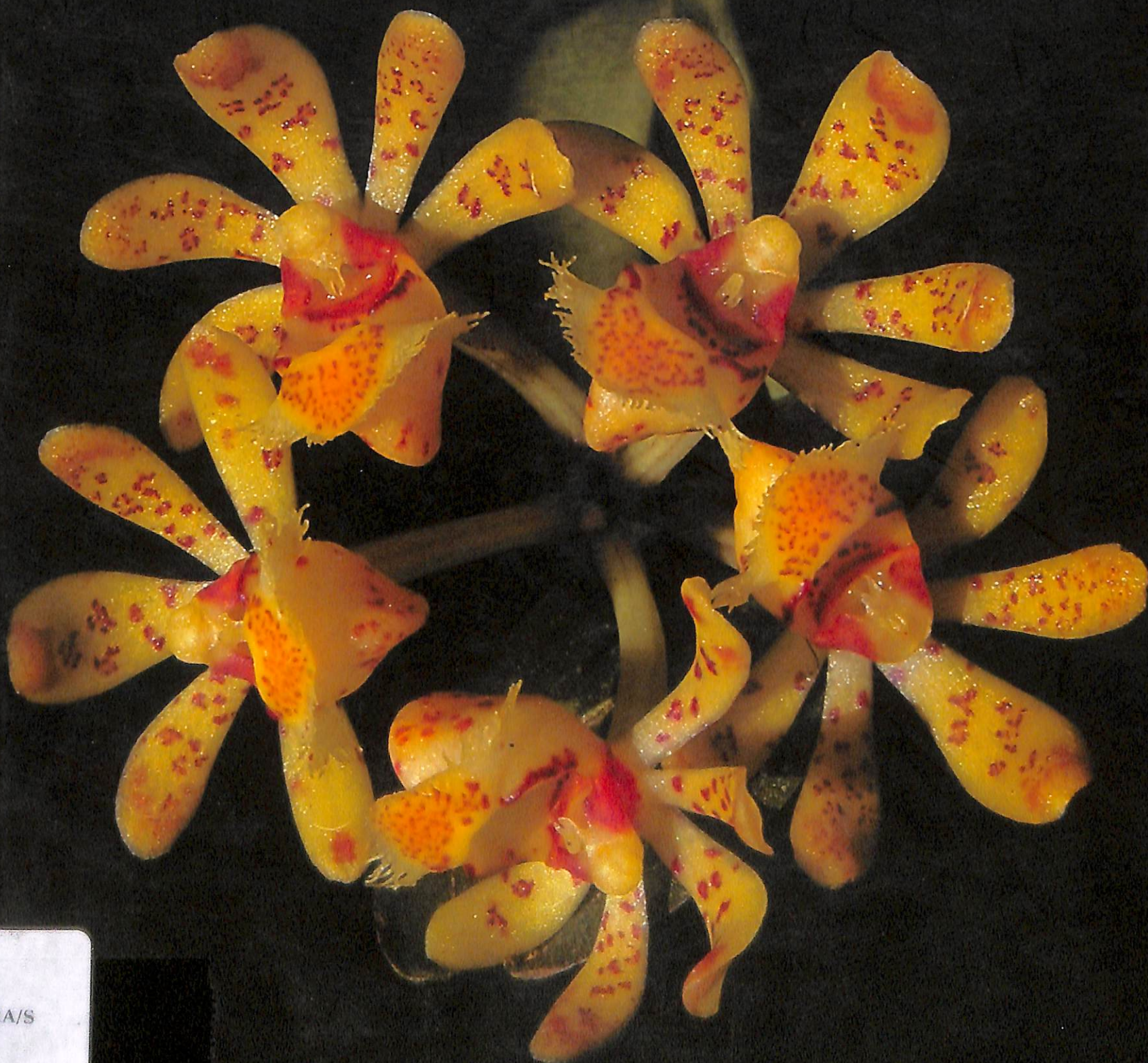


# 100 Sikkim Himalayan Orchids



Mohan Pradhan







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# Introduction

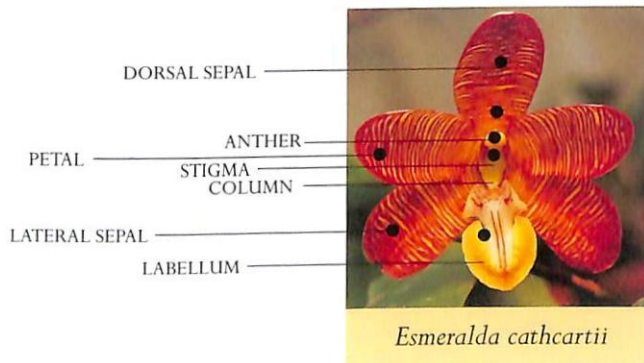


Orchids are plants belonging to the world's most highly evolved family, Orchidaceae, which is estimated to have approximately 25,000 species.

Orchidaceae represents around 10% of the total flora of the Sikkim Himalayas. The total number of species has been found to be 510 in 127 genera.

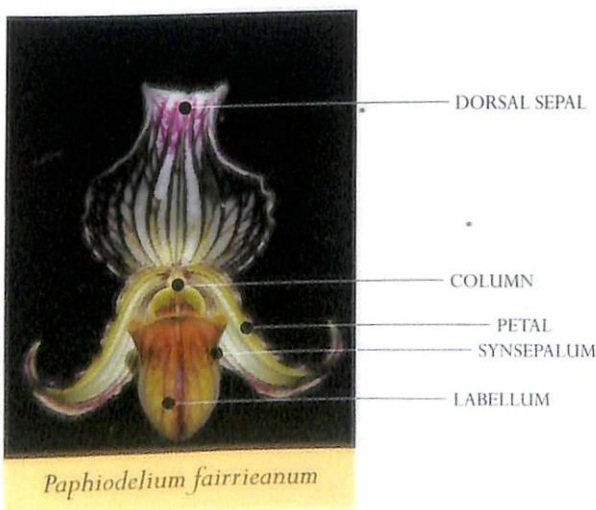
## (i) Structure

There is tremendous diversity in the shape, colour and size of orchid flowers, yet they are the same in their basic form.



The floral structure comprises of an outer segment consisting of three sepals and an inner segment of three petals. Some times the uppermost sepal is modified into a hood-like structure called the dorsal sepal, while the lateral sepals may be fused to form the synsepalum (e.g. *Paphiopedilum*).

Of the three petals, one of them varies greatly in shapes, colour and structure. This modified petal is called the lip or labellum.



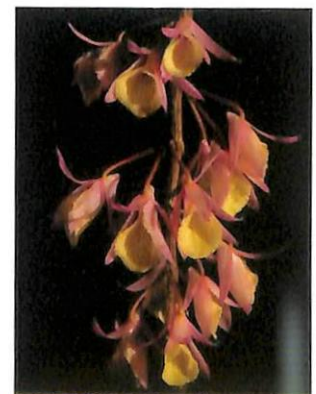
In most orchids the stamen and stigma unite into a structure called the central column or gynomostemium which is situated as the innermost segment.

Within the stamen, all the pollen grains cohere in 2-12 mealy or waxy masses called pollinia. These are housed within a protective structure called the anther cap. In the slipper orchids, two anthers are fertile and located behind a shield like structure called the staminode.

Below the anther cap is a membranous tissue called the rostellum and below it is a cavity called the stigma. The stigma leads into the stigmatic tube and further continues into the ovary. The ovary is below the floral organs and inferior in nature. The ovary contains small ovules which are inserted upon three placentas. These ovules develop into seeds after fertilization. The seeds are released when mature by the opening of three lateral valves of the fruit. The seeds then being dispersed by the wind.

## VEGETATIVE STRUCTURE

Orchids can also be categorized by their growth habit. They are either Monopodial or Sympodial. Monopodial orchids grow upwards from a terminal growing point. New growth begins as an extension of the growth of previous years.



*Dendrobium aphyllum*  
Sympodial



*Paphlianthe teres*  
Monopodial

Sympodial orchids produce their new growths from the base of previous growths. The season growth being arrested by a terminal flower spike.

# Botanical History



The advent of botanical exploration within the Sikkim Himalayas began with Sir Joseph Dalton Hooker's journey between 1848-50. Till then the Kingdom of Sikkim had remained closed to all foreign visitors. His travel opened the doors to the vast floral wealth of this region. Within the brief span of his travel in Sikkim Sir J.D. Hooker collected extensively and published the finding in "Flora of British India", Vol. V & VI in 1885 and *Icones Plantarum* in 1890. In 1895 he brought out an illustrated account of Indian Orchids. This publication contained description and illustration of 100 species.

Largely inspired by Hooker's work, G. King & R. Pantling subsequently brought out a much contemplated classic 'The Orchids of the Sikkim Himalayas' in 1898. This comprehensive illustrative work covered 91 genera and 448 species.

In 1898 Dought Freshfield travelled around Mt. Khangchendzonga from Lachen, Zemu glacier then crossing over into the Lhonak Valley and then North over the Jonsong La, before circling north of the mountain mass and down into East Nepal. He was the first person after Hooker to make any plant collection in Sikkim

During the past century, there have been several expeditions namely the Younghusband Expedition in 1903-04. Col. Prain (later Director at RBG, Kew) was part of the expedition and collected plants.

W.W. Smith & G.H. Cave in 1909 undertook extensive botanical expedition in North-West Sikkim. They then travelled up to the head of the Lhonak Valley to the Jonsong La and visited Chorten Nyimala before returning.

In 1926 Paul Bruhl published 'A guide to the Orchids of Sikkim' where 461 species and 92 genera were described. Herbarium material were collected in 1936 by F. Spencer Chapman and Col. R. Cooke during their climbing expedition of Fluted Peak, Sphinx and Pyramid Peak.

During the latter half of the 20th Century, Simon

Bowes-Lyon, nephew of H.M. Queen Elizabeth, the Mother, travelled in Sikkim. In 1953 Ghose published 'Beautiful Indian Orchids' describing 150 species and 27 genera. He was based in Darjeeling and was instrumental in collecting and distributing seeds and plants of orchids and alpine plants, till his demise in 1983.

Between 1929-32 a German Expedition led by Paul Bauer and the expedition led by Prof. Dyhrenfurth were all active around the Zemu and Lhonak area.

In the late 1950 and early 60's Dr. H. Hara from Japan undertook several extensive botanical expeditions resulting in the publication of *The Flora of Eastern Himalayas, Orchidaceae*.

Sir Basil Gould during his tenure as the political officer sent herbarium & plant material regularly to the RBG, Kew.

The publication of Indian Orchid Guide to Identification and Culture was undertaken by U.C. Pradhan in 1976 and 79 respectively. This comprehensive guide covers 810 species and 130 genera.

Several botanical expeditions were undertaken during the past three decades, namely in 1979 by Derek Fox in W. Sikkim, 1982 by Mr and Mrs. E. G. Millian up the Rathong chu.

The Alpine Garden Society, U.K. expedition in 1983 and the Royal Botanic Garden Edinburgh expedition in 1997.

The history of Sikkim Himalayan Orchids would be incomplete if we did not mention the role played in their conservation by late Rai Saheb Bhim Bahadur Pradhan, who during his tenure as the Forest Manager to Government of Sikkim between 1916-1956 was chiefly responsible for implementing laws giving protection to Sikkim flora and fauna.

Of late, several Orchid groups and NGO's have been actively engaged in the conservation of Sikkim Orchids.





# Sikkim



## GETTING THERE

**By Air:** The nearest airport is at Bagdogra in West Bengal. The services have several flights linking to Guwahati (Assam), Kolkata (W. Bengal) and New Delhi daily.

**Helicopter Service:** There is also a helicopter service connecting Bagdogra to Gangtok which takes about 30 min. STDC also organises mountain flights.

**By Rail:** New Jalpaiguri (NJP) is the nearest railhead at a distance of 124 km from Gangtok. The railhead is well connected to the rest of the country with daily trains to Delhi and other major towns and cities.

**By Road:** The journey of around 124 km takes approx. 4-5 hrs. Private cars and taxis can be hired on a full use or share basis from Bagdogra airport, NJP rail station or Siliguri town. Many private run

and Government operated buses are readily available from SNT Office, Hill Cart Rd. and Tenzing Norgay Station at Siliguri.

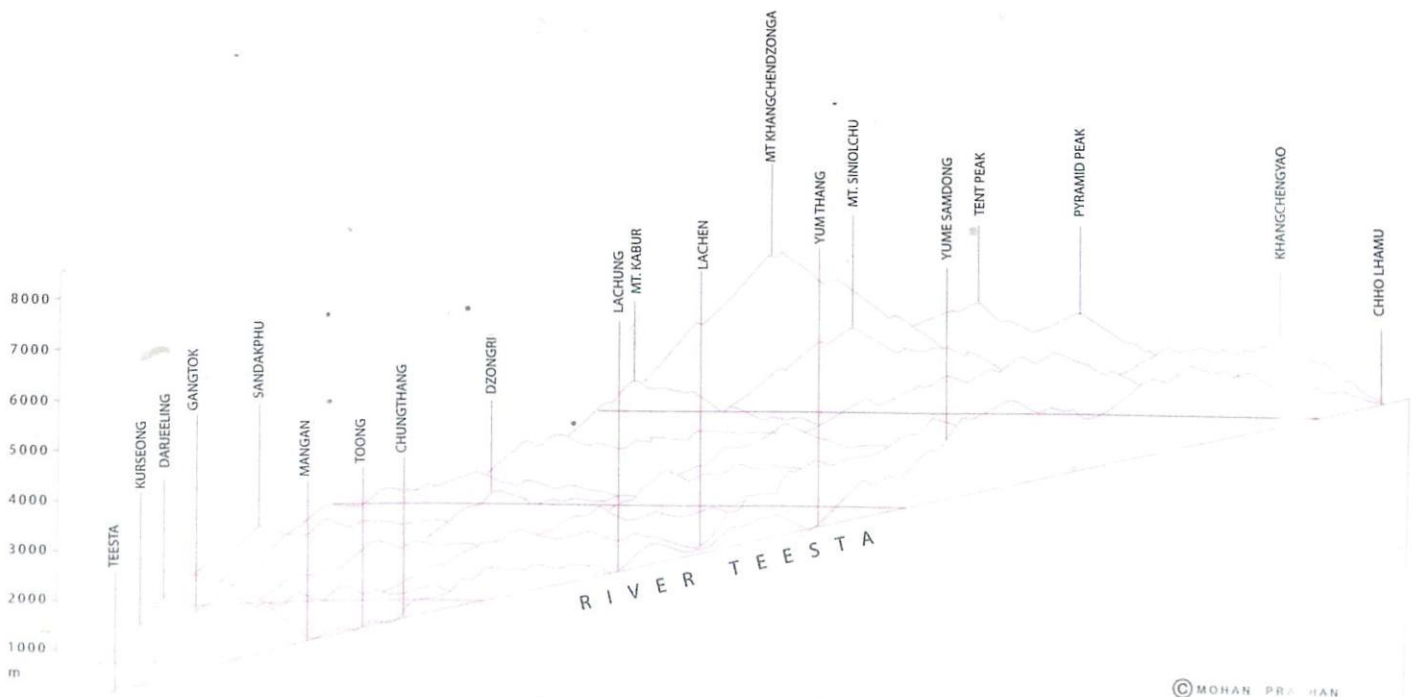
### Entry permits for Sikkim:

All foreign tourists are required to get a 15-day permit known as the Inner Line Permit (ILP) before they can travel in Sikkim.

The permits are issued at the Indian mission in your home country or at the places mentioned below. You are required to provide two passport sized photographs and copies of your passport and the Indian visa.

You can also get an ILP at Rangpo, the entry point into the state. The tourist office at the Rangpo tourist centre will issue a two-day permit which can then be extended for 15 days at Gangtok.

## Vertical Section of the Sikkim Himalayas



The 15-day permit can again be extended thrice for a period of 15 days at any of the addresses:

- Foreigner's Regional Registration office.  
Chennai, Kolkata, Mumbai and New Delhi.
- Immigration officer at the Airports  
Chennai, Kolkata, Mumbai and New Delhi.
- Resident Commissioner  
Government of Sikkim  
New Sikkim House  
14, Pansheel Marg  
Chanakyapuri  
New Delhi.
- Asst. Resident Commissioner, Government  
of Sikkim  
4/1 Middleton Street  
Kolkata  
West Bengal.
- Chief Secretary/Home Secretary  
Government of Sikkim  
Tashiling, Secretariat  
Gangtok, Sikkim.
- Director General of Police  
Government of Sikkim.
- Deputy Director (Tourist)  
Government of Sikkim  
SNT Colony  
Hill Cart Road  
Siliguri, West Bengal.

ILP allows foreign tourists, individuals as well as groups to visit major tourist destinations of Sikkim, including Gangtok, Rumtek, Pemayangtse and Phodong.

For foreign as well as domestic tourists, travel to areas beyond requires a Protected Area Permit (PAP). Tourist can only go to the Protected Areas under the aegis of a Travel Agent Approved by the Government of Sikkim.

To travel in areas other than those covered by the ILP and PAP, Special permits have to be obtained from the Ministry of Home Affairs, North Block, New Delhi.



### TREK 1

Yuksom (1,770m) - Bakhim (2,742m) - Tsokha (3,000m) - Phedong - Dzungri (3,962m) - Thangsing - Chemathang - Gochela (4,940m) (West Sikkim).

**Duration:** 7 days.

**Difficulty:** Moderate-difficult.

**Ideal time:** 2nd week April - 3rd week May for



*Rhododendron arboreum*





*Meconopsis horridula*

Rhododendron.  
1st week July-  
Mid August for  
Alpine Flora.

**Altitude:**  
1,600m -  
5,000m.

This is one of the most popular of the routes in this region. The drive itself from Gangtok via Singtam to Yuksom is interesting for orchid enthusiasts.

One can see *Cymbidium aloifolium*, *Bulbophyllum* ssp., *Dendrobium densiflorum*, *Dend. aphyllum*, *Dend. nobile* along the valley. As one begins to ascend from Singtam, the forest are a host to *Cymbidium devonianum*, *elegans*, *Coelogyne corymbosa*, *Dendrobium chrysanthum*, *Pleione praecox*, *Arisaema* spp, *Rhododendron dalhousiae*, etc.

Yuksom is the last motorable village at an altitude of 1,600m. It also happens to be the seat of the first Chogyal (King) of Sikkim. The first stretch of the trek up to Prekchu (river) passes through dense temperate forest. This area is rich in *Rhododendron griffithianum*, *dalhousiae* and *lindleyi*.

On reaching Prekchu, strenuous climb through thickets of *Arundinaria* habitat with large colonies of *Arisaema griffithii*, *Cardiocrinum giganteum*, *Rhododendron grande*, *falconeri* takes us past Bakhim, bringing us to the temperate coniferous forest around Tsokha.

Tsokha is a quaint little village and a delight for ornithologists. This is also the habitat of the Red Panda (State animal).

The route from Tsokha to Dzungri is very rich in *Rhododendron cinnabarinum*, *campylocarpum*, *hodgsonii*, the undergrowths inhabited by *Arisaema* spp, *Primula* spp, *Potentilla* etc. As one nears the plateau where Dzungri is situated, the vegetation is taken over by

Junipers, and *Rhododendron lepidotum*, *anthopogon* etc.

Dzungri is situated at an altitude of 3,800m and is exceedingly rich in alpine flora and do good to stay a few days to botanies extensively. The area is host to *Gentians*, *Pedicularis*, *Meconopsis*, terrestrial orchids and a host of primula species and commands a magnificent view of the mountain peaks.

The route from Dzungri to Chemathang via Thang-sing is almost a repetition of that between Tsokha to Dzungri, but commands spectacular scenery. The area between Chemathang and Gochela is a vast tract of alpine moraines and is a delight for alpine plant enthusiasts. One comes across *Gentians*, *Corydalis*, *Saxifragas*, *Fritillarias*, *Rheum nobile*, *Bistorta* spp, *Weldhemia*, *Rhododendron lentopodium* and *nivale* and a host of other plants.

Sir J.D. Hooker writes the following observation on the splendid display found during the summer months.

“Rhododendrons occupied the most prominent place, clothing the mountain slopes with a deep green mantle flowing with bells of brilliant flowers. Primrose were next both in beauty and abundance, and they were accompanied by yellow cowslips, three feet high, purple polyanthus, and pink large-flowered dwarf kinds nestled in the rocks. Gentians began to unfold their deep azure bells, acornites to rear their tall blue spikes and fritillaries to burst into flower. On the black rocks the gigantic rhubarb formed pale pyramidal towers a yard high, of inflated reflexed bracts.”



*Daphne* spp.



## TREK2

Gangtok (1,870m) - Kyangnosla alpine plant sanctuary, Changu lake 3,700m (East sikkim).

**Duration:** 1 day.

**Ideal Time:** Mid June-Mid August.

**Altitude:** 1,870m-3,700m. Can drive up to Changu Lake.

A very easy and popular route, for those short of time. The drive takes one from the sub-tropical zone to the alpine zone in approximately 2 hr. 30 mins.

As one begins to ascend, *Pleione praecox*, *Coel. ochracea* can be seen growing on trees.

The road banks are the habitats of *Buddleya*, *Acers*, *Rhododendron arboreum* and *lepidotum*.

As one nears Kyangnosla *Chusua pauciflora*, *Cathcartii villosa*, *Habenarias* can be seen in large colonies.

Kyangnosla Alpine Plant Sanctuary is itself situated at an altitude of 3,200m. It has a very picturesque landscape and trails are laid out within the sanctuary. The sanctuary has large colonies of *Arisaema* spp, *Impatiens*, terrestrial orchids like *Platanthera*, *Chusua*, *Aconite* and many species of *Rhododendrons*.

The drive from Kyangnosla to Changu takes just under 30 min. and is rich in *Primulas* like *P.kingii* with brilliant red flowers, *P.dentata*, *solliduoides*, *denticulate*, *sikkimensis* etc. *Rhododendron anthopogon*, *seto-*







*Primula kingii*

*sum, cinnabarinum* can be found growing around the lake, the under growth colonized by *Arisaemas*, *Anemone*. The open grasslands is colonized by *Meconopsis* spp, *Anemones*, *Iris* and orchids like *Bhutanthera albomarginata*, *Platenthera leptocaulon*, *Herminium* spp, *Chusua puberula* and *C. pauciflora*.

### TREK3

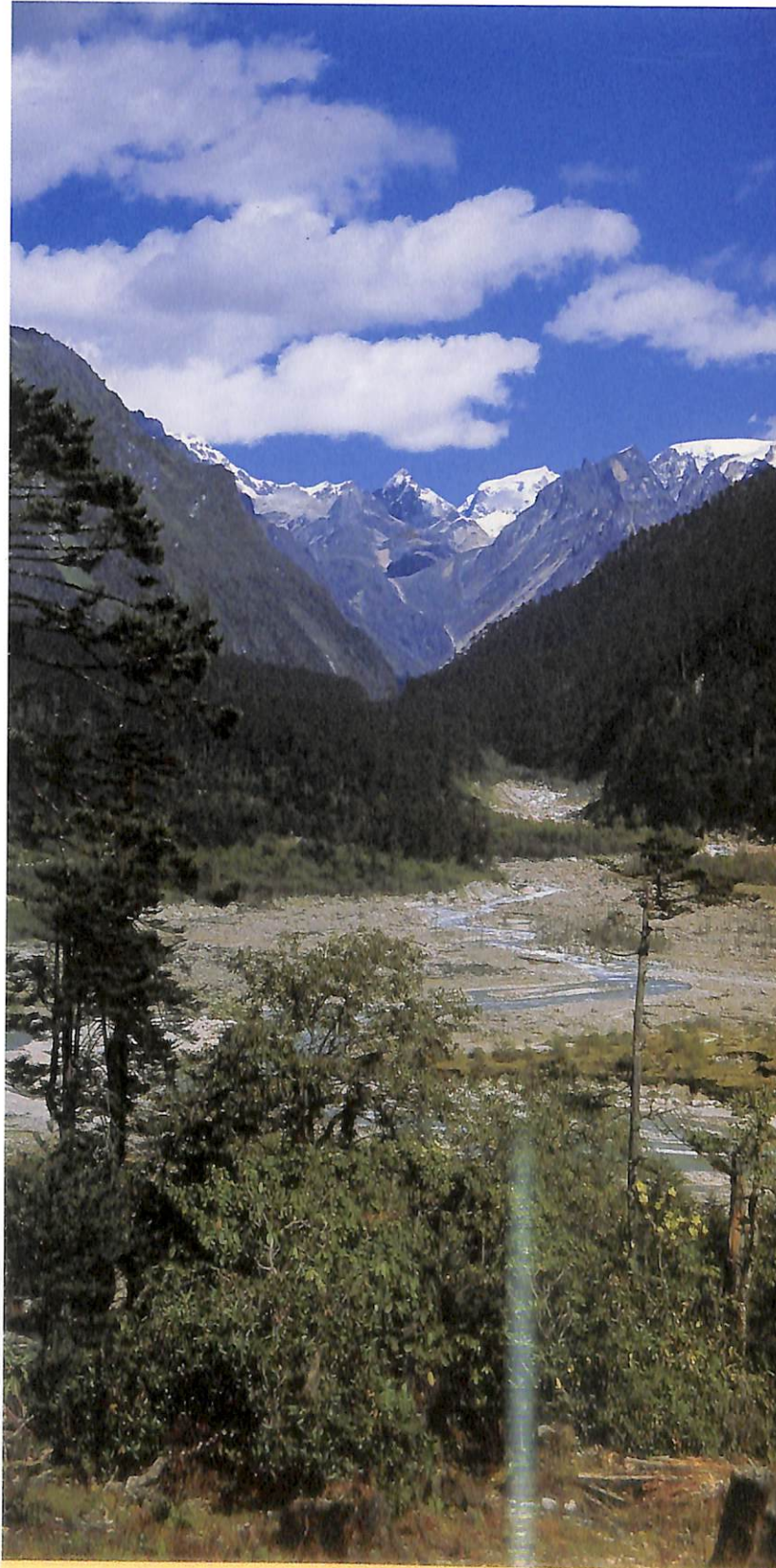
**Gangtok - Chungthang(1,750m) Lachen (2,778m.) Thanguu or Lachung - Yakchey - Phuni - Yumthang - Yume Samdong (North Sikkim).**

**Duration:** 3-5 days.

Can drive up to Yume Samdong.

**Ideal time:** 3rd week April-3rd week May for Rhododendron. 1st week July-Mid; August for Alpine plants.

The drive from Gangtok to Lachung via Mangan and Chungthang is very scenic. The route takes us through the sub-tropical forests along the valley of Teestachu. This route is very interesting for all those botanically inclined. As one reaches Pangthang, the trees on the ridge are full of epiphytic plants, *Pleione praecox*, *Coelogyne corymbosa*, *Aeschynanthus sikkimensis*, *Agapetes serpens* etc. The route to Mangan passes through large thickets of bamboos, waterfalls and moss covered rocks laden with *Bulbophyllum leopardinum*, *Malaxis* spp, and large masses of *Coelogyne cristata* and *Epigenuim amplum*. Along the road one can see *Didymocarpus*, *Arisaemas* and *Hedichyium* spp, *Diplomeris hirsuta* etc.



Yumthang Valley



As one reaches Tung, large colonies of *Arundina graminifolia* can be seen. The trees within this predominant sub-tropical forest are laden with *Oberonia*, *Pholidota*, *Erias* and *Bulbophyllum* spp. On crossing Chungthang one begins to ascend towards Lachung, the area route having extensive stretches of Oak forest. Lachung is a small town situated at an altitude of 2650m. The area around has many interesting plants like *Spathoglottis ixiodes*, *Primulas*, *Roscoeas*, *Arisaemas*, *Calanthe* spp.

The drive from Lachung to Yumthang passes through Yakshey and Phuni. The forest being predominantly *Rhododendron* spp, *Acers*, *Abies* and *Magnolias*. A stop over at Yakchey is recommended as many interesting plants can be found namely *Inula*, *Rhododendron niveum*, *Impatiens* spp, *Satyrium nepalensis*, *Pleione hookeriana*, large colonies of *Arisaema* spp, *Roscoeas* and *Primulas* and *Cardiocrinum giganteum*.

The drive from Yakchey to Yumthang is through one of the richest *Rhododendron* forests. One can stop over at the hot spring at Yumthang and find plants like *Seline*, *Meconopsis* and *Primulas* growing in abundance all along the Yumthang Valley. This area is also interesting for Ornithologists.

The drive from Yumthang to Yume Samdong is very



*Gentian ornata*

scenic and the *Abies* forest give way to *Rhododendron* thickets and then to open alpine meadows. The area around Yume Samdong is exceedingly rich in alpine flora. One needs to just walk about to find *Aconitum*, *Pedicularis*, *Primulas*, *Rhododendron setosum*, *R. anthopogon*, *Saxifraga*, *Gentians* and *Rheumobile*, *Meconopsis* spp, *Androsace* spp, *Cyananthus*, *Saussurea*, *Leontopodium*, *Potentilla*, *Corydalis* etc.

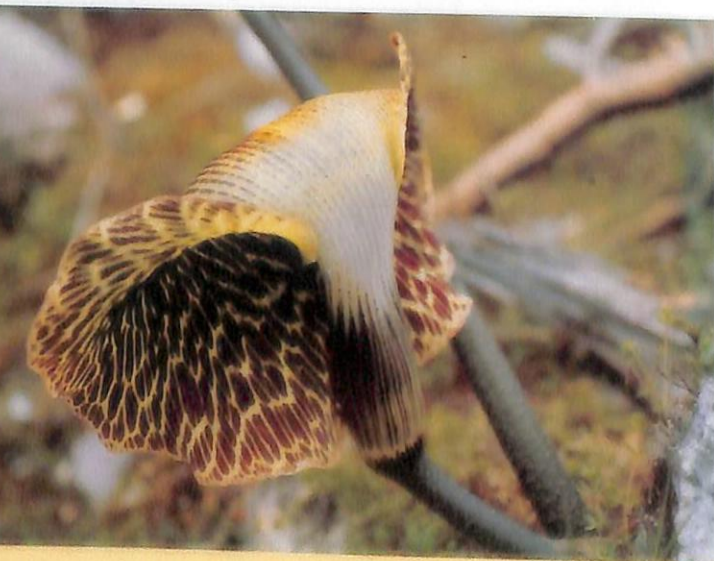
### Lachen (2,778m)

An alternative route is via Lachen and Thanguu. This is a newer route having being opened only recently and the plant habitats are more pristine than that of the Yumthang Valley. Thanguu is rich in plants, especially *Meconopsis*, Terrestrial orchids like *Herminium josephii*, *Habenaria disphylla*, *Primula sikkimensis* etc. An interesting route when opened in the future is to trek along the Thanguu Valley and cross over at Sebu-la to reach Yume Samdong. One can then return via Yumthang, Yakchey-Lachung-Chungthang-Gangtok.

“Lamteng: Sir J. D. Hooker writes the following;

“At first it appears incredible that so limited an area should present nearly all the types of the flora of the north temperate zone, not only, however is this case, but space is also found for the intercalation of types of a Malayan flora, otherwise wholly foreign to the North temperate region.

A few examples will show this. Among trees the Conifers are conspicuous namely silver fir, spruce,



*Arisaema griffithii*

14  
15





*Primula sikkimensis*

larch, juniper and yew; there are also species of birch, alder, ash, apple, oak, willow, cherry, mountainash, thorn, walnut, hazel, maple, poplar. Of bushes, rose, burberry, bramble, rhododendron, elder, current etc. Herbaceous plants are far too numerous to be enumerated as a list would include most of the common genera of European and North American plants. Of North American genera, not found in Europe, were Buddleia, Magnolia, Saxifragas, Hydrangea, Aralia, Panax, Trillium. The Japanese and Chinese floras are represented in Sikkim by Camellia, Deutzia, Aucuba, Hydrangea, Skimmia and Enkianthus. The Malayan by Magnolias, Vacciniums, Rhododendrons and many genera of orchids."

#### **TREK4**

**Hiley (2,700m) - Versey (3,000m) - Uttarey - Dentam (West Sikkim).**

**Duration:** 3 days.

**Difficulty:** Easy.

**Ideal Time:** 3rd week March-Mid May.

**Altitude:** 1,000m-3,500m.

This trek covers a distance of approximately 30km and passes through splendid temperate forest with a predominance of *Rhododendron*, conifers like *Tsuga* and *Abies spectabilis*. One gets to see a wide range of plants



as *Acers*, *Quercus*, *Magnolias*. Orchids found within the forests are *Coleogyne*, *Dendrobiums*, *Pleione*, *Calanthe*, *Habenarias*, *Liparis*, *Malaxis* and host of other species.

The altitude varies between 1,000m at Dentam to 2,700m at Hilley, finally reaching around 3,500m at Dhap. This route also provides a panoramic view of Mt. Khanchendzonga. Uttarey lake is being developed for water-sports and makes a pleasant stop-over. One can also connect the trek to the Singalila range.

### TREK5

Darjeeling (2,154m) - Maney Bhanjang (2,134m) - Meghma - Tonglu (3,070m) - Kalapokhari (3,150m) - Sandakphu (3,636m) - Phalut (3,605m) (Darjeeling District). West Bengal.

**Duration:** 3-7 days.

**Difficulty:** Moderate.

**Altitude:** 2,000m - 3,636m.

**Ideal Time:** 2nd week April - Mid May - Rhododendron. 2nd week June - Mid August - Alpine plants.

This route is one of the most wellknown in the Sikkim Himalayas. There is an option to drive up to Sandak-



*Aeschynanthus sikkimensis*



*Lilium nepalense*

phu or to trek from Maney Bhanjang (2,134m). From Maney Bhanjang the climb towards Meghma is steep. One can see *Pleione heokeriana*, *Arisaema griffithii* and many species of *Rhododendron*. From Meghma to Kalapokhari via Tonglu (3,070m) and Gairibans one finds *Arisaemas*, *Panax pseudo-gensin*, jewel orchids through forests of *Rhododendron grande*, *arboreum*, *falconeri*, *barbatum*. This route is also rich in *Primulas*, *Habenarias*, *Impatiens* etc.

The trek to Sandakphu from here takes approx. 6 hrs and is an uphill climb. This route is full of *Primulas* amongst *Rhododendron* thickets.

Sandakphu is situated at an altitude of 3,636m and commands a majestic view of the Himalayan Range. The area is the habitat of *Meconopsis*, *Fritillaria*, *Iris*, *Rhododendron anthropogon*, *campanulatum*, *Trillidium* and a host of *Primula* species.

From Sandakphu to the route to Phalut via Pasi Bhajan one comes across plants of *Rhododendron decipens*, *hodgsonii* and *cinnabarinum*, *lepidotum*, *Meconopsis*, *Primula* and terrestrial orchids.

From Phalut one can return to Maney Bhanjang via Raman (2,560m), Rimbick (2,286m) - Palmgua or Bijanbari (2,760m).



# Climatic zone



In Sikkim Himalaya there are four major habitat zones which are by no means exclusive, as some orchid species will be found in more than one zone. The four zones are:

1. Tropical (250-800m)
2. Sub-tropical (800-1,800m)
3. Sub-temperate to temperate (1,800-3,500m)
4. Alpine (above 3,500m)

## 1. Tropical zone

This is characterized by dense forest, mainly of *Mangifera*, *Ficus*, *Shorea*, *Cassia*, *Bombax*, *Artocarpus* and other species, with a secondary vegetation of bamboo and palms. Summer temperatures range from 30°-38°C by day to 20°-27°C by night, while in winter the night time temperatures can drop to 10°C. Within the zone orchids will be found in the following habitats.

- a) Trees. *Ascocentrum ampullaceum*, *Cymbidium aloifolium*, *Dendrodium jenkinsii*, *D. formosum* and numerous other species.
- b) Secondary vegetation. *Bulbophyllum* species, *Eria* species, *Phalaenopsis manni* and *P. lobbii*.
- c) River banks. *Anoectochilus roxburghii*, other 'jewel orchid' species, *Calanthe* species.
- d) Sandstone outcrops and cliffs. *Diplomeris hirsuta*, *Arundina graminifolia*, *Eulophia* and *Habenaria* species.

## 2. Sub-tropical zone

This zone is mostly composed of mixed deciduous and evergreen forests. The dominant trees are *Quercus*, *Prunus*, *Magnolia*, *Schima*, *Alnus*, *Bauhinia* and *Leucoscepterum*. Summer temperatures range from 25°-32°C by day to 10°-15°C by night. This zone experiences heavy rainfall (800-2,000mm) during the monsoon period when most orchids grow rapidly and complete their annual growth. During the winters, which are cool and dry, the plants draw water from the occasional rain and nightly condensation. Orchids occupy the following habitats.

a) Trees. *Bulbophyllum* species, *Esmeralda cathcartii*, *Cymbidium* species, *Oberonia* species, *Pleione maculata* etc.

b) Bamboo and palm thickets. *Paphiopedilum venustum*, *Eulophia* species, *Calanthe* and *Phaius* species.

c) Forest floor. *Paphiopedilum fairreanum* on grassy ledges. *Anthogonium gracile* and *Habenaria* species where it is muddy, and *Bulbophyllum leopardinum* on steep rocks.

## 3. Sub-temperate to temperate

This zone experiences snow in the cooler months of the year, and is characterized by mist at all times of the year. The dominant vegetation consists of *Alnus*, *Acer*, *Abies*, *Pinus*, *Larix*, *Quercus*, *Magnolia* and *Rhododendron*. The Summer temperature varies from 18°-21°C by day to 10°-15°C by night and during the winter reaches 10°C by day, while it is often below freezing at night. Rainfall is at a peak from June to September, thereafter decreasing rapidly. Orchids occupy the following habitats:

- a) Trees. *Cymbidium grandiflorum*, *C. elegans*, *Coelogyne cristata*, *Pleione hookeriana*, *Dendrobium candidum*, *D. hookerianum* and *Vandiopsis undulata*.
- b) Forest floor. *Goodyera fusca*, the 'jewel Orchids', *Calanthe chloroleuca* and *Nervilia macroglossa*.
- c) Grassy slopes. *Habenaria* species, *Liparis* species *Satyrium nepalense* etc.
- d) Rocky outcrops. *Pleione humilis*, *Satyrium nepalense*, *Anthogonium gracile* and *Spathoglottis ixiioides*.

## 4. Alpine zone

This is the uppermost limit where Orchids are found. The zone being snowbound for six to nine months. The vegetation consists of very reduced shrubs and alpine plants growing on open grassy meadows which are often grazed by yaks and sheep during the summer months. Orchids occupy the following habitats

- a) Open grassy meadows : *Orchis*, *Herminium*.
- b) Rocky banks and moraines : *Cypripedium* spp *Satyrium nepalense*.
- c) Rhododendron and Conifer : *Cypripedium* spp., *Histeria*.





# Cultivation



Growing Himalayan Orchids can be an exciting experience, especially with the diversity available today in the trade. With most of the species facing the presence of urbanization and loss of habitat it becomes imperative to learn about the cultural requirements so as to grow them to perfection.

Many of the Himalayan Orchids can be raised from seeds or by tissue culture of the more desirable strains. This relieves pressure on the wild population. The other advantage of lab grown plants are uniformity of plants and are more adaptable to the growing environment.

This chapter is being provided for ready reference for those who wish to grow Sikkim Himalayan Orchids.

## Basic Needs

- I. Light
- II. Temperature
- III. Air Movement and Humidity
- IV. Watering and Fertilizing
- V. Compost
- VI. Pest and Diseases
- VII. Resting
- VIII. Potting and after care

I. **Light:** The amount of light your orchid requires, depends on what kind it is. Most of the plants are divided into three basic light requirement type.

Type	Light Requirement	Examples
Low light	2 hrs of filtered sunlight/day	Jewel Orchids, <i>Esmeralda</i>
Medium light	4 hrs of sunlight/day	<i>Cymbidium</i> , <i>Coelogyne</i>
High light	6 hrs of sunlight/day	<i>Papilionanthe</i> , <i>Dendrobium</i>

Orchids require the correct amount of sunlight to grow and flower. The process of photosynthesis is dependent on the quantity of sunlight without adequate sunlight, the plant cannot support the growth

and flowers, it is also the case if there is an excess of sunlight.

The symptoms for plants not getting enough sunlight are: very dark green leaves.

The new leaves and growths are smaller than the previous one or the plant has not produced any flowers.

To correct the problem increase the level of sunlight gradually so as not to burn the plant.

The symptoms for too much light are:  
 Dry yellow patches on the leaves,  
 Stunted growth, yellowish in colour or  
 Large black patches on leaves, eventually the leaves dropping off.

One can correct by reducing the amount of sunlight by increasing shade.

## II. Temperature:

Orchids are usually classified into three temperature categories.

IV Warm	Min Night $\pm 15^{\circ}\text{C}$ (+60°F)	<i>Vanda</i>
Growing	Max Day $+32^{\circ}\text{C}$ (90°F)	<i>Phalaenopsis</i>
III Intermediate	$+13^{\circ}\text{C}$ (+55°F)	Jewel Orchid
	$+30^{\circ}\text{C}$ (85°F)	<i>Paphiopedilum</i>
II Cool	$10^{\circ}\text{C}$ (50°F)	<i>Pleione</i>
	$27^{\circ}\text{C}$ (80°F)	<i>Coelogyne</i>
II Cool	$5^{\circ}\text{C}$ (41°F)	<i>Habenarias</i>
	$25^{\circ}\text{C}$ (77°F)	<i>Cypripedium</i>

Obviously different orchids prefer different temperatures and it will be found that many microclimates exist within the confines of a green-house. Plants grow best if given their optimal temperatures.

## III. Air movement

All Orchids in the wild experience a constant flow of



air around them. In cultivation it becomes necessary to maintain a buoyant atmosphere of fresh moist air. Lack of air movement causes the temperature to rise, humidity to drop and increase in fungal and bacterial infection amongst plants.

#### IV. Watering and Fertilizing

Proper water and fertilizing is necessary for the plant to grow well and to induce it to flower.

This is best done using rainwater. On the average, watering is done once or twice a week as most orchids need to dry out periodically.

A few need watering or misting every day, especially those that are mounted. While others grow best with a long, moist growing season followed by a dry period of several months. e.g. *Dendrobium*, *Coelogynes*, *Pleiones*. Pseudobulbless plants like *Phalaenopsis*, *Paphiopedilum* and Jewel Orchids require a more constant moisture level.

The best approach for the grower is to try and find out as much about the wild environment and imitate it in cultivation.

Watering early in the day helps in providing the humidity and allowing the foliage to dry up by the evening, preventing water-borne disease. Misting over the leaves and damping down during the afternoon is always a useful exercise on a sunny day as it helps to ensure high humidity and also to lower the temperature.

Once the plants begin their growth cycle, a regular watering and fertilizing programme can begin. On each occasion, plants should be watered thoroughly. The frequency of the watering will depend on the size of the pot and the kind of compost used.

As most orchid composts are lacking in any nutrition, it is beneficial to feed the plants regularly during their growing season. Many prefer a high nitrogen fertilizer in spring, summer, changing to a high potash fertilizer in autumn so as to encourage the plants to flower and to harden off the plants for winters.

#### a. Over fertilizing :

- (i) a white crust forms around the inside rim of the compost.
- (ii) growing tips turn black and die, especially of leaves.
- (iii) very dark green leaves.

Correct the problem by:

- (i) flush the pot thoroughly with water to wash off the salt.
- (ii) change, compost.
- (iii) reduce the level of fertilizers.

#### Water chart

WATER MORE	LESS
(i) more light	(i) less light
(ii) higher temperature	(ii) lower temperature
(iii) humidity low	(iii) higher humidity
(iv) more ventilation	(iv) plastic/large pot
(v) mounted	(v) winters
(vi) clay/small pot	(vi) newly repotted plant
(vii) summers	

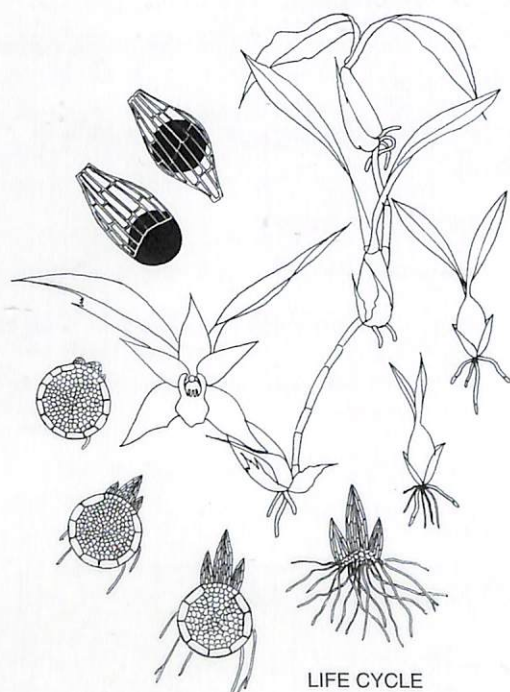
#### V. Compost

In cultivation a wide range of composts are available today. A composts work is to support the plant and to provide nutrient and moisture. A highly porous potting is recommended for epiphytic orchids and less so for the terrestrial species. The formulation as given below is just a guideline and necessary changes may be made to suit one's own watering schedule and environment.

##### 1. Epiphytic Orchids

- (a) *Intermediate - Cool Areas*





- (i) 1 part sphagnum : 1 part perlite/  
thermocole granule
- (ii) 1 part coconut chunks: 1 part charcoal
- (iii) Tree -fern blocks/cork (mounted)
- (iv) 1 part charcoal: 2 part coconut husk:  
1 part brick
- (v) 3 part fir bark: 1 part perlite

(b) *Tropical Areas*

- (i) 1 part charcoal: 1 part brick pieces
- (ii) 2 part sphagnum: 1 part perlite
- (iii) 1 part charcoal: 1 part coconut husk:  
1 part brick pieces
- (iv) Tree -fern blocks/coconut shell/  
cork (mounted)
- (v) 3 part fir bark: 1 part perlite

2. **Terrestrial Orchids**

(a) *Intermediate: Cool Areas*

- (i) 1 part sphagnum : 1 part leaf compost:  
1 part perlite

- (ii) 4 part fibrous loam: 1 part sand:  
1 part leaf compost/coco peat
- (iii) 2 part leaf compost: 1 part perlite
- (iv) 2 part coco peat : 1 part perlite

(b) *Tropical Areas*

- (i) 2 part top soil: 3 part manure: 3 part sand
- (ii) 2 part manure: 1 part leaf compost: 3 part  
sand
- (iii) 2 part sphagnum: 1 part perlite
- (iv) 1 part leaf compost: 1 part coco peat :  
1 part perlite

3. **Cymbidium**

- (i) 3 part fir bark : 1 part perlite
- (ii) 2 part rockwool : 1 part perlite
- (iii) 1 part leaf compost : 1 part manure:  
1 part perlite
- (iv) 3 part coco peat : 1 part perlite

4. **Paphiopedilum**

- (i) 3 part fir bark : 1 part perlite
- (ii) 1 part sphagnum: 1 part charcoal:  
1 part leaf litter
- (iii) 3 part sphagnum : 1 part perlite

VI. **Pest and Diseases**

All plants at one time or the other suffer from the various common pathogens. They can appear by introduction of plants from a new source or as symptoms of improper culture.

(i) **Pest**

(a) Red spider mite: These pests are hard to see with the naked eyes. They suck dry the leaves, so that infested leaves appear silvery on the underside and dry. They are more prevalent during the hot and dry season e.g. Cymbidium. This can be controlled by acaricide spraying.

(b) Mealybugs: Insects looking like clumps of cotton on the under side of leaves, sheaths on pseudobulbs and stems. Insecticide is effective against mealybugs.



(c) Scale: They usually appear as a circular raised brown around attached to plants.

Wipe with alcohol, spraying with and pesticide increasing ventilation and humidity should be effective.

(d) Slugs and snails: They are especially likely to damage new buds and shoots especially of *Phalaenopsis*. The best way to deal with them is by using slug baits and to check the plants at night.

## (ii) Diseases

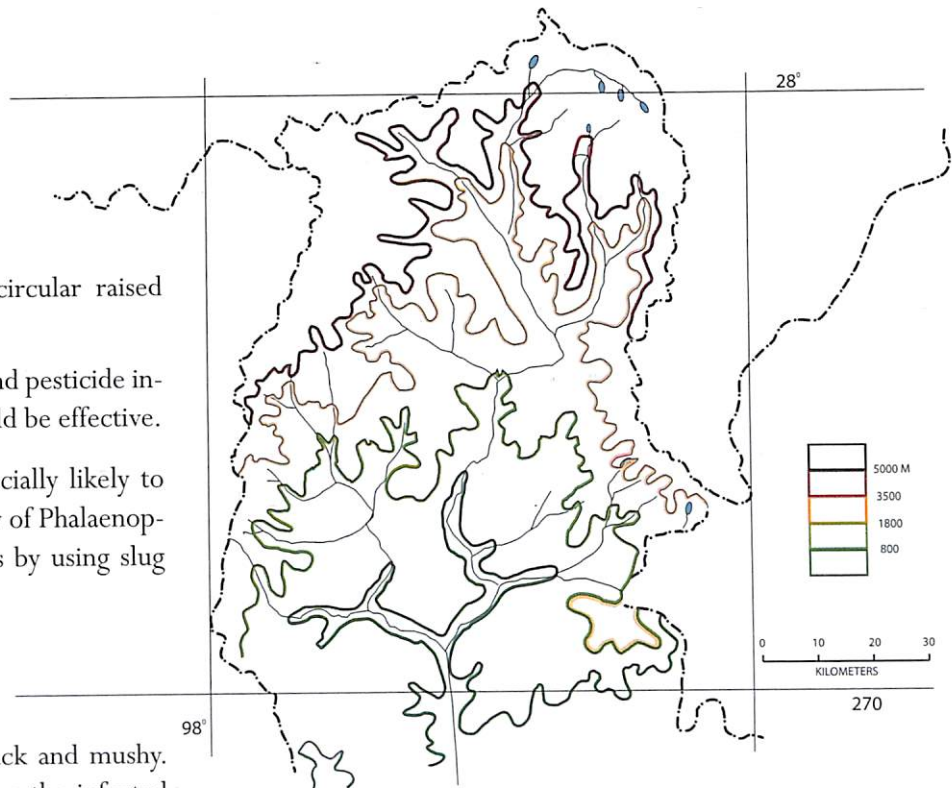
(a) Black Rot: Infected areas turn black and mushy. The problem can be dealt by removing the infected part and spraying with appropriate fungicide and isolating the plants immediately. Reduce humidity and increase ventilation.

(b) Petal Blight: This is caused by *Botrytis cineraria* that spot and disfigure orchid flowers. It is usually a problem associated with very high level of humidity and not enough ventilation. Black dots appears on the flowers. Cure: fungicide and increased air movement, reduce humidity.

(c) Viruses: Viruses infect orchids, the symptom being sunken spots and lines on leaves, and on flowers reduce vigour. Cure: There is no cure for viral infection. Always use sterile cutting tools to avoid transmitting to another plant. It is advisable to isolate and destroy the plants.

## VII. Resting:

Many terrestrial Orchids undergo a dormant season during winter when their pseudobulb or tubers shed their leaves and wait till a more favourable growing condition to return e.g. *Habenaria*, *Anthogonium*. Similarly the epiphytic orchids complete their growth cycle during the wet, summer months and undergo a resting stage during the more cool and dry winter months. E.g. *Dendrobium*, *Coelogyne* and *Pleione*. During cultivation, it is imperative that one remembers the plants natural growth cycle and not harm it by watering and fertilizing it when it is dormant.



VIII. **Potting and after care:** Orchids usually need to be repotted every other year. This can be done during spring or early summer as the plants are just beginning to come into growth, and would re-establish more quickly. Ideally one would repot when:

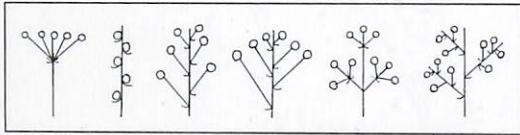
- (i) New roots are beginning to grow
- (ii) The plant has outgrown its container
- (iii) Compost level is well below the rim of the pot
- (iv) Compost has deteriorated
- (v) Plant not growing well in the compost.

During repotting, the old compost is removed. Dead roots are removed as near as possible to the base of the plant. Plants are divided if they have grown too large to handle, before they are repotted in a clean pot with fresh compost.

After repotting, water thoroughly and place the plants in 70-80% shade with good ventilation for a couple of weeks, till they show signs of growth. Spray the plants regularly to prevent drying, commence regular watering and feeding once the new roots have started to grow.

The plant then can be moved to the recommended light and temperature requirement.



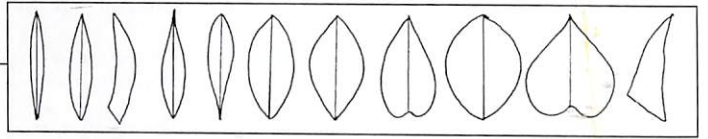
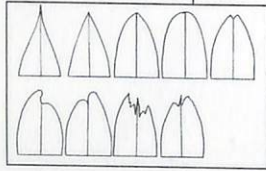


**INFLORESCENCE**

1. Umbel
2. Spike
3. Raceme
4. Corymb
5. Cyme
6. Pannicle

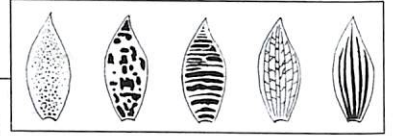
**LEAFTIPS**

1. Acuminate
2. Acute
3. Obtuse
4. Truncate
5. Retuse
6. Bilobed un-equally
8. Erore
9. Mucronate



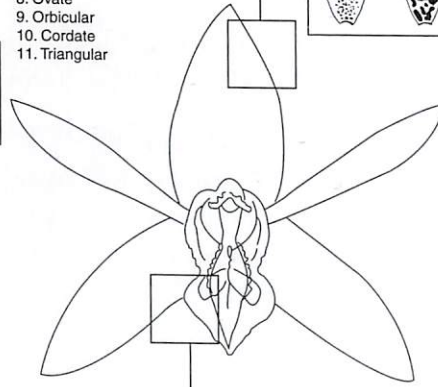
**LEAFSHAPES**

1. Linear
2. Oblong
3. Falcate
4. Lanceolate
5. Oblanceolate
6. Oval
7. Elliptic
8. Ovate
9. Orbicular
10. Cordate
11. Triangular

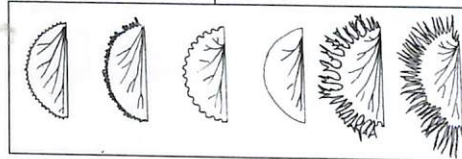


**COLOUR MARKINGS**

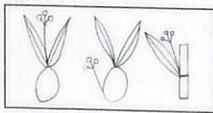
1. Spotted
2. Blotched
3. Striped
4. Reticulate
5. Veined



**LIP MARGINS**

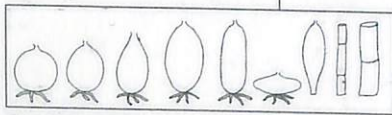


1. Denticulate
2. Ciliate
3. Crispitate
4. Plain
5. Fimbriate
6. Fringed



**ORIGIN OF INFLORESCENCE**

1. Terminal
2. Basal
3. Axillary



**BULB SHAPES**

1. Orbicular
2. Oval
3. Oblong
4. Elliptic
5. Cylindric
6. Turbinate
7. Clavate
8. Reed-like
9. Jointed

