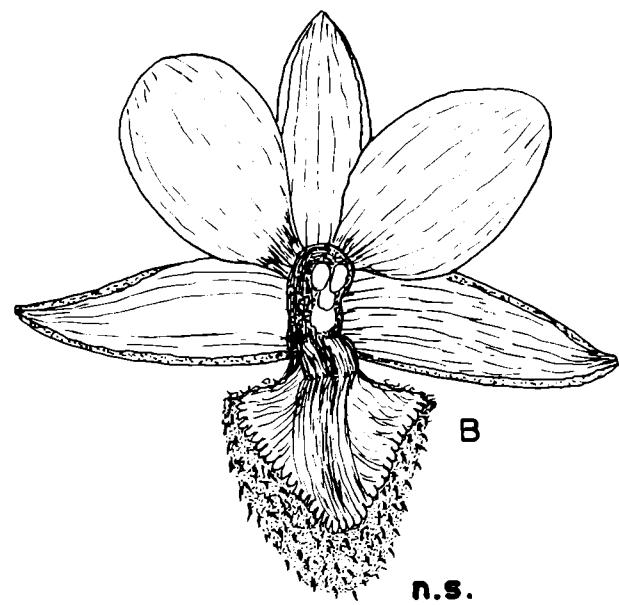
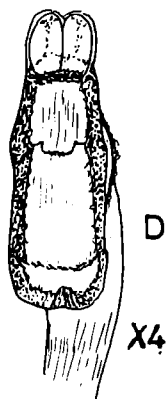
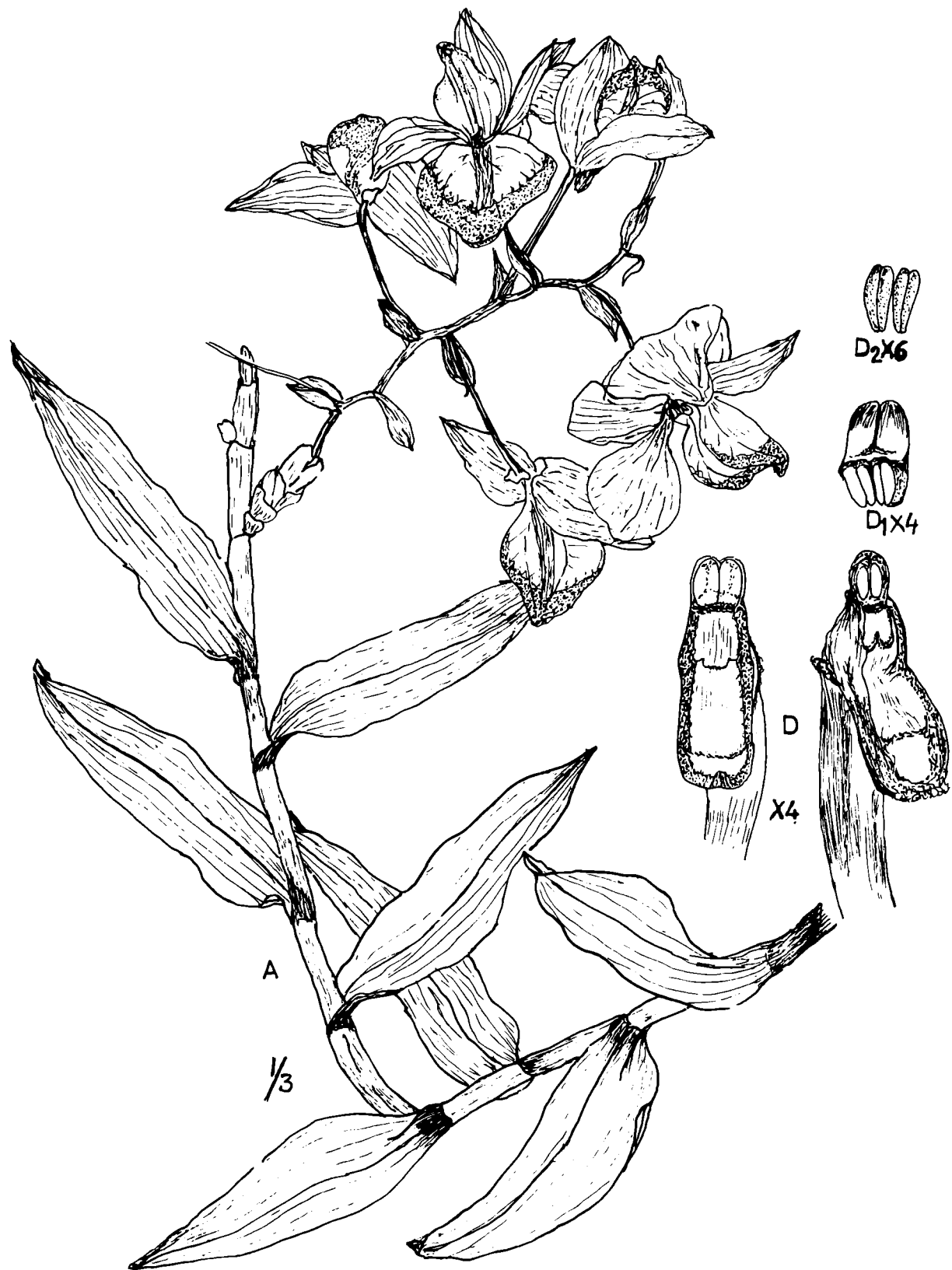


Plate 107

Dendrobium nobile Lindl. Gen. Sp. Orchid Pl. 79, 1830; Hk. f. 5:740, 1890; K. & P. 51, t.71, 1898; T.432, 1966 et 2:185, 1971; B. & T. 67:145, 1970; H. et al. 40, 1978.

Stem erect, 30-40 cm., a little compressed; leaves oblong, 7.5-14 cm. by 1.8-2.8 cm., narrowed at the base, apex obliquely notched, coriaceous. Flowers solitary, 2 or 4 on short peduncles from the nodes of leafy or leafless stem, 5.5-7 cm. in diam., purple gradually becoming white at the base; floral bracts loose, oblong 7-9 mm. long, much shorter than the ovary, scarious. Sepals subequal, dorsal sepal oblong elliptic, 3.4 cm. by 1.2 cm., erect, lateral sepals linear oblong, 3.5 cm. by 1.2 cm., margin slightly incurved; petals broadly elliptic, 3.6 cm. by 2 cm. obtuse, margin slightly incurved. Lip broadly ovate-oblong, 3.5 cm. long, lower half incurved, terminal half cucullate, with recurved margins pubescent on the inside and with a large purple blotch at the outside, claw short; mentum short and conical. Column short, 5 mm., broad opposite the stigma; foot 4 mm. long, faintly bilobed at the apex, slightly excavated. Anther 4 mm. long, conical with a truncate lip; pollinia oblong, 1.5 mm. long.

Flowering time - April.

Altitudinal range - 1065-1375 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No.

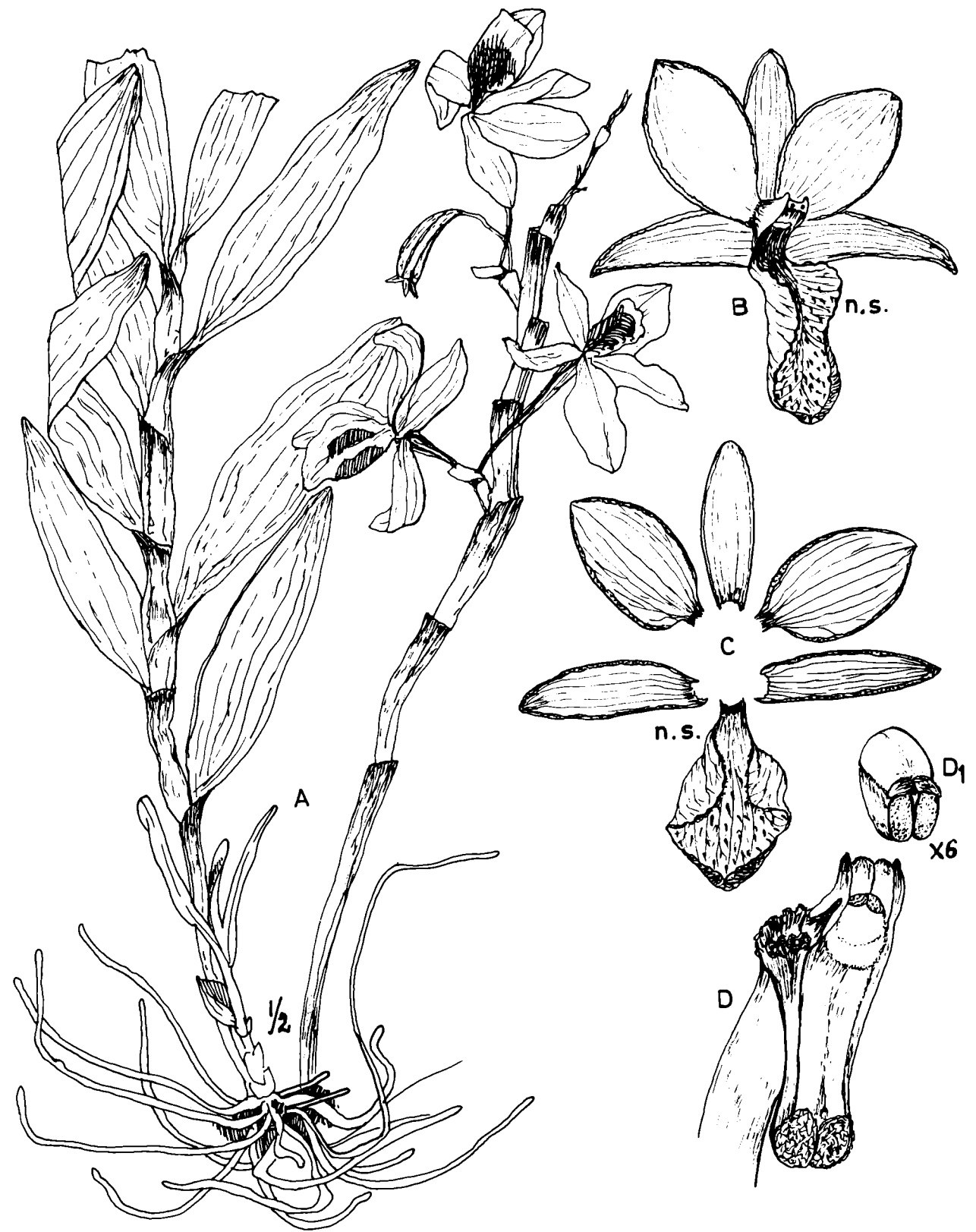


Plate 108

Dendrobium porphyrochilum Lindl. J. Proc. Linn. Soc. Bot. 3:18, 1859; Hk. f. 5:716, 1890; K. & P. 44, t.59, 1898; T.433, 1966 et 3:141, 1975; H. et al. 40, 1978.

Pseudobulbs cylindric, 1-2 cm. long, narrowed into a short stem; leaves 1-3, linear oblong, 2-4.5 cm. by 4-8 mm. obtuse or obliquely notched. Flowers 7-9 on a terminal raceme which is longer than the leaves, 1.2 cm. in diam., creamy or yellowish green; floral bracts linear 4-6 mm. long, equalling or shorter than the ovary. Sepals unequal, dorsal sepal elliptic-lanceolate, 6 mm. long, erect, lateral sepals lanceolate, subfalcate, 7 mm. long, erect; petals shorter than the sepals, 5 mm. long, oblong-lanceolate, acute. Lip elliptic, decurved from the base, 4 mm. long 2.5 mm. broad, margin faintly wavy (not entire), apex acute, and thickened, three obscure ridges of variable length at the slightly depressed base; mentum small and round. Column short, 1 mm. long, concave. Anther suborbicular with upturned lip, c 1 mm. long.

Flowering time- May - June.

Altitudinal range - 2290-2590 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. n = 19 (Mehra & Sehgal, Taxon. 24:512, 1975).

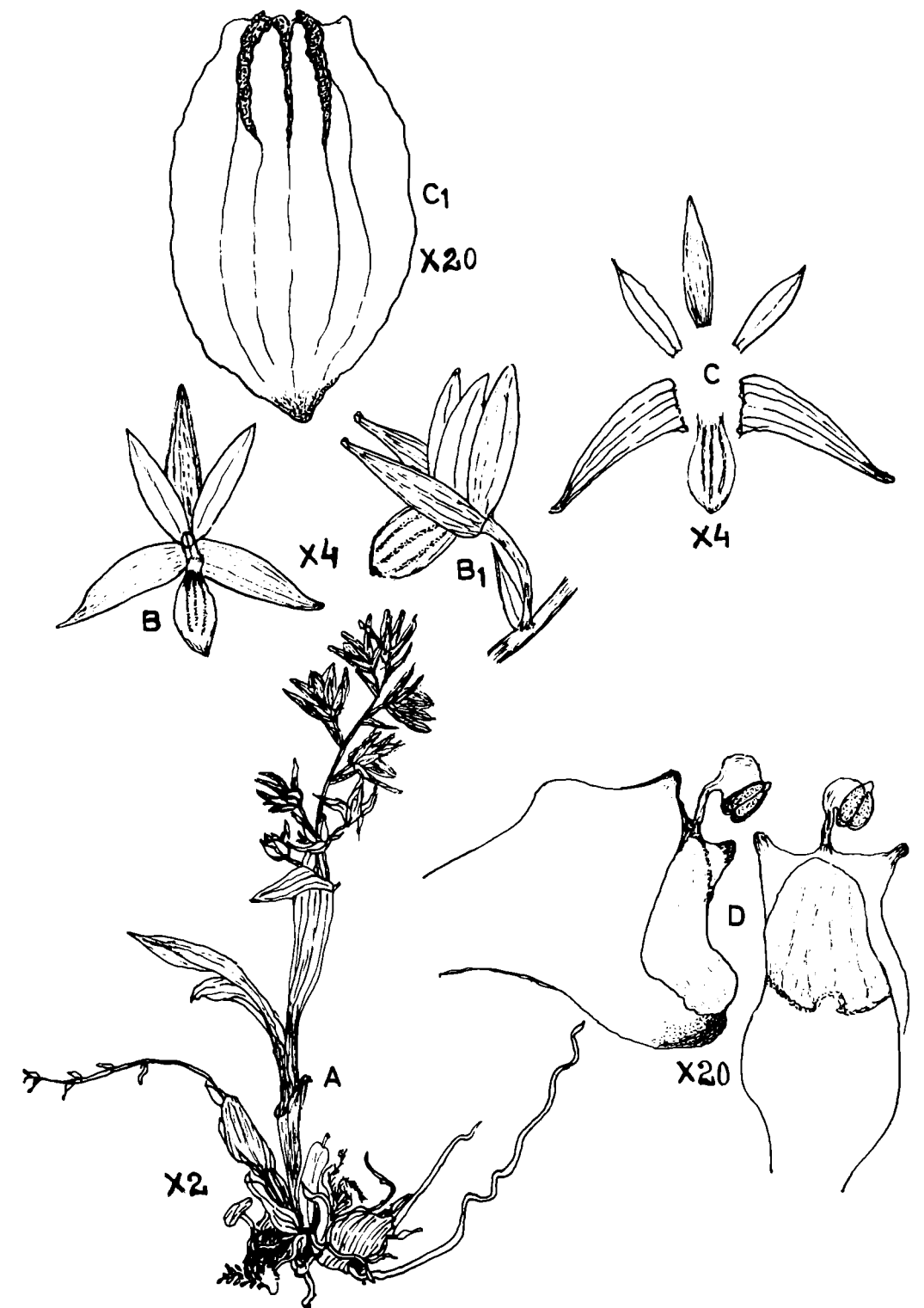


Plate 109

Dendrobium primulinum Lindl. in Gard. Chron. 1858:400, 1858; Hk. f. 5:735, 1890; D.97, t.98, 1906; B. & T. 67:145, 1970; Herk. 82:21, f. 12, 1974; H. et al. 40, 1978.

Stem pendulous, 17-26 cm. long; leaves broadly oblong, c 10 cm. long, smaller upwards. Flowers solitary on leafless stems, shortly pedicellate, 6.5 cm. in diam., white or pinkish; floral bracts minute. Sepals subequal, oblong, lanceolate, spreading; dorsal 2.2 cm. long, lateral 2.3 cm. long; petals shorter than the sepals, 2 cm. long, linear oblong, rounded. Lip broadly oblong, 2.5 cm. long, c 2 cm. broader nearly as broad, convolute towards the base, claw short, margin ciliate, basal portion white and with a calli, apical portion pinkish yellow, puberulous; mentum small and round. Column 4 mm. long, two horn-like processes at its apex; foot 5 mm. long, conical, narrowed to the base, edges thickened.

Flowering time - April.

Altitudinal range - \pm 1375 m.

Distributional pattern - west Nepal.

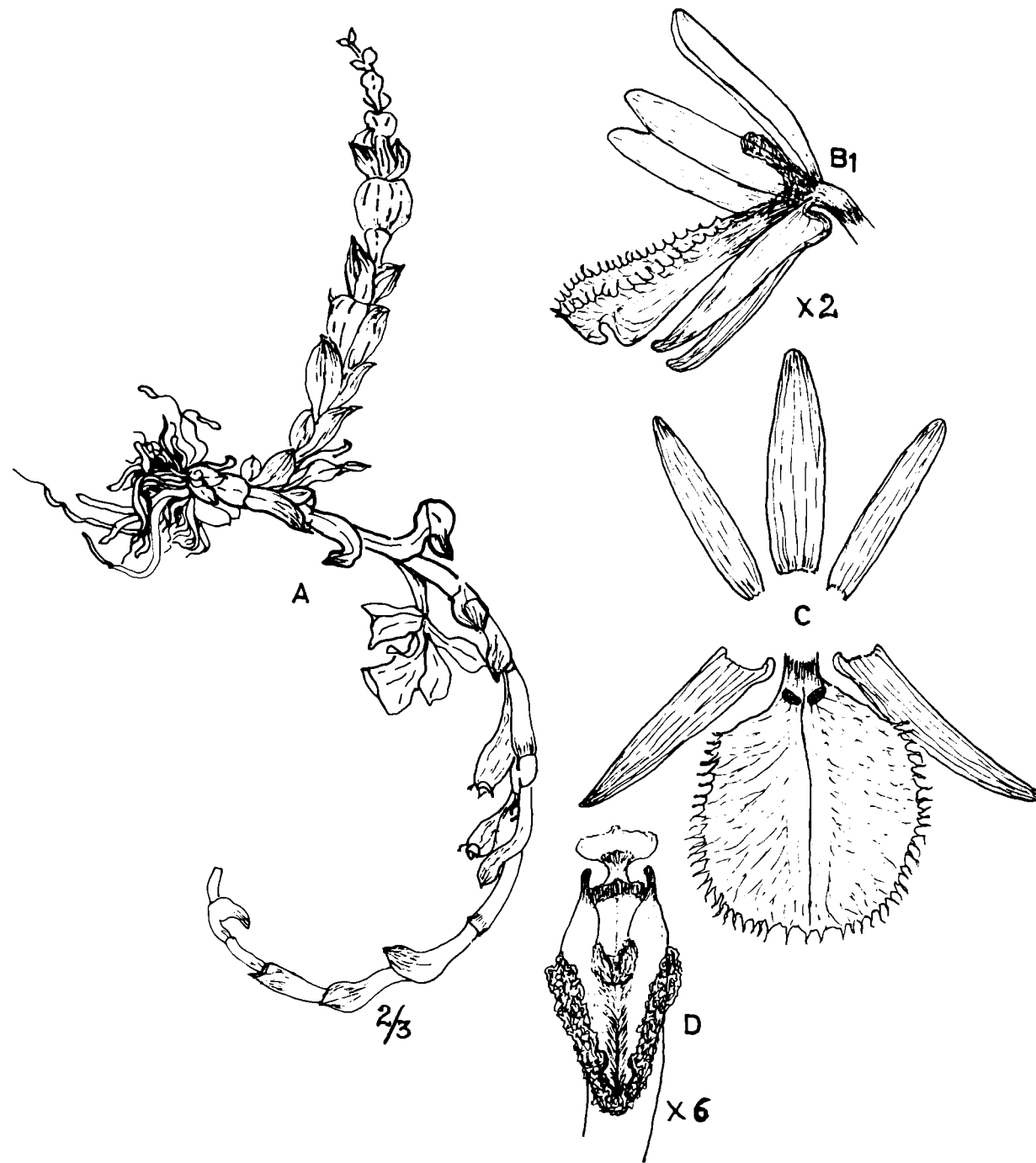
Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. n = 19 (Mehra & Vij, Taxon, 19:108, 1970).

2n = 38 (Mehra & Kashyap, ibid. 25:492, 1976).

also 2n = 57 (Vij et al., ibid. 25:634, 1976).



EPHEMERANTHA Hunt & Summerh. (Dendrobieae). This name was proposed by Hunt & Summerh. for *Desmotrichium* Bl. which has been conserved for a genus of the *Phaeophyta*. Not suggesting a lectotype, Hawkes proposed *Flickingeria*. We follow Hunt & Summerhayes (1916). *Ephemerantha* is distinguished from *Dendrobium* by its vegetative characters i.e. a creeping rooting rhizome from which erect branches arise, and the fugaciousness of the flowers, which is the principal character.

Plate 110

Ephemerantha macraei (Lindl.) P.F. Hunt & Summerh. in *Taxon* 10:105, 1961; B. & T. 67:147, 1970; H. et al. 41, 1978.

= *Dendrobium macraei* Lindl. Gen. Sp. Orchid Pl. 75, 1830 et Journ. Proc. Linn. Soc. Bot. 3:6, 1859; Hk. f. 5:714, 1890; K. & P. 8:61, t. 86, 1896; T.432, 1966.

Rhizome creeping, annulate, giving off pendulous branches which bear at intervals narrow fusiform, somewhat compressed pseudobulbs 5-6.5 cm. long. Leaf terminal on a pseudobulb, solitary, sessile, linear-oblong, 10-19 cm. by 2-3 cm. Flowers one or two from near the base of a leaf, white, 2-2.5 cm. in diam.; floral bracts proper minute, much shorter than the ovary. Sepals subequal, elliptic-oblong, spreading, dorsal sepal 1.3 cm. long, lateral sepals 1.4 cm. and broader; petals shorter and narrower than the sepals. Lip oblong-elliptic, decurved about the middle, side lobes oblong, truncate apices, sprinkled with red, disc between side lobes with 2 fleshy sinous crests, margin erose at the apex only, mid lobe contracted at the base and erose-crested, expanded into 2 diverging lobules with crenulate margin and with two circular pigmented patches, apex apiculate. Column 2 mm. long and spotted, foot 3 mm.; mentum conical 3 mm. long, broad. Lip of anther minutely denticulate.

Flowering time - April to June.

Altitudinal range - \pm 610 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 4 gatherings.

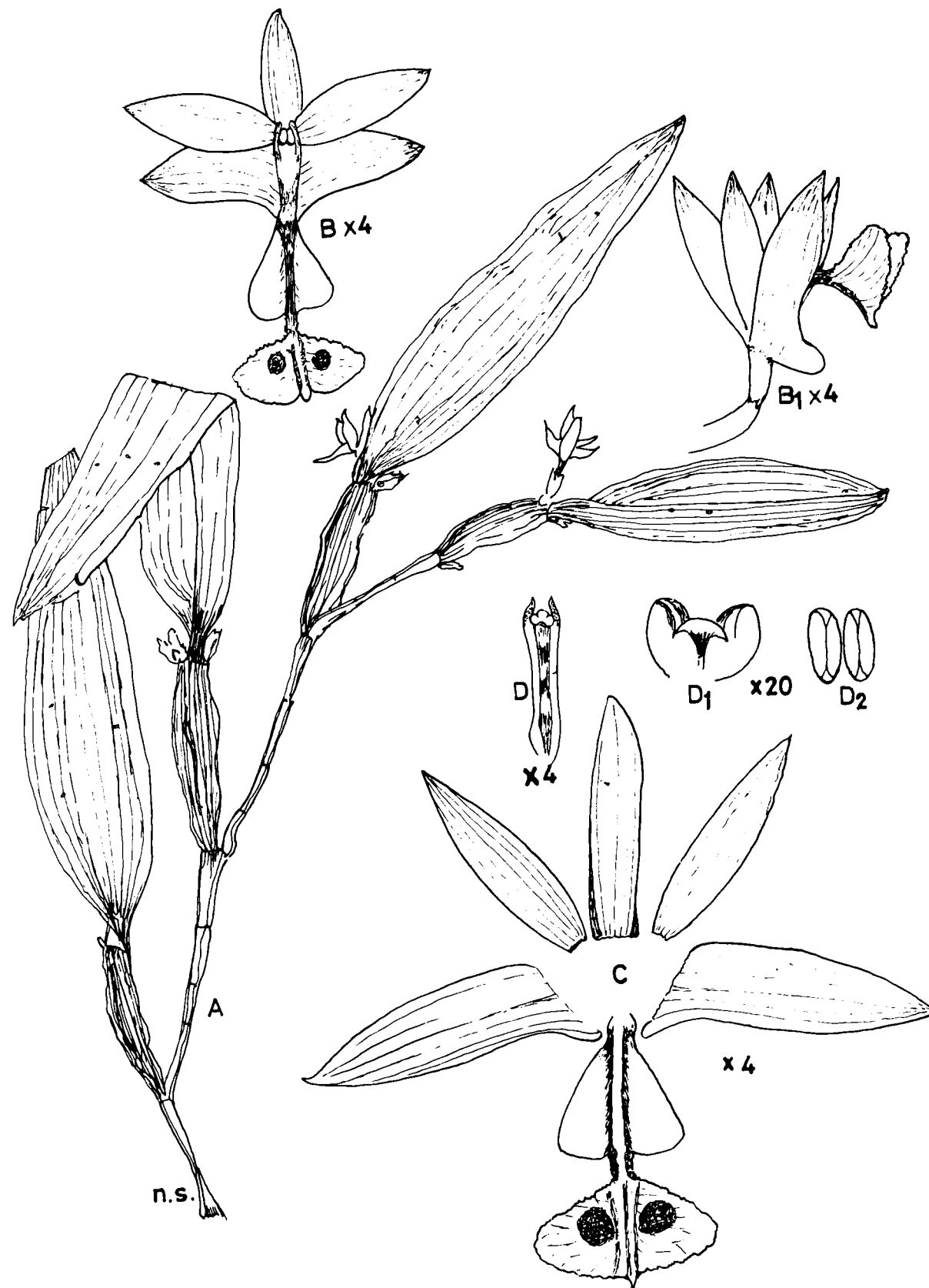
Specimens studied - 4.

Chr. No. n = 19 (Mehra & Vij, *Taxon*, 19:108, 1970 as *Dendrobium macraei*).

2n = 38 (Vij et al., *ibid.* 25:640, 1976; Singh, *ibid.* 30:704, 1981 as *D. macraei*).

also 2n = 40 (Mehra & Sehgal, *ibid.* 29:349, 1980).

Remarks - In a personal communication, Prof. Seidenfaden informs us that our plant may be *Flickingeria fugax* (Reichb. f.) Seidenf. More well preserved material is needed to comment on the two circular pigmented patches on the epichile.



EPIGENEIUM Gagnap. (Dendrobieae). The petals and the lateral sepals are on the column-foot.

Epiphytes, rhizome elongated, pseudobulbs numerous, moniliform, monophyllous. Inflorescence solitary terminal; flowers large; sepals subequal, spreading; dorsal sepal adnate to the column, lateral sepals attached to the foot; petals narrower and adnate to the sides of the column. Lip panduriform, oblong, base cuneate, side lobes erect, mid lobe obovate to obcordate; column short and foot long.

Epigeneium rotundatum (Lindl.) Summerh.

Pseudobulbs with two or three leaves; inflorescence one flowered, dorsal sepal less than 3 cm. long; petals broadly lanceolate, lip with 3 lamellae of unequal length, middle lamella being short, mid lobe of lip orbicular or subreniform, side lobes touching and overlapping over the column.

Artificial key to the species of Epigeneium

Flowers c 8.5 cm. in diam.; sepals linear-lanceolate. Lip with short and round side lobes; disk with usually 5 crenulate lamellae *amplum*.

Flowers c 5 cm. in diam.; sepals ovate-lanceolate. Lip with broader side lobes; disk with 3 crenulate lamellae. *fuscescens*.

Plate 111

Epigeneium amplum (Lindl.) Summerh. in Kew Bull. 2:260, 1957; B. & T. 67:148, f. 7, 1970; H. et al. 41, 1978; Seidenf. 34(1):71, t.33, 1980.

= *Dendrobium amplum* Lindl. in Wall. Pl. Asiat. Rarior. 1:25, t.29, 1830; Hk. f. 5:711, 1890; K. & P. 8:63, t.89, 1898; T.431, 1966; Herk. 78:117, f.59/70, 1970.

Pseudobulbs oblong or ellipsoidal borne on a woody pendulous rhizome, half covered by large scarios sheaths. Leaves oblong or elliptic-oblong, 9-15 cm. by 3-5.5 cm. acute; petiole short, 1.2-2.8 cm. Flower large, solitary, sepals and petals light greenish-brown spotted and blotched with darker brown, 8.5 cm. in diam.; bracts few, tubular at the base of the ovaries, scarios, 3.2-4 cm. long. Sepals unequal, 5 cm. long, linear-lanceolate, dorsal sepal erect, lateral sepals with broad bases, slightly falcate, wide spreading, lower side folded near the base; petals linear 4.8 cm. long, wide spreading. Lip articulate, 3-lobed, side lobes short, rounded yellowish with purple spots, mid lobe rhomboid, dark purple, crenulate, acute, disk with 3-5 crenulate ridges between the side lobes. Column straight with pink spots at the base, foot at right angles to the column, sides thickened and involute at the anterior end.

Flowering time - September to October.

Altitudinal range - 1375-1675 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 2.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:108, 1970 as *D. amplum*; Malla et al. ibid. 27:519, 1978).

Remarks - The margin of the terminal lobe of the lip is crenulate. The number of ridges (lamellae) is either 3 or 5.

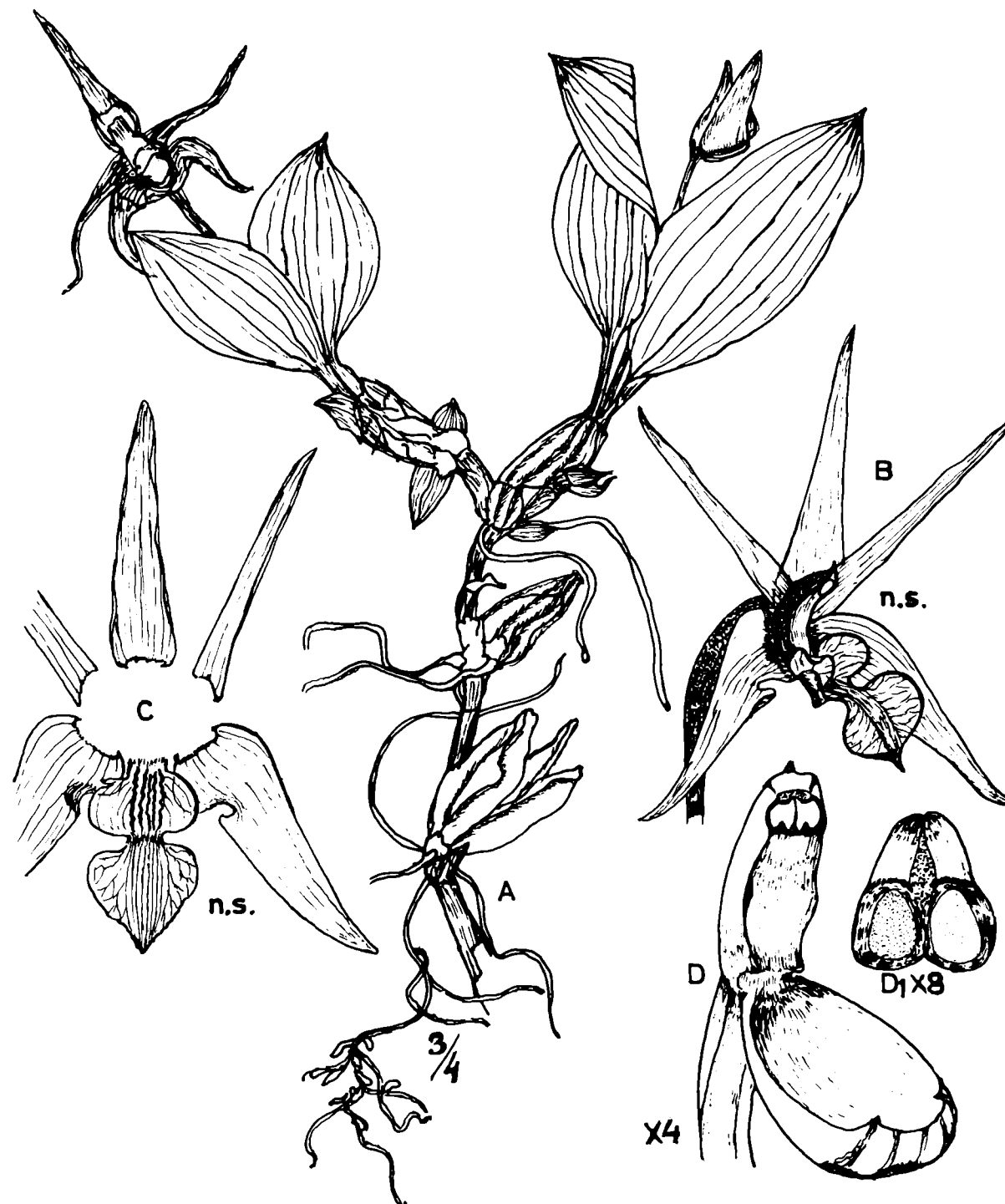


Plate 112

Epigeneium fuscescens (Griff.) Summerh. in Kew Bull. 2:262, 1957; H. et al. 41, 1978.

= *Dendrobium fuscescens* Griff., Notul. 3:308, 1851; Icon. Pl. Asiat. : t.309, 1851; Hk. f. 5:712, 1890; K. & P. 62, t.88, 1898.

Pseudobulbs ovoid widely separated on a branched thick rhizome, several close sheaths at the lower part of the pseudobulb. Leaves sessile, narrowly oblong-lanceolate, usually 6-10 cm. by 1.4-2 cm., apex notched. Flower solitary, c 5 cm. in diam., purplish-brown; floral bracts of variable size, ovate-lanceolate, scarious. Sepals subequal, ovate-lanceolate 2.8 cm. long acuminate, lateral sepals a little broader and subfalcate; petals equal in length to the sepals, much narrower. Lip obovate-oblong yellow, side lobes oblong, obtuse, margin undulate, mid lobe orbicular-ovate, undulate, disk with 3 crenulate lamellae between the side lobes. Column with a long foot.

Flowering time - March to April.

Altitudinal range - ± 1830 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 2.

Chr. No.



ERIA Lindl. (Dendrobieae). Description of the wooly perianth. Epiphytic orchid with long stem-like pseudobulbs. Flowers neither large nor showy, flower structure as in *Dendrobium*. Sepals adnate to the foot of the column forming a sac or mentum. Base of lip not forming a spur by uniting with the edges of the column-foot. Caudicles present and anther cap loose.

Eria alba Lindl.

This species closely resembles *E. excavata* with which it is very often confused. However, it can be distinguished by the mentum which is curved and spur-like; disk on the mid lobe of lip with 2 thick ridges which may be reduced to 2 calli; column although small it is not broad neither excavated.

Eria paniculata Lindl.

Stem pendulous, 30 to 60 cm. long with numerous well spaced leaves. Flowers whitish. Mid lobe of lip large, white, reniform, broader than long, wavy erose to fimbriate margin, side lobes with minute red spots, base of lip with a cylindrical callus on each side of which small conical calli present. Column and column foot green with edges red.

Eria stricta Lindl.

Pseudobulbs bearing two narrow terminal leaves. Flowers small, woolly in a long secund spike; petals broad 2 by 1.5 mm.; very short orbicular mid lobe of the lip and glabrous small bracts.

E. stricta as given in Hk. f. Fl. Brit. Ind. 791, 1890 includes two entities; one being with petals only half broad (2 by 0.8 mm.); mid lobe as long as broad at base or slightly longer, much recurved, also at the base recurved. This is *E. siamensis* Schltr. (see Seidenf. Op. Bot. 62; 80, f.42, 1982).

Artificial key to the species of Eria

- 1 Pseudobulbs globular or depressed, plants small; 2-3 leaved, leaves membraneous. Scape shorter than the leaves, fili-form. Flowers very small, c 6 mm. in diam. glabrous. Lip narrow, lanceolate and slightly dilated in the middle. *musicola*.
- 1* Pseudobulbs short or long, 1 noded, forming a fleshy stem or crowded on the creeping rhizome. Flowers small or medium sized, glabrous or pubescent, rarely woolly in lateral or subterminal spikes or racemes —
 - 2 Flowers small, or minute in dense spikes, subglobose, pilose. *spicata*.
 - 2* Flowers small or medium (1.2-1.5 cm. in diam.) many flowered spikes. Lip with 3 ridges—
 - 3 Floral bracts nearly equalling the ovary, mentum nil. Lip short, yellow and pink, side lobes erect. . . . *excavata*.
 - 3* Floral bracts shorter than the ovary, side lobes of lip rounded and spreading —
 - 4 Lip shorter than the petals, column with a puberulous foot. *graminifolia*.
 - 4* Lip shorter than the sepals but longer than the petals. Column not puberulous. *acervata*.
 - 4** Lip equalling the petals and slightly shorter than the sepals. Column with a curved foot. *amica*.
 - 2** Flowers large (c 2.5-4 cm. in diam.); racemes laxly few flowered; floral bracts shorter than the ovary —
 - 5 Side lobes of lip rounded, erect; 3 thick ridges from base to apex. *bractescens*.
 - 5* Side lobes of lip large, rounded and with 2 thick ridges between them. *coronaria*.
- 1** Pseudobulbs usually large. Flowers in terminal or subterminal spikes, wooly or dense white tomentose —
 - 6 Pseudobulbs 5-6 leaved. Lip undivided, broadly ovate, 4 mm. *discolor*.
 - 6* Pseudobulbs 3-5 leaved. Lip 3 lobed, oblong, c 1.1 cm. *pubescens*.
- 1*** Pseudobulbs 1 leaved. Flowers large, c 4 mm. long, lateral sepals keeled; ovary and pedicel 3 winged. *carinata*.

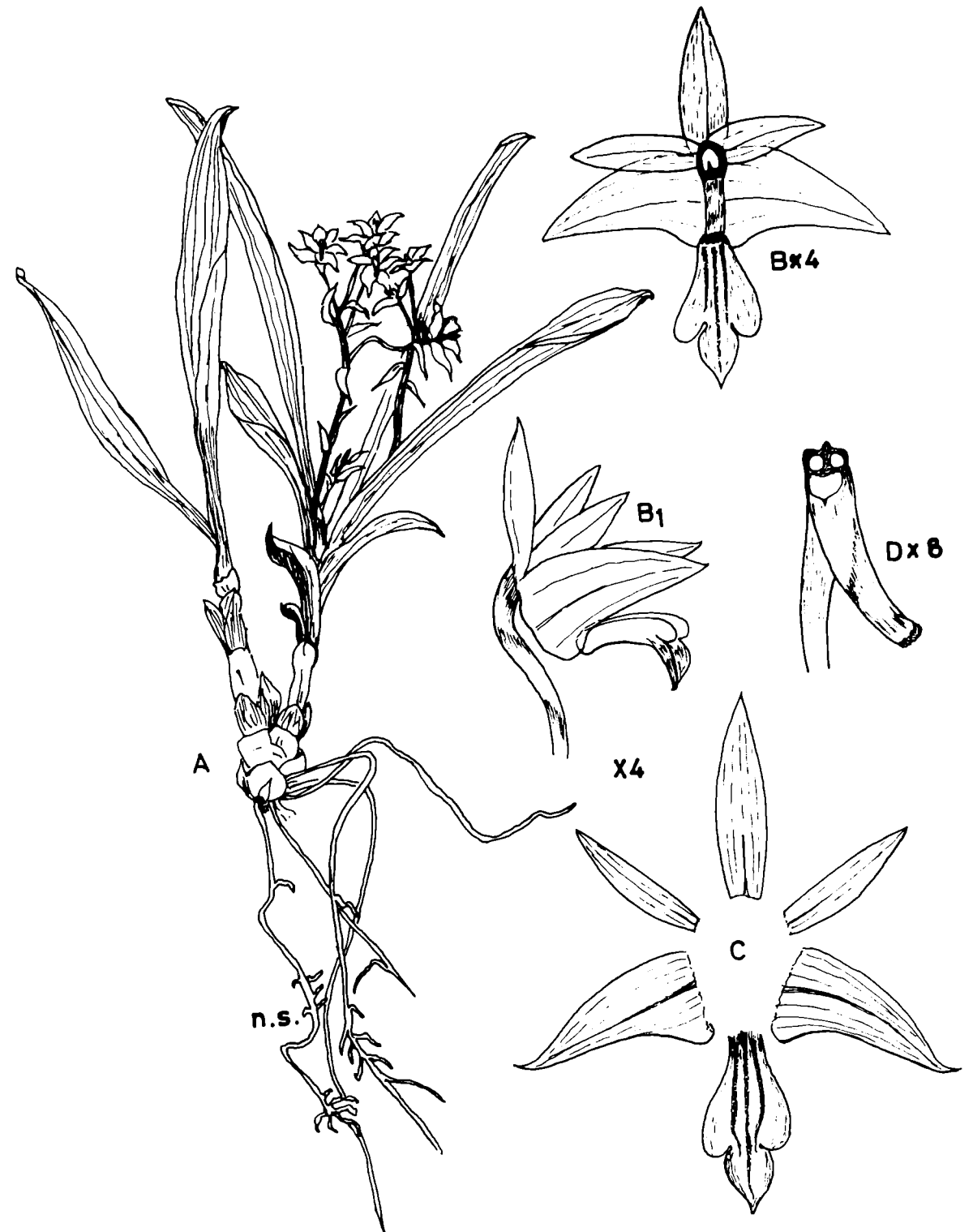


Plate 113

Eria acervata Lindl. in Jour., Hort. Soc. 6:57, 1851; Hk. f. 5:796, 1890; K. & P. 123, t.170, 1898, Seidenf. 62:106, t.61, 1982.

Rhizome stout, clothed with fibrous sheaths; pseudobulbs crowded, ellipsoid, more or less compressed, sheathed when young. Leaves 3-5, narrowly-oblong or oblanceolate-oblong 6.5-8.5 cm. by 1-1.5 cm. Racemes 1-3, arising from the axils of leaves, about half the length of the leaves, peduncle bearing 4-5 reflexed bracts, few flowered. Flowers c 1.5 cm. in diam., white; floral bracts lanceolate, 6-8 mm. in length, about half as long as the ovary, glabrous. Sepals subequal, lanceolate, acuminate, dorsal sepal erect, 10 mm long, lateral sepals falcate, 9 mm. long and broader at the base; petals smaller than the sepals, 8 mm. long, narrower, lanceolate. Lip oblong or obovate in general outline, 7 mm. long, white, side lobe tinged with yellow about the middle, oblong, mid lobe ovate or suborbicular, entire, acute, 3 median ridges from base almost to apex. Column 3 mm. long and foot 4 mm. long; mentum short and obtuse.

Flowering time - August.

Altitudinal range - \pm 550 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. n = 20 (Mehra & Sehgal, Taxon, 24:513, 1975).

Remarks - This is a new record for Nepal.

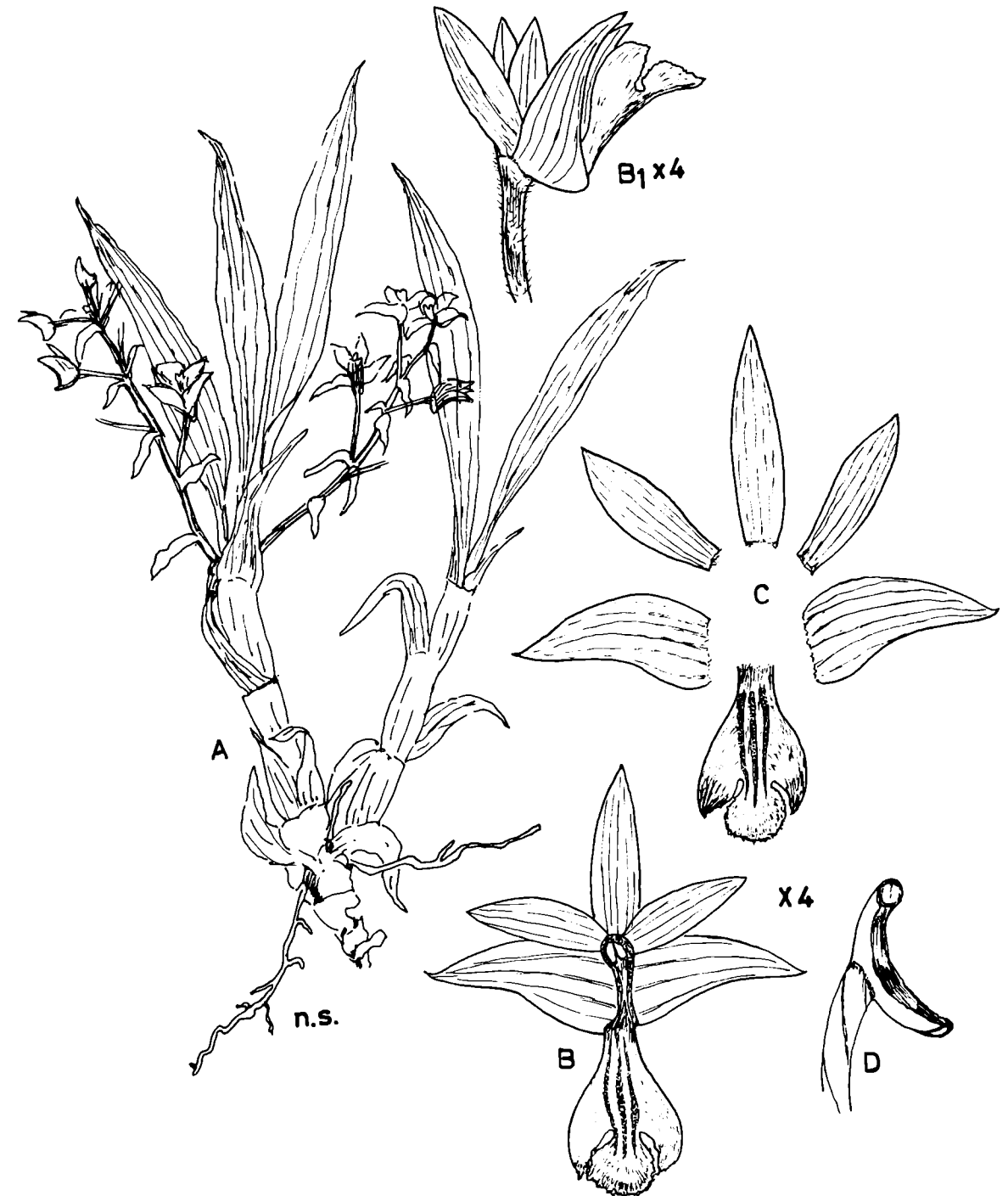


Plate 114

Eria amica Reichb. f. Xen. Orchid 2:162, t.168, 1870; Hk. f. 5:800; Seidenf. 62:115. t.71, 1982.

= *Eria confusa* Hk. f. Icon. Pl. : t. 1850, 1889; et 5:796, 1890; K. & P. 122, t. 169, 1898; B. & T. 67:150, 1970; Herk. 82:288, f.155, 1974, H. et al. 42, 1978.

Pseudobulbs elongate-clavate, sheathed, sheaths small and large. Leaves 2-8, oblong-lanceolate or lanceolate, 7.5-10.5 cm. by 1-2 cm., tapering to the base. Racemes arising in axils of sheaths below the leaves, rachis puberulous, laxly flowered. Flowers c 1.5 cm. in diam., yellowish, puberulous; floral bracts linear oblong, shorter than the ovary, 7-9 mm. long, pubescent. Sepals subequal ovate, dorsal sepal 1 cm. long, lateral sepals broadly ovate, 9 mm., subfalcate; petals narrower than the dorsal sepal, elliptic-lanceolate, 8 mm. long. Lip broadly obovate, 8 mm. long, base narrow, 3 lobed, side lobes broad, rounded, incurved, apices acute, mid lobe orbicular or ovate, thickened along the margin, 3 ridges, lateral ones short or all of equal length and extending to the mid lobe. Column 4 mm. long, foot curved, 4 mm. long.

Flowering time - March - April.

Altitudinal range - \pm 2000 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. n = 20 (Mehra & Sehgal, Taxon, 23:803, 9174 as *E. confusa*.)

Plate 115

Eria bractescens Lindl. in Edgw. Bot. Regist. 27, Misc : 18, 1841; Hk. f. 5:796, 1890; K. & P. 120, t.166, 1898; B. 19:218, 1964; B. & T. 67:149, 1970; H. et al. 42, 1978; Seidenf. 62:111, t.65, 1982.

Pseudobulbs crowded, oblong or cylindric, slightly curved, wrinkled at flowering time. Leaves 3-6 sometimes less, elliptic-oblong, 11-16 cm. by 2-2.5 cm., subcoriaceous, tapering to the base. Racemes slender, axillary, lax flowered, peduncles sheathed at the base. Flowers long pedicelled, yellowish-white, 2-3.3 cm. in diam., glabrous; bracts large 1.2-1.7 cm. long, shorter than the ovary. Sepals subequal, spreading, dorsal sepal oblong-elliptic, 1.1 cm., long, lateral sepal ovate-lanceolate, subfalcate, broader at the base, 1.2-1.4 cm. long, acute; petals linear oblong, 8-11 mm. long, shorter than the sepals, apices revolute. Lip oblong, expanded towards the apex 8-12 mm. long, 3-lobed, side lobes erect, rounded, apical lobe entire, deflexed at the apex, 3 red coloured lamellae from base to apex. Column stout, 5 mm. long, foot curved, 4 mm. long.

Flowering time - April.

Altitudinal range - \pm 610 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No.

Remarks - The ovary in some specimens is puberulous while in others it is glabrous.

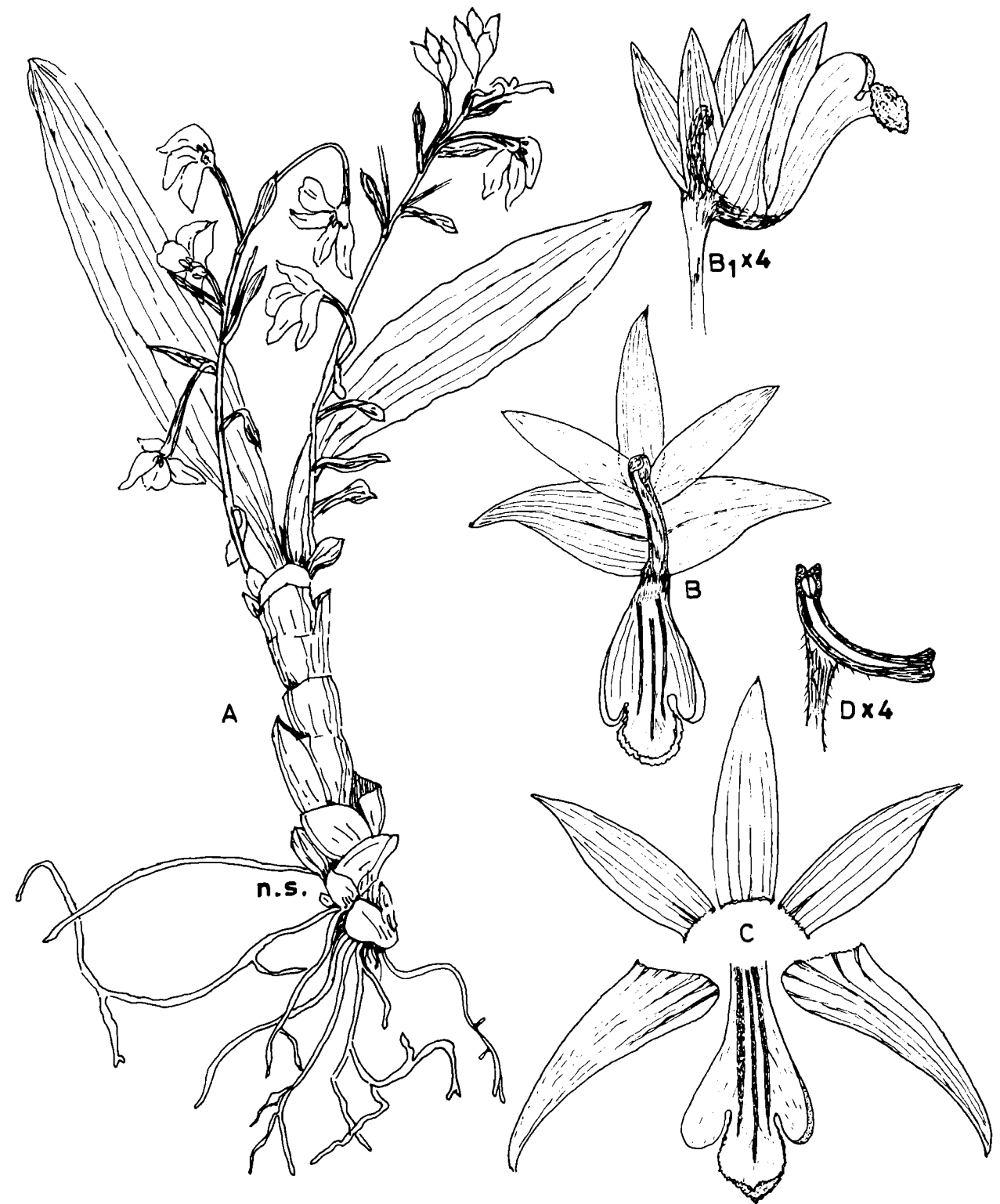


Plate 116

Eria carinata Lindl. Journ. Linn. Soc. 3:50, 1859; Hk. f. 5:808, 1890; K. & P. 129, t.179, 1898; Seidenf. 62:38, t.17, 1982.

Rhizome short, woody, covered with scarios sheaths; pseudobulbs oblong, furrowed. Leaf solitary, thickly coriaceous, elliptic-lanceolate, 15-17 cm. by 2.5-2.8 cm.; petiole stout, 4-4.5 cm. long. Inflorescence on a young pseudobulb covered by a sword-shaped conduplicate leaf; bracts 2.5-5 cm. long; raceme bearing 2-3 drooping flowers. Flowers 4 cm. long; floral bracts 3.5 cm. long, longer than the ovary. Sepals unequal, lanceolate, slightly spreading, dorsal 2.1 cm. long, lateral sepals longer, 2.4 cm. gibbous, keeled, keel denticulate near the apex; petals oblong, shorter than the sepals, 1.8 cm. long. Lip oblong, 2 cm. long, decurved at the middle, side lobes narrow, mid lobe oblong with a ridge along the middle running from base to apex, apiculate. Column very short and curved; foot shorter and broader. Ovary 1.7 cm. long, three winged.

Flowering time - July.

Altitudinal range - \pm 1430 m.

Distributional pattern - central Nepal.

Collection in Herbarium - 1 gathering.

Specimen studied - 1.

Chr. No.

Remarks - Although King & Pantl. give Nepal and refer to Wallich's collection, Hooker (loc. cit.) does not give the distribution in Nepal. There is no mention of this species by Hara et al., so we are inclined to take this species as a new record for Nepal.

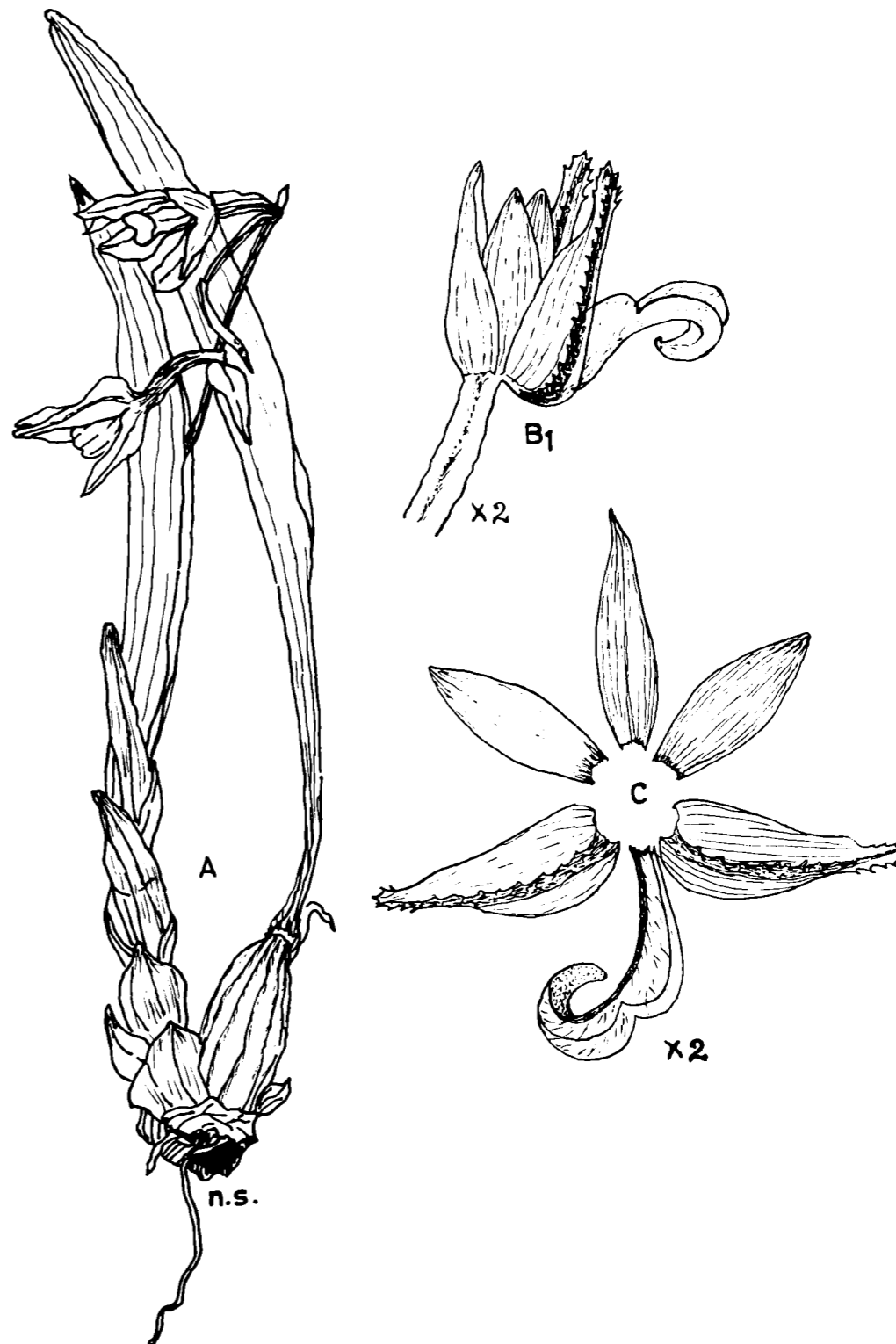


Plate 117

Eria coronaria (Lindl.) Reichb. f. in Walp., Ann. Bot. Syst. 6:271, 1861; K. & P. 124, t.172, 1898; D.433, 1966; T. 433, 1966 et 2:186, 1971; B. & T. 67:150, 1970; H. et al. 42, 1978; Seidenf. 62:40, t.18, 1982.

= *Coelogyne coronaria* Lindl. in Edgew, Bot. Regist. 27, Misc:83, 1841.

= *Trichosma suaveis* Lindl. : Hk. f. 5:827, 1890; op. cit. 6:193, 1890.

Pseudobulbs tufted, cylindric, with a large tabular sheath at the base. Leaves two, terminal, subsessile, subopposite, ovate-lanceolate, 11-20.5 cm. by 2.2-5.5 cm., thick. Racemes terminal, 2-4 flowered, peduncle short, sheathed at the base. Flowers large, 3-4 cm. in diam., white, glabrous; floral bracts narrowly lanceolate, c 3 mm. long, shorter than the ovary. Sepals subequal in length, spreading, dorsal sepal elliptic-oblong, 2 cm. long, lateral sepals subfalcate, c 2.1 cm. long by 1.2 cm., base broad attached to the sides of the column; petals elliptic-oblong, 1.8 cm. long. Lip oblong, 1.7 cm. long, 3-lobed, side lobes large, rounded, apex with undulate margin, with brownish strips, mid lobe small, oblong, with undulate margin, 5 yellow stripes, two broad crenulate ridges on the disk between the side lobes. Column stout, 8 mm. long; foot tapering, 4 mm. long.

Flowering time - October-November.

Altitudinal range - 1650-2300 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 5 gatherings.

Specimens studied - 4.

Chr. No. n = 18 (Mehra & Vij, Taxon, 19:108, 1970).

also variable -n17-19 and 22-26 (Mehra & Sehgal, ibid. 29:349, 1980).

Remarks - The size of the lip is variable. In some specimens the lip is longer and has 7 yellow ridges.

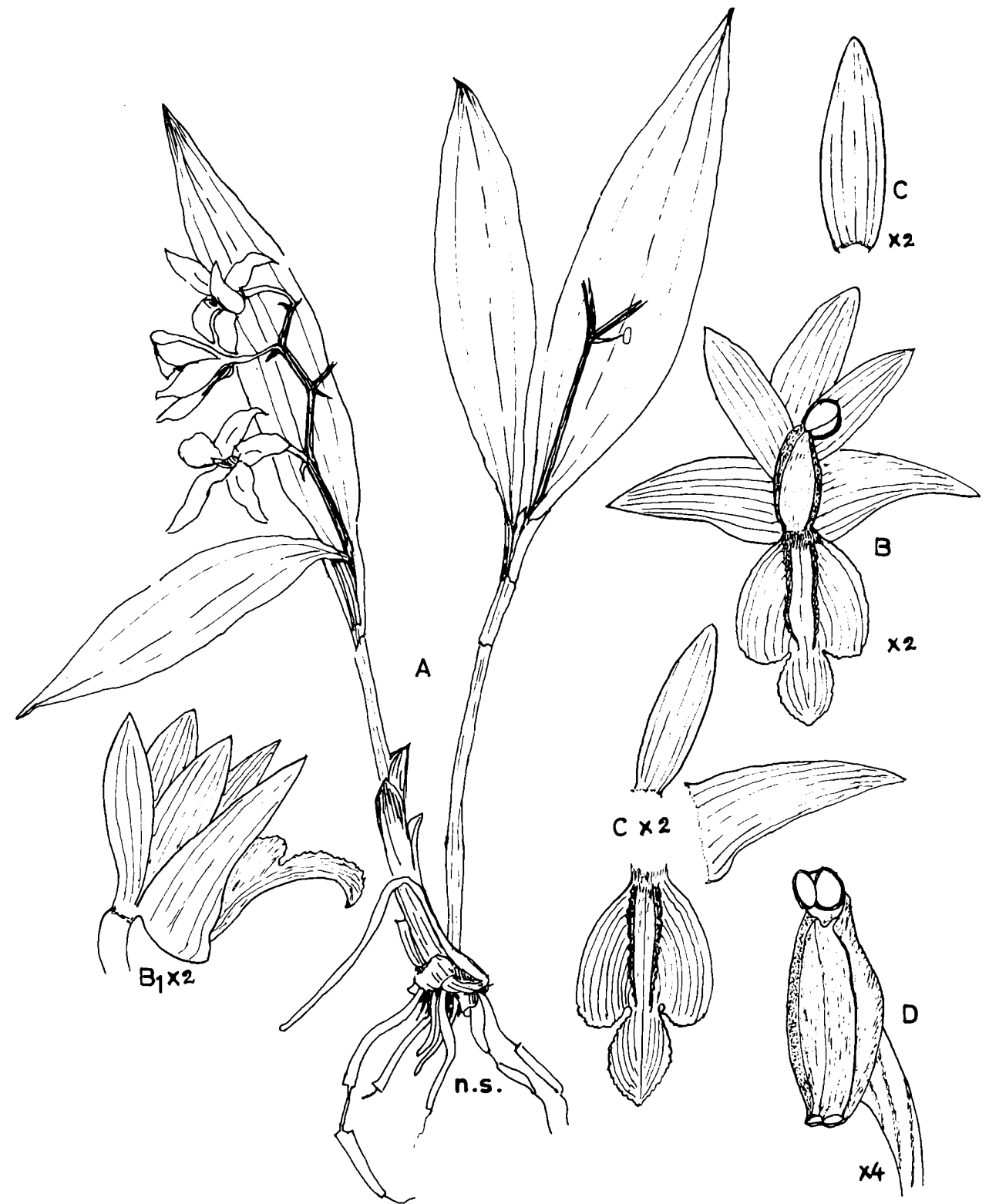


Plate 118

Eria discolor Lindl. in Journ. Linn. Soc. (bot) 3:51, 1859; Hk. f. 5:21, t.32, 1895; T.433, 1966; Seidenf. 62:49, t.23, 1982.

= *Tylostylis discolor* (Lindl.) Hk. f. : K. & P. 130, t.180, 1898.

= *Eria pulchella* Lindl. : Herk. 82:282, f.151, 1974.

Rhizome thick and woody, stem thick, constricted. Leaves 5-6, narrowly oblong, usually 9.5-15 cm. by 2-4 cm., coriaceous, subacute or emarginate. Racemes arising from beneath the leaves and shorter, erect, rachis stout and tomentose, few flowered; flower 1.6 cm. in diam., yellowish; floral bracts broadly elliptic, 6 mm., thick, glabrous. Sepals equal, 10 mm. by 4 mm. spreading, oblong elliptic, pubescent on the outer surface and slightly so on the inner surface; petals narrowly oblong, 8 mm. long, smaller than the sepals, spreading. Lip broadly ovate 4 mm. long, mobile being articulated to the foot by a claw, a disc at the base above the claw, surface pubescent, edges upturned. Column 5 mm. long, curved downwards and forwards, foot very short, 2 mm. long, with a dark coloured callus. Anther depressed; pollinia 8 attached to membranes.

Flowering time - April to June and again in November.

Altitudinal range - 450-600 m.

Distributional pattern - east Nepal.

Collection in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No. $n = 20$ (Vij et al., Taxon, 25:641, 1976 as *Tylostylis discolor*).

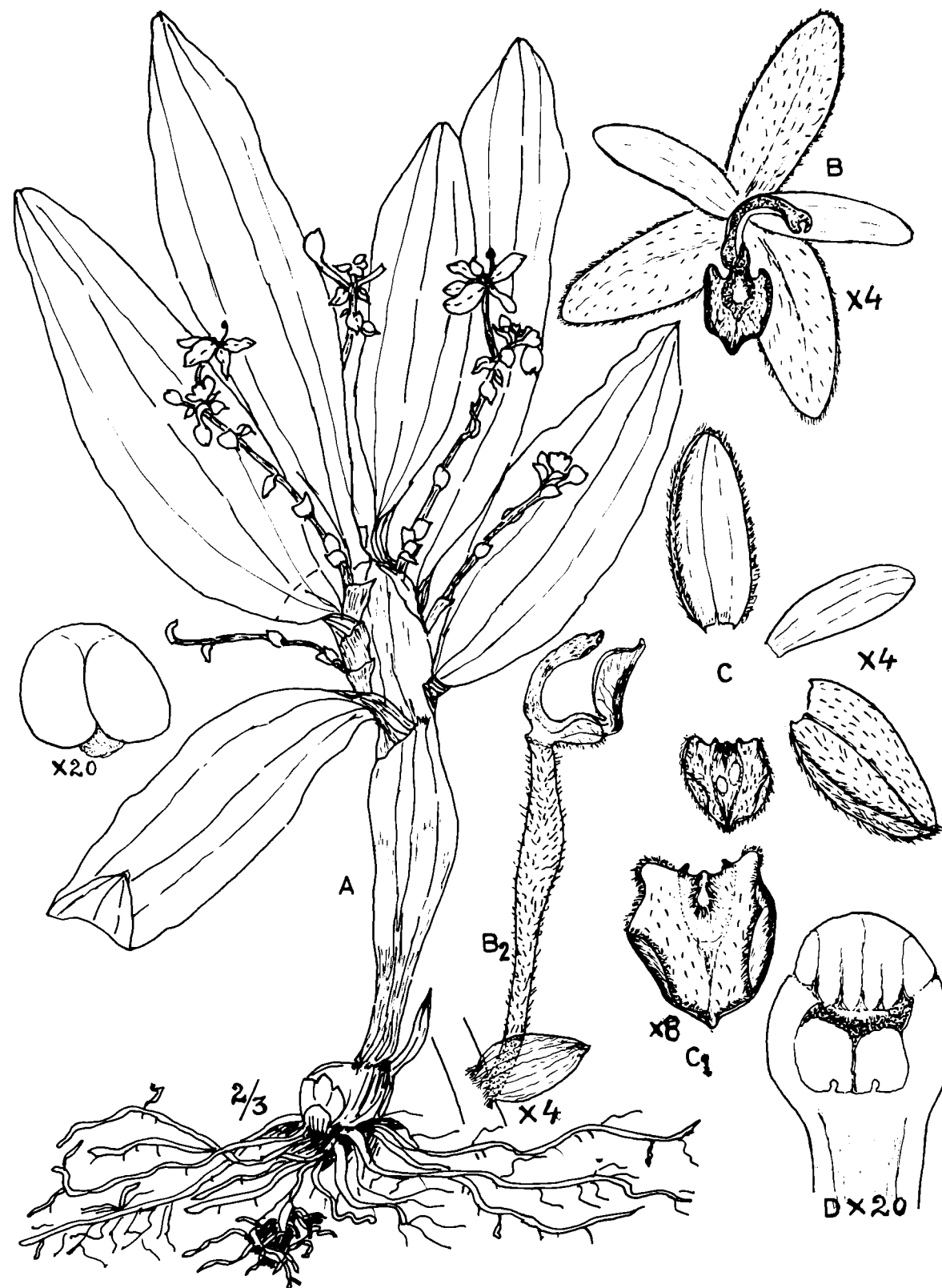


Plate 119

Eria excavata Lindl. Gen. Sp. Orchid Pl. 67, 1830; Hk. f. 5:795, 1890; K. & P. 124, t.171, 1898; T. 434, 1966; B. & T. 67:150, 1970; H. et al. 42, 1978.

Pseudobulbs oblong or ovoid, shrivelled at flowering time; leaves 4-6, elliptic-lanceolate or elliptic-oblong, 7-17 cm. by 1-3 cm., many nerved, acute, membranous. Raceme solitary terminal, shorter or equalling the leaves, few flowered. Flowers 1.2 cm. in diam., yellowish; floral bracts slightly shorter than the ovary, 7-9 mm. long, lanceolate, pubescent. Sepals subequal, slightly connivent, pubescent on the outer surface, dorsal sepal 8 mm. long, elliptic-oblong, acute, lateral sepals 7 mm. long, lanceolate, subfalcate; petals narrower but equalling the lateral sepals, 7 mm long, elliptic lanceolate, subacute. Lip obovate in outline, 3-lobed, side lobes rounded, erect and with three elongate calli between them or a single lobed mass, terminal lobe decurved, with 3 central crenate ridges, bilobulate or obovate and acute. Column very short; foot also short and deeply excavated.

Flowering time - May to July.

Altitudinal range - 1675-2290 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 6 gatherings.

Specimens studied - 6.

Chr. No. $n = 20$ (Mehra & Vij, Taxon, 19:108, 1970).

$2n = 38$ (Biswas, ibid. 29:169, 1980).

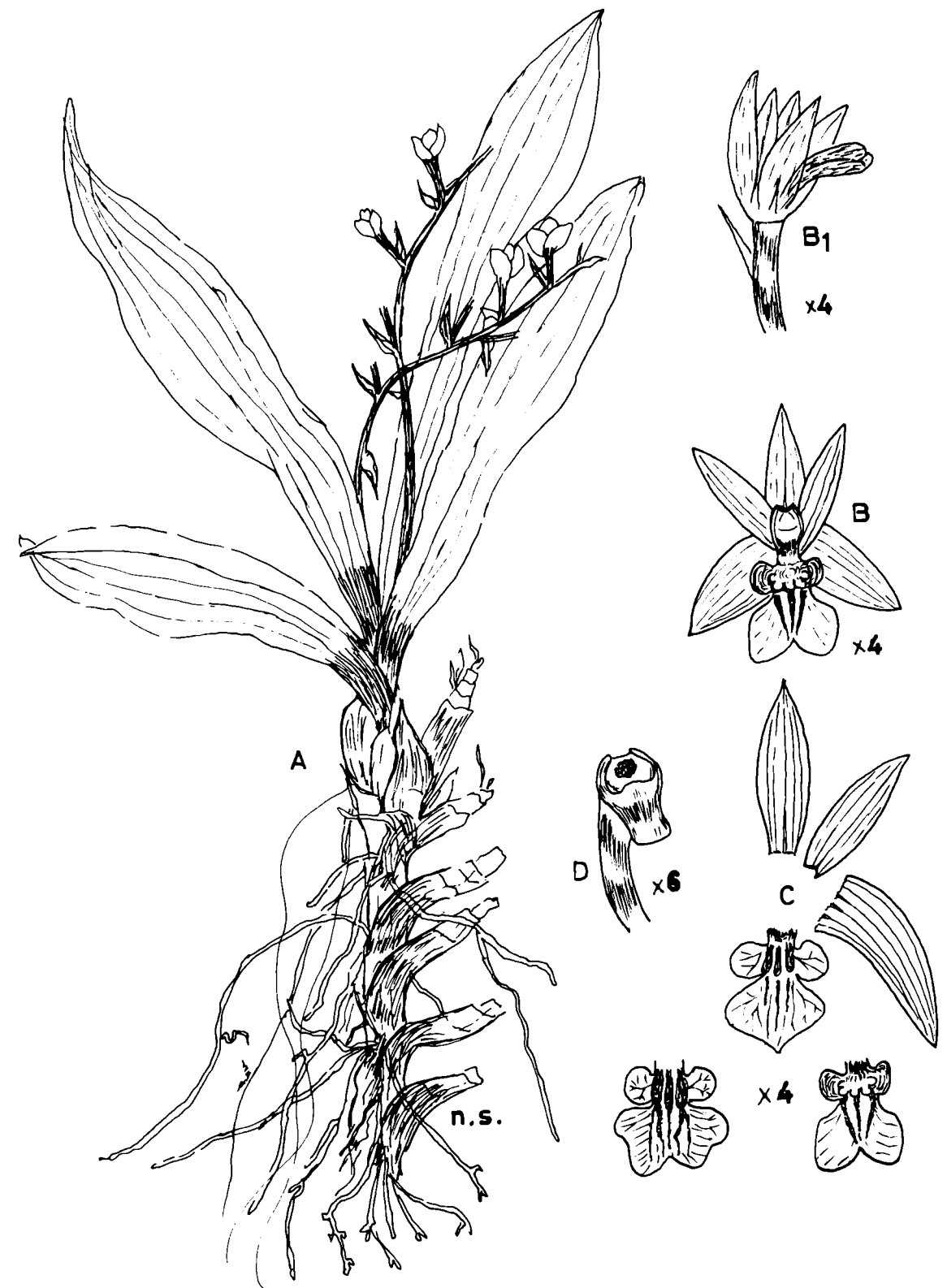


Plate 120

Eria graminifolia Lindl. in J. Proc. Soc. Bot. 3:54, 1859; Hk. f. 5:794, 1890; K. & P. 119, t.164, 1894; T.434, 1966; B. & T. 67:152, 1970; H. et al. 42, 1978.

Pseudobulbs short or elongate, coherent, bearing several long sheaths when young. Leaves 2-6, linear-lanceolate, 9-17 cm. by .6-1.6 cm. broad but narrowed towards the base, membraneous. Spikes usually several produced amongst the young leaves, equalling or slightly shorter than the leaves, rachis glandular pubescent bearing many flowers. Flowers 1.4 cm. in diam., mildly scented; floral bracts 7 cm. long, shorter than the ovary, acuminate. Sepals subequal, spreading, dorsal sepal 1 cm. long, elliptic-lanceolate, lateral sepals slightly shorter but broader, 8 mm. by 5 mm., lanceolate, subfalcate; petals equalling the lateral sepals but narrower, oblong. Lip fleshy, broadly oblong, 6 mm. long, shorter than the petals, 3 lobed, side lobes spreading outwards and recurved, terminal lobe transversely oblong or more or less orbicular, 3 stout ridges each ending at a callus, two on the side lobes and the middle on the terminal lobe. Column with a broad puberulous foot.

Flowering time - May to August.

Altitudinal range - 2300-2500 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 4 gatherings.

Specimens studied - 4.

Chr. No. n = 19 (Mehra & Viji, Taxon, 19:108, 1970).

2n = 38 (Biswas, ibid. 29:169, 1980).

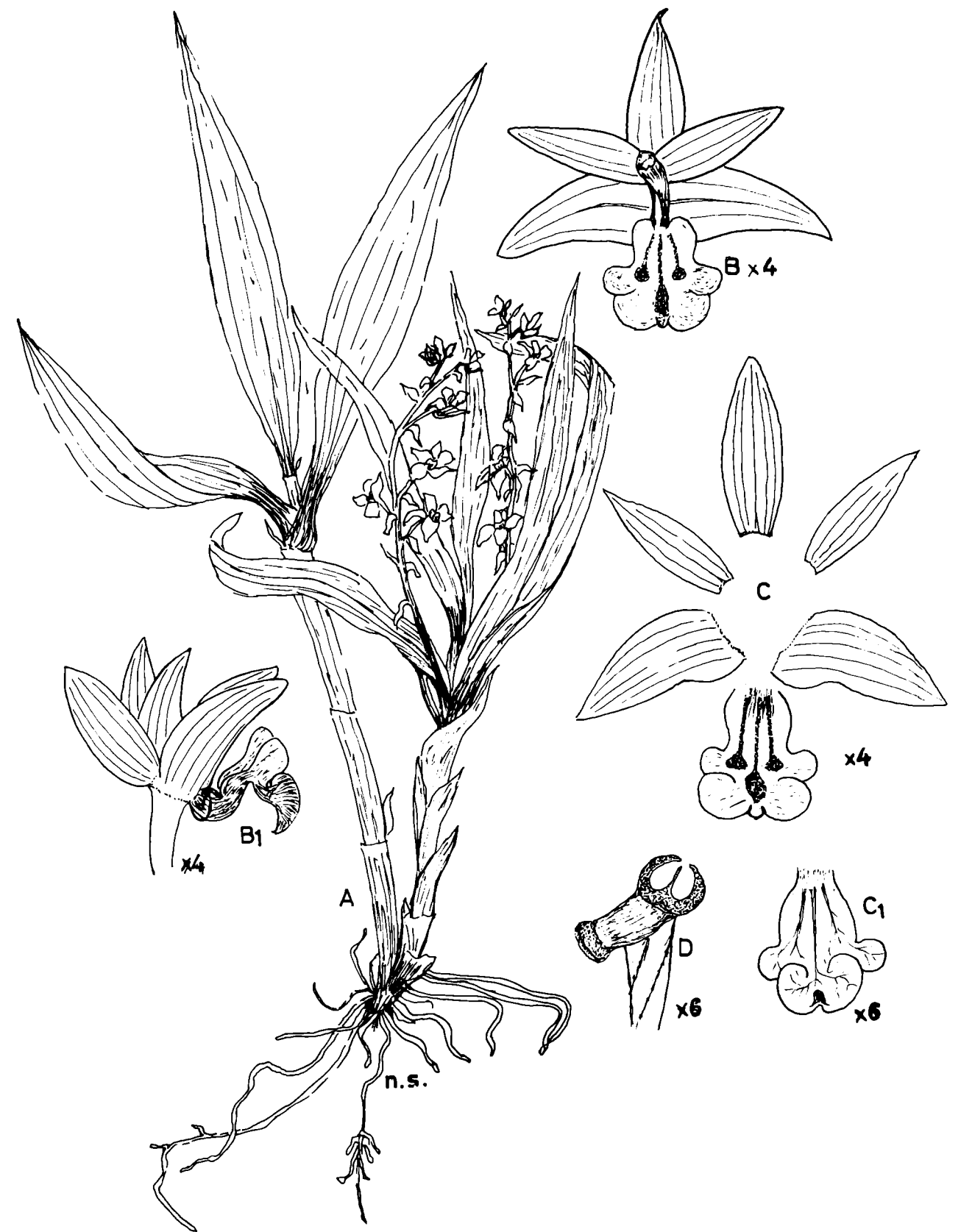


Plate 121

Eria muscicola (Lindl.) Lindl. J. Proc. Linn. Soc. Bot. 3:47, 1859; Hk. f. 5:789, 1890; K. & P. 117, t.159, 1898; T.434, 1966 et 3:143, 1975; B. & T. 67:152, t.9, 1970; H. et al. 42, 1978; Seidenf. 62:32, t.13, 1982.

= *Dendrobium muscicola* Lindl. Gen. Sp. Orchid. Pl.75, 1830.

Plants small, c 5 cm. in height, pseudobulbs depressed-globular, stem short and slender. Leaves 2-3, oblanceolate, 1.2-3.2 cm. by 3-9 mm., sessile or subsessile, apiculate. Scape terminal, erect, shorter than the leaves, 3 to 6 flowered raceme. Flowers secund, 6 mm. in diam., yellowish green; floral bracts lanceolate, 3-4 mm. long, longer than the ovary, acuminate. Sepals subequal, lanceolate, spreading, dorsal sepal 4 mm. long, lateral sepals falcate; petals narrower than the sepals, linear-lanceolate, erect. Lip shorter than the sepals, 3 mm. long, lanceolate without side lobes, concave, slightly dilated and deflexed at the middle, margin all along erose, two indistinct calli at the base, apex acuminate or acute; mentum rounded.

Flowering time - June to July.

Altitudinal range - 1525-1830 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. $n = 18$ (Mehra & Sehgal, Taxon, 25:647, 1976).

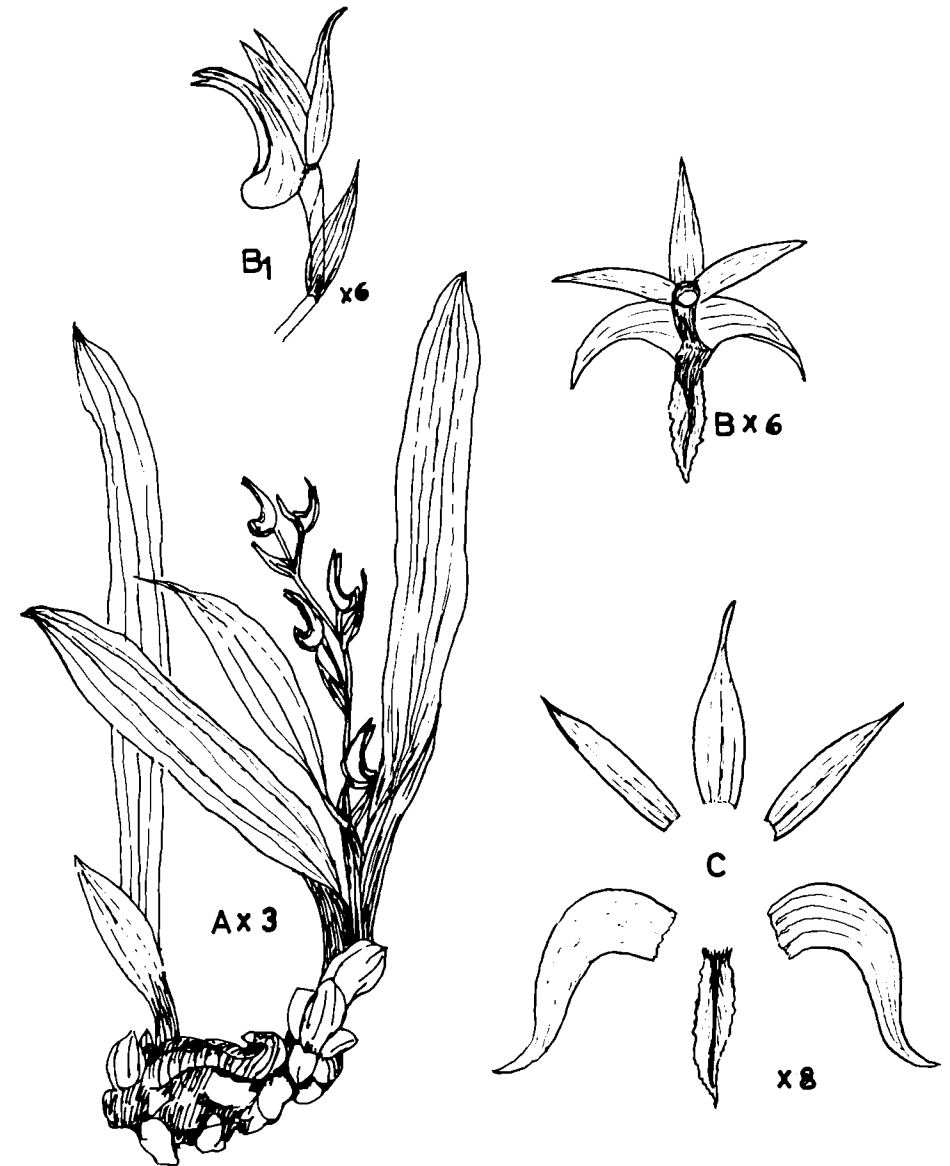


Plate 122

Eria pubescens (Hk.) Steud. Nomen. Bot. 2 ed 1, 566, 1840; H. et al. 42, 1978; Seidenf. 62:60, t.29, 1982.

= *Dendrobium pubescens* Hook. Exot. Pl. 2:t.124, 1825.

= *Eria flava* Lindl. : Hk. f. 5:801, 1890; K. & P. 126, t.175, 1898; T.434, 1966; B. & T. 67:150, 1970.

Rhizome stout, pseudobulbs large, sheathed at the base, compressed. Leaves 3-5, narrowly oblong or oblong-lanceolate, 7-16.5 cm. by 1-2 cm., narrowed towards the base, petioled, often loaded with concretions. Racemes arising from the base of the pseudobulbs, erect, stout, densely covered by soft tomentum, equalling the leaves. Flowers 2-2.5 cm. in diam., distant, yellow; floral bracts lanceolate, 7-12 mm. long, shorter or equalling the ovary, densely tomentose. Sepals also densely tomentose on the outside, unequal, dorsal sepal 1.1 cm. long, lanceolate, lateral sepals more or less triangular, 1.4 cm. long, 7 mm. broad at the base, ovate-lanceolate, subfalcate; petals parallel to the column, narrowly oblong, smaller than the dorsal sepal, 8 mm. long, narrowed at base and apex. Lip oblong 1.1 cm. long, 3 lobed, side-lobes narrow with acute or rounded apices, puberulous, mid lobe oblong, acute and slightly deflexed, number of ridges variable, two ridges extending from base to the junction of the side-lobes with mid lobe either prominent or faint and in addition to one or two ridges on the terminal lobe. Column 3 mm., erect; foot 5 mm. long, longer than the column itself and at right angles.

Flowering time - March to May.

Altitudinal range - 610-1980 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No. 2n = 40 (Vij et al. Taxon, 25:634, 1976).

also 2n = 38 (Biswas, ibid. 29:169, 1980 - all as *E. flava*).

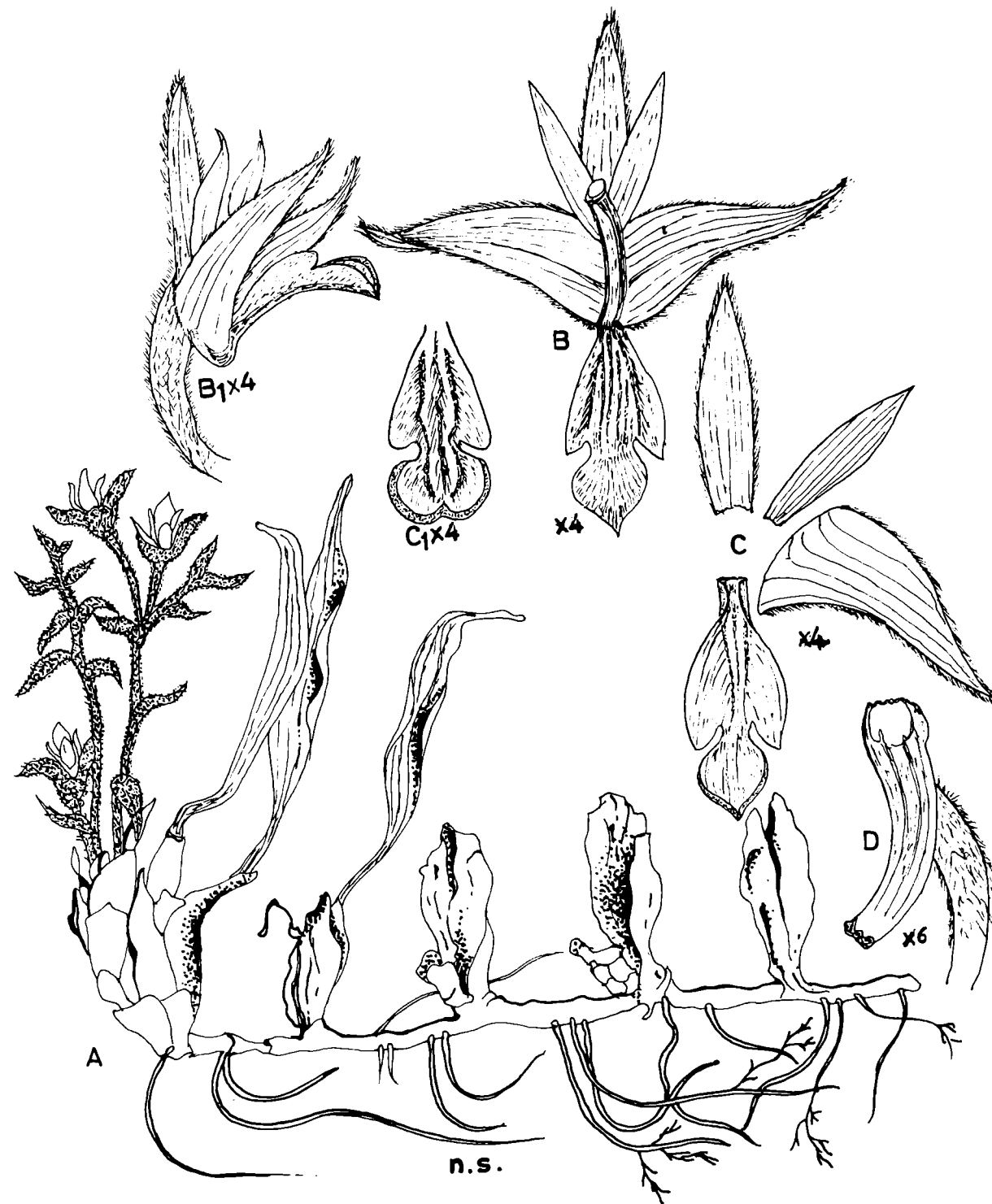


Plate 123

Eria spicata (D. Don) Hand.-Mazz., Symb. Sin. 7:1353, 1936; H. et al. 42, 1978; Seidenf. 62:126, t.78, 1982.

= *Octomeria spicata* D. Don, Prodr. Fl. Nep. 31, 1825.

= *Pinalia alba* Buch.-Ham. ex D. Don l.c.

= *Eria convallarioides* Lindl. : Hk. f. 5:791, 1890; K. & P. 118, t.161, 1898; B. & T. 67:150, 1970.

Pseudobulbs tufted, covered when young with large sheathing bracts; stem after flowering very stout. Leaves 4-6, elliptic-lanceolate or oblanceolate, 8.5-25.5 cm. by 2-2.5 cm., subsessile. Spike produced from the axil of the bracts and leaves, decurved, densely crowded by flowers. Flowers small, 7-8 mm. in diam., white or pale yellow; floral bracts 6 mm. long, ovate-lanceolate, equalling the ovary, bracts at the base of the flowering region are the largest. Sepals unequal, dorsal sepal broadly ovate, 5 mm. long, acute, apex bent inwards, lateral sepals as long but broader, 4.5 mm. at the base, broadly ovate, concave, subfalcate, acute; petals oblanceolate, spreading, as long as the sepals, but narrower. Lip cuneate, truncate 4 mm. long, sometimes with a broad triangular warted tip, obscurely 3 lobed, concave. Column slender; foot much curved, 3 mm. long.

Flowering time - July to August.

Altitudinal range - 1500-2200 m.

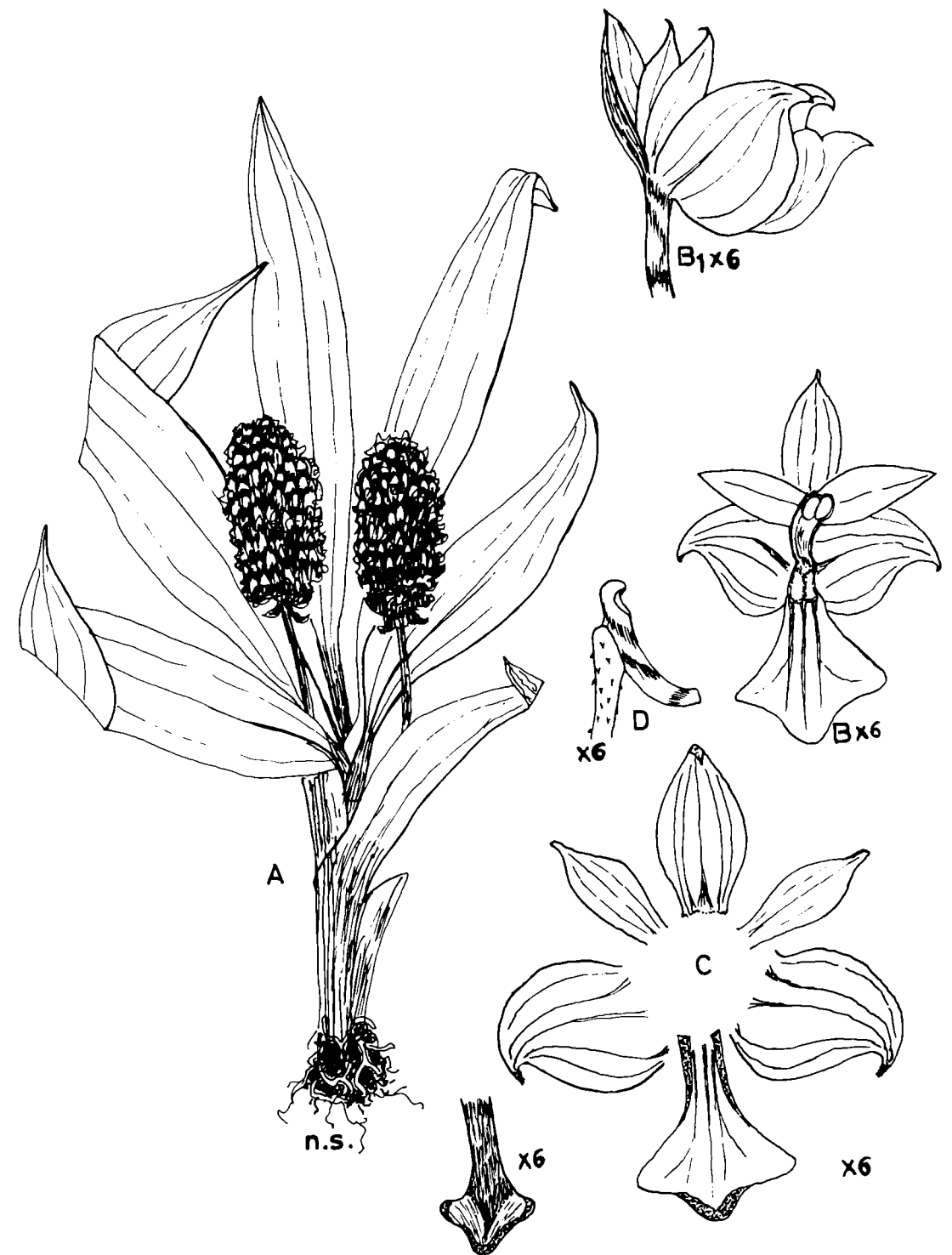
Distributional pattern - west and central Nepal.

Collection in Herbarium - 7 gatherings.

Specimens studied - 7.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:108, 1970 as *E. convallaroides*).

2n = 38 (Mehra & Sehgal, ibid. 27:226, 1978 as *E. spicata*).



LIPARIS Rich. (Liparideae). The name refers to the smooth, shining surface of the leaves of many of the species. The genus is closely allied to *Malaxis* in habit. Terrestrial or epiphytic usually with pseudobulbs. Leaves solitary or more, membranous or coriaceous, either continuous with their sheath or jointed on the sheath. Flowers generally small or of medium size in a raceme, resupinate. Sepals spreading, recurved with margin often rolled inwards. Petals as long as the sepals, very slender. Lip adnate to the base of the column, usually broad, column long and curved with small wings on either side of the stigmatic surface.

Liparis bituberculata (Hk.) Lindl.

According to Seidenfaden (31(1):32, 1976) the type specimen of *Cymbidium bituberculatum* Hook. on which this *Liparis bituberculata* is based has slender thin petals with one unbranched vein and the floral bracts are short as of *L. paradoxa* which of course is *L. nervosa* (Thbg) Lindl.

Liparis cordifolia Hk. f.

Leaf solitary on a short stem; inflorescence as long as the leaf. Floral bracts minute, triangular; Lip ovate-triangular, margin minutely erose-crenulate, apex broad and apiculate. (The lip is broader than that of *glossula* and the margin not ciliolate. From the drawings of other authors we find that the column is curved but not so much as in *glossula*).

Liparis olivacea Lindl.

This is a little known entity which is considered conspecific with *L. nervosa* (Thbg) Lindl. by Garay & Sweet (1974). However, we are confused to make out whether the floral bracts of *L. paradoxa* are long (see Seidenf. 31(1):34, 1976) or short (loc. cit. 32).

Liparis platyrachis Hk. f.

Epiphytic. Leaves 3 to 5, linear-lanceolate. Inflorescence pendulous, peduncle winged at places. Lip about half as long as the sepals, quadrate, hypochile with a large bilobed plate with somewhat raised lobules, epichile orbicular with a small triangular apiculus.

Liparis pygmaea King & Pantl.

Prof. Seidenfaden has a strong suspicion that *L. nana* Rolfe is the same as *L. pygmaea*. Thus we give a few characters of *L. nana* which is a Vietnamese plant.

Minute plants, leaves 2 or more. Inflorescence less than 3 cm. long. Lip squarish oval with a narrow, triangular apiculus, entire margin very minutely dentate. Column with slender wings extending above the operculum.

Liparis rostrata Reichb. f.

Plants with two opposite leaves, petioled. Inflorescence a little longer than the leaves, peduncle quadrangular with angles winged. Lip c 7-8 mm. broad, without calli, apex emarginate but apiculate. Column swollen at base and having two small warts a little above the base.

Artificial key to the species of *Liparis*

- 1 Leaves membranous, large, contracted at the base into and continuous with a long sheath —
 - 2 Lip abruptly deflexed from the very base, flat —
 - 3 Lip more or less rounded —
 - 4 Floral bracts broad, minute and erect. *cathcartii*.
 - 4* Floral bracts narrow, lanceolate, deflexed. *deflexa*.
 - 3* Lip elliptic, apex acute. *petiolata*.
 - 2* Lip deflexed from about the middle, concave —
 - 5 Lip margin ciliolate, apex mucronate. Leaf one. *glossula*.
 - 5* Lip margin erose, apex broad and emarginate. Leaves two or three. *nervosa*.
- 1* Leaves coriaceous, jointed to the sheath or to the pseudobulb —
 - 6 Lip much deflexed from about the middle —
 - 7 Pseudobulb elongated, stem like; leaves two. Wings of column elongated and hook-like. *bootanensis*.
 - 7* Pseudobulb short, ovoid and not stem like —
 - 8 Leaf solitary. Apical lobe of lip quadrate; two basal calli. *caespitosa*.
 - 8* Leaves two or more. Lip with two horizontal diverging callosities at the base. *perpusilla*.
 - 6* Lip deflexed from near the base —
 - 9 Leaves 2; pseudobulb disciform. Column insignificantly winged. *viridiflora*.
 - 9* Leaves 2-4; pseudobulb ovoid-oblong. Column winged, wings produced into long processes. *resupinata*.

Plate 124

Liparis bootanensis Griff. Notul. 3:278, 1851; Hk. f. 5:700, 1890; K. & P. 30, t.40, 1898; Seidenf. 31(1) 50, t.28, 1976.

Pseudobulbs narrowly oblong formed after flowering, young growth with lanceolate sheaths; leaf solitary, sessile or nearly so, arising from the apex of the pseudobulb, linear-oblong to oblanceolate, 12-18 cm. by 1.5-2.5 cm., acuminate. Inflorescence longer than the leaf, laxly flowered; floral bracts linear-lanceolate, 5-9 mm. long, shorter or equalling the ovary. Flowers 1.5 cm. long, yellow; sepals equal, linear-lanceolate, 6mm. long, edges revolute, lateral sepals lying parallel and below the lip; petals linear, 7 mm. long, much decurved, edges revolute. Lip cuneately oblong, 5 mm. long, deflexed at about the middle, base biauriculate and with two calli, apex broad and truncate, margin entire. Column curved, c 4 mm. long, base thickened, upper part with two long hook-like wings along the sides. Anther .5 mm. long with a large emarginate lip.

Flowering time - July.

Altitudinal range - c 2135 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. $n = 19$ (Mehra & Sehgal, Taxon, 23:803, 1974).



Plate 125

Liparis caespitosa (Thou.) Lindl. Bot. Reg. 115 st. 882, 1825; Seidenf. 31(1):61, f.38, 1976.

= *Malaxis caespitosa* Thou., Orch. Ill. Afr. t.89, 1822.

= *Liparis duthiei* Hk. f. : Hk. f. 5:701, 1890; K. & P. 32, t.42, 1898; D.93, 1906.

Pseudobulbs tufted, ovoid; leaf solitary, elliptic- or linear-lanceolate, 2.5-7.5 cm. by 4-8 mm. usually 6 mm., petioled sometimes sessile. Inflorescence exceeding the leaf, winged, peduncle without bracts, laxly flowered; floral bracts linear-lanceolate, 2-3 mm. long, equalling the ovary. Flower minute, c 4 mm. long yellowish green; sepals ovate-lanceolate or elliptic-lanceolate, dorsal 2.5 mm. long, lateral 2 mm. long, reflexed; petals linear, 2.5 mm. long, recurved. Lip quadrately oblong 2 mm long, slightly narrow at the base, decurved at about the middle, edges near the base involute and with two processes, apex broad and truncate, margin entire. Column stout, 1.25 mm. long, slightly curved, winged and broadened at the base.

Flowering time - July to September.

Altitudinal range - 610-920 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No. $n = 15$ (Arora, Taxon, 17:200, 1968; Mehra & Vij, ibid. 19:109, 1970).

Remarks - This is also a new record for Nepal, however the distribution of the taxon is given as Kumaon to Sikkim. Tuyama (1971) records this species collected from the Orchid sanctuary, Gangtok (Sikkim).

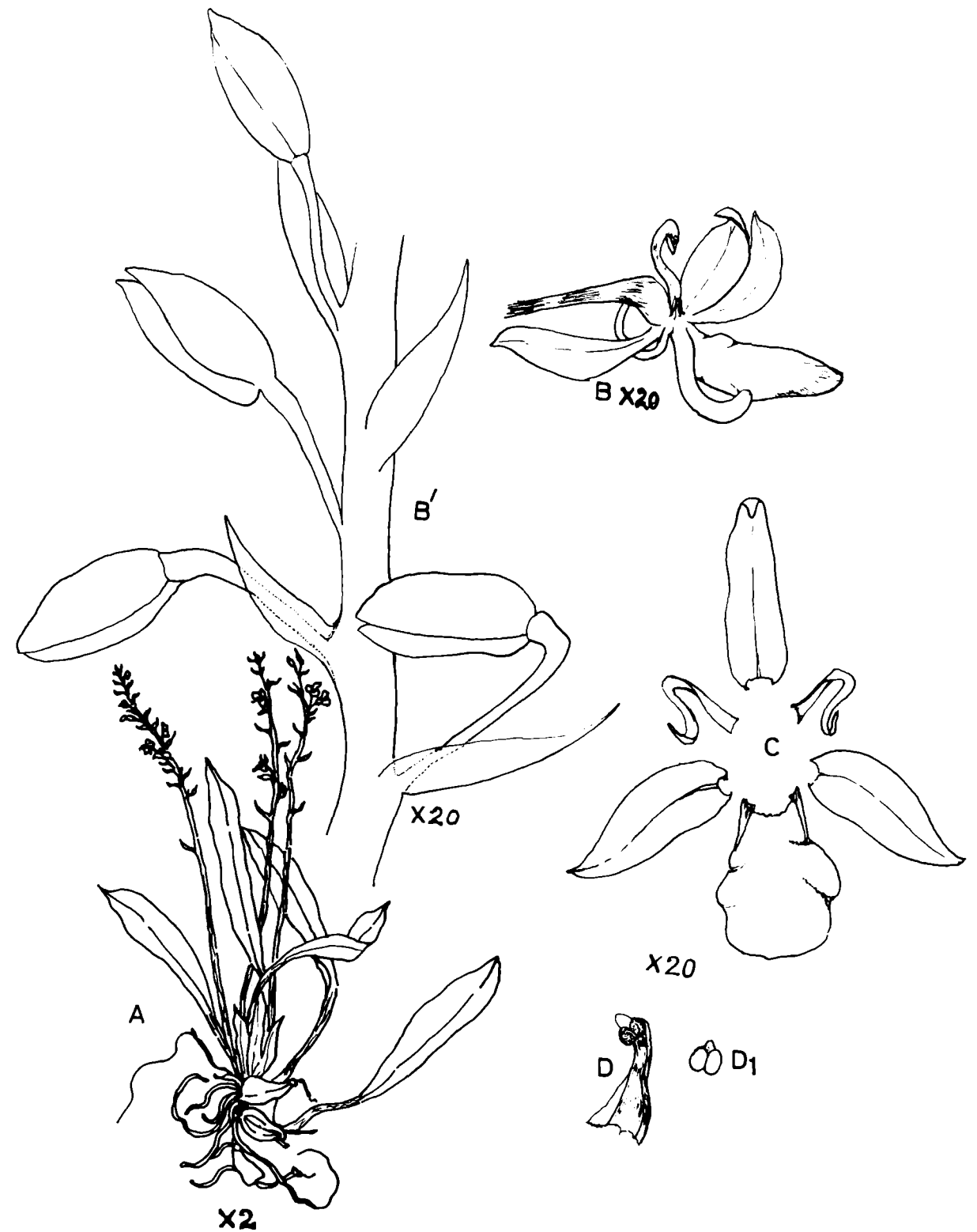


Plate 126

Liparis cathcartii Hk. f. in Icon Pl. 19, t.1808, 1889; Hk. f. 5:694, 1890; K. & P. 25, t.30, 1898; Seidenf. 31(1):24, 1976; H. et al. 47, 1978.

Pseudobulbs narrow, ovoid; stem arising from the base of pseudobulb, lower part decumbent, erect above, bearing several sheaths; leaves two subopposite, broadly-ovate to elliptic-ovate, blade 6.6-7 cm. by 2.8-3 cm.; petioles long, 3-4 cm., sheathing. Inflorescence much longer than the leaves, winged, laxly flowered, peduncle ebracteate. Flowers c 2 cm. long, greenish brown; floral bracts minute, 2 mm. long erect; sepals subequal, oblong, spreading, margin recurved, dorsal sepal 1 cm. long, lateral sepals 9 mm. long, closely adpressed to the lip; petals linear, 9 mm. long, curved and reflexed. Lip ovate or obcordate, 9 mm. long, 8 mm. broad, deflexed from the base, base clawed and with two callii which are connected to a cup at the middle of the lip. Column long, slender, 5 mm. long, curved, apex subtruncate with two short wings, base thickened and with two teeth.

Flowering time - July.

Altitudinal range - \pm 3050 m.

Distributional pattern - west Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

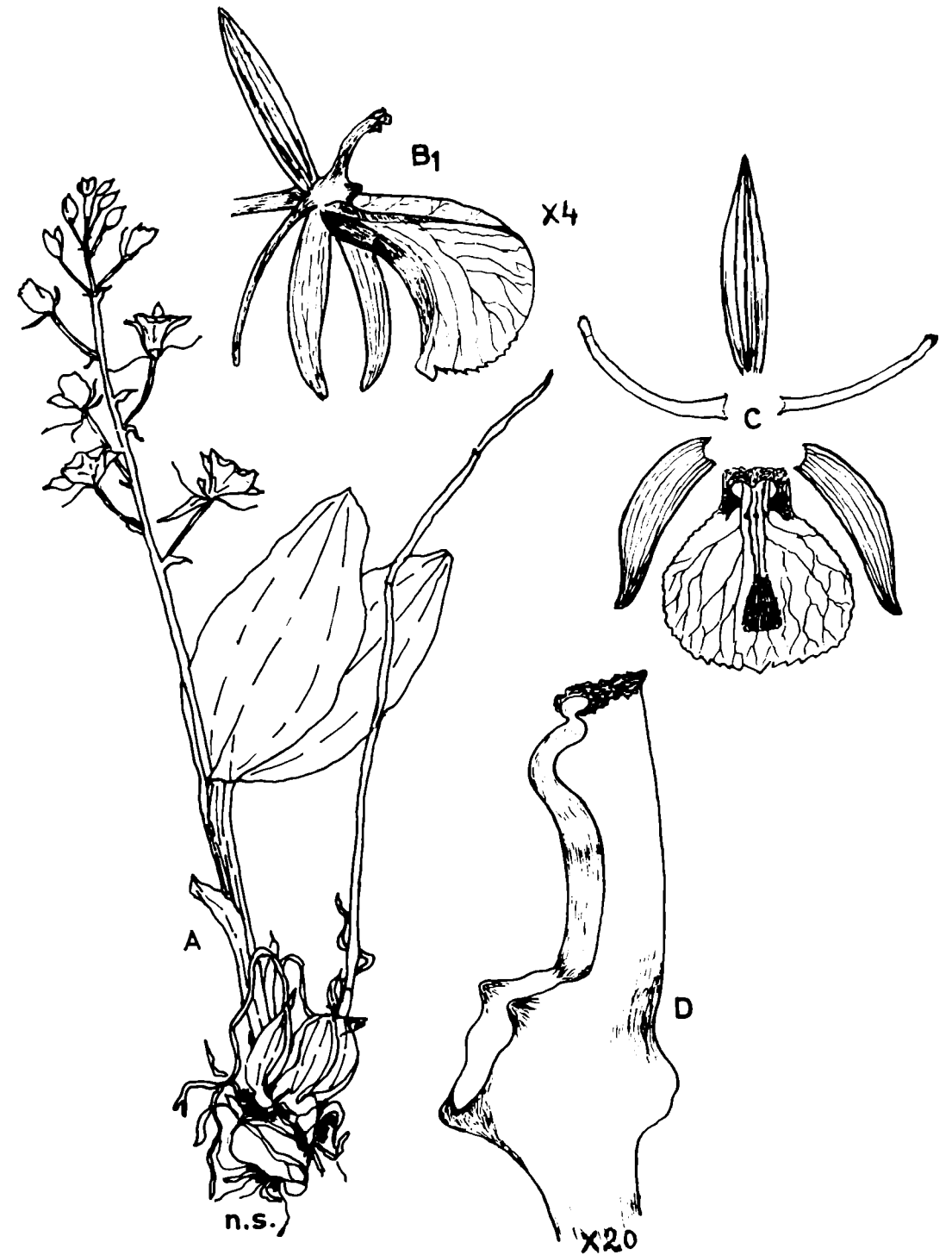


Plate 127

Liparis deflexa Hk. f. in Fl. Brit. Ind. 5:697, 1890; K. & P. 25, t.31, 1898; D.90, 1906; Seidenf. 31(1):27, f.15, 1976.

Stem slender arising from a pseudobulb; leaves two, subopposite, ovate-lanceolate or elliptic, lamina 10-15 cm. by 5.5-6 cm., subsessile, sheathing base, acuminate. Inflorescence longer than the leaves, erect, laxly flowered; bracts on the peduncle reflexed, many, 1.2 cm. gradually becoming smaller upwards, 6 mm.; floral bracts half as long as the ovary, 5 mm. long, lanceolate, reflexed. Flowers 1.2 cm. long, yellowish; sepals unequal, oblong, dorsal sepal 7 mm. long, acute, lateral sepals 6 mm. long, broader than the dorsal, obtuse; petals narrowly oblong or lanceolate, 6-7 mm. long, reflexed, margins recurved. Lip orbicular-reniform, 7 mm. long, 9 mm. broad, contracted at the base and deflexed, oblong mesial extending from base to near the apex, two calli at the base just below the column, margin at the base entire but rest minutely erose. Column slightly curved, 3 mm. long, narrow wings near the apex, base swollen with two knob-like projections.

Flowering time - August.

Altitudinal range - \pm 450-610 m.

Distributional pattern - east and central.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. $n = 21$ (Mehra & Kashyap, Taxon, 28:407, 1979).

Remarks - This is an addition to the species in Nepal, being a new record.

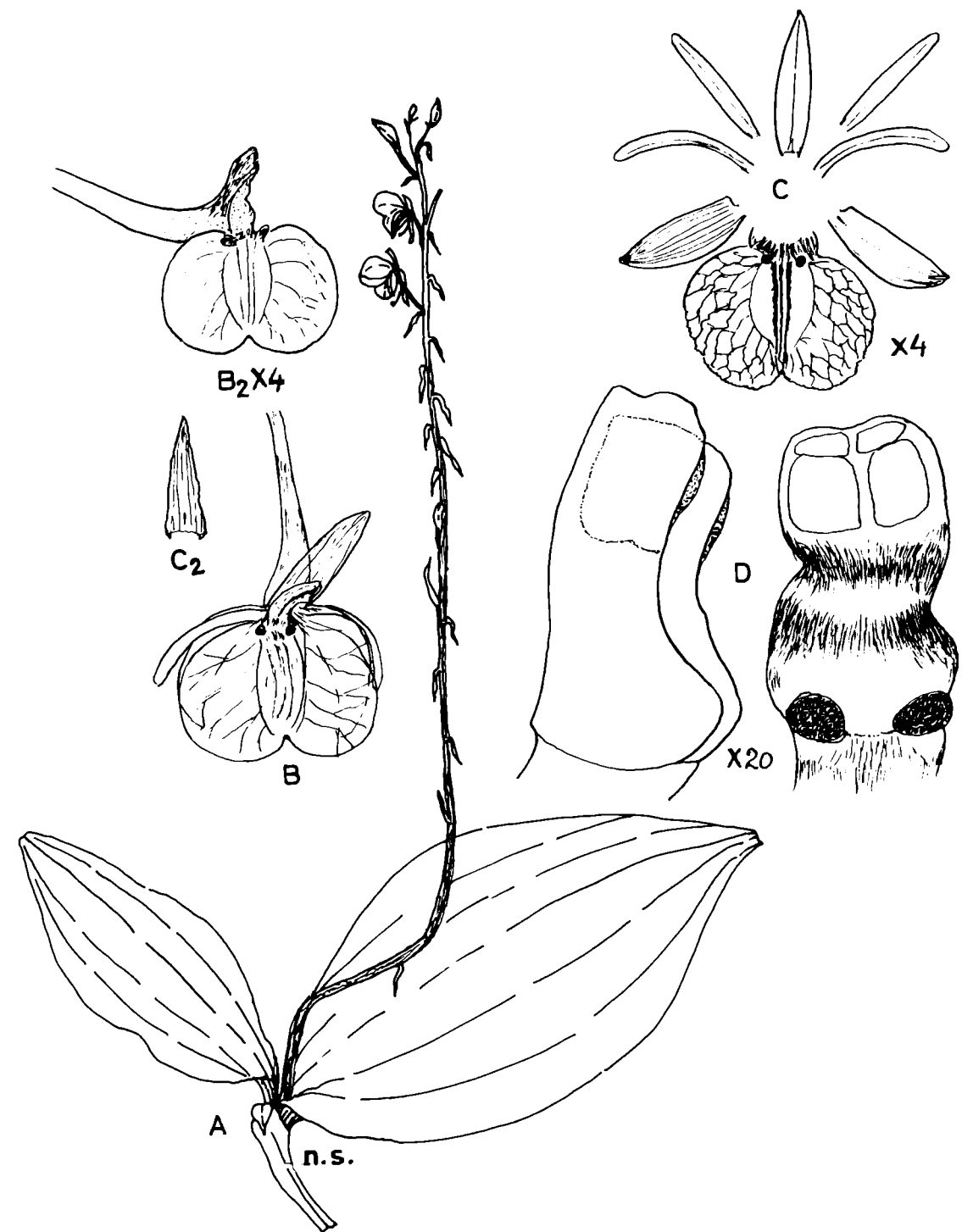


Plate 128

Liparis glossula Reichb. f. in *Linnaea* 41:44, 1876; Hk. f. 5:693, 1890; K. & P. 26, t.33, 1898; D.91, 1906; Kit. 104, 1955 (*grossula*); B. & T. 68:31, 1971; T. 3:159, 1975; H. et al. 47, 1978.

Pseudobulbs ovoid, 2.5-3.5 mm. long; leaf solitary, oblong, 7-11 cm. by 2-3.5 cm., sessile or subsessile, suddenly contracted into a sheath. Inflorescence longer than the leaf, peduncle slightly winged, laxly flowered; floral bracts linear, 7-10 mm., shorter than the ovary. Flowers greenish but lip purplish, 2 cm. long; sepals nearly equal, oblong-lanceolate, margin revolute, dorsal 1 cm. long, spreading, lateral pair under the lip and parallel, 9 mm. long; petals linear, 1 cm. long, reflexed. Lip obovate-oblong, cuspidate, deflexed about the middle, base without calli, 3 lines running from base to apex, anterior part concave, margin ciliolate except at the base, purple and veined all over. Column 4 mm. long, nearly straight, two short wings near the apex, base dilated into two large knob-like convexities, purple coloured. Anther with a beaked apex.

Flowering time - June to August.

Altitudinal range - 2900-4000 m.

Distributional pattern - west and central Nepal.

Specimens in Herbarium - 5 gatherings.

Specimens studied - 5.

Chr. No. n = 10 (Mehra & Vij, *Taxon*, 19:109, 1970; Vij et al. *ibid.* 25:635, 1976; Mehra & Kashyap, *ibid.* 27:226, 1978).

Remarks - The lip, in all our material, has 3 lines running from base to the apex and not one as given by previous workers.

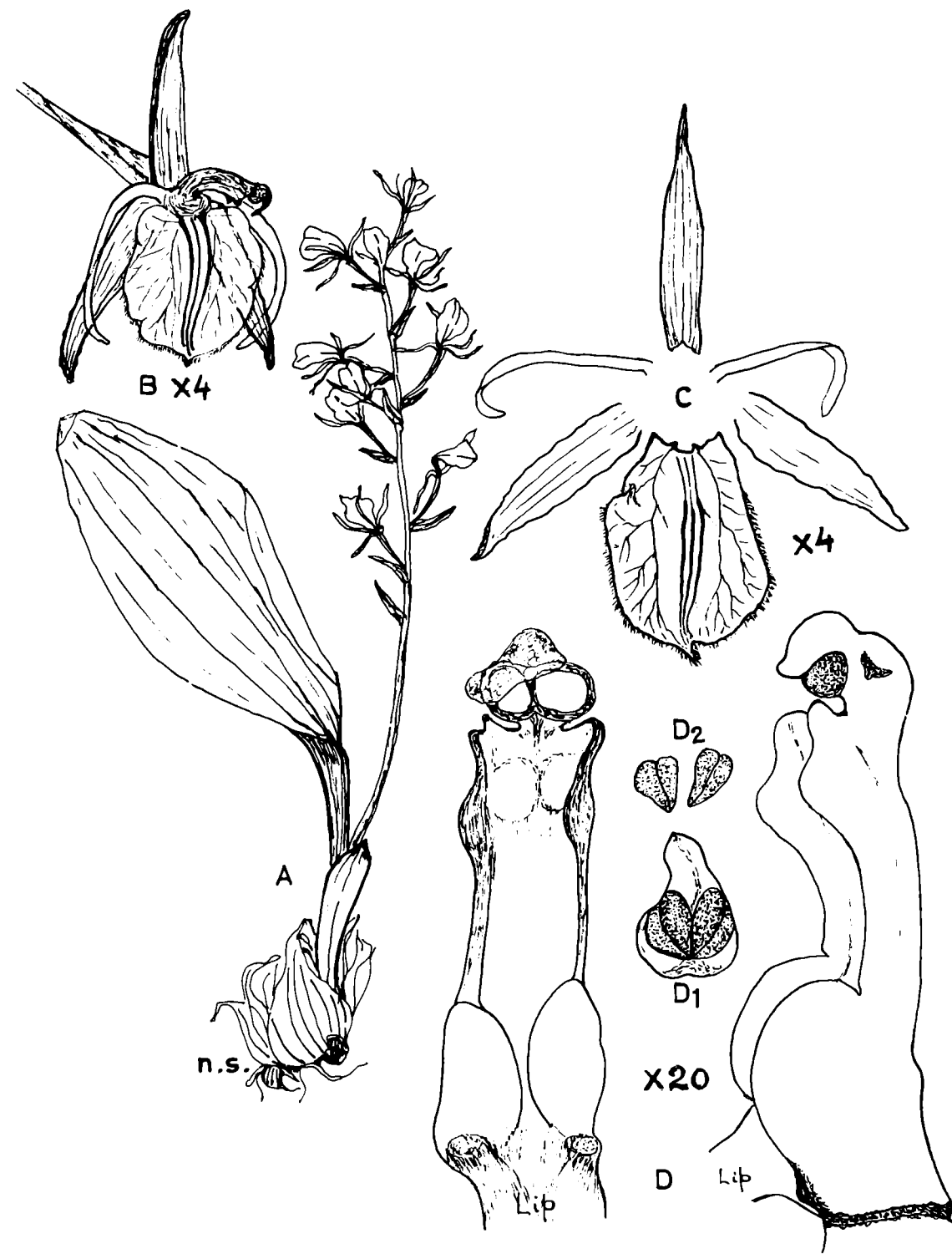


Plate 129

Liparis nervosa (Thunbg.) Lindl. Gen. Sp. Orchid Pl. 26, 1830; T. 3:159, 1975; Seidenf. 31(1); 30, f.16, 1976; H. et al. 47, 1978.

= *Ophrys nervosa* Thunbg. Fl. Jap. 27, 1784.

= *Empusa paradoxa* Lindl.

= *Liparis paradoxa* Reichb. f. : Hk. f. 5:697 et 6:181, 1890; K. & P. 27, t.34, 1898; D.92, 1906.

Pseudobulbs narrow and ovoid, stem erect bearing several sheaths; leaves 2-3, rarely 4, alternate, elliptic-lanceolate, 8-17 cm. by 2.3 cm., plicate, sheathing, sheath amplexicaul. Inflorescence about twice the length of leaves; peduncle finely striate; bracts 2 or 3 linear, 6-8 mm. long, recurved, laxly many flowered; floral bracts ovate-lanceolate, 3 mm. long, much shorter than the ovary. Flowers greenish yellow with purplish lip, 1.3 cm. long; sepals unequal, dorsal sepal linear, 5.5 mm. long, spreading, recurved margin, lateral sepals broadly ovate, 4 mm. long, 2 mm. broad, slightly concave, margin recurved; petals linear, 5 mm. long, reflexed, margin recurved. Lip obcordate or obovate, 4 mm. long, 4 mm. broad, deflexed at the middle, concave, base slightly raised, bearing 2 erect calli and lobed on the sides, margin entire, apical part broad, emarginate, erose and apiculate. Column not curved 3 mm. long, upper half hood-like, wings rounded and crenulate.

Flowering time - August to September.

Altitudinal range - 610-1375 m.

Distributional pattern - east, central and west Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No. n = 18 (Mehra & Vij, Taxon, 19:109, 1970, as *L. paradoxa*).

also n = 21 (Mehra & Sehgal, ibid. 24:513, 1975; Mehra & Kashyap, ibid. 28:407, 1979; Vij et al. ibid. 30:512, 1981 all as *L. paradoxa*).

2n = 42 (Jorapur & Hedge, ibid. 29:546, 1980; Singh, ibid. 30:704, 1981 all as *L. nervosa*).

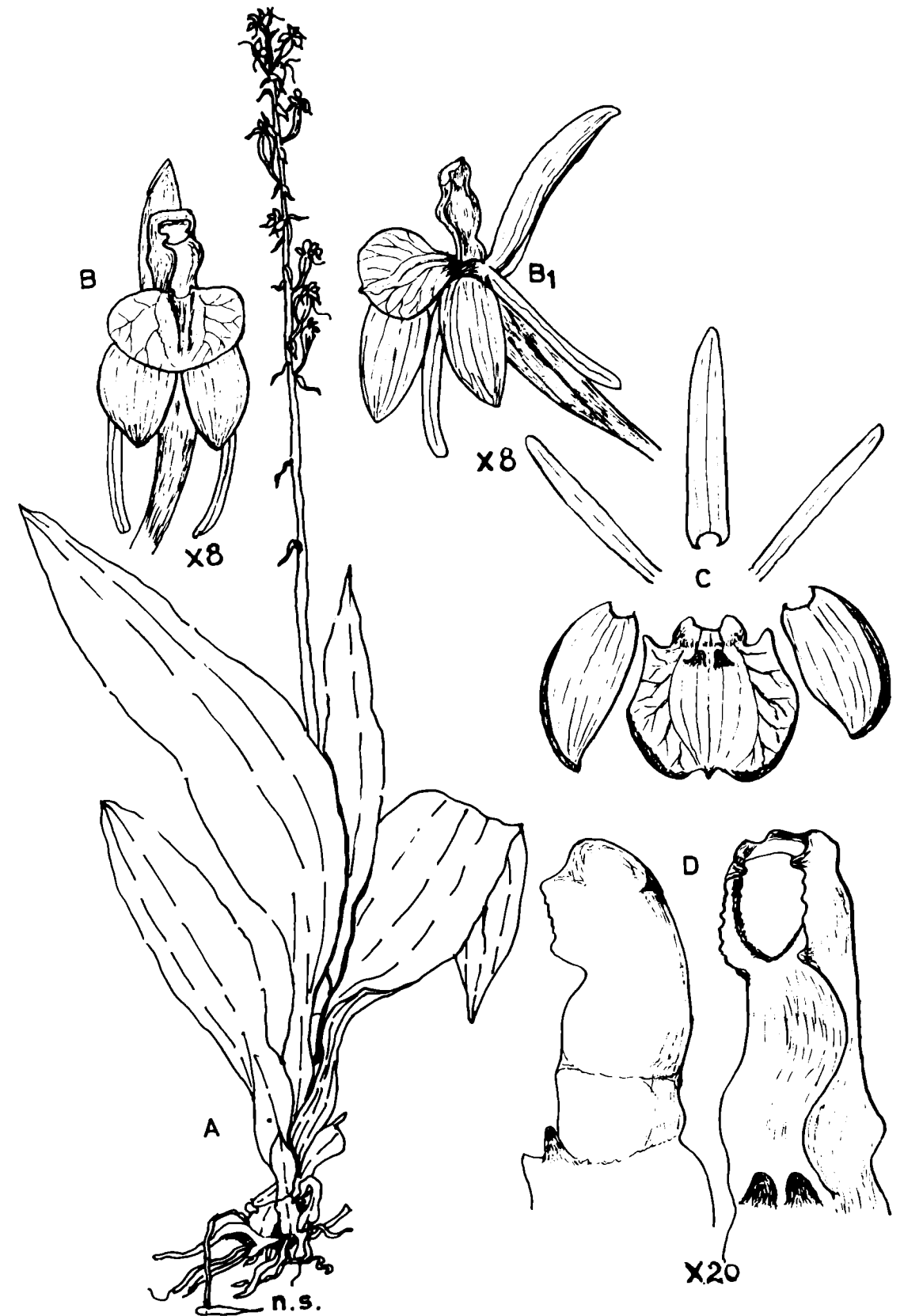


Plate 130

Liparis perpusilla Hook, f. in Icon. Pl. 19 : t, 1856B, 1889; Hk. f. 5:706, 1890; K. & P. 33, t.43, 1898; T. 2:190, 1971; Seidenf. 31(1); 91, f.61, 1976; H. et al. 47, 1978.

= *L. togashii* Tuyama, 441, f. 29c-e, 1966.

Pseudobulbs tufted, oblong; stem small; leaves 3-5, linear-lanceolate, 1.2-2.2 cm. by 1.5-2.5 mm., narrowed to the base, sessile, margin recurved. Inflorescence erect much longer than the leaves; peduncle winged bearing 1 or 2 linear bracts; laxly many flowered; floral bracts lanceolate, 2-3 mm. long shorter than the ovary. Flowers pink, c 4 mm. long; sepals equal, broadly elliptic-oblong, 2 mm. long, spreading, margin recurved; petals linear about as long as the sepals, reflexed. Lip quadrate, with 2 rounded side lobes, 1.5 mm. by 1.5 mm., deflexed at the middle, deeply grooved from base to apex having thin ridges running upwards, base with a concentric nectary from which proceed two elongated callosities. Column short, 1.5 mm. long, stout, two broad wings in the upper part, base broad. Anther ovoid.

Flowering time - August.

Altitudinal range - \pm 2300 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. n = 15 (Mehra & Vij, Taxon, 19:109, 1970).

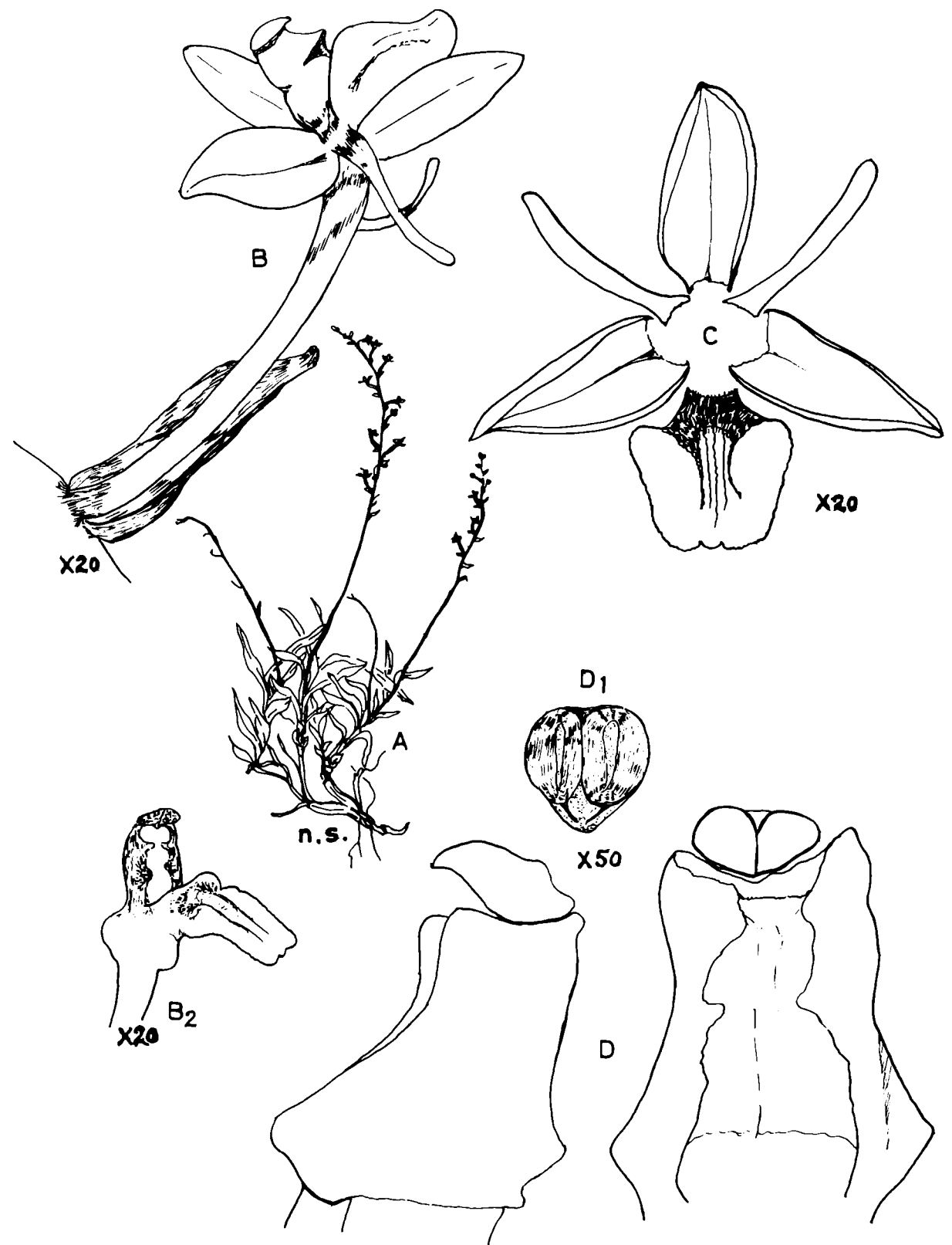


Plate 131

Liparis petiolata (D. Don), P.F. Hunt & Summerh. in Kew Bull. 20:52, 1966; T.2:190, 1971 et 3:160, 1975; Seidenf. 31(1):12, 1976; H. et al. 48, 1978.

= *Acianthus petiolatus* D. Don, Prodr. Fl. Nep. 29, 1825.

= *Liparis nepalensis* Lindl. : Hk. f. 5:693, 1890; K. & P. 26, t.32, 1898.

Terrestrial; pseudobulbs short, rootstock creeping, stout; leaves large two, broadly ovate to suborbicular, lamina, 5.7-6.5 cm. by 3-4.5 cm., base rounded or cordate, contracted into a petiole apex acute; petiole 2-3 cm. long. Inflorescence exceeding the leaves, peduncle ebracteate and without wings, few flowered; floral bracts lanceolate, 8 mm. long, equalling the ovary. Flowers 1.5 cm. long, petals and lip purplish; sepals subequal, lanceolate, edges revolute, dorsal sepal 1 cm. long, reflexed, lateral sepals equalling the dorsal but broader, lying parallel under the lip. Lip ovate-lanceolate, 1.1 cm. long 5 mm. broad, sides slightly raised, acuminate, base with 2 calli separated by a depression, a ridge running from base to apex, margin ciliolate, column curved, 4 mm. long, wings short, rostellum outgrowths 2, grooved, base thickened, 2 purple knob-like small projections at the very base.

Flowering time - June.

Altitudinal range - \pm 1500 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. n = 18 (Mehra & Vij, Taxon 19:109, 1970.

also n = 15 (Mehra & Sehgal, ibid. 25:647, 1976 - all as *L. nepalensis*).

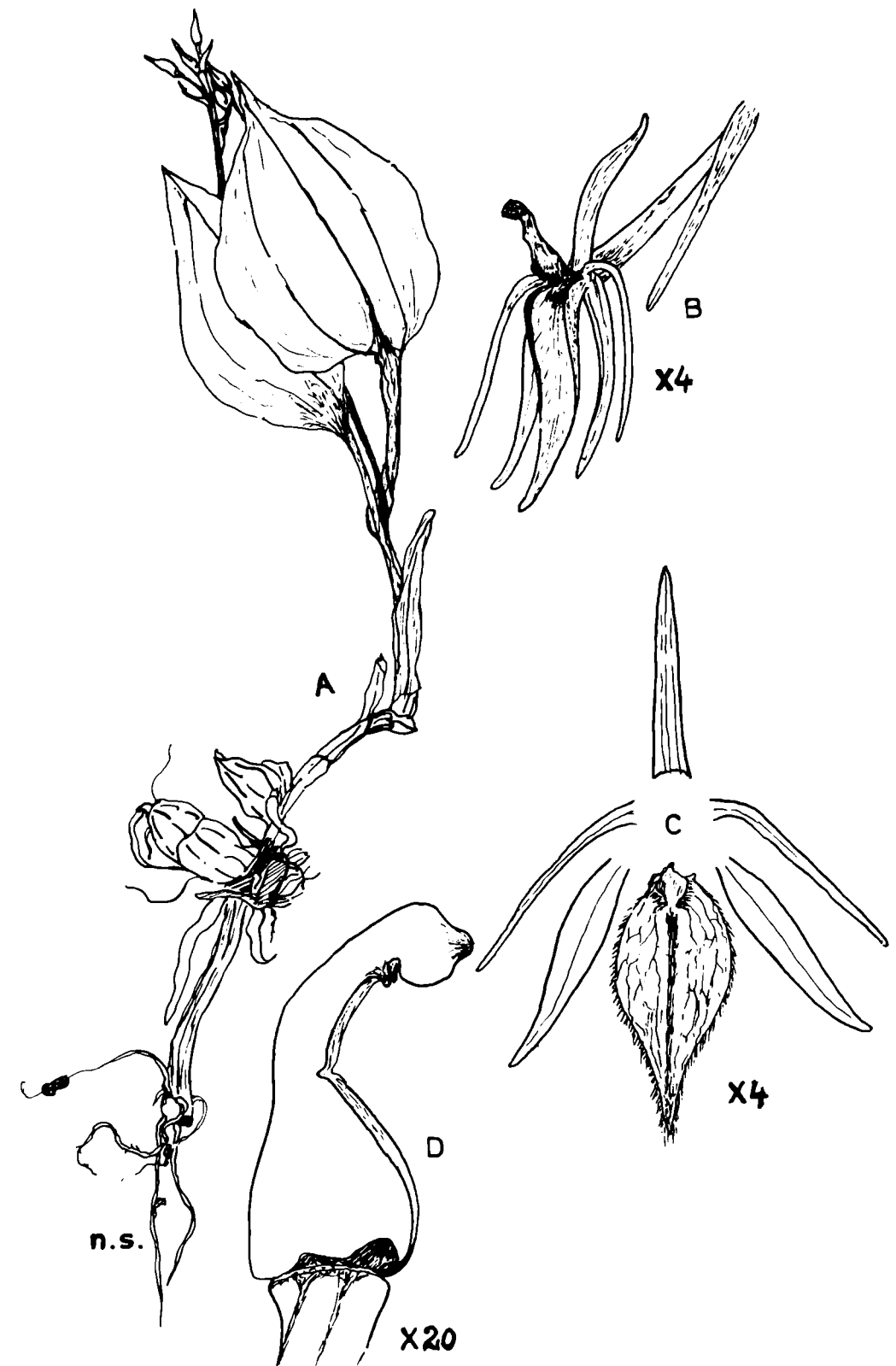


Plate 132

Liparis resupinata Ridley in J. Linn. Soc. Bot. 22:290, 1886; Hk. f. 5:705, 1890 et 6:183, 1890; K. & P. 36, t.48, 1898; T.441, 1966; Dept. Med. Pl. 2:133, 1969; B. & T. 68:31, 1971; Seidenf. 31(1):88, f.60, 1976; H. et al. 48, 1978.

Epiphytic, pseudobulbs tufted, c 3.5 cm. long; leaves 2-4, alternate linear-lanceolate 2.5-8 cm. by 6-10 mm., sessile, acute or acuminate. Inflorescence much longer than the leaves, subpendulous, peduncle without wings but bracteate, bracts many, lanceolate, 8-4 mm. gradually becoming smaller higher up, concave, spreading; laxly many flowered; floral bracts linear, 3 mm. long, shorter than the ovary. Flowers c 1 cm. long, greenish yellow; sepals equal, oblong, 6 mm. long, obtuse, dorsal retrorse, laterals not concealed by the lip but spreading outwards; petals linear equalling the sepals but narrower, spreading. Lip broadly ovate-oblong, 4 mm. long 2.5 mm. broad at the base, much smaller than the sepals, sagittate and 2 calli between the folds at the base, nectary present also at the base, apex broad with edges incurved. Column not curved, 3 mm. long, wings two at the apical portion, each with a long filiform process, pendent, two tooth-like projections at the very base.

Flowering time - February and March, and again in November to December.

Altitudinal range - 1830-2600 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 6 gatherings.

Specimens studied - 4.

Chr. No. n = 14 (Mehra & Vij, Taxon, 19:109, 1970).
also n = 28 (Mehra & Sehgal, ibid. 23:803, 1974).

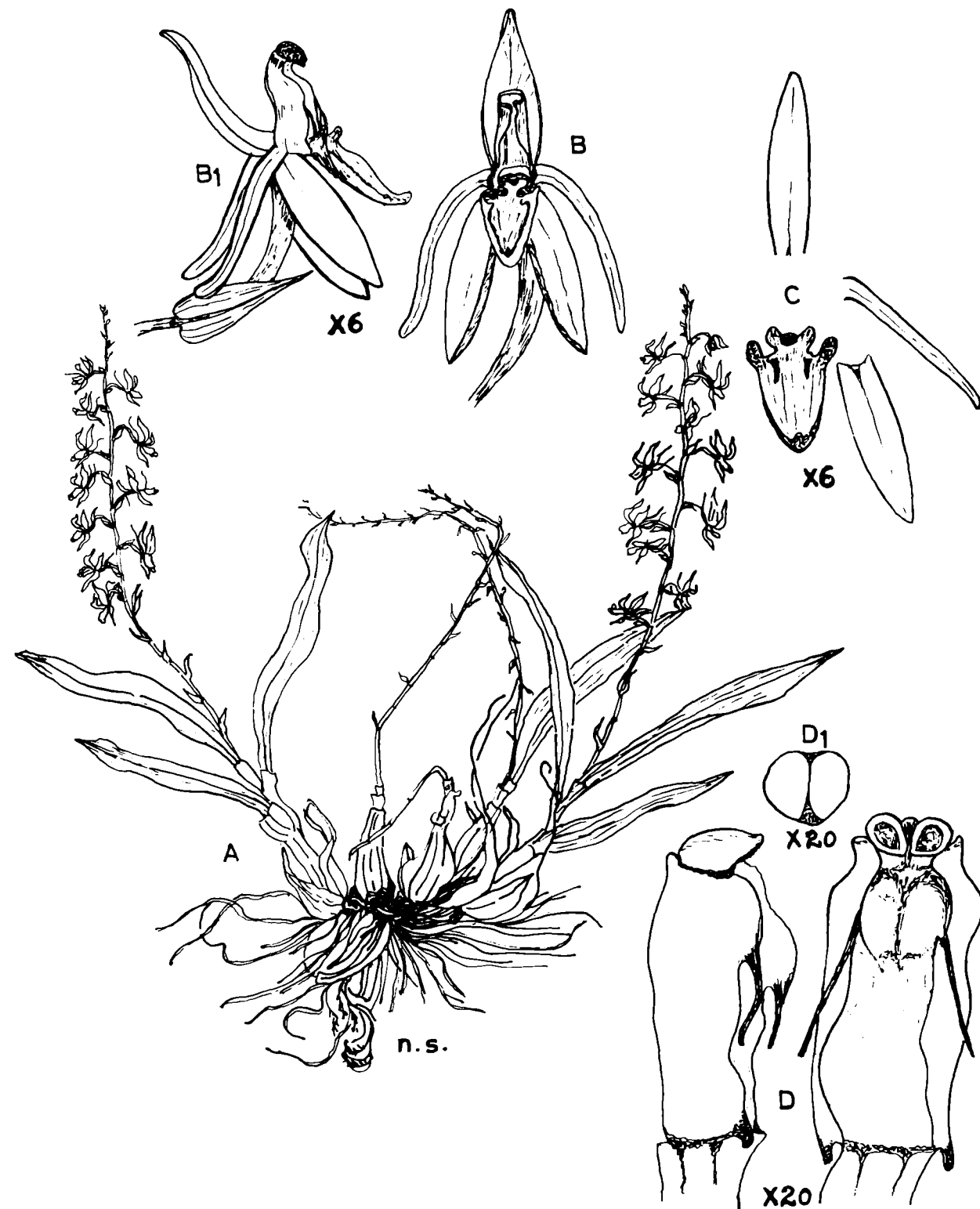


Plate 133

Liparis viridiflora (Bl.) Lindl. Gen. Sp. Orchid Pl. 31, 1830; T.443, 1966 et 2:191, 1971; B. & T. 68:31, 1971; Seidenf. 31(1):82, f.55, 1975; H. et al. 48, 1978.

= *Malaxis viridiflora* Bl. Bijdr. 8:392, 1825.

= *Liparis longipes* Lindl. : Hk. f. 5:703, 1890; K. & P. 29, t.37, 1898.

Epiphytic, pseudobulbs close together, more or less stem-like, covered by sheaths; leaves two, lanceolate, 10-21 cm. by 1.5-2 cm., acute or aristate. Inflorescence erect, slightly exceeding the leaves, peduncle bracteate, 2-3, bracts, linear, c 6 mm. long, many flowered; floral bracts linear, 3 mm; shorter than the ovary. Flowers small, 6 mm. long, yellowish green; sepals equal, linear-oblong, 2.25 mm. long, edges recurved; petals shorter and narrower than the sepals, 2 mm. long, linear, reflexed. Lip broadly-oblong, 2.25 mm. long, recurved below the middle (more or less folded), rather fleshy at the base, margin entire, apex apiculate. Column curved, 1.5 mm. long, wings small and round, base slightly thickened.

Flowering time - September to October.

Altitudinal range - 610-2135 m.

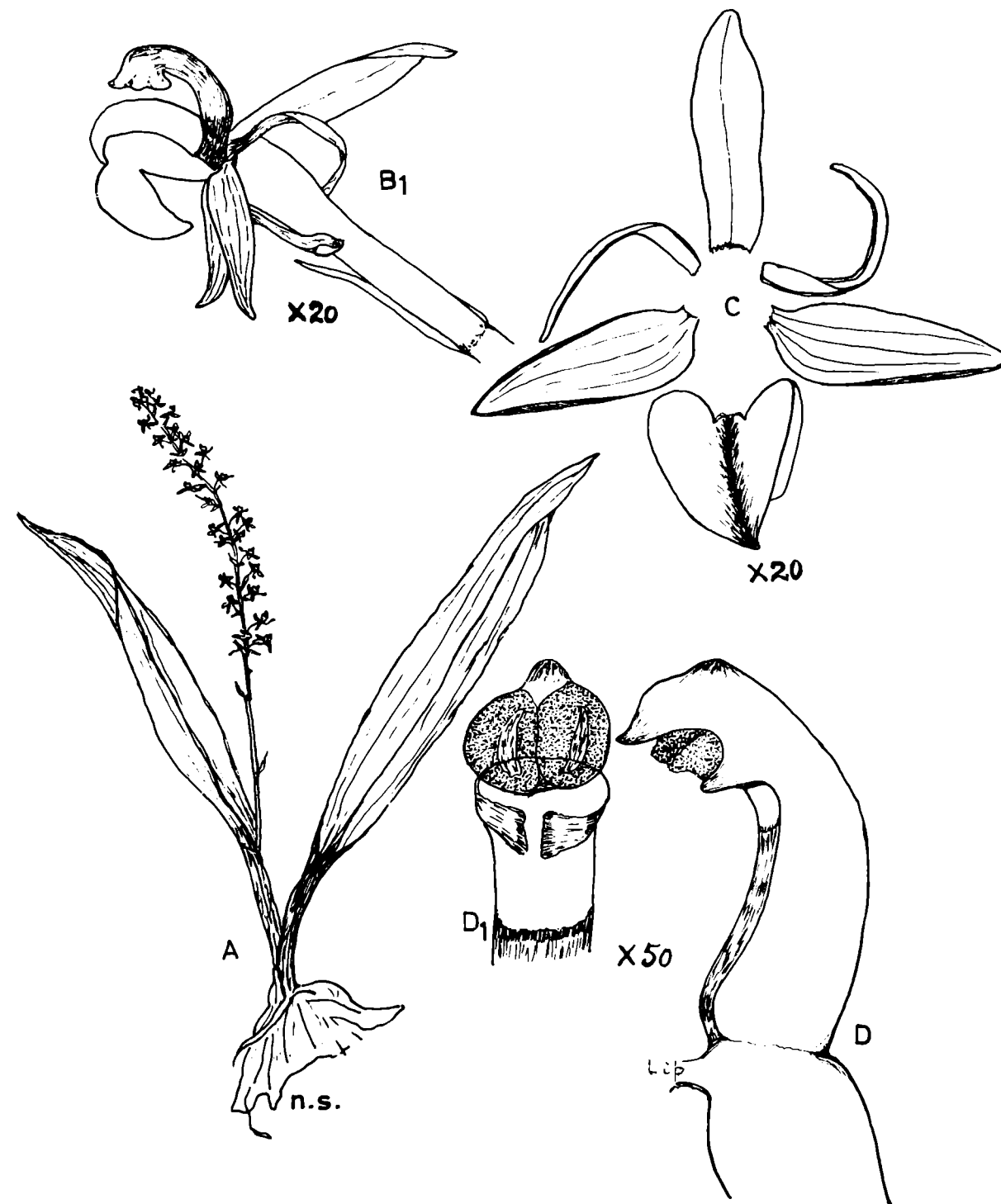
Distributional pattern - east and central Nepal.

Specimens in Herbarium - 5 gatherings.

Specimens studied - 5.

Chr. No. n = 15 (Arora, Taxon, 20:786, 1971; Mehra & Sehgal, ibid. 23:803, 1974; Mehra & Sehgal, ibid. 29:349, 1980).

2n = 38 (Biswas, ibid. 29:169, 1980 as *L. longipes*).



MALAXIS Soland ex Sw. (Liparideae). Refers to the soft and tender texture of the leaves.

These are terrestrial or rarely epiphytic orchids. The stem is creeping with erect leafy branches. Leaves solitary or with 2 leaves, broad, often unequal sided at the base thin more or less plicate and sheathing at the base. Inflorescence is terminal, few or many flowered, flowers small, sepals free or lateral one connate. Lip sessile, erect or spreading, entire or 3 lobed, concave to saccate, often with a hollow near the base, usually with 2 large lobes, the auricles lying close to the column very short, terete at the top, apex toothed, with or without fleshy arms. Anthers terminal, sessile erect on the back of the column.

Malaxis tamurensis Tuyama,

Plants about 50 cm. tall with 2 leaves. Lip 5 mm long, 6 mm. broad, apical lobe more or less rounded quadrangular, apex truncate and subirregular or faintly dentate, basal lobes oblong with rounded apex.

Artificial key to the species of Malaxis

- 1 Lip slightly convex, basal auricles sagittate, projecting upwards and more or less hiding the rest of the flower —
 - 2 Basal auricles of lip lying parallel to each other —
 - 3 Anterior part of lip broadly ovate. *acuminata*.
 - 3* Anterior part of lip narrowed, triangular-ovate. *calophylla*.
 - 2* Basal auricles of lip overlapping each other at the tips —
 - 4 Lip much contracted near the middle, apical part subreniform. *khasiana*.
 - 4* Lip slightly contracted near the middle, apical part obovate-oblong. *acuminata* f. *biloba*.
- 1* Lip concave, basal auricles absent, entire margin, apex produced into a beak (acuminate) —
 - 5 Plants with a single leaf. *cylindrostachya*.
 - 5* Plants with 2 leaves. *muscifera*.
- 1** Lip concave, fleshy, with 2 transverse calli, anterior part 3 lobed. *latifolia*.

Plate 134

Malaxis acuminata D. Don, Prodr. Fl. Nepal, 29, 1825; T. 443, 1966; 2:191, 1971 et 3:161, 1975; B. & T. 63:32, 1971; Seidenf. 33(1):55, t. 43, 1978; H. et al. 48, 1978.

= *Microstylis wallichii* Lindl. : Hk. f. 5:686, 1890; K. & P. 16, t. 18, 1898; D. 87, 1906.

Stem 5-7 cm. long, few sheaths below; leaves three to four, ovate-lanceolate, 7-12 cm. by 2.5-5 cm., upper leaves subsessile, lower with sheathing petiole, acute, undulate. Inflorescence exceeding the leaves, peduncle ribbed, laxly many flowered; floral bracts lanceolate, 5 mm. long, shorter than the ovary. Flowers 1.3-1.5 cm. long, yellowish green; sepals subequal, oblong, incurved margin, dorsal sepal 6 mm. long, laterals 5 mm. long and broader; petals linear, 5 mm. long, margin incurved. Lip ovate in general outline, convex, 8 mm. long, 6 mm. broad, basal auricles lanceolate, parallel to each other, inner edges straight, space between the two auricles c 2 mm., apex slightly incurved and notched. Column rounded 2 mm. long, sides swollen; anther c .5 mm. long with truncate lip.

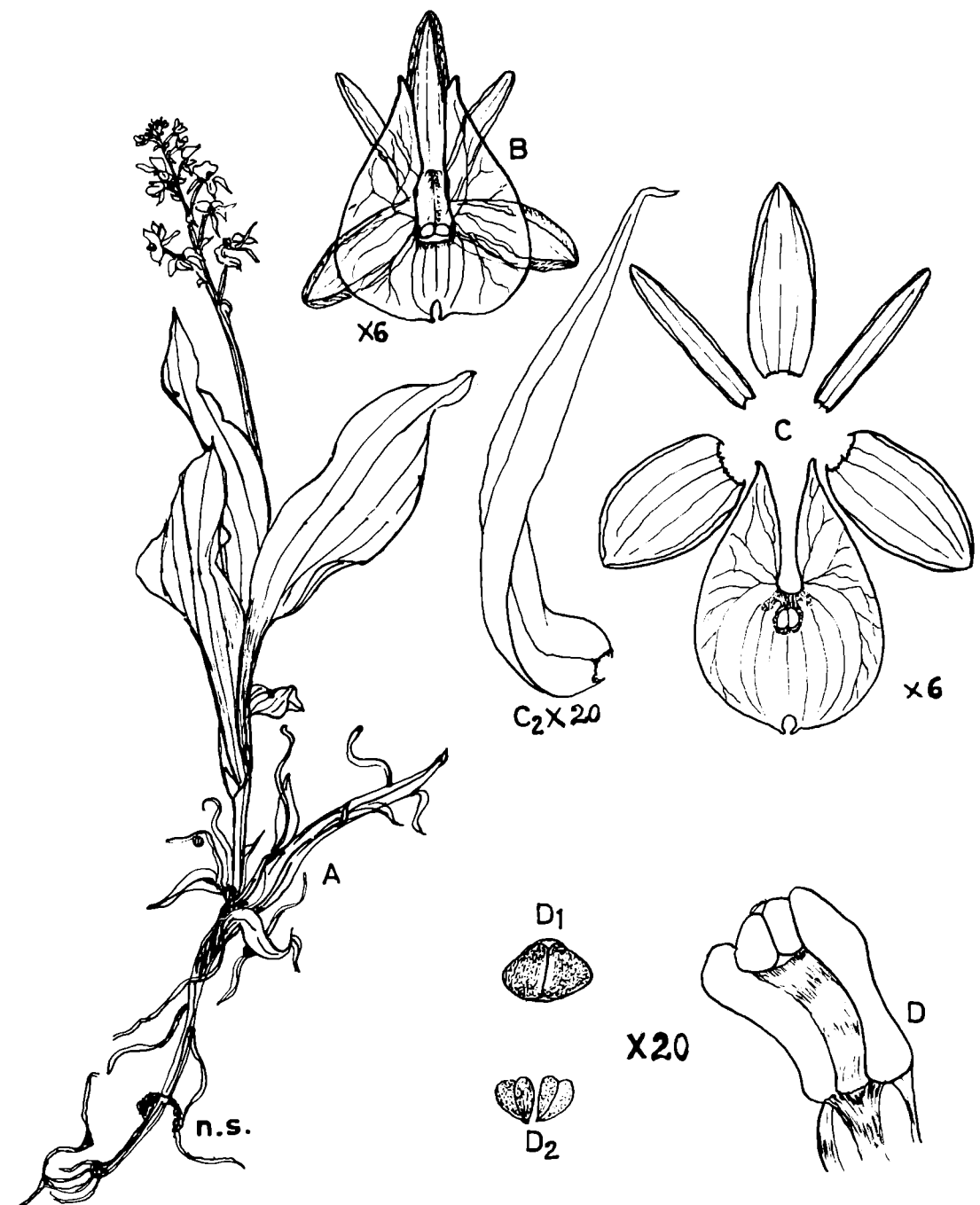
Flowering time - June to July.

Altitudinal range - 1220-2900 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 8 gatherings.

Specimens studied - 8.



Chr. No. n = 18 (Mehra & Vij, Taxon, 19:110, as *Microstylis wallichii*).
 also n = 15 (Arora, ibid. 20:786, 1971 as *Malaxis acuminata*).
 also n = 21 (Mehra & Kashyap, ibid. 25:492, 1976 as *Microstylis wallichii*;
 Mehra & Sehgal, ibid. 29:349, 1980 as *Malaxis acuminata*).
 2n = 36 (Vij et al. ibid. 30:512, 1981 as *Microstylis wallichii*).

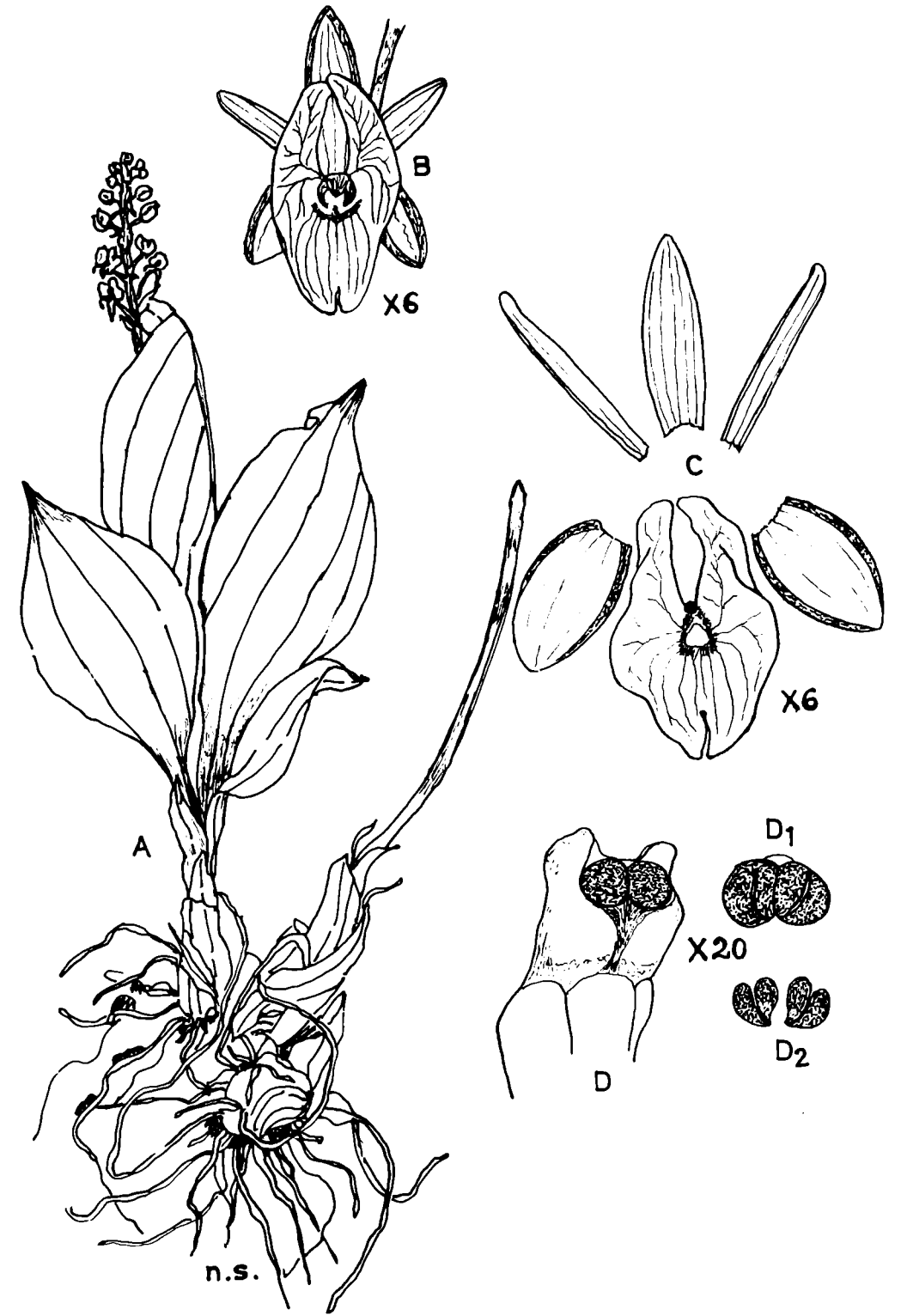


Plate 135

Malaxis acuminata forma biloba (Lindl.) Tuyama in Hara Pl. E. Himal : 443, 1966; Dept. Med. Pl. 1:48, 1967; Seidenf. 33(1):62, 1978; H. et al. 48, 1978.

= *Microstylis biloba* Lindl. Gen. Sp. Orchid Pl. 20, 1830.

= *Microstylis wallichii* var. *biloba* Hk. f. 5:686, 1890; K. & P. 16, t.19, 1898.

Plants usually more robust than the typical forms, and leaves thicker in texture. Basal auricles of lip slightly falcate so that the apices converge and meet each other or overlap; apical portion of lip obovate-oblong and bent forwards; apex deeply divided to form two oblong lobules. Column shorter and thicker than the typical form, arms fleshy.

Flowering time - June to July.

Altitudinal range - 1130-1800 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 7 gatherings.

Specimens studied - 7.

Chr. No. n = 18 (Mehra & Vij, Taxon, 19:109, 1970 as *Microstylis biloba*).

Plate 136

Malaxis calophylla (Reichb. f.) O. Ktze. Rev. Gen. 2:673, 1891; Seidenf. 33(1):54, 1978.

- = *Microstylis calophylla* Reichb. f. Gard. Chron. 2:718, 1789;
- = *Microstylis wallichii* Lindl. var. *brachycheila* Hk. f. 5:686, 1890;
- = *Microstylis scottii* Hk. f. 5:687, 1890; K. & P. 17, t.20, 1898.

Stem about 4.5 cm. high; leaves two, obliquely ovate-lanceolate, 9 cm. by 4.5 cm. undulate, almost crenate, acute. Inflorescence much longer than the leaves, peduncle robust and ribbed. Bracts few, linear, 1.2 cm., reflexed, laxly many flowered; floral bracts linear 10-6 mm. long, gradually becoming smaller upwards, as long as the ovary, reflexed. Flowers purplish, 1 cm. long; sepals unequal, dorsal sepal narrowly oblong, 6 mm. long, acute, lateral sepals ovato-oblong, 4 mm. long, broader than the dorsal, blunt; petals linear, 6 mm. long, recurved. Lip triangular-ovate 6.5 mm. long apex to lips of basal auricles, basal auricles, lanceolate, oblique and covering (tips not meeting), apical lobe triangular contracted bifid apex, margin throughout. Colum slightly curved forwards, 1.75 mm. long, arms knob-like.

Flowering time - June.

Altitudinal range - \pm 920 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. $n = 21$ (Vij et al. Taxon, 25:641, 1976 as *Microstylis scottii*).

Remarks - In published literature, the number of leaves is given as two to five. As we have only one gathering at our disposal we are unable to comment on this, however, our specimens have two leaves only. This is an addition to the Nepal flora, being a new record.

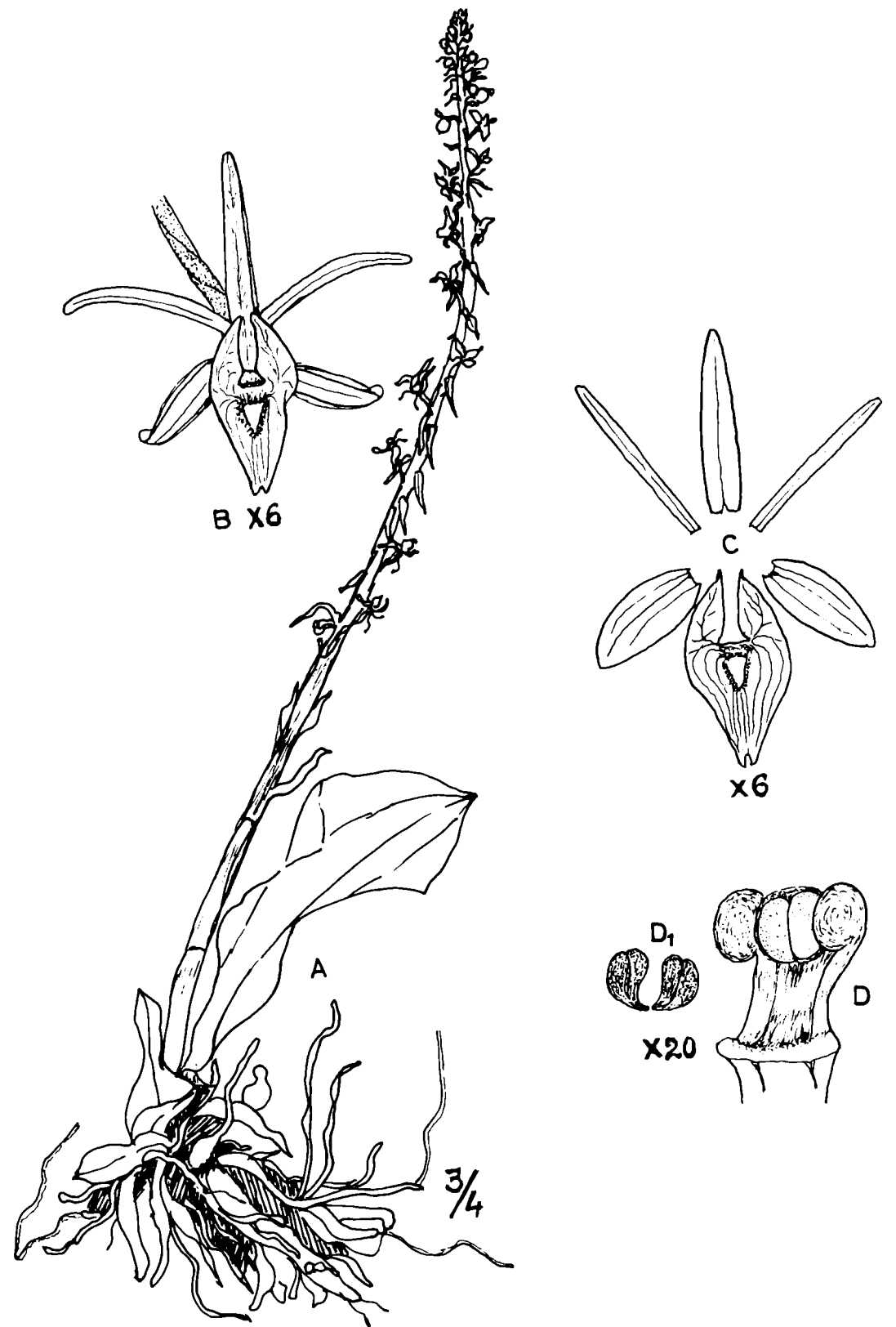


Plate 137

Malaxis cylindrostachya (Lindl.) Kuntze, Rev. Gen. Pl. 2:673, 1891; H. et al. 49, 1978.

= *Denia cylindrostachya* Lindl. Gen. Sp. Orchid Pl. 22, 1830.

= *Microstylis cylindrostachya* (Lindl.) Reichb. f. : Hk. f. 5:689, 1840; K. & P. 20, t.24, 1898; D.88, 1906.

Stem from the base of a small conical tuber, 4-14 cm. long and covered by one or two loose sheaths. Leaf solitary, elliptic or elliptic-oblong, 3.5-10 cm. by 2-4.5 cm.; petiole 5 cm. long. Inflorescence long, far exceeding the leaf, ebracteate, bearing numerous crowded flowers; floral bracts 2 mm. long, lanceolate, shorter than the ovary. Flowers 4.5 mm. long, greenish yellow; sepals equal, ovate, 2 mm. long, acuminate; petals linear-lanceolate, 1.75 mm. long, acute. Lip broadly ovate, 2 mm. long, 2 mm. broad, concave, base angled and denticulate, margin thickened, apex produced into a fleshy blunt end, a thick ridge running from base to apex, two convexities under the column. Column c. .75 mm. long, stout, arms none.

Flowering time - July to August.

Altitudinal range - 2000-3350 m.

Distributional pattern - west, central and east Nepal.

Specimens in Herbarium - 12 gatherings.

Specimens studied - 8.

Chr. No. $n = 15$ (Mehra & Vij, Taxon, 19:109, 1970; Vij et al. *ibid.* 30:512, 1981.

also $n = 15 + 0 - 2B$ (Mehra & Kashyap, *ibid.* 25:492, 1976).

$2n = 30$ (Vij et al. *ibid.* 25:635, 1976). All as *Microstylis cylindrostachya*.

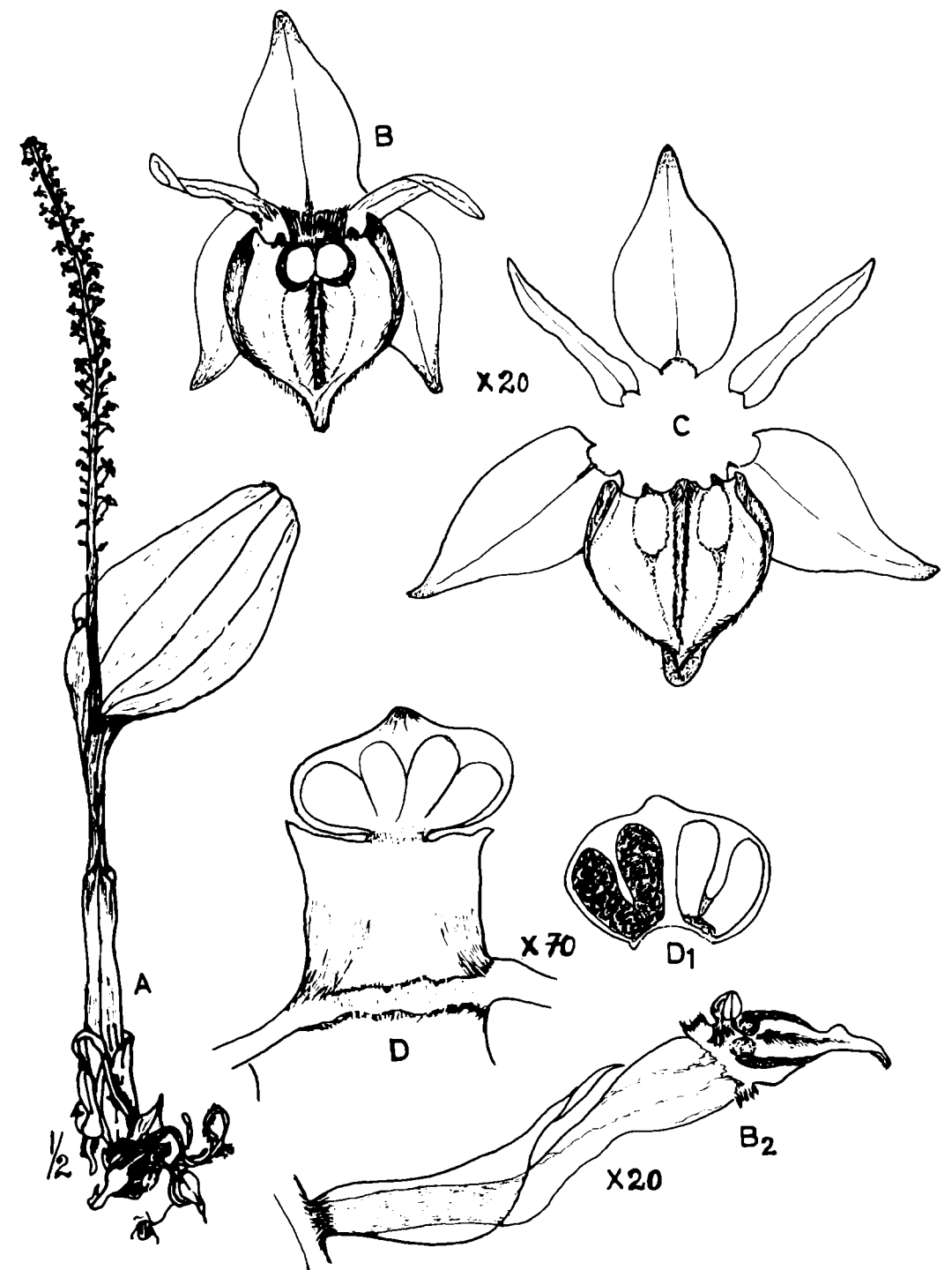


Plate 138

Malaxis khasiana (Hk. f.) Ktze., Rev. Gen. 2:673, 1891; B. & T. 68:33, 1971 (authority wrongly given); Seidenf. 33(1):52, t.39, 1978; H. et al. 49, 1978 (authority wrongly given).

= *Microstylis khasiana* Hk. f. Icon. Pl. t.1831, 1889 et 5:686, 1890; K. & P. 15, t.17, 1898; B.19:218, 1964.

Stem c 7 cm. tall with a cylindrical pseudobulb at the base; leaves three or four, ovate-elliptic, 4.5-6 cm. by 2-2.8 cm., slightly oblique; petiole short and sheathing, undulate, acute. Inflorescence twice the length of the leaves, peduncle ribbed, bract 2-5, lanceolate, c 5 mm. long, reflexed, laxly flowered; floral bracts lanceolate, 5 mm. long, reflexed, equalling or longer than the ovary. Flowers purplish, c 7 mm. long; sepals subequal, dorsal sepal oblong, 3.5 mm. long, narrower than the laterals, laterals broadly ovate, 3 mm. long, concave; petals linear, 3 mm. long. Lip yellow, broad, 5 mm. long up to the tip of auricles, concave, constricted in the middle, basal auricles falcate with converging and overlapping apices, apical lobe subreniform or obcordate, bifid, slightly undulate. Column slightly curved, 1 mm. long, deeply excavated, base dilated.

Flowering time - June.

Altitudinal range - 4500 ft.

Distributional pattern - east Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

Remarks - Although in the description, King & Pantling give the peduncle having some 7-8 bracts. In our specimens also, the peduncles are bracteate. They also mention the floral bracts as much shorter than the ovary. We find these bracts equalling or even longer than the ovaries.

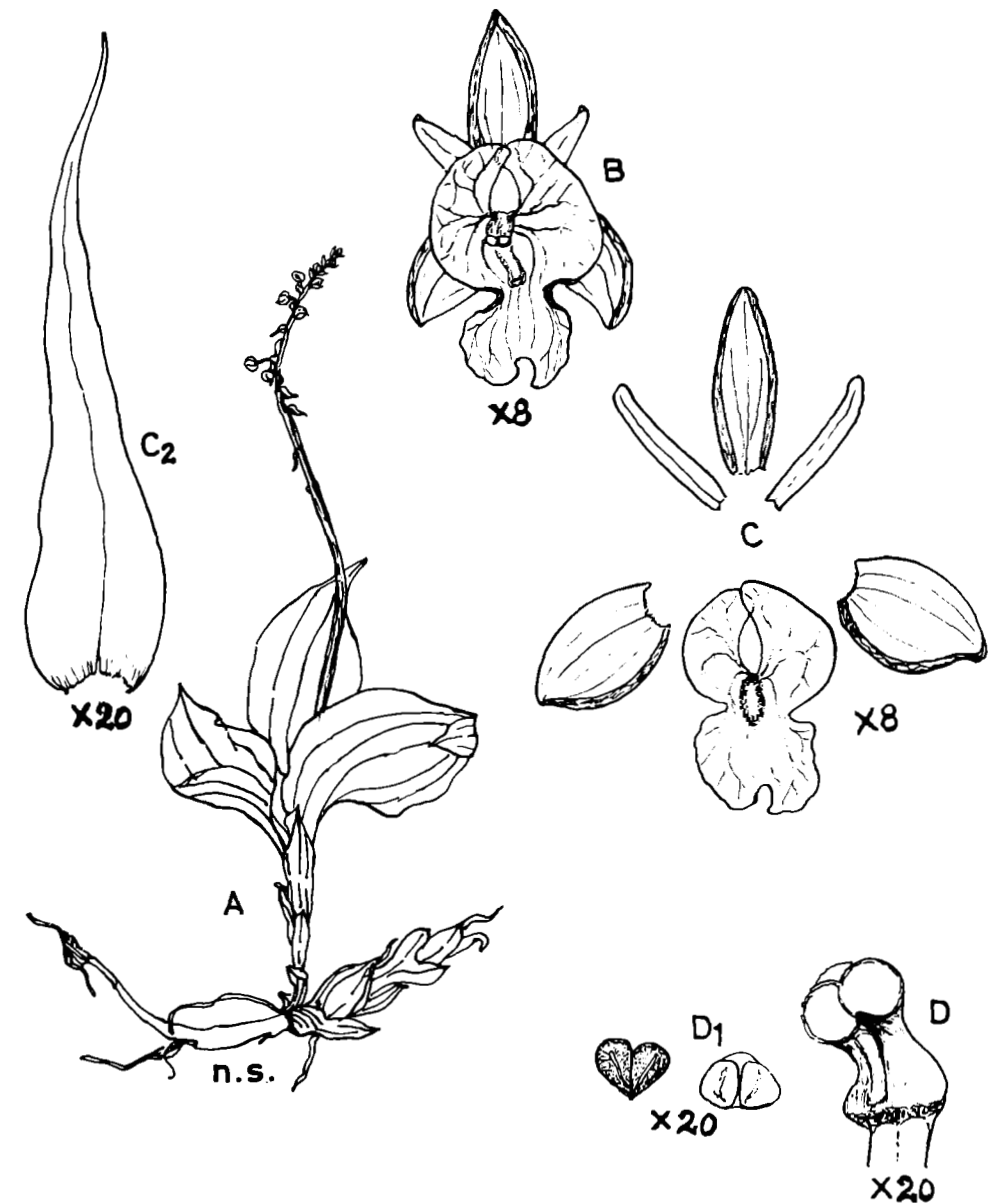


Plate 139

Malaxis latifolia Sm. in Rees. Cyclop. 22:Malaxis n. 3, 1812; T.444, 1966 et 2:191, 1971; Seidenf. 33(1):45, t.35, 1978; H. et al. 49, 1978.

= *Neottia plantaginea* D. Don, 27, 1825.

= *Microstylis congesta* (Lindl.) Reichb. f.: Hk. f. 5:689, 1890 et 6:181, 1890; K. & P. 19, t.23, 1898.

Stem stout, 5-10 cm., thickened near the base; leaves three to five, elliptic-lanceolate, 7-20 cm. by 2-2.5 cm., oblique, sheathing or shortly petioled, acuminate, undulate. Inflorescence exceeding the leaves, peduncle striate, two - three subulate bracts, 8 mm. reflexed, densely flowered; floral bracts lanceolate, 2.5-3 mm. long, as long as or exceeding the ovary. Flowers resupinate, greenish yellow, 5 mm. long; sepals equal, oblong, 3 mm. long, laterals subfalcate; petals linear, 3 mm. long, obtuse. Lip oblong or subquadrately ovate, c 2 mm. long, concave, fleshy, anterior part 3 lobed, basal part without lobes, a transverse callus at the base of the lip close to the column. Column c. 1.25 mm. long, excavated, ovary undulately winged.

Flowering time - July to August.

Altitudinal range - 1070-2135 m.

Distribution pattern - east and central Nepal.

Specimens in Herbarium - 5 gatherings.

Specimens studied - 5.

Chr. No. n = 21 (Mehra & Vij, Taxon, 19:109, 1970 as *Microstylis congesta*;
Mehra & Sehgal, ibid. 29:349, 1980 as *Malaxis latifolia*).

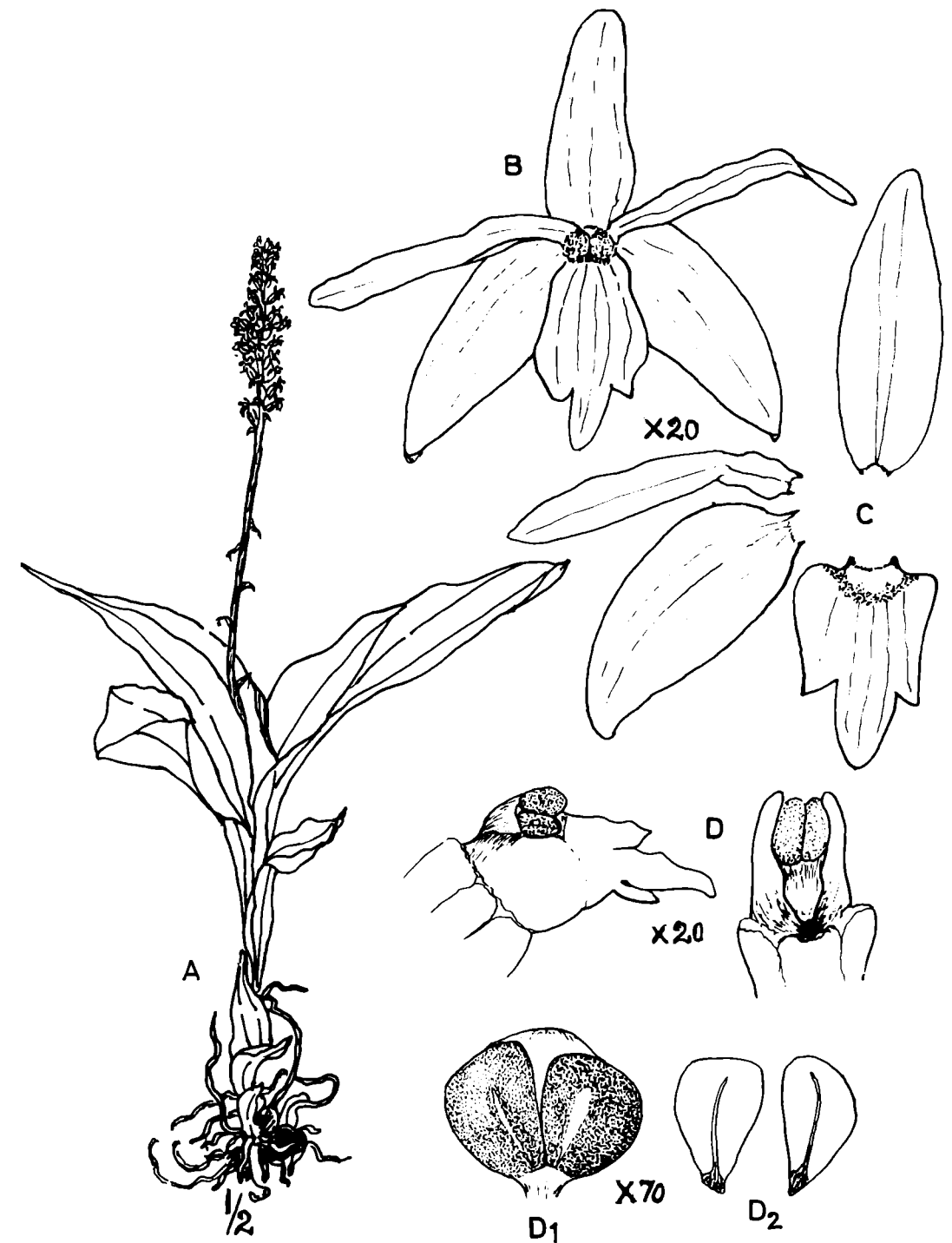


Plate 140

Malaxis muscifera (Lindl.) Kuntze, Revis. Gen. Pl. 2:673, 1891; T.444, 1966 et, 2:191; et 3:162, 1975; B. & T. 68:33, 1971; H. et al. 49, 1978.

= *Dienia muscifera* Lindl. Gen. Sp. Orchid Pl. 23, 1830.

= *Microstylis muscifera* (Lindl.) Ridl. : Hk. f. 5:689, 1890; K. & P. 20, t.25, 1898; D.89, 1906; Kit. 104, 1955.

Stem arising from apex of pseudobulb, 2.5-12 cm. long; leaves two, subopposite, unequal, ovate or ovate-lanceolate 2.4-8 cm., sheathing or shortly petioled. Inflorescence far exceeding the leaves, peduncle ebracteate, laxly flowered; floral bracts lanceolate, 2-3 mm. long, equalling or shorter than the ovary. Flower yellowish green, 4.5 mm. long; sepals equal, broadly oblong-lanceolate, 2 mm. long, margins curved, acute; petals linear, shorter than the sepals, 1.5 mm., acute. Lip broadly ovate, 2 mm. long, deeply concave fleshy, side lobes at about the middle with recurved margins, apical lobe with thickened margin, apex acute. Column very short, c 1 mm., fleshy, arms absent.

Flowering time - July to August.

Altitudinal range - 1800-4000 m.

Distributional pattern - east, central and west Nepal.

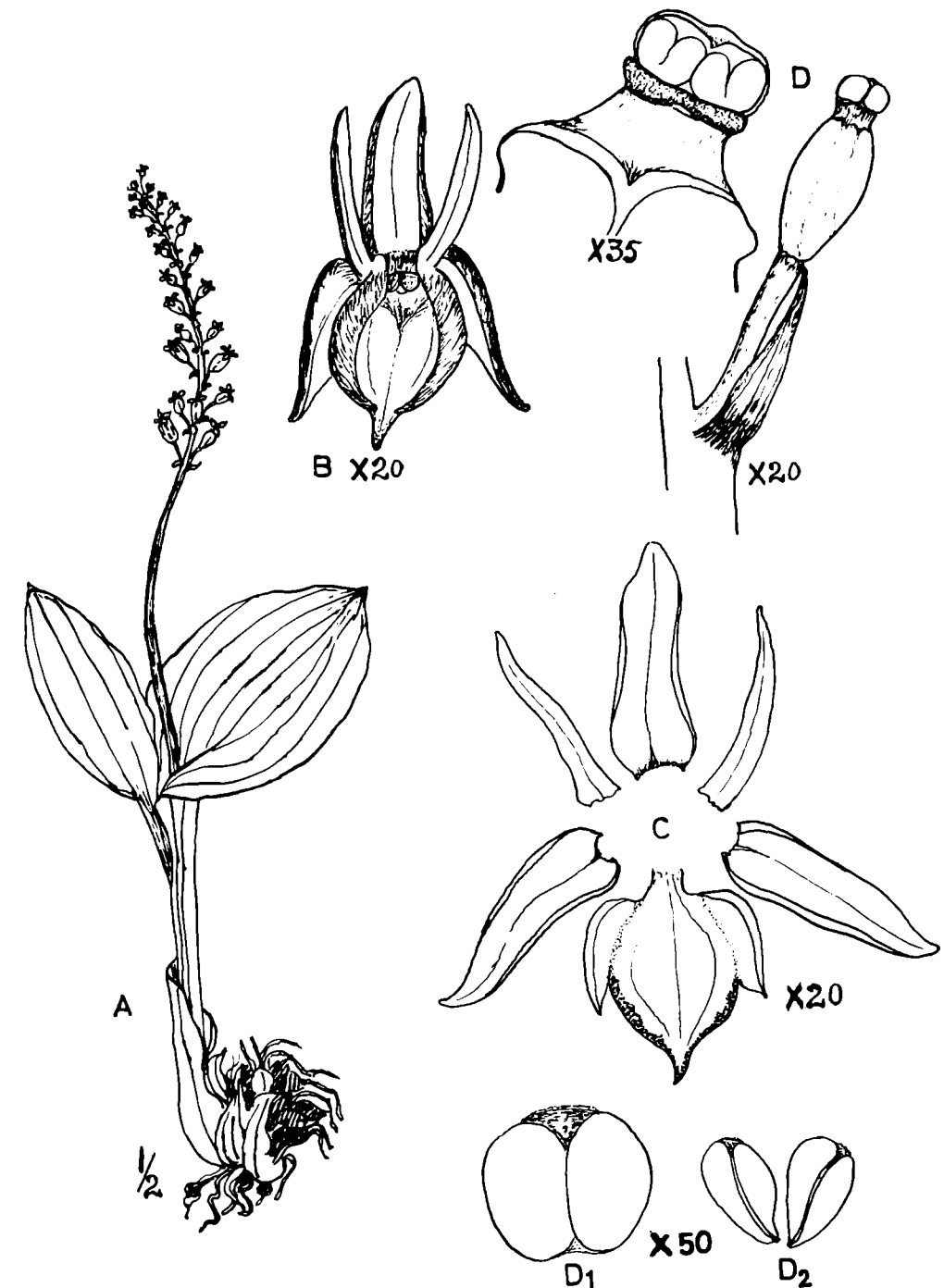
Specimens in Herbarium - 17 gatherings.

Specimens studied - 8.

Chr. No. n = 15 (Mehra & Vij, Taxon, 19:110, 1970 as *Microstylis muscifera*).

also n = 30 (Mehra & Kashyap, Taxon, 28:407, 1979 as *Malaxis muscifera*;

Vij et al., ibid. 30:512, 1981 as *Microstylis muscifera*).



NEOGYNA Reichb. f. (Coelogyneae). A separating concept from *Coelogyne*.

Neogyne gardneriana (Lindl.) Reichb. f. ex Pfitz.

Pseudobulbs long, narrow; leaves with long petiole, elliptic-lanceolate. Inflorescence nodding, flowers large, distichous, white; sepals and petals connivent below; base of lip bisaccate, side lobes small, mid lobe 2-cleft, rounded, with two wavy ridges.

OBERONIA Lindl. (Liparideae). Erect or pendulous tufted epiphytic orchids, which are unique. Holttum describes them as "the plants are easy to recognise owing to their much flattened leaves, looking as though they have been put into a press. The leaves are so flattened laterally that they have practically no upper surface, except at the sheathing base". Further, he adds "the flowers are never more than 2 mm. long and hardly more than 1 mm. ... The flowers are usually greenish to yellowish, orange or red, sometimes rich brown, they are often beautifully shaped. The inflorescence continues to grow at the base after the middle part is mature; the middle flowers open first and the basal flowers usually last of all. Usually many fruits are produced". The inflorescence is terminal with a very large number of minute flowers that rarely are more than 1-2 mm. Sepals are equal among themselves, erect or reflexed; petals usually narrower and shorter. Lip is sessile, concave at the base, fimbriate, entire or more or less 3 lobed.

Oberonia myosurus [(Forster. f.) Lindl. ex Wall.] Lindl.

Plants with leaves terete, slightly curved. Inflorescence as much as 8 cm. long; flowers white; petals linear. Lip 3 lobed, mid lobe with 3-4 apical laciniae, c 1 mm. long and 1-2 lateral laciniae, shorter.

Oberonia rufilabris Lindl.

Stem very short, acaulescent, leaves narrowly oblong, subensiform. Inflorescence much longer than the leaves. Lip twice as long as the sepals and petals, mid lobe distinctly bilobed, lobules lanceolate and parallel; side lobes filiform and close to the narrow base.

Artificial key to the species of *Oberonia*

- 1 Lip without lateral lobes or basal auricles —
 - 2 Lip coarsely erose from base to apex, apex of lip not lobulate; petals spreading erose-dentate; rachis of inflorescence slender. Floral bracts oblong, equalling or smaller than the ovary, subentire or apex serrulate. *prainiana*.
 - 2* Lip entire or very slightly erose at the apex only; petals entire; inflorescence axis fleshy. Floral bracts ovate-rotund more or less semilunar, irregularly serrate. *pachyrachis*.
- ;* Lip with narrow lateral lobes, terminal lobe rounded, entire, lateral lobes dentate. Floral bracts fleshy near the base and enclosing the flowers. *pachyphylla*.
- 1** Lip broad, rounded in general outline; lateral lobes large —
 - 3 Lateral lobes pectinate, terminal lobe coarsely erose-dentate. Floral bracts elliptic, exceeding the ovary and convolute around it, serrate in the upper half. *iridifolia*.
 - 3* Lateral lobes small. Floral bracts oblong, longer than the ovary, irregularly serrulate. *falconerii*.
 - 3** Lateral lobes entire, hairy and separated from the bifid hairy apical lobe by a smooth mesochile. Floral bracts ovate-rotund, longer than the ovary and denticulate. *ensiformis*.
- 1*** Lip distinctly with projecting lateral lobes —
 - 4 Lateral lobes directed forwards —
 - 5 Lateral lobes erose-dentate, terminal lobe emarginate. Floral bracts lanceolate, equalling the ovary, obscurely crenulate. *brachystachys*.
 - 5* Lateral lobes entire, terminal lobe obcordate. Floral bracts ovate-lanceolate, exceeding the ovary as well as the flower, upper half serrate. *obcordate*.
 - 5** Lateral lobes subcrenulate, terminal lobe deeply cleft into two oblong lobes. Floral bracts lanceolate, equalling the ovary, serrate. *acaulis*.
 - 4* Lateral lobes directed horizontally outwards. Floral bracts ovate-lanceolate, irregularly serrate in the upper part *falcata*.
- 1**** Lip lobed only at the apex, base broad with two small auricles; apex with two long falcate lobules separated by a deep sinus. Floral bracts lanceolate, irregularly serrate or subserrate —
 - 6 Petals spreading, linear-oblong, entire. Sepals spreading. Stem elongate. *caulescens*.
 - 6* Petals reflexed. Stem very short. *pyrulifera*.

Plate 141

***Oberonia acaulis* W. Griff. Notul. Fl. Asiat 3:275-276, t. 286, f. 1, 1851; H. et al. 50, 1978.**

= *O. myriantha* Lindl. : Hk. f. 5:679, 1888; K. & P. 10, t.12, 1898; B. 19:218, 1964; T. 446, 1966.

Stem short and tufted; leaves ensiform 2.5-24 cm. by 3-10 mm., very unequal in size, straight, falcate. Inflorescence much longer than the leaves, slender, decurved; peduncle covered with linear bracts, c 5 mm., spreading; densely flowered in more or less whorls; floral bracts 2-3 mm. long, lanceolate equalling or slightly longer than the ovary, serrate. Flowers minute, c 3 mm. long, dark brown or yellowish brown; sepals equal, ovate, 1.3 mm. long, entire; petals broadly oblong, equalling the sepals but slightly broader, truncate. Lip 2 mm. long, lateral lobes broadly oblong or oblong, entire or crenulate divergent, terminal lobe large, deeply cleft into two oblong lobules, sinus broad or narrow, margin entire or slightly crenulate, upper surface having irregularly scattered watery blisters, a shallow depression at the base under the column.

Flowering time - September to October.

Altitudinal range - 610-2000 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 7 gatherings.

Specimens studied - 7.

Chr. No. n = c 36 (Arora, Taxon, 20:786, 1971).

also n = 15 (Mehra & Sehgal, ibid. 27:389, 1978; Mehra & Kashyap, ibid. 3:507, 1981).

2n = 30 (Vij et al. ibid. 25:635, 1976) (all as *Oberonia myriantha*).

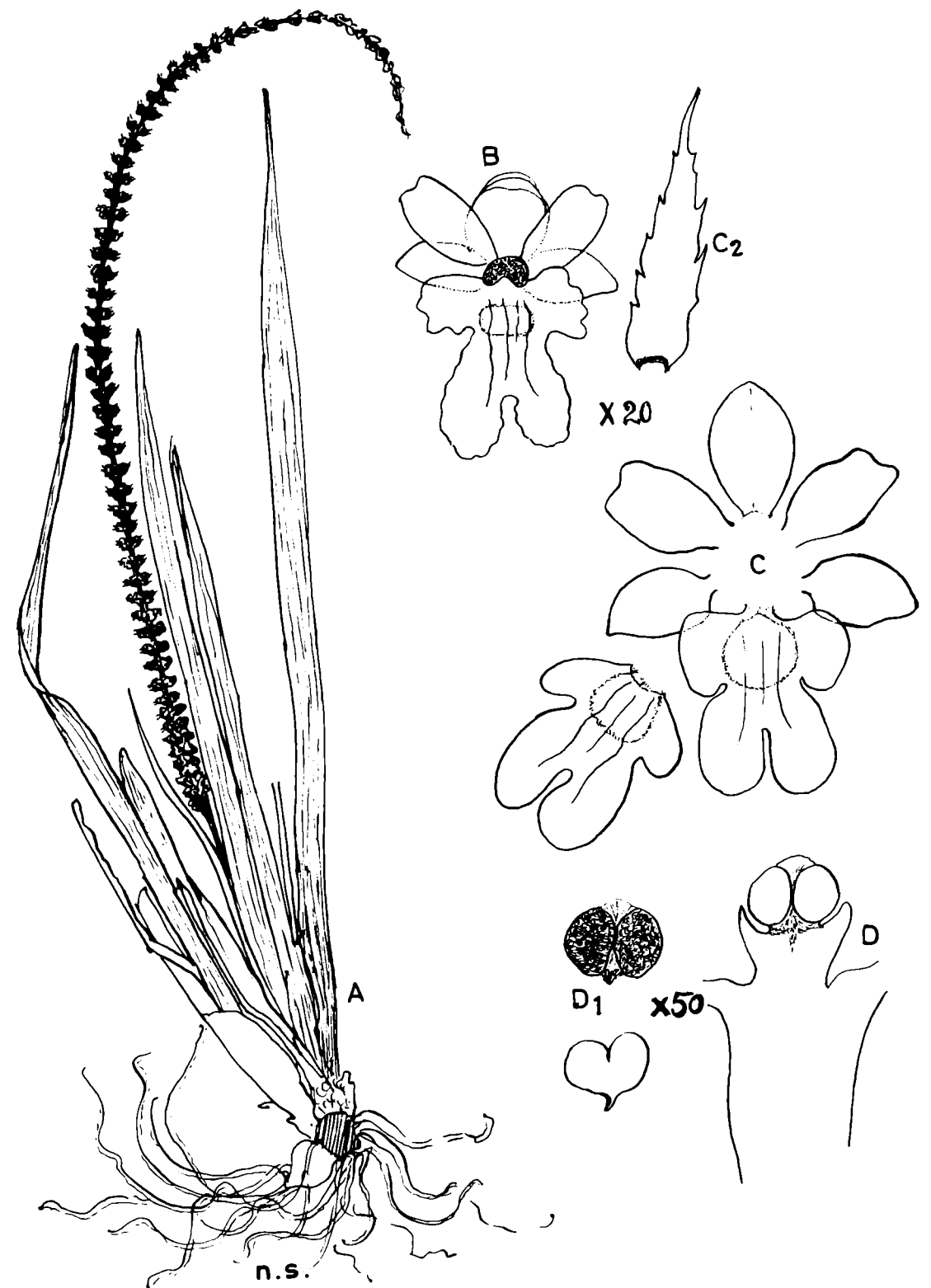


Plate 142

Oberonia brachystachys Lindl. Sert. Orch. st. 8, 1838; Seidenf. 33(1):37, f.29, 1978.

= *Oberonia demissa* Lindl. : Hk. f. 5:680, 1888; K. & P. 9, t.10, 1898.

Stem very short; leaves linear-oblong, 2.5-6.5 cm. by 6-10 mm. subfalcate. Inflorescence as long as the longest leaf, usually decurved, peduncle ebracteate, raceme densely flowered and truncate; floral bracts lanceolate, 1.75 mm. equalling the ovary, obscurely irregularly crenulate. Flowers minute, 1.5 mm. long, reddish brown; sepals subequal ovate, entire, reflexed and lying on the ovary, dorsal sepal .5 mm. with incurved apex, laterals .75 mm., broader; petals elliptic, .75 mm. long, erose-dentate, spreading. Lip 1 mm. long, 1.5 mm. broad at the base, lateral lobes in general oblong, sometimes falcate, erose-dentate, divergent; terminal lobe orbicular, emarginate apex, erose-dentate.

Flowering time - April.

Altitudinal range - \pm 450 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

Remarks - This is a new record for Nepal.

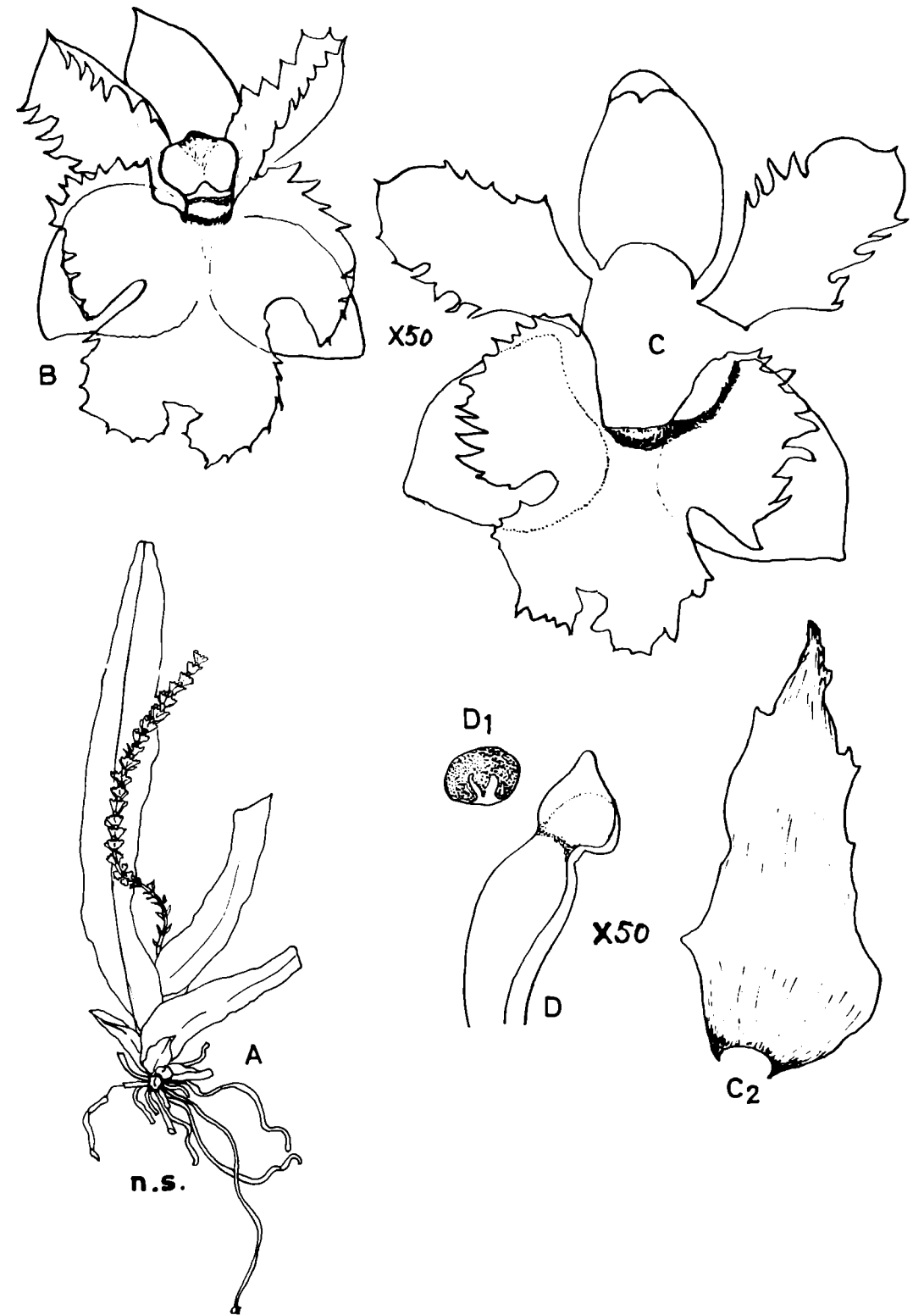


Plate 143

Oberonia caulescens Lindl. Gen. Sp. Orchid Pl. 15, 1830; Hk. f. 5:682, 1888; K. & P. 11, t.11B, 1898; Seidenf. & Aro. 2:22, 1982.

= *O. longilabris* King & Pantl. 8:13, t.13A, 1898.

Caulicent, stem tufted 2-4.5 cm. high, slender; leaves linear-ensiform, 1.6-4 cm. by 2-4 mm. falcate, acute. Inflorescence longer than the leaves, decurved, bracteate, bracts few to many, subulate, 3 mm. long, laxly flowered; floral bracts lanceolate, 3 mm. long, irregularly subserrate. Flowers minute, yellow, 2.5 mm. long; sepals ovate, 1 mm. long, entire; petals linear-oblong equalling the sepals, subtruncate, spreading as the sepals. Lip oblong in general outline, 2 mm. long, 1 mm. broad, two small auricle-like lateral lobes near the base, terminal lobe broadly lanceolate with two lobules at the apex, sinus wide. Column short with two teeth-like wings.

Flowering time - Probably July-August as it fruits in September and October.

Altitudinal range - 1300-2290 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. $n = 15$ (Vij et al. Taxon, 25:635, 1976 as *O. longilabris*).

Remarks - King & Pantl. give the inflorescence peduncle as ebracteate whereas in all our specimens the peduncles have bracts. Our materials otherwise answer fully to the description given by King & Pantl. This is a new record.

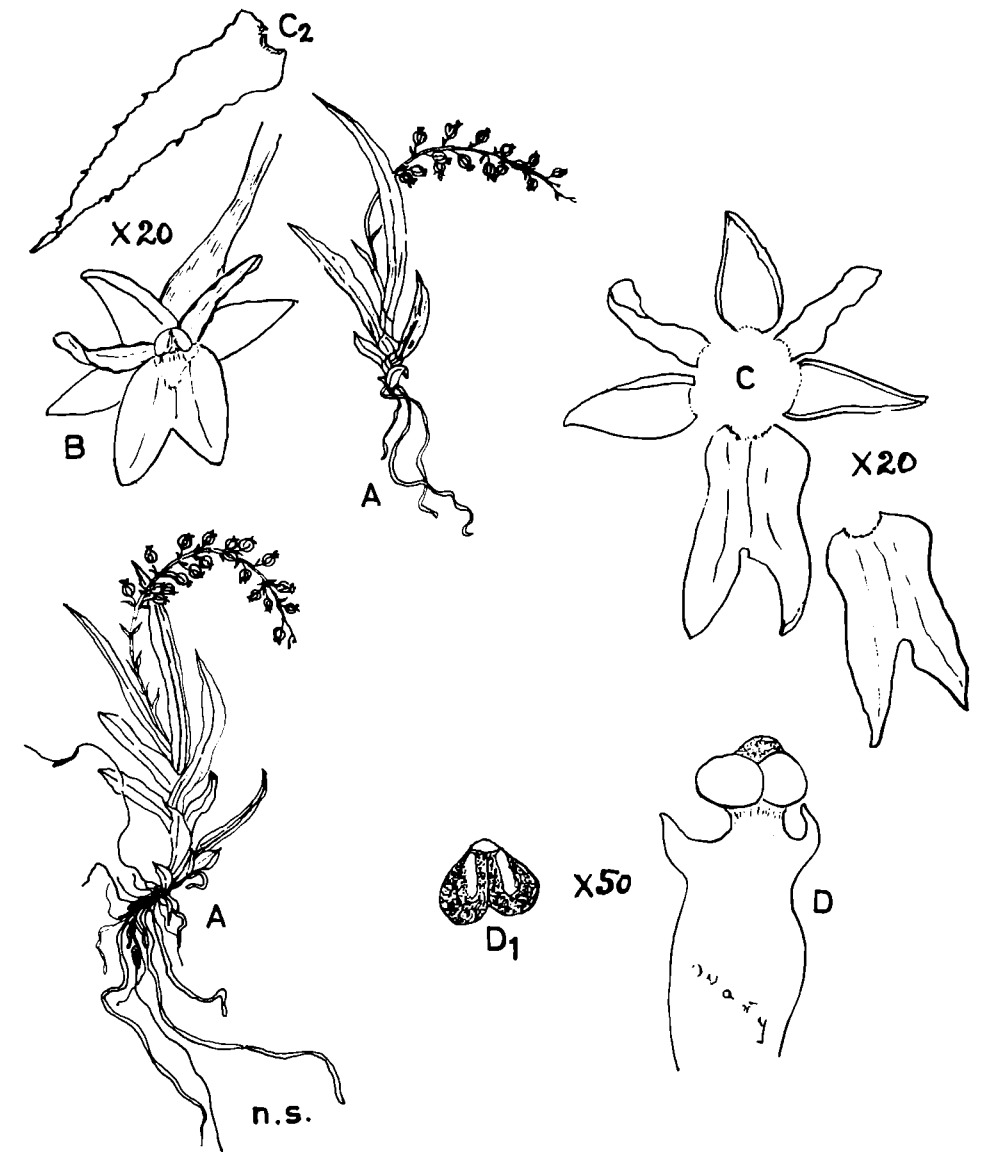


Plate 144

Oberonia ensiformis (Sm.) Lindl., Fol. Orchid, Oberonia 21, 1859; Hk. f. 5:679, 1888; K. & P. 8, t.9, 1898; D.86, 1906; B. & T. 68:35, 1971; Seidenf. 33(1):13, t.6, 1978; H. et al. 50, 1978.

= *Malaxis ensiformis* Smith in Rees. Cyclop. 22: Malaxis n : 14, 1812.

= *Stelis mucronata* D. Don, 32, 1825.

Stem 5-6.5 cm. high; leaves linear-ensiform, 7.5-30 cm. by 1.1-1.8 cm., falcate, coriaceous, acuminate. Inflorescence erect, shorter than the leaves; peduncle bearing numerous lanceolate bracts, c 2.5 mm. long, dense flowered; floral bracts ovate-rotund, 2.5 mm. long, longer than the ovary, denticulate. Flowers yellowish brown, 3.5 mm. long; sepals equal, broadly ovate, 1.5 mm. long, entire, acute, reflexed; petals ovate, equalling the sepals, denticulate. Lip 2.25 mm. long, 2 mm. broad at base, lateral lobes broad, rounded or small and wide, mid lobe obcordate with two rounded lobules, apical sinus broad, margin all over denticulate, mesochile depressed. Column very short lying on the base of the lip.

Flowering time - October.

Altitudinal range - ± 1100 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. n = 15 (Vij et al., Taxon, 25:635, 1976; Mehra & Kashyap, ibid. 30:507, 1981).

2n = 30 (Jorapur & Hedge, ibid. 29:546, 1980; Singh, ibid. 30:705, 1981).

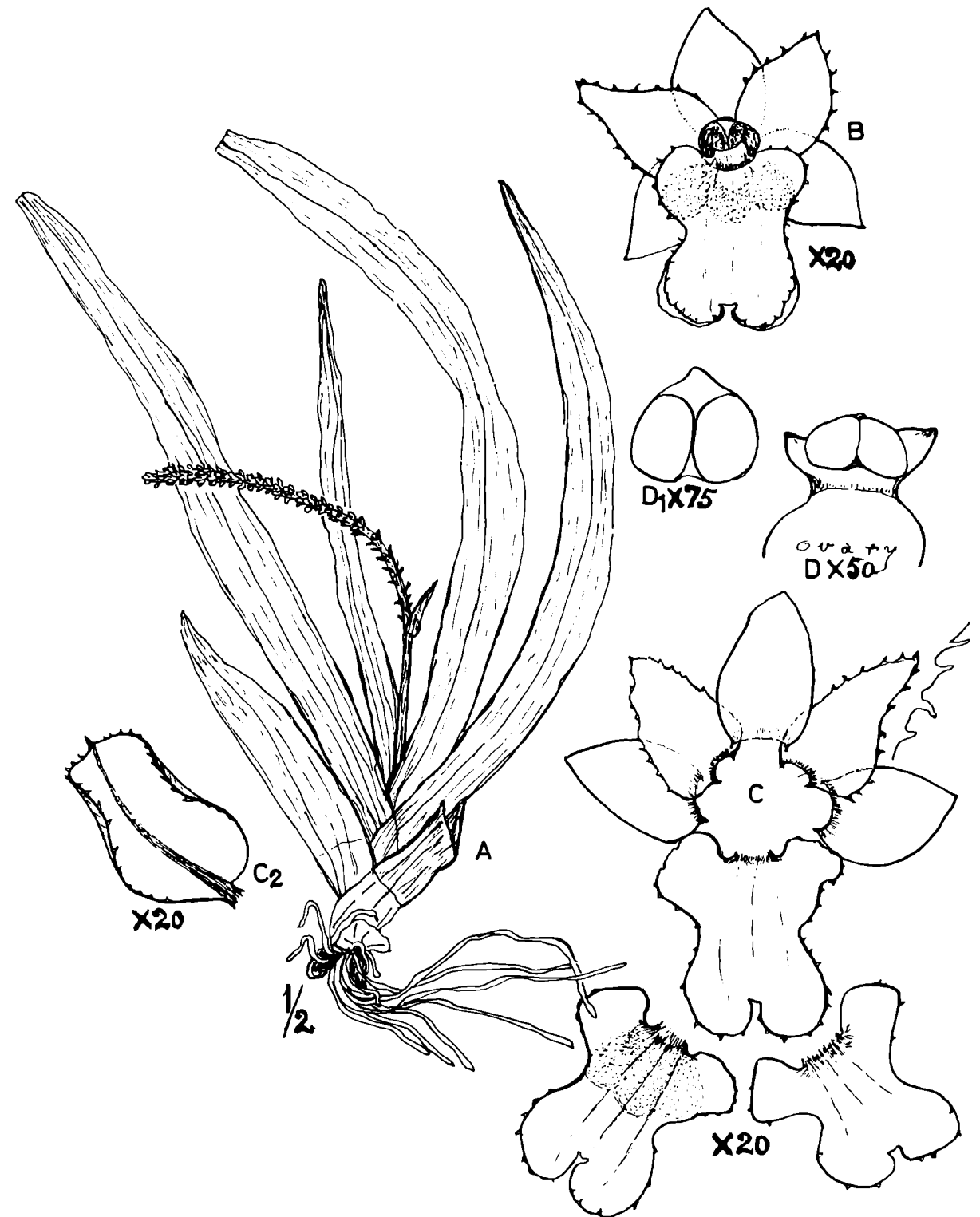


Plate 145

Oberonia falcata King & Pantl. in J. Asiat. Soc. Bengal 64:329, 1895 et Ann Roy. Bot. Gard. Calcutta 8:12, t.14, 1898; T.445, 1966; 2:191, 1971 et 3:162, 1975; B. & T. 68:35, 1971; Seidenf. 33(1):30, t.20, 1978; H. et al. 50, 1978.

Caulicent, tufted, stem 6-9.5 cm. high; leaves falcate, 2-3.5 cm. by 2-5 mm., ensiform, acute. Inflorescence erect, longer than the leaves; peduncle very short, bracteate, bracts minute except the lowermost, numerous flowers in whorls; floral bracts ovate-lanceolate, c 1.5 mm. long, margin irregularly serrate in the upper part. Flowers yellowish green, minute, crowded, brittle; sepals ovate, entire, spreading; petals linear oblong, entire. Lip as long as the sepals, oblong in general outline, side lobes triangular, pointing outwards, mid lobe lanceolate. Column very small.

Flowering time - June.

Altitudinal range - \pm 1980 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimen studied - J.

Chr. No.

Remarks - The entire material at our disposal is rather imperfect in the sense that it is in fruiting condition, thus it has not been possible to study the floral characters in a better way.

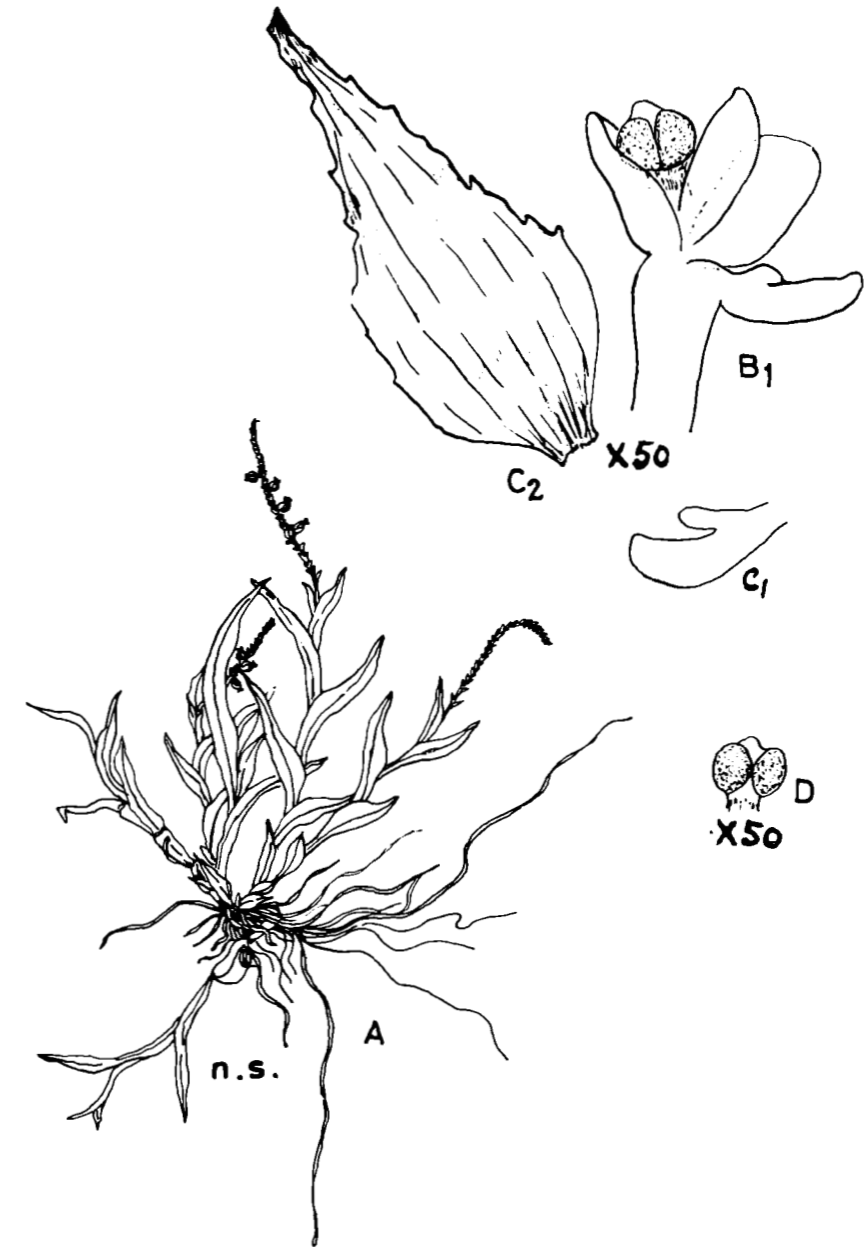


Plate 146

Oberonia falconeri Hk. f. in Hook. Icon. Pl. 18 : t. 1780, 1888 et 5:678, 1888; D.86, t.94, 1906; Seidenf. 33(1):22, t.12, 1978; H. et al. 50, 1978.

Stem short and tufted; leaves broadly ensiform, straight or falcate, 2.5-8 cm. by 6-11 mm., acute coriaceous. Inflorescence terminal; peduncle bracteate, bracts few lanceolate, 3 mm. long, densely flowered, floral bracts oblong, 2.5 mm., longer than the ovary, irregularly serrulate, membranous. Flowers very minute, 1.5 mm. long, yellowish; sepals ovate, .75 mm. long, acute, reflexed; petals lanceolate, equalling the sepals, subfalcate, obtuse. Lip oblong, .75 mm. long, lateral lobes small, tooth-like, mid lobe large with two small incurved apical obtuse lobes separated by a broad sinus, surface except the basal part scattered with gland-like specks thus glistening. Column short.

Flowering time - probably April, as fruits appear in May & June.

Altitudinal range - 310-920 m.

Distributional pattern - west, central and east Nepal.

Specimens in Herbarium - 5 gatherings.

Specimens studied - 5.

Chr. No. n = 15 (Mehra & Kashyap, Taxon, 25:492, 1976; Vij et al. ibid. 25:635, 1976).

2n = 30 (Jorapur & Hedge, ibid. 29:546, 1980; Singh, ibid. 30:705, 1981).

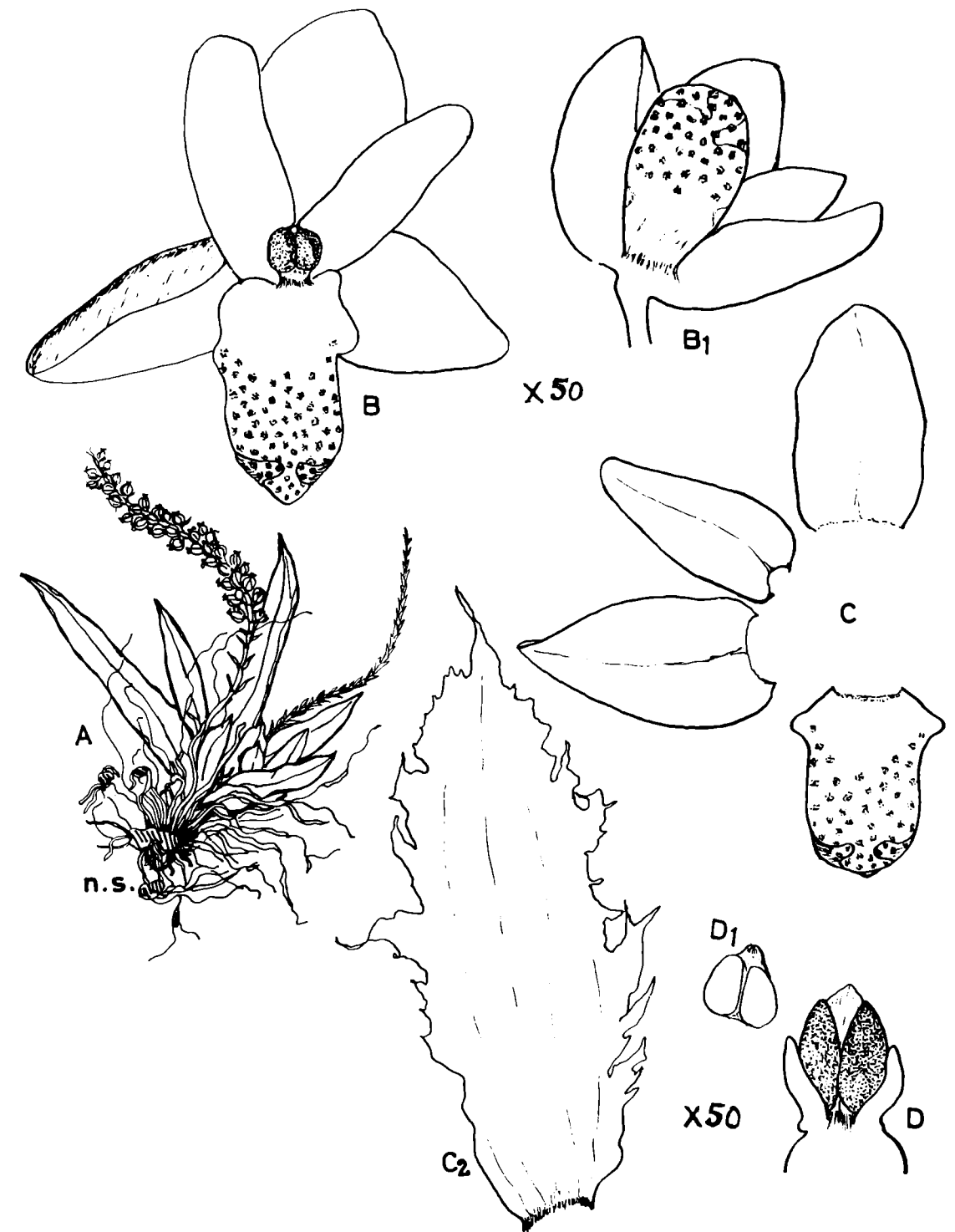


Plate 147

Oberonia iridifolia (Roxb.) Lindl. Gen. Sp. Orchid Pl.15, 1830, pp.; Hk. f. 5:675, 1888; K. & P. 8, t. 8, 1898; T.445, 1966; B. & T. 68:35, 1971; Seidenf. 33(1):16, t. 7, 1978; H. et al. 50, 1978.

= *Cymbidium iridifolium* Roxb. Fl. Ind. 3:458, 1832.

Stem short; leaves broadly ensiform, 4-20 cm. by 7-20 mm. acute. Inflorescence longer than the leaves, decurved; peduncle faintly winged, ebracteate; densely flowered, flowers not in clear whorls; floral bracts minute, elliptic, obtuse, 1.75 mm. long; serrate in the upper half, exceeding the ovary and convolute around it. Flowers minute, 2.5 mm. long, yellowish; sepals subequal, ovate, dorsal 1 mm. long, lateral smaller in length but broader; petals equalling the sepals, oblong, denticulate. Lip orbicular in general outline, 1.5 mm. long and 1.5 mm. broad, lateral lobes indistinct, pectinate, terminal lobe broadly bifid, pectinate. Column very small c $\frac{1}{3}$ mm. long.

Flowering time - October to november.

Altitudinal range - 310-610 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 4 gatherings.

Specimens studied - 4.

Chr. No. n = 15 (Mehra & Sehgal, Taxon, 24:513, 1975
Mehra & Sehgal, ibid. 25:647, 1976).

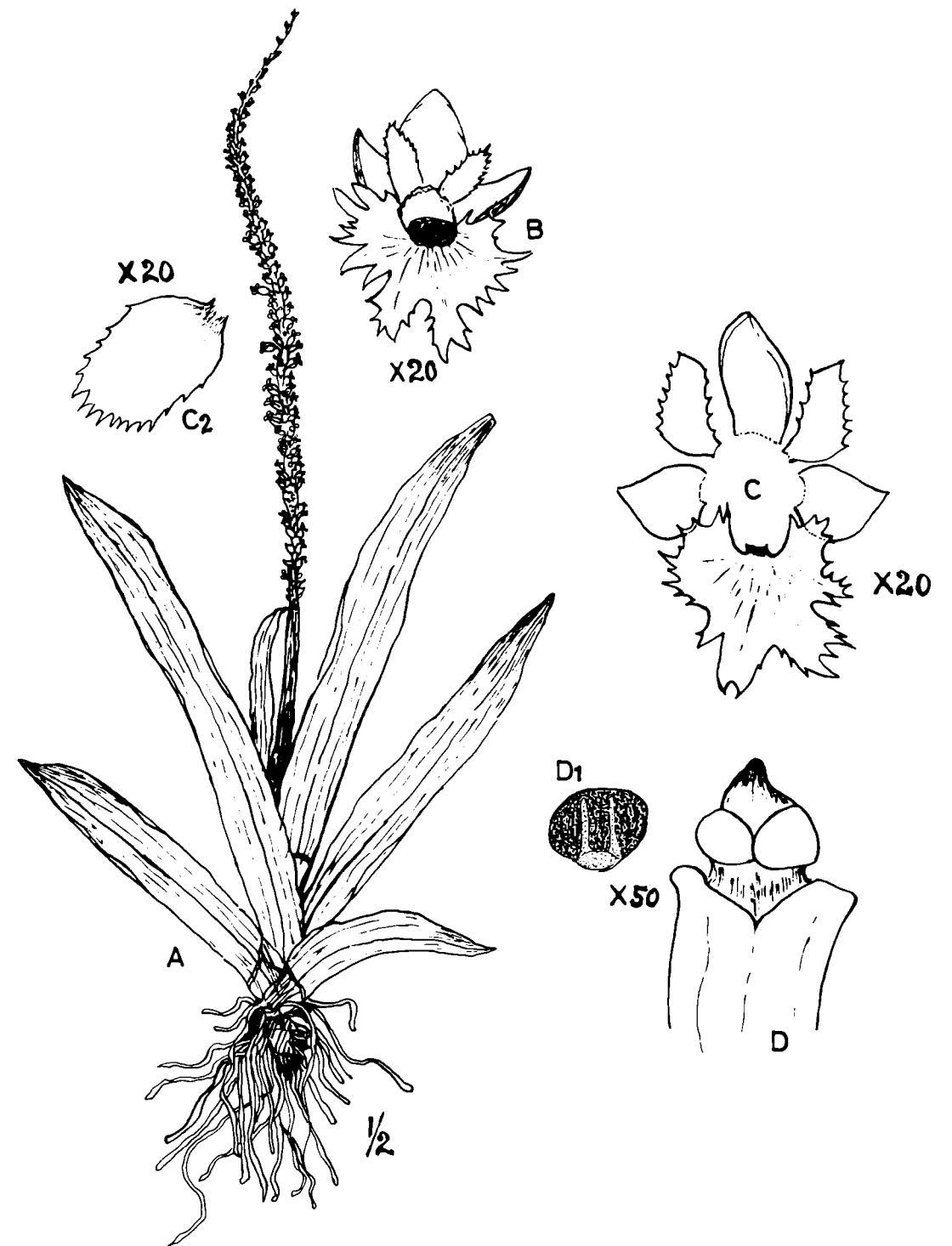


Plate 148

Oberonia obcordata Lindl. Fol. Orchid. Oberonia 43, 1859; Hk. f. 5:684, 1888; K. & P. 9, t.11, 1898; Seidenf. 33(1):30, t.19, 1978; H. et al. 50, 1978.

Cauliscent, stem short; leaves linear, 2-4.5 cm. by 3-6 mm. falcate, fleshy, acute. Inflorescence with short peduncle, bracts on peduncle few, floral region as long as the leaves, decurved, flowers in lax dense whorls; floral bracts ovate-lanceolate, 3 mm. long, exceeding the ovary as well as the flower, upper half serrate. Flowers 2 mm. long, brown; sepals subequal, 1 mm. long dorsal broadly ovate and lateral ovate; petals linear-oblong, equalling the sepals, spreading. Lip longer than the sepals, 1.5 mm. long, 1.5 mm. broad at the tips of lateral lobes which are divergent, oblong, entire, terminal lobe obcordately bilobed, entire. Column slightly swollen at the base.

Flowering time - March and again in September.

Altitudinal range - 2000 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. n = 15 (Mehra & Vij, Taxon, 19:110, 1970).

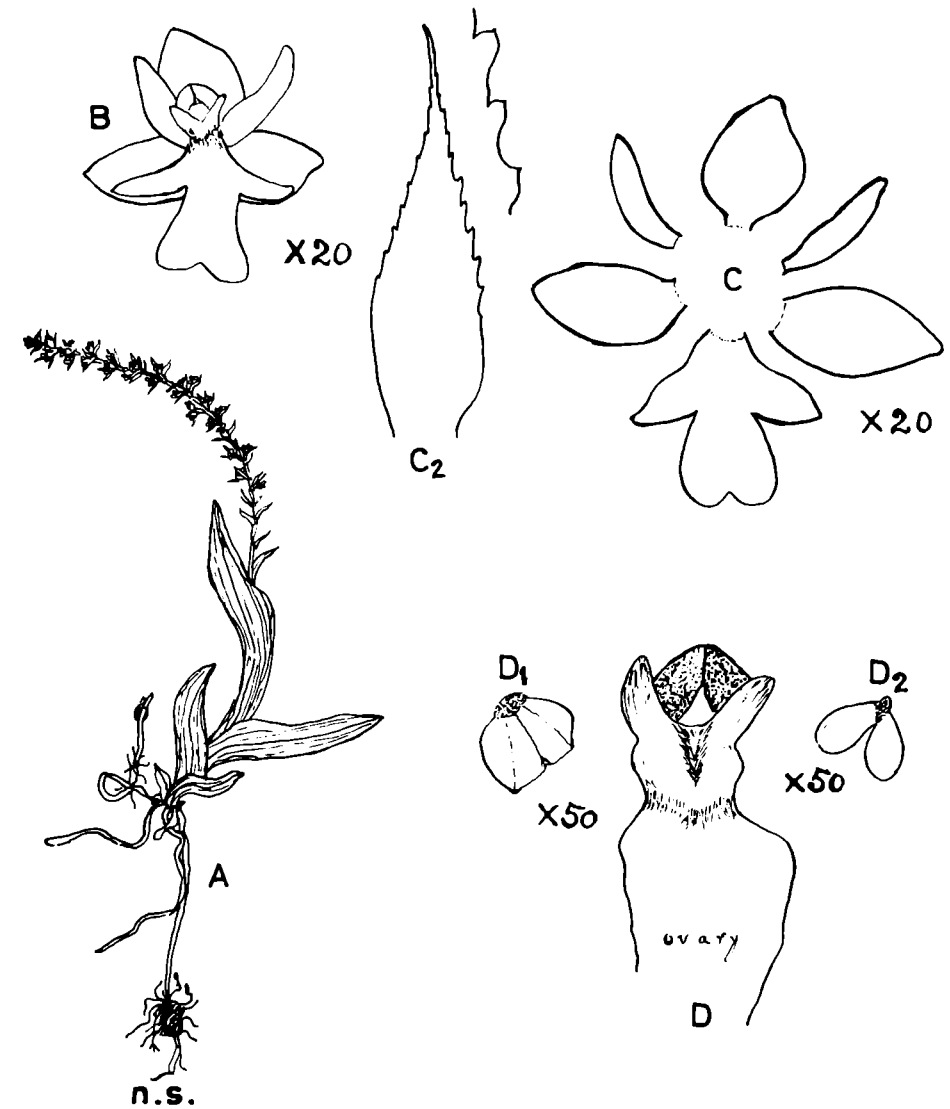


Plate 149

Oberonia pachyphylla King & Pantl. in Ann. Roy. Bot. Gard. Calcutta 8:5, t. 4, 1898; Seidenf. 33(1):35, t.26, 1978.

Stem very short; leaves broadly lanceolate, 1-2.2 cm. by 4-8 mm. broad, lower leaves fleshy, acute. Inflorescence with a short peduncle, one to four lanceolate bracts c 3 mm. long, hyaline, flowering region long and far exceeding the leaves, densely flowered; floral bracts 1.5 mm. ovate, fleshy at the base, enclosing the young flowers. Flowers 1.4 mm. long; sepals broadly ovate, .8 mm. long, spreading and concave, dorsal sepal with toothed margin, laterals entire; petals ovate-lanceolate, toothed margin, spreading. Lip slightly shorter than the sepals, .7 mm. long, .9 mm. broad, lateral lobes rotund with dentate margin, terminal lobe rounded, entire; a depression on the lip under the column, a semilunar pigmented blotch about the middle. Column very short.

Flowering time - Probably in March as it fruits in April.

Altitudinal range - \pm 550 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

Remarks - Although the species had been described by King & Pantling, we too have noted the following - 1) the dorsal sepal has toothed margin. 2) the petals also have toothed margin, 3) the lip has a semilunar blotch in the middle. This is a new record.

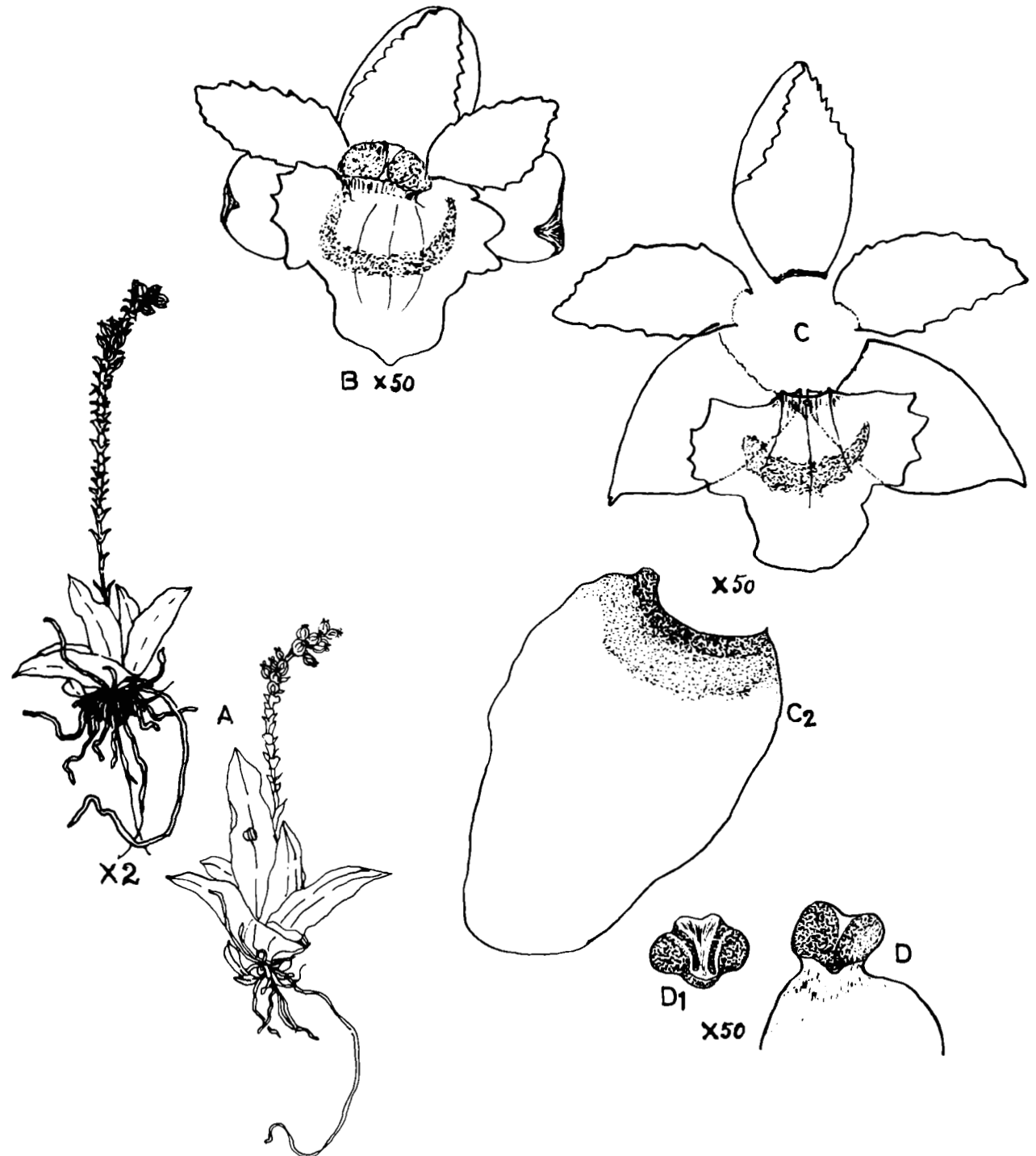


Plate 150

Oberonia pachyrachis Reichb. f. ex Hk. f. Fl. Brit. Ind. 5:681, 1888; K. & P. 4, t.3, 1898; D.85, 1906; T. 446, 1966; B. & T. 68:36, 1971; Seidenf. 33(1):11, t. 4 1978; H. et al. 50, 1978.

Stem very short and tufted; leaves narrowly ensiform, 3-8.5 cm. by 6-13 mm. slightly falcate, narrowed at the base, acute. Inflorescence peduncle compressed and adnate to a leaf at its apex, broad, ebracteate, flower bearing region fleshy thus flowers sunken; floral bracts ovate-rotund more or less semilunar, c. .75 mm. long, irregularly serrate. Flowers very minute, 1.5 mm. long, sunken in the fleshy rachis; sepals elliptic, .8 mm. long, lateral sepals with a mamillate apex which is serrate; petals smaller than the sepals, linear-oblong, subentire. Lip orbicular-elliptic, 1 mm. long, 1 mm. broad, lateral lobes absent, concave, subentire or subserrate, a depression below the column. Column very short.

Flowering time - March-April and September to October.

Altitudinal range - 600 to 1675 m.

Distributional pattern - east, central and west Nepal.

Specimens in Herbarium - 9 gatherings.

Specimens studied - 9.

Chr. No. n = 15 (Mehra & Sehgal, Taxon, 24:513, 1973; Vij et al. ibid. 25:635, 1976).

2n = 30 (Mehra & Kashyap, ibid. 28:407, 1979).

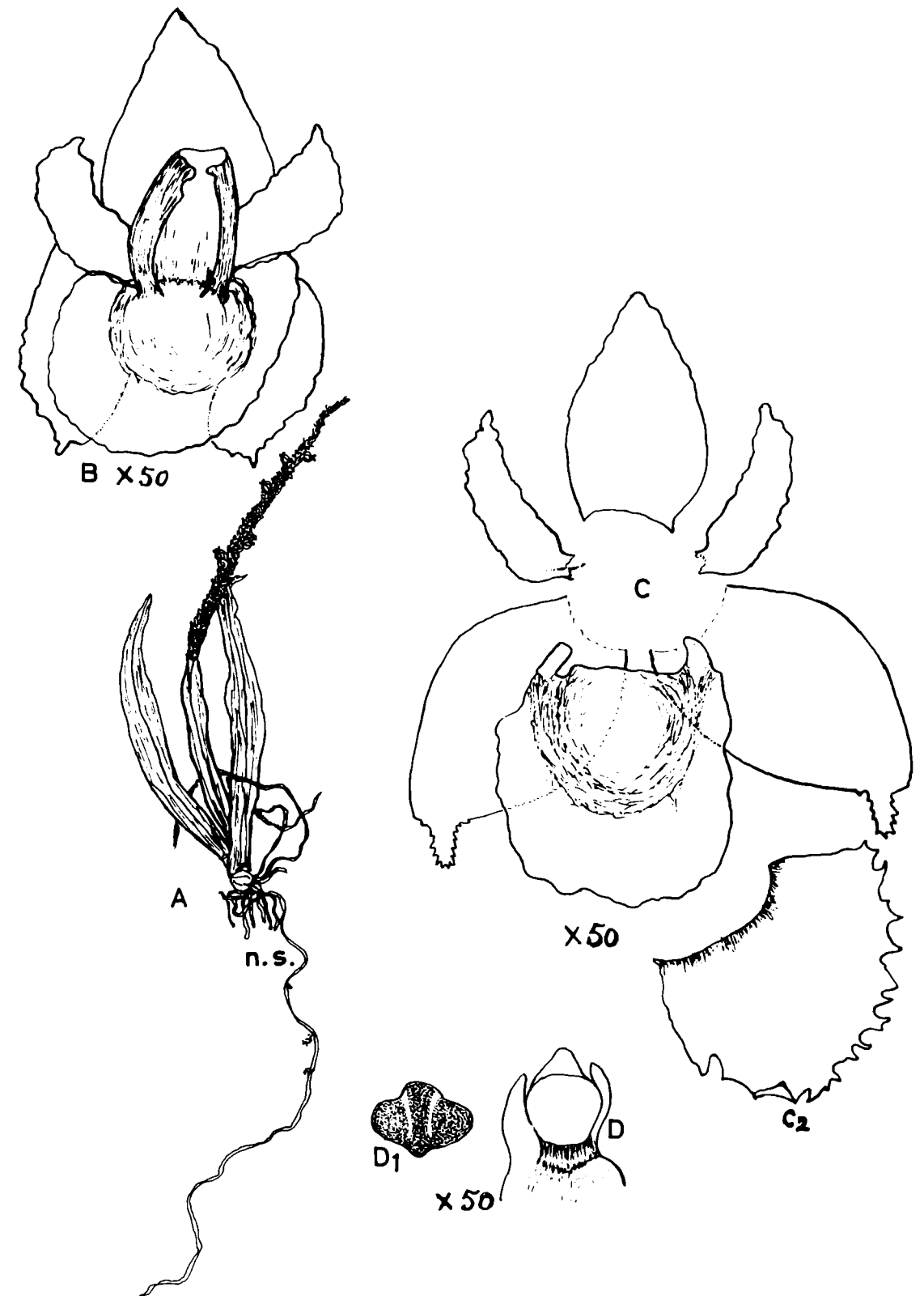


Plate 151

Oberonia prainiana King & Pantl. in J. Asiat. Soc. Bengal 64; 331, 1895, et Ann. Roy. Bot. Gard. Calcutta 8 : 3, t. 1, 1898; Seidenf. 33(1):35, t. 25, 1978.

Stem very short; leaves fleshy, oblong, 1-2 cm. by 3-6 mm. slightly falcate, acute. Inflorescence, erect, slender, far exceeding the leaves, peduncle bracteate, adnate to the uppermost leaf, densely flowered in the lower region but laxly flowered higher up; floral bracts equalling the ovary or smaller, oblong, 1 mm or .75 mm. long, subentire but apex serrulate. Flowers brownish, c 1.75 mm. long; sepals oblong, .4 mm. long, entire, rounded revolute, lateral sepals broader than the dorsal; petals narrowly elliptic c .3 mm., coarsely and unequally serrate, acute, spreading. Lip elliptic-lanceolate, c .7 mm. long, irregularly lobulate-serrate, base truncate with a depression below the column.

Flowering time - June - July.

Altitudinal range - \pm 915 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. $n = 15$ (Mehra & Vij, Taxon, 19:110, 1970).

$2n = 30$ (Vij et al., ibid. 25:635, 1976).

Remarks - King & Pantling who described this taxon mention that the lip is not much longer than the sepals but we find that the lip is about twice the length of the sepals. This is a new record.

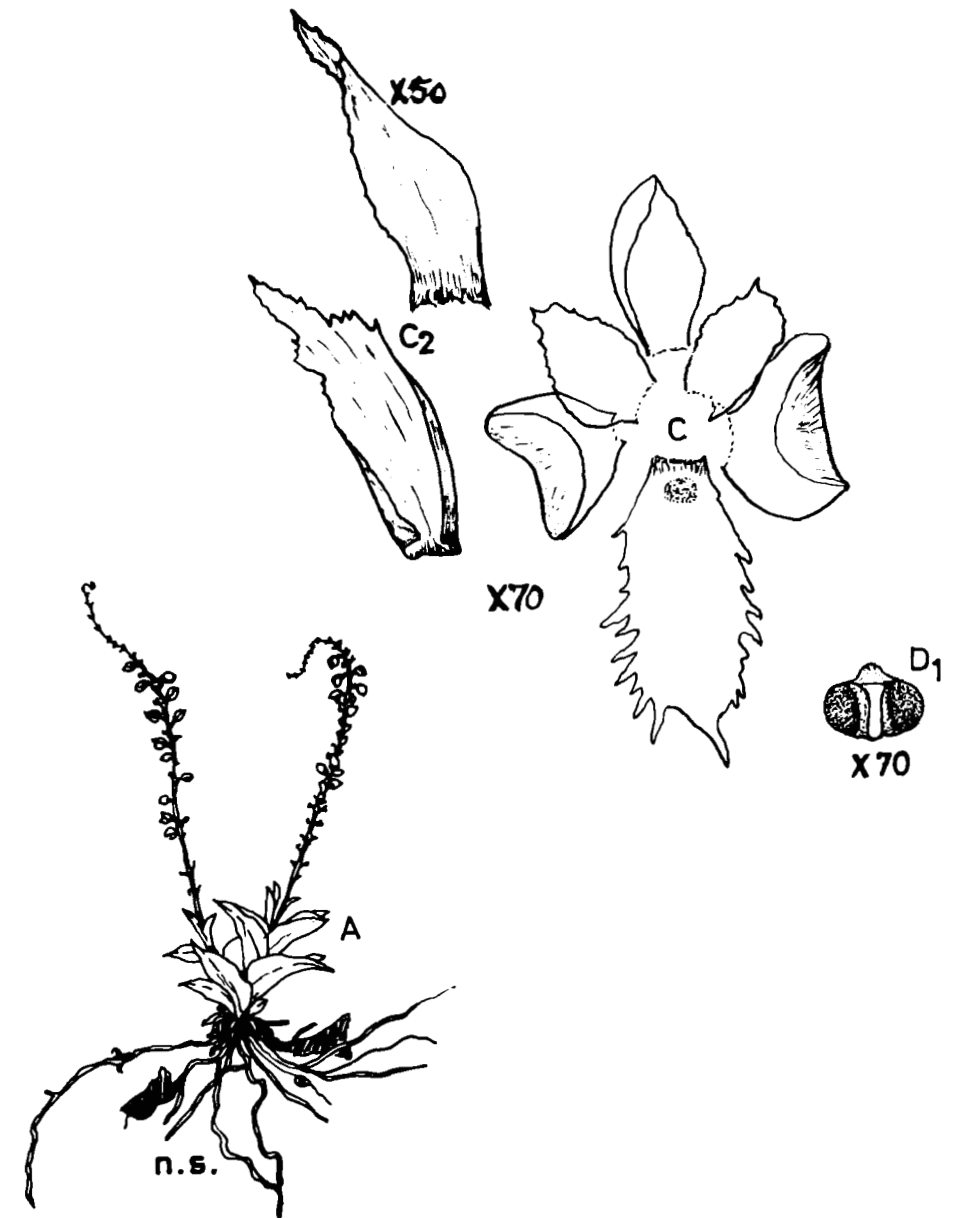


Plate 152

Oberonia pyrulifera Lindl. Fol. Orchid. Oberonia 3:1859; Hk. f. 5:678, 1888; K. & P. 14, t.168, 1898; Seidenf. 33(1):23, t.13, 1978.

Stem erect about 2.5 cm. high; leaves obliquely ensiform, 1.8-3.5 cm. by 2-4 mm., acute. Inflorescence slender, erect, far exceeding the leaves, peduncle terete, bracteate, bracts c 2.5 mm. long, laxly flowered; floral bracts 1.5-2 mm. long, shorter or equalling the ovary, lanceolate or broadly elliptic, serrulate. Flowers minute, c 2 mm. long; sepals ovate, 1 mm. long entire, acute reflexed; petals oblong 1 mm. long, crenulate, reflexed. Lip 1.5-2 mm. long, 1-1.5 mm. broad, small indistinct auricles on either side at the base, apical lobe deeply cleft into two oblong, subfalcate diverging lobules, sinus more or less triangular.

Flowering time - June - July.

Altitudinal range - \pm 2440 m.

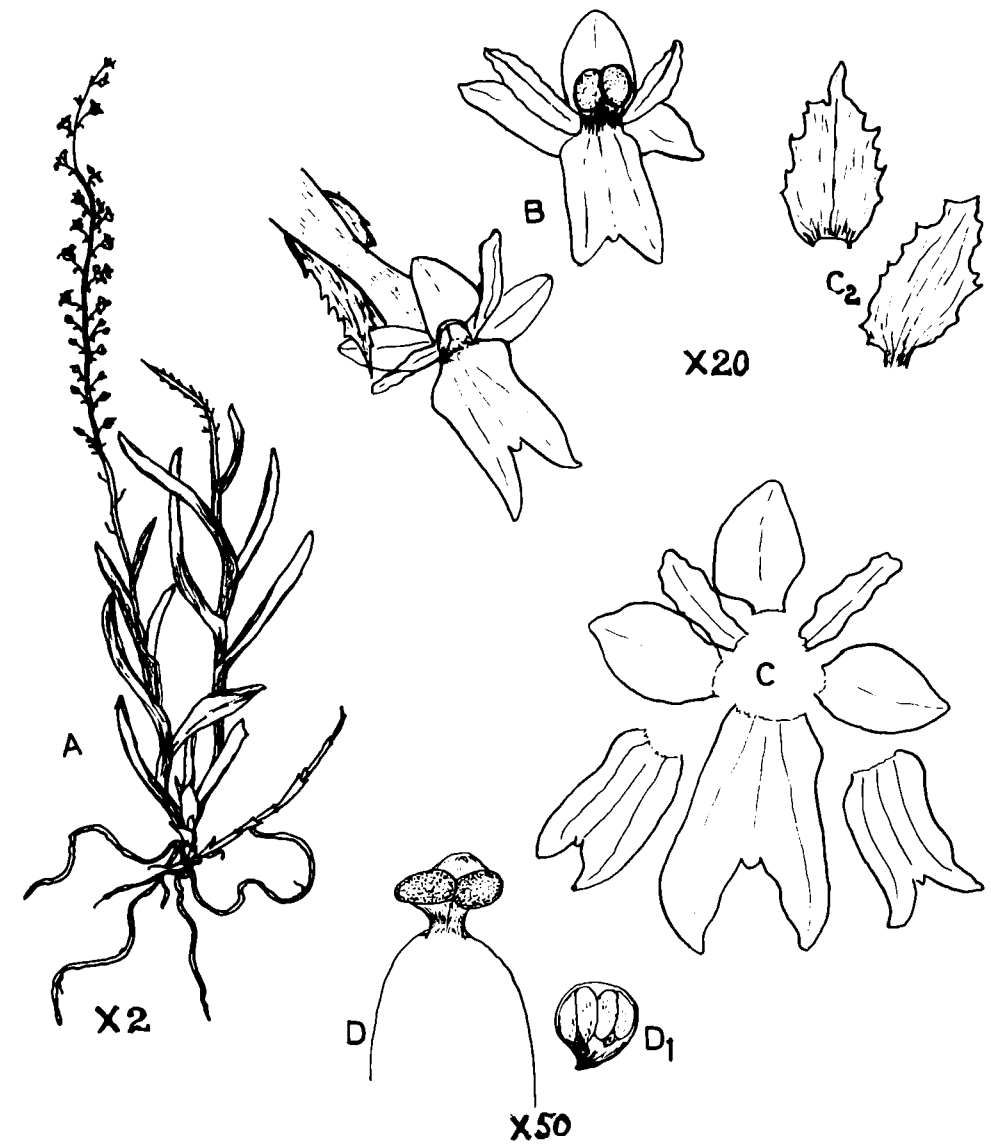
Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

Remarks - King & Pantl. mention the stem of this plant as very short, however in the fig. a fairly tall stem is shown. Our specimens have exactly such tall stems. This is a new record for Nepal.



OTOCHILUS Lindl. (Coelogyneae). The generic name is derived from the auriculate lateral lobes of the lip which enclasp the base of the column. These are epiphytic orchids with articulate branched stems, formed by elongated superimposed pseudobulbs; leaves on the uppermost pseudobulbs in pairs, elliptic or lanceolate. Flowers small, bracteate, in racemes; bracts scarious with sides rolled inwards. Sepals and petals spreading, free and subequal. Lip short, sessile on base of column, base saccate, lateral lobes short, erect, mid lobe entire; column long and slender, foot absent.

Artificial key to the species of *Otochilus*

- 1 Flowers 2.4 cm. long from apex of dorsal sepal to apex of lip; dorsal sepal 12 mm. long; leaves narrowly elliptic. *lancilabius*.
- 1* Flowers c 1.3-1.5 cm. long from apex of dorsal sepal to apex of lip; dorsal sepal 8 mm. long or less —
 - 2 Leaves linear-oblong; sepals and petals obtuse. Lateral sepals with a fold near the base and a keel at the back. Lateral sepals and lip 3 veined. *fuscus*.
 - 2* Leaves elliptic-oblong; sepals and petals acute. Lateral sepals without a fold near the base and no keel at the back. Lateral sepals and lip 5 veined. *albus*.

Plate 153

Otochilus albus Lindl. Gen. Sp. Orchid. Pl. 35, 1830; Hk. f. 5; 843, 1890 et 6:195, 1890; K. & P. 143, t. 200, 1898; Burk. 4:133, 1910; T. 2:192, 1971 et 3:163, 1975; B. & T. 68; 662, 1972 (all as 'alba'); Seidenf. 71(1&2):10, f. 9, 1976; H. et al. 51, 1978.

Internodes of the stem pseudobulbous, subcylindric, 3-6 cm. long; leaves elliptic-lanceolate, blades 5.5-12 cm. by 1.2-2 cm., acuminate tapering at the base into a petiole, 1-2 cm. long. Racemes base enveloped in large sheaths; laxly flowered; floral bracts caducous, 7-8 mm. long, ovate-lanceolate, equalling or slightly exceeding the ovary. Flowers white, 1.3 cm. long; sepals oblong-lanceolate, 8 mm. long, dorsal a bit shorter, acute, lateral sepals 5 veined, no fold near the base, back not keeled; petals narrower, 7 mm. long, linear-lanceolate. Lip equalling the sepals, 7 mm. long, saccate, side-lobes broad, mid lobe oblong, apiculate, deflexed from the base. Column long and slender, 7 mm. long, winged and with a hood-like extension, thickened at the apex, bent at the base. Anther subglobose.

Flowering time - June.

Altitudinal range - 1525-2440 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 4 gatherings.

Specimens studied - 2.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:110, 1970).

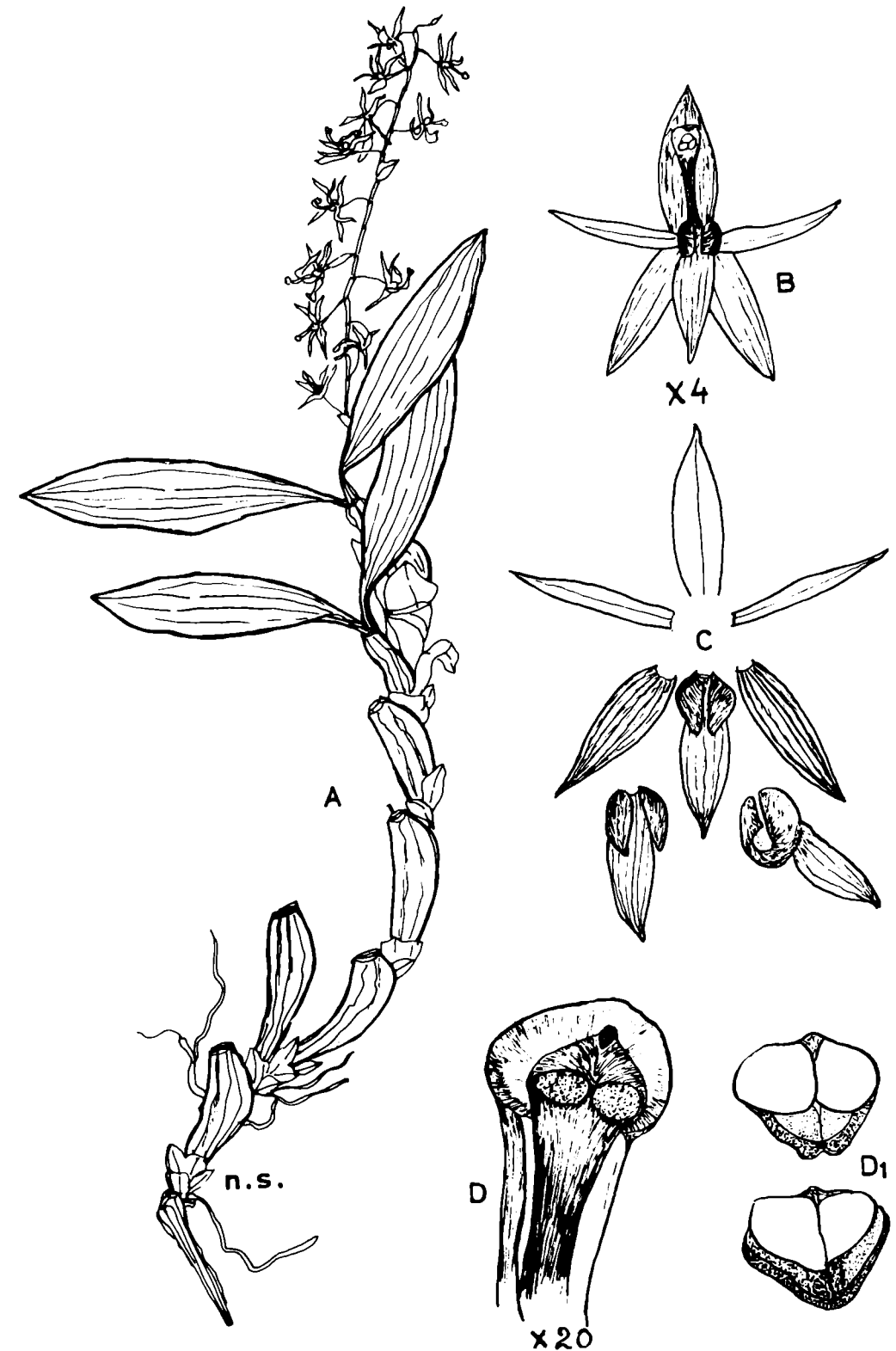


Plate 154

Otochilus fuscus Lindl. Gen. Sp. Orchid. Pl. 35, 1830; Hk. f. 5:844, 1890; K. & P. 143, t.199, 1898; T. 447, 1966 et 3:1631, 1975; Dept. Med. Pl. 2:133, 1969; B. & T. 68:662, 1972 (all as 'fusca'); Seidenf. 71(1&2):8, f.8, 1976; H. et al. 51, 1978.

Pendulous; internodes of stem pseudobulbous, fusiform or cylindric, 3-7.5 cm. long, clothed by fibrous sheaths; leaves linear-lanceolate, 9.5-15 cm. by 8-12 mm., slightly narrowed at the base to form a short petiole, petiole 1-2 cm. long. Racemes as long as the leaves which on fruiting becomes longer, peduncle enclosed in imbricate sheaths; floral bracts narrow, oblong 9 mm. long, scarious, subtruncate, margins incurved, longer than the ovary. Flowers 1.3 cm. long, white; sepals subequal, dorsal 1 lanceolate, 8 mm. long, lateral sepals subfalcate, lanceolate, 8 mm. long, 3 veined, folded near the base, subacute back with a keel; petals oblanceolate, equalling the sepals. Lip concave with a saccate, bicornute base, terminal lobe oblong, shorter than the sepals, lateral lobes small teeth-like. Column 6 mm. long, winged at the apex. Anther with a pointed lip.

Flowering time - December and January.

Altitudinal range - 1070-1830 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 4 gatherings.

Specimens studied - 3.

Chr. No. $n = 20$ (Mehra & Vij. Taxon, 19:110, 1970; Mehra & Sehgal, ibid. 29:349, 1980).

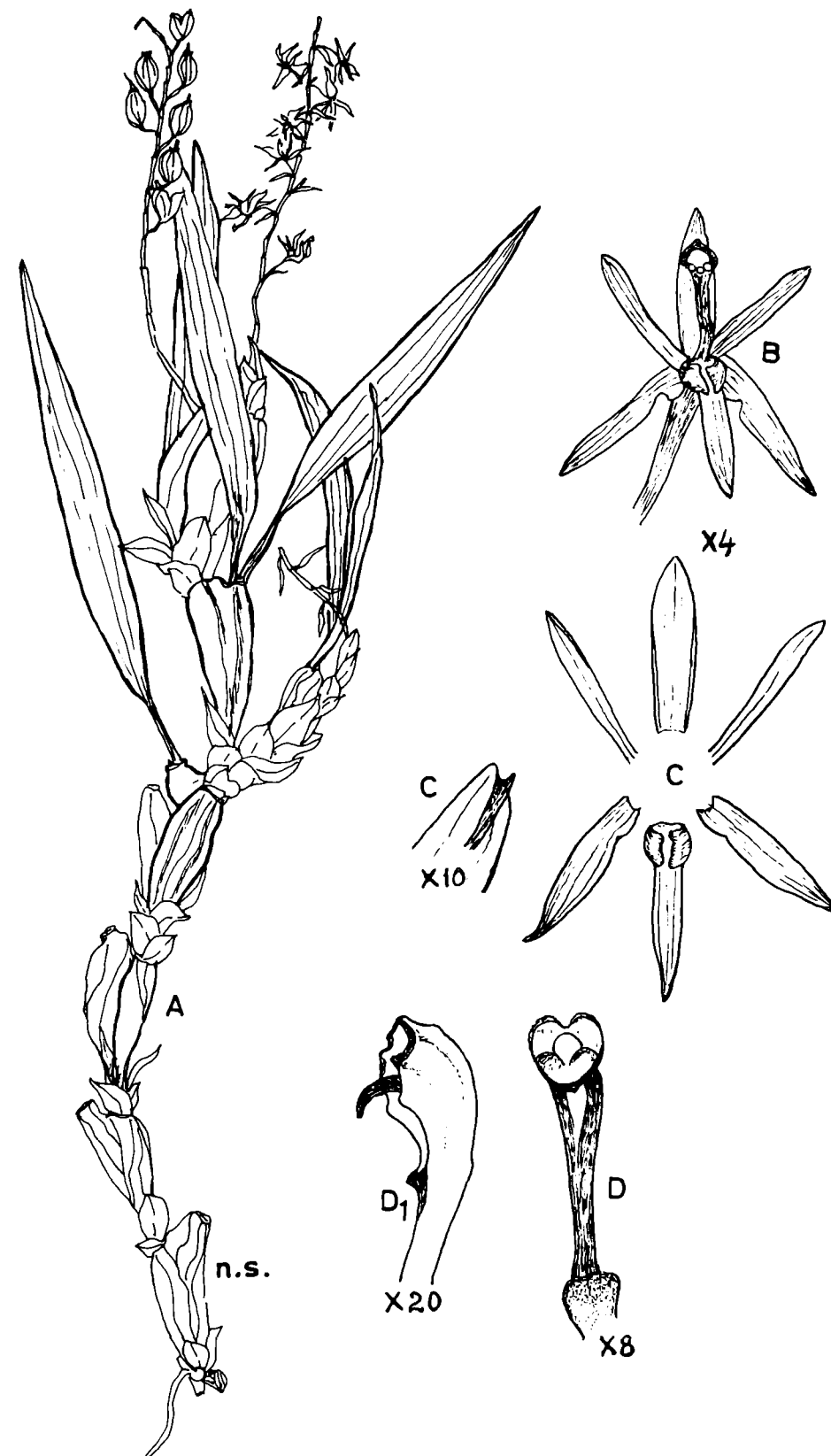


Plate 155

Otochilus lancilabius Seidenf. Bot. Tidssk. 71:13, f.11, 1976.

= *O. porrectus* auct. non. Lindl.; Hk. f. 5:844, 1890; K. & P. 142, t. 198, 1898; T.447, 1966 et 2:192; 1971; Dept. Med. Pl. 2:133, 1969; B. & T. 68; 662, 1972; H. et al. 51, 1978.

Internodes of stem pseudobulbous but long and cylindric, 4.5-10 cm., sheaths appressed; leaves narrowly elliptic, 13-23.5 cm. by 2.7-5 cm., narrowed at the base to the petiole, acuminate, petiole 1.6-3 cm. long. Raceme shorter than the leaves, peduncle enclosed by imbricate sheaths, laxly flowered; floral bracts 1.2 cm. long, equalling the ovary, caducous. Flowers white 2.2-2.4 cm. long; sepals subequal, oblong-lanceolate, 1.3 cm. long, lateral pair subfalcate and with a fold near the base; petals equalling the sepals, linear, acute, spreading. Lip shorter than the sepals, 1 cm. long, saccate and deflexed at the base, side lobes small and obtuse, terminal lobe oblong, acute three strong veins at the base. Column very long and slender, 1 cm. long, winged and thickened at the apex. Anther with shortly pointed lip.

Flowering time - October to December.

Altitudinal range - 1830-2440 m.

Distributional pattern - central and east Nepal.

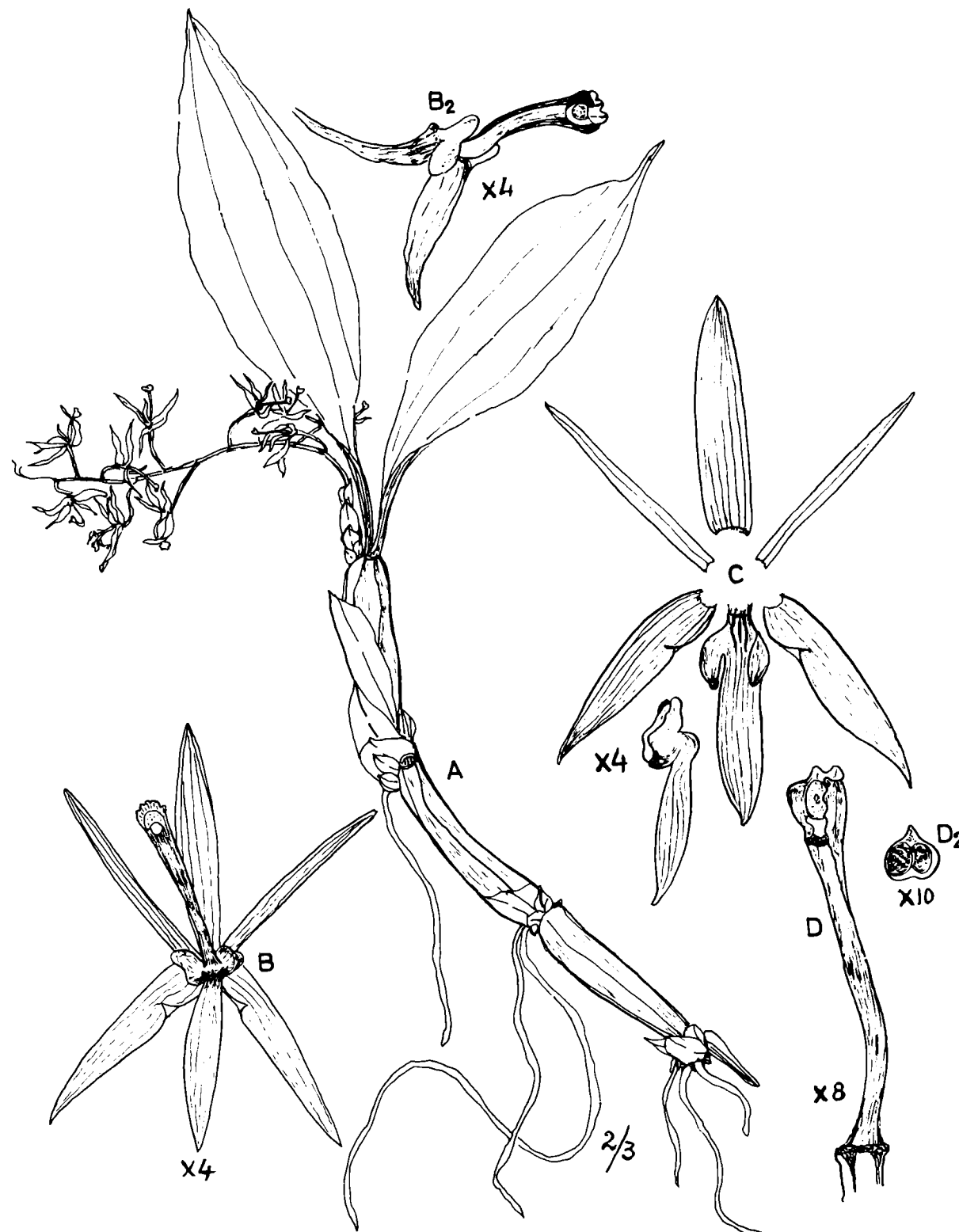
Specimens in Herbarium - 6 gatherings.

Specimens studied - 2.

Chr. No. $n = 20$ (Mehra & Vij, Taxon, 19:110, 1970; Mehra & Sehgal, ibid. 29:349, 1980).

$2n = 40$ (Mehra & Kashyap, ibid. 30:507, 1981).

Remarks - According to Seidenfaden, the true *O. porrectus* is easily recognised by its ovate apiculate mid lobe of the lip, and the five lamellae appearing at the base of the epichile. The side lobes are acute. We have noted the presence of a fold near the base of the lateral sepals, a character not recorded by Seidenfaden.



PANISEA Lindl. (Coelogyneae). The generic name probably alludes to the similarity of the floral segments. They are very close to *Coelogyne* but differ from it in details of the lip and column. These are small tufted epiphytes with pseudobulbs; leaves usually two, membranous and narrow elliptic. Scape is lateral, few flowered but usually one in *uniflora*.

Artificial key to the species of Panisea

Flowers solitary on a short peduncle from the base of and not longer than the pseudobulb. A disc between the slightly ridged lamellae in the lip *uniflora*.
 Flowers few in a raceme. Lip with a curious sigmoid flexure at the base, no disc and no lamellae in the lip. *demissa*.

Plate 156

Panisea demissa (D. Don) Pfitz. in Engl. Pf. reich IV-50, 11B-7, Ht. 32:141, t.49, 1907; H. et al. 51, 1978.

= *Dendrobium demissum* D. Don, Prodr. Fl. Nep. 34, 1825.

= *Coelogyne parviflora* Lindl.

= *Panisea parviflora* (Lindl.) Lindl. : Hk. f. 5:783, 1890; K. & P. 142, t.197, 1898; T.447, 1966; Dept. Med. Pl. 2:134, 1969; B. & T. 66:583, 1969.

Pseudobulbs narrowly ovoid, 1.5-3 cm. or even up to 5 cm.; leaves narrowly elliptic-lanceolate, 4.5-10.5 cm. by 7-13 mm., tapering to the base into an indistinct petiole or sometime into a distinct petiole, 1.2-3 cm. long, acute. Inflorescence slightly decurved, about as long as the leaves, laxly 5-8 flowered, peduncle with membranous sheaths; floral bracts lanceolate, 6-9 mm. long, shorter than the ovary. Flowers c 2 cm. in diam. white; sepals keeled, dorsal sepal oblong-lanceolate, 1.1 cm. long, lateral sepals oblong-lanceolate, falcate, 1.2 cm. long, gibbous at base; petals oblong, shorter than the sepals, 9 mm. long, slightly broad at the base. Lip with a curious sigmoid flexure at the base, c 1.2 cm. long; narrowly lanceolate, 3 nerved pink, subacute. Column brownish, 1 cm. long, winged which at the top is expanded and serrulate.

Flowering time - October to December.

Altitudinal range - 1890-2440 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 13 gatherings.

Specimens studied - 6.

Chr. No.

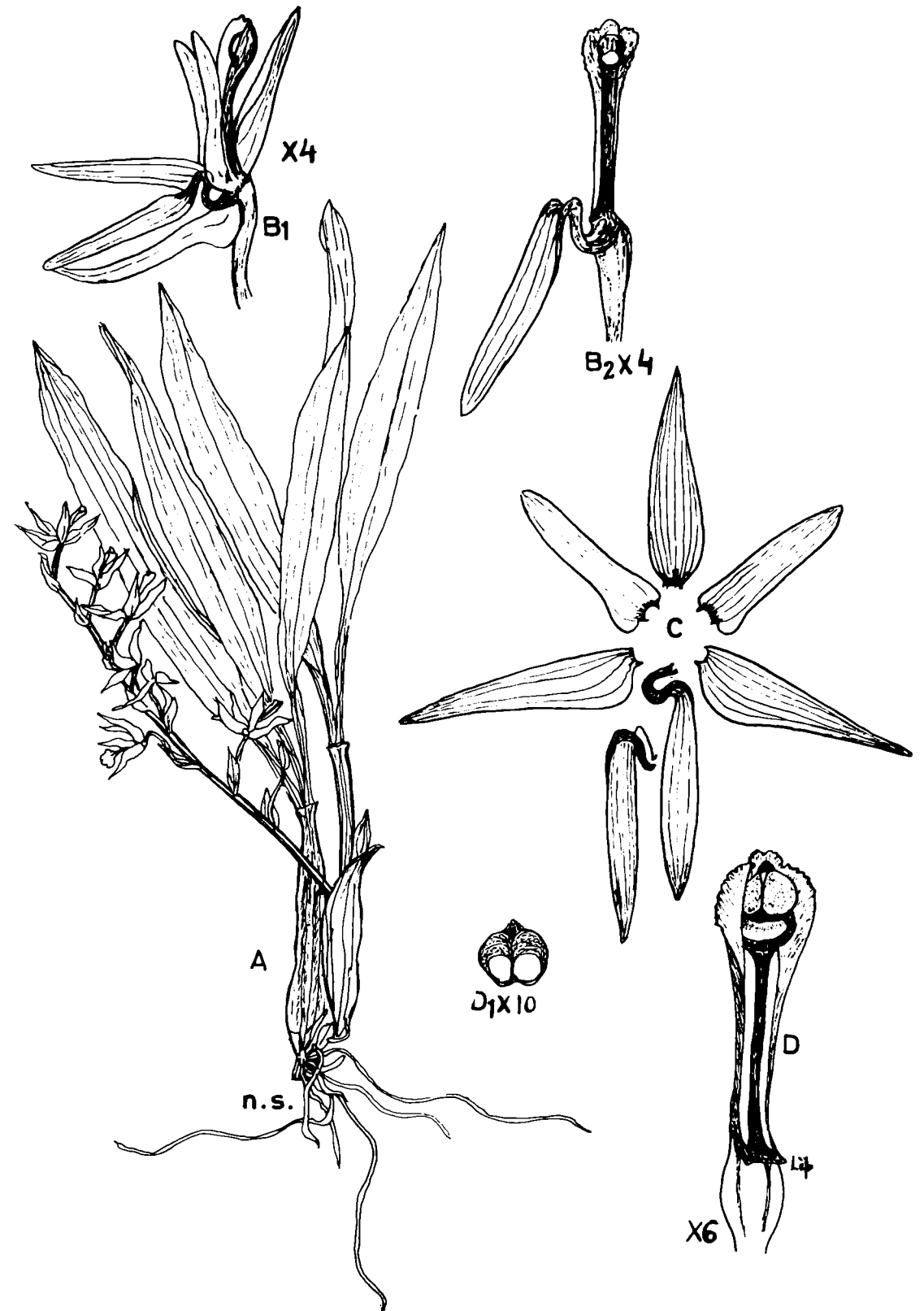


Plate 157

Panisea uniflora (Lindl.) Lindl. Fol. Orchid. 1 Panisea : 2, 1854; Seidenf. 70:77, f.12, 1975; H. et al. 52, 1978.

= *Coelogyne uniflora* Lindl. Gen. Sp. Orchid. Pl. 42, 1830; Hk. f. 5:842, 1890; K. & P. 138, t.192, 1898; B. & T. 66:586 1968; T. 2:183, 1971; Herk. 80:190, t.155, 1972.

Pseudobulbs densely crowded, broadly ovoid, 1.5-3 cm., mammilate with loose sheaths at the base. Leaves in pairs, narrowly lanceolate, 5-10 cm. by 6-12 mm., narrowed to the base, sessile. Flower 2.8-3.3 cm. in diam., solitary, yellowish on a short peduncle from the base of the pseudobulb; lanceolate, imbricate bracts at the base of the ovary, 6-16 mm. long, shorter than the ovary; sepals oblong-lanceolate, 1.7 cm. long, spreading; petals lanceolate, 1.5 cm. long, shorter than the sepals. Lip oblong, 1.7 cm., long, reddish brown with 4 elongated orange spots, with a very short claw, side lobes erect, narrow, with apices directed forwards and upwards, isthmus between side lobes and anterior lobe with undulate margin, anterior lobe ovate, entire, a disk obscurely ridged, lamellae prominent. Column 7 mm. long winged with two broad marginal lobes below the stigma and above the anther, a broad lobe with two teeth.

Flowering time - April to June.

Altitudinal range - 1000-2285 m.

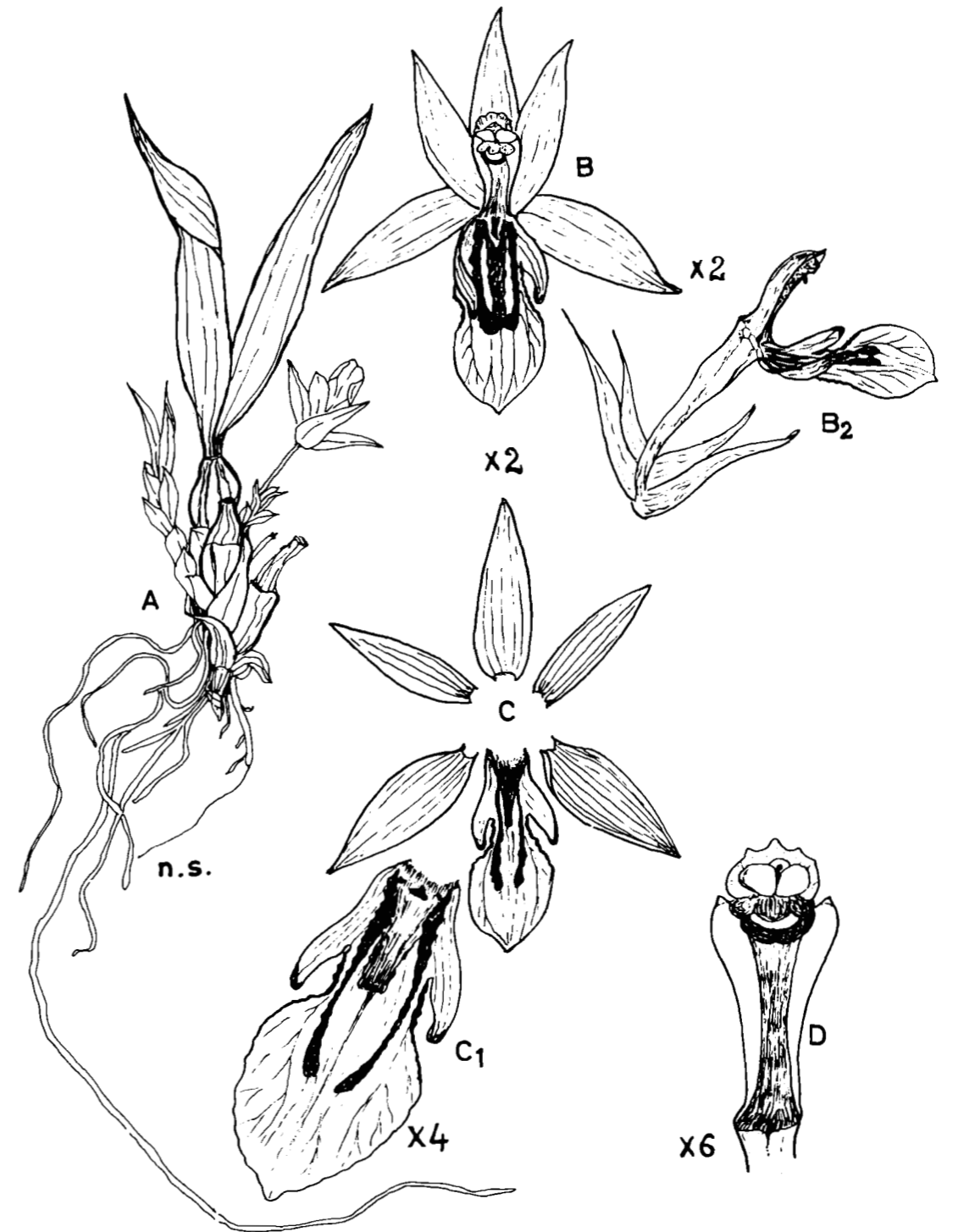
Distributional pattern - central and east Nepal.

Specimens in Herbarium - 5 gatherings.

Specimens studied - 3.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:107, 1970 as *Coelogyne uniflora*).

Remarks - The disk in some flowers is very long and fuses at its apex with the two lamellae. Usually the disk extends half way the lip.



PHOLIODOTA Lindl. ex Hooker (Coelogyneae). There are large scales which ensheath the pseudobulbs also there are bracts at the base of the inflorescence. Habit is of *Otochilus*. Epiphytic with one or two leaves and flowers in long pendulous racemes, the rachis of which is flexuous, and the bracts are stiff and distichous. Column is very short and with wide wings.

Pholidota recurva Lindl.

Internodes pseudobulb like; leaves in pair, narrowly oblong, narrowed into a short petiole. Inflorescence as long as the leaves on a young pseudobulb; floral bracts fanshaped; flowers c 1.5 cm. in diam., secund; lip with two auricle-like terminal lobes, five short ridges on the upper surface.

Artificial key to the species of Pholidota

- 1 Pseudobulbs uninodal; flowering scape from top pseudobulbs; inflorescence rachis thickened, not zigzag; flowers distichous..... *imbricate*.
- 1* Stem elongate, branched and formed of pseudobulbous internodes —
- 2 Flowering scape from top of pseudobulbs; dorsal sepal suborbicular —
- 3 Inflorescence rachis flexuous, zigzag. Flowers 9 mm. in diam., petals elliptic-lanceolate; column winged, wings orbicular..... *griffithii*.
- 3* Inflorescence rachis not flexuous but zigzag. Flowers 1.4-2.2 cm. in diam., petals ovate-orbicular; column slightly winged..... *articulata*.
- 2* Flowering scape from the sheath of the internodes. Flowers 8 mm. in diam., column broadly winged in the upper half. *protracta*.

Plate 158

Pholidota articulata Lindl. Gen. Sp. Orchid. Pl. 38, 1830; Hk. f. 5:844, 1890; K. & P. 146, t. 205, 1898; B. & T. 68:664, t.1, 1972; T. 3:163, 1975; H. et al. 53, 1978.

Stem jointed, branched, internodes 4-9 cm. long, terete, with a few broad scarious sheaths at the nodes; leaves in pairs, elliptic-lanceolate or oblong-lanceolate, 7-14 cm. by 2-4 cm., thickly membranous. Racemes terminal on young pseudobulbs, arising between the leaves, drooping but as long as the leaves, densely flowered. Flowers 1.4-2.2 cm. in diam., brownish; floral bracts rhomboid-ovate, c 2 cm. long, convolute, deciduous; sepals subequal, dorsal sepal ovate, 7 mm., lateral pair ovato-oblong, boat shaped, 8 mm. long; petals ovate-orbicular, 6 mm. long, blunt. Lip broadly cymbiform, 9 mm. long, about as long as the lateral sepals, a transverse oblong broad bilobulate lobe in the middle, infolded at the base, disk with five bold lamellae. Column 3.5 mm. long, slightly winged at the apex, clinandrium with teeth, rostellum large. Anther subglobular, 1.5 mm.

Flowering time - May to June.

Altitudinal range - 570-2285 m.

Distributional pattern - east & central Nepal.

Specimens in Herbarium - 9 gatherings.

Specimens studied - 8.

Chr. No. n = 20 (Arora, Taxon, 17:200, 1968; Mehra & Vij, ibid. 19:110, 1970).

n = 20 + 1-3B (Mehra & Kashyap, ibid. 30:507, 1981).

2n = 40 (Mehra & Kashyap, ibid. 28:407, 1979).

Remarks - The flowers are of variable size because the individual floral parts vary in size, particularly the petals which may be even 10 mm. long, the dorsal sepal, lateral sepals and the lip vary within 2-3 mm.

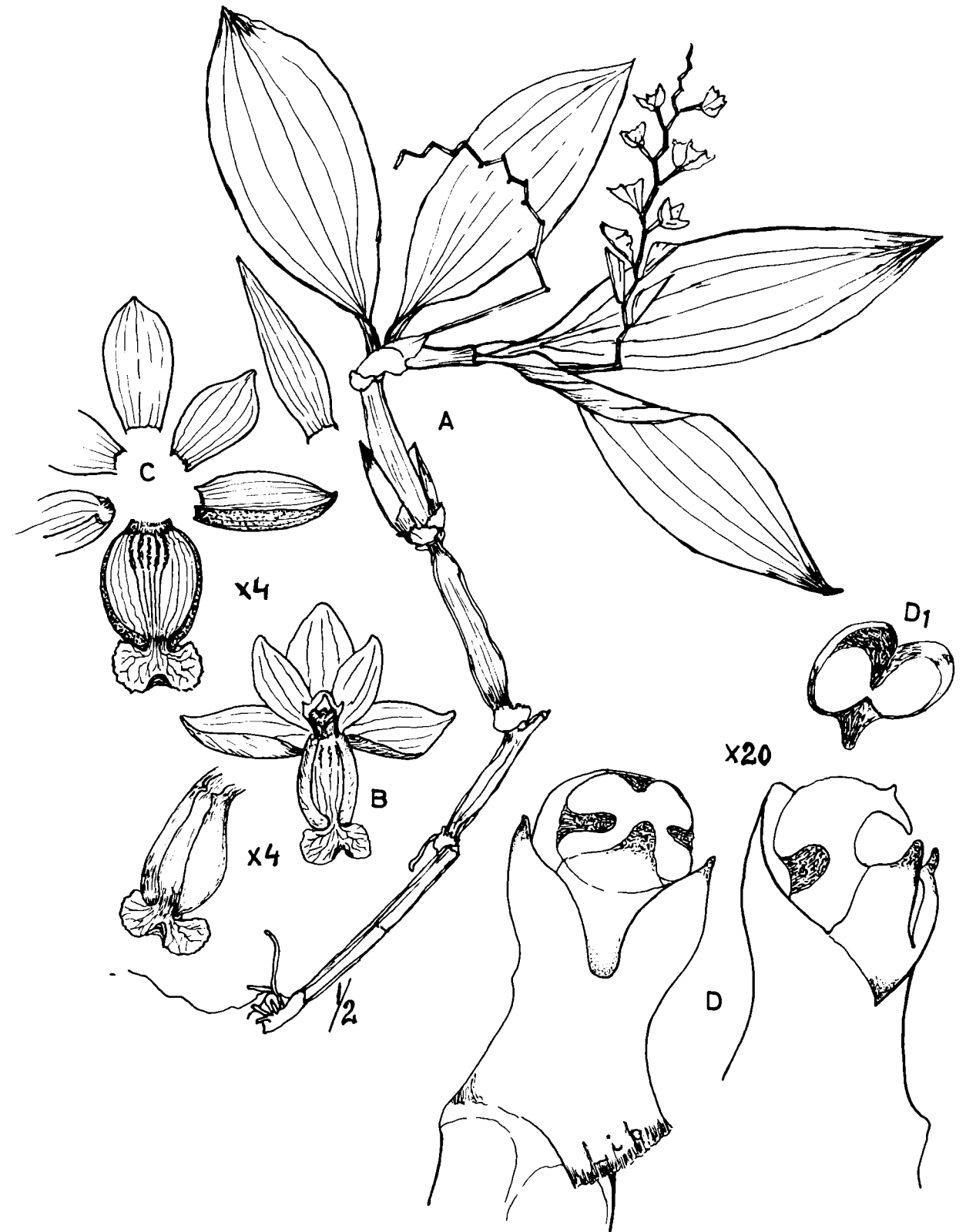


Plate 159

Pholidota griffithii Hk. f. in Icon. Pl. 19:t. 1881, 1889 et 5:845, 1890; T. 2:193, 1975 et 3:163, 1975; B. & T. 68:664, 1972; H. et al. 53, 1978.

P. articulata v. *griffithii* (Hk. f.) K. & P. 147, t.204, 1898.

Stem jointed, branching, internodes terete, 4.5-14 cm. long, furrows less; leaves in pairs, elliptic-oblong, 6-10 cm. by 1.5-2.5 cm., petiole very short. Racemes drooping, terminal, about as long as the leaves, sparse and laxly flowered; floral bracts caducous, suborbicular. Flowers brownish, 9 mm. in diam.; sepals nearly equal, ovate, 5.5 mm. long, laterals concave; petals elliptic-lanceolate, 4.5 mm. long. Lip cymbiform, 5 mm. long, a transverse oblong biloculate lobe in the middle, infolded at the base, disk with five lamellae. Column 1.5 mm. long, winged at the apex, wings suborbicular, rostellum ovate, acuminate. Anther lobes divergent.

Flowering time - June.

Altitudinal range - 1066-2440 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 4 gatherings.

Specimens studied - 4.

Chr. No. $n = 20$ (Vij, et al. Taxon, 25:635, 1976; Mehra & Sehgal, ibid. 29:349, 1980) (both as *P. articulata* v. *griffithii*).

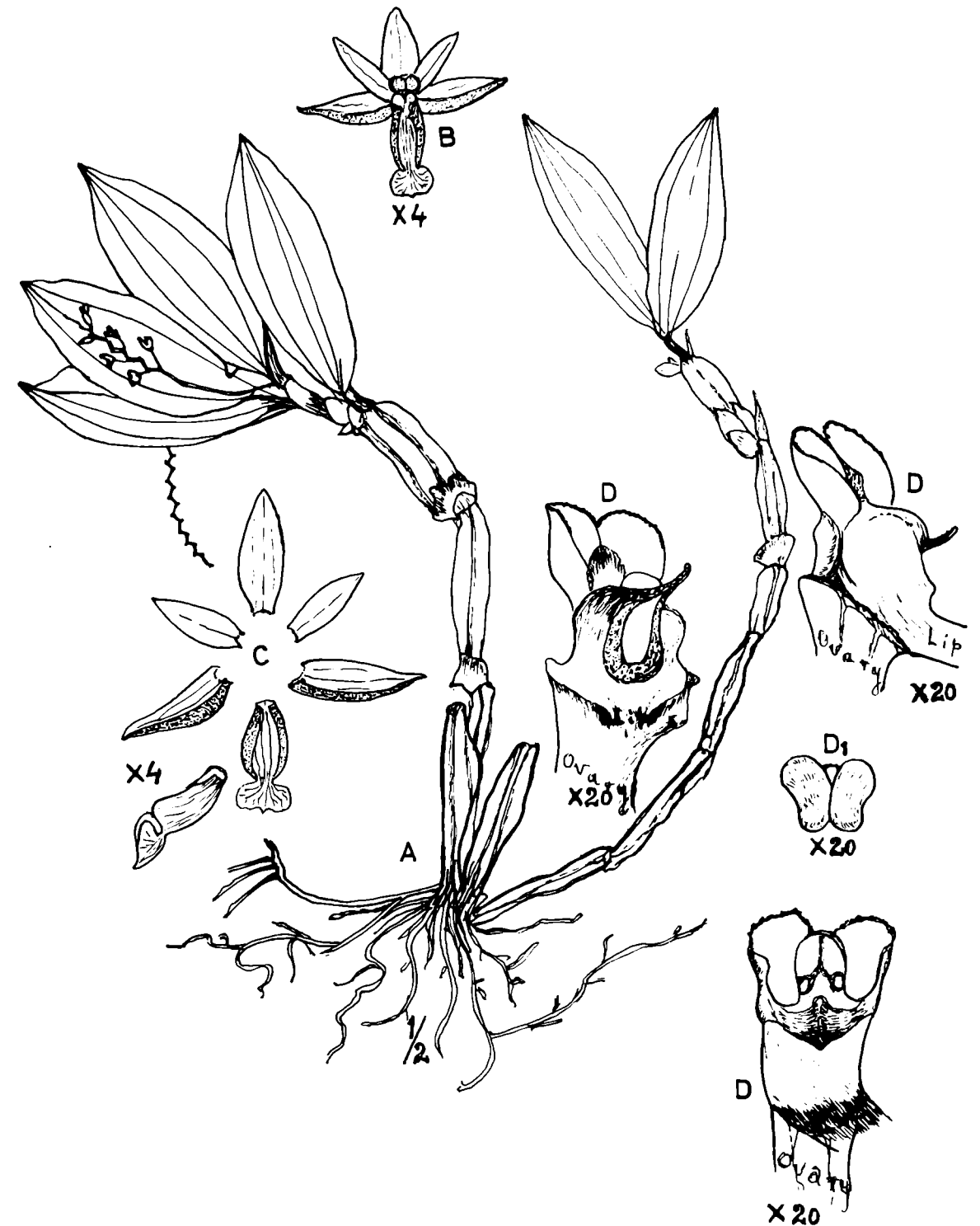


Plate 160

Phliodota imbricata Hook. Exot. Fl. 2 : t.138, 1825; Hk. f. 5:845, 1890; K. & P. 144, t.201, 1898; T. 447, 1966 et 2:193, 1971; Dept. Med. Pl. 2:134, 1969; B. & T. 68:664, t.2, 1972; H. et al. 53, 1978.

= *Ptilocnema bracteatum* D. Don, Prodr. Fl. Nep. 33, 1825.

Stem stout, creeping rhizomatous bearing uninodal pseudobulb, pseudobulbs 4-6.5 cm. long; leaf solitary, elliptic-lanceolate or elliptic-oblancoate, 17-32 cm. by 3-6 cm.; petiole stout, 2.5-5 cm. long. Inflorescence from the base of the pseudobulb, covered by few imbricating sheaths, peduncle long, densely flowered; floral bracts subrotund, 6 mm. by 9 mm., convolute, edges infolded, longer than the ovary, persistent. Flowers distichous, 1.1 cm. in diam., white; sepals unequal, dorsal sepal 5 mm. long orbicular, lateral pair 6.5 mm. long, boatshaped, connate at the base, keeled; petals oblong, 5 mm. long. Lip 3 lobed, 6 mm. long, 8 mm. broad at the lobes, side lobes large, broad, rounded, terminal lobe divided into two oblong lobules separated by a broad sinus, three warts at the base of the lip. Column more or less circular, 4 mm. long, broad towards the apex, and winged, rostellum truncate and 2 brachiate.

Flowering time - June to July.

Altitudinal range - 610-2440 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 13 gatherings.

Specimens studied - 4.

Chr. No. n = 20 (Mehra & Vij, Taxon, 18:110, 1970).

2n = 40 (Arora in Taxon, 17:200, 1968; Mehra & Kashyap, ibid. 30:507, 1981; Singh, ibid. 30:705, 1981).

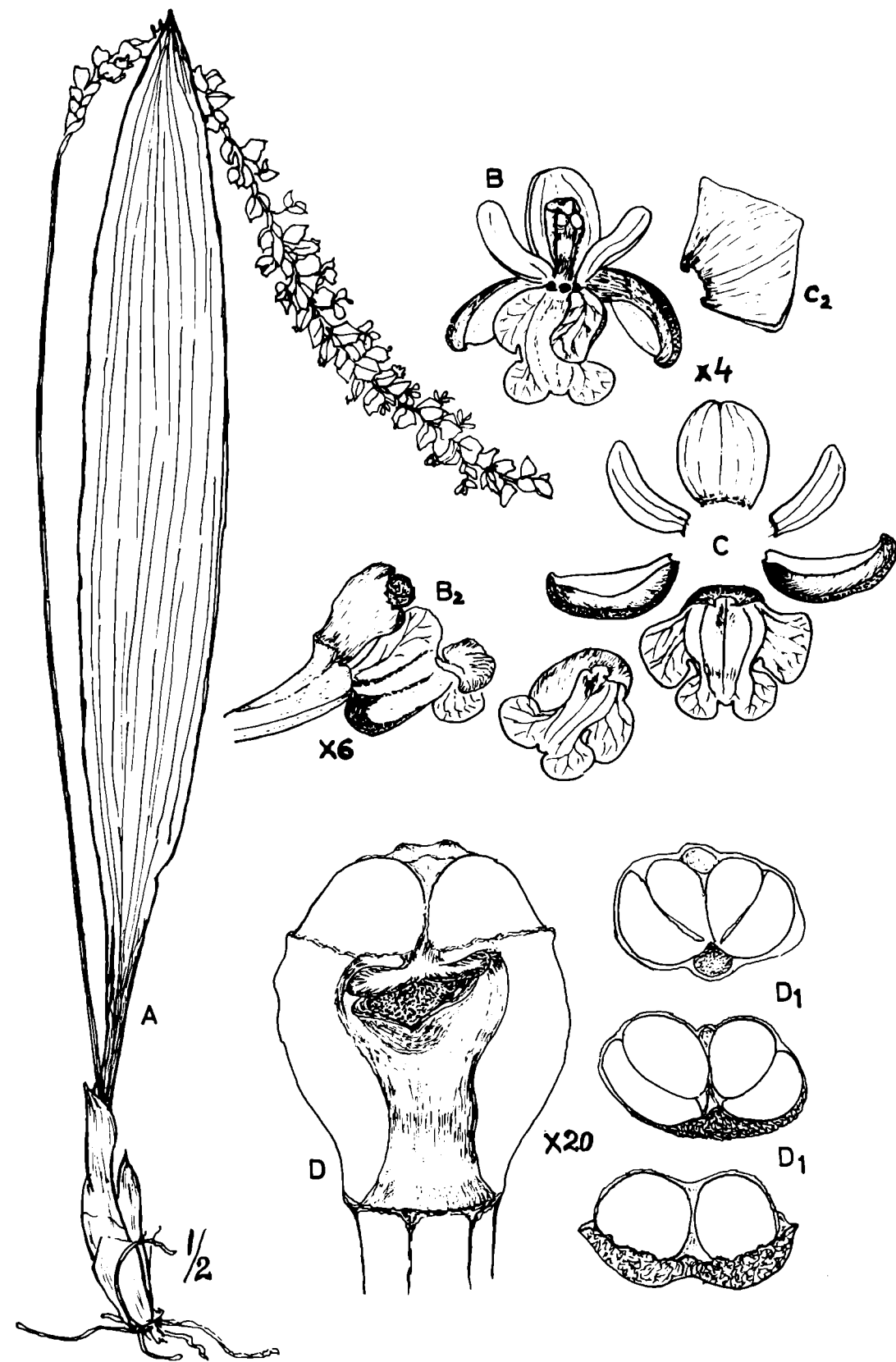


Plate 161

Pholidota protracta Hk. f. in Icon. Fl. 19 : t.1877, 1889 et 5:845, 1890; K. & P. 146, t.203, 1898; T.448, 1966 et 2:193, 1971; Deptt. Med. Pl. 2:193, 1971; B. & T. 68:665, 1972; H. et al. 53, 1978.

Stem flexuous, elongate internodes terete, clothed by numerous long scarios sheaths, and giving off pseudobulbs, 3-6 cm. long; leaves two at the apex of pseudobulbs, elliptic-lanceolate, 7-12.5 cm. by 1.5-2.5 cm. shortly petioled. Inflorescence subsessile, shorter than the leaves, peduncles short, few flowered; floral bracts broadly ovate, 3 mm. long, shorter than the ovary. Flowers greenish or white, 8 mm. in diam., sepals subequal broadly ovate, 4.5 mm. long, concave, laterals slightly falcate and connivent; petals broadly elliptic, 4 mm., shorter than the sepals, obtuse. Lip oblong 5 mm. long, concave gibbous, side lobes narrow, mid lobe corrugately trilobulate. Column 3 mm. long, broadly winged in the upper half.

Flowering time - October.

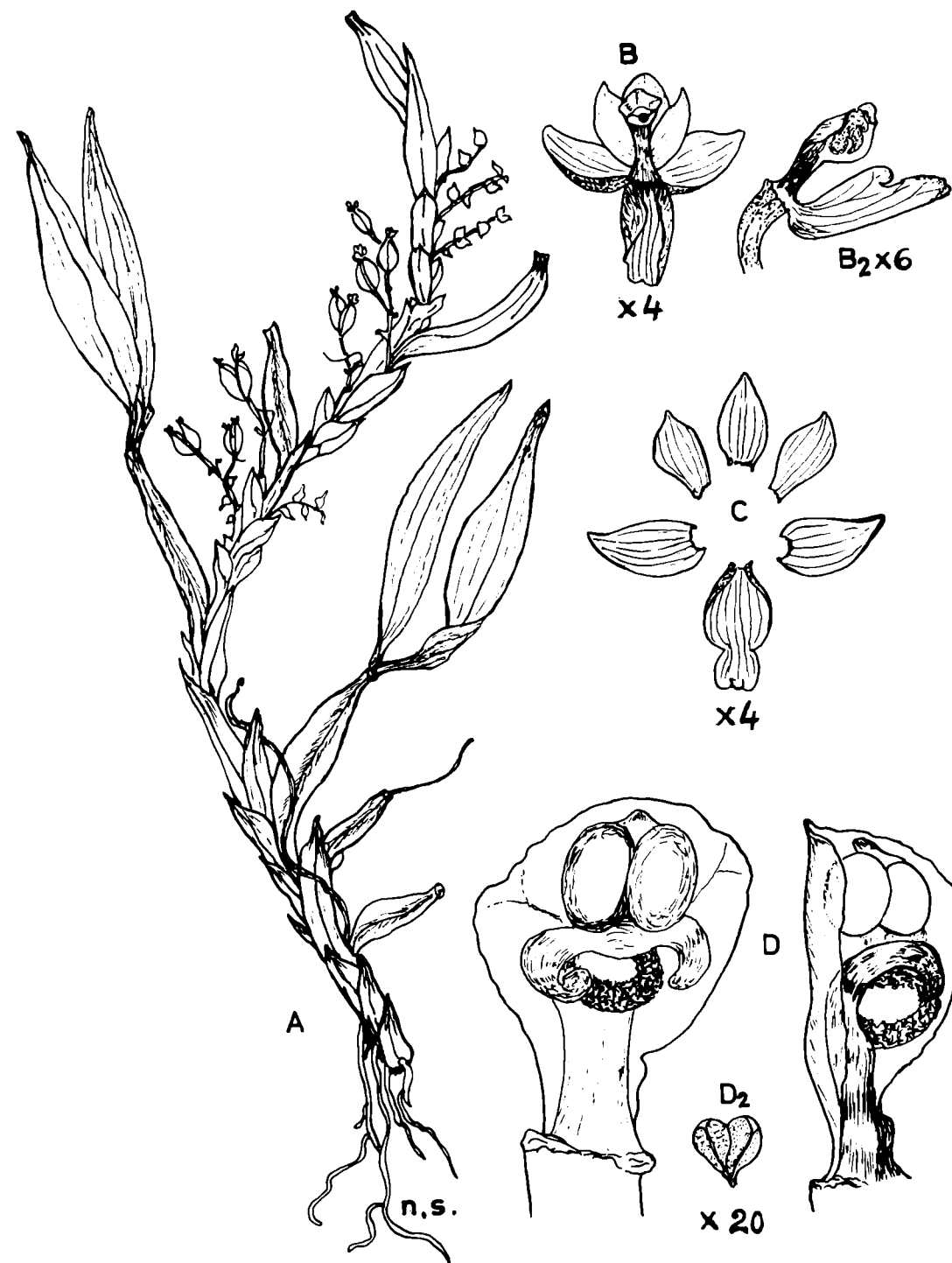
Altitudinal range - 1980-2135 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 2.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:110, 1970).



PLEIONE D. Don (Coelogyneae). These are closely allied to *Coelogyne* Lindl. but are unique in habit, being cluster-forming, mostly rather dwarf plants found growing in the ground, or on rocks of trees, with peculiar flask-shaped irregular pseudobulbs, deciduous folded leaves and solitary, often proportionately very large flowers, which arise concurrently with the new growth. Flowers arise from the base of the pseudobulbs; sepals valvate; labellum with obscure lateral lobes or they are absent, margin serrate or denticulate, apically lobed.

Pleione maculata (Lindl.) Lindl. & Paxton.

Pseudobulbs barrel-shaped; leaves in pairs on the old pseudobulbs, leafless when flowering. Flower solitary rarely 2, fragrant, 5-7 cm., sepals and petals white with few pinkish lines; lip marked purple and yellow, apex broad and emarginate, upper surface with 5 to 7 pectinate lines.

Artificial key to the species of *Pleione*

- 1 Pseudobulbs flask-shaped, gradually narrowed into a beak —
 - 2 Flowers appearing before and leaves present. Lip elliptic. *humilis*.
 - 2* Flowers appearing at the same time as young leaves. Lip elliptic. *hookeriana*.
- 1* Pseudobulbs barrel-shaped, abruptly contracting into a beak; basal sheaths of flowering stem verrucose. Lip with a keel, keel extending to 2/3rd length of. *praecox*.

Plate 162

Pleione hookeriana (Lindl.) J. Moore in Williams Orchid. Grow. Man. ed. 6:548, 1885; T.448, 1966, 2:193, 1971, et 3:164, 1975; Deptt. Med. Pl. 2:174, 1969; B. & T. 66:582, t. 9, 1969; Herk. 79:108, f. 235, 1971; H. et al. 54, 1978.

= *Coelogyne hookeriana* Lindl., Fol. Orchid. Coelogyne 14, 1854; Hk. f. 5:842, 1890; K. & P. 139, t. 193, 1898; B. 19:218, 1964.

Pseudobulbs caespitose, ovoid, 1.5-2.5 cm. long, with few lax sheaths; leaf solitary from the base of the pseudobulb, narrowly elliptic, 4-6.5 cm. by 1-2 cm.; petiole 2-2.6 cm. long. Flowering scape enveloped in tubular imbricating sheaths bearing a single flower; floral bract obovate-elliptic, convolute, 9-12 mm., equalling the ovary, persistent. Flowers white with pinkish tint, 3.5-4.5 cm. in diam.; sepals subequal in length, spreading, dorsal elliptic-oblong, 2.2 cm. long, lateral pair broadly oblong, 2 cm. long but broader; petals longer than the sepals, 2.4 cm. long, oblanceolate, spreading. Lip subreniform, 2.1 cm. long by 2.7 cm. near the base, cordate, broad and entire in the posterior half, lobulate and minutely erose at the anterior, retuse apex, disk with 5-7 ciliate ridges from base to apex. Column 1.8 cm. long, curved broadly winged in the upper half, wings widening at the erose apex.

Flowering time - May to June.

Altitudinal range - 2550-3050 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 6 gatherings.

Specimens studied - 3.

Chr. No. n = 20 (Malla et al. Taxon, 28:628, 1979).

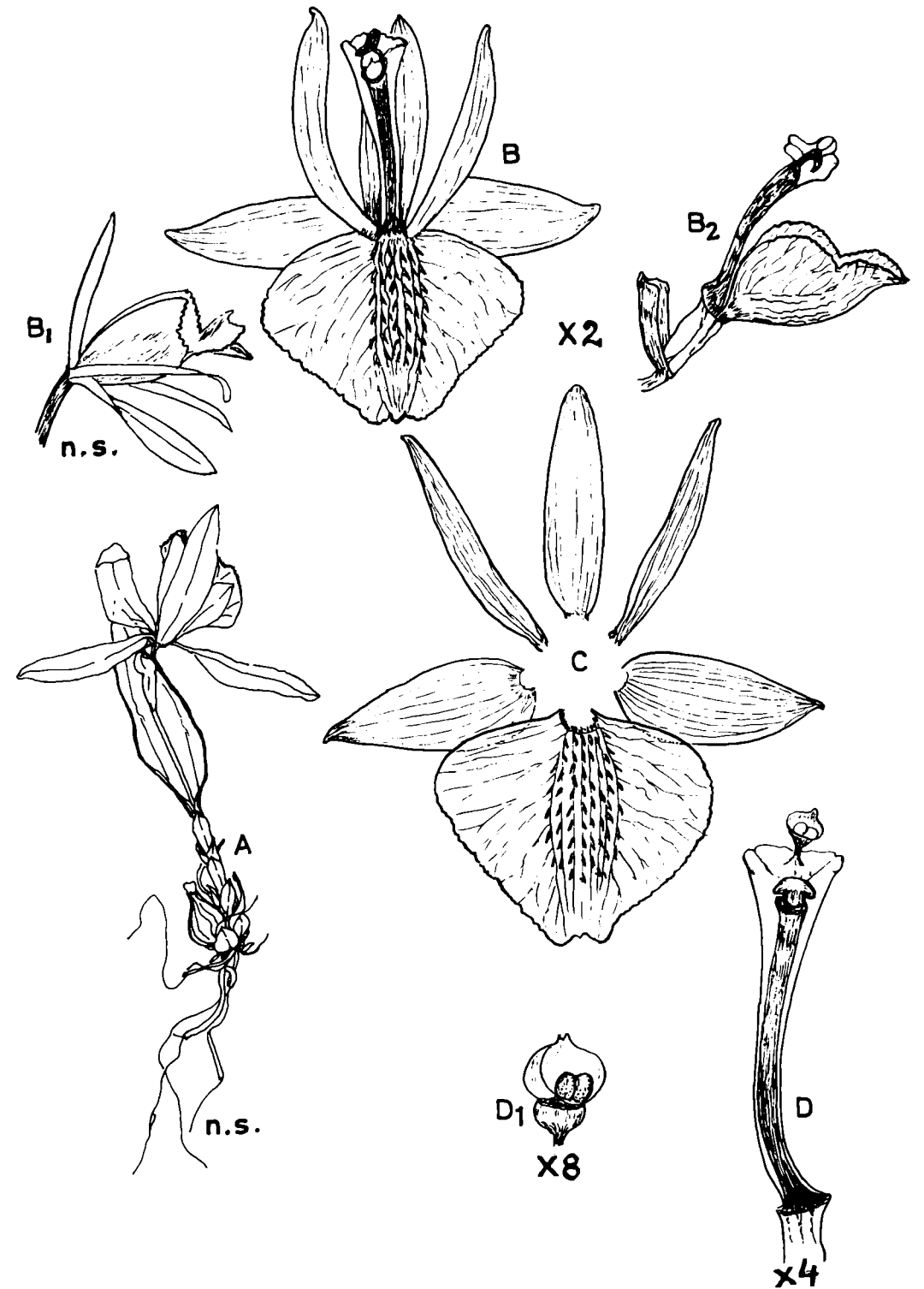


Plate 163

Pleione humilis (Sm.) D. Don, Prodr. Fl. Nep. 37, 1825; T. 448, t. 76, 1966 et 3:164, 1975; Deptt. Med. Pl. 2:135, 1969; B. & T. 66:582, t. 10, 1969; Herk. 79:105, f. 236, 1971; H. et al. 55, 1978.

= *Epidendrum humile* Smith, Exot. Bot. 2:75, t. 98, 1806.

= *Coelogyne humilis* (Sm.) Lindl. : Hk. f. 5:840, 1890 et 6:194, 1890; K. & P. 139, t. 194, 1898.

Pseudobulbs caespitose, narrowly ovoid, 3-4.5 cm. long, sheaths fibrous. Leaves present when plants not flowering, elliptic tapering to a sessile base, 7.8-10 cm. by 3-4.5 cm. acute. Peduncle arising from the base of the pseudobulb, covered up to the apex by sheaths, 1 or rarely 2 flowered; floral bracts obovoid-elliptic, 2.2-2.4 cm. long, exceeding the ovary, convolute. Flowers white, 5.5-6.5 cm. in diam.; sepals subequal, oblong, spreading, dorsal 3.5 cm. long, lateral pair a bit shorter but broader; petals narrower, lanceolate 4 cm. long, spreading. Lip suborbicular or obovate 3.6 cm. by 2.1 cm., concave at the lower part, shortly clawed, expanding into a wide mouth, dentate and fimbriate, apex retuse or bilobulate, upper surface with numerous fringed pinkish lamellae. Column 2.7 cm. long, winged, apex expanded into a hood with erose margins.

Flowering time - February to March.

Altitudinal range - 2135-3050 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 9 gatherings.

Specimens studied - 4.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:110, 1970; Mehra & Sehgal, ibid. 29:349, 1980).

Remarks - This species is abundantly present in central Nepal.

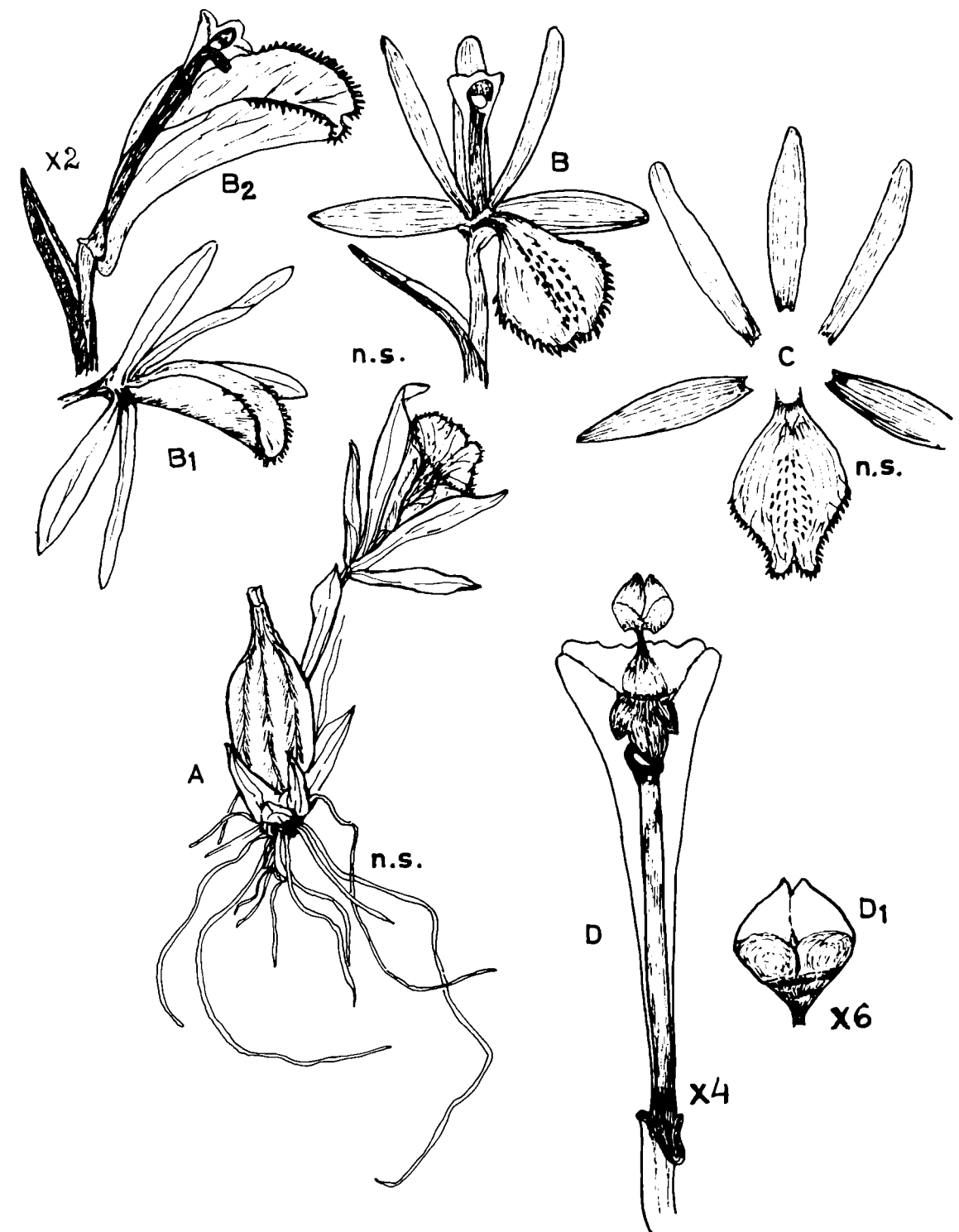


Plate 164

Pleione praecox (Sm.) D. Don, Prodr. Fl. Nep. 37, 1825; T. 449, 1966, 2:135, 1969; B. & T. 66:582, t.11, 1969; Herk. 79:105, f.234, 1971; H. et al. 55, 1978.

= *Epidendrum praecox* Smith Exot. Bot. 2:73, t. 97, 1806.

= *Coelogyne praecox* (Sm.) Lindl. : Hk. f. 5:840, 1890 et 6:194, 1890; K. & P. 141, t. 196, 1898.

Pseudobulbs caespitose and very variable, imperfectly sheathed by loose brown fibres; leaves not present when flowering, in pairs, elliptic-oblong or elliptic rarely oblanceolate 10.5-21 cm. by 4-7.5 cm., narrowed to a petiole, 2-6 cm. long. Peduncle from the base of a pseudobulb, as long as the pseudobulb, 1 or 2 flowered; floral bract obovoid, 2.5 cm. long, equalling the ovary, convolute. Flowers rose coloured, 8.5-10.5 cm. in diam.; sepals subequal, oblanceolate or lanceolate, spreading, dorsal 6.6 cm. long, lateral pair shorter, petals about as long as the sepals, spreading. Lip ovate-orbicular, basal part convolute around the column, anterior part concave, mouth wide open, repand with irregular lobulate-dentate margin, apex slightly bifid, five lacinate lamellae present about the middle of the lip. Column 4 cm. long with a short sac at the base, narrowly winged which at the apex expanded into a wide hood, irregularly lobulate.

Flowering time - September to November.

Altitudinal range - 1525-2440 m.

Distributional pattern - east and central Nepal.

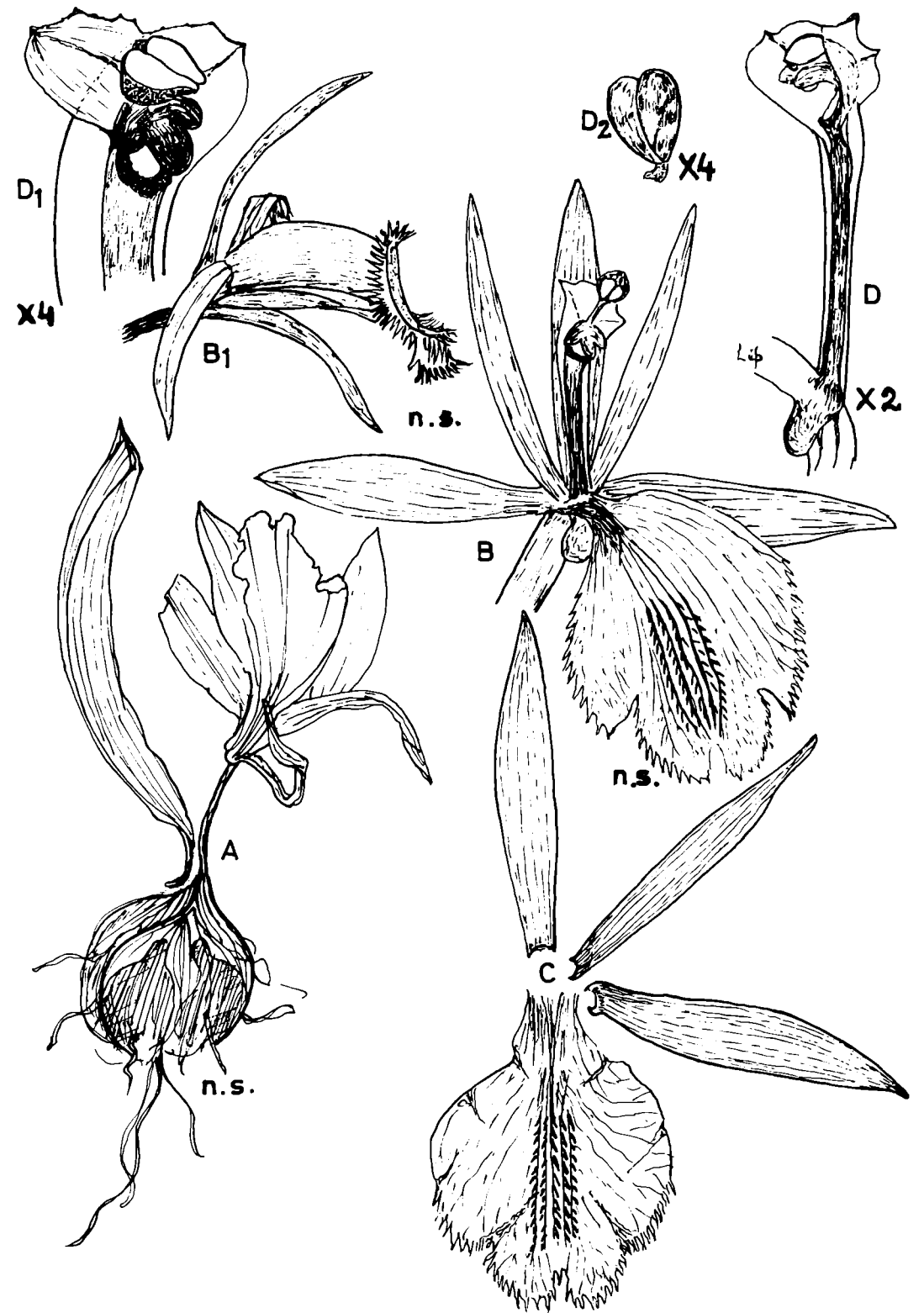
Specimens in Herbarium - 6 gatherings.

Specimens studied - 3.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:110, 1970; Mehra & Sehgal, ibid. 29:349, 1980).

n = 20 + 0-38 (Vij, et al., ibid. 25:641, 1976).

Remarks - This species is mostly found in east Nepal.



PODOCHILUS Bl. (Podochileae). Possibly the name refers to the 2 introrse appendices at the base of the lip. These are mostly small often moss-like epiphytic orchids, with small leaves. Flowers very small in leaf opposed racemes or spikes, bracts persistent. Lateral sepals connate at the base forming a mentum; labellum clawed and appendaged; rostellum triangular and bifid.

Plate 165

Podochilus cultratus Lindl. Gen. Sp. Orchid. Pl. 234, 1833; Hk. f. 6:80, 1890; K. & P. 245, t. 326, 1898; Seidenf. 68(1):57, 1973; H. et al. 55, 1978.

Stem 8-13 cm. long, clothed throughout with flattened equitant leaves; leaves falcately lanceolate, laterally compressed, 1-1.4 cm. long about 4 mm. broad, acute. Peduncles short, terminal, decurved, 2-4 flowered, often producing two or more roots; floral bracts broadly ovate 2-3 mm. long, equalling the ovary, cuspidate. Flowers 5 mm. long, white flushed with pink; sepals subequal, broadly ovate, dorsal 4 mm. long, lateral pair 3.5 mm. long, subfalcate, spreading; petals broadly obovate, 3 mm. long, acute. Lip oblong, 4 mm. long, 2 mm. broad near the apex, slightly constricted in the middle, slightly deflexed, attached at the base to the gibbous foot of the column, apex bilobulate, disc smooth but with 3 lamellae-like deep pink coloured veins. Column very short 2.5 mm. long with a much produced foot; rostellum bipartite. Anther curved, c 2 mm. long, curved and beaked; pollinia 2 mm. long with geniculate caudicles, two attached to a shield-shaped gland.

Flowering time - September.

Altitudinal range - \pm 610 m.

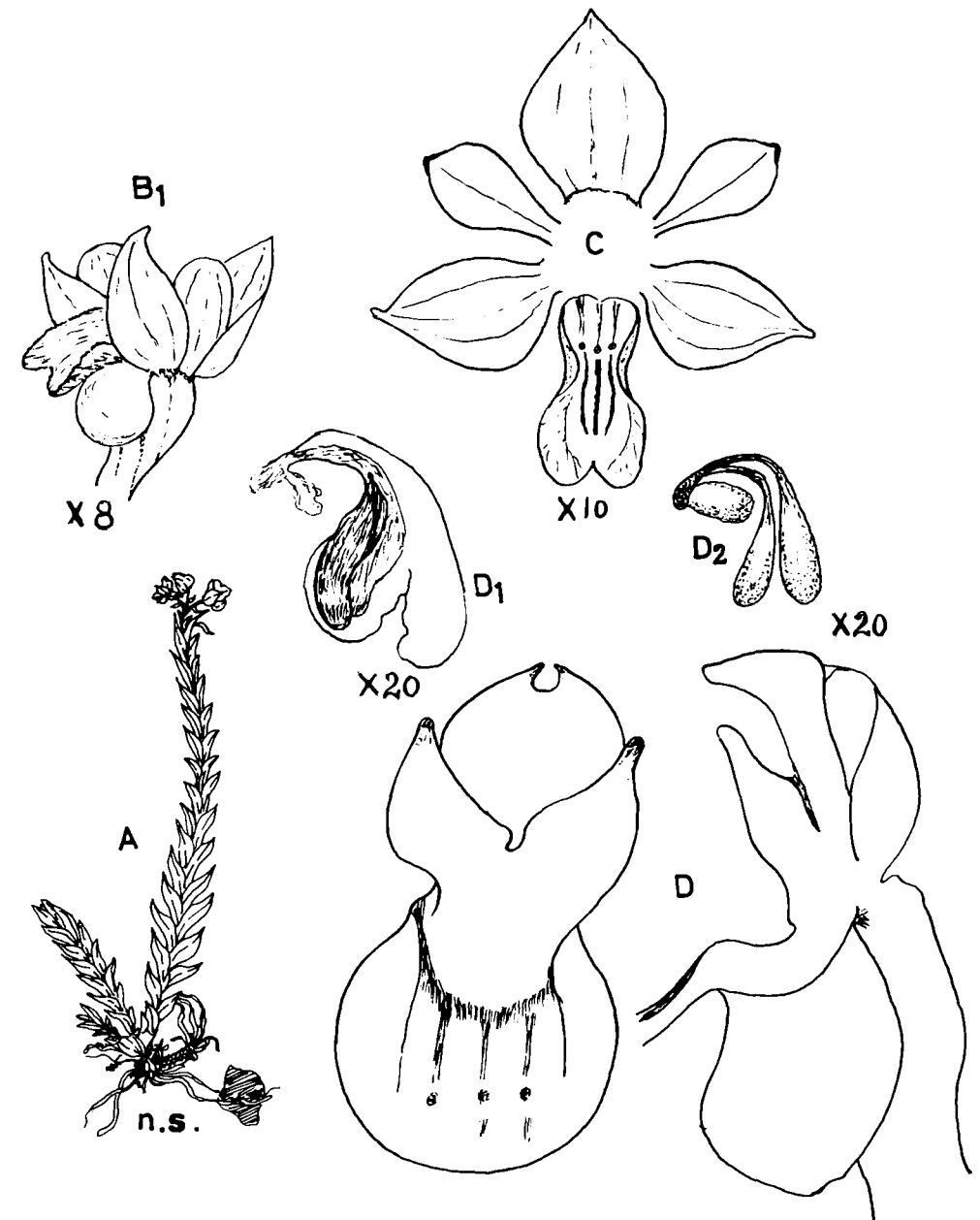
Distributional pattern - east Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. $n = 19$ (Mehra & Vij, Taxon, 19:110, 1970).

Remarks - King & Pantling mention of small roots developing from the base of the inflorescence. In our specimens there are few such roots. These roots may have the purpose of securing nourishment during seed formation.



STELIS Sw. (Pleurothallideae). *Stelis* a Greek word signifying the mistletoe which grows on a tree, which is the nature of this genus. The essential characters of this orchid being - sepals cohering at the base; petals smaller than the sepals, concave, obtuse, vaulted. Lip of the size and shape of the petals and without a spur.

***Stelis biflora* Sm.**

Bulbs nearly globose; roots branching and creeping; leaves ovate, petioles c 3.5 cm. long. Inflorescence equalling the leaves, bearing two flowers of yellowish colour; sepals equal, cohering at the base; petals much smaller than the sepals, concave, acuminate, vaulted over the column; lip ovate, equalling the petals and nearly of the same shape, revolute, margins inflexed; spur absent.

TRICHOTOSIA Bl. (Dendrobieae). From the hairy indument common in the genus. Seidenfaden (62:11, 1982) believes it was Blume himself who felt that his *Trichotosia* was better placed as a subgenus under *Eria*. This was followed by later authors, some considering *Trichotosia* as a section rather than subgenus. But Kranzlin found reasons to reestablish a separate genus.

***Trichotosia dasyphylla* (Par. & Reichb. f.) Krzl.**

= *Eria dasyphylla* Parish & Reichb. f.

Plants caespitose from the creeping much branching rhizome, each shoot in the sympodium raises as a very short stem. Leaves 2-4 in a rosette, nearly orbicular to pyriform to lanceolate-spathulate. Flowers usually developing before leaves, greenish yellow; floral bracts hairy. Lip usually with two large brownish purple patches on disc., sometimes a single large blotch, finely erose margin, two rounded calli at the very base.

ANTHOGONIUM Lindl. (Phajeeae). The name refers to the curious angle at which the tubular flower is joined to the pedicellate ovary. This is a terrestrial or rockdwelling orchid and is probably allied to *Spathoglottis*.

Plate 166

***Anthogonium gracile* Wall. ex Lindl. Gen. Sp. Orchid. Pl. 426, 1840; Hk. f. 5:822, 1890; K. & P. 96, t.134, 1894; B.55 : 267, 1958; T.425, 1966 et 3:137, 1975; B. & T. 69:284, 1972; H. et al. 31, 1978.**

Pseudobulb ovoid, stem 6-10 cm. long, slender, sheathed at the base. Leaves 2-5, membranous, lanceolate, 12-30 cm. by 8-16 mm., sheathing at the base, acuminate. Scape arising from the side of the pseudobulb, longer than the leaves, slender, bearing several tabular sheaths, sparsely flowered; floral bracts lanceolate, c 2 mm., much shorter than the ovary. Flowers pink, 2-3 cm. long, at a wide angle with the longstalked ovary; tube of the perianth longer than the free parts. Lip very long and slender, 1.5 cm. long, anterior part of the lip connate, adnate to the base of the column, apex tri-lobulate. Column very long; 1.6 cm., apex dilated, tip 3 lobed.

Flowering time - August to October.

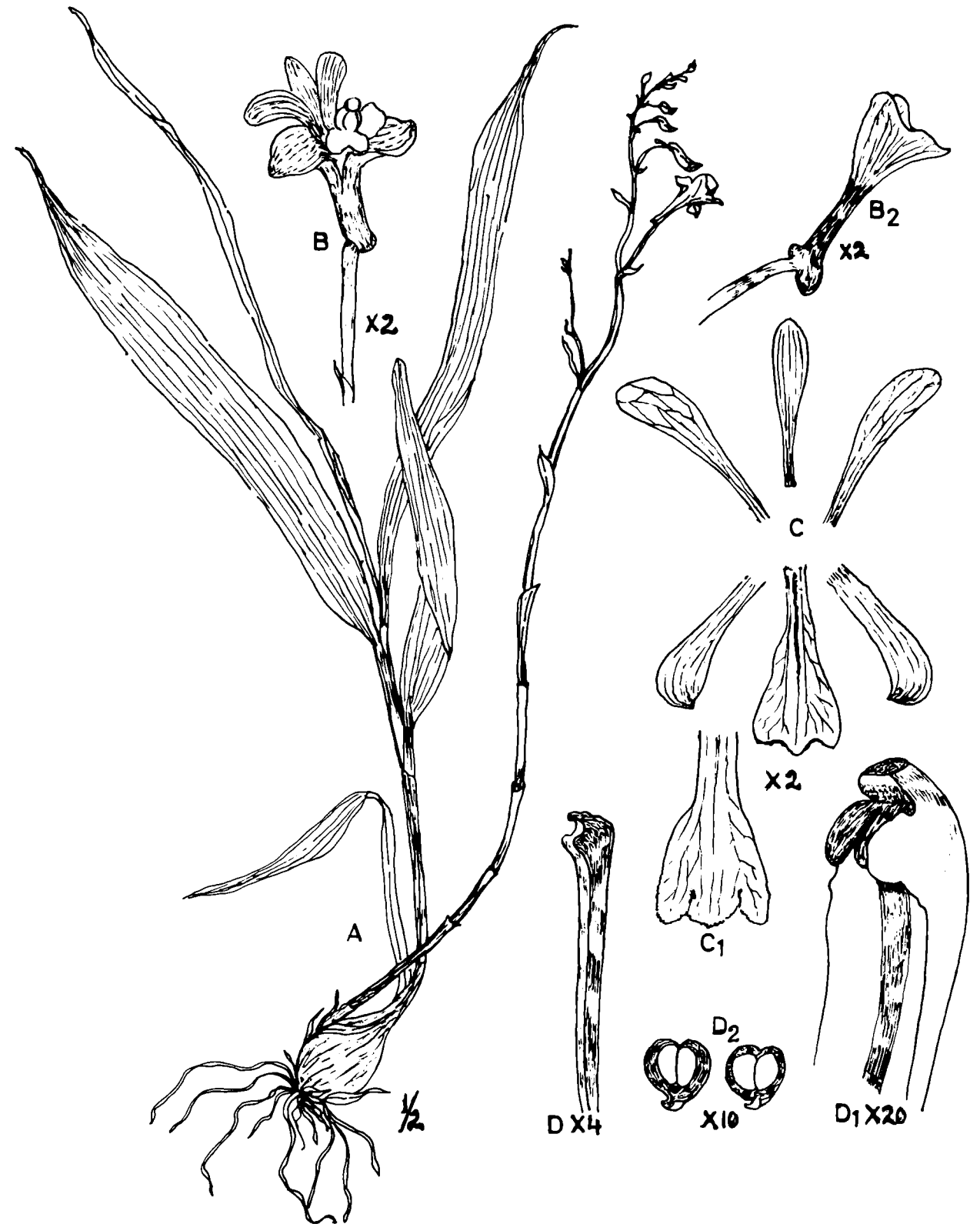
Altitudinal range - 1066-2440 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 11 gatherings.

Specimens studied - 5.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:106, 1970).
also n = 19 (Mehra & Sehgal, ibid. 29:348, 1980).
2n = 38 (Mehra & Sehgal, ibid. 27:388, 1978).



BULBOPHYLLUM Thouars, (Bulbophylleae). Refers to the thick, fleshy leaves - "bulb-leaf". Because of extremes of variance which occur within *Bulbophyllum*, it had been divided into a number of distinct segregates by some orchidologists, specially *Cirrhopetalum* Lindl. and *Megaclinium* Lindl., but botanically these intergrade perfectly with the larger group. Hooker. f. (1890) kept *Cirrhopetalum* as a separate genus; Ridley (1896) also kept the genus separate. However, the genus *Cirrhopetalum* cannot be separated from *Bulbophyllum* by any good character, but is artificially distinguished by the shortness of the dorsal sepal and the great length of the lateral sepals which are twisted near the base so that their upper edges meet, and by the flowers being usually in whorled umbels, rarely in racemes or heads. Seidenfaden opines that a separate genus *Cirrhopetalum* is difficult to maintain. A brief characterisation of the genus *Bulbophyllum* is difficult to make. They possess more or less prominent often angular one leaved pseudobulbs, which are borne at varying distances from each other as a creeping rhizome. Leaves are thick and persistent, very seldom 2, then deciduous. Flowers solitary, of racemose or in heads or in umbellate inflorescence, small to rather large.

***Bulbophyllum helenae* (Kt.) J.J. Sm.**

Pseudobulbs on an elongated rhizome; leaf solitary. Inflorescence half as long as the leaf, umbellate, many flowered. Flower c 4 cm. long; dorsal sepal and petals green, blotched; lateral sepals cohering except at the base and apex, reddish brown. Lip oblong, dilated at the base.

***Bulbophyllum hookeri* (Duthie) J.J. Sm.**

Pseudobulbs crowded, ovoid, one leaved; leaf elliptic-oblong or lanceolate. Inflorescence equalling or exceeding the leaves, flowers 3-10, umbellate; dorsal sepal concave and embracing the column; lateral sepals 4 times the length of the dorsal, cohering at their bases, yellow with reddish veins; lip deflexed from about the middle, margins incurved thus forming a deep furrow; yellow with reddish spots.

***Bulbophyllum otoglossum* Tuyama.**

Pseudobulbs curved with erect apices; leaves spatulate to linear-spathulate gradually attenuated to a petiole. Inflorescence nearly half the length of the leaf, bearing a single flower; dorsal sepal linear-oblong, laterals oblique equalling the dorsal, margins involute; lip with its epichile ovate and base hastate, margin irregularly verrucose, hypochile cylindrical and short.

***Bulbophyllum scabratum* Reichb. f.**

Pseudobulbs densely crowded with a solitary long petioled leaf. Inflorescence shorter than the leaf, flowers small; dorsal sepal much shorter than the lateral pair which are gibbous at base; petals half as long as the lateral sepals. Lip minute, stipitate; column dorsally 3-toothed.

***Bulbophyllum striatum* (Griff.) Reichb. f.**

Pseudobulbs obpyriform; leaf solitary, petioled, elliptic, coriaceous. Inflorescence longer than the leaf, 1-3 flowered; flowers yellowish green, striped with purple; petals much smaller than the sepals; lip as long as the petals, bent over itself near the base.

***Bulbophyllum yoksunense* J.J. Sm.**

Rhizome very long, branching, pseudobulbs distant oblong-cylindric bearing solitary leaf. Inflorescence very short, about as long as the pseudobulbs; 3-4 umbellate flowers; dorsal sepal $\frac{1}{3}$ rd the lateral pair; petals broadly ovate, densely ciliate at the anterior half; lip about as long as the petals, deflexed from the middle.

Artificial key to the species of *Bulbophyllum*

- 1 Lateral sepals free (except in *cylindraceum* and *careyanum*) —
 - 2 Flowers solitary, 2 or 3, from near the base of a pseudobulb, large on long pedicels —
 - 3 Sepals and petals striped; pseudobulbs cylindric. *affine*
 - 3* Sepals and petals spotted; pseudobulbs obpyriform. *leopardinum*
 - 2* Flowers in racemes, umbels or heads —
 - 4 Flowers yellowish green; lateral sepals free, spreading; petals entire; ovary shortly stalked. . . *polyrhizum*.
 - 4* Flowers dark coloured, either brown or purple in racemes —
 - 5 Racemes decurved, drooping, densely flowered —
 - 6 Leaves and flowers contemporaneous —
 - 7 Leaves solitary; pseudobulbs when present not covered by fibrous sheath at base —
 - 8 Lateral sepals cohering along inner margin. Lip entire. Pseudobulb none. *cylindraceum*.
 - 8* Lateral sepals cohering by tips; lip with lateral lobes. Pseudobulb more or less ovoid *careyanum*.
 - 7* Leaves solitary. Pseudobulbs ovoid, fibrous sheath present at base. *bisetum*
 - 6* Leaves and flowers not contemporaneous —
 - 9 Sepals and petals hairy. Lip oblong-lanceolate, caudate-acuminate, "C" shaped. Leaves in pair. *hirtum*.
 - 9* Sepals and petals not hairy. Lip oblong-lanceolate, stipitate. Leaves two. *triste*.
 - 5* Racemes erect. Lip without hairs —
 - 10 Pseudobulbs crowded. Lip oblong. Petals ciliate at the apical half. *secundum*.
 - 10* Pseudobulbs crowded. Lip oblong-lanceolate with edges glandular-ciliolate. *eublepharum*.
 - 10** Pseudobulbs distant. Lip oblong. Petals entire. *reptans*.
 - 5** Flowers in heads. Lip excavated, filled with hairs. *odoratissimum*.
 - 4** Flowers in dense heads, minute, purplish. Lip decurved as if folded. *xylophyllum*.
 - 4*** Flowers umbellately capitate, few flowered; lateral sepals caudate. Lip 3 lobed, side lobes erect. *caudatum*.
- 1* Lateral sepals connate at different degrees —
 - 11 Lateral sepals connate almost to their apices forming a flattened blade —
 - 12 Leaves in pairs; flowers in drooping racemes —
 - 13 Dorsal sepal more or less as long as the lateral sepals. *viridiflorum*.
 - 13* Dorsal sepal much smaller than the lateral sepals and awned. *wallichii*.
 - 12* Leaf solitary; flowers in umbels. Lateral sepals at first cohering except at the base but afterwards separating. *retusisculum*.
 - 11* Lateral sepals connate except at the base. Inflorescence subumbellate or umbellate —
 - 14 Pseudobulbs on a rhizome —
 - 15 Lip oblong, decurved from below the middle. *rolfei*.
 - 15* Lip broadly ovate, slightly bent, spotted. *sikkimense*.
 - 14* Pseudobulbs crowded, rhizome none —
 - 16 Lip oblong, tapering to the apex; dorsal sepal awned. *elatum*.
 - 16* Lip oblong, slightly bent; dorsal sepal acute. *sarcophyllum*.
 - 11** Lateral sepals cohering for the entire length. Inflorescence umbellate. *umbellatum*.
- 1** Lateral sepals cohering only at base. *guttulatum*.

Plate 167

Bulbophyllum affine Lindl. Gen. Sp. Orchid. Pl. 48, 1830; Hk. f. 5:756, 1890; K. & P. 67, t.91, 1898; T. 426, 1966; B. & T. 66:289, 1966; H. et al. 32, 1978; Seidenf. 33:18, f. 3, 1979.

Rhizome long and stout, densely rooting; pseudobulbs, 3.5-6 cm. apart, cylindric, 3-4.5 cm. long. Leaf narrowly oblong, 7.5-19 cm. by 1.5-3.3 cm., base narrowed to a short petiole, 6-8 mm. long. Scape very short, arising from the side of the pseudobulb or directly from rhizome, bracteate at base, bearing a single flower (rarely two). Flower 2.5-3 cm. long. Yellowish with purple stripes; sepals subequal, lanceolate, 1.8 cm., lateral sepals falcate and slightly broader than the dorsal; petals shorter than the sepals, ovate-lanceolate, 1.4 cm. Lip reddish brown, lanceolate, 8 mm. long, thickened and concave at the base, shortly stipitate, margins of upper surface dark purple and turned outwards. Column yellowish green, 4 mm. long, stout; foot c 4 mm. long. Anther 2.25 mm. long, conical and scabrid.

Flowering time - June.

Altitudinal range - 1220-1675 m.

Distributional pattern - central & east Nepal.

Specimens in Herbarium - 5 gatherings.

Specimens studied - 3.

Chr. No. $n = 20$ (Mehra & Vij., Taxon, 19:106, 1970).

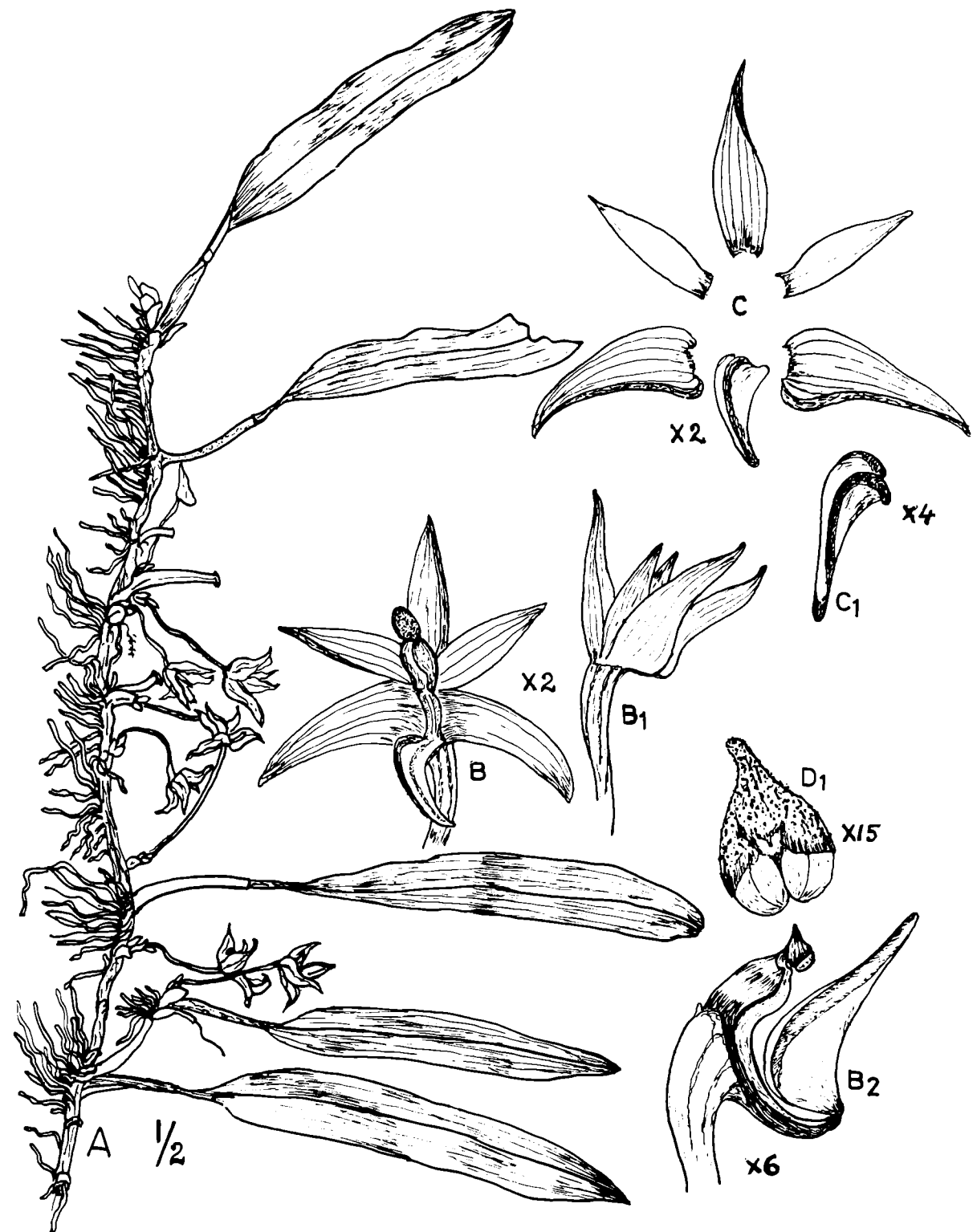


Plate 168

Bulbophyllum bisetum Lindl., Ann. Nat. Hist. 10:186, 1842; Hk. f. 5:767, 1890; K. & P. 73, t. 99, 1898; Seidenf. 33:105, f. 65, 1979.

= *Phyllorchis biseta* (Lindl.) O. Ktz. Rev. Gen. 2:677, 1891.

Rhizome slender, wiry; pseudobulbs 3-3.5 cm. apart, ovoid fibrous sheath at base. Leaf solitary, oblong-lanceolate, 5-7.5 cm. by 1-1.5 cm., base narrowed to a short petiole, 6-10 mm., apex obliquely bifid. Scape pendulous, filiform, peduncle bearing a few subulate bracts, c 3 mm., densely flowered; floral bracts lanceolate, shorter than the curved ovary, c 2 mm. long. Flowers purplish, 8 mm. long; sepals subequal, dorsally keeled, keel undulate, dorsal sepal ovate-lanceolate, 6 mm. long, lateral pair 8 mm. long, broadly ovate, inner margin coherent, unequal sided, upper margin crenulate; apex acuminate and curved upwards; petals shorter than the sepals, spathulate, each with a linear spur inserted behind, parallel to it and exceeding in length. Lip stipitate, ovate-lanceolate, deflexed about the middle, deeply grooved, basal portion with sides crenate, apical portion narrow, acute and pubescent. Column 1.5 mm. long with two apical processes; a large callus below the stigma; foot curved. Anther apiculate with an oblong lip; pollinia broadly elliptic.

Flowering time - September.

Altitudinal range - \pm 1675 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. n = 40 (Biswas, Taxon, 29:169, 1980).

Remarks - According to Hooker, the fleshy appendages are at the base of the dorsal sepal, while King & Pantl. give the linear spurs as inserted behind the petals. Our observations agree with those of King & Pantl., however, the spurs are not fleshy. Besides there is a pair of black projections at the base of each petal. This is a new record.

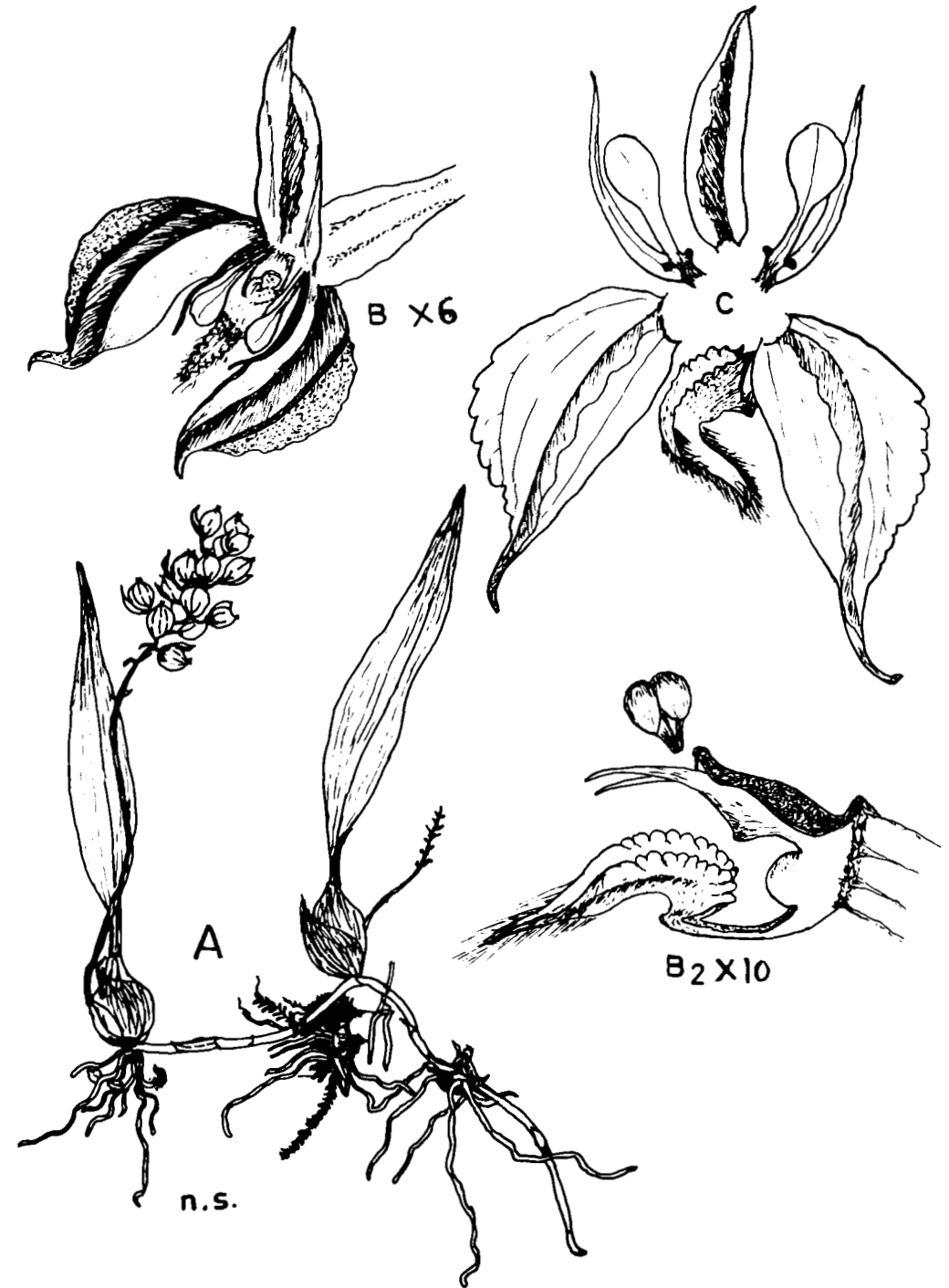


Plate 169

Bulbophyllum careyanum (Hk.) Spr. Syst. Veg. 3:732, 1826; Hk. f. 5:760, 1890; K. & P. 71, t.97, 1898; T. 426, 1966; Dept. Med. Pl. 2:131, 1969; B. & T. 66:289, t.1, 1969; H. et al. 32, 1978; Seidenf. 33:145, f. 98, 99, 1979.

= *Anisopetalon careyanum* Hook. Exot. Fl. 2, 149, 1825.

= *Pleurothallis purpurea* D. Don, 33, 1825.

Rhizome stout and thick, pseudobulbs erect, ovoid, 6-9 cm. apart and 3.5-5 cm. long. Leaf solitary, oblong-lanceolate, 11-20 cm. by 2-3.2 cm., apex notched, tapering to a sessile base. Scape stout, 10-16 cm. high, shorter than the leaf, peduncle bearing many sheathing bracts, densely flowered part decurved; floral bracts 5-7 mm. long, lanceolate, longer than the ovary. Flowers dark brown, 8-10 mm. long; sepals unequal, dorsal sepal ovate, 5 mm. long, acute, lateral sepals oblong-ovate, 7 mm. long, acute, base free but cohering at the tips; petals broadly ovate or triangular, 2 mm. long, caudate-acuminate with serrate margin, fleshy. Lip oblong 3.5 mm. long, base broad with two short falcate side lobes, terminal lobe with edges slightly raised and erose. Column stout, c 2 mm. with wings, apical teeth long; foot curved, c 2 mm. long.

Flowering time - September to October.

Altitudinal range - 610-2135 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No. n = 19 + B (Mehra & Vij, Taxon, 19:106, 1970).

also n = 19 (Mehra & Sehgal, ibid. 29:348, 1980).

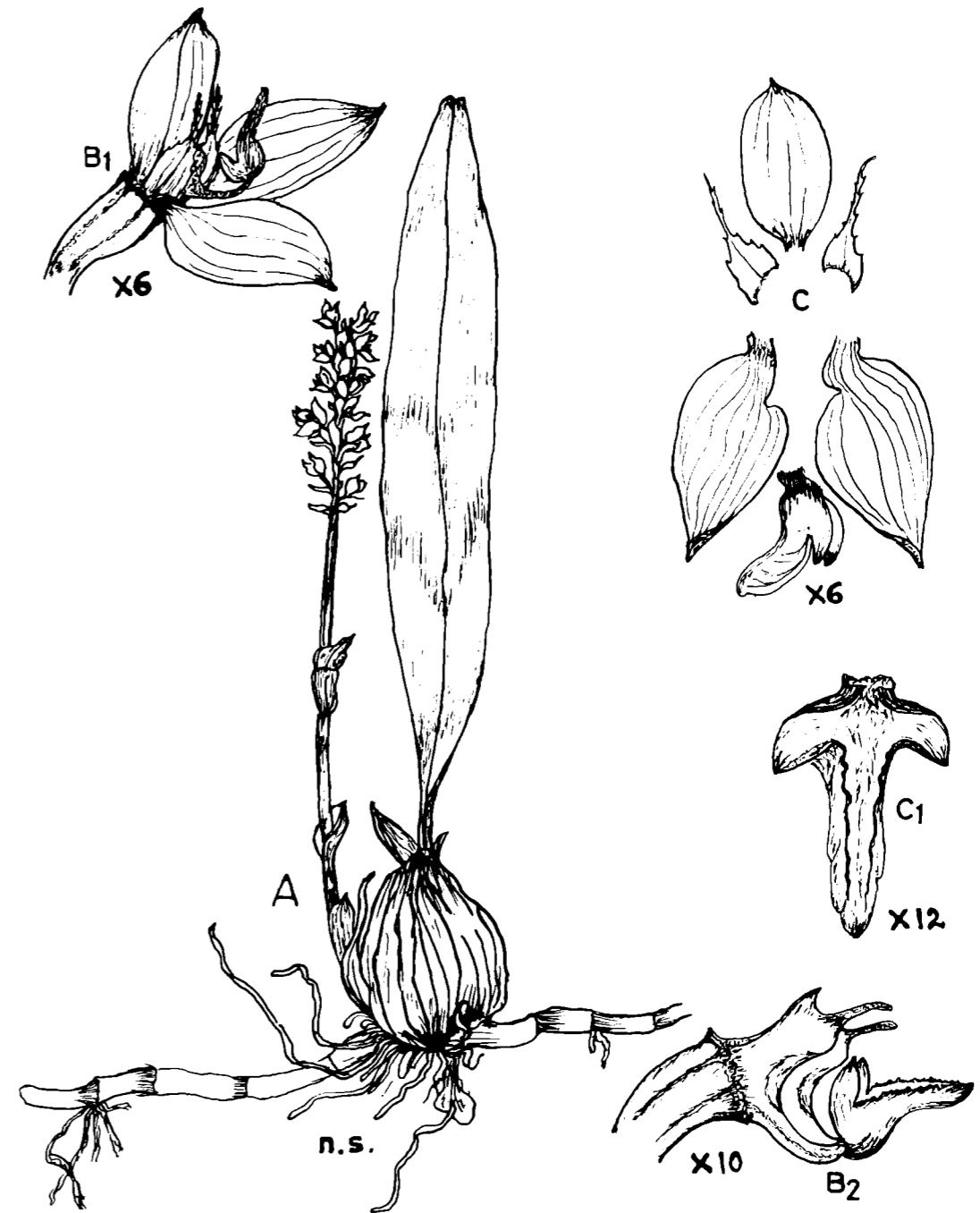


Plate 170

Bulbophyllum caudatum Lindl. Gen. Sp. Orchid. Pl. 56, 1830; Hk. f. 5:759, 1890; T.426, 1966; B. & T. 66:290, 1969; Seidenf. 29:167, f. 81, 1973.

= *Cirrhopetalum caudatum* (Lindl.) King & Pantl. 93, t.129, 1898.

Rhizome slender, filiform, pseudobulbs ovoid 7-11 mm. long, 2-4 cm. apart. Leaf small, oblong, 2-3.5 cm. by 6-10 mm., sessile or subsessile, coriaceous, acute. Scape stout, equalling or slightly exceeding the pseudobulb sheathed at the base, few flowered umbels; floral bract lanceolate, 4-5 mm. long, exceeding the ovary. Flowers small, 3 cm., long, radiating; sepals very unequal, dorsal sepal oblong-ovate, 5.5 mm. long, concave, vaulted over the column, lateral pair many times longer, lanceolate 2.7 cm. long, parallel, nowhere cohering, filiform tips; petals oblong-obovate, c 2.25 mm. long, blunt. Lip shortly stipitate, as long as the petals, oblong, 2 mm., side lobes erect, rounded, anterior half with decurved edges. Column short, 1.5 mm. broad, two pairs of apical teeth, the lower pair broad and curved, upper slender and straight; foot curved. Anther papillose.

Flowering time - July.

Altitudinal range - 1066-1675 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 4 gatherings.

Specimens studied - 4.

Chr. No. $n = 19$ (Mehra & Viji, Taxon, 19:107, 1970 as *Cirrhopetalum caudatum*; Mehra & Sehgal, ibid. 29:348, 1980 as *Bulbophyllum caudatum*).

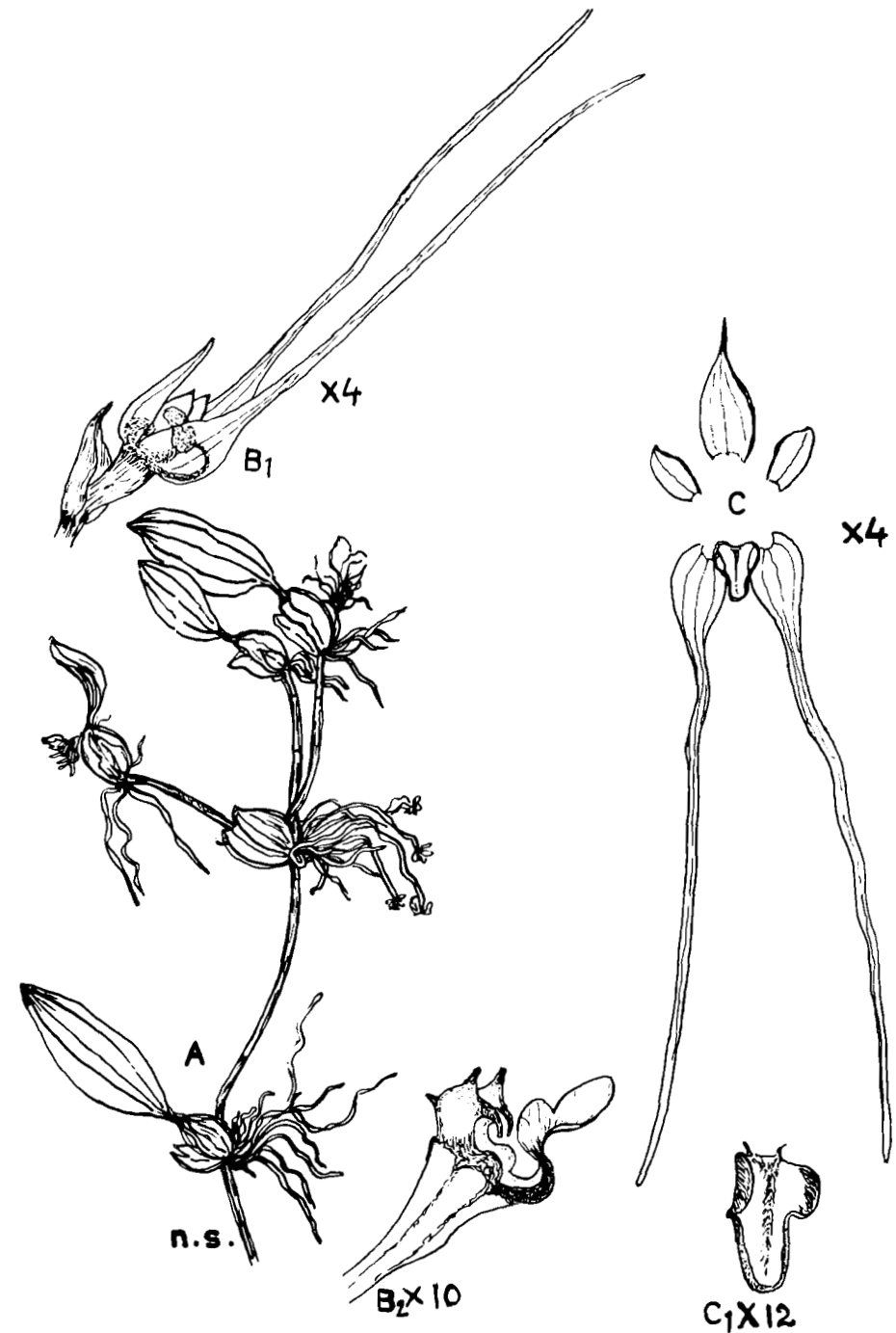


Plate 171

Bulbophyllum cylindraceum Lindl. Gen. Sp. Orchid Pl. 53, 1830; Wall. 1:69, 1830; Hk. f. 5:765, 1890; K. & P. 70, t. 96, 1898; T. 426, 1966; B. & T. 66:260, 1969; H. et al. 32, 1978.

Rhizome very stout; pseudobulb none. Leaf one, oblong-elliptic, blade c 10-16 cm. by 2-2.8 cm., base tapering into a petiole, 6 cm. long. Scape c 20-28 cm. long, exceeding the leaves, peduncle with few sheathing bracts, flowers densely crowded; floral bracts ovate, 2.5 mm., longer than the ovary. Flowers deep purple, 8-9 mm. long; sepals unequal, dorsal ovate, much smaller than the lateral pair, 4.5 mm. long, lateral sepals broadly oblong, 6 mm., unequal sided, inner sides parallel and cohering, outer rounded; petals falcate-lanceolate, 2.5 mm. long, base truncate, apex acuminate, margin serrate towards the apex. Lip thick, ovate, 3 mm. long, deflexed about the middle, posterior half deeply grooved and papillose, apex obtuse. Column 1 mm. long with 3 unequal processes; foot 1.5 mm., rather straight.

Flowering time - September.

Altitudinal range - \pm 2285 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:106, 1970).

also n = 19 (Mehra & Sehgal, ibid. 29:348, 1980).

2n = 42 (Biswas, ibid. 29:169, 1980).

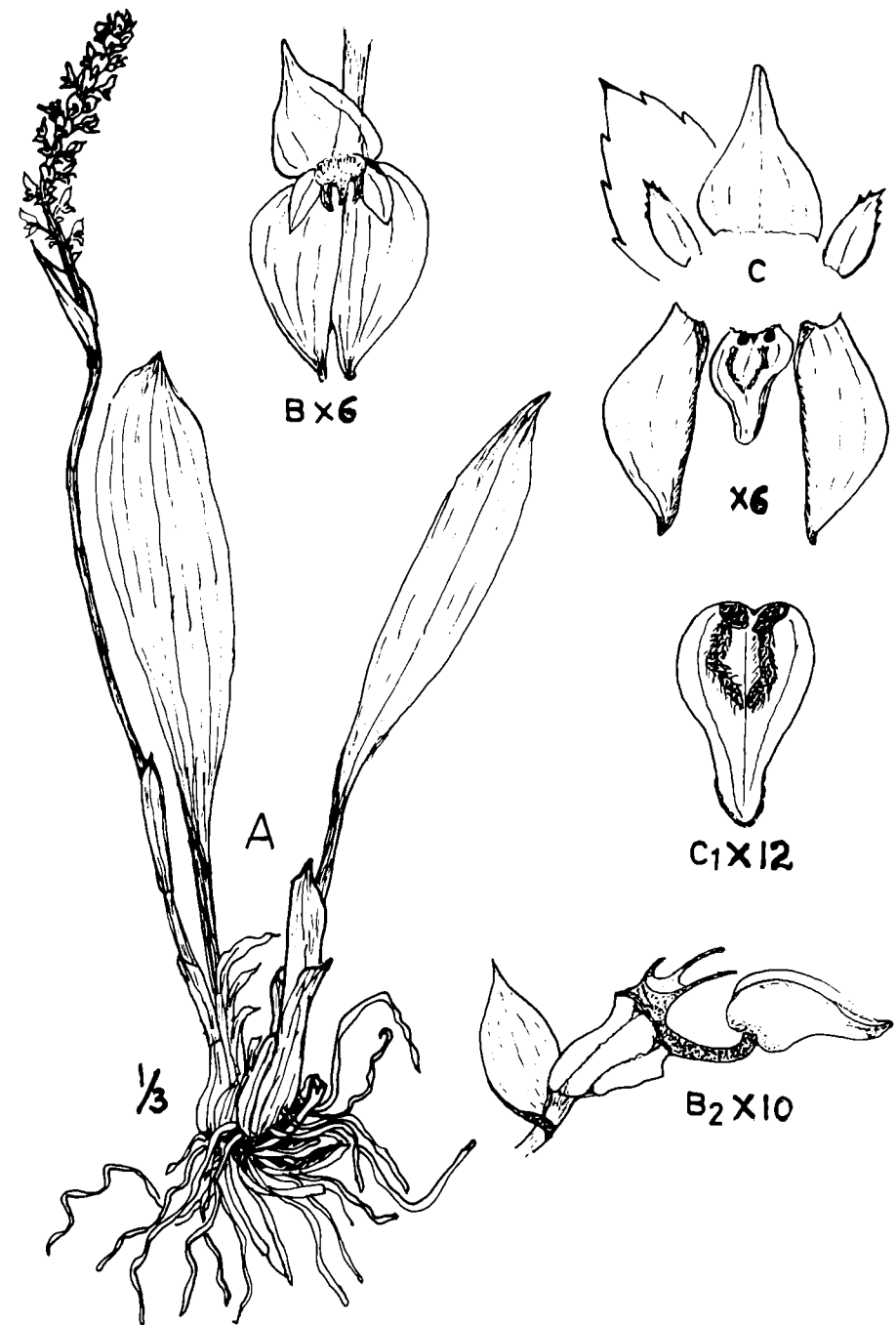


Plate 172

Bulbophyllum elatum (Hk. f.) J.J. Smith in Bull. Jard. Bot. Buitenz. ser. 2, 8:23, 1912; Seidenf. 29:210, t.114, 1973; H. et al. 33, 1978.

= *Cirrhopetalum elatum* Hk. f. Fl. Brit. Ind. 5:775, 1890; K. & P. 93, t.103, 1898; B. & T. 66:295, t.3, 1969.

Pseudobulbs ovoid or cylindric, 5-7 cm. long; leaf solitary, oblong-lanceolate, blade 18-25 cm. by 2-2.5 cm., slightly notched at the apex, narrowed to a short petiole, 1.5-2 cm. Scape stout c 30 cm. long, speckled with purple, peduncle with 2-3 sheathing bracts, umbel with many flowers; floral bracts linear, 7 mm. long, much shorter than the ovary. Flower greyish yellow, speckled with purple, 2.5 cm. long; sepals very unequal, dorsal sepal broadly ovate, concave, 1 cm. long, awned apex, lateral sepals oblong-lanceolate, 2.3 cm. long, falcate, not cohering; petals falcately ovate, 3.5 mm. long, base oblique, apex apiculate. Lip oblong, 4 mm. long, base dilated and with a mesial groove in the basal half, tapering to a subacute apex. Column 3 mm. long, winged, apical teeth decurved; foot 5 mm. long, curved.

Flowering time - May.

Altitudinal range - \pm 2135 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

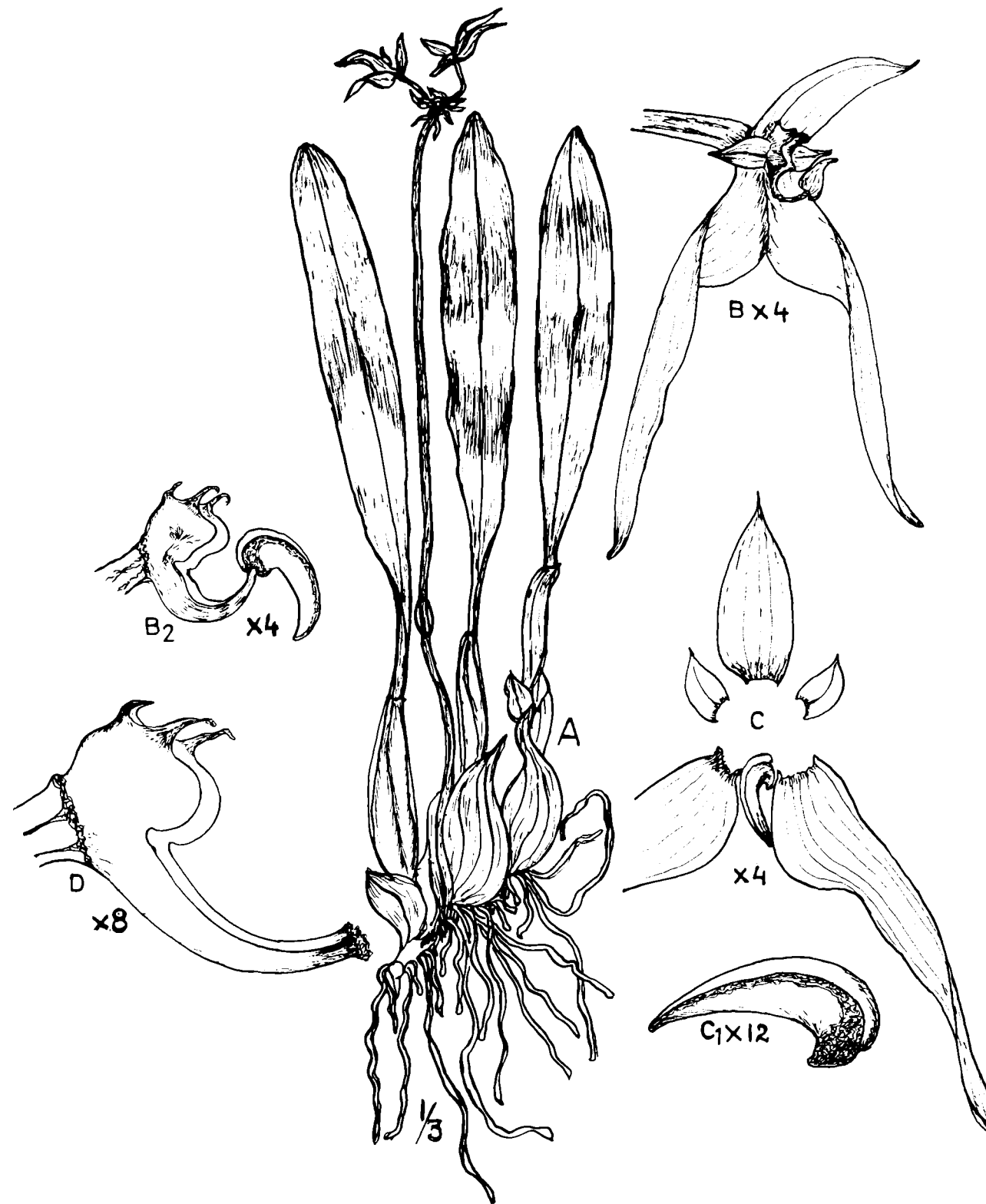


Plate 173

Bulbophyllum eublepharum Reichb. f. in Walp. Ann. 6:252, 1861; Hk. f. 5:764, 1890; K. & P. 78, t. 107, 1898.

Rhizome none, but pseudobulbs close together, 5-6.5 cm. long slightly thickened at the base, dark coloured. Leaf solitary oblong, c 12.5 cm. by 2.2 cm., much narrowed to the petiole, 1.5 cm. long. Scape stout, 17-23 cm. tall, peduncle with 2 or 3 longer bracts lower down and several shorter ones near the apex, laxly flowered; floral bracts oblong-lanceolate, 4 mm. long, slightly longer than the ovary, concave. Flowers green, 1.2 cm. long; sepals unequal, distantly serrate, dorsal sepal ovate-oblong 7.5 cm. long concave, lateral pair ovate-lanceolate, 9 mm. long, acuminate; petals half as long as the sepals, 5 mm. long, broadly elliptic, margin ciliolate. Lip stipitate, oblong-lanceolate, 3 mm. long deeply grooved in the lower half and edges glandular-ciliolate, margin turned outwards towards the apex, blunt. Column broad, 3 mm. long, with 3 apical teeth; foot 2 mm. long.

Flowering time - July.

Altitudinal range - \pm 1066 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. $n = 19$ (Mehra & Vij, Taxon, 19:106, 1970; Mehra & Sehgal, *ibid.* 29:148, 1980).

Remarks - This is a new record.

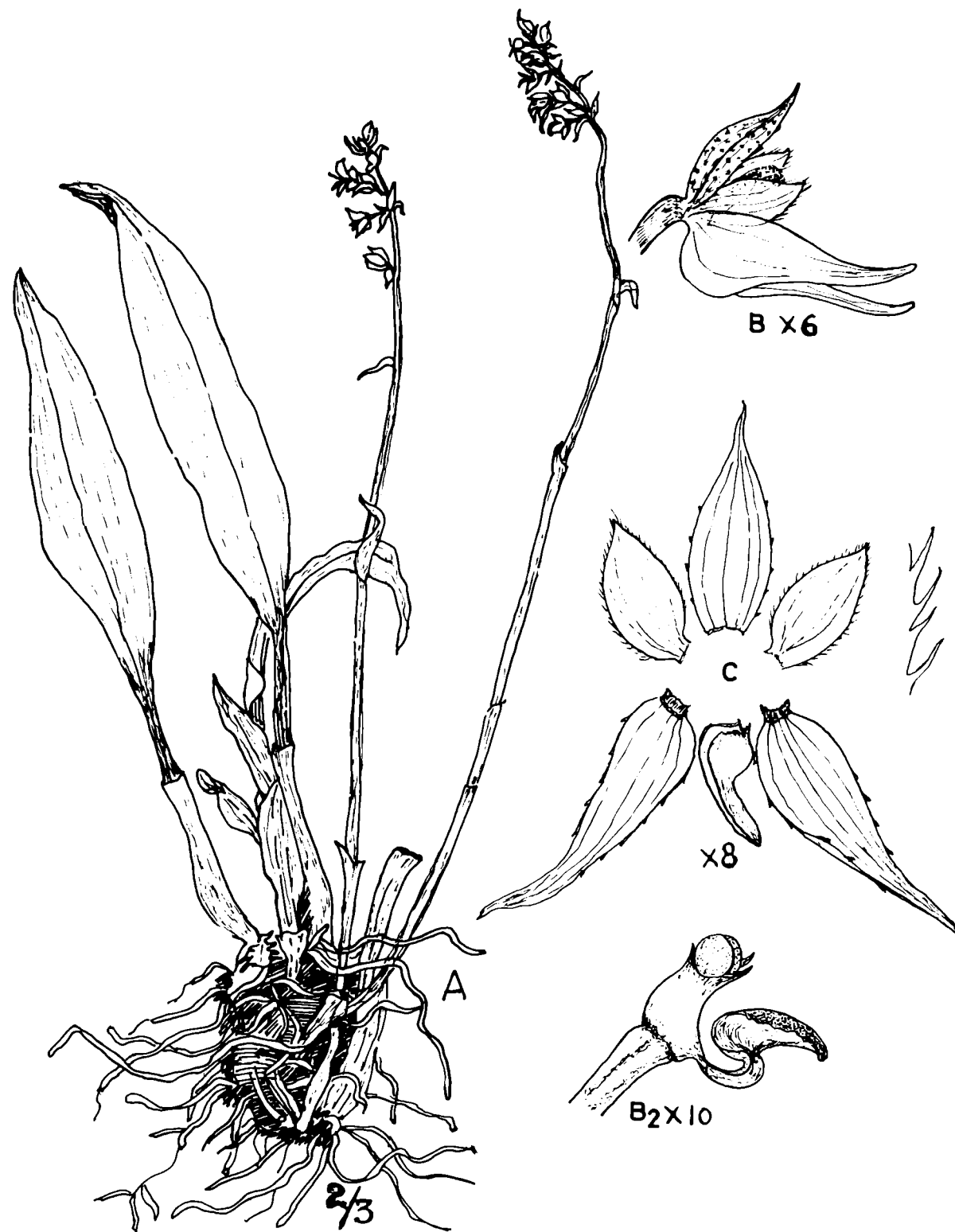


Plate 174

Bulbophyllum guttulatum Wall. ex Hk. f. Fl. Brit. Ind. 5:776, 1890 (as Syn.); Seidenf. 29:176, t.89, 1973; H. et al. 33, 1978.

= *Cirrhopetalum guttulatum* (Wall. mss) Hk. f. 5:776, 1890; K. & P. 94, t.131, 1898; B. & T. 66:295, 1969.

Pseudobulb crowded, ovoid, 2.5-4 cm. long; leaf elliptic-oblong, 10-15 cm. by 1.8-2.6 cm., tapering to a channelled petiole, 1-2 cm. long. Scape usually exceeding the leaf, sometimes equalling, decurved, sprinkled with purple, sheathing bracts at the base, peduncle with bracts for apart, 1.3-1 cm. long; floral bracts ovate, 5 mm. long, much shorter than the ovary, acuminate. Flowers usually 6-8 an umbel, pedicellate, 2-2.5 cm. long; sepals very unequal, spreading, yellow, speckled with purple, dorsal sepal broadly ovate 8 mm. long, concave and vaulted over the column, apiculate, lateral pair ovate-lanceolate 1.2 cm. long, subfalcate, upper margins incurved, broad base and cohering only at the base, apex divergent and subacute; petals broadly elliptic, 5 mm. long, shorter than the dorsal sepal spreading, apiculate, yellow speckled with purple. Lip oblong, c 4 mm. long, deflexed from the middle, base broad, apex emarginate, under surface grooved, speckled with purple spots all over. Column stout, 2 mm. long, with broad wings, apical teeth filiform and curved; foot 5 mm. long, apex upturned.

Flowering time - August to September.

Altitudinal range - 1066-2285 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No.



Plate 175

Bulbophyllum hirtum (Sm.) Lindl. Gen. Sp. Orchid. Pl. 51, 1830; Hk. f. 5:762, 1890; K. & P. 84, t.117, 1898; B. & T. 66:290, 1969; H. et al. 32, 1978; Seidenf. 33:203, t. 147, 1979.

= *Stelis hirta* Smith in Rees, Cyclop. 34 : Stelis n.11, 1816.

Pseudobulbs close together, ovoid-oblong, 2.5-3 cm.; leaves absent at flowering time (in pair, oblong-lanceolate, 10-23 cm. by 2-4.5 cm., narrowed to the base, subsessile, subacute, flaccid). Scape stout, 15-25 cm. long, pendulous at the flowering region, peduncle with 2 or 3 bracts, 8 mm. long far apart, densely flowered; floral bracts ovate, 3.5-4 mm. equalling or slightly exceeding the ovary. Flowers greenish, 1 cm. long; sepals unequal, green and densely pubescent on the outer surface, dorsal sepal lanceolate, 6 mm. acuminate, lateral pair lanceolate with a broad base, 8 mm. long, covering, caudate-acuminate; petals ovate, 2 mm. long, margin ciliolate, acute. Lip linear-oblong 4 mm., curved, more or less "C" shaped, a central groove, margins thick and papillose, apex broader. Column short, c 1 mm., apical spurs minute; foot curved, 2.5 mm. long. Anther conical. Ovary pubescent.

Flowering time - January-February.

Altitudinal range - 1830-2135 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No.

Remarks - The dorsal sepal may be linear-lanceolate and then the apex is caudate-acuminate.

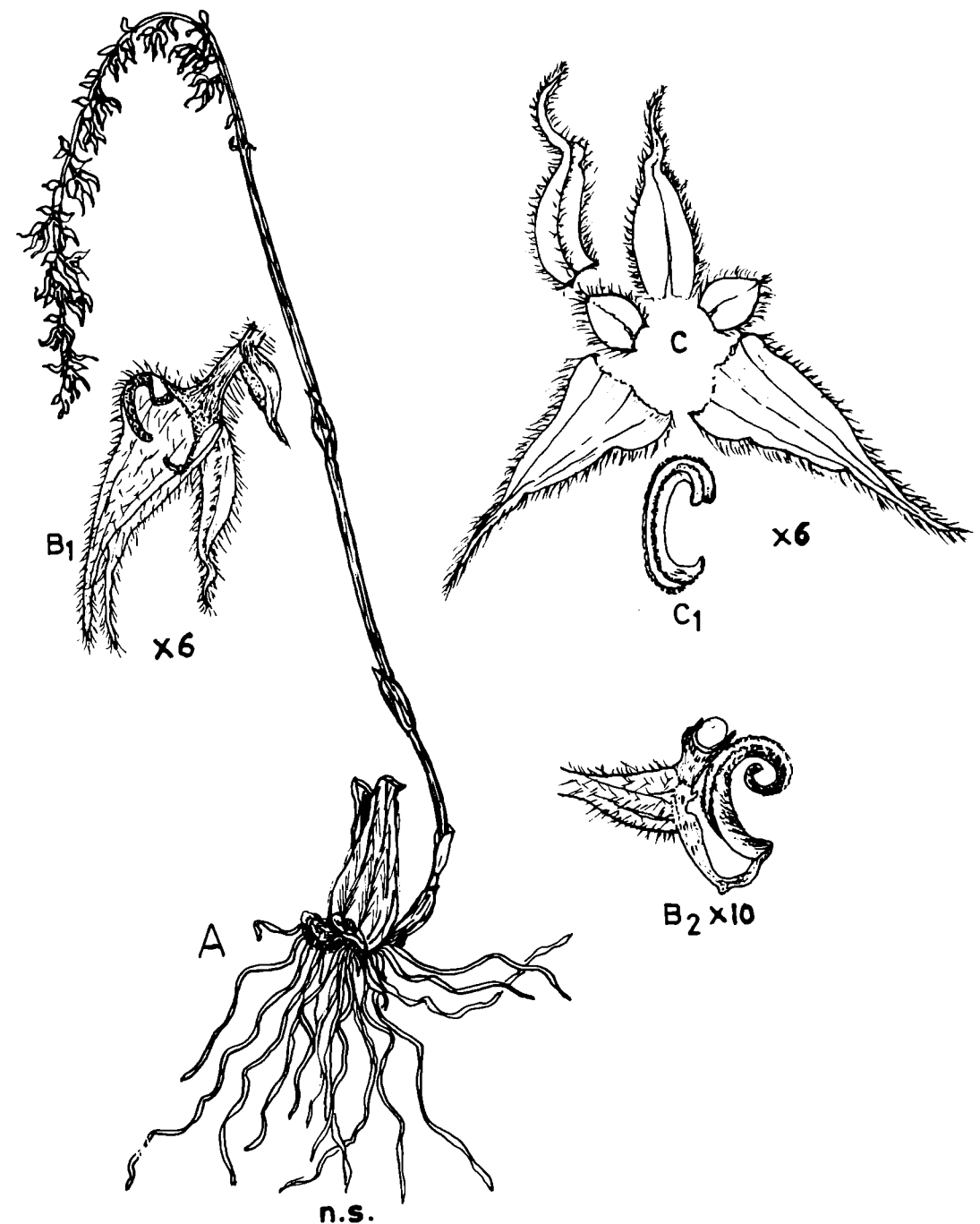


Plate 176

Bulbophyllum leopardinum (Wall.) Lindl. Gen. Sp. Orchid. Pl. 48, 1830; Hk. f. 5:756, 1890; K. & P. 67, t.92, 1898; T.427, 1966, 2:177, 1971 et 3:33, 1978; B. & T. 66:290, t.2, 1969; H. et al. 32, 1978; Seidenf. 33:28, t.10, 1979.

= *Dendrobium leopardinum* Wall. Tent. Fl. Nepal, 39, t.28, 1824.

Rhizome very stout, covered with numerous fibrous sheaths, pseudobulbs crowded, 2.5-4.5 cm. long, obpyriform. Leaf solitary, elliptic-oblong, blade 7.5-14.5 cm. by 2.5-5 cm., base narrowed to a petiole, 2-4.5 cm. long, mucronate. Scape as long as the pseudobulb and arising by its side, peduncle bearing a single flower or even three; floral bract much shorter than the ovary and very close to each other, outer the largest 1 cm. long. Flower greenish, spotted with crimson, 4-5 cm. long; sepals subequal, ovate-lanceolate, acute, dorsal sepal 1.8 cm. long, concave, lateral pair 2 cm. long, curved at the base, much broader than the dorsal, 1.2 cm.; petals smaller than the sepals, 1.4 cm., ovate, spotted with crimson. Lip shorter than the sepals, lanceolate, 1.2 cm. long, slightly curved, base with small toothed auricles near its attachment with the foot, upper surface concave and grooved, marginal folds turned outwards deep crimson, indistinctly spotted. Column 5 mm. winged, long with 2 apical spurs; foot curved, 12 mm. long. Anther conical, 2.5 mm., papillose.

Flowering time - probably September to October.

Altitudinal range - 1830-2135 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No. n = 19 (Mehra & Vij, Taxon, 19:106, 1970).

also n = 18 (Mehra & Sehgal, ibid. 24:512, 1975).

2n = 38 (Biswas, ibid. 29:169, 1980).

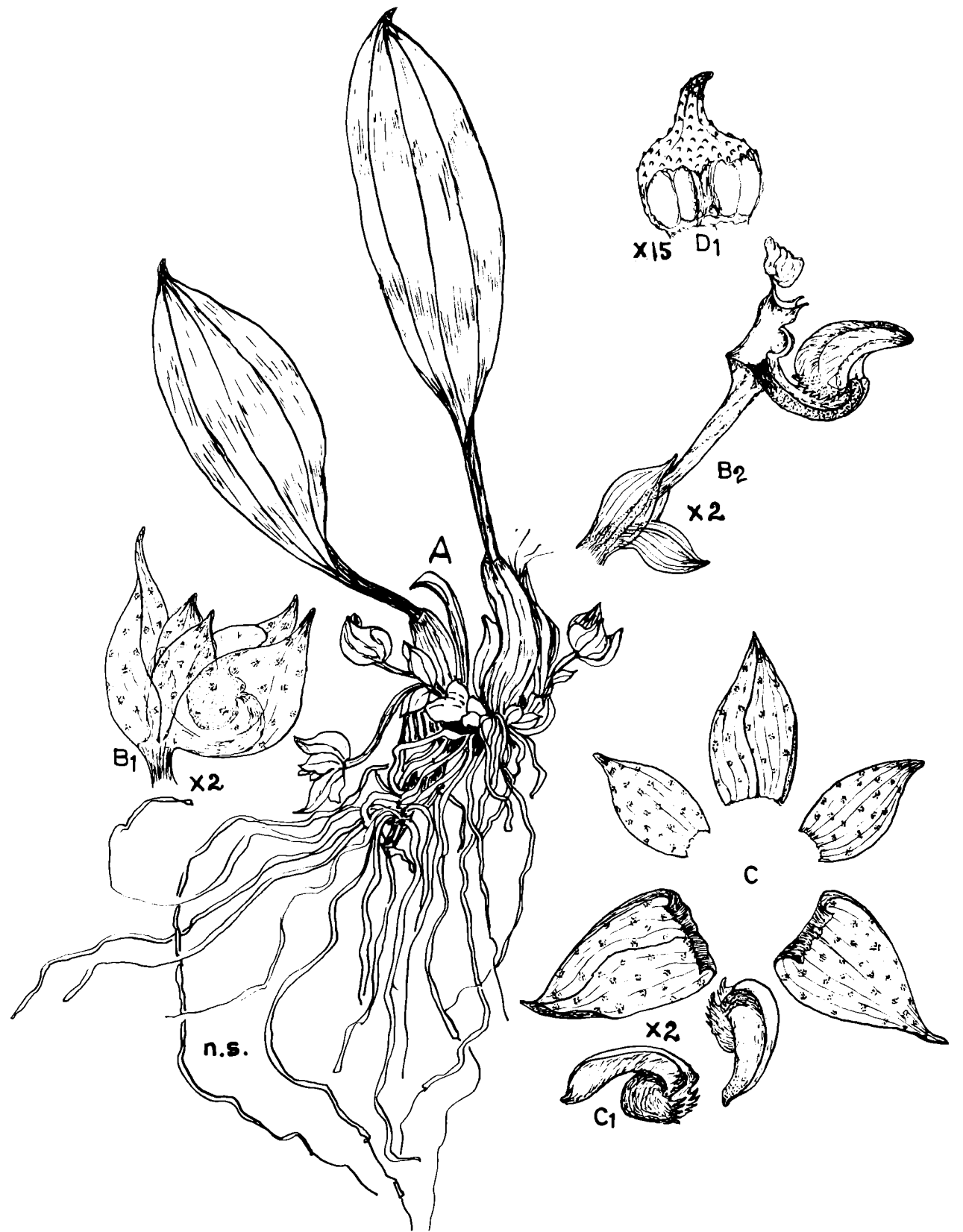


Plate 177

Bulbophyllum odoratissimum (Sm.) Lindl. Gen. Sp. Orchid. Pl. 55, 1830; Hk. f. 5:758, 1890; K. & P. 79, t.109, 1898; T. 427, 1966 et 3:33, 1979; B. & T. 66:290, f. 2, 1969; H. et al. 32, 1978; Seidenf. 33:76, f.43, 1979.

= *Stelis odoratissima* Smith in Rees, Cyclop. 34 : Stelis n.12, 1814.

= *Stelis caudata* D. Don, 32, 1825.

Rhizome thin, woody; pseudobulb suctylindric, 2-3 cm. long. Leaf solitary, oblong-lanceolate, 6-8.5 cm. by 1-1.7 cm., narrowed to a sessile base. Scape arising from the base of the pseudobulb, stout, as long or longer than the leaf having many sheathing bracts lower down, peduncle with scarious bracts, c 1 cm. long, many flowered compact umbel; floral bracts lanceolate, 7-8.5 mm. long, exceeding the ovary. Flowers white, 1.2-1.5 cm. long; sepals subequal, lanceolate, spreading, terete near the tips, dorsal sepal 8 mm. long, laterals 1.1 cm. long; petals minute, c 1.5 mm. long ovate. Lip about as long as the petals, oblong-lanceolate, convex with a central groove, fleshy, margin erose and with small hairs. Column short, 1.25 mm., apical teeth small; foot very short.

Flowering time - June - July.

Altitudinal range - 1300 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. n = 29 (Malla et al., Taxon, 26:444, 1977).

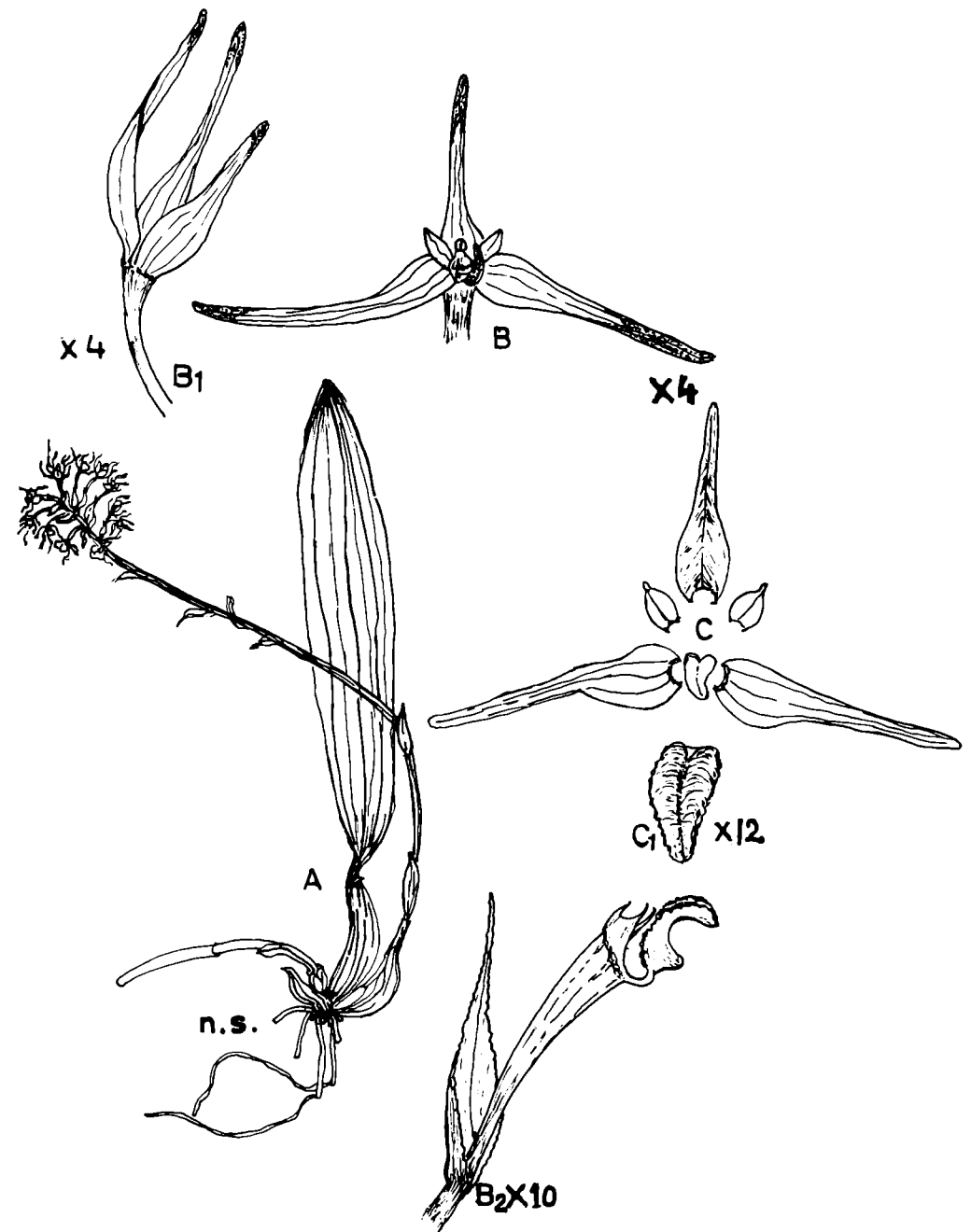


Plate 178

Bulbophyllum polyrhizum Lindl. Gen. Sp. Orchid. Pl. 53, 1830; Hk. f. 5:767, 1890; K. & P. 70, t.95, 1898; D. 104, 1906; B. & T. 73:151, 1975; Seidenf. 65:141, t.27, 1969 et 33:108, t.68, 1978; T.3:33, 1978; H. et al. 32, 1978.

Rhizome threadlike, much branched, pseudobulbs ovoid or globular, 2 cm. apart. (Leaf narrowly oblong, narrowed to the sessile base, deciduous before flowering) scape filiform, 7-10 cm. arising from the side of the pseudobulb, peduncle suberect and having 2 or 3 minute bracts, c 2 mm. long, few and distantly flowered; floral bracts c. 1.5 mm. long, oblong, much shorter than the ovary. Flowers green, 7 mm. long, suberect; sepals unequal, spreading, dorsal sepal 4 mm. long, ovate, concave, lateral sepals oblong-lanceolate, 4.75 mm. long, subfalcate; petals broadly ovate, 2.5 mm. long, much shorter than the sepals, acute. Lip stipitate, deflexed at the base, oblong, 3 mm. long, grooved in the lower half, scaberulous. Column c 1 mm. long with small apical teeth; foot slightly curved, c 1.25 mm. long. Anther papillose.

Flowering time - May.

Altitudinal range - 915-2135 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No. n = 19 (Arora, Taxon, 20:785, 1971).

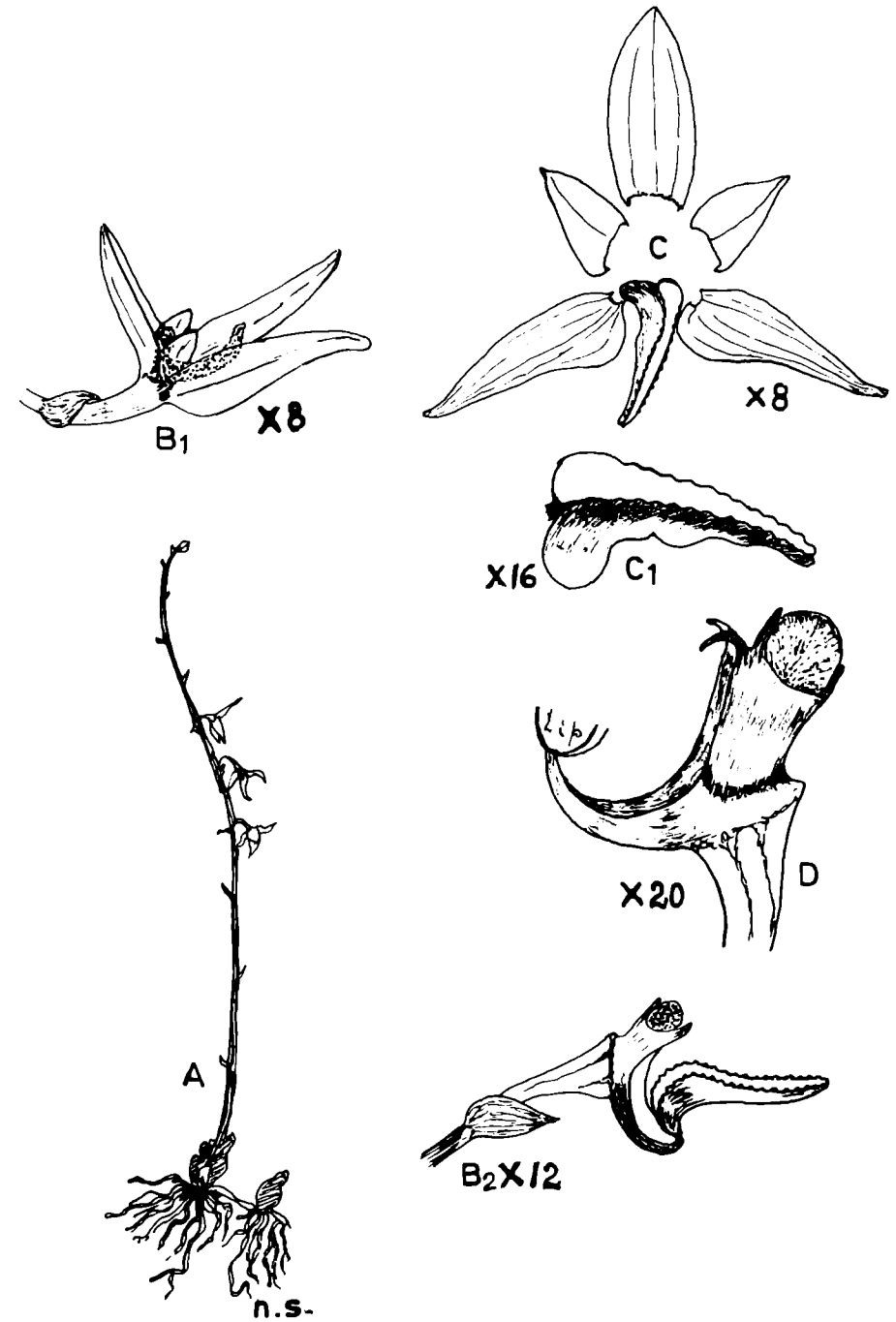


Plate 179

Bulbophyllum reptans (Lindl.) Lindl. Gen. Sp. Orchid. Pl. 51, 1830; Hk. f. 5:768, 1890; K. & P. 77, t. 106, 1898; D. 106, 1906; B. & T. 66:292, 1969; H. et al. 32, 1978.

= *Tibrachia reptans* Lindl. Collect. Bot. t.41A, 1825.

Rhizome slender, wiry, bearing pseudobulbs about 5.5-6.5 cm. apart, obpyriform, 1.5-2 cm. long. Leaf linear-oblong, 8-12.5 cm. by 6-9 mm., obliquely notched, narrowed to a short petiole, c 5 mm. long. Scape arising by the side of the pseudobulb, slender, decurved, peduncle sheathed at the base and bracteate upwards, bracts varying in length, laxly few flowered; floral bracts oblong-lanceolate, 7-4 mm. long, longer than the ovary. Flowers yellowish green c 1 cm. long, sepals subequal, lanceolate, dorsal sepal ovato-oblong, 6.5 mm. long, undulate margin, laterals subfalcate, 7 mm. long, base broad; petals oblong, 3 mm. long, obtuse. Lip oblong, 3-4 mm. long, stipitate, deflexed from the middle, expanded and grooved at the base, apex narrowed, margin more or less winged, wings deflexed. Column c 1 mm. long, shortly winged, apical processes filiform; foot c 2 mm, slightly curved.

Flowering time - March.

Altitudinal range - 1300-2500 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 6 gatherings.

Specimens studied - 4.

Chr. No. n = 19 + 0 - 1B (Mehra & Sehgal, Taxon, 24:512, 1975).

also n = 19 (Vij & Gupta, ibid. 25:634, 1976).

2n = 38 (Mehra & Kashyap, ibid. 27:226, 1978).

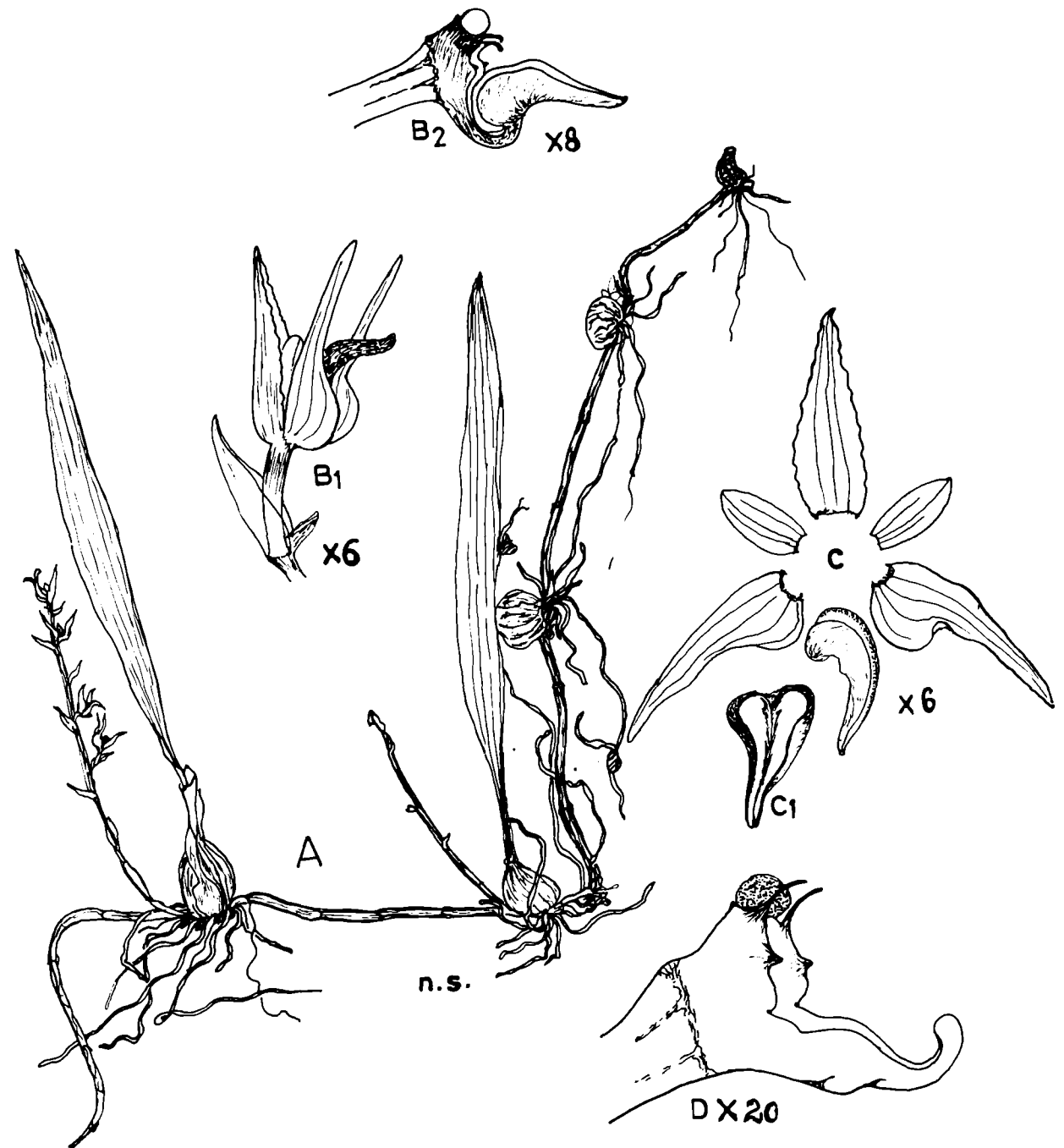


Plate 180

Bulbophyllum retusiusculum Reichb. f. Gard. Chron. 1869 : 1182, 1869; Seidenf. 29:195, t.106-108, 1973; H. et al. 32, 1978.

= *Cirrhopetalum wallichii* Lindl. 59, 1830 (non Lindl. 1839 & 1842); Hk. f. 5:776, 1980 pp.; K. & P. 88, t.121, 1898.

= *Bulbophyllum wallichii* auct. non Reichb. f.; T. 428, 1966; B. & T. 66:292, 1969.

Rhizome wiry, pseudobulbs ovoid, 1.5-2.4 cm. long slightly curved, 1-1.5 cm. apart. Leaf solitary, oblong, 3.5-6.5 cm. by 7-12 mm., obliquely notched, tapering to a sessile or subsessile base. Scape usually exceeding the leaf, but sometimes equalling, arising from the side of the pseudobulb, peduncle with several lanceolate bracts, 10-8 mm.; 6-10 flowered umbel; floral bracts lanceolate 8-6 mm. long and nearly as long as the ovary. Flowers with floral parts differently coloured, c 1.2-1.5 cm. long; sepals very unequal, dorsal sepal oblong-ovate, reddish with 3 deep red nerves, 5 mm. long, obtuse except at the base and apex, lateral sepals linear-oblong, 2.4 cm. long, at first cohering except at the base and apex by the inner side, but later separating, falcately incurved, entire yellowish; petals as long as the dorsal sepal, 5 mm., broadly elliptic, obtuse, reddish spreading. Lip oblong, c 3 mm. long, decurved from the middle, base dilated and grooved, apex narrowed down to subacute, entire, yellow. Column 1.5 mm. with erect apical teeth; foot curved, c 3 mm. long. Anther ovoid, papillose.

Flowering time - September.

Altitudinal range - 2285-2590 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 2.

Chr. No. n = 19 (Mehra & Vij, Taxon, 19:107, 1970 as *Cirrhopetalum wallichii*; Mehra & Sehgal, ibid, 29:348, 1980 as *B. retusiusculum*).

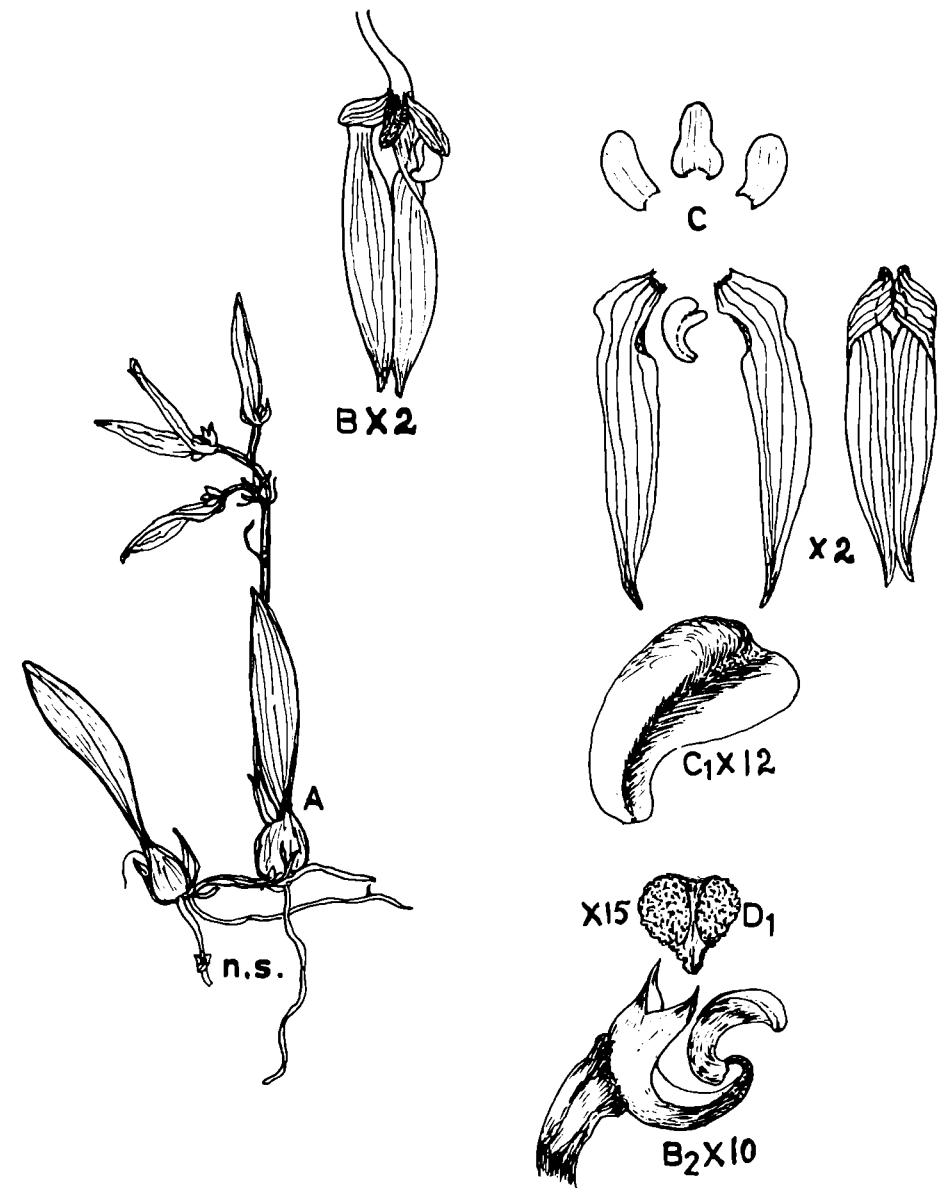


Plate 181

***Bulbophyllum rolfei* (Ktz.) Seidenf. Dansk. Bot. Ark. 33:149, 1979.**

= *Phyllorchis rolfei* Ktz. Rev. Gen. 2:276, 1891.

= *Bulbophyllum dyerianum* (King & Pantl.) Seidenf.; H. et al. 33, 1978.

= *Cirrhopetalum dyerianum* King & Pantl. 64(3):335, 1895.

= *Cirrhopetalum parvulum* Hk. f. 5:778, 1890; K. & P. 92, t. 128, 1898.

= *Bulbophyllum parvulum* auct. non Lindl., T. 427, 1966.

Rhizome slender, flexuous; pseudobulbs 7-15 mm. long, about 2 cm. apart. Leaf solitary, elliptic, 4-4.3 cm. by 8-12 mm. narrowed at the base, sessile or subsessile. Scape erect, equalling or slightly exceeding the leaf, slender, sheathed at the base, peduncle ebracteate, 3 or 4 flowers subumbellate; floral bracts 5-7 mm. lanceolate, equalling or longer than the ovary. Flowers drooping, 1.5 cm. long; sepals very unequal yellowish with purple nerves, dorsal sepal oblong, 6 mm. long, erose, lateral pair linear-oblong, 11 mm. long, falcate, apex acuminate and diverging; petals ovate purplish, unequal sided, 5 mm. long, erose. Lip oblong, decurved from below the middle, a deep mesial groove from base to apex, purplish on the outside. Column with 3 short teeth, foot much curved.

Flowering time - June.

Altitudinal range - \pm 2600 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. n = 19 (Mehra & Vij, Taxon, 19; 107, 1970 as *Cirrhopetalum parvulum*).

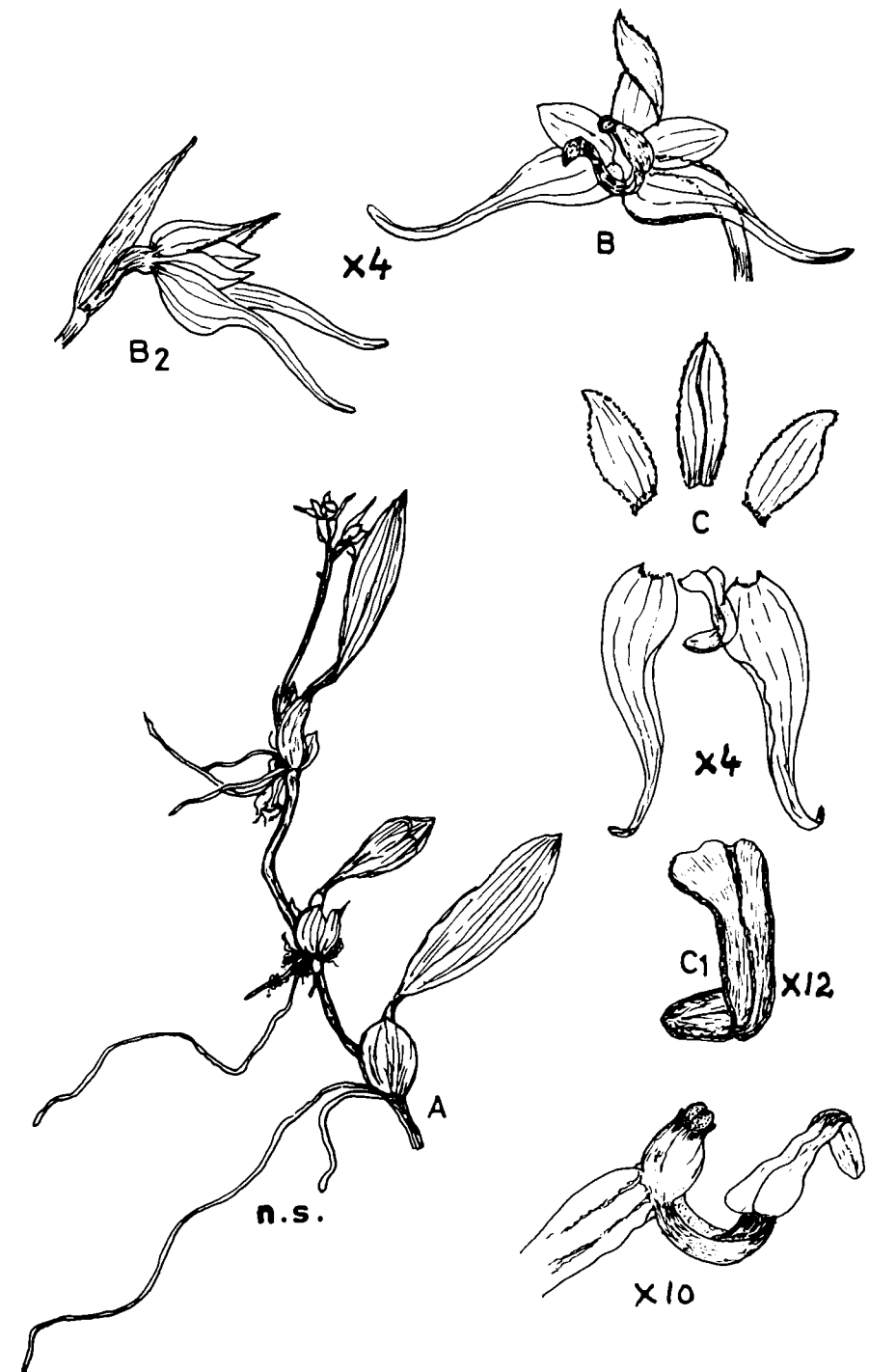


Plate 182

Bulbophyllum sarcophyllum (King & Pantl.) J.J. Sm. Bull. Buitz. 2. 58:27, 1912; Seidenf. 29:182, t.93, 1973.

= *Cirrhopetallum sarcophyllum* King & Pantl. in Journ. Roy Asiat. Soc. Bengal 64:335, 1895 et 8:91, t.126, 1898.

Rhizome thick, pseudobulbs discoid, c 3 mm. thick, 4.5-7 cm. apart, each with long fibers at its base. Leaf pendulous, oblong, blade 10-15 cm. by 2-3.2 cm., subfalcate, acute fleshy, narrowed to a stout petiole, 1.5-2 cm. long. Scape nearly half as long as the leaf, directed upwards, peduncle sheathed at the base, and two widely separated lanceolate bracts c 6 mm. long, on its length, umbel 3-7 flowered; floral bracts ovate, 4 mm. long, shorter than the ovary. Flower reddish, c 1.5 cm. long; sepals unequal, reddish and much mottled, dorsal sepal ovate, 5 mm., acute, concave, lateral sepals falcate-lanceolate 1 cm. long, cohering at the apical 1/3rd, acuminate, glandular, puberulous; petals oblong, 3 mm. long, falcate, acute, reddish and mottled. Lip oblong, 3 mm., slightly curved deeply grooved in the basal half, anterior half faintly grooved, apex acute. Column stout, 1.5 mm. long, two erect apical teeth; foot curved, 3 mm. long, inner surface rough.

Flowering time - May.

Altitudinal range - ± 305 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

Remarks - This is a new record for Nepal.

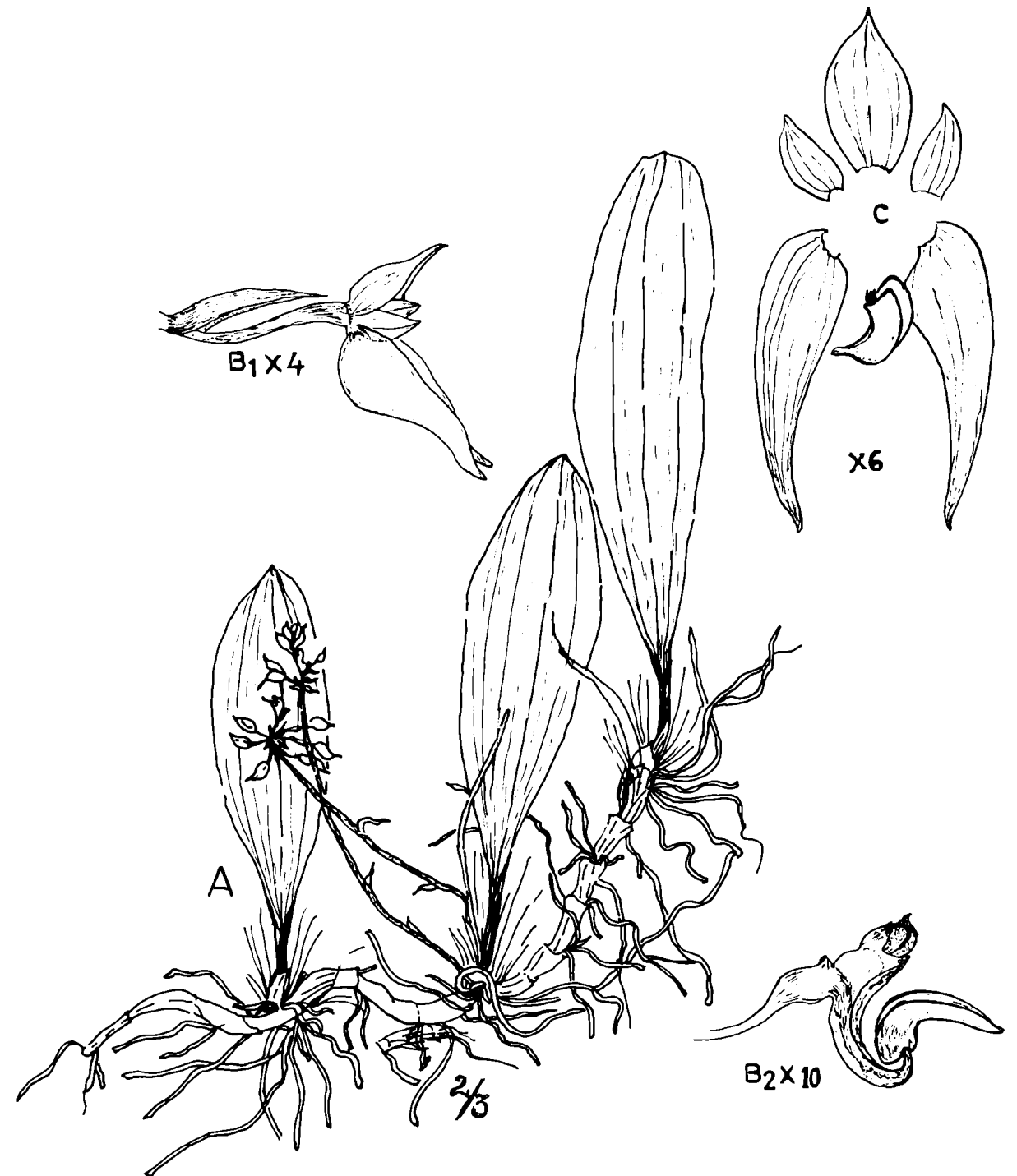


Plate 183

Bulbophyllum secundum Hk. f. in Fl. Brit. Ind. 5:764, 1890; K. & P. 75, t.101, 1898; T. 2:179, 1971; H. et al. 34, 1978; Seidenf. 33(3):103, f. 63, 1979.

Rhizome slender, pseudobulbs turbinate, crowded, leaf solitary, linear-oblong, 3.5-5 cm. by 4-6 mm., obtuse, narrowed to a petiole, 4-8 mm. long. Scape erect, much longer than the leaves, c 10-12.5 cm., peduncle slender with 1 or 2 sheathing bracts at the base and small lanceolate bracts, 1.5 mm. on it, laxly few flowered; floral bracts minute c 1 mm., much shorter than the ovary. Flowers secund, small, c 7 mm. long, purplish; sepals subequal, dorsal sepal ovate, 3 mm. long, ciliolate at the apex, lateral pair broadly triangular equalling the dorsal in length but much broad, spreading, erose; petals much smaller than the sepals, spathulate, 1.75 mm. long, margin at the anterior half strongly ciliate. Lip longer than the petals, oblong, c 2.25 mm. long, slightly dilated at the middle and depressed, base truncate, apex obtuse and slightly deflexed, margin ciliate. Column c 1 mm. long, with two bigger apical teeth and also two small knob-like teeth below; foot c. 1.5 mm. long, curved.

Flowering time - July.

Altitudinal range - \pm 2135 m.

Distributional pattern - central Nepal.

Specimens in Herbarium- 3 gatherings.

Specimens studied - 3.

Chr. No. $n = 20$ (Mehra & Vij, Taxon, 19:106, 1970).

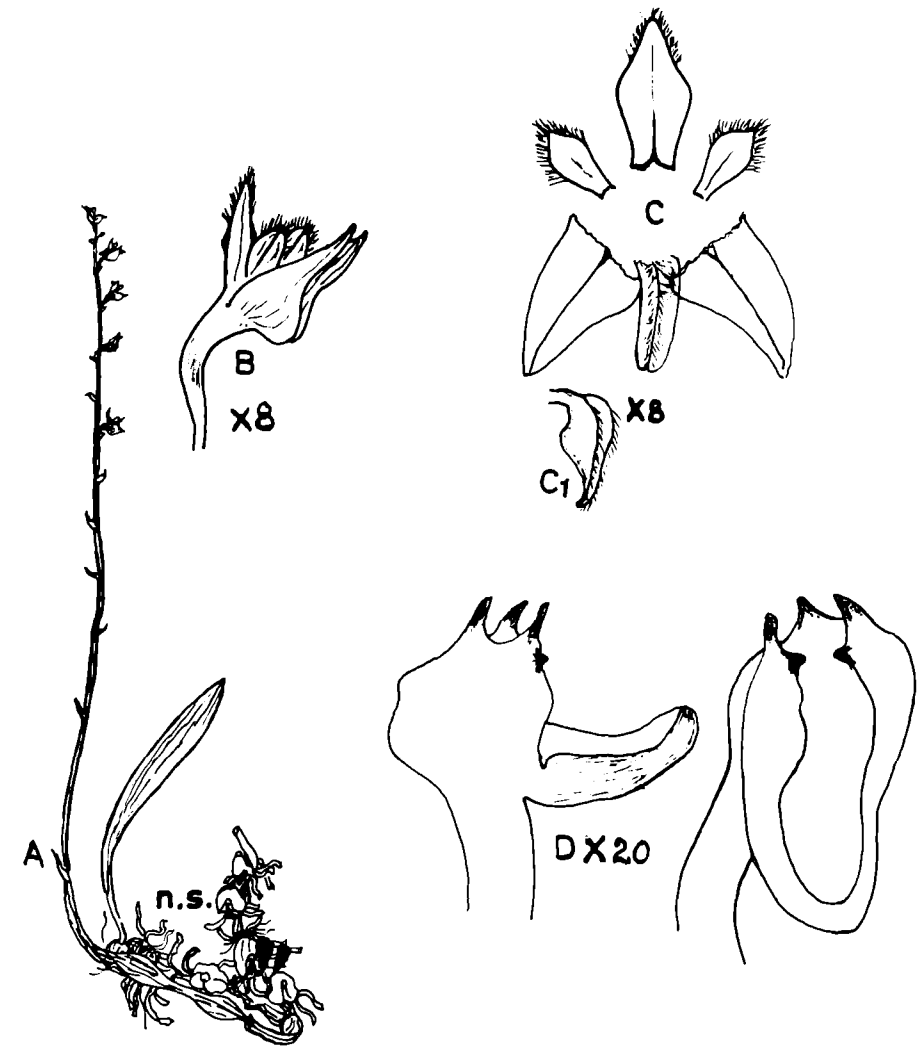


Plate 184

Bulbophyllum sikkimense (King & Pantl.) J.J. Sm. Bull. Buitz. 2. s8:28, 1912; Seidenf. 29:105, 152A, B, 1973.

= *Cirrhopetalum sikkimense* King & Pantl. Ann. Roy Bot. Gard. Calcutta, 8:90, t.125, 1898.

Rhizome stout naked, pseudobulbs ovoid-globose, about 1 cm. apart. Leaf solitary, oblanceolate, 2-3.5 cm. by 8-12 mm., obliquely notched obtuse apex, narrowed to a sessile base. Scape longer than the leaves, 6-9 cm. suberect, peduncle with 2-3 bracts, lanceolate, c 4 mm. long, umbel of 8-12 flowers; floral bracts c 2 mm. long, shorter than the ovary. Flowers 1.5 cm. long, floral parts differently coloured, sepals very unequal, dorsal sepal ovate, acuminate, 5 mm. long concave, margin and tip with long hairs, greenish with 5 reddish nerves, lateral pair oblong-lanceolate, subfalcate, 1.1 cm. long, coherent except at the basal 1/3rd, apex obtuse, entire, pinkish; petals ovate, 3 mm. long, subfalcate, base oblique, body margin and apex ciliate, greenish with 3 reddish nerves. Lip broadly ovate in general outline, base broad and gradually narrowed towards the anterior end, 2.5 mm. long, slightly bent and concave, upper surface smooth, brown with many small reddish spots. Column c 1.5 mm. long very shortly bidentate; foot 2.5 mm. long, broad at the base and tapering, curved.

Flowering time - June.

Altitudinal range - ± 610 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

Remarks - The colour of the floral parts are different from those given by King & Pantling. This is a new record.

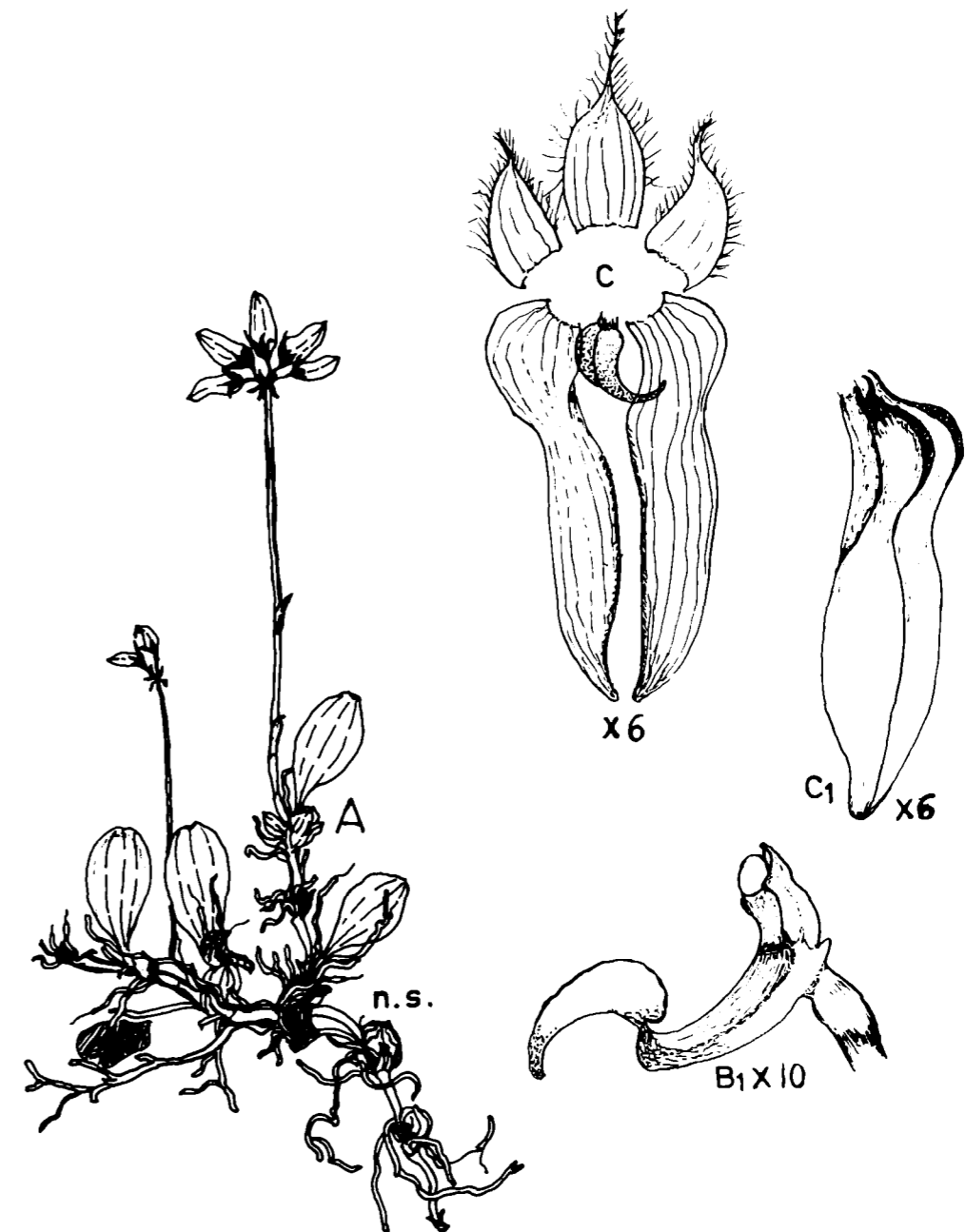


Plate 185

Bulbophyllum triste Reichb. f. in Walp. Ann. Bot. Syst. 6:253, 1861; Hk. f. 5:768, 1890; K. & P. 73, t. 98, 1898; T. 427, 1966; H. et al. 34, 1978; Seidenf. 33(3):213, f. 156, 1979.

Rhizome not very thick, pseudobulb turbinate 1.5 cm. long, close together, leafless when flowering. (Leaves two from each pseudobulb, narrowly oblong, tapering to a subsessile base as well as to the acute tip.) Scape c 25 cm. long, peduncle slender erect bearing 4-6 distant bracts, lower sheathing, 10-9 mm. long, higher up not sheathing 7-4 mm. long, lanceolate, floral region drooping and densely flowered; floral bracts c 3 mm. as long as the ovary. Flowers greenish with purple spots, 7 mm. long; sepals unequal, dorsal, dorsal sepal ovato-oblong. 3 mm. long, concave, rounded apex, laterals longer, ovato-lanceolate, 4.25 mm., gibbous, cohering at the tips, margins incurved; petals triangular, 1.75 mm., acute. Lip stipitate, oblong-lanceolate, 2.25 mm., slightly recurved, broader and deeply grooved at the base, anterior half narrowed and more or less flat at the apex. Column 1 mm. long, with subulate apical processes; foot c 1.5 mm. long and curved.

Flowering time - June.

Altitudinal range - \pm 2135 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. n = 19 (Arora, Taxon, 20:785, 1971; Vij et al. ibid. 25:640, 1976).

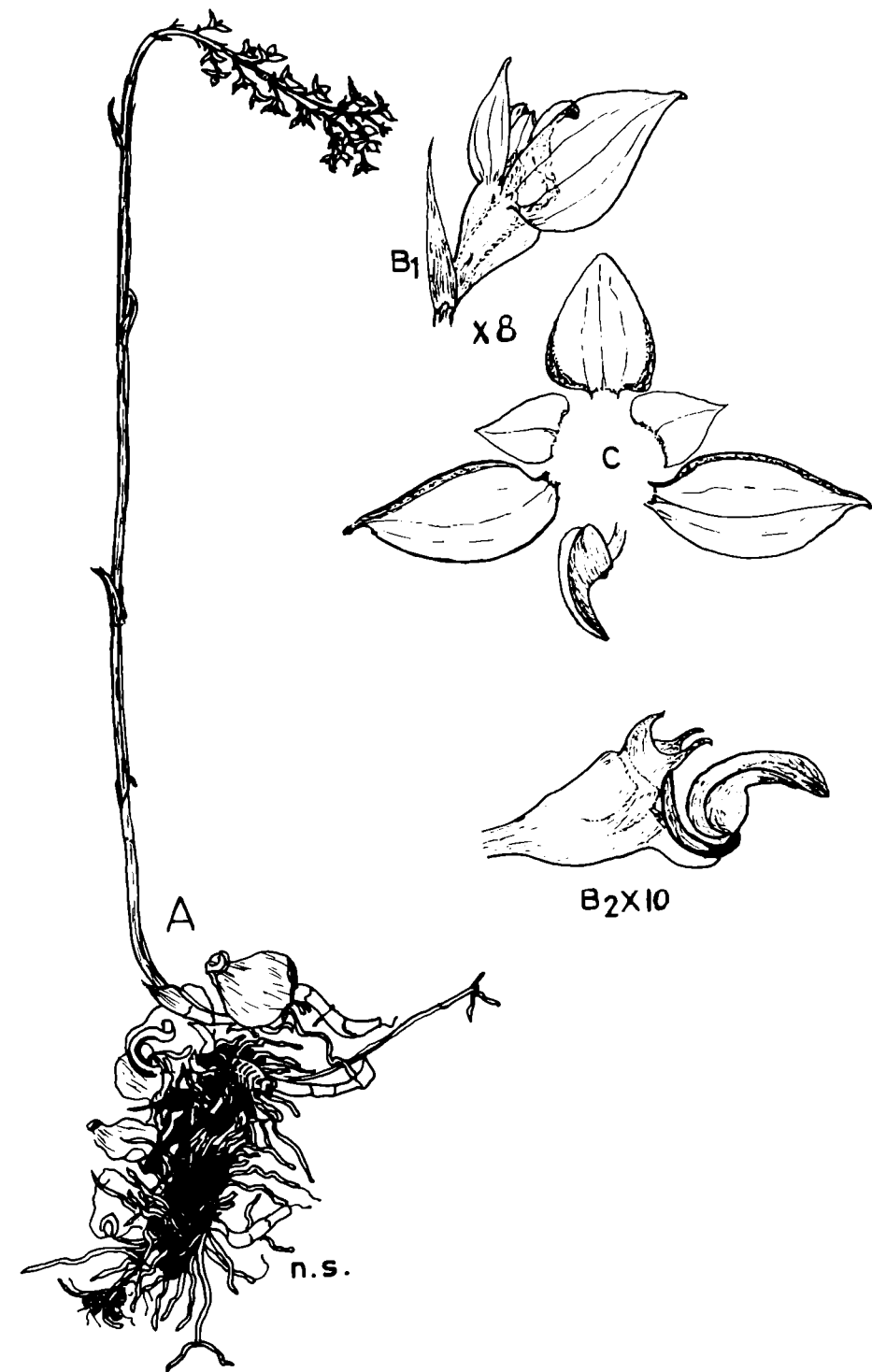


Plate 186

Bulbophyllum umbellatum Lindl. Gen. Sp. Orchid Pl. 56, 1830; Seidenf. 29:178, t.90, 1973; H. et al. 34, 1978.

= *Cirrhopetalum maculosum* Lindl. : Hk. f. 5:776, 1890; K. & P. 95, t. 132, 1898; B. & T. 66:295, 1969.

Rhizome with fibrous sheaths and many roots, pseudobulb very close to each other, 1.5-2.5 cm. distant, or ovoid and 2.5-3.5 cm. long. Leaf solitary, oblong-lanceolate, 9.5-15 cm. by 1.5-2 cm., thick, apex obtuse and notched, petiole short, 8-15 mm. long. Scape stout 7.5-11 cm. long, erect, peduncle with a sheath at the base and bearing a 2-4 flowered umbel; floral bracts lanceolate, 7-10 mm. long, shorter than the ovary. Flowers yellowish with floral parts spotted, 1.5-2.0 cm. long, sepals very unequal, dorsal sepal broadly ovate, 9 mm. long, slightly concave, rounded, lateral sepals ovate-lanceolate, 1.4 cm. long, base broad and cohering, falcate, upper margins curved inwards; petals broadly ovate, 7 mm. long, obtuse. Lip oblong, with a broad base tapering to the apex deflexed, upper surface grooved, margins turned outwards. Column 2 mm., broadly winged, apical teeth short and curved; foot c 6.5 mm. long, rectangular and slightly curved.

Flowering time - March - April.

Altitudinal range - ± 1830 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. 2n = 38 (Vij et al. Taxon, 25:634, 1976 as *Cirrhopetalum maculosum*; Mehra & Kashyap, ibid. 27:226, 1978 as *Bulbophyllum umbellatum*).

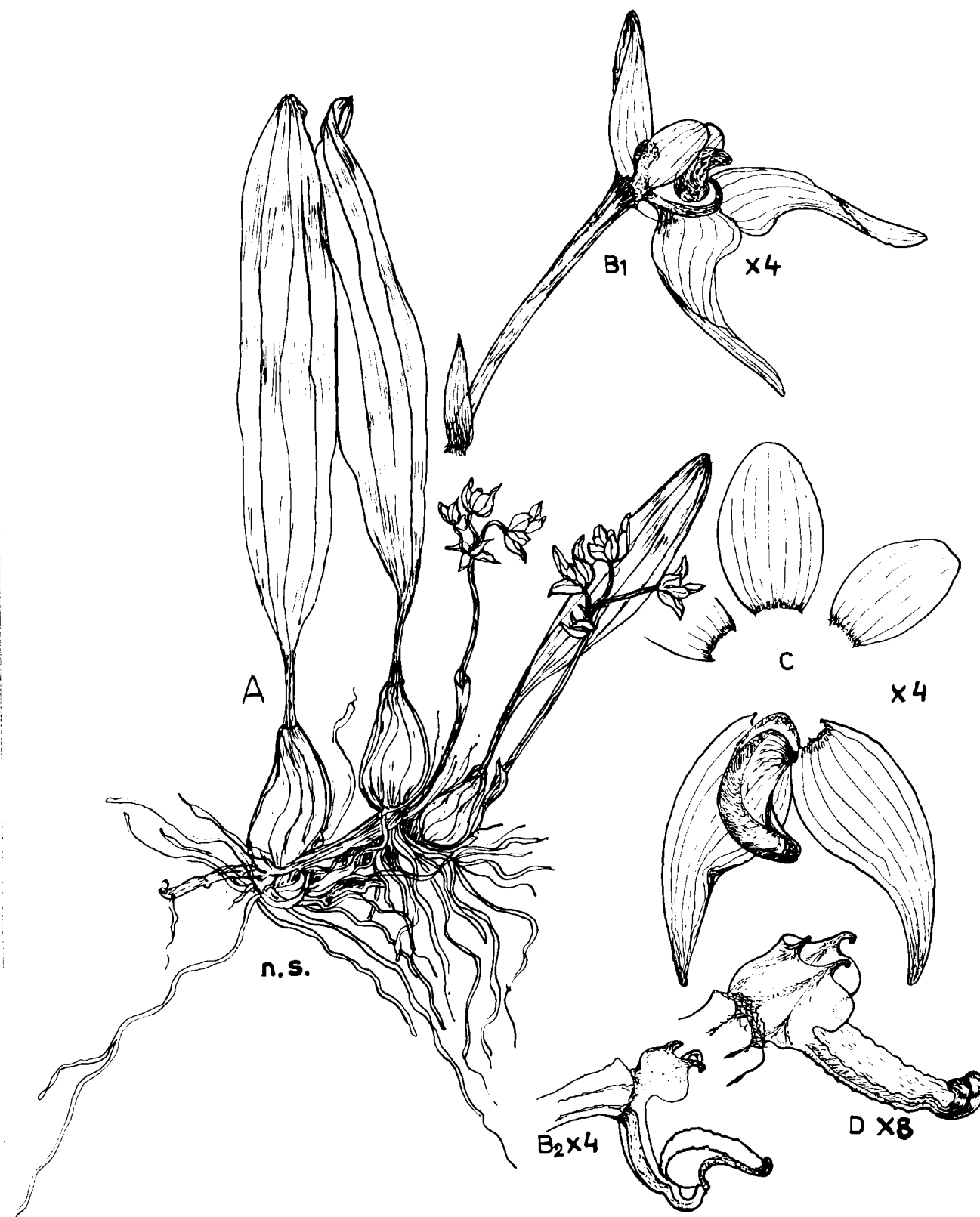


Plate 187

Bulbophyllum viridiflorum (Hk. f.) Schlechter in Orchis 4:108, 1910; T. 428, 1966; Seidenf. 29:237, f. 131, 1973; H. et al. 34, 1978.

= *Cirrhopetalum viridiflorum* Hk. f. Fl. Brit. Ind. 5:779, 1890 et 6:190, 1890; K. & P. 86, t. 118, 1898.

Pseudobulbs ovoid, 2-3 cm. long, leaves in pairs, soon falling off, oblong-lanceolate, 9-19 cm. by 2.5-4.5 cm., thin, acute, narrowed to sessile base. Scape stout, 9-15 cm. long, peduncle erect in the lower part but decurved in the floral region, 2 or 3 distant sheathing bracts 1.5-1 cm. long, densely many flowered; floral bracts ovate, 2-3 mm. long, equalling the ovary. Flower yellowish green, drooping, c 8 mm. long; sepals unequal, dorsal sepal ovate-oblong, 4 mm. long, concave, lateral sepals ovate-lanceolate, 6 mm. long, cohering from base to apex; petals oblong-lanceolate, 3 mm. long, margin of the upper half serrate. Lip oblong, 3 mm. long, deflexed at the middle, orange yellow, edges of the grooved basal half turned outwards, fleshy, margin finely crenulate. Column 2 mm. long with hooked apical processes; foot 2 mm., slightly curved. Anther obovate, papillose.

Flowering time - June to August.

Altitudinal range - 1830-2590 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 5 gatherings.

Specimens studied - 5.

Chr. No. n = 19 (Mehra & Vij, Taxon, 19:107, 1970).

also n = 19 + 0 - 3B (Mehra & Kashyap, ibid. 27:226, 1978) all as *Cirrhopetalum viridiflorum*.

Remarks - The petals of our specimens are not suborbicular and the margins do not have glandular hairs as given by Hooker (loc. cit.) and King & Pantl. (loc. cit.). Also, the lip does not have an entire margin.

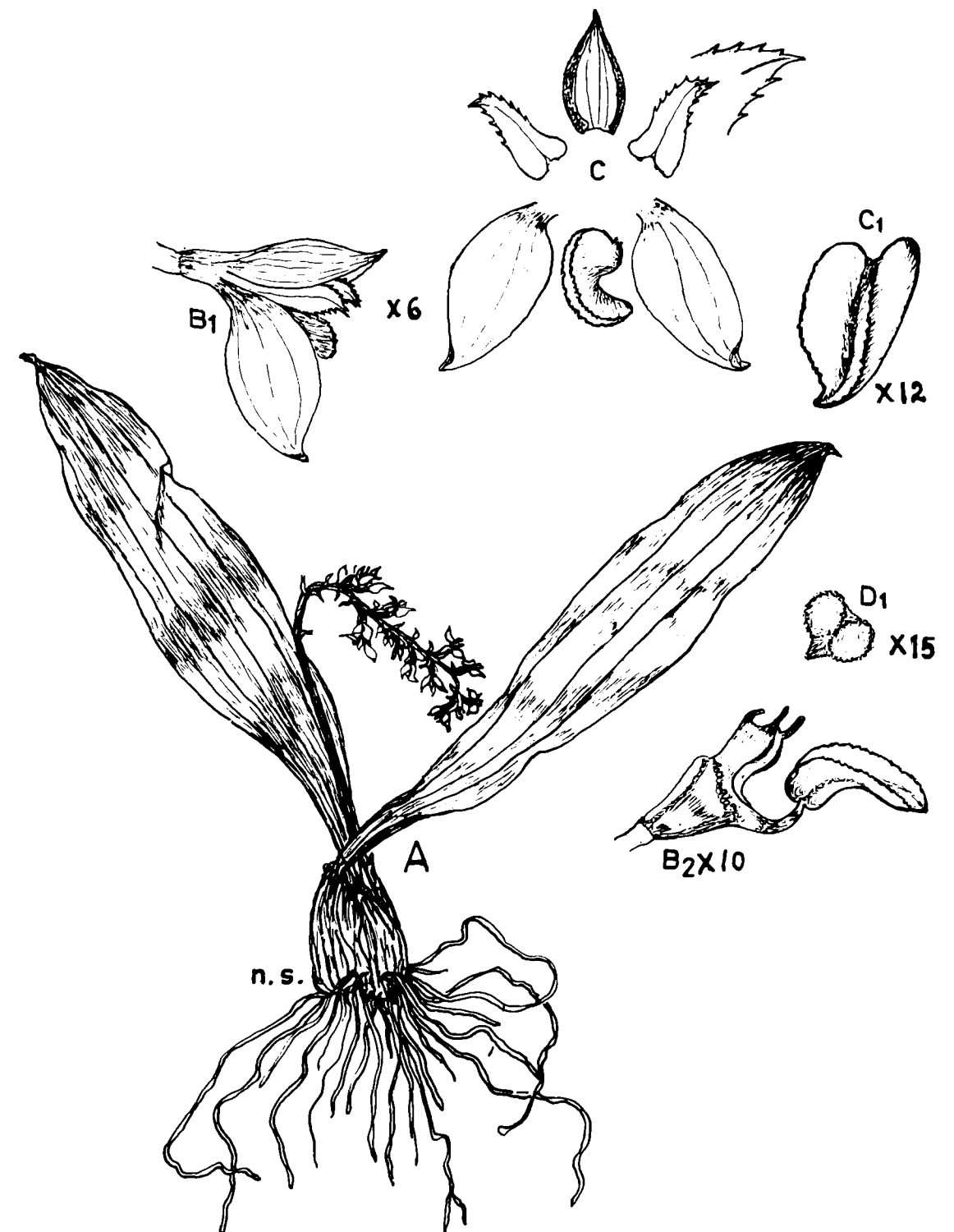


Plate 188

Bulbophyllum wallichii Reichb. f. in Walp. Ann. Bot. Syst. 6:259, 1861; Seidenf. 29:234, f.127, 1973 et 33:189, f. 137 & 138, 1979; T. 3:34, 1978; H. et al. 34, 1978.

= *Cirrhopetalum wallichii* auct. non Lindl. 1830; Lindl. in Edw. Bot. Regist. 25, Misc. 119, 1839.

= *Cirrhopetalum refractum* auct. non Zoll., Hk. f. 5:779, 1890 (p.p.); K. & P. 87, t. 119, 1898 (p.p.); D. 107, 1906; B. & T. 66:295, 1969.

Pseudobulb conical and short, crowded, wrinkled at flowering time. Leaves deciduous at flowering time (narrowly oblong, contracted at the base, sessile, acute). Scape 20-25 cm. long, peduncle erect but slightly drooping in the floral region, sheathed at the base, 3-4 ovate-acuminate bracts, 6 mm. long, laxly flowered; floral bracts 6-8 mm. long, much exceeding the ovary. Flowers decurved, yellowish green when young, changing to brown with age, 4-5.3 cm. long; sepals very unequal, dorsal sepal ovate-lanceolate, 7 mm., apex awned, margin serrate; lateral pair linear, 4.8 cm. long, cohering except at the base; petals triangular, 4 mm. long, acuminate and serrate. Lip oblong, 2.5 mm. long, deflexed from the middle, basal half with the edges upturned and in the anterior half the edges turned outwards, margin hairy all along except at the base. Column short, c 1 mm. long, stout, apical teeth long and decurved; foot c 1 mm. long, slightly curved. Anther faintly papillose.

Flowering time - April.

Altitudinal range - \pm 1220 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. n = 19 (Mehra & Kashyap, Taxon, 30:507, 1981 as *Cirrhopetalum refractum*).

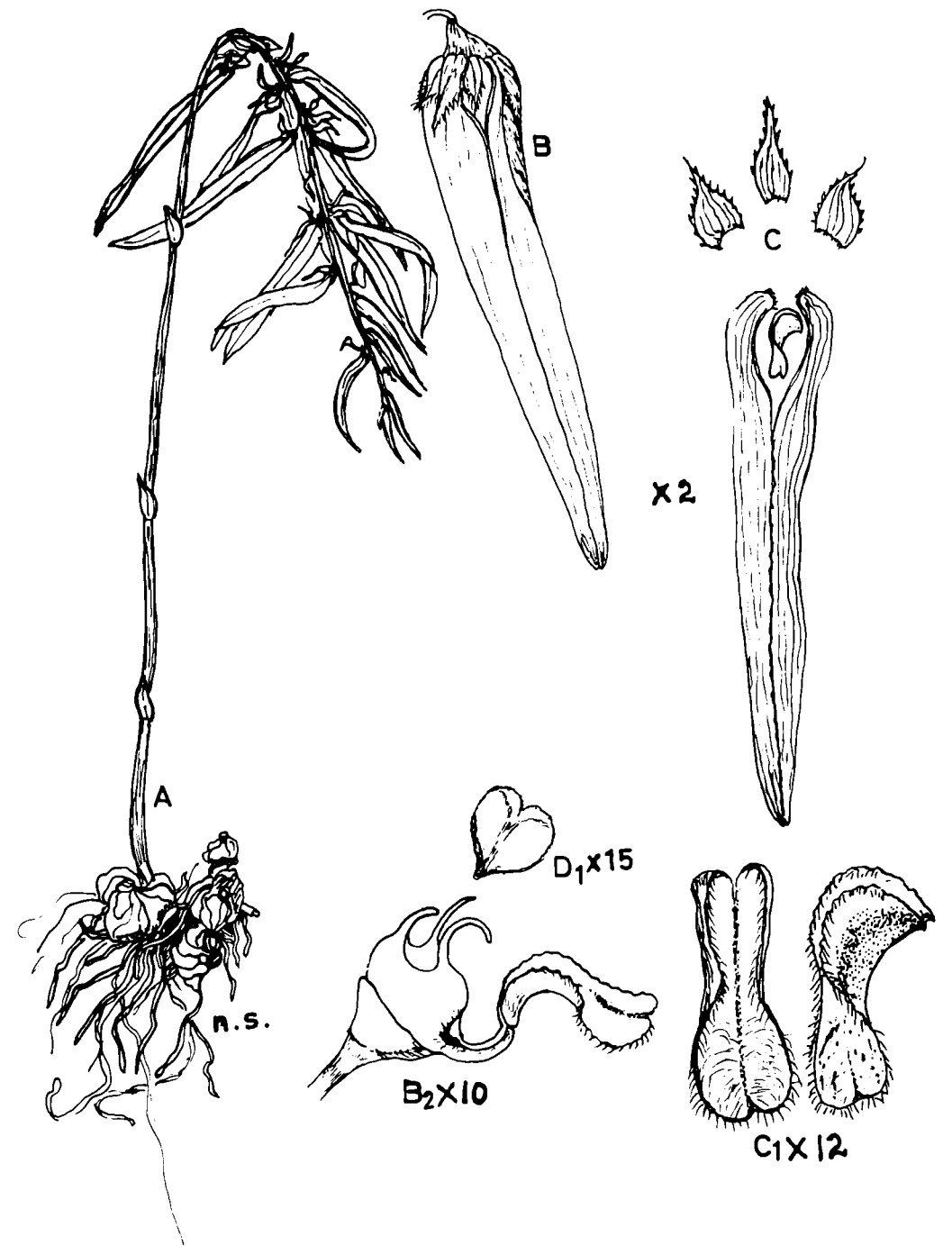


Plate 189

Bulbophyllum xylophyllum Par. & Reichb. f. Trans. Linn. Soc. 30:151, 1874; Hk. f. 5:766, 1880; Seidenf. 33:179, f. 127, 1979.

= *Phyllorchis xylophylla* (Par. & Reichb. f.) O. Ktze. Rev. Gen. 2:678, 1891.

= *Bulbophyllum gracilipes* K. & P. 77, t. 105, 1890.

Rhizome c 4 mm. thick, pseudobulbs none. Leaf solitary, oblanceolate or elliptic-oblanceolate, 2.6-5.8 cm. by 9-14 mm., narrowed to the base, sessile or subsessile. Scape erect, slender, distant from the leaf, longer than it, peduncle with a bract near the base and another near about the middle, flowers dense, capitate; floral bracts minute. Flowers c 4 mm. long, purplish; sepals subequal, dorsal sepal triangular, 2.5 mm. long, broader, lying very close to the column, lateral sepals ovate, equalling the dorsal in length but narrower, spreading; petals shorter than the sepals, oblong, falcate, 1.25 mm. long. Lip obovate c 3 mm. long, decurved from the middle as if folded, posterior half grooved, anterior convex, dilated, margin entire but whole surface papillose.

Flowering time - September.

Altitudinal range - \pm 910 m.

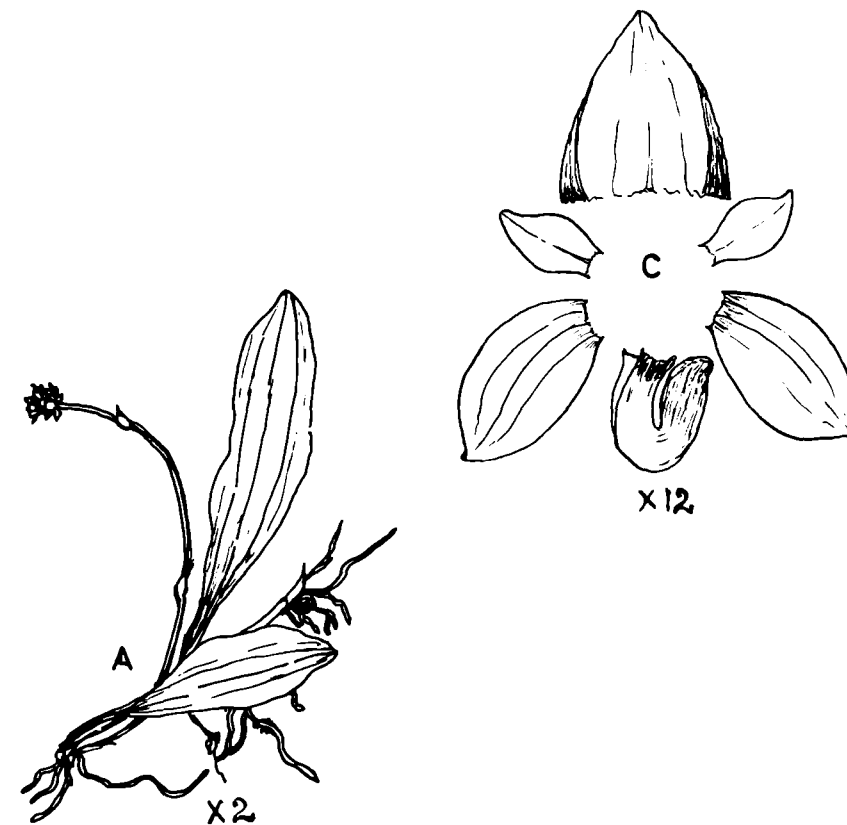
Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

Remarks - The material at hand is rather poor for a detailed study. This is a new record.



CALANTHE R. Br. (Phajaeae). In Greek 'kalos' means beautiful and 'anthe' bloom, thus the genus is named as such because most of the species have beautiful flowers. These are primarily terrestrial or lithophytic, rarely epiphytic. All the *Calanthe* bear rather sizeable usually distinctly folded leaves and produce erect or drooping inflorescences. Pseudobulbs covered by persistent leaf bases. Sepals and petals more or less spreading; labellum with long spur.

***Calanthe biloba* Lindl.**

Pseudobulbs stout, stem-like; leaves many towards the upper part, broadly-elliptic. Inflorescence arising from the axils of lower leaves, laxly many flowered; floral bracts equalling the ovary. Flowers yellow or violet; sepals spreading; petals shorter and narrower than the sepals; lip longer than the sepals, broad, deeply bilobed, lobules broadly hatchet-shaped with undulate margin; spur very short.

***Calanthe masuca* (D. Don) Lindl.**

Pseudobulbs conical; leaves broadly elliptic or elliptic-ovate, subsessile. Inflorescence laxly flowered, pubescent; floral bracts concave and shorter than the ovary. Flowers uniformly light violet; lateral sepals longer than the dorsal; petals smaller than the sepals; lip equalling the sepals, 3 lobed, apical lobe large and deeply emarginate; spur longer than the ovary.

***Calanthe pachystalix* Reichb. f. ex Hk. f.**

Leaves usually 30 cm. long, linear-lanceolate. Inflorescence dense flowered, puberulous above, floral bracts very small; sepals ovate obtuse; petals linear oblong; lip short, side lobes obovate, mid lobe linear falcate and shorter than the side lobes; spur shorter than the sepals.

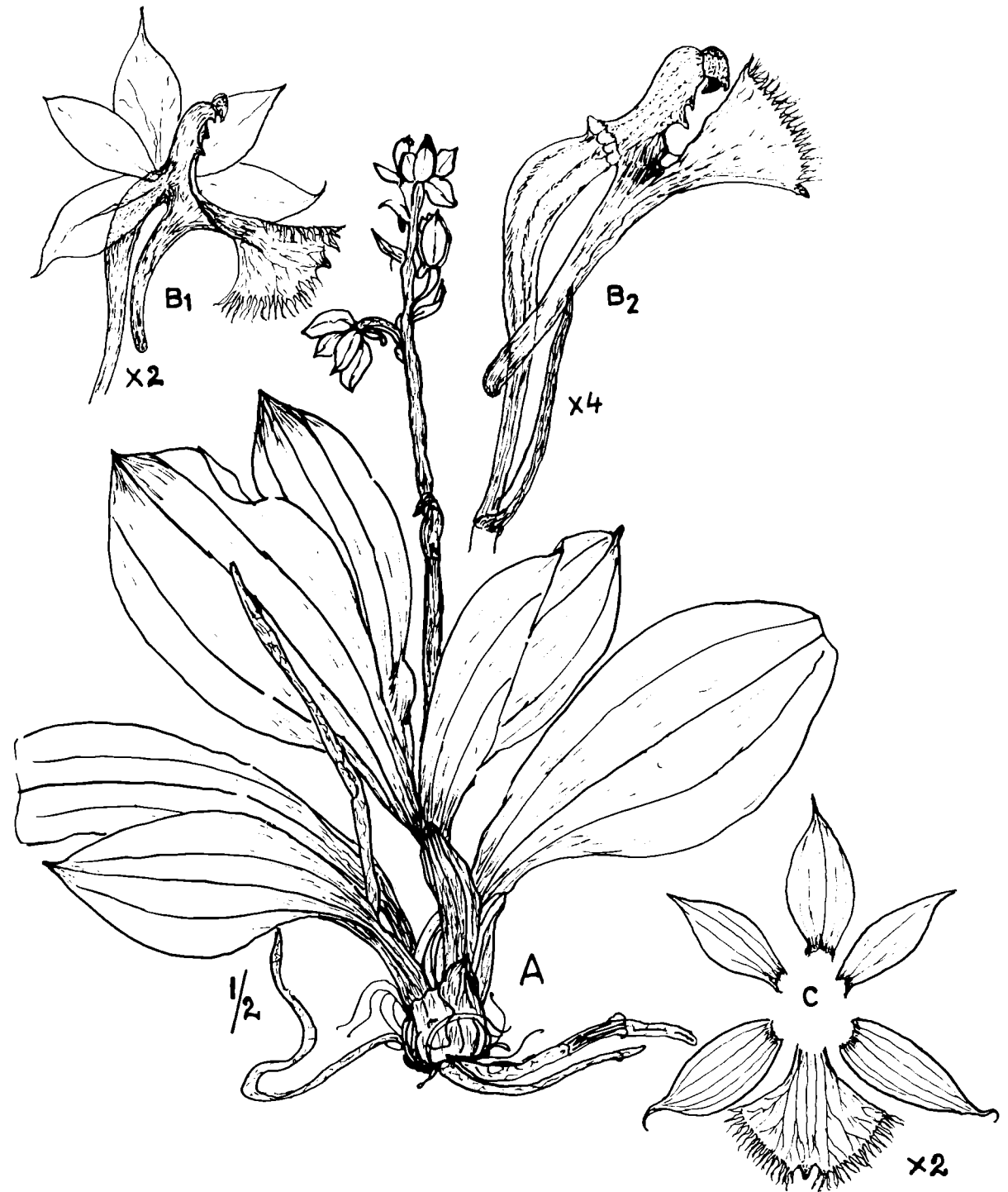
Artificial key to the species of *Calanthe*

- 1 Spur absent —
 - 2 Apical lobe of lip without ridges. Flowers lavender coloured. *puberula*.
 - 2* Apical lobe of lip with 3 prominent ridges. Petals and sepals green, lip orange red. *tricarinata*.
- 1* Spur present —
 - 3 Spur small (1-2 mm.) —
 - 4 Flowers Large (c 2.5 cm. in diam.) —
 - 5 Lip 3 lobed, attached to the column for half its length. *brevicornu*.
 - 5* Lip trovel shaped. *trulliformis*.
 - 4* Flowers small c 1.3 cm. in diam.; lip with lateral lobes, attached for the whole length to column. *mannii*.
 - 3* Spur long (1.5-2.5 cm.) —
 - 6 Lip with lateral lobes —
 - 7 Lateral lobes spreading, not incumbent on the apical lobe. *plantaginea*.
 - 7* Lateral lobes incumbent on the apical lobe by the tips only. *chloraleuca*.
 - 6* Lip without lateral lobes, edges deeply incised-pectinate. *alpina*.

Plate 190

***Calanthe alpina* Hk. f. ex Lindl.** Fol. Orchid, *Calanthe*. 5, 1854; Hk. f. 5; 850, 1890; K. & P. 170, t. 229, 1898; H. et al. 34, 1978.

Pseudostem very short, pseudobulbs subcylindric; leaves unequal, lower sheath-like, elliptic-lanceolate or oblanceolate, blade 10-20 cm. by 3.5-5 cm. sheathing into an indistinct petiole, acuminate. Scape arising amongst the leaves, stout, 25-45 cm. long, racemes 4-6 flowered; floral bracts lanceolate, 1.3-1.7 cm. long, shorter than the ovary. Flowers 2.8 cm. in diam. yellowish green; sepals equal, ovate-oblong, 1.5 cm. long, concave, apiculate; petals elliptic-lanceolate, 1.3 cm. long, subconnivent with the dorsal sepal. Lip semi-orbicular, pinkish with red veins, c 1 cm. long, edges deeply inciso-fimbriate, joined to



the column about the middle; spur 1.5 cm. long, stout and incurved. Column short, c 5 mm. long, broadly winged, margin toothed. Anther with a small lip.

Flowering time - June-July.

Altitudinal range - 2700-2750 m.

Distributional pattern - east & central Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. n = 20 (Mehra & Viji, Taxon, 19:106, 1970).

Plate 191

Calanthe brevicorum Lindl. Gen. Sp. Orchid Pl. 251, 1833; Hk. f. 5:848, 1890; K. & P. 168, t. 227, 1898; T. 2:179, 1971; H. et al. 34, 1978.

Pseudostem stout with wide sheaths, pseudobulbs small; leaves usually 3, subequal, oblong-lanceolate or oblong-elliptic, blade 20-26 cm. by 5-56 cm., shortly acuminate, tapering to the wide sheathed base, subsessile. Scape 40-50 cm. long, arising amongst the leaves, peduncle with few scattered bracts, 1.5 cm. long; laxly flowered raceme; floral bracts narrowly lanceolate 1.1 cm. long, about half as long as the ovary. Flowers dull purple, c 2.5 cm. in diam.; sepals equal, oblong-lanceolate, c 1.4 cm. long, acute, spreading puberulous on the outside; petals shorter than the sepals, 1.1 cm. long, lanceolate. Lip 3 lobed, 9 mm. long, side lobes subfalcate, obtuse, mid lobe transversely oblong or subobovate, emarginate, apiculate, margin irregularly toothed, disk with 3 tubercled fleshy lamellae from base to near the apex where the height increases; spur short, c 1.5 mm. long, straight. Column very short c 4 mm. long, broadly winged. Anther beaked.

Flowering time - May.

Altitudinal range - \pm 2440 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. n = 20 (Mehra & Viji, Taxon, 19:106, 1970).

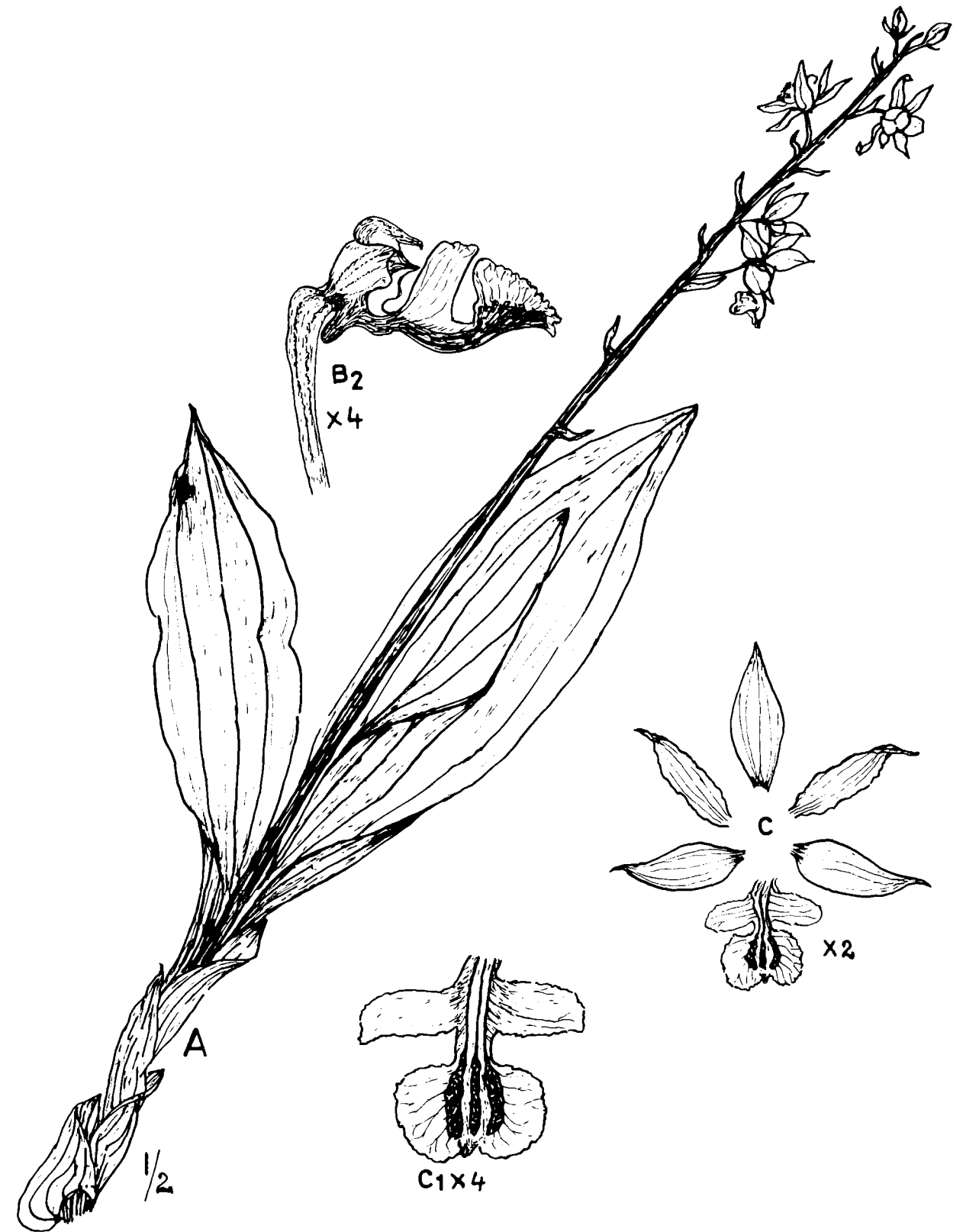


Plate 192

Calanthe chloroleuca Lindl. Fol. Orchid Calanthe, 10, 1854; Hk. f. 5:852, 1890 et 5(1):31, t.45, 1895; T.428, 1966; B. & T. 69:284, 1972.

Pseudobulbs ovoid on a stout rhizome. Leaves 2-3, elliptic-lanceolate, blade 30-34 cm. by 7-8.5 cm., gradually tapering to a long petiole, 11-18 cm., sheathing. Scape from amongst the young leaves, longer than the leaves, peduncle with 1 or 2 sheaths, laxly few flowered; floral bracts 7-10 mm. long, much shorter than the ovary. Flowers yellowish green, lip white with an elongated yellow patch, c 4 cm. in diam; sepals subequal, 1.9 cm. long, dorsal sepal oblong, lateral ovate-lanceolate; petals oblanceolate, 1.6 cm. long. Lip broadly ovate in general outline, 1.4 cm. long, 3 lobed, side lobes broadly oblong, divergent, apical lobe broad or subreniform, divided into 2 broad rounded lobules, minutely erose; spur stout, 2 cm. long, longer than the ovary, slightly curved, cylindric, 2 calli at the mouth of the spur. Column short, 4 mm. long, broad, apiculate at the apex.

Flowering time - April-May.

Altitudinal range - 2135-2440 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. n = 20 (Mehra & Sehgal, Taxon, 24:512, 1975).

Remarks - King & Pantling mention of the spur as much shorter than the ovary but Hooker gives it as longer than the ovary. Our observations agree with Hooker.



Plate 193

Calanthe mannii Hk. f. in Fl. Brit. Ind. 5:850, 1890; K. & P. 167, t. 225, 1898; T. 2:180, 1971 et 3:137, 1975; H. et al. 34, 1978.

Pseudostem about 7.0 cm. long, pseudobulb small with thick roots. Leaves lowermost sheath-like, 2-3, oblanceolate, blade 18-25 cm. by 4-5 cm., tapering gradually downwards. Scape amongst the leaves, 25-35 cm. long, pubescent, laxly flowered from about the middle; floral bracts minute, 2.5 mm. long, shorter than the ovary. Flowers dull brown, 1.3 cm. in diam., sepals equal, ovate-oblong, 7 mm. long, connivent, acute, concave, pubescent externally; petals oblong, 6 mm. long, acute. Lip 3 lobed, 3.5 mm. long, basal lobes large, broad, erect, mid lobe deflexed, subreniform, retuse with a short tuberculate apex, margin slightly wavy, disk with 3 tubercled ridges from the base to the middle of the mid lobe; spur conical, c 2 mm. long, curved forwards. Column 3 mm. long, slightly broadened at the apex.

Flowering time - May to June.

Altitudinal range - 2285 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No. $n = 20$ (Mehra & Sehgal, Taxon, 23:802, 1976).

$2n = 40$ (Vij et al. ibid. 25:634, 1976; Mehra & Kashyap, ibid. 28:407, 1979).

Remarks - The three lamellae are of equal thickness and of equal length in all our specimens, while Hooker (loc. cit.) and King & Pantl. (loc. cit.) mention that the middle one is shorter.



Plate 194

Calanthe plantaginea Lindl. Gen. Sp. Orchid Pl. 250, 1833; Hk. f. 5:853, 1890; D.122, t.105, 1906; T. 2:180, 1971; Herk. 79:226, f.295, 1971; H. et al. 34, 1978.

Pseudostem 10-24 cm. long, enclosed by long tubular sheaths, pseudobulbs small. Leaves 2-3, all more or less equal in size, blade 18-30 cm. by 4-9 cm. oblanceolate or elliptic-lanceolate, tapering into a long petiole, c 8-15 cm. long. Scpae arising laterally and covered loosely by 3-5 small sheathing leaves, peduncle stout, 35-45 cm. long, many flowered racemes; floral bracts small, 5-7 mm. long such shorter than the ovary. Flowers drooping, c 3 cm. in diam., sweet smelling, purplish; sepal equal, oblanceolate, 1.5 cm. long, glabrous; petals lanceolate, smaller than the sepals, 1.3 cm. long, acute. Lip smaller than the sepals, 8 mm. long, 3 lobed, side lobes rhomboid-ovovate or cuneate-obovate, mid lobe variable, cuneately reniform or obovate, apiculate, disk with three slender lamellae extending from base to near the apex; spur slender, 2.1-2.6 cm. long, equalling or longer than the ovary. Column 6 mm. long.

Flowering time - March-April.

Altitudinal range - 1525-2135 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 9 gatherings.

Specimens studied - 9.

Chr. No. $2n = 40$ (Arora, Taxon, 17:199, 1968).

Remarks - The lip shows much variations and this is also reflected on the side lobes, mid lobe as well as on the lamellae.



Plate 195

Calanthe puberula Lindl. Gen. Sp. Orchid Pl. 252, 1833; Hk. f. 5:848, 1890; K. & P. 166, t. 224, 1898; D. 119, 1906; T. 3:139; H. et al. 34, 1978.

Pseudostem 4-6 cm. long, pseudobulb small. Leaves lower ones more or less sheath-like, 3-5 unequal, elliptic or elliptic-oblong, blade 10-17 cm. by 3.5-5 cm. narrowed to a loose sheathing base, acuminate. Scape arising amongst the leaves, 25-30 cm. long, peduncle with several scattered bracts c 1.1 cm. long, laxly flowered racemes; floral bracts lanceolate 1.4-1.9 cm. long, as long as the ovary or shorter. Flowers violet tint or purplish, 2.5-3.0 cm. in diam., puberulous externally; sepals subequal, ovate-lanceolate, acuminate, spreading, dorsal sepal 1.4 cm. long and narrower than the laterals, laterals 1.6 cm. long; petals linear, 1.1 cm. long, falcate, acute, spreading. Lip shortly clawed, 1.1 cm. long, broadly oblong, falcate, 3 lobed, side lobes near the base, falcately oblong, round, mid lobe ovate-orbicular, long apiculate apex, coarsely erose, connected to the basal side lobes by a narrow straight isthmus, disk with 3 calli between the basal lobes, no spur. Column c 6 mm. long, short and thick with 2 pairs of teeth.

Flowering time - July to August.

Altitudinal range - 1830-2290 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 4 gatherings.

Specimens studied - 4.

Chr. No. $n = 20$ (Mehra & Sehgal, Taxon, 25, 646, 1976).

Remarks - In the published literature 2 calli are mentioned but we find 3 calli in all our specimens.



Plate 196

Calanthe tricarinata Lindl. Gen. Sp. Orchid Pl. 252, 1833; Hk. f. 5:847, 1890 et 6:195, 1890; K. & P. 166, t. 223, 1898; D. 119, 1906; Kit. 99:1955; Dept. Med. Pl. 2:131, 1969; T. 2:180, t. a, b, 1971 et 3:139, 1975; Herk. 79:226, f. 296, 1971; H. et al. 34, 1978.

Pseudostem 7-19 cm., pseudobulbs small 2-2.5 cm. long. Leaves lower ones sheathing and small, upper 2 to 3 oblanceolate, blade 17-35 cm. by 5-8.5 cm. narrowed to the sessile base or a distinct petiole present, 11-14 cm. long. Scape developing and arising amongst the sheathed leaves, 25-60 cm. long, peduncle stout, laxly flowered racemes; floral bracts 4-8 mm. long, shorter than the ovary. Flowers yellowish green, 2.5-3.5 cm. in diam.; sepals ovato-lanceolate, 2 cm. long, acuminate, green, spreading; petals lanceolate, 1.6 cm. long, acuminate. Lip broadly oblong, 3 lobed, decurved, side lobes near the base, erect, broad and rounded, mid lobe oblong, obtuse, margin much undulate, a didymous callus at the base between the side lobes and disk with 3 prominent crenulate ridges in the mid lobe; spur absent. Column short, thick, c 5 mm. long, hispid on the anterior surface.

Flowering time - May-July.

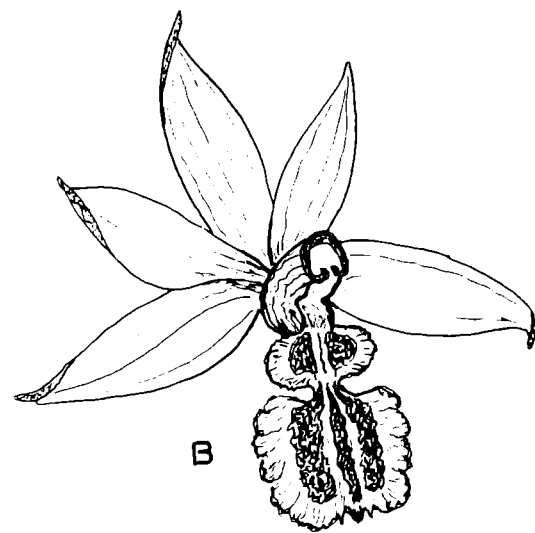
Altitudinal range - 2285-2900 m.

Distributional pattern - central and west Nepal.

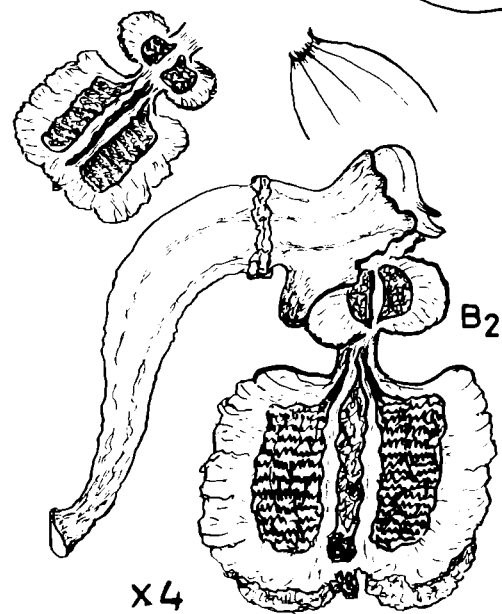
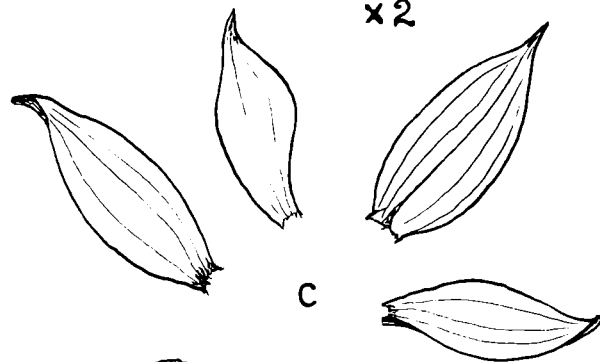
Specimens in Herbarium - 12 gatherings.

Specimens studied - 12.

Chr. No. n = 20 (Mehra & Kashyap, Taxon, 28:407, 1979).



x2



x4

Plate 197

Calanthe trulliformis King & Pantl. J. Asiat. Soc. Bengal, 64:337, t. 2, 1895 et 8:168, t. 226, 1898; T. 3:139, t. 7e, 1975; H. et al. 34, 1978.

Pseudostem c 4 cm. long, pseudobulbs oblong. Leaves lower ones sheathlike, upper 3-5, blade linear-lanceolate, 18-30 cm. by 1.5-2.5 cm., sessile, acute. Scape arising amongst the leaves, 35-45 cm., peduncle stout, laxly flowered racemes; floral bracts 2.1-3.2 cm. long, linear-lanceolate, equalling or exceeding the ovary. Flowers brownish, c 2.8 cm. in diam., sepals subequal, dorsal ovato-lanceolate, 1.5 cm. long, acuminate, laterals lanceolate, 1.6 cm. long, falcate; petals linear-lanceolate, 1.3 cm. long, acuminate. Lip trowel-shaped 1.2 cm. long, white, short thick claw, base with a pink mark, entire, irregularly crenate-dentate, acute, two lamellae extending from base to near about the apex, converging and gradually narrowing; spur short, c 1.0 mm. long, cylindric. Column short, c 4 mm. slightly expanded at the apex.

Flowering time - July to August.

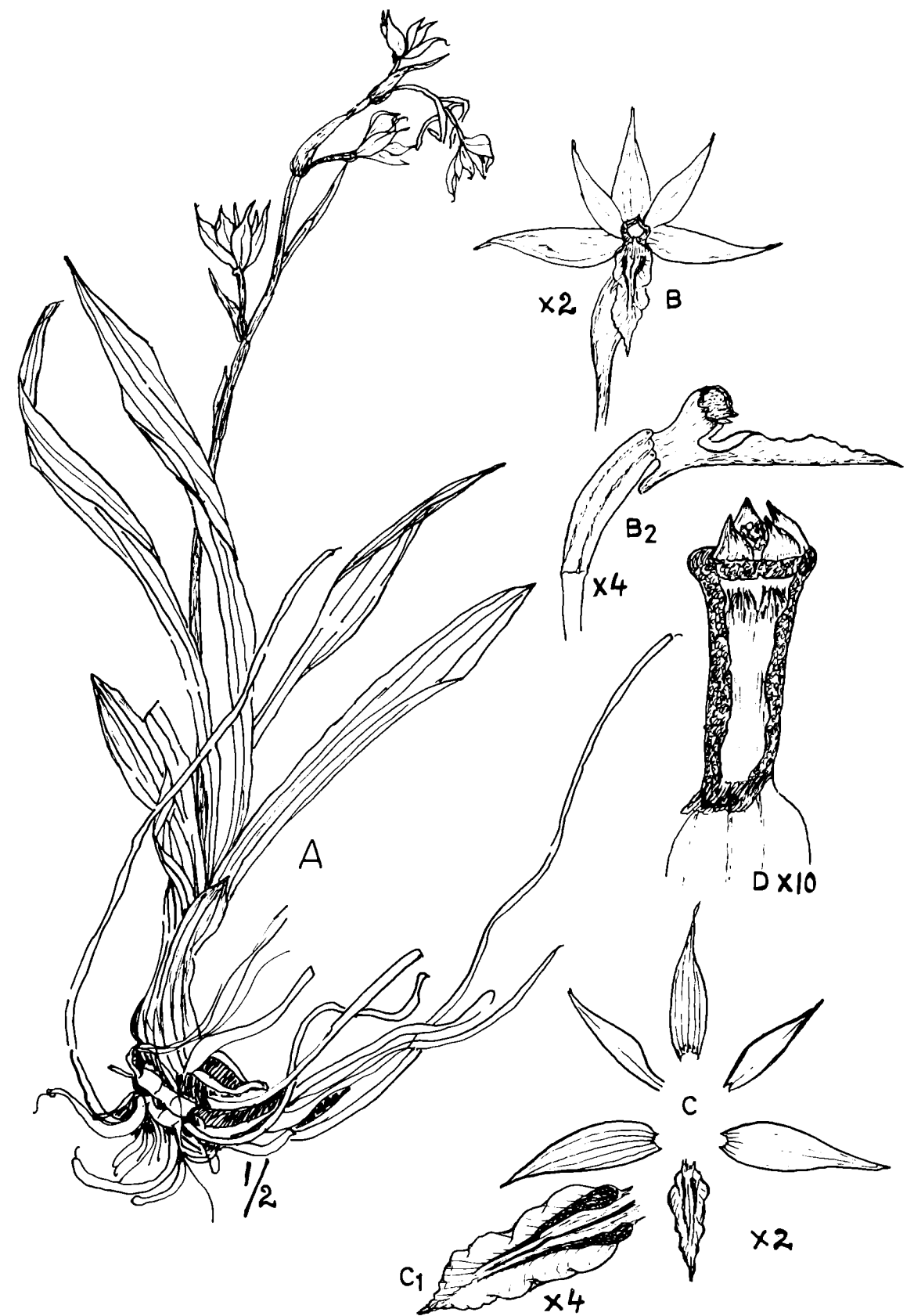
Altitudinal range - 2590 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:107, 1970).



CORALLORHIZA R. Br. (Corallorhizaceae). Descriptive of the often brittle, coral-like texture of the rhizome or of their coral-like appearance. Leafless herbs with coralloid rhizome. Flowers small, whitish in a terminal spike.

Corallorhiza trifida Chatelain.

Rootless parasite with a flattened succulent rhizome. Inflorescence slender, few flowered; flowers small c 6 mm. long; sepals ovate-lanceolate, lateral pair deflexed; petals incurved; lip deflexed, 3 lobed, midlobe retuse, side lobes narrow.

CREMASTRA Lindl. (Cryptoideae). The generic name refers to the conspicuous pedicellate ovary. These are terrestrial orchids which are small and insignificant.

Cremastra appendiculata (D. Don) Makino.

Terrestrial with a bulbous stem; leaves usually two, long petioled, elliptic. Inflorescence a raceme of secund flowers; flowers pink or purplish, pendulous; sepals and petals connivent in a tube below; lip with a saccate base and lip dilated and 3-lobed, lateral lobes narrowly oblong. Column 3-lobed at the apex.

CYMBIDIUM Sw. (Cymbidieae). The lip is boat-shaped thus the genus has been named as such. The genus contains highly variable plants which are variously terrestrial, lithophytic or epiphytic in habit. The pseudobulbs are covered by sheathing leaf bases. The racemes are suberect or drooping, bearing medium sized to very large flowers. Floral shape is diversified, labellum is 3 lobed, lateral lobes convolute and embracing the column; central part of the labellum is keeled.

Cymbidium eburnum Lindl.

Pseudostem short and stout; leaves linear, apex not notched. Inflorescence much shorter than the leaves, suberect, 2-3 flowered; floral bracts acuminate. Flowers white, fragrant, c 7.5-10 cm. across; sepals and petals spreading; lip oblong-obovate, side lobes narrow, terminal lobe slightly deflexed, edges undulate-crenate; 3 broad pubescent yellow ridges.

Cymbidium pendulum (Roxb.) Sw.

Epiphyte with a stout pseudo-stem; leaves linear-oblong, apex not notched, expanded at the base. Inflorescence 25 to 30 cm. long, decurved from the base; floral bracts small, triangular; flowers numerous but not crowded, dark purple brown. Sepals and petals equal; lip dilated and faintly saccate at the base, side lobes narrow ovate, apical lobe oblong, emarginate and much decurved, two parallel continuous lamellae divergent at the base between the side lobes.

Key to the species of *Cymbidium*

- 1 Terrestrial —
 - 2 Margin of apical lobe of lip entire or nearly so —
 - 3 Side lobes of lip distinct —
 - 4 Leaves linear, their bases forming a pseudostem; lateral lobes of lip broad, rounded; apical lobe faintly crenate. *cyprifolium*.
 - 4* Leaves elliptic, borne on a stem; lateral lobes of lip long and narrow; apical lobe bent. *lancefolium*.
 - 3* Side lobes of lip obscure, apical lobe decurved at the apex. Leaves oblong-ob lanceolate. *devonianum*.
 - 2* Margin of apical lobe not entire but hairy —
 - 5 Margin of apical lobe only finely hairy. *iridioides*.
 - 5* Margin of apical lobe and side lobes undulate and hairy. *hookerianum*.
- 1* Epiphytic —
 - 6 Flowers numerous; peduncle covered over by lanceolate sheaths —
 - 7 Racemes densely flowered. Lamellae 2, united at the apex into a knob-like callus. *longifolium*.
 - 7* Racemes many flowered but not dense. Lamellae extending from base to isthmus and 2 lines on the apical lobe. *erythraeum*.
 - 6* Flowers many but far apart; peduncle with scarious sheaths. Lamellae broken and disconnected in the apical lobe; apical lobe entire, lateral lobes narrow and pointing outwards. *aloifolium*.

Plate 198

Cymbidium aloifolium (L.) Swartz, in Nova Acta Reg. Soc. Sci. Upsal, 6:73, 1799 (s. Lat.); Hk. f. 6:10, 1890 p.p.; K. & P. 189, t. 252, 1898; H. et al. 37, 1978.

= *Epidendrum aloifolium* L. Sp. Pl. 953, 1753.

= *Cymbidium simulans* Rolfe, : T. 431, 1966; B. & T. 69:288, 1972.

Pseudostem short; leaves linear-oblong 30-60 cm. by 2-2.6 cm., curved, fleshy, obliquely notched at the apex. Inflorescence arising from the base, usually longer than the leaves but sometimes equalling or shorter, peduncle with several tubular scarious sheaths near the base, many flowered decurved racemes; floral bracts minute, ovate, 2-3 mm. long, much shorter than the ovary. Flowers yellow with brown stripes and brownish lip, c 4 cm. in diam.; sepals equal, oblong or oblanceolate, 2.1 cm. long, lateral pair slightly falcate; petals as long as the sepals ovate-oblanceolate, slightly broader than the sepals. Lip 2.0 cm. long, nearly equal to the lateral sepals, oblong, 3 lobed, lateral lobes oblong, narrow, pointing outwards, apical lobe ovate-oblong, decurved, acute with two broken lamellae disconnected in the middle and curved near the base. Column curved, 1.1 cm. long, slightly thickened at the apex.

Flowering time - May-June.

Altitudinal range - 450-920 m.

Distributional pattern - east, central and west Nepal.

Specimens in Herbarium - 10 gatherings.

Specimens studied - 5.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:108, 1970; Sarkar et al., ibid. 25:648, 1976).

2n = 40 (Sarkar et al., ibid. 25:648, 1976; Singh, ibid. 30:704, 1981).

Remarks - This species is easily distinguished by the two broken lamellae which are curved near the base of the lip. King & Pantling give the characters of the shape of the sepals and petals besides the shape of the lateral lobes of the lip to distinguish this species from *C. pendulum*.

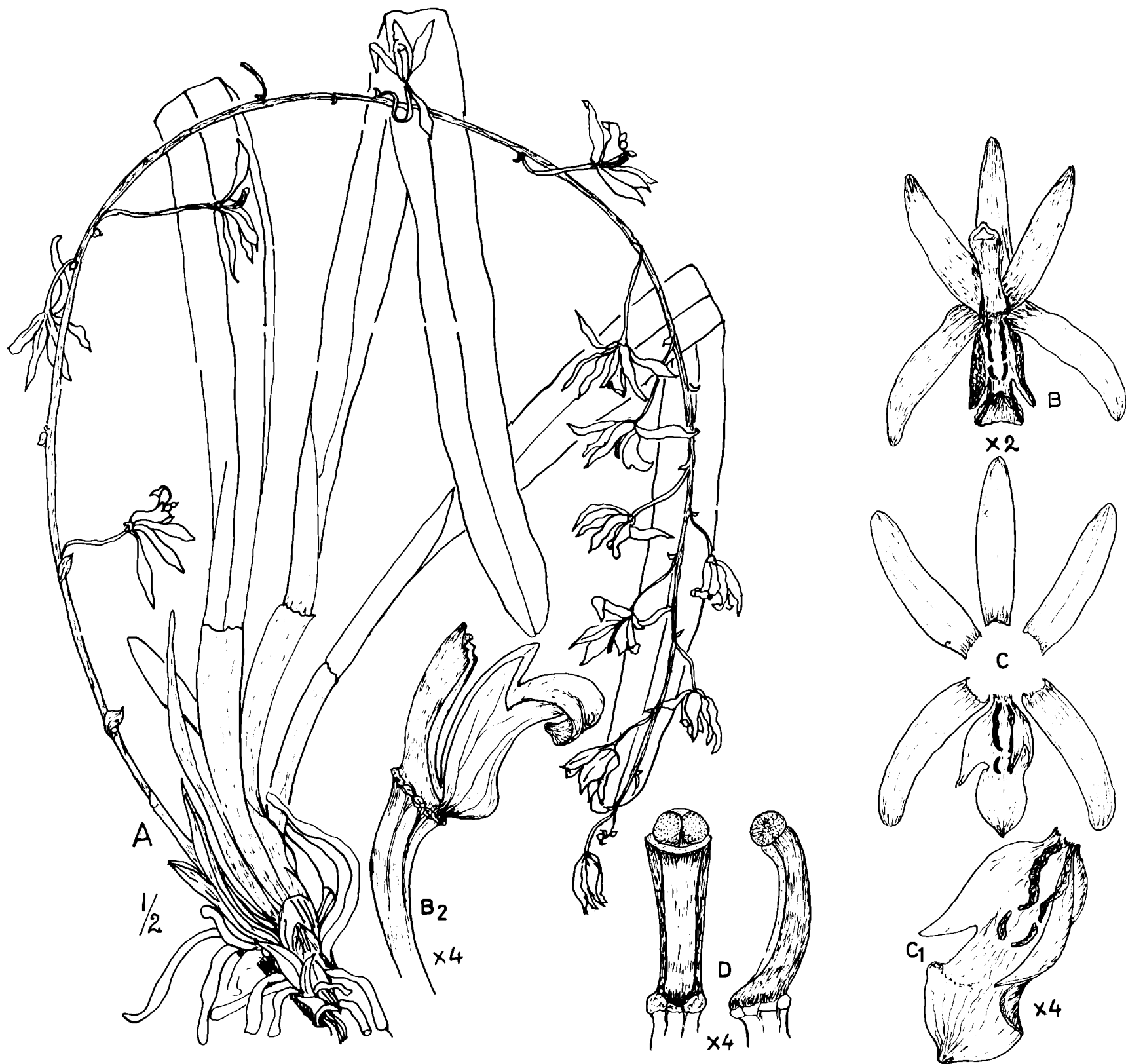


Plate 199

Cymbidium cyperifolium Lindl. Gen. Sp. Orchid Pl. 163, 1833; Hk. f. 6:13, 1890; K. & P. 186, t. 248, 1898; D. 135, 1906; B. & T. 69:286, 1972.

Terrestrial, pseudostem thin and short; leaves linear, 25-70 cm. by 5-8 mm., acuminate, sheathing, base, lowermost 2 or 3 sheath-like. Inflorescence arising from the base of the pseudostem, erect, c 40-45 cm. tall, peduncle stout, covered by a number of long acuminate sheaths, 5-7 flowered raceme; floral bracts lanceolate, 2.5-3.5 cm., longer than the ovary, acuminate. Flowers greenish-yellow, fragrant, 5.5 cm. in diam.; sepals subequal, lanceolate, acute, spreading, dorsal sepal 4.3 cm. long, laterals 3.5 cm. long; petals shorter than the sepals, 3 cm., slightly broader. Lip c 2 cm. when spread out, 3 lobed, lateral lobes long, narrow, erect and blunt, apical lobe ovate or oblong-ovate, deflexed, faintly crenulate, acute, disc with two smooth lamellae between the side lobes. Column stout, 1.3 cm. long, more or less straight.

Flowering time - March.

Altitudinal range - ± 1675-2440 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. 2n = 42 (Mehra & Sehgal, Taxon, 27:389, 1978).

also 2n = 40 (Biswas, ibid. 29:169, 1980).

Remarks - The flowers in our specimens are bigger in size than what is given by King & Pantling.



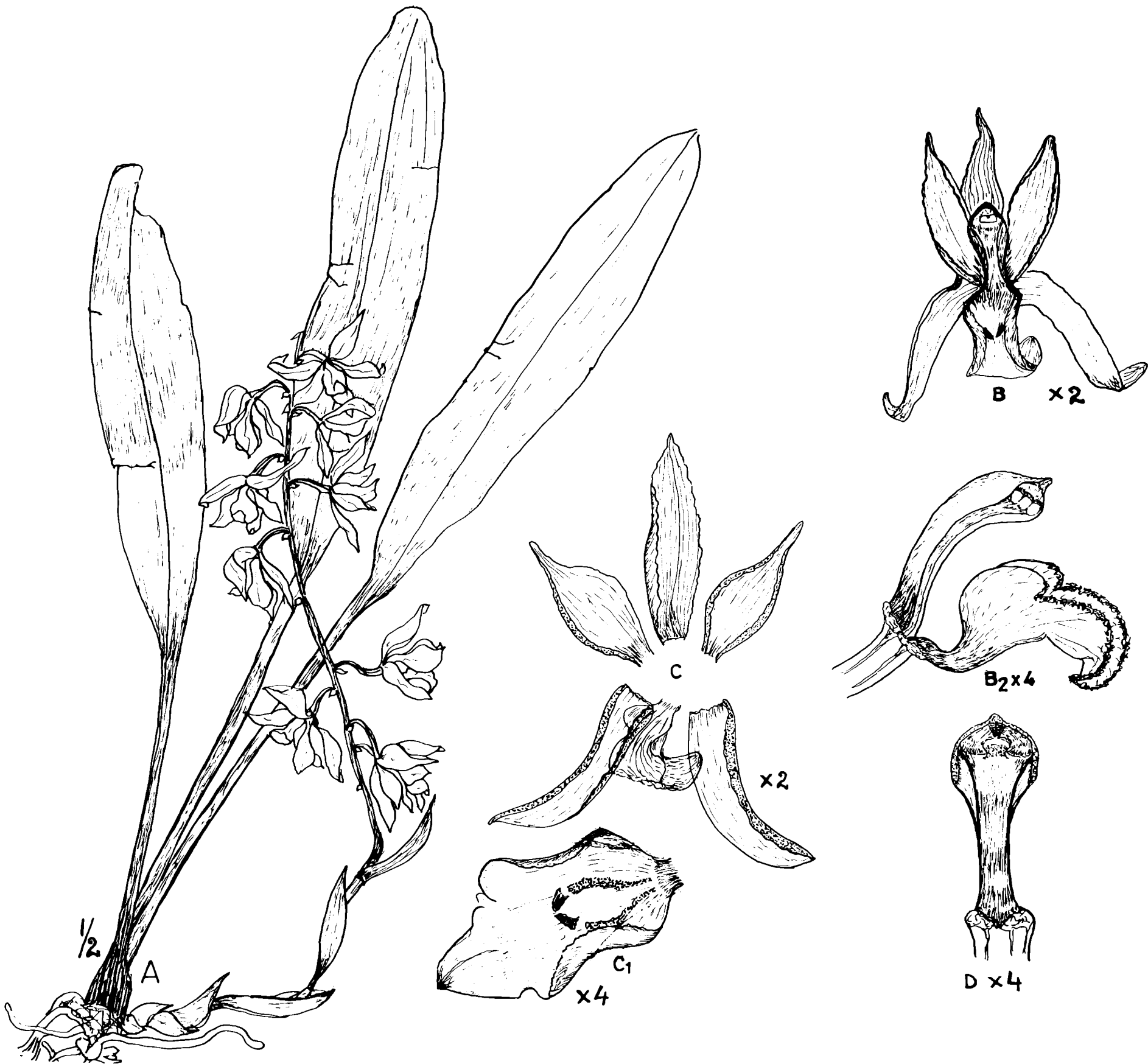


Plate 201

Cymbidium erythraeum Lindl. in J. Proc. Linn. Soc. Bot. 3:30, 1859; H. et al. 37, 1978.

= *C. longifolium* auct. non D. Don : Hk. f. 6:13, 1890; K. & P. 191, t. 254, 1898; T. 430, 1966 et 2:183, 1971; Dept. Med. Pl. 2:132, 1969; B. & T. 69:287, 1972.

Pseudostem short, covered by persistent leaf bases; leaves linear, 55-85 cm. by 7-11 mm., channelled below dilated at the base. Inflorescence very stout, 35-50 cm. long, suberect in the lower but decurved in the floral region, peduncle covered by 5-7 lanceolate sheaths which are larger upwards, many flowered raceme; floral bracts minute, 4 mm. long, much shorter than the ovary. Flowers green with brownish purple stripes, 6-7.5 cm. in diam.; sepals subequal, oblong-lanceolate, dorsal sepal 4.9 cm. long, lateral pair 4.5 cm. long, slightly narrower and spreading; petals equalling the dorsal sepal, falcate and spreading. Lip oblong in general outline, 4 cm. long with a short claw, side lobes long, narrow, directed forwards, apical lobe ovate or orbicular, apex acute and deflexed, thinly pubescent, slightly undulate margin, yellowish and spotted red, disk with two lamellae extending from base to the isthmus and two lines on the apical lobe. Column slightly curved, 3.5 cm. long, saccate at base.

Flowering time - September to October.

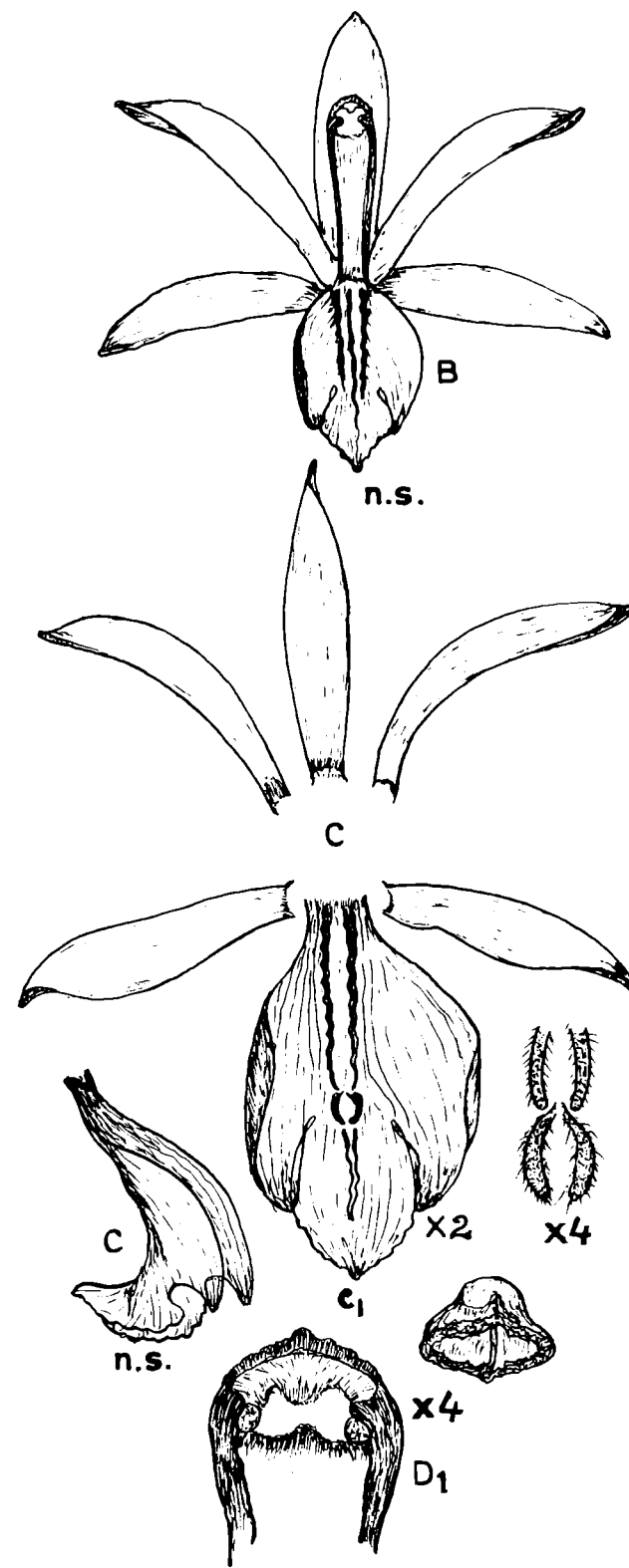
Altitudinal range - 1525-2445 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 7 gatherings.

Specimens studied - 7.

Chr. No.



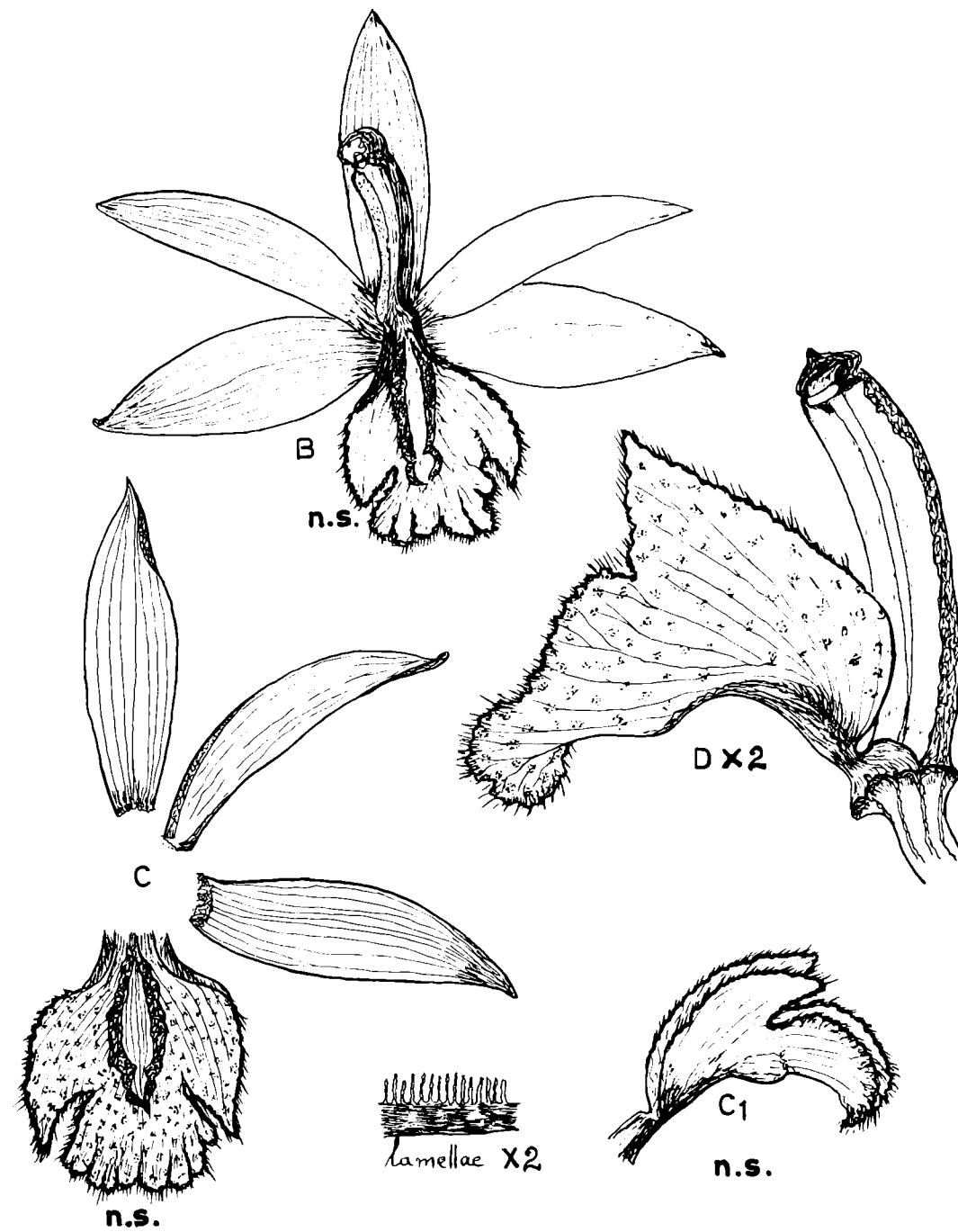


Plate 203

Cymbidium iridioides D. Don, Prodr. Fl. Nep. 36, 1825; Hk. f. 6:14, 1890; H. et al. 38, 1978.

= *C. giganteum* Wall. ex Lindl. : Hk. f. 6:12, 1890; K. & P. 191, t. 255, 1898; B. & T. 69:286, 1972.

Pseudostem very short, leaves linear-lanceolate, 35-60 cm. by 2.5-3 cm. narrowed towards the base and then expanded, entire, acute. Inflorescence shorter or longer than the leaves, decurved peduncle stout and covered by numerous sheaths, which gradually increase in length upwards, laxly many flowered raceme; floral bracts minute 2.5-4 mm. long. Flowers-sepals and petals yellowish with purple stripes, lip also yellowish with purple stripes on the side lobe but mid lobe with spots, 6-7.5 cm. in diam.; sepals subequal, elliptic-oblong, dorsal sepal 4 cm. long, incurved, acute, lateral sepals 3.7 cm. long, spreading, acute; petals oblong, 4 cm. long, subfalcate. Lip shorter than the sepals, much decurved, 3 lobed, side lobes large, erose, apex blunt and directed forwards, apical lobe ovate-oblong, deflexed, undulate-crenate, ciliate, upper surface with 3 parallel hairy ridges running from base to near the apex. Column slightly curved, 2.5 cm. long, wing narrow but slightly wider at the base, a nectary sac at the base.

Flowering time - October-November.

Altitudinal range - east and central Nepal.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 4 gatherings.

Specimens studied - 4.

Chr. No. n = 20 (Malla et al. Taxon, 26:265, 1977; Mehra & Sehgal, ibid. 29:348, 1980).

2n = 40 (Vij et al. ibid. 25:634, 1976; Mehra & Kashyap, ibid. 27:226, 1978 all as *C. giganteum*).

Remarks - Because of the similarity of size of the flowers and the sepals and petals having stripes there is a superficial resemblance between *C. iridioides* and *C. erythraeum*. On a closer examination the differences are many and they being — *C. iridioides* — Isthmus of side lobes is about the middle of the lip; undulations of the margin of the apical lobe very clear and the margin of the side lobes is erose and ciliate. There are 2 hairy lamellae and a third in the middle which is short and without hairs.

C. erythraeum — The isthmus of the side lobes is at about 1/3rd from the apex, undulations of the margin of the apical lobe are very few, shallow and far apart, the margin of the side lobes is neither erose nor ciliate. There are 2 lamellae which are parallel to each other and not hairy.

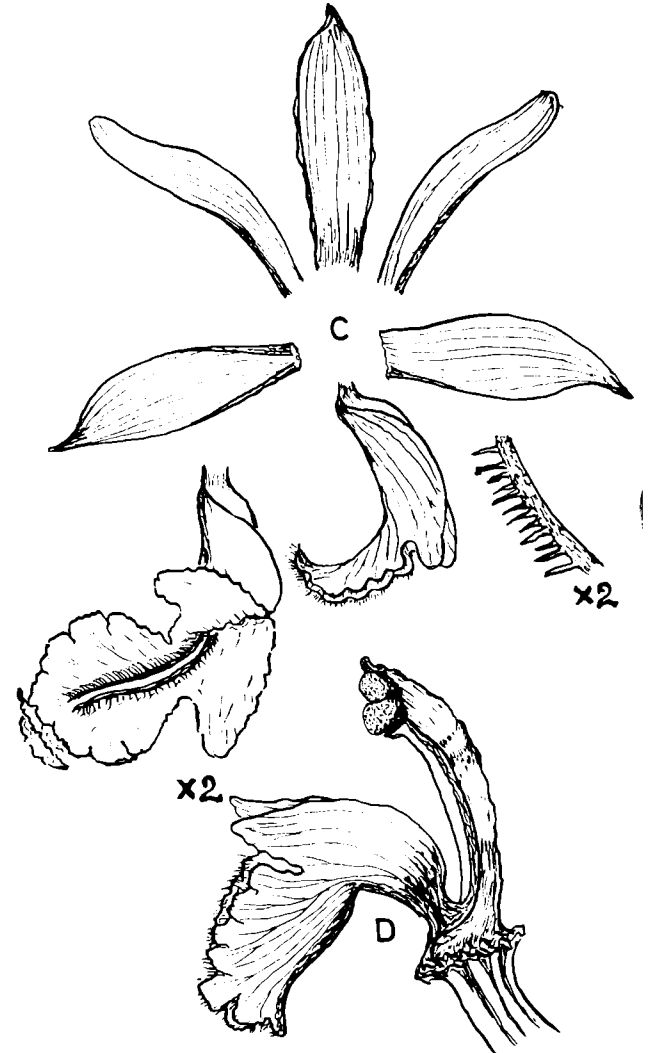
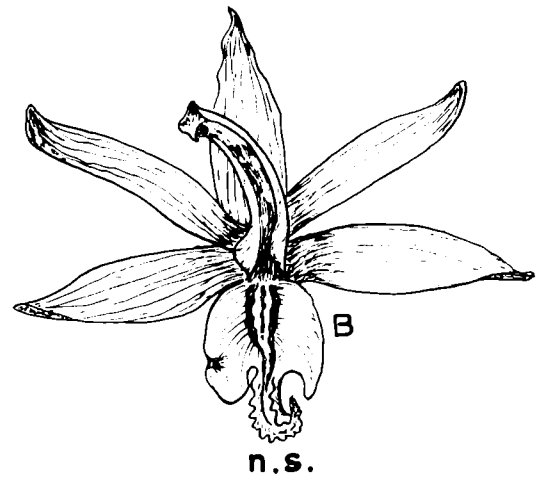


Plate 204

Cymbidium lancifolium Hook. Exot. Fl. 1 : t.51, 1832; Hk. f. 6:9, 1890; K. & P. 185, t. 247, 1898; B. & T. 69:287, t. 5, 1972; H. et al. 38, 1978.

Terrestrial, stem narrow fusiform, covered by many large scarios sheaths and fibers. Leaves 3-4, oblong-ob lanceolate, blade 12-15 cm. by 2.5-3 cm., acute, narrowed to a long petiole, 10-12 cm., sheathing. Inflorescence shorter than the leaves, peduncle with many lax sheaths; laxly 3-4 flowered; floral bracts 1 cm. long, much shorter than the ovary. Flower with sepals and petals greenish yellow, lip white with purple transverse stripes, 3.5-4.5 cm. in diam.; sepals equal, oblanceolate, 2.4 cm. long, acute; petals 2.1 cm. long, oblanceolate. Lip broadly ovate in general outline, 1.8 cm. long, deflexed at the anterior end, 3 lobed, side lobes broad, round, entire, apical lobe ovate, acute, entire, disk with 2 lamellae, narrow at the base but broader towards the apex. Column slightly curved, 1.3 cm. long, with two knoblike projections at the apex.

Flowering time - July.

Altitudinal range - \pm 2290 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. $n = 19$ (Vij et al., Taxon, 25:640, 1976; Mehra & Sehgal, ibid. 25, 646, 1976).

$2n = 38$ (Mehra & Sehgal, ibid. 27:389, 1978).



Plate 205

Cymbidium longifolium D. Don, Prodr. Fl. Nep. 36, 1825; H. et al. 38, 1978.

= *C. elegans* Lindl. : K. & P. 194, t. 259, 1898; T. 430, 1966; Dept. Med. Pl. 2:132, 1969; B. & T. 69:286, 1972.

= *Cyperorchis elegans* (Lindl.) Bl. : Hk. f. 6:14, 1890.

Pseudostem short; leaves linear, 40-65 cm. by 1.3-1.6 cm., acuminate, slightly expanded at the base. Inflorescence as long as the leaves, decurved, peduncle covered by lanceolate convolute sheaths, densely flowered raceme; floral bracts very minute, 6 mm. long much shorter than the ovary. Flowers light yellow, drooping, 1.6 cm. in diam.; sepals subequal, dorsal sepal 3.5 cm., oblong-lanceolate, lateral sepals 3.3 cm. oblong-oblancheolate, slightly concave at the apex; petals 3.5 cm., lanceolate, acute. Lip as long as the petals, 3.5 cm. long, oblong, 3 lobed, side lobes near the apex, incurved, rounded, apical lobe small, obcordate, incurved, undulate, disk with 2 narrow parallel ridges, prominent towards the base and united at the apex into a knob-like callus. Column slender, 2.5 cm. long, apex curved forwards and slightly pubescent at base.

Flowering time - October-November.

Altitudinal range - ± 2135-2440 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. n = 20 (Mehra & Vij, Taxon, 19:108, 1970; Mehra & Sehgal, ibid. 29:348, 1980 all as *Cyperorchis elegans* (Lindl.) Bl.



EULOPHIA R. Br. ex Lindl. (Cypripodiaceae). The name is in reference to the crest on the lip. These are mostly terrestrial, possess relatively prominent somewhat angular pseudobulbs, usually 2 or more apical, leathery or plicate leaves. The inflorescence are basal and bear from few to very many often showy flowers, which usually open successively over a rather long period of time.

Eulophia bicallosa (D. Don) P. F. Hunt & Summerh.

Tubers oblong and lobed; leaves absent at flowering, linear, petiole long. Inflorescence a dense many flowered raceme; floral bracts shorter than the ovary. Flowers resupinate; sepals linear-oblong, undulate margin; petals narrowly elliptic, shorter than the petals; lip longer than the petals, side lobes narrow, apical lobe large, orbicular, upper surface with five ridges above the middle but only two lines below the middle.

Eulophia dabia (D. Don) Hochr.

Tubers irregularly oblong; leaves narrowly elliptic, petiole long, arising from the apex of a slender pseudostem. Inflorescence appearing much before the leaves develop, laxly many flowered; floral bracts linear exceeding the ovaries. Flowers drooping, pink; sepals linear-lanceolate, striped with pink; petals oblanceolate, spreading; lip equalling the sepals, elliptic-ovate, side lobes short and incurved, apical lobe orbicular deeper in colour than the side lobes, 3 median lamellae ending in a fimbriate patch on the apical lobe.

Eulophia graminea Lindl.

Pseudobulbs epigeal; leaves grass-like, linear, sheathing at the base. Inflorescence arising from the side of the pseudobulb branched, exceeding the leaves; floral bracts shorter than the ovary. Flowers distant, c 1.8 cm. across; sepals and petals spreading, venation netted; lip oblong-oblanceolate, equalling the sepals and petals, sidelobes small and narrow, apical lobe rounded, 5 ridges extending from base to apex, edges fimbriate on the apical lobe; spur short and slightly broadened.

Eulophia nuda Lindl.

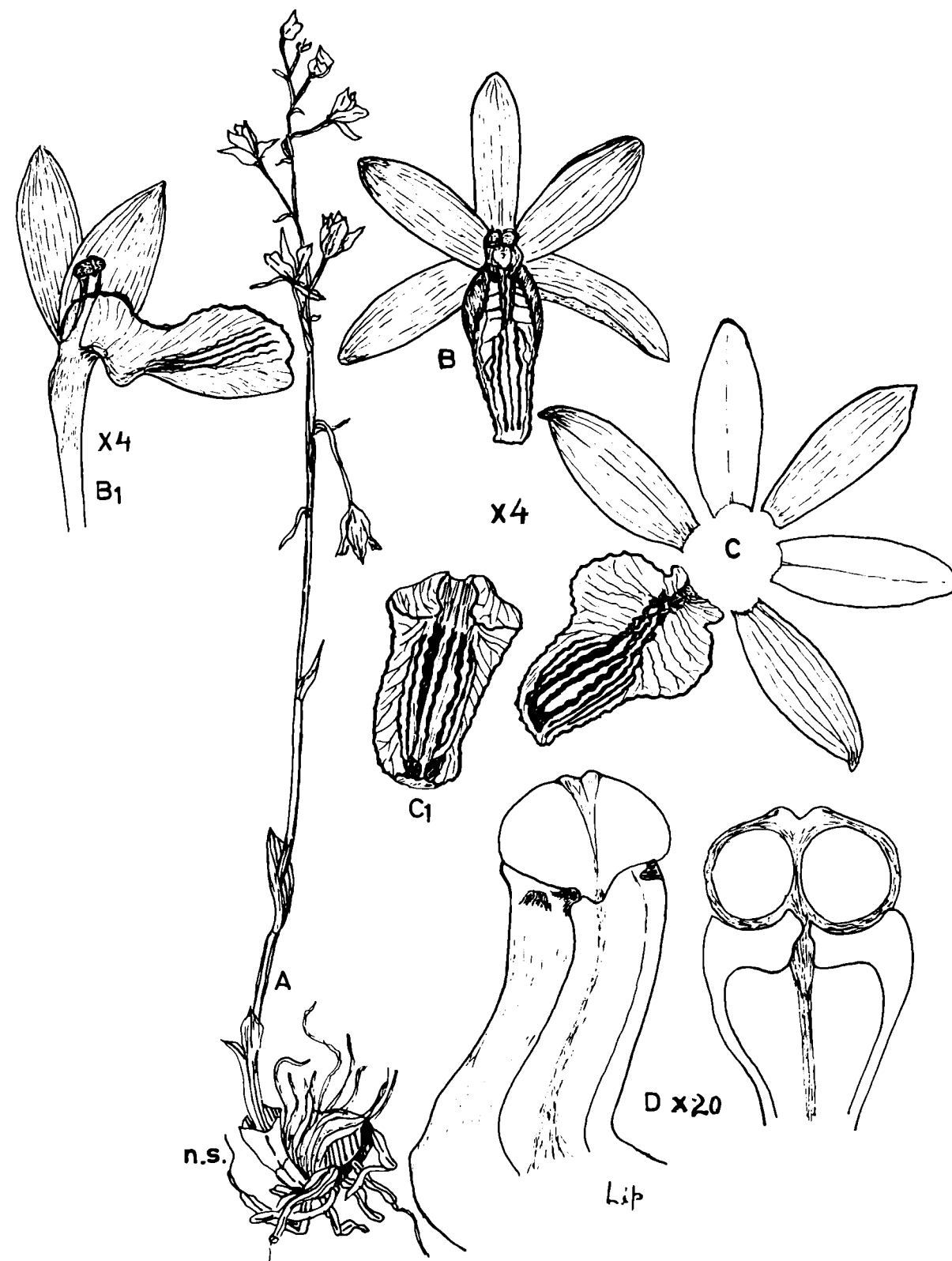
Tubers large and smooth. Leaves arising from the side of the tubers forming, by their sheaths, a short pseudostem, elliptic-lanceolate. Inflorescence arising from the base of the pseudostem, laxly few flowered; floral bracts half the length of the stalked ovary. Flowers usually pale green and variegated; lateral sepals falcate; petals shorter than the sepals; lip as long as the sepals, basal lobes obscure, apical lobe oblong having on the surface many vertical line which disappear towards the apex; spur short.

Artificial key to the species of *Eulophia*

- 1 Column without or with a slightly produced foot —
 - 2 Leaves appearing with the flowers —
 - 3 Lip without spur, just saccate; floral bracts much shorter than the ovary. *explanata*.
 - 3* Lip with a short geniculate spur; floral bracts equalling or exceeding the flowers—
 - 4 Stem stout; leaves large c 70-80 cm. long. Sepals erect, ovate oblong. *mackinnoni*.
 - 4* Stem slender; leaves small c 15-20 cm. long. Sepals spreading linear-lanceolate. *herbacea*
 - 2* Leaves appearing after the flowers; flowers in dense racemes; terminal lobe of lip yellow. *hormusjii*.
- 1* Column with a distinct foot —
 - 5 Leaves appearing after the flowers. Lip with a short blunt sac at the base and 3 lamellate. *flava*.
 - 5* Leaves appearing with the flowers. Lip with a short curved spur and many lamellate. *obtusata*.

Plate 206

Eulophia explanata Lindl. Gen. Sp. Orchid Pl. 180, 1833; Hk. f. 6:3 & 195, 1890; D.125, t. 108, 1906; H. et al. 43, 1978.



Height of the plant 25 cm., pseudobulb ovoid, 5 cm. long, pseudostem c 5 cm. long; leaves too young at the time of flowering (when present-lanceolate, c 30 cm. long, and 10 cm. broad). Flowering scape 25 cm. arising from the side of the pseudobulb, two loose sheaths at the base and some bracts on the peduncle, 2-1.5 cm. long, laxly many flowered; floral bracts lanceolate, 8-5 mm. long, shorter than the ovary. Flowers yellowish green with purplish streaks, c 2 cm. in diam.; sepals spatulate-lanceolate, 1 cm. long, 3 mm. broad; petals oblong, equalling the sepals in length but broader and rounded. Lip about equalling the sepals and petals, a short conical sac on the ventral surface along the middle near the base, 3 lobed, subpanduriform when flattened, adnate to the base of lateral sepals, basal lobes erect, rounded, undulate, slightly incurved, mid lobe oblong, margin deflexed and undulate, apex emarginate, disk with two prominent lateral and one median crenate lamellae, all three ending near the apex, separately or uniting together; a few additional faint lamellae-like branches also present. Column short, 3 mm. long, foot very slightly produced. Anther 1.25 mm. long, emarginate at apex, pollinia with a broad, short caudicle.

Flowering time - May.

Altitudinal range - \pm 305 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

Remarks - Hara et al. express that the occurrence of this taxon is uncertain in Nepal as Buch.-Ham's locality Morung has not been traced. In fact there is a district in the Kingdom of Nepal by that name. We feel that the specimen(s) must have been brought by some local inhabitant who gave the name of the district instead of the specific locality.

Plate 207

Eulophia flava (Lindl.) Hk. f. Fl. Brit. Ind. 6:7, 1890; D. 128, t. 110, 1906; H. et al. 43, 1978.

= *Cyrtopera flava* Lindl. Gen. Sp. Orchid Pl. 189, 1833.

A tall robust plant with a thick rhizomatous stem; leaves 3-4 on a young short stem, c 100-120 cm. long, linear-lanceolate. Flowering scape stout, 80-100 cm. long, covered at the base by close fitting sheaths, arising when plants are leafless, laxly many flowered; floral bracts much shorter than the ovary, ovate-lanceolate, 1.6-1.2 cm. long, acuminate. Flowers large, drooping, light yellow; sepal oblong-lanceolate; petals a little shorter than the sepals but broader; lip equalling the sepals, an indistinct spur on the ventral surface, 3 lobed, side lobes large, rounded, spotted at the base, margin recurved, mid lobe oblong, apical portion folded, disk with two crenate lamellae. Column long, produced at the base into a short foot. Anther apex emarginate, pollinia attached to a stout broad-based caudicle.

Flowering time - not known.

Altitudinal range - \pm 305 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

Remarks - The specimen at hand is young, so the dissection of the flower bud has been done. That is the reason why measurements of different parts have not been given. The plant flowers before leafing. Hara et al. mention about the uncertainty of the occurrence of this species in Nepal.

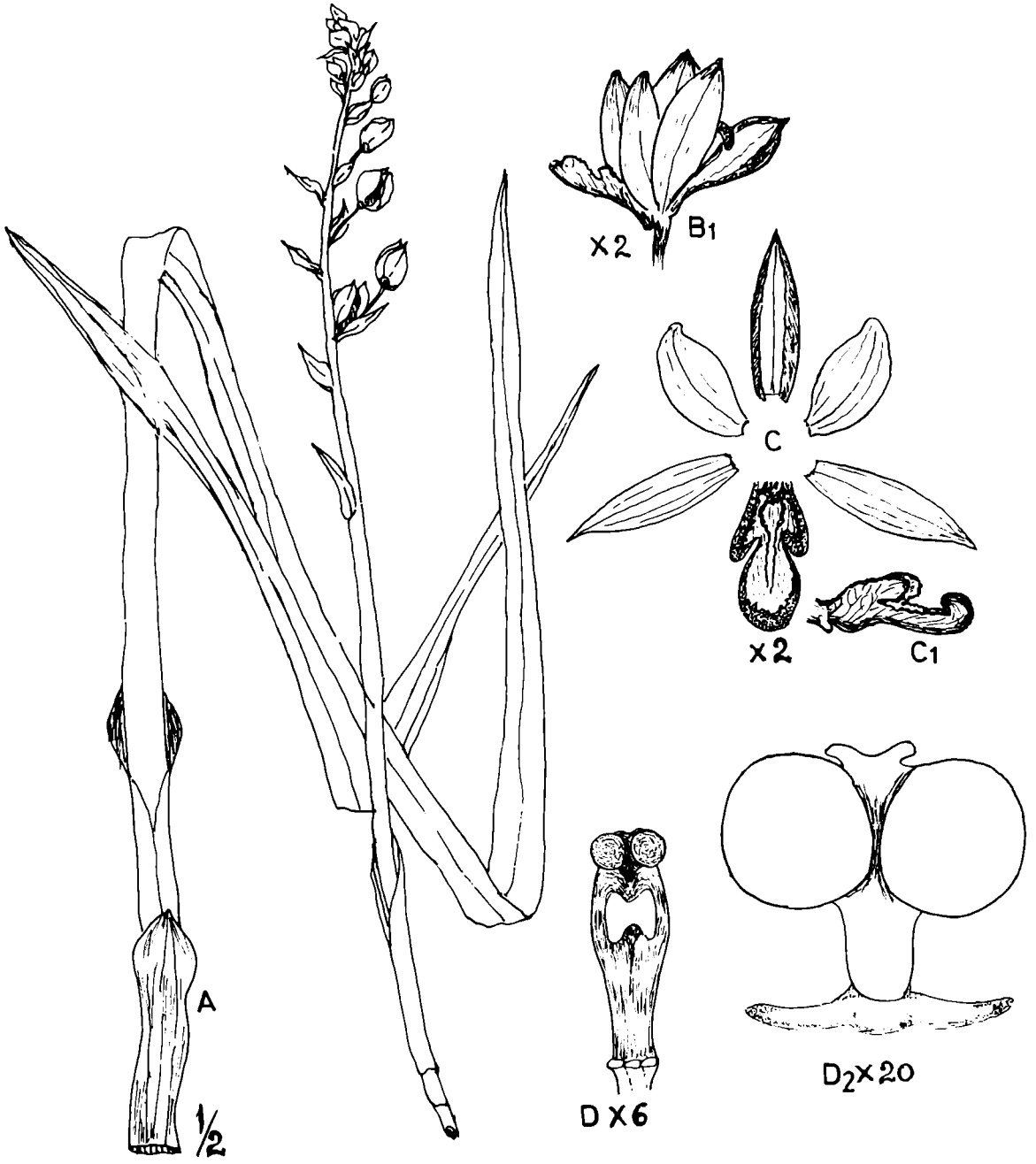


Plate 208

Eulophia herbacea Lindl. Gen. Sp. Orchid Pl. 182, 1833; Hk. f. 6:2, 1890; D. 123, t. 106, 1906; T. 3:143, 1975; H. et al. 43, 1978.

Pseudobulbs c 4 cm. long, pseudostem 10-15 cm. long; leaves appearing just after the flowering (linear-lanceolate, 12-18 cm. long). Flowering scape c 40 cm. long, a few sheathing bracts at the base, peduncle with bracts, ovate, c 1.8 cm. long, laxly flowered; floral bracts 8-10 mm. long, lanceolate, shorter than the ovary. Flowers purplish or white, c 3 cm. in diam., fragrant; sepals linear-lanceolate, 1.6 cm. long, spreading; petals elliptic or lanceolate, shorter than the sepals, 1.4 cm., acute. Lip obovate-oblong, 1.4 cm. long, short geniculate spur at the base along the mid ventral line, 3 lobed, side lobes round, crenulate margin, mid lobe oblong-deltoid, crenulate, disk with two fimbriate lamellae. Column stout, 7 mm. long slightly curved and winged. Anther with a small projection on either side of its lips; pollinia transversely oblong with a short broad caudicle.

Flowering time - April.

Altitudinal range - \pm c 100 m.

Distributional pattern - west Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

Remarks - i) The flowers appear in our specimen before leafing and are smaller in size. ii) The floral bracts are much shorter than the ovary, although Duthie (loc. cit.) mentions of the bracts equalling or are longer than the ovary. iii) Disk has two fimbriate lamellae and not many as given by others.



Plate 209

Eulophia hormusjii Duthie, Ann. Roy Bot. Gard. Calcutta, 9:125, t. 109, 1906.

Pseudostem c 8 cm. long bearing two sheaths; leaves appearing after flowering (two, narrowly elliptic-lanceolate, 30-35 cm. by 2-3 cm., acuminate). Flowering scape arising from the top of the tuber, 20-40 cm. long, covered at intervals by lanceolate sheaths, peduncle bearing lanceolate few bracts 4.5 cm. long, densely flowered; floral bracts of variable length becoming gradually smaller upwards. Flowers c 4 cm. in diam., purplish yellow; sepals and petals attached to the column, erecto-patent, sepals 2.1 cm. long, petals 1.8 cm. long, oblanceolate. Lip obovate-oblong, 1.7 cm. long, with a long, curved spur, side lobes erect, entire, mid lobe orbicular, obscurely bifid, undulate or erose margin, disk with 3 parallel lamellae ending in a coarsely fimbriate patch near the apex. Column without a foot, 8 mm. long, constricted in the middle, grooved. Anther terminal, pollinia with a short, stout caudicle.

Flowering time - December.

Altitudinal range - \pm 305 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. $n = 27$ (Mehra & Vij, Taxon, 19:108, 1970; Vij et al. *ibid.* 30:512, 1981).

$2n = 54$ (Mehra & Kashyap, *ibid.* 30:507, 1981).

Remarks - This is a new record for Nepal.

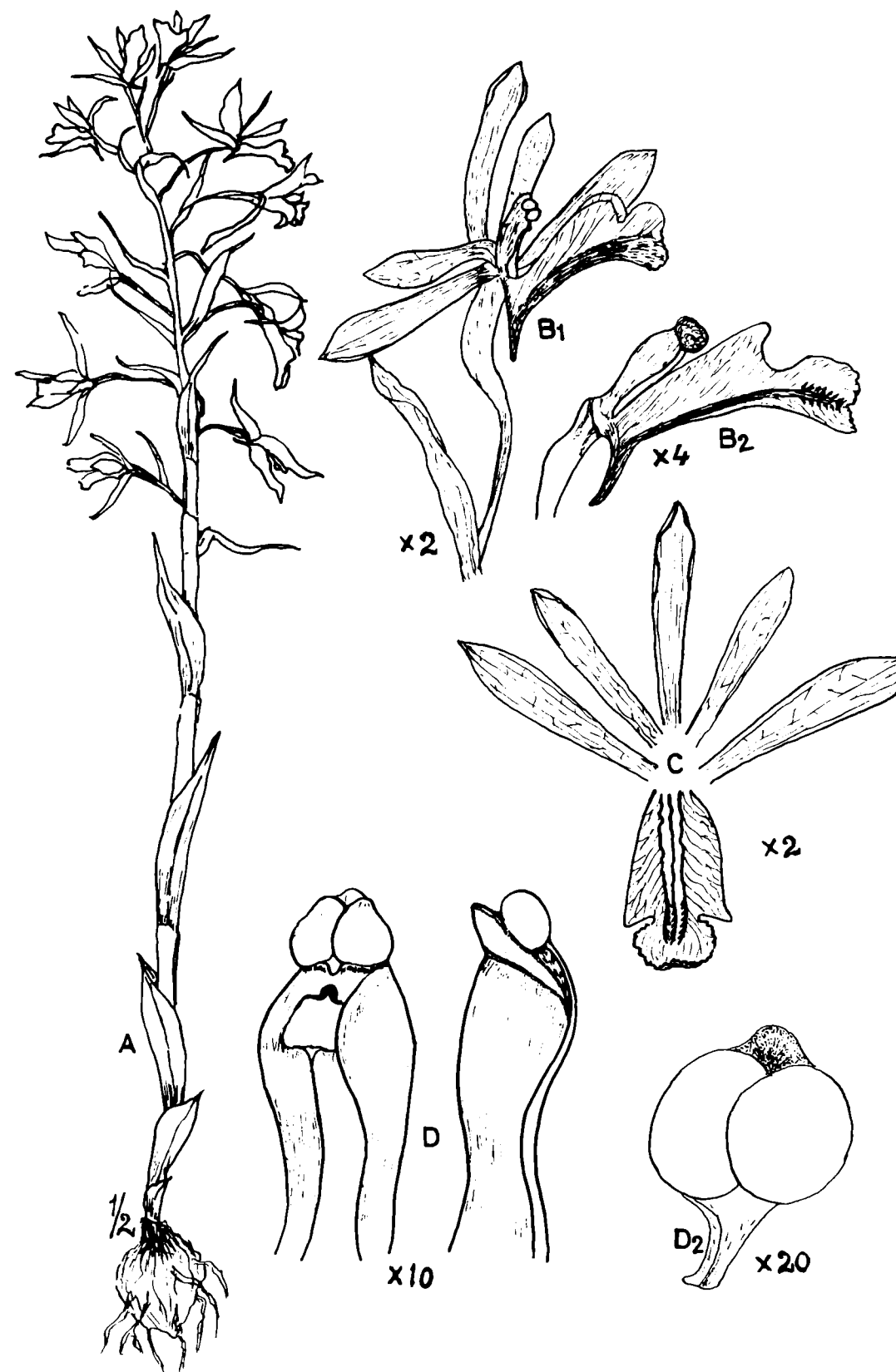


Plate 210

Eulophia mackinnonii Duthie, Journ. Asiat. Soc. Bengal, 71:40, et 9:124, t. 107, 1906.

Rhizome formed by a series of triangular pseudobulbs; pseudostem about 25 cm. high arising from the young pseudobulb. Leaves appearing along with the flowers, usually two, broadly lanceolate, blade 38-50 cm. by 6-6.5 cm., tapering into long sheaths, few tubular sheaths on the lower part, acuminate, nerves prominent. Flowering scape shorter than the leaves, arising from the side of the pseudobulb, a few sheaths at the lower portion, laxly few flowered; floral bracts linear-lanceolate, 2.2-1.3 cm. long, equalling or shorter than the ovary, persistent. Flowers 8-10, large, c 3.8 cm. in diam., yellowish; sepals fleshy, elliptic, erect, dorsal sepal 1.7 cm. long, laterals a little longer and unequal at base; petals fleshy, shorter than the sepals, 1.2 cm., oblong-ovate, margins overlapping, rounded. Lip 3 lobed, shorter than the sepals, 1.4 cm. long, short geniculate spur, side lobes shallow and erect, terminal lobe broad, rounded with undulate margin, 5 ridges extending from base to near the apex. Column short, c 7 mm. long, broadly winged, foot slightly produced. Anther with a 2 toothed lip.

Flowering time - July.

Altitudinal range - ± 610 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

Remarks - This is also a new record for Nepal.



Plate 211

Eulophia obtusa (Lindl.) Hk. f. in Fl. Brit. Ind. 6:3, 1890; D. 129, t. 111, 1906.

= *Cyrtopera obtusa* Lindl. Gen. Sp. Orchid Pl. 190, 1833.

Plants 90-150 cm. tall, the leaves and flowering scape arising from a horizontal tuber; a pseudostem formed by the sheaths enclosing the bases of the leaves and scape. Leaves 2-3, linear, ensiform, 30-40 cm. long, acuminate. Flowering scape c 1.5 m. long, exceeding the leaves, a few sheaths at the base, lax flowered; floral bracts ovato-lanceolate, 8-10 mm. long, shorter than the ovary. Flowers 6-10, yellow, 3 cm. in diam.; sepals nearly equal, dorsal obovate, 1.7 cm. long, lateral oblong, 1.6 cm., acute, adnate to the base of the column; petals obovate, equalling the lateral sepals, but broader 1.1 cm., obtuse. Lip clawed, 3 lobed, longer than the lateral sepals, 2 cm. long, a short curved spur on the ventral surface along the middle line, side lobes large, erect and rounded, mid lobe bent upwards, suborbicular when flattened, margin reflexed and undulate, disk with 5 prominent ridges terminating near the apex in an oblong grooved callus, two sets of finger-like projections at the base of the lip. Column 1 cm. long, curved into a short foot, narrowly winged, slightly broadened at the apex, 4 mm.

Flowering time - May.

Altitudinal range - ± 250 m.

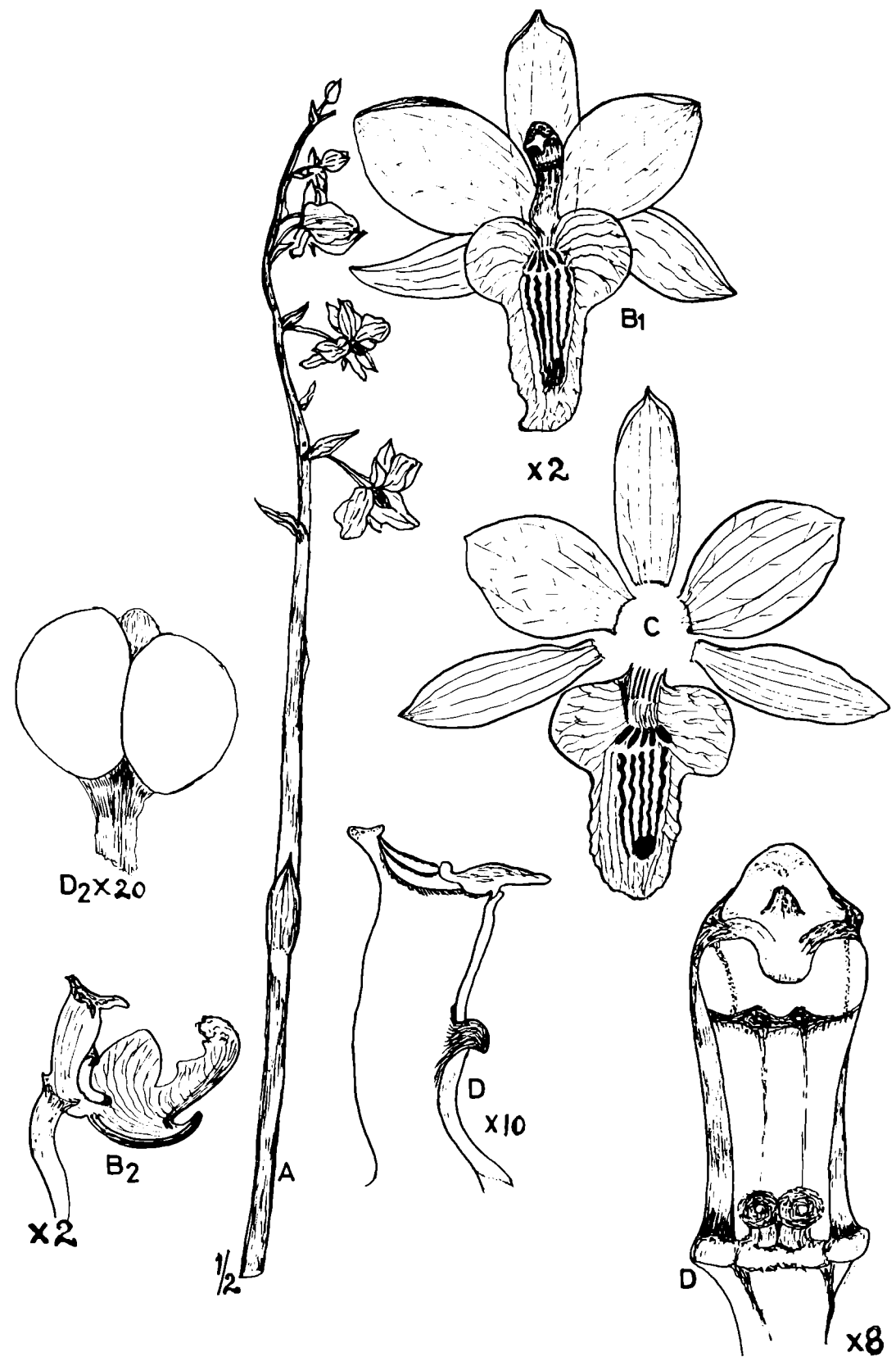
Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

Remarks - This, as well, is a new record for Nepal.



GEODORUM Jack (Cyrtopodieae). The generic name is from the terrestrial habit. Terrestrial orchids with globose rhizomes; leaves plicate, elliptic, sheaths forming a pseudostem. Scape sheathed, flowers in decurved raceme, fragrant; sepals and petals almost equal in length.



Plate 212

Geodorum pallidum D. Don, Prodr. Fl. Nepal 31, 1825; Hk. f. 6:18, 1890; H. et al. 44, 1978.

= *G. purpureum* R. Br.; K. & P. 181, t. 245, 1898; T. 3:144, 1975; B. & T. 73:153, 1975; B. & T. 73:153, 1975 (as *G. densiflorum*).

Terrestrial with underground subglobose rhizome sheaths of leaves form a pseudostem. Leaves elliptic, blade 12-25 cm. by 5-9 cm., tapering to a long sheath, acute. Inflorescence shorter than the leaves, 23-25 cm. long, peduncle bearing 3-4 sheathing bracts, densely flowered raceme decurved; floral bracts lanceolate, 6-10 mm., longer than the ovary. Flowers white or pinkish white, c 2 cm. in diam.; sepals equal, 1.1 cm. long, oblong, erect, acute; petals equalling the sepals but broader, midrib thickened, apex obliquely acute. Lip broadly ovate, ventricose, 1 cm. long, no side lobes but slightly expanded near the base, bifid or emarginate, disc granulated. Column 5 mm. long, stout.

Flowering time - June-July.

Altitudinal range - ± 305 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 2 gathering.

Specimens studied - 2.

Chr. No. 2n = 52 (Biswas, Taxon, 29:169, 1980 as *G. purpureum*).

MONOMERIAL Lindl. (Genyorchideae). The generic name is in reference to the apparent incompleteness of the perianth: "This is the only known genus ... in which the petals are abortive. Nothing is found in their room, but is a wide tooth-letted interval between the upper and lower sepals". Pseudobulbs one leaved on a stout long rhizome. Dorsal sepal broad, lateral much longer at the end of the naked foot of the column. Lip small and jointed on the foot of the column.

Plate 213

Monomeria barbata Lindl. Gen. Sp. Orchid Pl. 61, 1830; Hk. f. 5:781, 1890; K. & P. 152, t.208, 1898; H. et al. 49, 1978.

Epiphytic. Rhizome stout bearing pseudobulbs, 2-5 cm. apart, pseudobulbs ovoid, 3-4 cm. long, shrivelled at flowering time, each bearing leaf. Leaf oblong, blade 12-19 cm. by 2-2.3 cm., petioled thick, 5-7.5 cm. Scape nearly as long as the leaves, peduncle purple bearing many sheathing bracts, 10-7 mm. long, gradually diminishing in size upwards, laxly flowered; floral bracts 5-6 mm. long, much shorter than the ovary. Flowers rather large, 2-2.5 cm. long yellow with purple veins; sepals very unequal, dorsal sepal ovate, 1 cm. long, acuminate, more or less erect, lateral sepals far removed from the dorsal sepal and top of the ovary due to linear growth of receptacle along the foot of the column, thus the lateral sepals arise at a level near the middle of the foot, lanceolate, 1.7 cm. long, coherent at base and apex, margin reflexed, hispid on the outer surface; petals minute, 5 cm. long, broad at the upper end, c 1.5 mm. at apex, fimbriate margin. Lip far removed and arising at the end of the foot, much deflexed from about the middle, c 5 mm. long, laterally compressed, two curved hor-like lobes at the base directed upwards and touching the curved foot. Column short, 3 mm. long, very broad, winged, apical teeth small; foot 9 mm. long, much curved.

Flowering time - October to November.

Altitudinal range - 1830-2135 m.

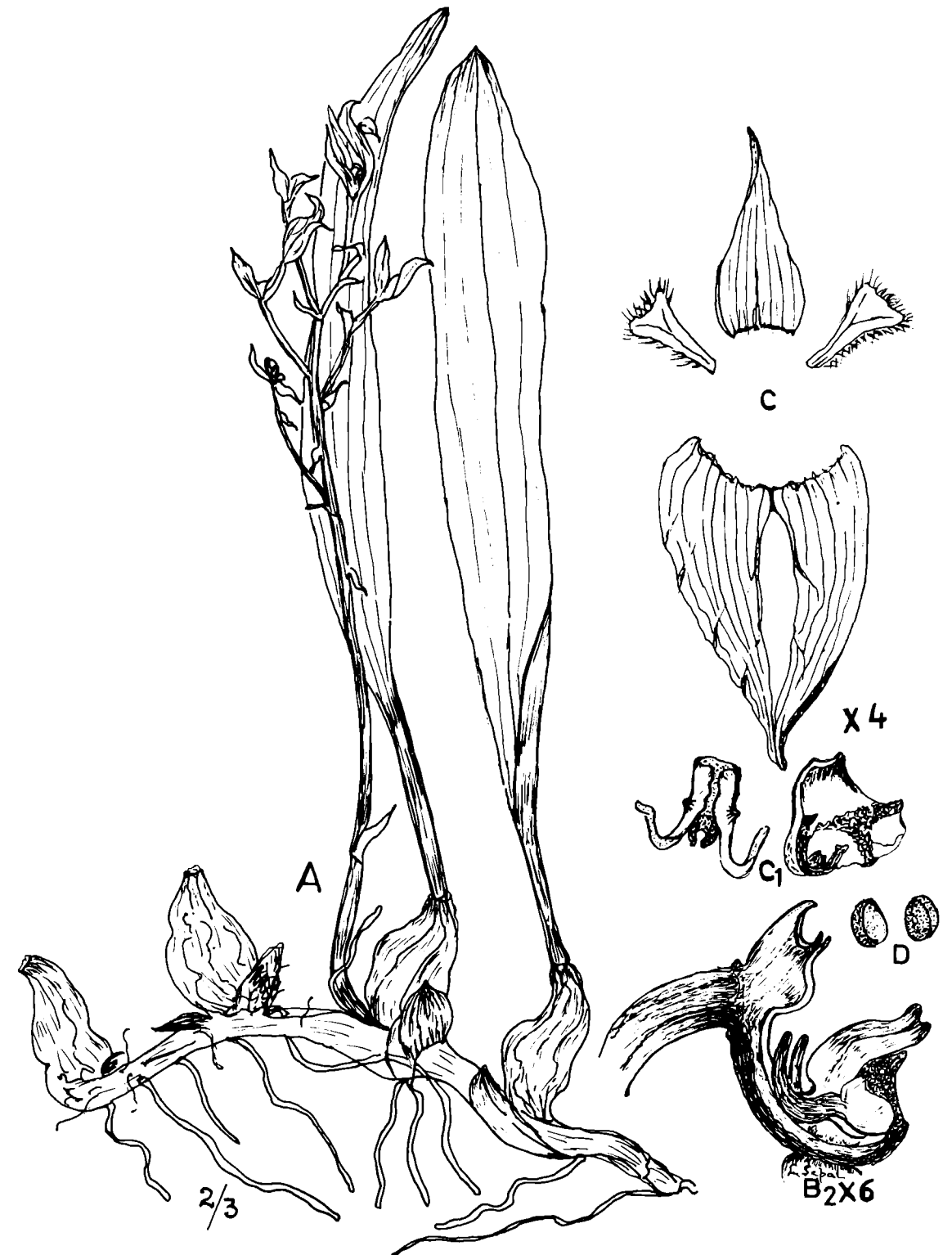
Distributional pattern - central Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No.

Remarks - Hooker (loc. cit. p.782) regarded the Nepal habitat as an error. King & Pantling (loc. cit. p.152) mention of Wallich's collection from Nepal besides Sikkim and Khasi Hills. By Hara et al. Wallich's 1978 — the TYPE is given. It appears that our gathering of this species has been made after many years.



OREORCHIS Lindl. (Cyrtopodieae). Alluding probably to their native habitat in mountains of Asia. The floral structures have somewhat the affinity of *Cremastra* Lindl. These are terrestrial with corn like pseudobulbs. Leaves long and narrow, solitary or sometimes 2; flowers small in slender racemes. Sepals subequal, lanceolate, erect; labellum clawed, 3 lobed, lateral lobes erect and mid lobe spreading.

***Oreorchis porphyranthes* Tuyama,**

Plants terrestrial, pseudobulbs partly epigeous; leaves lanceolate, attenuated apically and basally, chartaceous. Inflorescence laxly 2-5 flowered; floral bracts equalling or shorter than the ovary. Flowers purplish; dorsal sepal linear-oblong, laterals oblong; petals oblanceolate. Lip ovate-oblong, 3 lobed, side lobes transversely oblong, two longitudinal ridges to the base.

Artificial key to the species of *Oreorchis*

Lip with a saccate base; lateral lobes of lip large and rounded. *foliosa*.
 Lip not saccate at base; lateral lobes of lip basal, small, lanceolate and falcate. *micrantha*.

Plate 214

***Oreorchis foliosa* (Lindl.) Lindl.** J. Proc. Linn. Soc. Bot. 3:27, 1859; Hk. f. 5:709, 1890; K. & P. 183, t. 137, 1898; Kit. 104, 1955; T. 446, 1966; H. et al. 51, 1978.

= *Corallorhiza foliosa* Lindl. Gen. Sp. Orchid. Pl. 535, 1840.

Pseudobulb ovoid, 1.5-2 cm. long bearing a few fibers. Leaf solitary, terminal, oblong-lanceolate, 17-18.5 cm. by 1.5-1.7 cm., narrowed to base into a petiole, 2-6 cm. long. Scape 35-40 cm. long, erect, peduncle with 2 or 3 tight fitting sheaths, c 5-6 cm; raceme laxly few flowered; floral bracts small, 3 mm., shorter than the ovary. Flowers pinkish, 1.2 cm. long. Sepals subequal, 1 cm. long, lanceolate, lateral sepals falcate and produced at the base; petals broader than the sepals, 8 mm. long, oblanceolate, acute. Lip 8 mm. long, deflexed, 3 lobed, side lobes broadly oblong, obtuse, entire, mid lobe subreniform, deeply retuse, margin thick and erose, base clawed, disc with 5 thick branching veins (not lamellae); short saccate base. Column 6 mm. long, curved, sides thickened, more so at the base.

Flowering time - June-July.

Altitudinal range - 2900-3100 m.

Distributional pattern - west Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No.

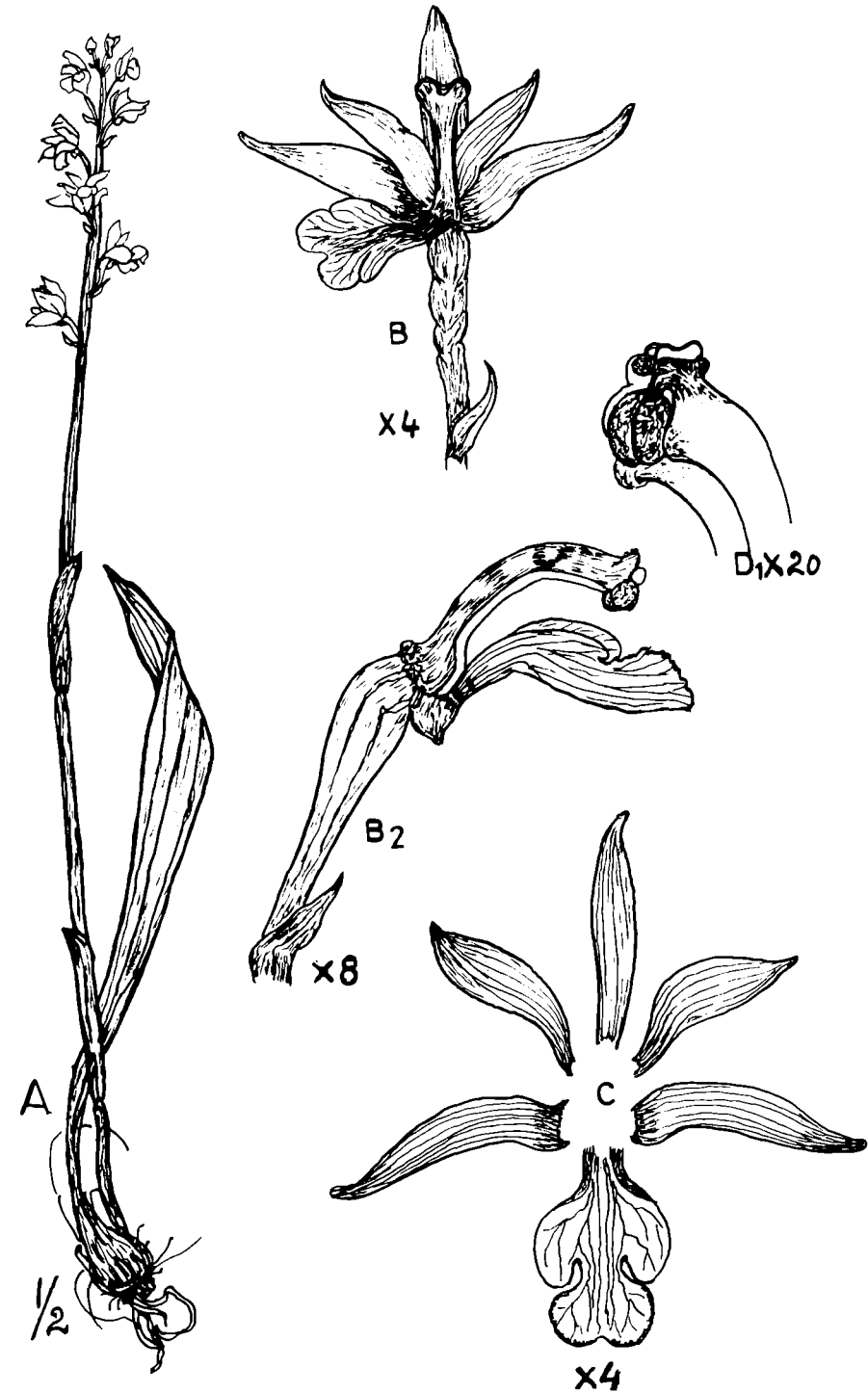


Plate 215

Oreorchis micrantha Lindl. J. Proc. Linn. Soc. Bot. 3:27, 1859; Hk.f. 5:709, 1890; K. & P. 183, t. 138, 1898; T. 446, 1966, 2:192, 1971 et 3:163, 1975; H. et al. 51, 1978.

Pseudobulb ovoid-conic, 1.5-2 cm. with a few fibers (Leaves usually 2, often solitary or rarely 3, linear). Scape 30-40 cm. long, arising from the side of the pseudobulb, peduncle with 2 or 3 tubular sheaths, raceme lax flowered; floral bracts minute, shorter than the ovary. Flowers yellowish, spotted purple, c 1 cm. long; sepals subequal, elliptic-lanceolate, dorsal 6 mm. long, laterals 5.5 mm., subfalcate; petals slightly broader than the sepals, oblanceolate, 5 mm. long, acute. Lip obovate-oblong, 5 mm. long, 3 lobed, side lobes narrowly oblong, horizontal, c 2 mm., arising from the base of the lip, terminal lobe deflexed from the base, broadly obovate, deep sinus leading to 2 lobules, margin minutely crumpled, base narrowed to a short claw, disc with a linear fleshy callus, 5 thick veins arising from it and each slightly thickened at the end. Column 3 mm. long, not curved.

Flowering time - June-July.

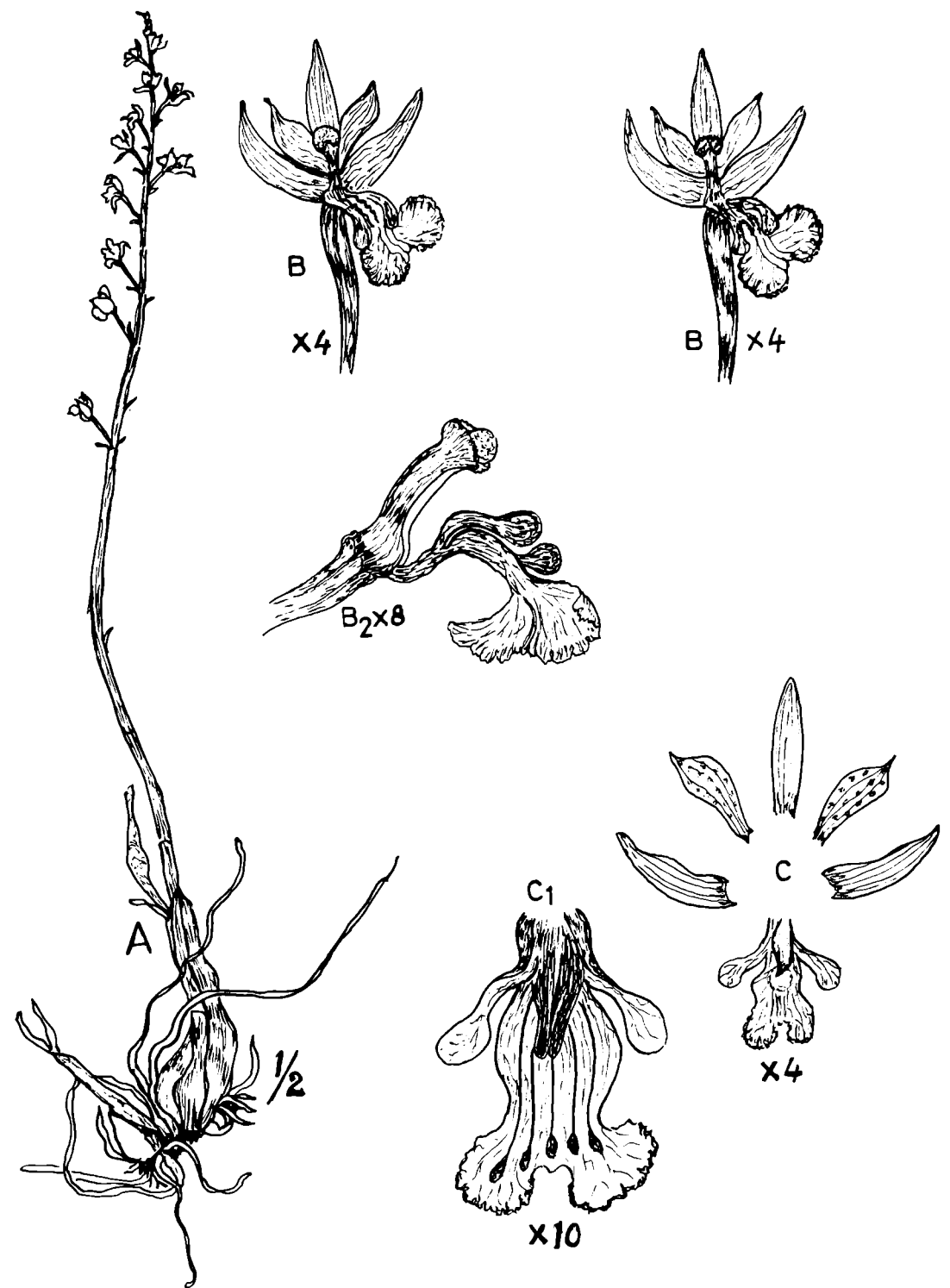
Altitudinal range - 2300-2900 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 5 gatherings.

Specimens studied - 5.

Chr. No.



PHAIUS Lour. (Phaieae). From the preponderant brownish hue of the flowers. Terrestrial or epiphytal herbs of usually large size. Flowers handsome, large in a raceme. Lip gibbous or spurred.

Phaius flavus (Bl.) Lindl.

Pseudobulbs large, stem 40-60 cm. tall; leaves 4 to 6, elliptic-lanceolate, often spotted with yellowish white. Inflorescence arising from the base of the pseudobulb, a many flowered dense raceme; floral bracts large, far exceeding the ovary. Flowers dull yellow or golden yellow, large; lip erect, oblong, concave, side lobes narrow, apical lobe deflexed, crumpled, orange brown in colour, spur short and conical.

Phaius tancarvilleae (L'Herit.) Bl.

Pseudobulbs sheathed by leaf-bases; leaves 30-60 cm. long, elliptic-lanceolate. Inflorescence very long, arising from the side of the pseudobulb, many flowered; flowers larger, buff and purple, rarely yellowish; lip ovate-rotund at the anterior part, middle dilated; spur 1.3 to 1.8 cm. long.

SPATHOGLOTTIS Bl. (Phaieae). The name probably refers to the broad mid lobe of the lip. Terrestrial orchids with long petioled leaves. Flowers few, large on slender scape. Sepals and petals almost equal; lip distinctly 3 lobed, usually saccate base. Column slender, long and winged at apex.

Plate 216

Spathoglottis ixiioides (D. Don.) Lindl. Gen. Sp. Orchid. Pl. 120, 1831; Hk. f. 5:814, 1890; K. & P. 100, 1898; Kit. 104, 1955; B. & T. 69:289, 1972 et 73:153, 1975; T. 3:164, 1975; H. et al. 56, 1978.

= *Cymbidium ixiioides* D. Don, Prodr. Fl. Nep. 36, 1825.

Pseudobulb 1.5-2 cm. long, globular or ovoid, numerous sheath-like fibers at the base. Leaves 2 or 3 on a short stem arising from the top of the pseudobulb, linear, 7-20 cm. by 3-6 mm., acuminate, narrowed down to a sessile base. Scape arising from the side of the pseudobulb, erect, usually equalling or exceeding the leaves, peduncle with a sheathing bract, laxly 3 or rarely 4 flowered; floral bracts lanceolate, 6-8 mm. long, much shorter than the ovary. Flowers yellow, drooping, 3.5 cm. in diam.; sepals subequal, elliptic-oblong, 2.2 cm. long acute, spreading, dorsal narrower than the lateral which is 9 mm. broad; petals 2.2 cm. long elliptic-oblong equalling the sepals, more veined than the sepals. Lip sessile, 3 lobed, base concave, side lobes conical, diverging, terminal lobe obcordate, disc between the side lobes with 2 elongate calli separated by a mesial ridge extending to the terminal lobe, an auricle on each side at the sinus. Column 1.2 cm. long, winged towards the apex. Anther 2 celled; pollinia clavate cohering in fours.

Flowering time - July to September.

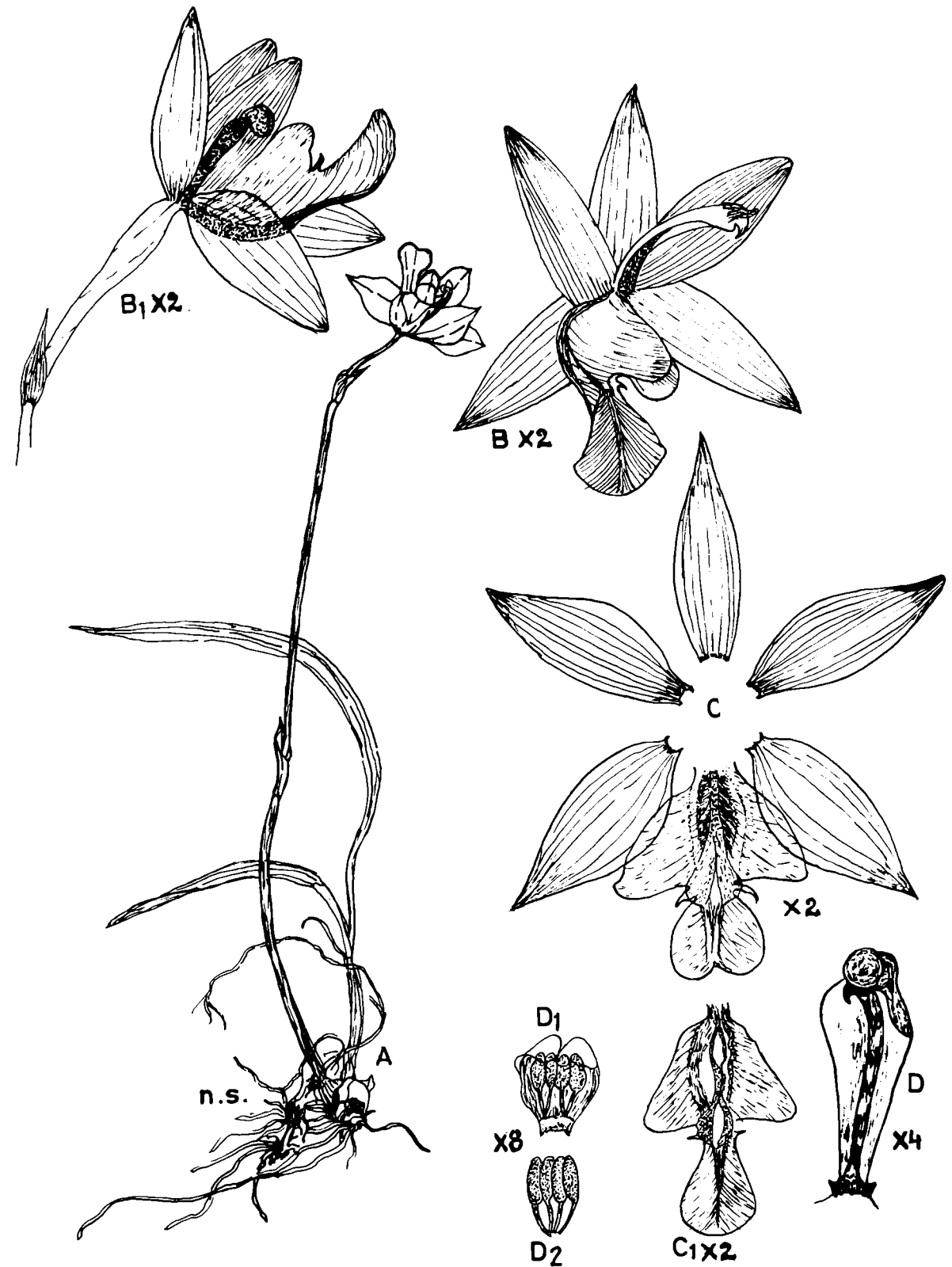
Altitudinal range - 1900-2750 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 6 gatherings.

Specimens studied - 4.

Chr. No.



SUNIPIA Buchanan ex Smith (Bulbophylleae). Probably from a nepalese name. Tufted epiphytes with creeping rhizome, 1 leaved. Flowers small in a distichious spike concealed by imbricating bracts. Lip small and broadly tongue shaped.

Seidenfaden (1969) joined the two genera *Sunipia* & *Ione* which he later (1972) admits was an error. *Sunipia* has the priority.

Artificial key to the species of *Sunipia*

- 1 Scape much longer than leaves —
- 2 Flowers c 2.5 cm. long; racemes secund; bracts longer than the ovary. *paleacea*.
- 2* Flowers numerous, c 7 mm. long; racemes distichious; bracts very large and partly concealing the flowers. *racemosa*.
- 1* Scape equalling the leaves; flowers c 1 cm. long; racemes distichous; bracts longer than the ovary. *bicolor*.

Plate 217

Sunipia bicolor Lindl. Gen. Sp. Orchid Pl. 179, 1833; H. et al. 57, 1978.

= *Ione bicolor* (Lindl.) Lindl. Fol. Orchid. Ione : 3, 1853; K. & P. 159, t. 216, 1898; T. 440, 1966 et 2:190, 1971; Seidenf. 64:216, 1969.

= *Bulbophyllum bicolor* (Lindl.) Hk. f. 5:770, 1890; B. & T. 66:289, 1969.

Pseudobulbs distant, broad and gradually tapering downwards, 1.2-1.5 cm. apart; leaf linear, 5.5-10 cm. by 6-8 mm., obliquely bifid at the apex, sessile. Scape 10-15 cm. long, with 6-8 flowers, distichously arranged; floral bracts lanceolate, 7-9 mm. longer than the ovary. Flowers c 12 mm. long, perianth pink streaked; sepals subequal, dorsal lanceolate 6 mm., laterals lanceolate, 9 mm. long, connate at the base, 3 nerved; petals elliptic, 3 cm. long spreading at right angles to the sepals. Lip red panduriform 5 mm. long, truncate at the base, two minute auricles, anterior part expanded, deeply serrate, apex emarginate, a thickened process extending to the apex; column short, foot very small.

Flowering time - November to January.

Altitudinal range - 1830-2300 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No. n = 20 (Mehra & Sehgal, Taxon, 23:803, 1974 as *Ione bicolor*).

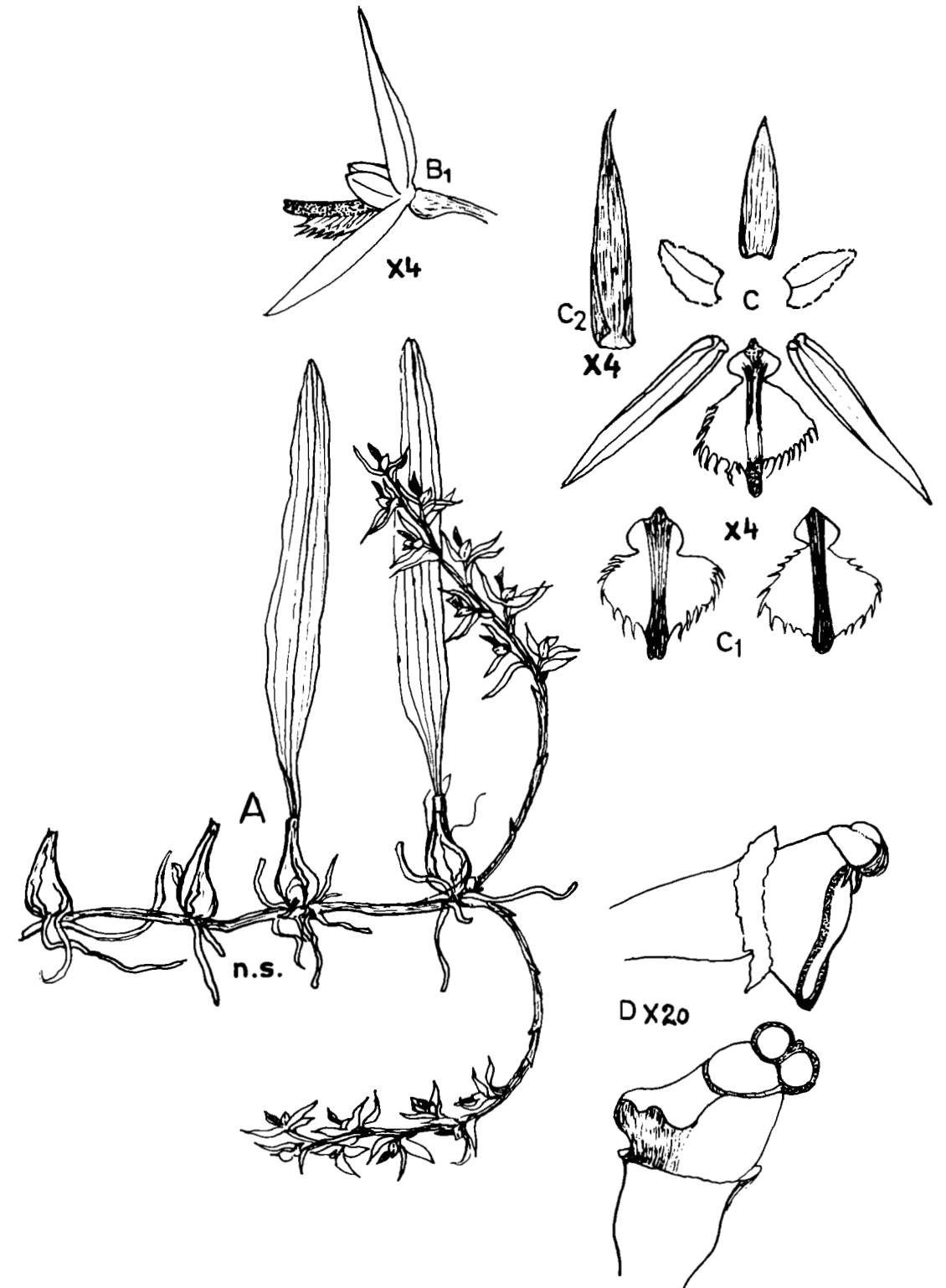


Plate 218

Sunipia paleacea (Lindl.) P.F. Hunt, Kew Bull. 26:184, 1971; H. et al. 57, 1978.

= *Ione paleacea* Lindl. Fol. Orchid. Ione 2, 1853; K. & P. 158, t. 215, 1898; T. 440, 1966; Seidenf. 66:212, 1969.

= *Bulbophyllum paleaceum* (Lindl.) Hk. f. 5:769, 1890; B. & T. 66:292, 1966.

Pseudobulbs ovoid or gradually tapering downwards, c 2 cm. apart; leaves linear-oblong, 10-19.5 cm. by 1.6-2.2 cm., narrowed down to a sessile base, blunt. Scape much longer than the leaf, 20-30 cm. long, peduncle with 3-4 sheathing bracts, few flowered (4 to 6); floral bracts spathe-like, 1.5-2.5 cm., broadly lanceolate, exceeding the ovary. Flowers secund, 2.5-3.0 cm. long; sepals subequal, lanceolate-oblong, whitish with pink reticulations, dorsal slightly shorter, 2.6 cm., the laterals, 2.8 cm., connate; petals broadly oblong, 5 mm. spreading, smaller than the sepals or serrulate. Lip dark purple, oblong-lanceolate, shorter than the lateral sepals, crenate, 1.9 cm. long, base thickened and connate with the foot, gradually tapering to the apex, a reticulated two-chambered callus in the middle which is thickest towards the base; column 3 mm. long; rostellum with 2 subulate processes; foot very small.

Flowering time - October to November.

Altitudinal range - 1830-2135 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 4 gatherings.

Specimens studied - 2.

Chr. No.

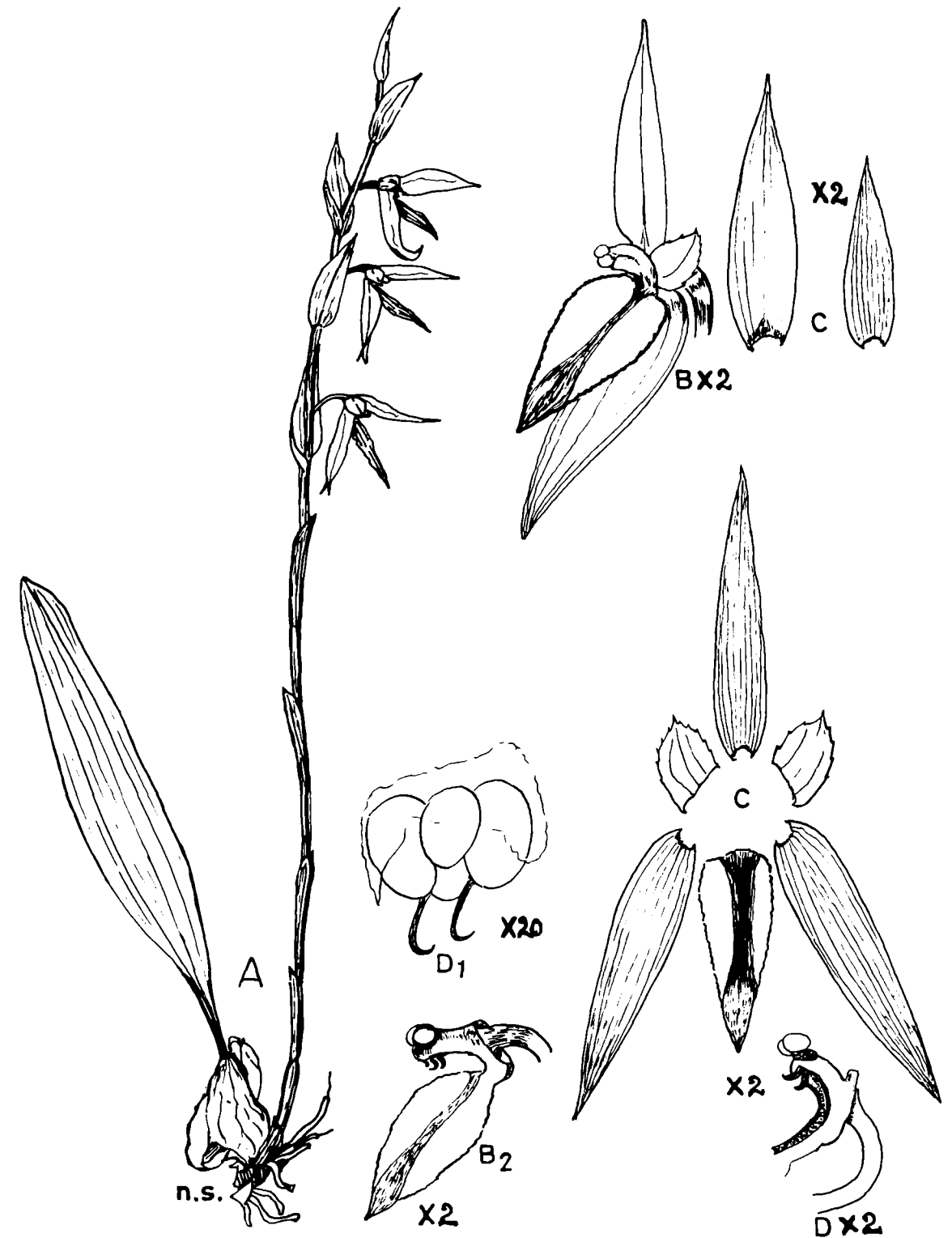


Plate 219

Sunipia racemosa (Smith) Tang & Wang in Acta Phytotax Sm. 1:90, 1951; H. et al. 67, 1978.

= *Stelis racemosa* Smith in Rees. Cyclop, 34:Stelis 10, 1816.

= *Sunipia scariosa* Lindl. : Hk. f. 5:772, 1890; B. & T. 66:296, 1969.

= *Ione scariosa* (Lindl.) K. & P. 161, t. 219, 1898; Seidenf. 64:227, f. 12-16 1969; T. 3:157, 1975.

Pseudobulbs ovoid, distant on the rhizome, 1.5-2 cm. apart; leaf oblong-lanceolate, 9-14 cm. by 1.3-2 cm.; petiole short and channelled. Scape slender, erect, 15-30 cm. long, deflexed, peduncle with 2 or 3 sheathed-bracts, compressed, laxly flowered, distichous; floral bracts very large and partly concealing the flowers, 6-8 mm. long. Flowers greenish, 7 mm. long; sepals unequal spreading, dorsal ovate, 4 mm. long concave, laterals longer 5 mm. oblong, lying parallel to the lip; petals minute 2 mm. long very broad, 2.5 mm. blunt. Lip small 4 mm. long fleshy without side lobes, lower half convolute and with a small callus at the base. Column very short, foot absent.

Flowering time - May to June.

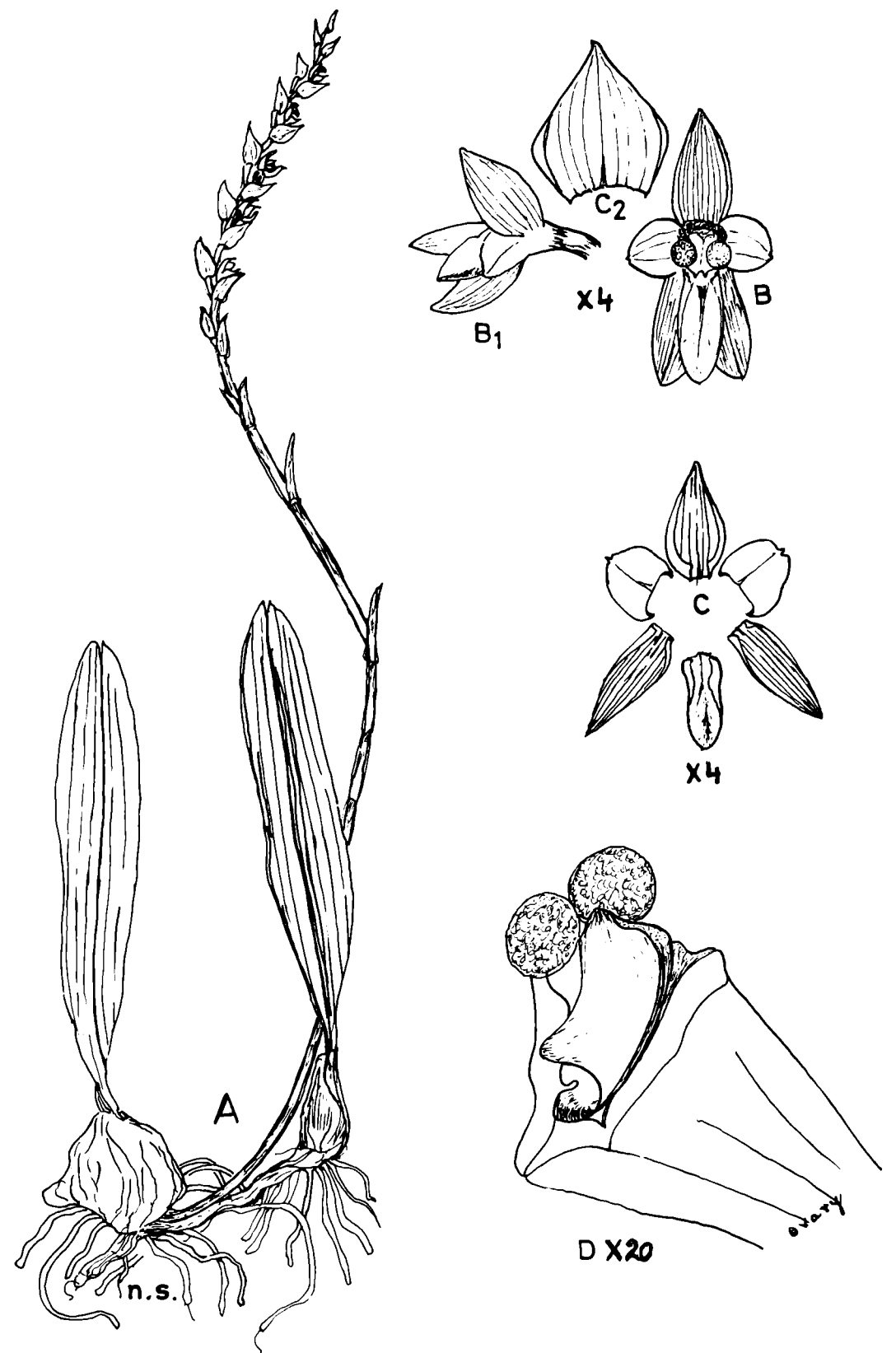
Altitudinal range - ± 1220-1525 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No.



THELASIS Bl. (Thelasiaceae). The name alludes probably to the profoundly emarginate attenuated rostellum which could be likened to a nipple. These are epiphytic orchids with small pseudobulbs, 1-2 leaved. Sepals connivent, laterals keeled or winged; petals narrow, membraneous; lip sessile at the base of the column. Column very short, foot absent, rostellum terminal and large.

Thelasis pygmaea (W. Griff.) Lindl.

Pseudobulbs small, c 1.2 cm. in diam., bearing 1 or 2 leaves; leaves linear-oblong, fleshy, obliquely bifid at the apex. Inflorescence arising from the base of the pseudobulb, exceeding the leaves; floral bracts equalling the ovary, scariosus. Flowers lax; lip shorter than the sepals, with side lobes.

Plate 220

Thelasis longifolia Hk. f. Icon. Pl. 19 : t, 2155, 1889 et Fl. Brit. Ind. 6:87, 1890; K. & P. 250, t. 332, 1898.

Pseudobulbs conical, 1.2-2 cm. bearing a single leaf. Leaf oblong-lanceolate or oblanceolate, 10-15 cm. by 1.25-2 cm., bifid at apex, narrowed to the sessile base. Scape arising from a young pseudobulb, exceeding the leaf, 27 cm. long, peduncle with several sheathing bracts at base and 2 or 3 higher up, raceme with many flowers, not crowded but lax; floral bracts broadly ovate, 2 mm. long, shorter than the ovary. Flowers minute, 6 mm. long, creamy; sepals subequal, dorsal sepal 5 mm. long, oblong, lateral sepals ovate, 4.5 mm. long but broader than the dorsal; petals narrowly oblong 4 mm. long. Lip elliptic, 4.5 mm. long and 2.5 mm. broad, slightly rolled inwards, also slightly thickened along the middle at the base entire, acute. Column tapering upwards, 3.5 mm. long; rostellum long and narrow.

Flowering time - July.

Altitudinal range - \pm 1250 m.

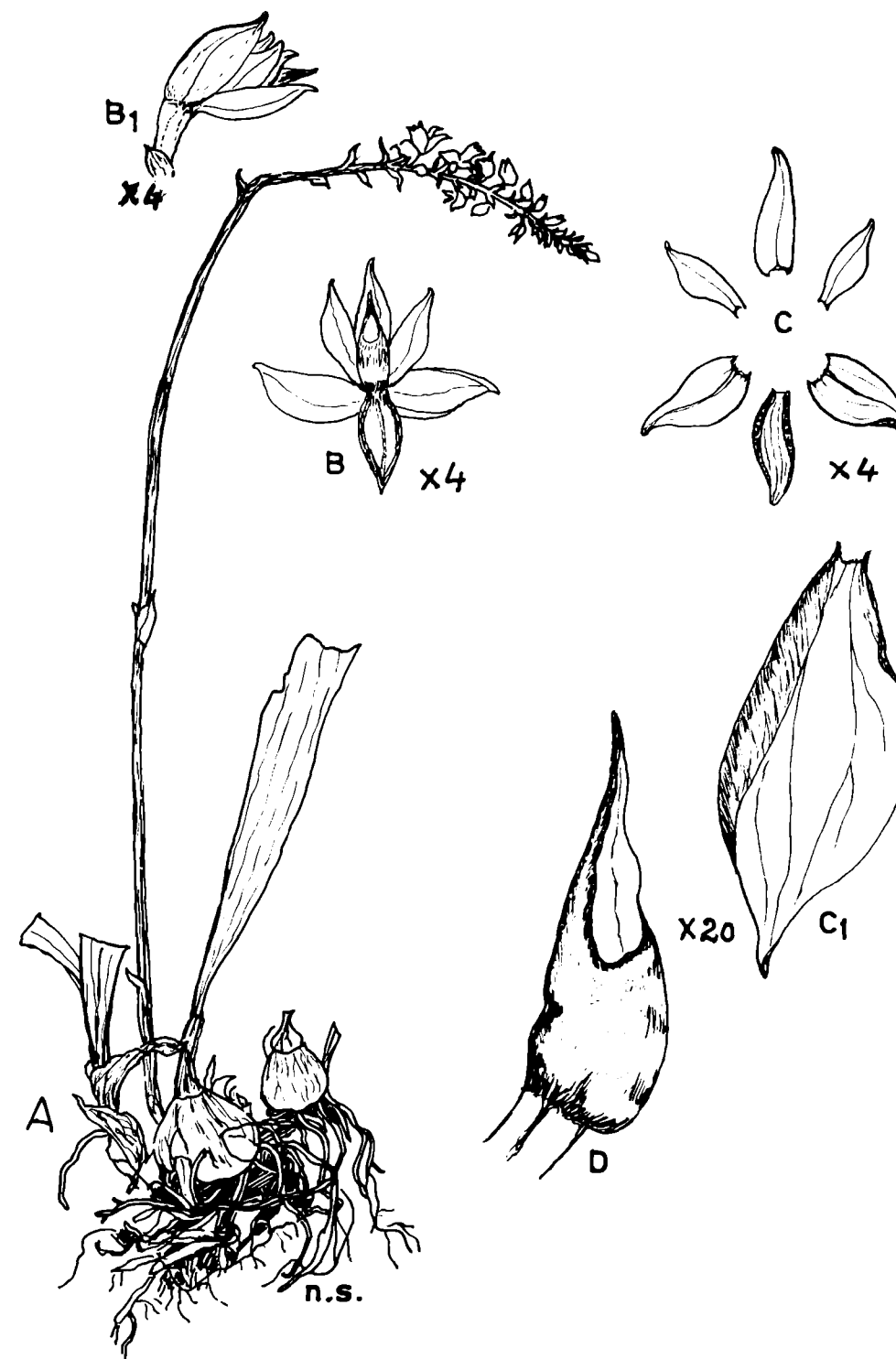
Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

Remarks - This is a new record.



TIPULARIA Nuttal. (Cyrtopodieae). The name alludes to the very long slender and irregular spur on the lip, giving the whole flower a fancied resemblance to a water spider or crane fly. Terrestrial orchid with small pseudobulb; leaf solitary and ovate. Flowers small in loose raceme; sepals with revolute margins; petals narrow. Lip small, 3 lobed; spur longer slender; column also slender.

Plate 221

Tipularia josephii Reichb. f. ex Lindl. J. Proc. Linn. Soc. Bot. 1:174, 1857; Hk. f. 5:708, 1890; K. & P. 151, t. 207, 1898; T. 452, 1966 et 2:194, 1971; H. et al., 1978.

Pseudobulb small, globular, c 1.6 cm. long with few long fibers; leaf solitary, broadly ovate, blade 7-11 cm. by 4-5.8 cm., rounded base, margin undulate, contracted into a petiole, c 1.5 cm. long. Inflorescence c 35 cm., peduncle with a narrow lanceolate bract, loosely many flowered raceme; floral bracts minute, much shorter than the ovary. Flowers greenish brown, c 8 mm. long; sepals equal, lanceolate, 5 mm. long 4-5 veined spreading; petals oblong-lanceolate, 4.5 mm. long, with a mid vein, acute. Lip 4 mm. long, 3 lobed, side lobes short, rounded slightly erose along the margin, each with a thick oblong, mid lobe ovate-lanceolate, deflexed, erose; spur slender, 8 mm. long, curved forward. Column broad, erect, 2.5 mm. long. Anther terminal, depressed.

Flowering time - August.

Altitudinal range - 2750-3100 m.

Distribution pattern - east and central Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No.

Remarks - In our specimens, we have not been able to find a callus in front of the column and almost at the mouth of the spur.



ACAMPE Lindl. (Sarcantheeae - Saccolabiineae). The name probably refers to the small, brittle flowers which have no flexibility. These are epiphytic with long branched stout stems, rarely the stem may be short. Leaves are thick, coriaceous, keeled and unequally bi-fid. Flowers which are in racemes may be fairly large or of medium size, fleshy. The labellum is spurred with the side lobes erect, and the mid lobe bent, hairy at base.

Acampe multiflora (Lindl.) Lindl.

According to the published literature, there is confusion between this species and *A. rigida*, the type locality of which is Nepal. As we have no access to the type materials and ascertain the localities of both *A. multiflora* and *A. rigida*, we leave it here and for some more information refer to Hara et al. (1978).

Key to the species of Acampe

Stem erect and long. Lip without side lobe crenate; spur wide. Flowers greenish with white lip. *papillosa*.
 Stem robust, stout. Lip 3 lobed, upper surface of apical lobe transversely wrinkled and hairy. Flowers yellow with purple spots *rigida*.

Plate 222

Acampe papillosa (Lindl.) Lindl. Fol. Orchid, Acampe 2 1853; T. 2:176, 1971; H. et al. 30, 1978.

= *Saccolabium papillosum* Lindl. in Edw., Bot. Reg. 18 : t. 1952, 1833 et Gen. Sp. Orchid Pl. 222, 1833; Hk. f. 6:63, 1890; K. & P. 219, t. 290, 1898; Burk. 4:133, 1910; B. & T. 70:26, 1973.

Stem erect, rigid, sometimes branched and clustered. Leaves subhorizontal, oblong-lanceolate, 7-12 cm. by 1.1-2 cm. curved, apex truncate or obliquely notched, conduplicate, coriaceous. Inflorescence leaf-opposed, much shorter than the leaves, 2-2.5 cm. long, subcorymbose raceme of 4-6 flowers; floral bracts minute, more or less triangular. Flowers 1.1 cm. in diam., greenish with white lip with small purple spots all over; sepals subequal, oblong, dorsal sepal, 5 mm. long, blunt, laterals 6 mm. long, subfalcate; petals narrower than the sepals, 5 mm. by 1 mm. Lip slightly longer than the sepals, 7 mm. long, ovate-oblong, crenate, adnate to the base of the column, base cylindric and tapering into a spur; spur 2-3 mm. long, about half as long as the ovary, pubescent within; column short, c 2 mm. long. Anther broadly conical pollinia deeply bipartite.

Flowering time - September to November.

Altitudinal range - 200-950 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 5 gatherings.

Specimens studied - 5.

Chr. No. n = 18 and 19 (Mehra & Sehgal, Taxon, 27:388, 1978).

2n = 38 (Mehra & Vij, Taxon, 19:110, 1970 as *Saccolabium papillosum*).

also 2n = 36 (Mehra & Kashyap, ibid. 27:226, 1978).

Remarks - The inflorescence is a corymbose raceme and not an umbel as given in published literature.

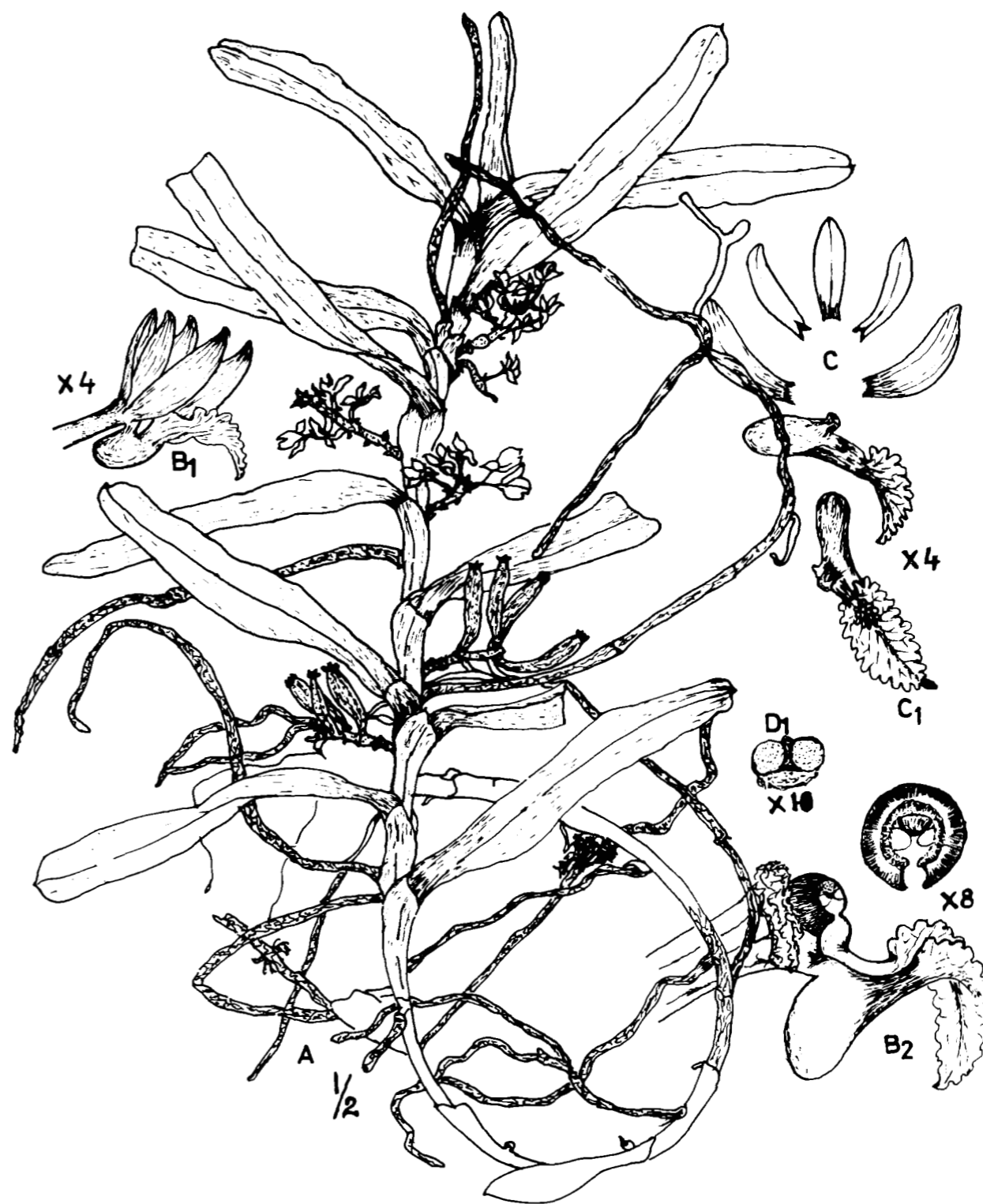


Plate 223

Acampe rigida (Buch-Ham. ex Sm.) P.F. Hunt in Kew Bull. 24:98, 1970; H. et al. 31, 1978.

= *Aerides rigida* Buch.-Ham. ex Sm. in Rees. Cyclop. 39 : Aerides n 12, 1819; Hk. f. 6:48, 1890.

= *Acampe longifolia* (Lindl.) Lindl. : T. 2:176, 1971; B. & T. 70:26, 1973.

= *Saccolabium longifolium* (Lindl.) Hk. f. 6:62 et 197, 1890; K. & P. 220, t. 292, 1898.

Stem very stout, leaves oblong, 20-30 cm. by 3.5-4.8 cm., apex broad, emarginate or faintly bifid, base joined to a wide sheath which is persistent. Inflorescence leaf-opposed, stout and much shorter than the leaves, c 15 cm. long, bearing few distant sheaths in the lower half and terminally a subcorymbose raceme of 4-6 flowers, rarely branched; floral bracts ovate, c 2 mm. long. Flowers fleshy, yellow with purple spots except the lip, 1.5 cm. in diam.; sepals equal, 1.1 cm. long, elliptic-oblong, dorsal 6 mm. broad, slightly broader than laterals; petals smaller than the sepals, 9 mm. by 3 mm., oblong. Lip 3 lobed, 9 mm. long, side lobes narrow, acute angled, apical lobe ovate, fleshy, forming a broad conical sac, transversely wrinkled and with a hairy plate on the upper surface; a short conical spur, c 2 mm. long; column stout, c 4 mm. long. Anther with two conical points at the apex.

Flowering time - September to October.

Altitudinal range - 570-1375 m.

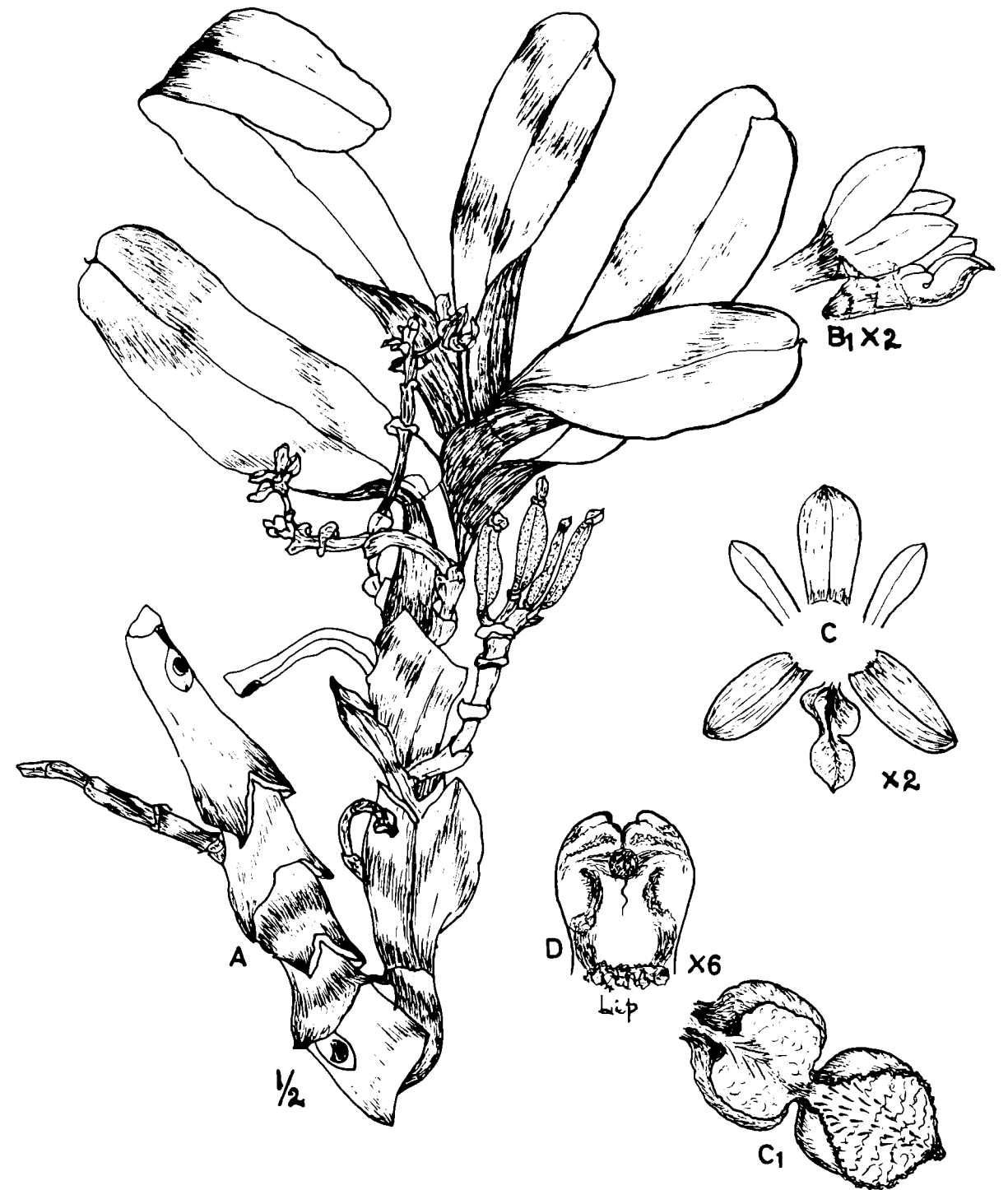
Distributional pattern - central and east Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No. n = 19 (Mehra & Vij, Taxon, 19:110, 1970; Vij et al. ibid. 25:635, 1976 as *Saccolabium longifolium*; Malla et al., ibid. 27:519, 1978 as *A. longifolium*; also Mehra & Sehgal, ibid. 29:348, 1980 as *A. rigida*).

Remarks - The inflorescence appears to us as subcorymbose and not a panicle.



AERIDES Lour. (Sarcantheae - Sarcochilinae). The name is derived from Geek meaning 'air resembling' ... "They being epiphytic, they are capable of absorbing from the atmosphere". These epiphytic orchids have leafy stems, with coriaceous leaves, which may be terete or linear. Brightly coloured flowers are in racemes or even solitary. The labellum is spurred, divided mid lobe and the side lobes.

Aerides vandarum Reichb. f.

Stem tufted with broad flat roots; leaves thick, 20-25 cm. long. Inflorescence peduncle stout; few flowered; flowers white, c 3.5-5 cm. in diam.; sepals and petals with crisped margins. Lip with side lobes narrow, mid lobe bipartite at its tip; spur cylindrical.

Key to the species of Aerides

- Apical lobe of lip large, hastate, spur short and rectangular. *multiflora*.
 Apical lobe of lip linear, lying between the side lobes; spur large, infundibuliform. *odorata*.

Plate 224

Aerides multiflora Roxb. Pl. Coromand. 3:68, t. 271, 1820 et Fl. Ind. 2 ed. 3:475, 1832; Hk. f. 6:44, 1890; K. & P. 212, t. 283, 1898; T. 425, 1966 et 2:177, 1971; B. & T. 70:27, f. 1, 1973; Seidenf. 68(1):78, f. 33, 1973; H. et al. 31, 1978.

Stem stout; leaves narrowly oblong, 12.5-28 cm. by 1.5-2 cm., deeply channelled and keeled, recurved, apex obliquely bifid, frequently flushed with a reddish tint. Inflorescence axillary, 20-40 cm. long, longer than the leaves, peduncle with a few distant sheaths, c 7 mm. densely many flowered raceme; floral bracts 4 mm. long, oblong, shorter than the ovary. Flowers rose purple or pink, c 1.7 cm. in diam.; sepals subequal, dorsal sepal oblong, 8 mm. long, laterals ovate, 7 mm. long; petals oblong, longer than the sepals, 9 mm. Lip triangular, 1.5 cm. long, 1-1.3 cm. broad, erose or faintly crenulate, acute, base thick forming a callus across the mouth of the spur; spur rectangular, bent, c 5 mm. long; column 4 mm. long, margin thickened, slightly winged at the base, foot absent. Anther 3 mm. long, with a long curved beak, pollinia globular.

Flowering time - June to July.

Altitudinal range - 300-1065 m.

Distributional pattern - east, central and west Nepal.

Specimens in Herbarium - 11 gatherings.

Specimens studied - 5.

Chr. No. n = 19 (Arora, Taxon, 17:199, 1968).

2n = 38 (Mehra & Kashyap, ibid. 28:407, 1979; Vij et al., ibid. 30:512, 1981).

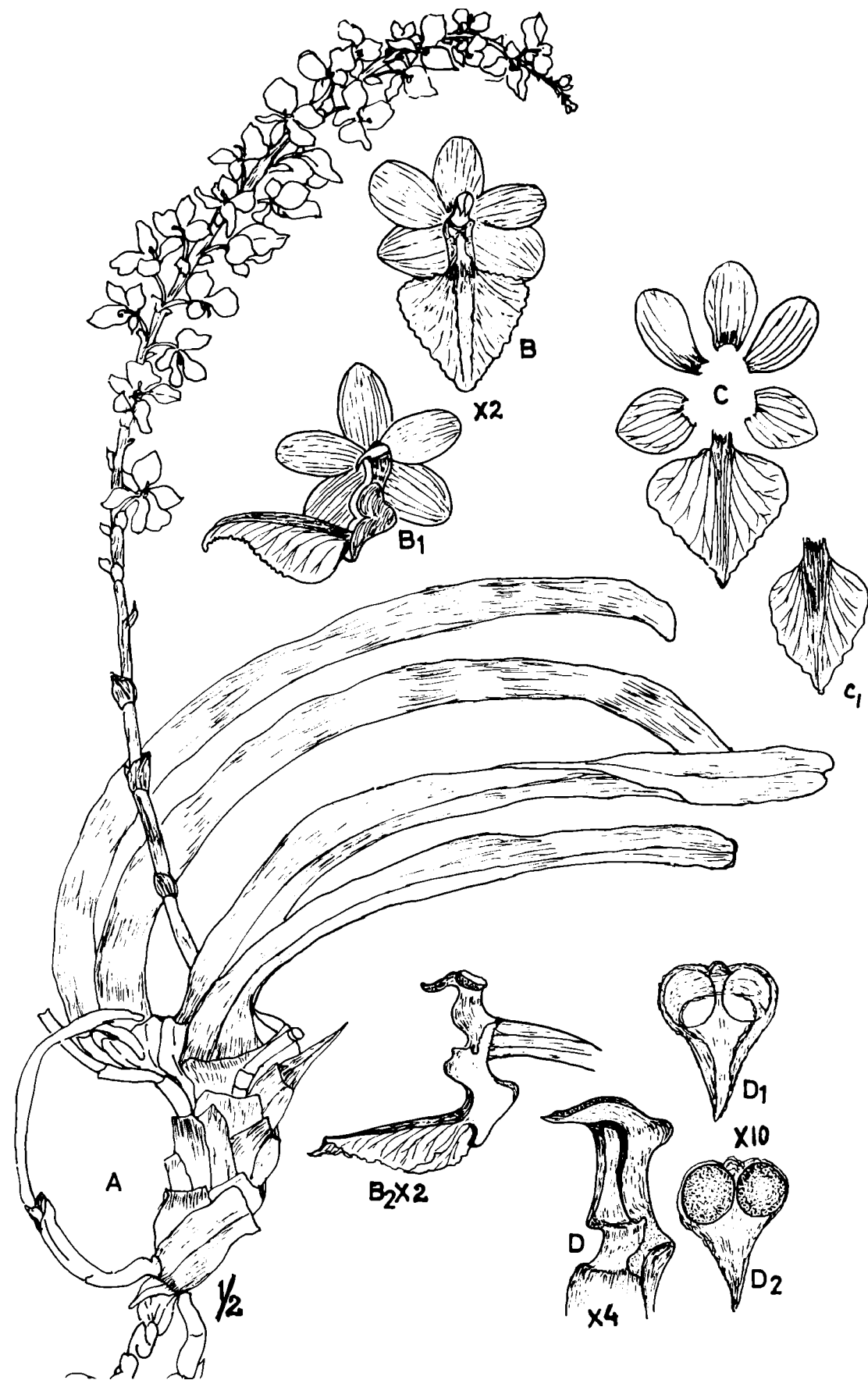


Plate 225

Aerides odorata Lour. Fl. Coch. 2:525, 1790; Hk. f. 6:47, 1890; K. & P. 212, t. 282, 1898; D. 143, 1906; B. & T. 70:27, 1973; H. et al. 31, 1978.

Stem very stout; leaves oblong, 14-25 cm. by 2-3.5 cm., flat, keeled, obtusely bilobed. Inflorescence supra-axillary, 14-35 cm. long, equalling or longer than the leaves, peduncle stout, bearing a few oblong sheathing bracts, c 7 mm., many flowered racemes; floral bracts 3-5 mm. long, much shorter than the ovary, sheathing. Flowers white with pink spots or faintly pinkish white, 1.8 cm. in diam.; sepals unequal, spreading, dorsal sepal elliptic-ovate, 8 mm. long, lateral sepals broadly ovate, 9 mm. long, broader than the dorsal, 7.5 mm. broad; petals oblong, 8 mm. long, subfalcate. Lip with side lobes shallow, truncate and erose, apical lobe linear lying between the edges of the lateral lobes; spur very large, c 1 cm., uncinately incurved, infundibular; column 8 mm. long, foot short, 2 mm. long, adnate to the lip. Anther triangular, 2 mm. long, sunken and beaked, pollinia globose.

Flowering time - June, some time as early as in May.

Altitudinal range - 305-950 m.

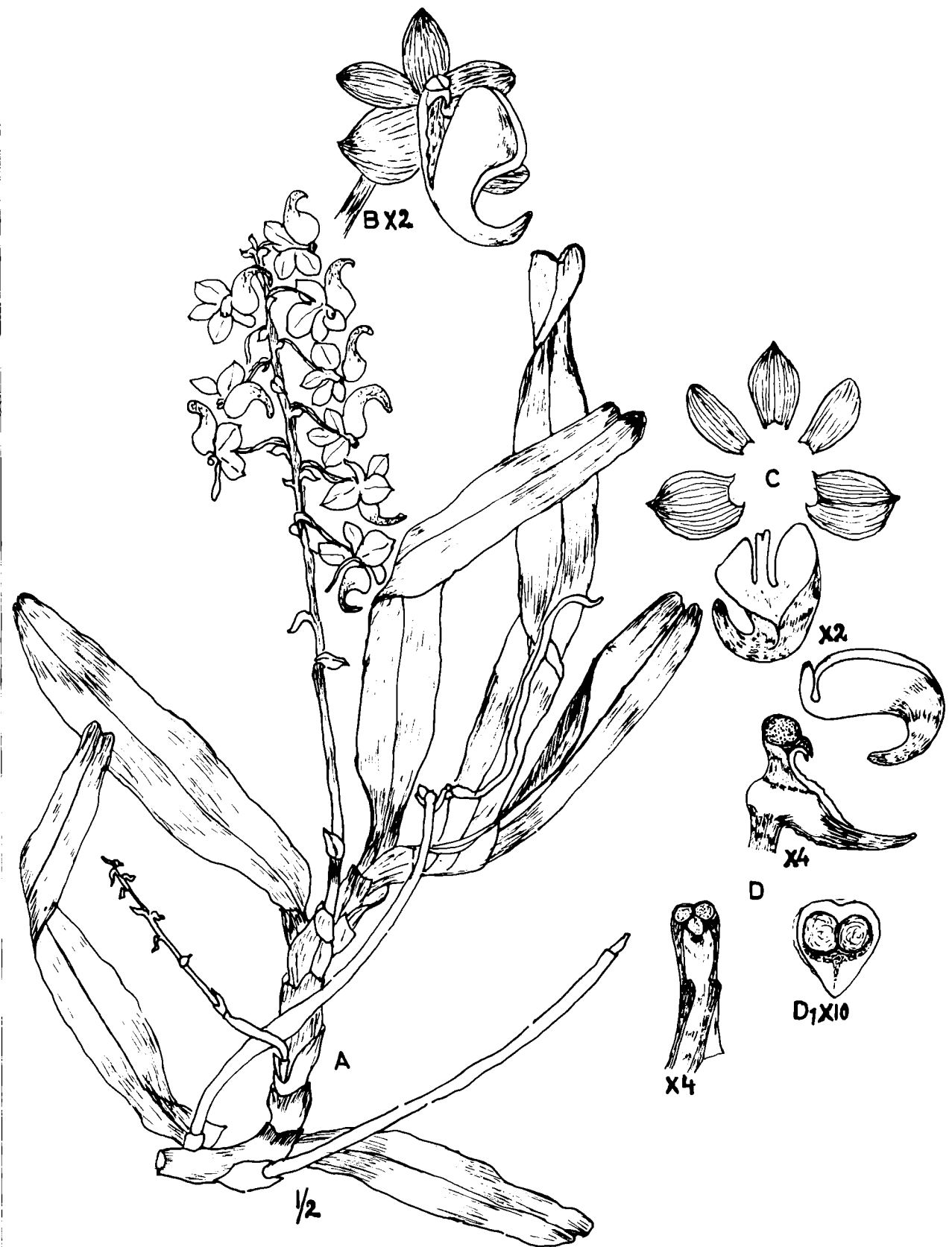
Distributional pattern - east, central and west Nepal.

Specimens in Herbarium - 7 gatherings.

Specimens studied - 4.

Chr. No. n = 19 (Arora, Taxon, 17:199, 1968; Vij et al. *ibid.* 25:640, 1976; Mehra & Sehgal, *ibid.* 25:640, 1976; Mehra & Sehgal, *ibid.* 29:348, 1980).

2n = 36 (Mehra & Kashyap, *ibid.* 30:507, 1981).



ASCOCENTRUM Schltr. (Sarcantheae - Vandinae). The name is because of the large, baglike spur which hangs from the lip. Small epiphytic orchids with the habit of *Vanda* R. Br. The lip is very characteristic, being adnate to the column, side lobes erect and small, and the mid lobe is ligulate; spur although large yet it is shorter than the ovary, without any septa with thickenings at the mouth of the spur.

Plate 226

Ascocentrum ampullaceum (Roxb.) Schltr. in Fedde, Repert. Beih. 1:975, 1913; H. et al. 32, 1978.

= *Aerides ampullacea* Roxb. Fl. Ind. 2 ed. 3:476, 1832.

= *Saccolabium ampullaceum* (Roxb.) Lindl. : Hk. f. 6:64, 1890; K. & P. 220, t.293, 1898.

Stem stout, clustered, older portions clothed with the sheaths of fallen leaves. Leaves oblong, keeled, 7-13 cm. by 1-1.5 cm., mottled brown, acutely bifid, thick and coriaceous. Inflorescence axillary, as long or shorter than the leaves, 7-9 cm., erect, peduncle short and stout, many flowered raceme; floral bracts minute. Flowers pink, 1.3 cm. in diam.; sepals equal, broadly obovate, 7 mm. long and 4 mm. broad, spreading; petals similar to sepals in size and shape. Lip linear-oblong, 4.5 mm. long, faintly crenate, tip upturned; spur cylindrical, 9 mm. long, bent backwards, sometimes inflated; column stout, short, c 2 mm. Anther dome-shaped with a short beak, 1.5 mm., pollinia globose with strap shaped caudicle, the margins of which fold inwards on removal from the anther.

Flowering time - April.

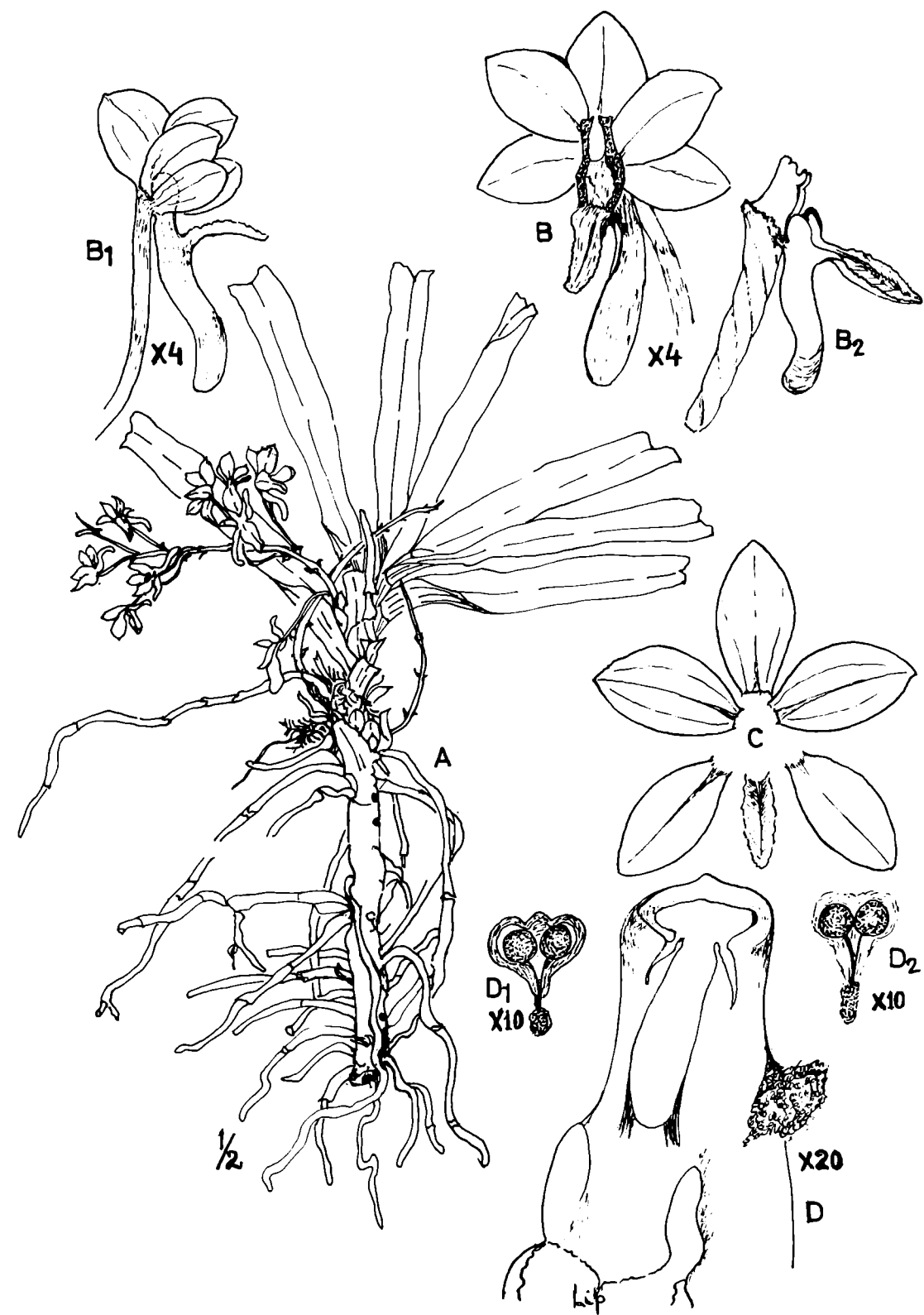
Altitudinal range - 200-450 m.

Distribtuional pattern - east and central Nepal.

Specimens in Herbarium - 4 gatherings.

Specimens studied - 3.

Chr. No.



CHILOSCHISTA Lindl. (Sarcantheae - Sarcochilinae). The name alludes to the bipartite or cleft lip. Epiphytes with stem absent, and leafless when flowering.

Chiloschista usneoides (D. Don) Lindl.

Stem absent; roots densely tufted and tortuous; leaves also absent. Inflorescence a many flowered raceme; flowers white or faintly pink; sepals spreading, oblong; petals broad, spreading. Lip 3 lobed, side lobes linear-oblong, apical lobe truncate, disk between side lobes pubescent.

Plate 227

Chiloschista lunifera (Reichb. f.) J.J. Sm. ex Holttum in Kew Bull. 14:273, 1960; T. 2:181, 1971; H. et al. 35, 1978.

= *Thrixspermum luniferum* Reichb. f. in Gard. Chron. 1868:786, 1868.

= *Sarcochilus luniferus* (Richb. f.) Benth, ex Hk. f. 6:37, 1890; K. & P. 207, t.276, 1898; B. 19:218, 1964; B. & T. 70:28, 1973.

Roots numerous, tufted, elongated and flattened, greenish; stem much reduced. Leaves absent. Inflorescence pendulous, 12-15 cm. long, peduncle densely pubescent, bracteoles c 3 mm. long hyaline, many flowered lax raceme; floral bracts c 2 mm. long, equalling the ovary, hyaline. Flowers yellow or yellowish, c 1.1 cm. in diam.; sepals subequal, ovate, dorsal 4.5 mm. long, laterals slightly longer and slightly oblique; petals broader than the sepals but equalling in length, subquadrate, truncate. Lip erect and parallel to the column forming a deep pouch 4.5 mm. long, side lobes large, obliquely oblong and spreading outwards, apical lobe reduced to knob, base jointed to the foot of the column. Column very short, c 1 mm., thick, foot 3 mm. long not thick. Anther dome-shaped, c 1 mm. broad, bearing laterally two curved setae c 1 mm. long.

Flowering time - March-April.

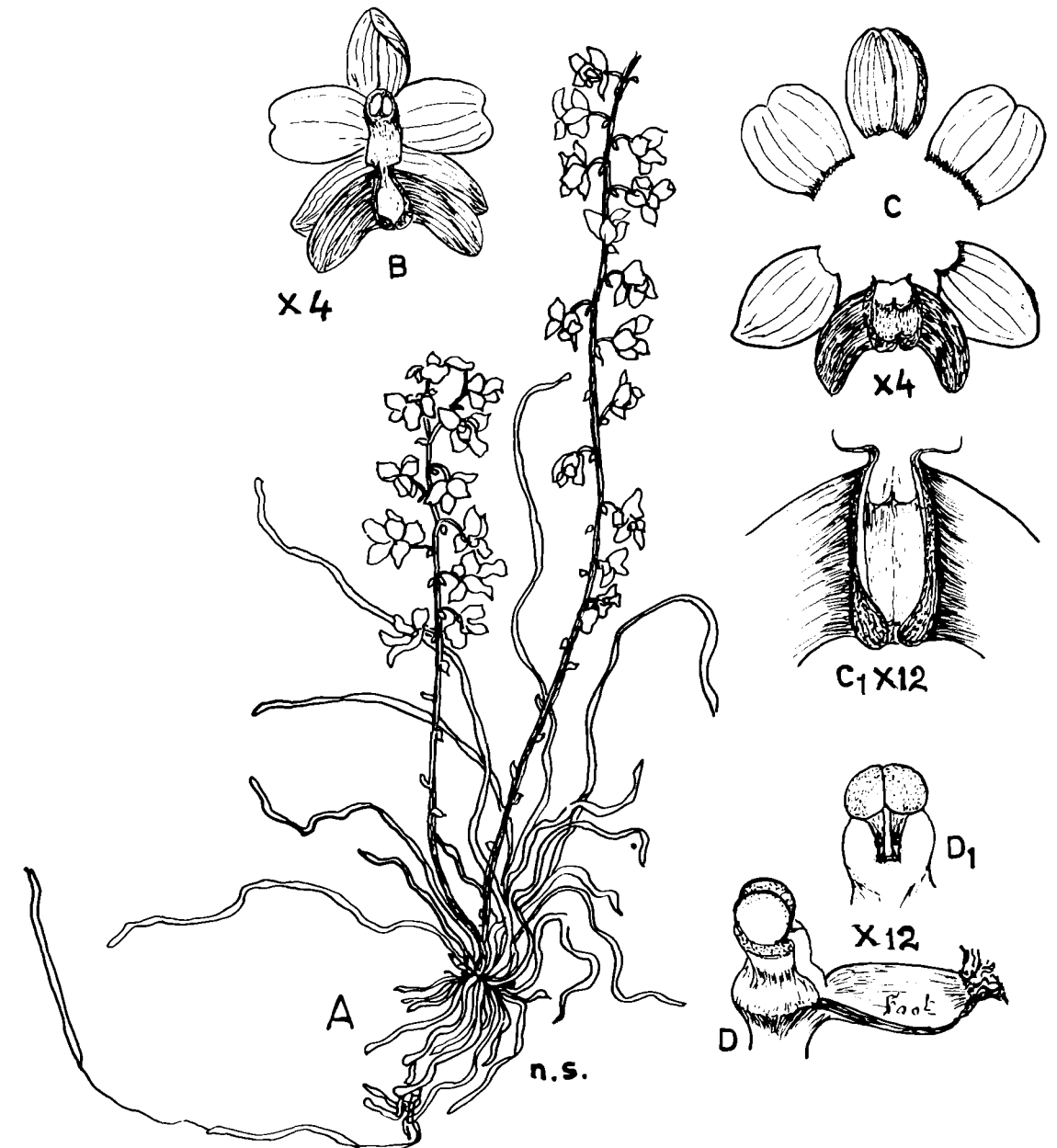
Altitudinal range - 1375-2440 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 5 gatherings.

Specimens studied - 3.

Chr. No. n = 19 (Mehra & Vij, Taxon, 19:110, 1970 as *Sarcochilus luniferus*).



CLEISOSTOMA Bl. (Sarcantheae - Saccolabiinae). The name refers to the closed or narrowed mouth of the inflated lip due to the overgrowing callosities. These epiphytic orchids have long stems with flat, fleshy and coriaceous leaves. The labellum as a large funnel-shaped spur the mouth of which is narrowed or practically obliterated by the growth of two calli.

Key to the species of Cleisostoma

- Leaves terete; side lobes of lip auriculate and infolded; spur saccate, with base 2 lobed. *filiformis*.
 Leaves flat; side lobes of lip broadly triangular; spur cylindrical. *racemiferum*.

Plate 228

Cleisostoma filiforme (Lindl.) Garay in Bot. Mus. Harv. Univ. Leaflet 23:171, 1972; Seidenf. 29(3):55, 1975; H. et al. 35, 1978.

= *Sarcanthus filiformis* Lindl. in Edw. Bot. Reg. 28. Misc. 61, 1842; Hk. f. 6:66, 1890; K. & P. 240, t. 319, 1898; T. 449, t. 7a, 1966; B. & T. 70:32, 1973.

Stem slender, pendulous, terete; leaves elongate, terete, 20-25 cm. long, distant but more or less on one side. Inflorescence extra-axillary, slender, 15-30 cm. shorter or longer than the leaves, peduncle with sheathing bracts at the base, lax-flowered long raceme; floral bracts 1.5 mm. long, broadly oblong, scale-like, shorter than the ovary. Flowers with sepals and petals pink, lip white except the tip of the apical lobe deep pink or purplish, 8 mm. in diam.; sepals nearly equal c 4 mm. long, oblong, reflexed but the dorsal concave at the apex; petals linear, smaller than the sepals, 3 mm. long, also reflexed. Lip fleshy, produced into an infundibular spur, 4 mm., side-lobes auriculate and infolded, apical lobe small, triangular, apex recurved; spur 2 celled; column 2 mm. long, with a broad base (foot) 2 mm. long. Anther depressed and beaked.

Flowering time - August.

Altitudinal range - 915 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. n = 10 (Mehra & Vij, Taxon, 19:110, 1970 as *Sarcanthus filiformis*).

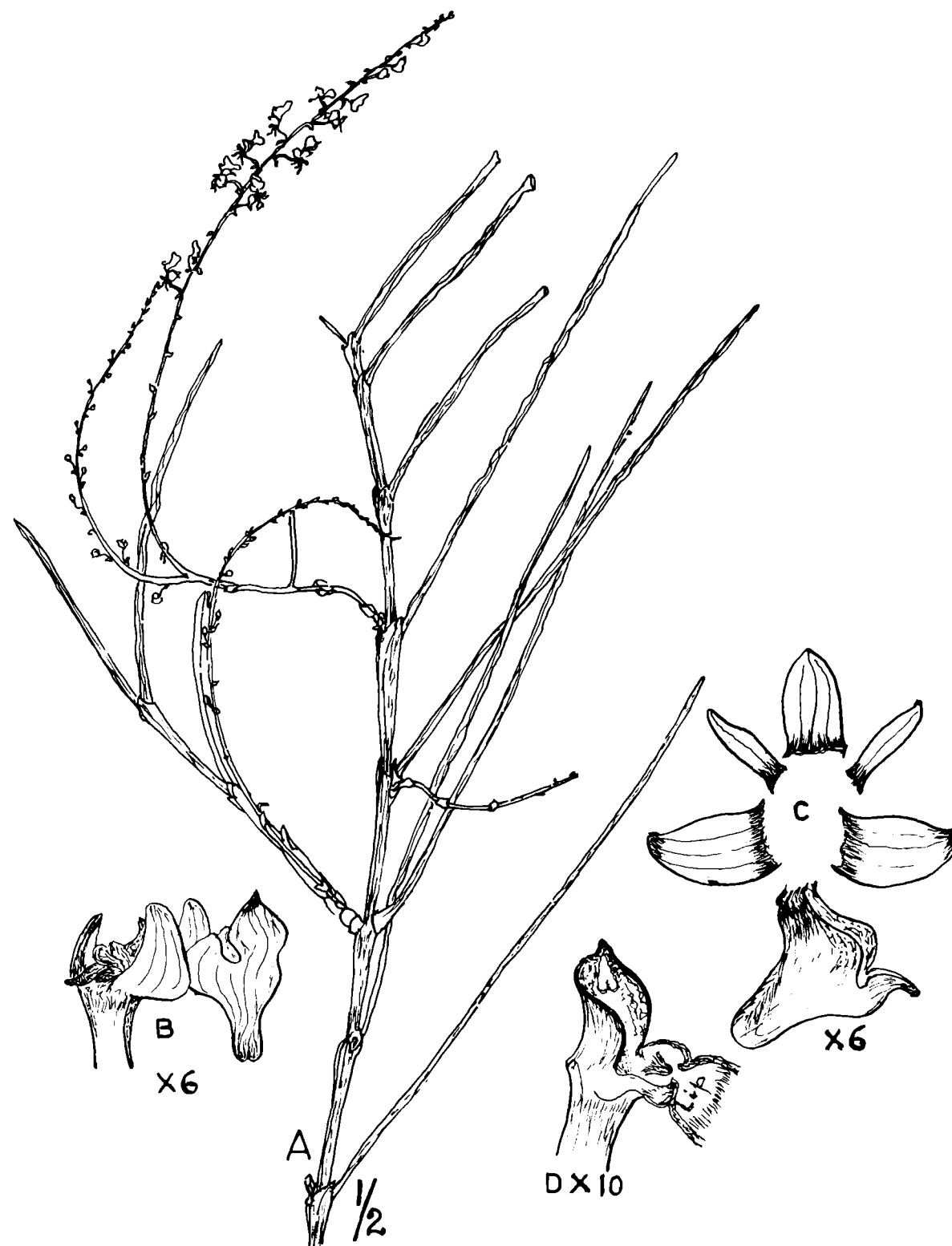


Plate 229

Cleisostoma racemiferum (Lindl.) Garay in Bot. Mus. Harv. Univ. Leaflet 23:173, 1972; Seidenf. 29(3):16, f. 4, 1975; H. et al. 36, 1978.

= *Saccolabium racemiferum* Lindl. Gen. Sp. Orchid Pl. 224, 1833.

= *Sarcanthus pallidus* Lindl. : Hk. f. 6:68, 1890; K. & P. 241, t. 320, 1898.

= *Sarcanthus racemifer* (Lindl.) Reichb. f. : T. 2:194, 1971; B. & T. 70:33, 1973.

Stem stout, c 2 cm. in diam., leafy from the base. Leaves, lorate, flat, 20-25 cm. by 3-4.5 cm., obtuse but obliquely bifid, loose sheathing base, coriaceous. Inflorescence axillary, much longer than the leaves, much branched many flowered panicle, peduncles slender having a few sheathing bracts; floral bracts 1.5 mm. long. Flowers brownish with white lip, c 8 mm. diam.; sepals subequal, broadly elliptic, 4 mm. long, spreading, dorsal concave, laterals with slightly compressed base and subfalcate; petals smaller than the sepals, 3 mm. long, elliptic. Lip fleshy, apical lobe ovate with an incurved apical beak, side lobes broadly triangular, base adnate to the foot and produced into a cylindric spur, 4 mm. long which is curved forwards. Column short, 2 mm., foot very short c 1 mm. Anther depressed, c 1 mm. beaked, pollinia with thin caudicle.

Flowering time - August.

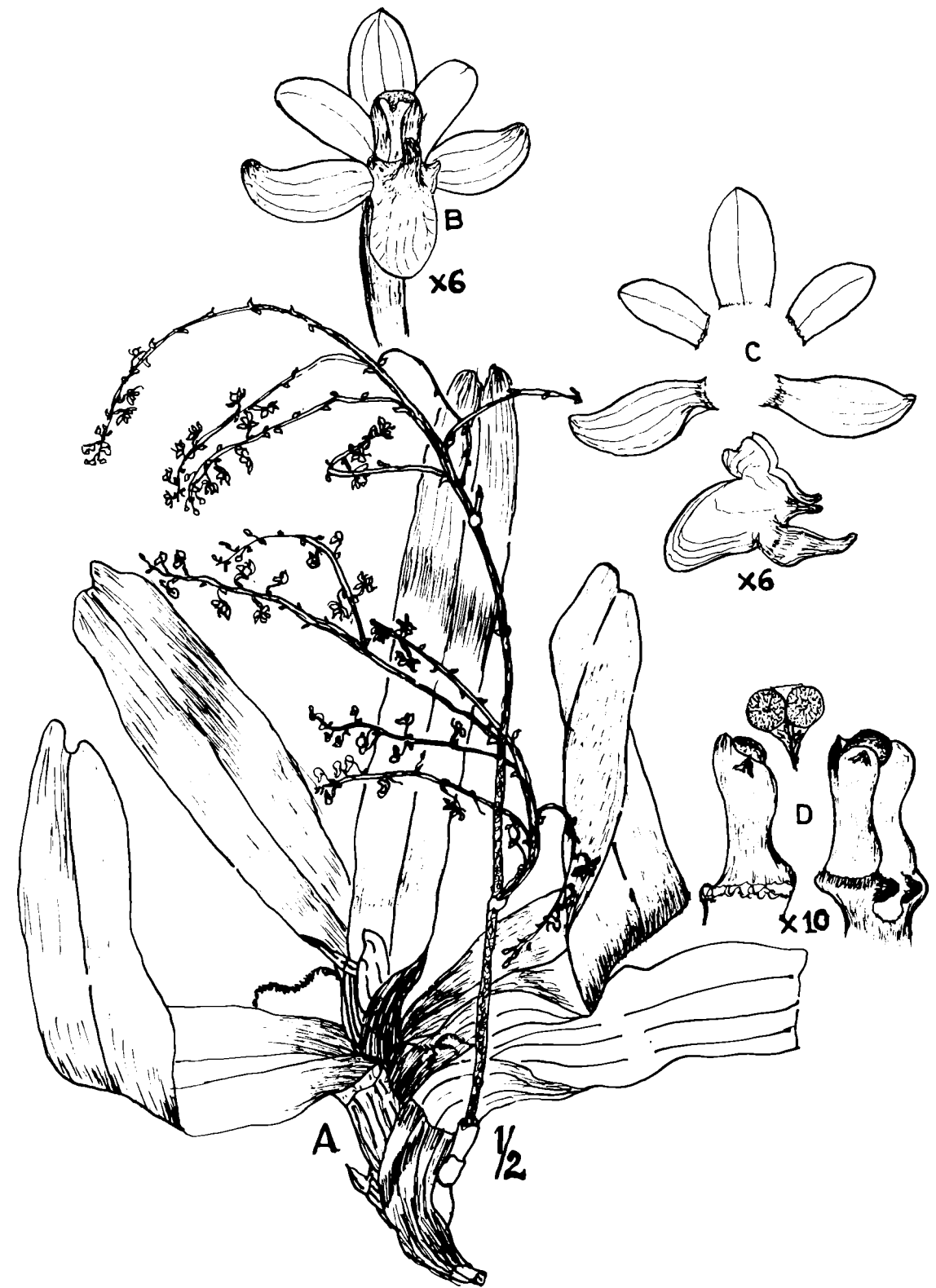
Altitudinal range - 1675 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No. $n = 19$ (Malla et al., Taxon, 27:519, 1978 as *Sarcanthus racemifer*; Mehra & Sehgal, *ibid.* 29:348, 1980).



ESMERALDA Reichb. f. (Sarcantheae-Vandinae). Schultes and Pease giving the etymology of the name, mention that it may possibly refer to the overwhelming beauty of the flowers which make this orchid a jewel in collections or perhaps to the very deep green hue of the foliage. Hawkes considered *Esmeralda* as a synonym of *Arachnanthe*. The chief character is that the lip jointed on the base of the column and is mobile.

Esmeralda cathcartii Reichb. f. (= *Arachnanthe cathcartii* Benth.).

Stem several meters long, pendulous, stout; leaves flaccidly coriaceous oblong, unequally and obliquely bifid. Inflorescence leaf opposed, exceeding the leaves, 4-5 flowered raceme; floral bracts much shorter than the ovary. Flowers 4.5-8 cm. in diam.; sepals and petals broad, oblong, externally white, on the upper surface chocolate-brown and finely barred with yellow. Lip shorter than sepals, side lobes marked with pink, apical lobe yellow, margins incurved.

Plate 230

Esmeralda clarkei Reichb. f. Gard. Chron. 2:552, 1886; B. & T. 70:29, t. 2, 1973.

= *Arachnis clarkei* (Reichb. f.) J.J. Sm.

= *Arachnanthe clarkei* Rolfe, : Hk. f. 6:28, 1890; K. & P. 209, t. 279, 1898.

Stem stout, 25-45 cm. long, pendulous; leaves oblong, 12-16 cm. by 2.5-3.7 cm., sheathing at base, apex unequally and obliquely bifid, coriaceous. Inflorescence more or less equalling the leaves, 3-4 flowered racemes. Flower, 7 cm. in diam., fleshy and very fragrant. Sepals and petals yellow with brown unequal stripes, lip with similar colouration but stripes horizontal; sepals unequal, dorsal sepal 3.3 cm. long by 1.1 cm. broad, oblong, lateral pair 3.1 cm. long equally broad, oblong but falcate; petals 3.5 cm. long, narrower than the sepals, subfalcate. Lip fleshy, 1.8 cm. long, shortly clawed, hypochile transversely oblong with erect, quadrate side lobes, mesochile thick and contracted, dilated on its lower surface into a short conical papilla, epichile expanded, subrotund, margin minutely serrate, apiculate, upper surface with deep furrows and ridges. Column 1 cm. long, very stout, speckled with brown spots. Anther conical, pollinia globular, attached to a large sland.

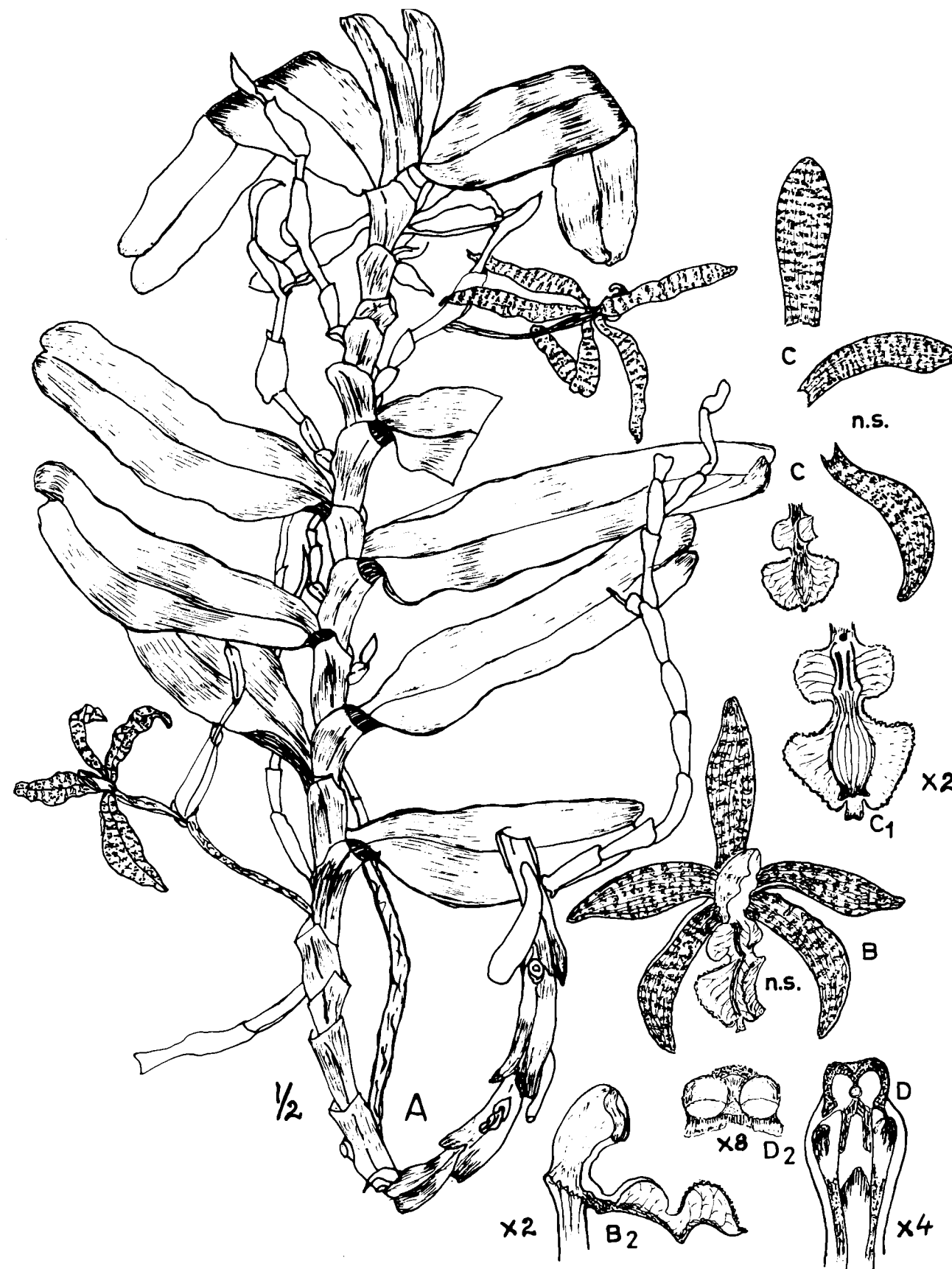
Flowering time - October to November.

Altitudinal range - 1500-1675 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.



GASTROCHILUS D. Don, (Sarcantheae - Saccolabiinae). In allusion to the belly-shaped lip in this genus. Epiphytic orchids with leaf opposed or supra axillary inflorescence. Sepals and petals are adnate to the column, and the lip has a cylindrical or saccate spur, with or without lateral lobes, the apical lobe is often hairy or fimbriate.

Gastrochilus affinis (King & Pantl.) Schltr.

Stem slender, pendulous and branched; leaves fleshy, lanceolate. Inflorescence slender, 2 or 3 flowered raceme; floral bracts ovate and much shorter than the ovary. Flowers greenish brown; sepals and petals ovate-elliptic, spreading except the dorsal sepal erect. Lip as long as the sepals, side lobes very narrow, apical lobe broadly triangular, decurved, with two thick mesial ridges; spur compressed, conical, bifid.

Key to the species of Gastrochilus

- 1 Side lobes of lip very narrow, apical lobe reniform with margin fimbriate. Inflorescence leaf opposed. *acutifolium*.
- 1* Side lobes of lip absent —
 - 2 Inflorescence axillary —
 - 3 Apical lobe of lip reniform with hair-like papillae. Leaves narrowly oblong. *calceolaris*.
 - 3* Apical lobe of lip broadly ovate or reniform. Plants flexuous, leaves terete. *inconspicuum*.
 - 2* Inflorescence leaf opposed; stem very slender, filiform; leaves sessile. *distichus*.

Plate 231

Gastrochilus acutifolium (Lindl.) O. Ktz. Rev. Gen. 2:661, 1891; Herk. 82:356, f. 196, 1974.

= *Saccolabium acutifolium* Lindl. Gen. Sp. Orchid Pl. 223, 1833; Hk. f. 6:61, 1890; K. & P. 226, t. 302, 1898.

Stem elongate, covered by sheaths of old leaves; leaves oblong-lanceolate, 8-12 cm. by 1.8-2.5 cm., acute, slightly obliquely bifid, semi-amplexicaul, jointed to a short tubular sheath, fleshy. Inflorescence leaf-opposed, peduncle with usually two tubular sheaths, umbellate with 6-8 flowers; floral bracts 3 mm. long, broadly oblong. Flowers yellow, lip white with a yellow patch and red spotted, 2 cm. in diam.; sepals subequal, oblong-oblancheolate, 1 cm. long, fleshy, slightly reflexed, dorsal erect, lateral pair slightly oblique; petals also fleshy, oblong-oblancheolate but smaller than the sepals, 8 mm. long. Lip shallowly saccate at base, 6 mm. long, side lobes very narrow, entire, apical lobe reniform, faintly 3 lobulate, fimbriate, a large broadly ovate or reniform patch at the middle, papillose-pubescent or even tubercled inner surface; column short and thick, c 2 mm. long. Anther dome-shaped, beaked; pollinia with filiform caudicle which is dilated at base and apex.

Flowering time - September to November.

Altitudinal range - 1525-2135 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

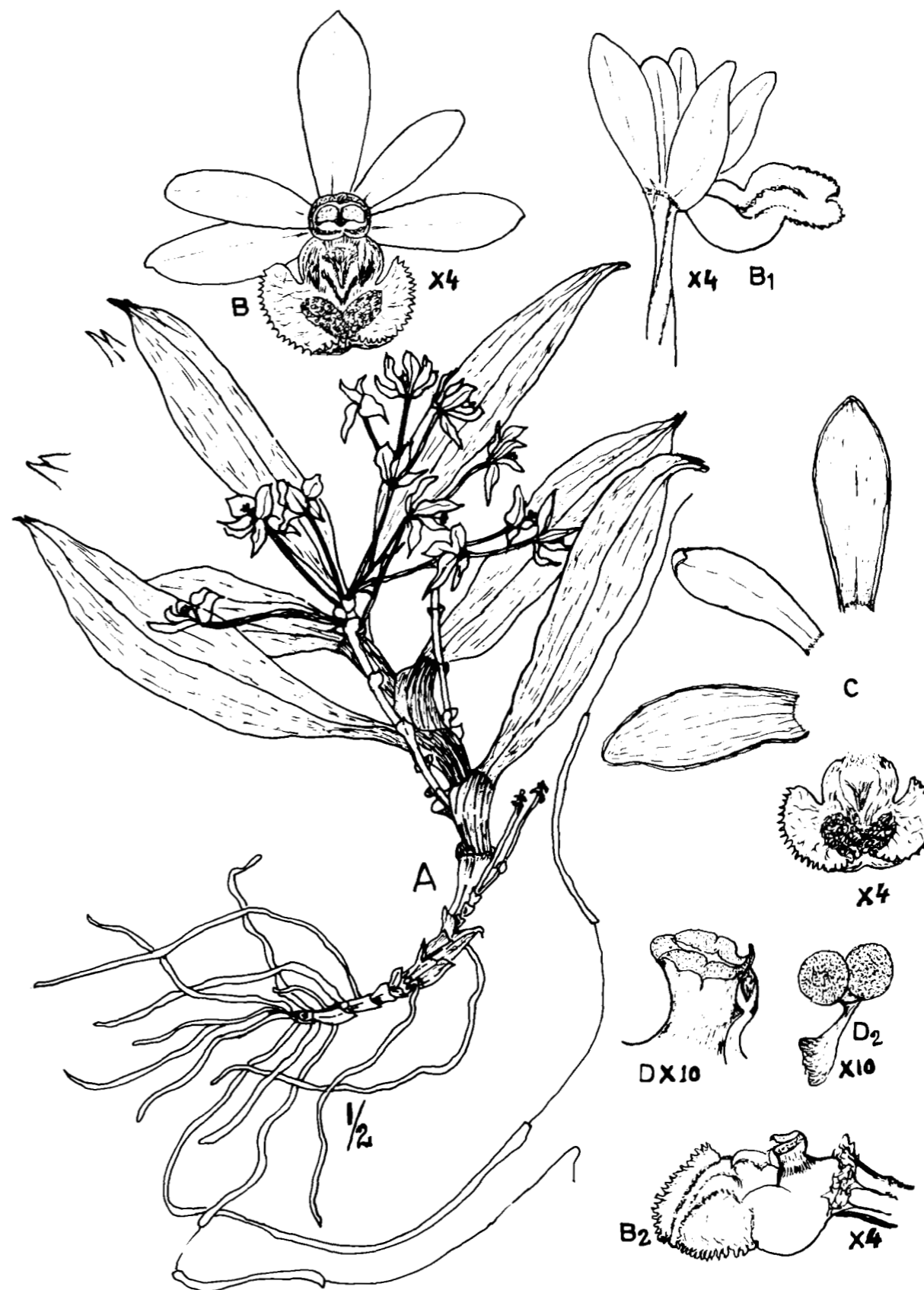


Plate 232

Gastrochilus calceolaris (Buch.-Ham. ex Sm.) D. Don, Prodr. Fl. Nep. 32, 1825; T. 435, 1966 et 2:187, 1971; B. & T. 70:30; Herk. 82:354, t. 194, 1974; H. et al. 43, 1978.

= *Aerides calceolaris* Buch. Ham. ex Smith in Rees, Cyclop. 39: Aerides No. 11, 1819.

= *Saccolabium calceolare* (Sm.) Lindl. : Hk. f. 6:60, 1890; K. & P. 225, t. 300, 1898.

Stem short and pendulous; leaves narrowly oblong, 10-25 cm. by 1.4-2.3 cm., falcate, unequally bifid apex. Inflorescence axillary, peduncle with many short sheaths at base, many flowered corymbose racemes; floral bracts 4 mm. long, broad. Flowers greenish with brown spots on sepals and petals, lip yellow with reddish brown spots, 1.4-1.6 cm. in diam.; sepals subequal, spreading, dorsal sepal obovate-oblong, 9 mm. long and 4.5 mm. broad, lateral sepals oblong, slightly shorter and narrower than the dorsal, slightly falcate; petals oblong-obovate, equalling the lateral sepals, falcate. Lip c 1 cm. long, base wide short saccate, blade of lip reniform, margin and entire surface densely covered with hair-like papillae-echinate, a yellow triangular pad at the base without hairs (no side lobes); column c 2 mm. long, thick. Anther depressed, 3 mm. broad, shortly beaked, pollinia with a slender caudicle.

Flowering time - February to April.

Altitudinal range - 915-2300 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 10 gatherings.

Specimens studied - 5.

Chr. No. n = 19 (Arora, Taxon, 20:785, 1971; Mehra & Sehgal, ibid. 27:389, 1978).

n = 38 (Mehra & Vij, ibid. 19:110, 1970 as *Saccolabium calceolare*).

2n = 38 (Mehra & Kashyap, ibid. 28:407, 1979; Vij et al. ibid. 30:512, 1981 as *Saccolabium calceolare*).

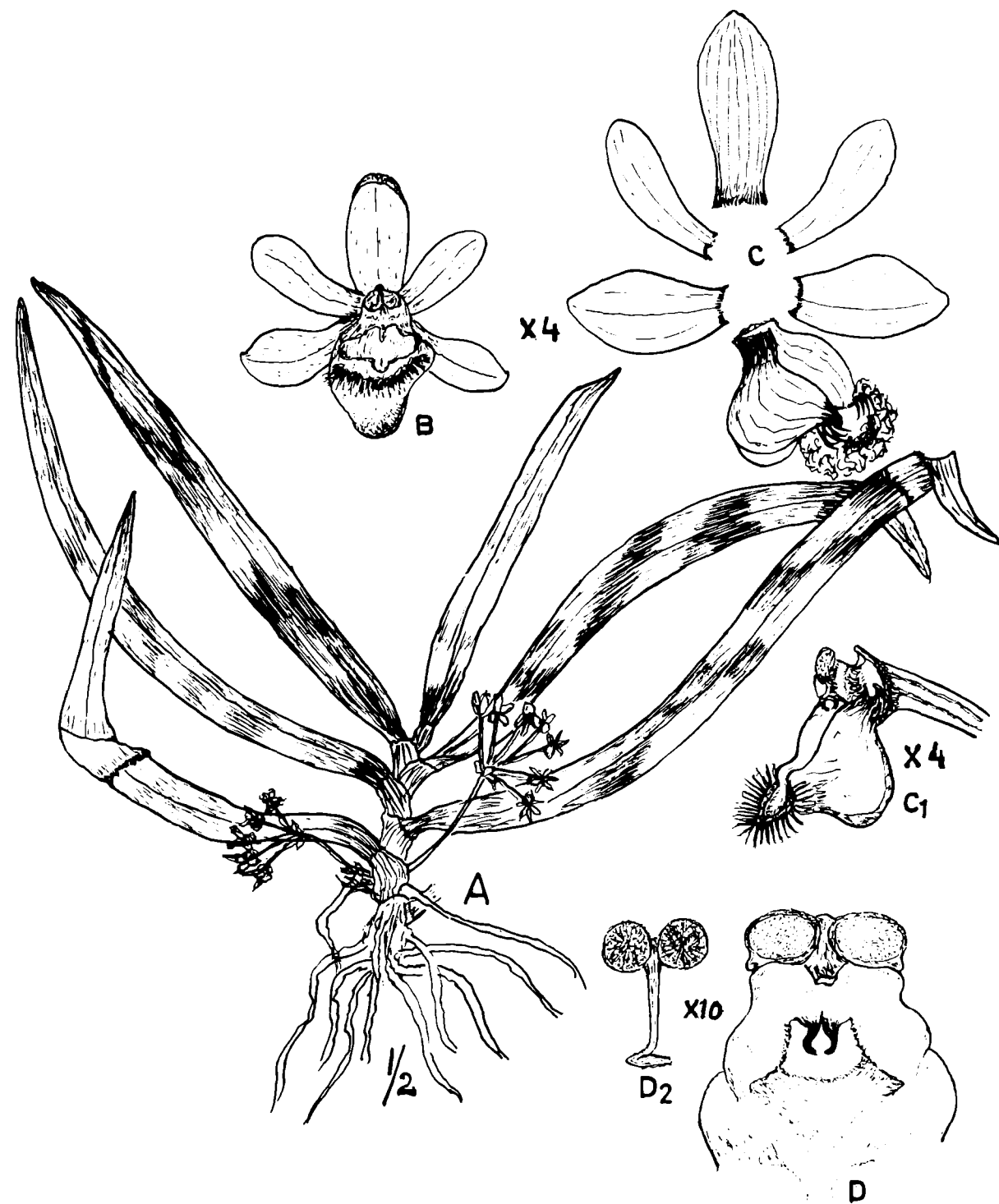


Plate 233

Gastrochilus distichus (Lindl.) Kuntze, Rev. Gen. Pl. 2:661, 1891; T. 435, 1966 et 2:187, 1971; B. & T. 70:30, 1973; Herk. 82:356, t. 195, 1974; H. et al. 44, 1978.

= *Saccolabium distichum* Lindl. Journ. Linn. Soc. Bot. 3:36, 1859; Hk. f. 6:64, 1890; K. & P. 227, t. 303, 1898.

Stem very slender, filiform, pendulous; leaves sessile lanceolate, 2-2.5 cm. by 3-6 mm., base slightly oblique, acuminate and bearing two or three setae, fleshy with pink spots. Inflorescence leaf-opposed, usually equalling the leaves rarely exceeding, raceme lax bearing 2-4 flowers; floral bracts minute, c 2 mm., oblong. Flowers green with brownish spots, 1.3 cm. in diam.; sepals equal, oblong-elliptic, 6 mm. long and 3 mm. broad, obtuse; petals similar to the sepals. Lip c 6 mm. long, base saccate, blade of lip semi-circular, margin deflexed, entire surface and margin not covered by hairs, papillae or echinae, two blunt glabrous calli at the base (side lobes absent); column c 2 mm. long, broad. Anther with a short beak, pollinia with long slender caudicles.

Flowering time March to May.

Altitudinal range - 1675-2500 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 4 gatherings.

Specimens studied - 2.

Chr. No. n = 19 (Mehra & Vij, Taxon, 19:110, 1970 as *Saccolabium distichum*).

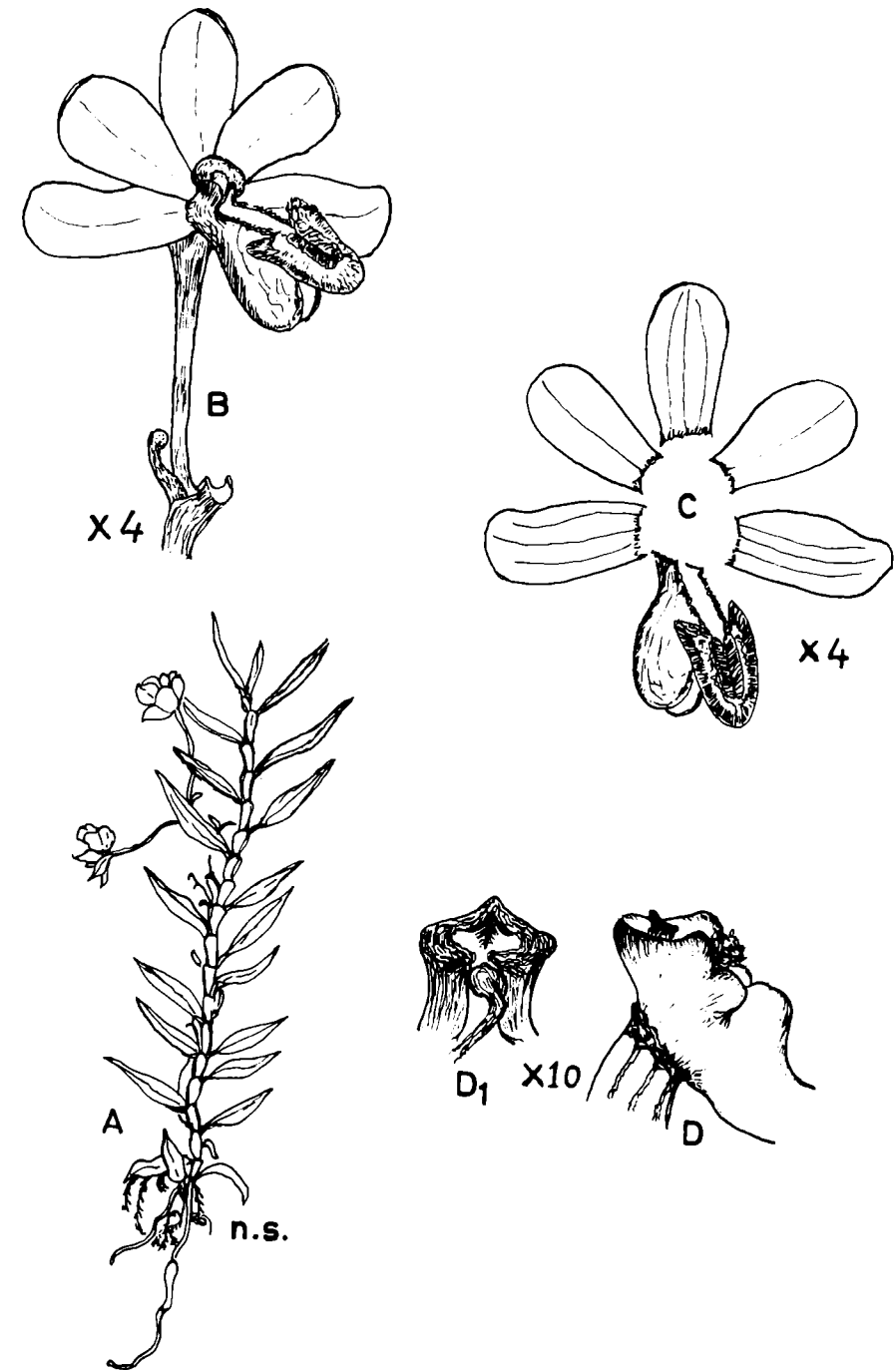


Plate 234

Gastrochilus inconspicuus (Hk. f.) Ktze. Rev. Gen. 2, 1891; Seidenf. 27(4):94, f. 46, 1971; H. et al. 44, 1978.

= *Saccolabium inconspicuus* Hk. f. Fl. Brit. Ind. 6:56, 1890.

= *Luisia inconspicua* (Hk. f.) Hk. f. ex King & Pantling, 203, t. 272, 1898.

Stem slender, flexuous, interlaced, internodes c 1 cm. long. Leaves terete, 3.5-6.5 cm. long, nearly straight and spreading. Raceme axillary, c 2-3 mm. long, slender, 1-4 flowered. Flowers small, greenish pink, c 6 mm. in diam.; sepals equal, ovato-lanceolate, 3 mm. long, spreading; petals oblong, equalling the sepals slightly tapering towards the apex. Lip equalling the sepals, 3 mm. long, basal part hemispherically saccate, margins entire, apical part broadly ovate or subreniform, decurved, upper surface finely hispid; column stout, 1.5 mm. long; rostellum large. Anther broad.

Flowering time - May to July.

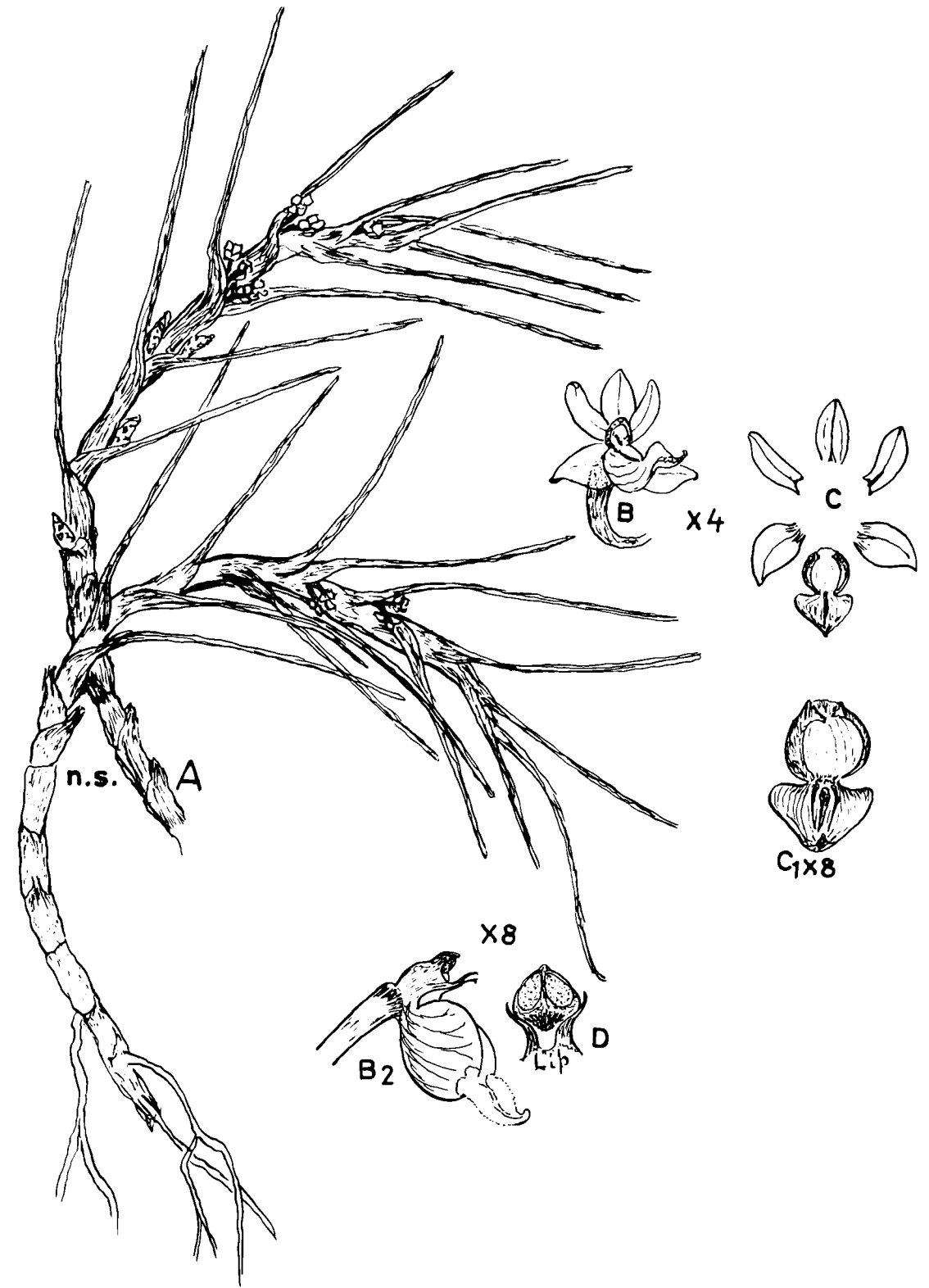
Altitudinal range - 765-1070 m.

Distributional pattern - central Nepal.

Specimens in Herbarium - 4 gatherings.

Specimens studied - 4.

Chr. No. $n = 19$ (Mehra & Vij, Taxon, 19:109, 1970; Mehra & Kashyap, ibid. 28:407, 1979 all as *Luisia inconspicua*).



KINGIDIUM P.F. Hunt (Sarcantheae - Sarcochilinae). This a new name for *Kingiella* Rolfe, which was "in memory of the work of the late Sir George King with Indian orchids". The genus is characterised by the union of the lateral sepals with the base of the lip, forming a spur-like mentum, from which the lobes are borne directly.

Kingidium deliciosum (Reichb. f.) Sw. (= *Phalaenopsis decumbens* (Griff.) Holtt.).

Roots forming tortuous tufts; stem c 2.5 cm. high; leaves fan, oblong, 15-20 cm. long, oblong-lanceolate. Inflorescence pendulous, arising beneath the leaves, longer than leaves sometimes branched; floral bracts minute; flowers pale yellow with purple markings on the lip, bases of sepals and petals mottled with pink; dorsal sepal oblong-obtuse, lateral pair shorter and broader; petals as long as the lateral pair, oblong. Lip with side lobes spreading, mid lobe obcordate; a very short wide spur.

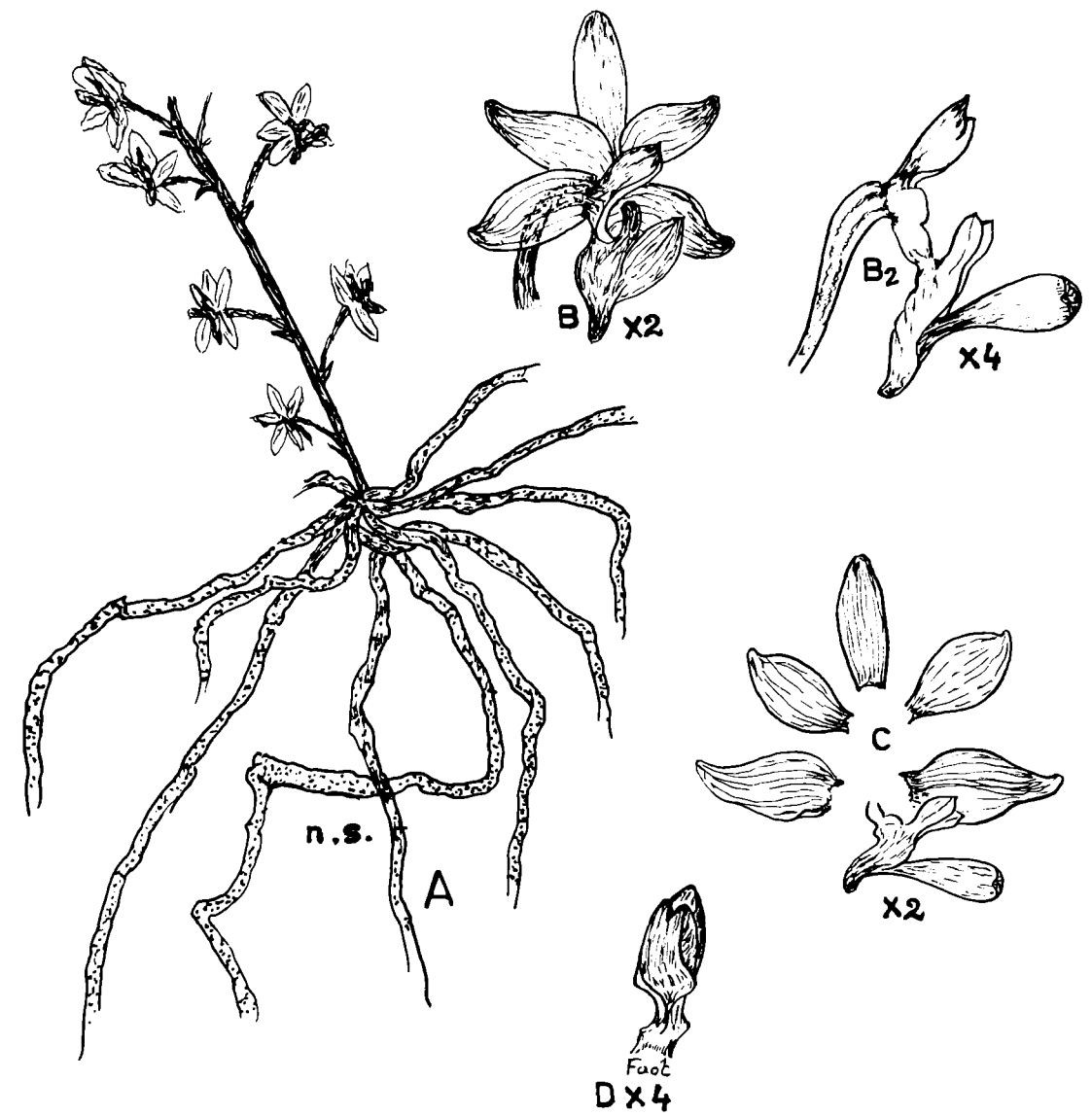


Plate 235

Kingidium taenialis (Lindl.) P.F. Hunt in Kew Bull. 24:98, 1970; H. et al. 47, 1978.

= *Aerides taenialis* Lindl. Gen. Sp. Orchid Pl. 239, 1833.

= *Dorites taenialis* (Lindl.) Hk. f. 6:31, 1890; K. & P. 199, t. 266; D. 138, 1906; Kit. 101, 1955; T. 433, 1966 et 2:185, 1971; B. & T. 70:29, 1973.

Roots numerous, flat and broad, forming large tortuous tufts; stem much reduced. (Leaves few or solitary, pendulous, elliptic-oblong, tapering to a sessile base). Inflorescence short, 6.5-8 cm. long, few flowered raceme; floral bracts 3 mm. long, much shorter than the ovary. Flowers purplish or pink with a darker lip, 2 cm. in diam.; sepals unequal, dorsal oblong, 1 cm. long, lateral sepals broadly oblong or elliptic, broader than the dorsal united with the base of the lip; petals obovate, slightly shorter than the sepals. Lip c 1.2 mm. long, side-lobes narrow, spatulate, reflexed, mid lobe broadly spatulate, curved forwards from its point of attachment with the side lobes, base produced downwards into a subcylindric spur-like mentum, 4 mm. long. Column 5 mm. long, narrowly winged, dilated, foot 3 mm. long.

Flowering time - April to June.

Altitudinal range - 1220-2300 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 8 gatherings.

Specimens studied - 4.

Chr. No. n = 18 (Mehra & Sehgal, Taxon, 25:647, 1976).

2n = 38 (Mehra & Kashyap, ibid. 27:226, 1978).

LUSIAGaud. (Sarcantheae - Vandinae). It is dedicated to Don Luis de Torres, a Spanish botanist of the nineteenth century. The plants are very much like some of the terete leaved species of *Sarcanthus* in appearance or the larger ones like *Papilionanthe teres* (Roxb.) Schltr. (*Vanda teres* Lindl.). The flowers are very distinct, which are usually greenish or yellowish, with a purple-brown fleshy lip of peculiar shape, being distinctly divided by a groove into basal and apical parts; basal part more or less hollow sometimes with distinct side lobes; apical part usually larger, wrinkled or grooved longitudinally.

Luisia trichorhiza (Hook.) Bl.

Stem very stout; leaves fleshy. Inflorescence a 4-5 flowered stout spike; floral bracts broad. Flowers c 2 cm. in diam., developed on short thick tubercles, pale green; lateral sepals obliquely ovate, longer than the oblong dorsal sepal, greenish with faint purple lines; petals longer than the sepals, oblong. Lip larger than the sepals, deeply concave at base and with erect rounded edges, apical half broadly cordate and having short vertical ridges.

Plate 236

Luisia zeylanica Lindl. Folia Orchid. Luisia : 3, 1853; Seidenf. 27:62, t. 33, 1971, H. et al. 48, 1978.

= *L. teretifolia* auct. non Gaudich. : Hk. f. 6:22, 1890; K. & P. 202, t. 271, 1898; D. 140, 1906; T. 443, 1966 et 2:191, 1971; B. & T. 70:31, 1973.

Stem slightly curved, sometimes branched internodes about 1 cm. long. Leaves terete, spreading, 12-22 cm. long. Raceme axillary 1 cm. long, 3-5 flowered. Flowers greenish-yellow but base purplish, lip similarly coloured, c 1 cm. in diam.; sepals subequal, boat-shaped, dorsal 4 mm. long and laterals 5.5 mm. long; petals narrowly oblong, 6 mm. long, blunt, spreading. Lip longer than the sepals, 7 mm. long, base subsaccate, apical lobe rhomboid, deflexed, subtruncate, 5 or 6 vertical lines on the upper surface; column 2.5 mm. long. less than half the length of the lip. Anther depressed.

Flowering time - April to June.

Altitudinal range - 305-1065 m.

Distributional pattern - east and central Nepal.

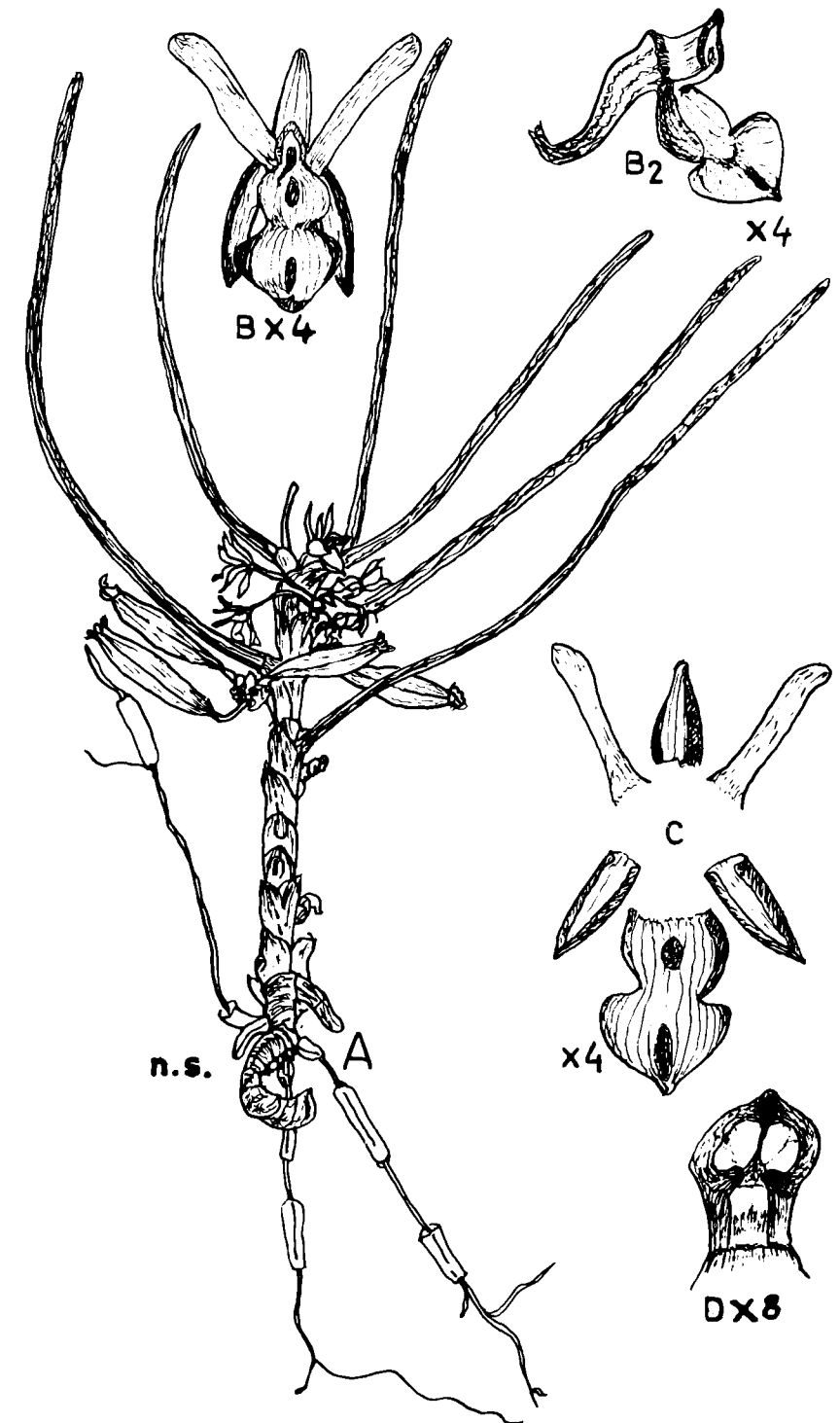
Specimens in Herbarium - 8 gatherings.

Specimens studied - 8.

Chr. No. n = 19 (Mehra & Vij, Taxon, 19:109, 1970).

2n = 38 (Kulkarni & Jorapur, ibid. 28:392, 1979; Singh, ibid. 30:705, 1981) all as *L. teretifolia*.

Remarks - There is a small callus in the middle of the subsaccate base, also another oval disc-like patch near the subtruncate apex.



ORNITHOCHILUS Wall. ex Lindl. (Sarcantheae - Sarcochilinae). Descriptive of the bilobed lip with the lobes divaricate and vertical, resembling a bird in flight. This is an epiphytic orchid with a very short stem; few obliquely elliptic leaves. The raceme is either unbranched or sparingly branched, with small flowers having an incurved spur.

Plate 237

Ornithochilus difformis (Wall. ex Lindl.) Schltr. in Fedde Repert. Beih. 4:277, 1919; T. 446, 1966; B. & T. 70:31, 1973; H. et al. 51, 1978.

= *Aerides difformis* Wall. ex Lindl. Gen. Sp. Orchid Pl. 242, 1833.

= *Ornithochilus fuscus* Wall. ex Lindl. (pro. syn.): Hk. f. 6:76, 1890; K. & P. 200, t. 268, 1898; D. 139, 1906.

Stem pendulous; leaves broadly oblong, 7.5-16 cm. by 3-4.5 cm., flat, narrowed at the base, sessile, coriaceous. Inflorescence supra-axillary, far exceeding the leaves, 20-35 cm. long, peduncle stout with 2 or 3 tabular sheaths, many flowers on a lax raceme, raceme simple or sparsely branched; floral bracts lanceolate, 3 mm. long, much shorter than the ovary. Flowers yellow with pinkish stripes and lip dark pink, 1 cm. in diam.; sepals unequal, spreading, dorsal sepal oblong, 5 mm. long, slightly concave, lateral sepals obliquely obovate, 6 mm. long; petals smaller, oblong, serrulate. Lip much larger than the sepals, 8 mm. from base to side-lobules of apical lobe, side lobes subquadrate, apical lobe divided into 3 lobules, the side-lobules recurved with pectinate margin, central lobule triangular, infolded and with entire margin, a broad long claw and an incurved subcylindric spur joint to the apical lobe, 2 calli at the mouth of the spur. Column stout, 3 mm. long cylindric, foot c. .75 mm. long, leading to a 1.5 mm. long and broad claw, rostellum forked. Anther oblong, pollinia with broad caudicle.

Flowering time - June-July.

Altitudinal range - 1200-1980 m.

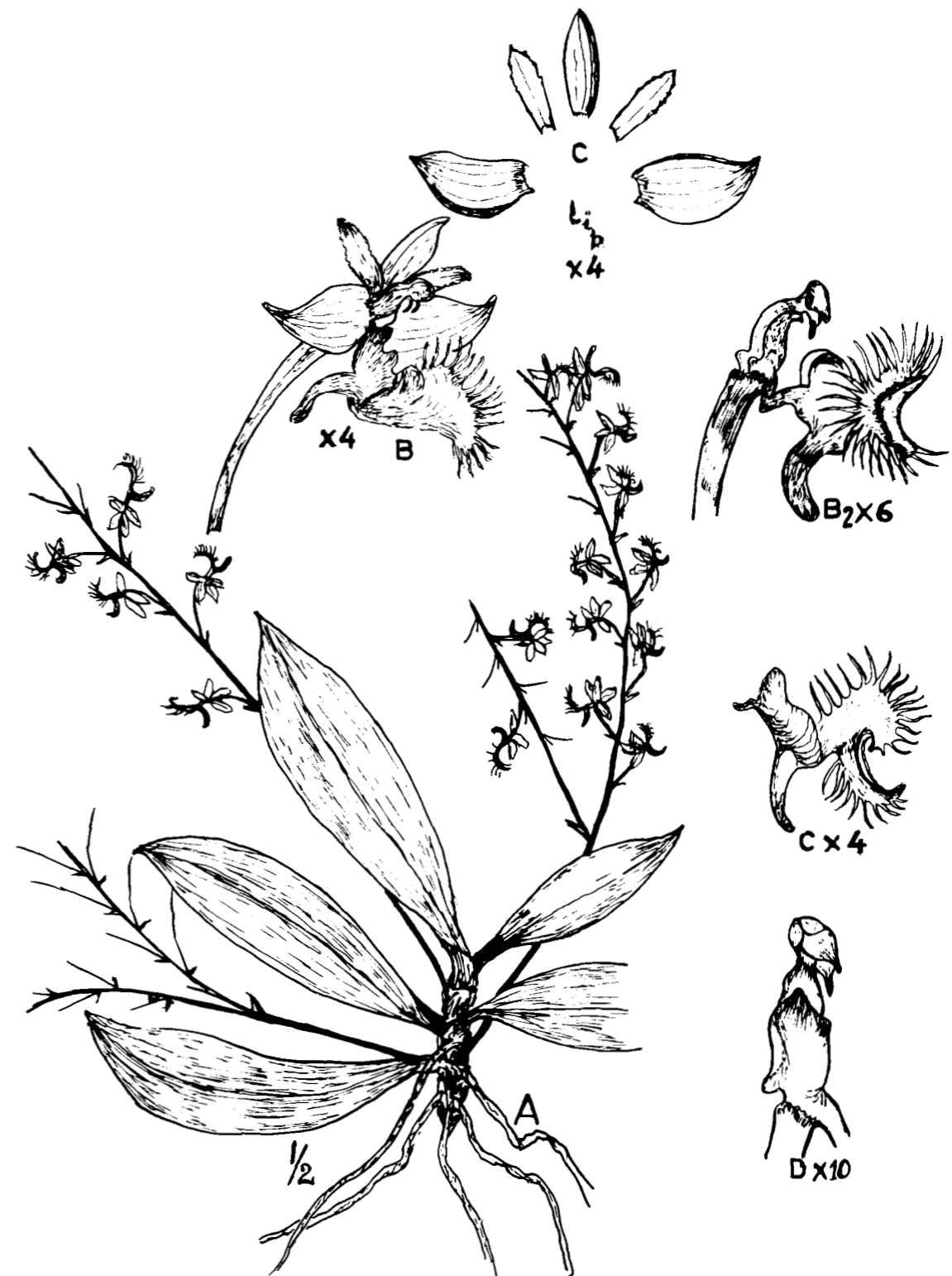
Distributional pattern - central and east Nepal.

Specimens in Herbarium - 6 gatherings.

Specimens studied - 3.

Chr. No. n = 19 (Mehra & Sehgal, Taxon, 29:349, 1980 as *O. fuscus*).

2n = 38 (Mehra & Kashyap, ibid. 25:492, 1976; Vij et al., ibid. 25:641, 1976, both as *O. fuscus*).



PAPILIONANTHE Schltr. As a rule most of the Vandas have fairly long, wide and flat leaves with the midrib depressed above but a few species from a special group with terete leaves and long climbing habit. For this group Schlechter has proposed a new generic name — *Papilionanthe*. According to Holttum, however, a careful examination of the longitudinal section of the flowers and their pollinia shows no essential differences from the other Vandas.

We have followed Seidenfaden in assigning the species to the genus *Papilionanthe*.

Papilionanthe teres (Roxb.) Schltr. (= *Vanda teres* Lindl.).

Stem long, subscentent, slender, leaves fleshy, terete. Inflorescence extra-axillary, 3-6 flowered raceme; flowers c 7.5 cm. in diam., white or faintly pinkish; sepals and petals widely spreading and with undulate margins. Lip longer than the sepals, side lobes broad and incurved, mid lobe deeply bifid, hairy towards the base; spur infundibuliform.

Plate 238

Papilionanthe uniflora (Lindl.) Garay, Bot. Muse. Leafl. Harv. Univ. 23:372, 1974.

= *Aerides uniflora* (Lindl.) Summerh. in Kew Bull. 1955:588, 1956; H. et al. 31, 1978.

= *Mesoclastes uniflora* Lindl. Gen. Sp. Orchid. Pl. 45, 1830.

= *Aerides longicornu* Hk. f. 6:44, 1890 (nomen illegit); K. & P. 211, t. 281, 1898; T. 2:176, 1971.

Stem slender, pendulous, elongate; leaves terete, 9.5-18 cm. long, breadth c 2 mm. Peduncle extra-axillary, very slender, one flowered but very rarely 2 flowered. Flowers c 1.5 cm. across, white with slightly pinkish spur; sepals subequal, oblong, dorsal slightly shorter than the laterals, c 9 mm. long, erect, apiculate, laterals spreading and subfalcate; petals 8 mm. by 5 mm., broadly oblong, base truncate, undulate. Lip with bipartite side lobes, segments elongate subulate, mid lobe narrow, clawed, tip dilated and bifid; spur 1.6 cm. long, narrowly elongated, infundibuliform, slightly curved forwards; column short, 4 mm., foot much longer, 10 mm. long, adnate to the lip. Anther shortly beaked, c 2 mm., pollinia globose with filiform caudicles.

Flowering time - September to October.

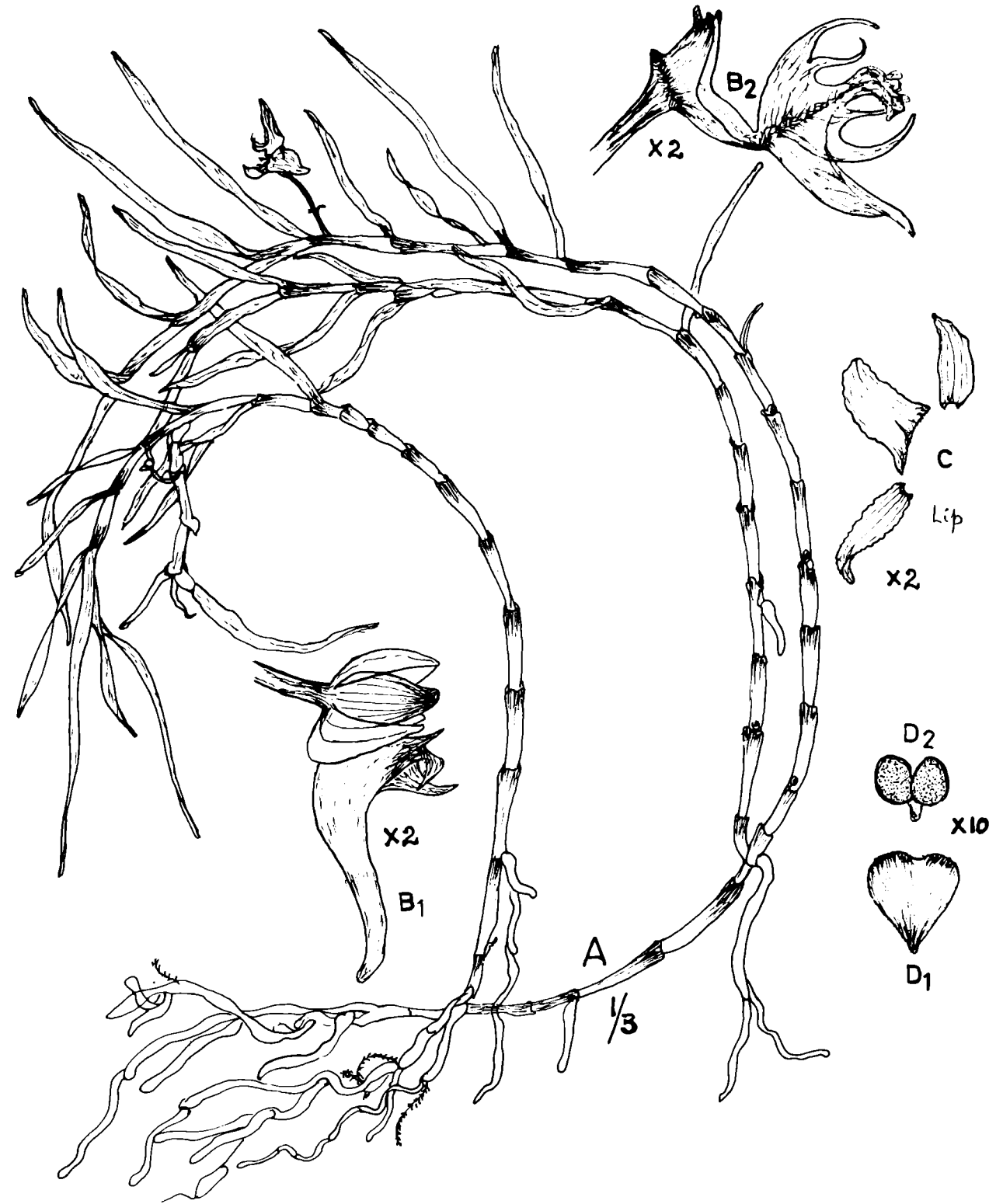
Altitudinal range - 1525-2135 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 3 gatherings.

Specimens studied - 3.

Chr. No. n = 19 (Mehra & Vij, Taxon, 19:106, 1970 as *A. longicornu*).



PELATANTHERIA Ridl. (Sarcantheeae - Sarcophilinae). This genus is allied to *Sarcanthus* Lindl., though totally different in habit. The stems are usually tall, and the racemes short. The column is remarkably broad and thick. The pollinia are very distinct in the broad short quadrate caudicle and equally large disc.

Plate 239

Pelatantheria insectifera (Reichb. f.) Ridl. J. Linn. Soc. 32:373, 1896; Seidenf. 65:152, 1969.

= *Sarcanthus insectifer* Reichb. f. in Bonplandia 5:159, 1857; Hk. f. 6:68, 1890; D. 149, 1906.

Stem robust, scandent, flexuous, giving off adventitious roots. Leaves oblong, 3.5-5 cm. by 1.3-1.8 cm., almost imbricate and distichously arranged, amplexicaul, obtusely bifid, thick and coriaceous. Inflorescence axillary, shorter than the leaves, decurved, few flowered racemes; floral bracts minute. Flowers greenish yellow with two reddish brown stripes on sepals and petals, lip purplish, 1.3-1.5 cm. in diam.; sepals unequal, spreading, dorsal sepal oblong, 4 mm. long, lateral pair falcately elliptic-ovate, 6 mm. long; petals equalling the dorsal sepal. Lip broadly funnel-shaped, 7 mm. long, terminal lobe triangular ovate or cordate with thickened and attenuated apex, side lobes short and rounded; spur short, 4 mm. long, broadly conical with a ring of hairs at the mouth; column c 2 mm. long with uncinately recurved arms at the tip. Anther hemispheric, c 2.25 mm. broad, pollinia globose with stripe (caudicle) short and very broad.

Flowering time - November.

Altitudinal range - 200 m.

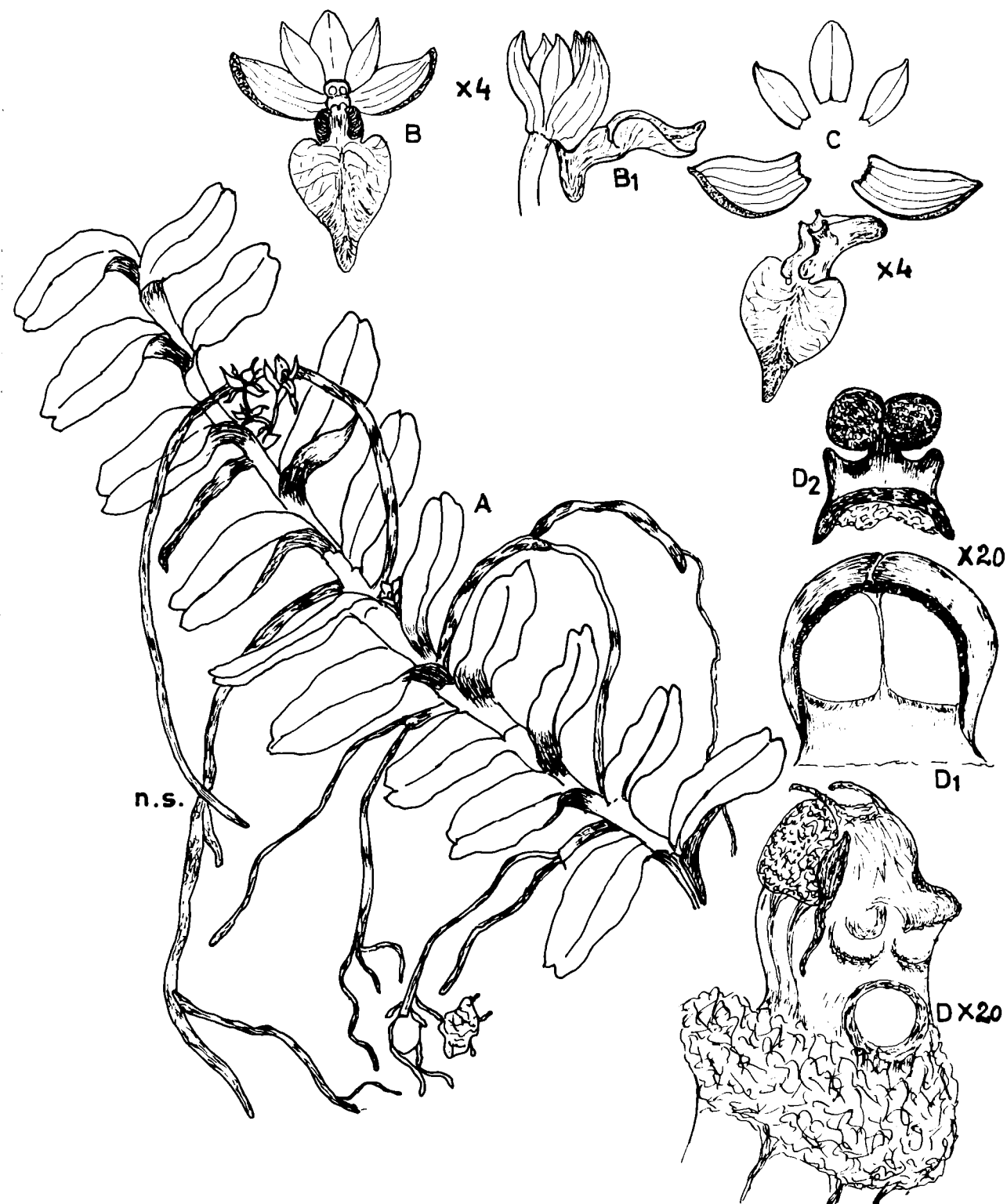
Distributional pattern - east Nepal.

Specimens in Herbarium - 1 gathering.

Specimens studied - 1.

Chr. No.

Remarks - This is a new record for Nepal. It has been found in one locality only where it is abundant as an epiphyte on *Shorea robusta*.



PHALAENOPSIS Bl. (Sarcantheae - Sarcochilinae). Because of the supposed likeness of the flowers of the type species to certain tropical moths, the genus is named. These are epiphytic orchids, the remarkable feature being the presence of the forked appendages on the lip. The lip is not spurred, but may be saccate; one or more appendages are usually present at the base of the mid lobe or between the side lobes.

Plate 240

Phalaenopsis mannii Reichb. f. in Gard. Chron. 1871:902, 1871; Hk. f. 6:30, 1890; K. & P. 197, t. 264, 1898; H. et al. 53, 1978.

Stem very short with thick roots. Leaves oblong-lanceolate, 12-30 cm. by 4.5-10 cm., falcate, obtuse with a minute apiculus, tapering to a sessile base. Inflorescence arising below the leaves, pendulous about as long as or shorter than the leaves, racemes branched, laxly many flowered; floral bracts 5-8 mm. long, much shorter than the ovary, ovate-lanceolate. Flowers greenish yellow with brown stripes, 2.5-3.3 cm. in diam.; sepals unequal, dorsal sepal oblong, 1.7 cm. long, acute, lateral pair broadly ovate-lanceolate slightly longer than the dorsal; petals shorter than the sepals, c 1.4 cm. long, oblong, falcate, acute. Lip much shorter than the sepals, 9 mm. long, white, side lobes falcately oblong, purple striped, mid lobe truncate, panduriform with two widely spreading, recurved, oblong, carunculate and laciniate apical lobules, disc with a flattened appendage in front of two awns, two backwardly directed setae in the middle of the lip, base clawed. Column 7 mm. long, foot short, 2 mm. long with two flattened outgrowths; rostellum elongate.

Flowering time - April to June.

Altitudinal range - 200-610 m.

Distributional pattern - east Nepal.

Specimens in Herbarium- 6 gatherings.

Specimens studied - 4.

Chr. No.



RHYNCHOSTYLIS Bl. (Sarcantheae - Sarcophilinae). From the beaked column of the flowers. Epiphytic, with stout, creeping and leafy stem. Leaves very thick, deeply channelled, keeled and curved. Racemes densely flowered, drooping; flowers blotched. Lip deeply saccate, epichile obovate and concave.

Plate 241

Rhynchostylis retusa (L.) Bl. Bijdr. Fl. Nederl. Ind. 7:286, t. 49, 1825; Hk. f. 6:32, 1890; K. & P. 213, t. 284, 1898; Burk. 133, 1910; T. 449, 1966 et 2:194, 1971; Schill. 94:223, 1969; Dept. Med. Pl. 2:135, 1969; Herk. 78:117, 1970 et 84:163, 13, 1976; B. & T. 70:33, 1973; H. et al. 55, 1978.

= *Epidendrum retusum* Linn. Sp. Fl. 953, 1753.

= *Aerides spicatum* D. Don, 31, 1825.

Stem stout, leafy, older portion covered by the sheaths of decayed leaves. Leaves oblong, curved, 12-35 cm. by 2-2.5 cm., deeply channelled, keeled, bluntly bilobed. Inflorescence longer than the leaves, c 3.1 cm. long, peduncle with a few scattered sheaths, raceme densely flowered; floral bracts minute 2-3 mm. Flowers pinkish white or pink marked by purple spots, 1.5 cm. in diam.; sepals subequal, dorsal sepal broadly oblong, 7 mm. long, laterals broadly and obliquely ovate, 8 mm. and slightly broader than the dorsal; petals narrower than the sepals, 7.5 mm. long, elliptic-oblong. Lip deeply saccate, c 1 cm. long, hypochile forming a deep wide spur c 5 mm. long, no side lobes, epichile obovate, concave, margins raised, apex acute and recurved. Column short, 3 mm. long, stout and dilated at the base, foot very short. Anther rounded, pollinia with slender caudicles.

Flowering time - June to July.

Altitudinal range - 350-1830 m.

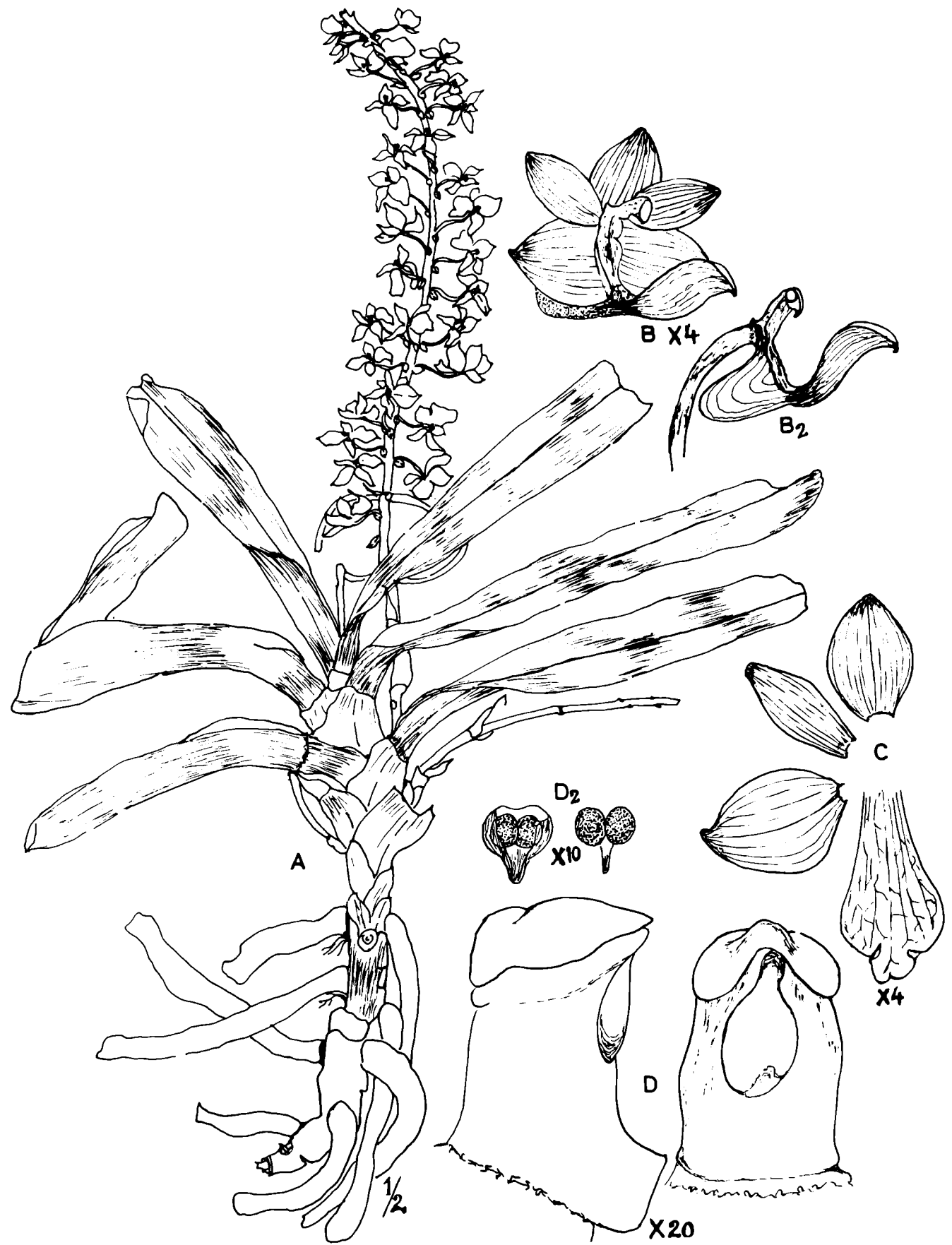
Distributional pattern - west, central and east Nepal.

Specimens in Herbarium - 12 gatherings.

Specimens studied - 6.

Chr. No. n = 19 (Arora, Taxon, 17:200, 1968; Mehra & Sehgal, ibid. 29:349, 1980).

2n = 38 (Vij et al., ibid. 25:635, 1976; Kulkarni & Jorapur, ibid. 28:392, 1979; Mehra & Kashyap, ibid. 30:507, 1981; Vij et al., ibid. 30:512, 1981; Singh, ibid. 30:705, 1981).



SMITINANDIA Holttum. (Sarcantheeae - Saccolabiine). Named after Tem Smitinand, Orchidologist of Thailand. The shape of the labellum differs greatly from that of *Sarcanthus* and the callus which closes the entrance to the spur is an outgrowth from the base of the mid lobe of the lip, and not from the back of the spur as is in *Sarcanthus*. The pollinia are in two pairs, the two in a pair are very unequal, and when viewed from front, the smaller members of each pair are hidden.

Plate 242

Smitinandia micrantha (Lindl.) Holttum in Gard. Bull., Singapore, 25:106, 1969; H. et al. 56, 1978.

= *Saccolabium micranthum* Lindl. Gen. Sp. Orchid Pl. 220, 1833; Hk. f. 6:59, 1890.

= *Cleisostoma micranthum* (Lindl.) King & Pantl. 234, t. 312, 1898; D. 148, 1906.

Stem covered over by leaf-sheaths. Leaves narrowly oblong, 5.5-9 cm. by 1-1.5 cm., obliquely truncate and bifid, keeled, shortly sheathed at base. Inflorescence leaf opposed, 6-12 cm. long, equalling or longer than the leaves, peduncle stout, bracts few at the base, densely flowered raceme but only few opening at a time; floral bracts minute. Flowers pinkish with dark pink lip, 6 mm. in diam.; sepals unequal, dorsal ovate, lateral sepals broader and slightly longer than the dorsal, acute; petals smaller than the sepals, oblong faintly serrulate, spreading. Lip fleshy, c 5 mm. long, mid lobe obovate or oblong, apex recurved, margin serrulate, side lobes small, broad, base with a wide spur, 2 calli near the mouth of the spur. Column very short, c 1 mm. long, stout with a large protuberance on either side of the rostellum. Anther depressed with a pointed beak; pollinia with a triangular caudicle.

Flowering time - May to June.

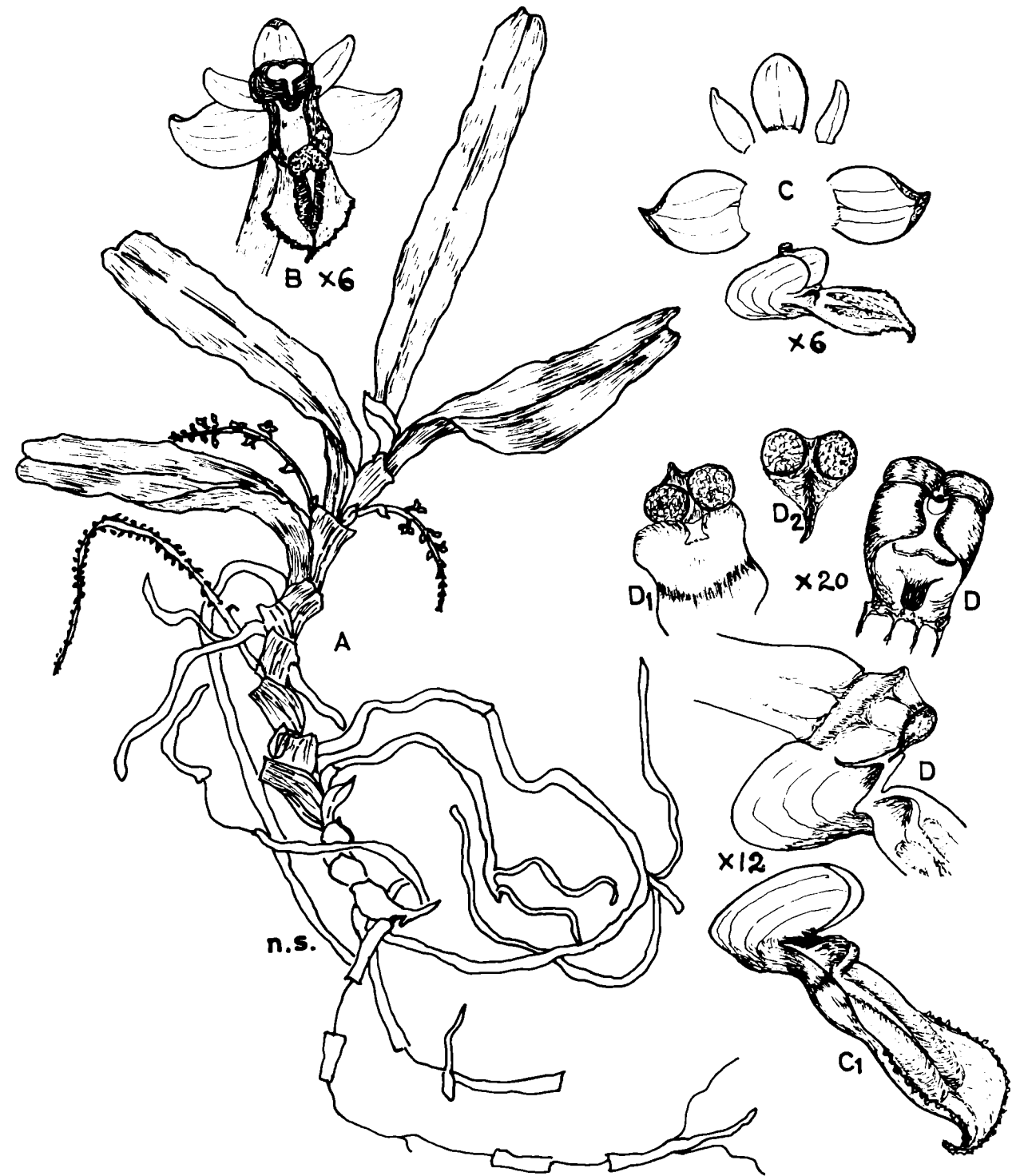
Altitudinal range - 455-1375 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 4 gatherings.

Specimens studied - 4.

Chr. No. n = 19 (Mehra & Vij, Taxon, 19:107, 1970; Mehra & Kashyap, ibid. 25:492, 1976; Vij et al., ibid. 25:634, 1976; Mehra & Sehgal, ibid. 29:348, 1980 — all as *Cleisostoma micranthum*).



STEREOCHILUS Lindl. (Sarcantheae - Sarcophilinae). The name is derived from the solid lip (Solid bag-shaped lip). These are epiphytal orchids with a short stem and coriaceous leaves. Flowers are in extra-axillary racemes. Lip is distinctly 3 lobed and spurred; and the anther is terminal.

Stereochilus bicuspidatus (Hk. f.) King & Pantl.

Stem long and with numerous roots; leaves coriaceous, narrowly oblong. Inflorescence arising below the leaves, exceeding them, bearing laxly crowded flowers; floral bracts minute. Flowers c 8 mm. across, yellowish and marked pink along the midribs of sepals, petals and lobes of the lip; dorsal sepal obovate-elliptic, lateral pair broadly elliptic; petals smaller than the sepals, oblanceolate. Lip equalling the sepals, side lobes rounded, apical lobe ovate, concave; spur as long as the ovary, two calli touching and closing the mouth of the spur.

UNCIFERA Lindl. (Sarcantheae - Saccolabiinae). The name suggests the retrorse, hook-like spur on the lip.

Uncifera acuminata Lindl.

Leaves linear-oblong, up to 7 cm. long. Racemes shorter than the leaves; 8-10 flowered. Flowers pale green, c 6 mm. across; lip with apical lobe fleshy, broadly triangular, side lobes rounded, erose. Spur longer than the ovary and curved forwards.

Uncifera obtusifolia Lindl.

Leaves flat, 9-20 cm. long. Racemes longer than the leaves; densely flowered. Flowers pale yellow, c 1.2 cm. across; lip longer than the sepals; apical lobe thickened, laterally compressed, 3 lobulate; side lobes small, near the base. Spur long and curved forwards and almost touching the lip.

VANDA Jones (Sarcantheae - Vandinae). From the Sanskrit word referring to *Vanda tessellata* and possibly to other parasitic Loranthaceae which are 'banda' (meaning "tide to") the host. Epiphytic, with stem which is leafy. Leaves are very coriaceous, usually keeled. Sepals and petals usually with undulate margin; lip large, usually saccate or spurred, disk there on ridged or lamellate.

Artificial key to the species of Vanda

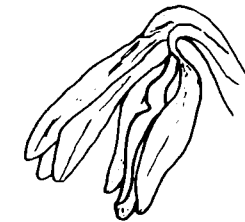
- 1 Lip gibbous, not spurred or saccate. Flowers c 2.5 cm. in diam.,..... *alpina*.
- 1 Lip spurred at the base —
 - 2 Sepals and petals spreading —
 - 3 Flowers c 3.5-5 cm. in diam.; disk of lip with fleshy ridges, side lobes small and fleshy..... *tessellata*.
 - 3* Flowers small, c 1.5 cm. in diam.; disk of lip without ridges, side lobes small, erect and oblong..... *testacea*.
 - 2* Sepals and petals incurved, flowers 3.5-5 cm. in diam., side lobes erect, triangular, 2 divaricate lobules of the apical lobe..... *cristata*.

Plate 243

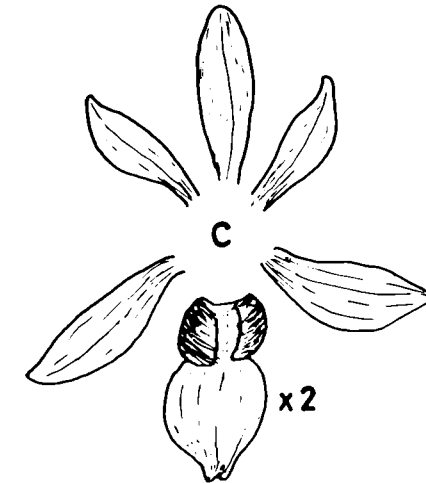
Vanda alpina (Lindl.) Lindl. Fol. Orch. Vanda 10, 1853; Hk. f. 6:53, 1890; K. & P. 217, t. 289, 1898; D. 146, 1906; B. & T. 70:34, 1973; H. et al. 57, 1978.

= *Luisia alpina* Lindl. Bot. Reg. Misc. 56, 1838.

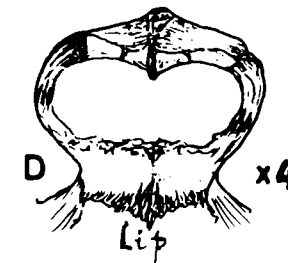
Stem long, covered by old leaf sheaths; leaves numerous, oblong, truncately and unequally bilobed, slightly dialted at the base, rigid, recurved and keeled. Inflorescence axillary, shorter than the leaves, two flowered raceme or solitary flower; floral bracts minute. Flowers yellowish green with lip yellowish and



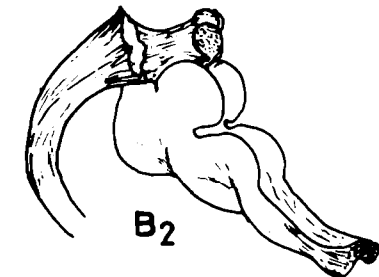
B x 2



x 2



x 4



B2

purple tint, not exceeding 3 cm. in diam.; sepals subequal, rather connivent, c 2.5 cm. long, lateral pair faintly falcate; petals narrowly oblong, c 2.25 cm. long, also connivent. Lip c 3.3 cm. long, pale yellow, apical lobe retuse, concave, upper surface with shallow ridges, side lobes small, entire, rounded and incurved; not spurred but gibbous at base; column short, c 4.5 mm. stout, broad, foot absent.

Flowering time - July.

Altitudinal range - 1065-1525 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 4 gatherings.

Specimens studied - 2.

Chr. No.

Remarks - In habit and foliage it resembles *V. aristata* but the inflorescence is 2 or even one flowered; lip is characteristically different, gibbous at base and the column is short and broad.

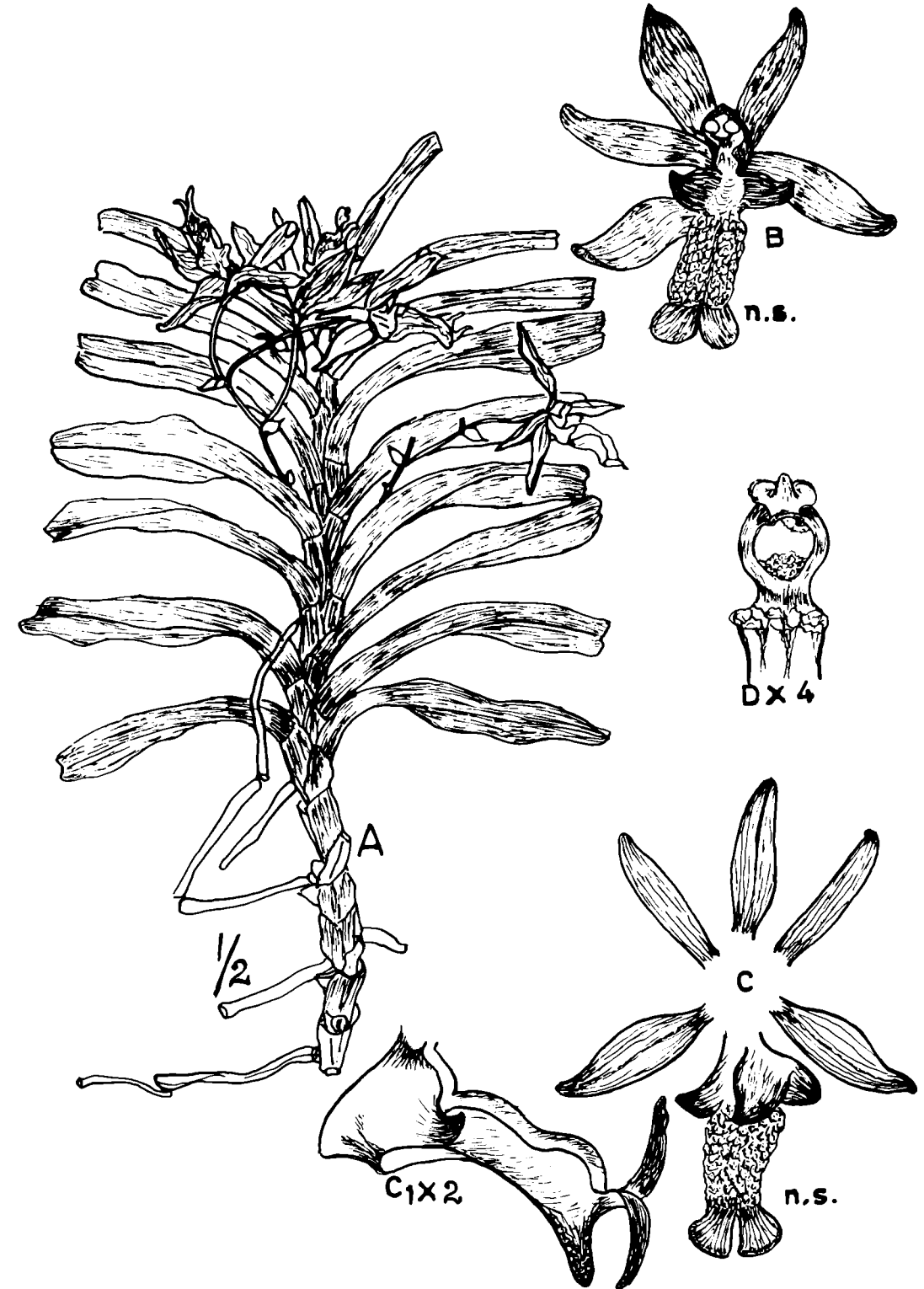


Plate 244

Vanda cristata Lindl. Gen. Sp. Orchid Pl. 216, 1833; Hk. f. 6:53, 1890; K. & P. 216, t. 287, 1898; D. 146, 1906; T. 2:195, 1971; B. & T. 70:34, t. 5, 1973; Herk. 83:134, f. 73, 1975; H. et al. 57, 1978.

Stem long, stout, covered by old sheaths. Leaves narrowly oblong, 7-12 cm. by 1-1.5 cm., conduplicate, truncately and unequally bilobed, slightly dilated at the base, rigidly coriaceous, recurved and keeled. Inflorescence axillary, usually equalling the leaves but sometimes exceeding, bracts on peduncle few, raceme 2-5 flowered; floral bracts 4-6 mm. long. Flowers green with lip yellowish, purple tint, 3.5-5 cm. in diam.; sepals subequal, spreading, oblong, obtuse, dorsal 2.8 cm. long, laterals a bit smaller; petals narrowly oblong, equalling the sepals but narrower. Lip 3.3 cm. fleshy, apical lobe oblong, 2 divaricate oblong lobules at the apex, a horn-like fleshy beak directed downwards a little behind the apex, side lobes erect, triangular spur wide, infundibular, c 6 mm.; column short, 6 mm. long, foot absent.

Flowering time - March to June, also in November.

Altitudinal range - 610-2135 m.

Distributional pattern - east and central Nepal.

Specimens in Herbarium - 9 gatherings.

Specimens studied - 5.

Chr. No. n = 19 (Arora, Taxon, 20:786, 1971; Mehra & Kashyap ibid. 25:492; Mehra & Sehgal, ibid. 29:350, 1980).

Plate 245

Vanda tessellata (Roxb.) Hook. in Loud. Hort. Brit. 372:1830; B. & T. 70:35, 1973; Herk. 83:206, f. 207, 1975 (nomen).

= *Epidendrum tessellatum* Roxb. Cor. Pl. 34, t. 42, 1820.

= *Vanda roxburghii* R. Br. : Hk. f. 6:52, 1890; D. 116, 1906; H. et al. 58, 1978.

Stems long, even up to 30 cm., clinging by roots which are thick with a white velamen; leaves narrow c 15 cm. long, channelled and keeled, unequally bilobed. Inflorescence longer than the leaves, usually 5-8 flowered raceme; floral bracts small. Flowers 3.5-4.5 cm. in diam. tessellated with brown or purple; sepals c 2.8 cm. long, spreading, yellowish green or bluish tessellated; petals c 2.5 cm. long, spreading and tessellated similar to sepals. Lip about half as long as the sepals or rarely equalling, apical lobe panduriform, dull violet and pales at the base, tip dilated, truncate, 2 lobed and purple, side lobes small, acute, purple-spotted; spur conical; column short, thick and broad. Pollinia globose, caudicles short and attached to a subquadrate gland.

Flowering time - July to August.

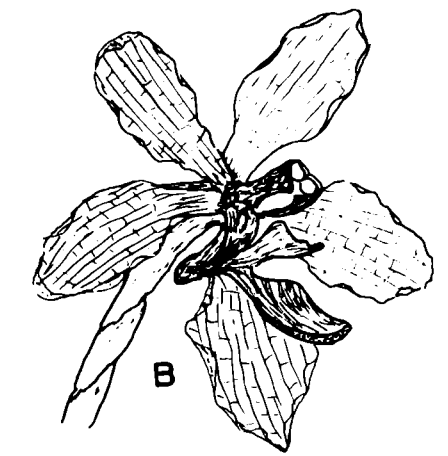
Altitudinal range - sub-Himalayan region, not extending above 455 m.

Distributional pattern - west, central and east Nepal.

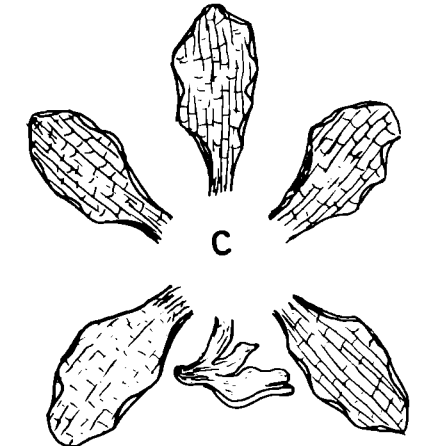
Specimens in Herbarium - 5 gatherings.

Specimens studied - 3.

Chr. No.



n.s.



x6



Plate 246

Vanda testacea (Lindl.) Reichb. f. Gard. Chron. 2:166, 1877; Seidenf. & Aro. 2:25, 1982.

= *Vanda parviflora* Lindl. in Edw. Bot. Regist. 30, misc:45, 1844; Hk. f. 6:50, 1890; K. & P. 215, t. 286, 1898; Burk. 4:133, 1910; B. & T. 70:34, 1973; Herk. 83:279, f. 165, 1975; H. et al. 58, 1978.

Stem stout, clothed by old sheaths. Leaves linear-oblong to lanceolate, 7.5-11 cm. by 1-1.2 cm., conduplicate, channelled and keeled, unequally and obtusely bilobed, base neither dilated nor narrowed, coriaceous. Inflorescence arising below the leaves and equalling them, few flowered raceme; floral bracts minute. Flowers yellowish with pink lip, 1.5 cm. in diam., sepals subequal, spatulate, dorsal sepal 8 mm. long, laterals 7 mm. long, slightly broader than the dorsal; petals spatulate-oblong, slightly falcate, 8 mm. long. Lip fleshy, c 8 mm. long, apical lobe oblong, decurved, apex broad, emarginate or faintly 2 lobulate, base faintly saggitate, side lobes erect, oblong; spur half as long as the ovary, 1.5 mm.; column thick, stout, 3 mm. long, foot very short.

Flowering time - June.

Altitudinal range - \pm 460 m.

Distributional pattern - east Nepal.

Specimens in Herbarium - 2 gatherings.

Specimens studied - 2.

Chr. No. n = 19 (Mehra & Kashyap, Taxon, 25:492, 1976; Vij et al. ibid. 25:641, 1976; Vij et al. ibid. 30:512, 1981).



VANDOPSIS Pfitzer, (Sarcantheae - Vandinae). Implying a resemblance to *Vanda*. These are robust and spectacular epiphytic orchids. Sepals and petals are widely spreading with very wavy margins; lip smaller than the sepals, epichile concave, with two ridges running from the base nearly to the apex. This genus differs from *Vanda* chiefly by its lip, which is neither saccate nor spurred at the base, but is concave.

Plate 247

Vandopsis undulata (Lindl.) J.J. Sm. in Naturk. Tijdschr. Ned-Indie. 72:77, 1912; B. & T. 70:35, t. 7, 1973; Herk. 85:55, f. 56, 1977; H. et al. 58, 1978.

= *Vanda undulata* Lindl. J. Proc. Linn. Soc. Bot. 3:42, 1859; T. 452, 1966 et 2:195, 1971.

= *Stauroopsis undulatum* (Lindl.) Benth. ex Hk. f. 6:27, 1890; K. & P. 205, t. 275, 1898; B. 19:218, 1964.

Stem long, erect, sheath and scape minutely warted. Leaves narrowly oblong, 7-10 cm. by 1.2-2 cm., distichous, coriaceous, flat, apex unequally obliquely 2 lobed. Inflorescence leaf-opposed, stout, rigid, few distant sheaths, raceme laxly few-flowered; floral bracts 6-8 mm. long. Flowers large having sepals and petals white with lip white at base and lemon yellow at tip, 3.6 cm. in diam.; sepals oblong-spathulate, 1.8 cm. long, very wavy margin; petals similar in shape but smaller and narrower than the sepals, also margin very wavy. Lip fleshy, 1.4 cm. long, apical lobe concave and laterally compressed, disc with two ridges running from the base, side lobes rounded, erect and embracing the column; column short, c 3.5 mm., stout.

Flowering time - April to May.

Altitudinal range - 455-2135 m.

Distributional pattern - central and east Nepal.

Specimens in Herbarium - 6 gatherings.

Specimens studied - 3.

Chr. No. n = 19 (Mehra & Vij, Taxon, 19:111, 1970 as *Stauroopsis undulatus*; also Mehra & Sehgal, ibid. 29:350, 1980 as *Vandopsis undulata*).



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PELATANTHERIA Ridl.	508	exelliana Soo	120	SARCOPODIUM Lindl.	198
insectifera (Reichb.f.)		juncea (King & Pantl.)			
Ridl.	508	Kranz.	112	SATYRIUM Sw.	130
		latilabris Lindl.	122	ciliatum Lindl.	130
PERISTYLUS Bl.	92	leptacaulon (Hk.f.) Soo	112	nepalense D. Don	132
albomarginata (King &		obcordata Lindl.	24	nepalense D. Don, v. <i>cili-</i>	
Pantl.) comb. nov.	92	sikkimensis (Hk.f.) Kranz.	124	atum (Lindl.) Hk.f.	130
aristatus Lindl.	92	stenantha (Hk.f.) Soo	126	repens L.	152
constrictus (Lindl.) Lindl.	94	<i>susannae</i> auct. non (L.)			
densus (Lindl.) Sant. &		Lindl.	88		
Kapad.	96	PLEIONE D. Don	350	SERAPIAS Linn.	138
elisabethae (Duthie) Gupta	98	hookeriana (Lindl.) J.		helleborine L.	138
fallax Lindl.	100	Moore	350	<i>helleborine</i> v. <i>longifolia</i> L.	136
goodyeroides (D. Don)		humilis (Sm.) D. Don	352		
Lindl.	102	maculata (Lindl.) Lindl. &			
hamiltonianus (Lindl.)		Paxt.	350		
Lindl.	92	praecox (Sm.) D. Don	354	SMITINANDIA Holtt.	514
lawii Wight	104			micrantha (Lindl.) Holtt.	514
nematocaulon (Hk.f.)					
comb. nov.	106	<i>PLEUROTHALLIS pur-</i>			
parishii Reichb. f.	108	<i>purea</i> D. Don	336	SPATHOGLOTTIS Bl.	462
prainii (Hk.f.) Kranzl.	110			ixioides (D. Don) Lindl.	462
richardianus Wight	92	PODOCHILUS Bl.	356		
		cultratus Lindl.	356	SPIRANTHES L.C. Rich.	164
				<i>australis</i> (R. Br.) Lindl.	164
PHAIUS Lour.	462			sinensis (Pers.) Ames	164
<i>albus</i> Lindl.	166	<i>POGONIA carinata</i> Lindl.	160		
flavus (Bl.) Lindl.	462	flabelliformis Buch.-		<i>STAUROPSIS undulatum</i>	
tancarvilleae (Le Herit.) Bl.	462	Ham.	162	(Lindl.) Benth. ex Hk.f.	524
		<i>prainiana</i> King & Pantl.	162		
		scottii Bl.	162		
PHALAENOPSIS Bl.	510				
<i>decumbens</i> (Griff.) Holtt.	500			STELIS Sw.	358
mannii Reichb. f.	510	PONEORCHIS Reichb. f.	128	biflora Sm.	358
		chusua (D. Don) Soo	128	<i>caudata</i> D. Don	382
				<i>hirta</i> Sm.	378
PHOLIODOTA Lindl. ex				<i>mucronata</i> D. Don	314
Hook.	342	<i>PTILOCNEMA bracteatum</i>		<i>odoratissima</i> Sm.	382
articulata Lindl.	342	D. Don	346	<i>racemosa</i> Sm.	468
articulata Lindl. v. <i>grif-</i>					
<i>fithii</i> (Hk.f.) King & Pantl	344			STEREOCHILUS Lindl.	516
griffithii Hk.f.	344	RHYNCHOSTYLIS Bl.	512	bicuspidatus (Hk.f.) King &	
imbricata Hook.	346	retusa (L.) Bl.	512	Pantl.	516
protracta Hk.f.	348				
recurva Lindl.	342				
		<i>SACCOLABIUM acuti-</i>			
<i>PHYLLORCHIS biseta</i>		<i>folium</i> Lindl.	492	SUNIPIA Buch.-Ham. ex	
(Lindl.) Ktz.	364	<i>ampullaceum</i> (Roxb.)		Sm.	464
<i>rolfei</i> Ktz.	390	Lindl.	482	bicolor Lindl.	464
<i>xylophylla</i> (Pars. & Reichb.		<i>calceolare</i> (Sm.) Lindl.	494	paleacea (Lindl.) P.F. Hunt	466
f.) Ktz.	406	<i>distichum</i> Lindl.	496	racemosa (Sm.) Tang &	
		<i>inconspicua</i> Hk.f.	498	Wang	468
<i>PINALA alba</i> Buch. Ham. ex		<i>longifolium</i> (Lindl.) Hk.f.	476	<i>scariosa</i> Lindl.	468
D. Don	268	<i>micranthum</i> Lindl.	514		
		<i>papillosum</i> Lindl.	474	THELASIS Bl.	470
		<i>recimiferum</i> Lindl.	488	longifolia Hk.f.	470
				pygmaea (W. Griff.) Lindl.	470
PLATANTHERA L.C. Rich	112	SARCANTHUS <i>filiformis</i>			
arcuata Lindl.	112	Lindl.	486	<i>THRIXSPERMUM luni</i>	
bakeriana (King & Pantl.)		<i>insectifer</i> Reichb. f.	506	<i>ferum</i> Reichb.f.	484
Kranz.	114	<i>pallidus</i> Lindl.	488		
biermanniana (King &		<i>recimifer</i> (Lindl.) Reichb.f.	488		
Pantl.) Kranz.	112			THUNIA Reichb.f.	166
clavigera Lindl.	116			alba (Lindl.) Reichb.f.	166
edgworthii (Hk.f. ex Col-		<i>SARCHOCHILUS luniferus</i>			
lett) Gupta	118	(Reichb.f.) Benth. ex Hk.f.	484		

PULARIA Nutt.	472
<i> josephii</i> Reichb. f.	472
<i>RIBRACHIA reptans</i> Lindl.	386
<i>RICHOSMA suavis</i> Lindl.	256
RICHOTOSIA Bl.	358
<i> dasyphylla</i> (Pars. & Reichb. f.) Krzl.	358
<i>YLOSTYLIS discolor</i> (Lindl.) Hk. f.	258
YNCIFERA Lindl.	516
<i> acuminata</i> Lindl.	516
<i> obtusifolia</i> Lindl.	516
ZANDA Jones	516
<i> alpina</i> (Lindl.) Lindl.	516
<i> cristata</i> Lindl.	518
<i> parviflora</i> Lindl.	522
<i> roxburghii</i> R.Br.	520
<i> teres</i> Lindl.	504
<i> tessellata</i> (Roxb.) Hook.	500
<i> testacea</i> (Lindl.) Reichb. f.	522
<i> undulata</i> Lindl.	524
VANDOPSIS Pftz.	524
<i> undulata</i> (Lindl.) J. J. Sm.	524
ZEUXINE Lindl.	168
<i> flava</i> (Wall. ex Lindl.) Benth. ex Hk. f.	168
<i> goodyeroides</i> Lindl.	168
<i> longilabris</i> (Lindl.) Benth. ex Hk. f.	168
<i> nervosa</i> (Wall. ex Lindl.) Benth. ex Cl.	168
<i> strateumatica</i> (L.) Schltr.	170
<i> sulcata</i> (Roxb.) Lindl.	170