

DEORALI ORCHID SANCTUARY, GANGTOK

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ABSTRACT

Sikkim Himalayas are well-known for their rich wealth of flora and fauna. Many edible, economic and ornamental plants are found in and around Gangtok. Sacred groves of Rumtek, Enchey and Deorali are nature reserves around Buddhist Monasteries. Naturalists have visited these areas since the days of Hooker (1848) and collected beautiful orchids for cultivation. As many as 600 species of orchids were described from Sikkim by King & Pantling (1898) whereas Bruhl (1926) provided a guide to identify these beautiful orchids in nature.

Gangtok or the "Hilltop", situated on the ridge with deep gorges of Ranichu in the West and Rorocho in the East ranges from 1675 to 1860 m. The Enchey monastery near tourist lodge, the deer park near Secretariat and the Institute Tibetology near Chuten attract visitors.

INTRODUCTION

The Deorali Orchid Sanctuary was established in 1970 by the Forest Deptt. in two hectares of natural area adjoining the Institute of Tibetology by the side of National High Way. The humid climate, and well exposed terrain of Deorali favour growth of several tropical and temperate orchids. Some species are indigenous to Gangtok but many others are introduced for propagation and conservation of endemic species. As many as 225 species of orchids are now under cultivation at Deorali. In all 51 Genera are represented and include *Acanthephippium*, *Arachnis*, *Chrysoglossum*, *Didiciea*, *Herminium*, *Mono-meria*, *Ornithochilus*, *Porpax*, *Spathoglottis* and *Stauroopsis* to name a few. A few like *Renanthera imschootiana*, the Slipper Orchid *Paphiopedilum spicerianum* and *Cryptochilus lutea* have been introduced from the Eastern India.

As one proceeds from Gangtok towards Ranipool there is a road leading to Chuten

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just above the Forest Secretariat at Deorali. An avenue of graceful tree ferns *Cyathea spinulosa* leads to the Institute of Tibetology. The fenced site north of the institute adjoining the National High Way is demarcated as the orchid sanctuary. A canopy of native trees like "chilaune" (*Schima wallichii*), "Katus" (*Quercus spicata*), "Utis" (*Alnus nepalensis*) and "Mawa" (*Engelhardtia spicata*), "Toon" (*Toona ciliata*), "Malata" (*Macaranga denticulata*), constitute the macrohabitat for orchids. A shrubby undergrowth of *Eurya acuminata*, *Indigofera stachyoides*, *Edgeworthia gardneri* and herbs like *Polygonum molle*, *Houttuynia cordata* and *Impatiens* sp. constitute the ground flora making a niche congenial for native and exotic orchids.

The entrance gate of orchid sanctuary is flanked by beautiful tree fern, a clump of *Angiopteris evecta*, a bed of ground orchids and *Coelogyne* forms margin of a lily pond. *Dendrobium moschatum* and *D. nobile* are also located nearby. The minute

orchid *Eria musicola* can be seen with its bulbs right on the 'chilaune' in front of the gate. The rare *Katherinea ampla* and *Coelogyne ovalis* are found on the tree trunks on the Eastern slopes along bridle path. A strip of levelled area along the path from the pond is covered with a colony of tall bamboo orchid (*Arundina graminifolia*). The mossy floor on the right between bridle paths is planted with well-known slipper-orchid, *Paphiopedilum insigne*, *P. villosum*, *P. hirsutissimum* and the exotic *P. spicerianum*. Populations of bright flowered *Dendrobium nobile* and cylindrical leaved *Papilionanthe teres* grow on stumps or branches of small trees as epiphytes. Many epiphytic species of orchids are grown on the trees simulating the natural habitat.

Several ephemerals which recur in the season as annuals are maintained in beds. Such plants include delicate herbs like *Anoectochilus lanceolatus*, *Hetaeria bicolor* and *Malaxis iridifolia*. The profusely blooming ground orchids *Cymbidium longifolium*, *Calanthe masuca* and musk scented *Coelogyne barbata* occupy large beds on either side of bridle path. Temperate orchids like *Orchis chusua*, *Satyrium nepalense* and *Anthogonium gracile* grow during monsoon.

As many as 225 species of orchids native to Sikkim Himalayas are conserved in this sanctuary. The status of conservation efforts and importance of useful, endemic and threatened species is given in the following tables.

STATUS OF CONSERVATION OF ORCHIDS

Genera	Deorali	Sikkim	Performance
<i>Acanthephippium</i> Bl.	2	2	Excellent
<i>Aerides</i> Lour.	5	4	Very good
<i>Agrostophyllum</i> Blume	3	4	Fair
<i>Anoectochilus</i> Blume	5	7	Very good
<i>Anthogonium</i> Lindl.	1	1	Excellent
<i>Arachnis</i> Bl.	1	3	Fair
<i>Arundina</i> Blume	1	1	Excellent
<i>Assecentrum</i> Schltr.	1	2	Good
<i>Bulbophyllum</i> Thou.	15	30	Good
<i>Calanthe</i> R.Br.	11	15	Very good
<i>Camarotis</i> Lindl.	2	2	Excellent
<i>Chrysoglossum</i> Bl.	1	1	Excellent
<i>Cirrhopetalum</i> Lindl.	10	17	Very good
<i>Cleisostoma</i> Blume	7	7	Excellent
<i>Coelogyne</i> Lindl.	9	17	Good
<i>Cryptochilus</i> Wall.	2	2	
<i>Cymbidium</i> Sw.	17	16	Very good
<i>Dendrobium</i> Sw	35	36	Excellent
<i>Didickea</i> King & Prain	1	1	Excellent
<i>Eria</i> Lindl.	22	21	Excellent
<i>Eulophia</i> R. Br.	2	8	Fair
<i>Gastrochilus</i> D. Don	3		
<i>Goodyera</i> R. Br.	3	10	Fair
<i>Habenaria</i> Willd.	5	32	Fair
<i>Herminium</i> R. Br.	1	8	Fair
<i>Hetaeria</i> Bl.	1	1	
<i>Listera</i> R. Br.	2	8	Fair
<i>Liparis</i> Rich	15	24	Good
<i>Luisia</i> Gaud.	4	5	Excellent

<i>Malaxis</i> Sw.	3	11	Fair
<i>Monomeria</i> Lindl.	1	1	Excellent
<i>Oberonia</i> Lindl.	7	20	Good
<i>Orchis</i> L.	1	5	Fair
<i>Ornithochilus</i> Wall.	1	1	Excellent
<i>Otochilus</i> Lindl.	2	3	Excellent
<i>Paphiopedilum</i> Pfitz.	6	4	Excellent
<i>Phaius</i> Lour.	4	6	Good
<i>Papilionanthe</i> Schltr.	1	4	Fair
<i>Phalaenopsis</i> Bl.	2	2	Excellent
<i>Pholidota</i> Lindl.	4	6	Good
<i>Pleione</i> D. Don	3	4	Very good
<i>Rhynchostylis</i> Bl.	1	1	Excellent
<i>Satyrium</i> Sw.	1	2	Good
<i>Spathoglottis</i> Blume	1	1	Excellent
<i>Staurosis</i> Reichb. f.	1	1	Excellent
<i>Thelasis</i> Blume	2	2	Excellent
<i>Thunia</i> Reich. f.	1	1	Fair
<i>Vanda</i> R. Br.	2	4	Good
<i>Zeuxine</i> Lindl.	4	11	Fair

IMPORTANCE OF SPECIES

Fragrant

Acanthephippium striatum
Aerides fieldingii
Aerides odoratum
Bulbophyllum leopardinum
Coelogyne graminifolia
Cymbidium eburneum
Cymbidium giganteum
Cymbidium grandiflorum
Dendrobium aggregatum
Dendrobium amoenum
Dendrobium candidum
Dendrobium densiflorum
Dendrobium gibsonii
Dendrobium moschatum
Dendrobium ochreatum
Dendrobium parishii
Dendrobium primulinum
Dendrobium williamsoni
Eria coronaria
Gastrochilus calceolaris
Habenaria goodyeroides

Endemic

Agrostophyllum brevipes
Anoectochilus tortus
Bulbophyllum gamblei
Bulbophyllum piluliferum
Cirrhopetalum caudatum
Cleisostoma armigerum
Cymbidium gammieanum
Cymbidium whiteae
Eria biflora
Eria confusa
Eria pannea

Threatened

Anoectochilus roxburghii
Bulbophyllum eublepharum
Bulbophyllum thomsoni
Cirrhopetalum brevipes
Dendrobium rotundatum
Dendrobium wardianum

ORCHIDS (UNDER CULTIVATION) IN DEORALI ORCHID SANCTUARY, GANGTOK.

***Acanthephippium striatum* Lindl.**
 Terrestrial with creamy white flowers,
 scented. July-August. Sikkim, Khasia
 Hills. 540-900 m. Threatened.

***A. sylhetense* Lindl.**
 Terrestrial with creamy-yellow spotted

and with purple flowers, scented. April-
 May; Sikkim, Khasia Hills: 600-1200 m.
 Threatened.

***Aerides fieldingii* Jennings**
 Epiphytic with bright rose coloured
 flowers, scented. May-June. Sikkim,
 Meghalaya. 560-950 m. Fair.

- A. longicornu** Hook. f.
Epiphytic with white flowers suffused with pink, September, Sikkim, Naga Hills. 1650 m. Threatened.
- A. multiflorum** Roxb.
Epiphytic with white and rose purple shaded flowers. June-July. Tropical valleys, 700 m. Common.
- A. odoratum** Lour.
Epiphytic with whitish purple flowers, fragrant. June-July. Tropical valleys. 1000 m. Fair.
- A. vandarum** Reichb. f.
Epiphytic with white flowers, fragrant. March-April, Sikkim, Khasia Hills and Manipur, 1500-2000 m. Threatened.
- Agrostophyllum brevipes** King & Pantl.
Epiphytic with white congested flowers. June-July. Tropical valleys. 650 m. Fair.
- A. callosum** Reichb. f.
Epiphytic with pink flowers. June-July. Sikkim, Khasia & Naga Hills. 700-1800 m. Common.
- A. khasianum** Griff.
Epiphytic with white flowers having pale yellow patch on the lip. August. Tropical valleys. 650-700 m. Fair.
- A. myianthum** King & Pantl.
Epiphytic with small numerous yellow flowers. August. Tista valley. 400 m. Fair.
- Anoectochilus grandiflorus** Lindl.
Terrestrial with pale green, mottled white pink tipped flowers. July. Tendong in Sikkim, Khasia Hills. 1000-1600 m. Fair.
- A. lanceolatus** Lindl.
Terrestrial with pale green flowers. July-September. Yoksum in Sikkim, Phadong R.F., Khasia Hills, 1400 m. Threatened.
- A. roxburghii** Lindl.
Terrestrial with greenish white flowers. April-May. Sikkim, Assam & Manipur. 1000 m. Threatened.
- A. sikkimensis** King & Pantl.
Terrestrial with olive green and white flowers. September-October. Sikkim, Darjeeling and Khasia Hills. 1000-1800 m. Rare.
- A. tortus** King & Pantl.
Terrestrial with green flowers. December. Sikkim, Endemic. 1000 m. Rare.
- Anthogonium gracile** Lindl.
Terrestrial with white or rose coloured flowers. August. Sikkim, Khasia and Naga Hills. 1200-2200 m. Fair common in Gangtok.
- Arachnis cathcartii** Sm.
Terrestrial or epiphytic with pale yellow suffused with red brown bands, scented. March-April. Sikkim. Endemic. 1000-1500 m. Rare.
- A. clarkei** Sm.
Terrestrial or epiphytic with brown light yellow striped flowers, fragrant. November-December. Eastern Himalayas. 1000-2000 m. Fair.
- Arundina graminifolia** (D. Don) Hochr.
Terrestrial with pink-purple flowers. April-May. Sikkim, Khasia Hills and Manipur. 1000 m. Fair.
- Ascocentrum ampullaceum** (Roxb.) Schltr.
Epiphytic with pink or rose coloured flowers. March-May. Tropical valleys. 400-1000 m. Fair.
- Bulbophyllum affine** Lindl.
Epiphytic with white or pale green purple nerved flowers. June-July. Tista valley, Khasia and Naga Hills. 1000 m. Fair.
- B. bisetum** Lindl.
Epiphytic with olive green and brown flowers. September. Rungbee in Sikkim, Khasia Hills. 1300-1700 m. Restricted.
- B. careyanum** Spreng.
Epiphytic with white or yellow flowers. October. Sikkim, Khasia Hills. 1500-1800 m. Fair.

B. cauliflorum Hook. f.

Epiphytic with green flushed with brown flowers. July. Sikkim, Darjeeling and Khasia Hills. 1650-2000 m. Restricted.

B. cylindraceum Lindl.

Epiphytic with purple flowers. October-January. Sikkim, Khasia Hills. 2000-2200 m. Fair.

B. eublepharum Reichb. f.

Epiphytic with green flowers and long spur. August. Sureil and Tongloo in Sikkim. Endemic. 2000-2300 m. Threatened.

B. gamblei Hook. f.

Epiphytic with pale yellowish green flowers. July-August. Engo in Sikkim. Endemic. 1500-2100 m. Threatened.

B. hirtum Lindl.

Epiphytic with greenish white or yellow flowers. October-January. Sikkim, Khasia Hills. 1000-2000 m. Restricted.

B. leopardinum Lindl.

Epiphytic with whitish or pale-ochraceous spotted with crimson flowers, fragrant. October-November. Tista valley, Mangan. 2000 m. Rare.

B. leptanthum Hook. f.

Epiphytic with pale yellowish green flowers, scented. July. Sikkim, Khasia Hills. 1000-1700 m. Restricted.

B. odoratissimum Lindl.

Epiphytic with yellowish white flowers, scented. May-September. Sikkim, Khasia Hills. 1000-2100 m. Fair.

B. piluliferum King & Pantl.

Epiphytic with dark brown and reddish streaked flowers. May. Sikkim. Endemic. 350 m. Rare.

B. protractum Hook. f.

Epiphytic with light yellow flowers. July. Sikkim, Andaman Islands. 500-700 m. Fair.

B. reptans Lindl.

Epiphytic with yellowish purple spotted flowers. October-December. Sikkim, Khasia & Naga Hills. 1500-2000 m. Common.

B. thomsoni Hook. f.

Epiphytic with minute yellowish-white flowers. September. Sikkim. Endemic. 1300 m. Threatened.

Calanthe biloba Lindl.

Terrestrial with light yellow suffused with purplish-brown flowers. September-October. Sikkim, Manipur. 1050-2100 m. Restricted.

C. brevicornu Lindl.

Terrestrial with brownish-purple flowers. May-June Sikkim Manipur. 1800-2500 m. Fair.

C. chloroleuca Lindl.

Terrestrial with yellowish green flowers. April-May. Sikkim. Endemic. 2000-2500 m. Endangered.

C. densiflora Lindl.

Terrestrial with pale yellow flowers. October. Sikkim, Khasia Hills. 1300-2000 m. Fair.

C. gracilis Lindl.

Terrestrial with yellowish white flowers. October. Sikkim, Khasia Hills. 1000-1200 m. Fair.

C. herbacea Lindl.

Terrestrial with brownish green flowers, fragrant. April-May. Rungbee in Sikkim. Endemic. 1200-1800 m. Threatened.

C. longipes Hook. f.

Terrestrial with pure white flowers. October. Sikkim. Endemic. 2000 m. Threatened.

C. mannii Hook. f.

Terrestrial with pubescent dull brown flowers. May. Sikkim, Khasia Hills and Kumaon. 2000 m. Fair.

- C. masuca** Lindl.
Terrestrial with purplish mauve flowers. August-September. Lanchen valley in Sikkim, Khasia Hills. 800-1800 m. Threatened.
- C. puberula** Lindl.
Terrestrial with pale-lavender flowers. July-August. Sikkim, Khasia and Naga Hills. 2000 m. Threatened.
- C. whiteana** King & Pantl.
Terrestrial with yellowish flowers. May. Chungthang in Sikkim. Endemic. 2000 m. Endangered.
- Camarotis mannii** King & Pantl.
Epiphytic with pink and crimson spotted flowers. June-July. Sikkim, Khasia Hills. 450 m. Restricted.
- C. obtusa** Lindl.
Epiphytic with white flowers. August. Tista valley in Sikkim. 400 m. Restricted.
- Chrysoglossum erraticum** Hook. f.
Terrestrial with white reddish spotted flowers. June. Rishap in Sikkim. Endemic. 1800 m. Threatened.
- Cirrhopetalum bhotanense** Hook. f.
Epiphytic with rose red spotted flowers. April. Sikkim, Khasia Hills. 1000 m. Fair.
- C. brevipes** Hook. f.
Epiphytic with rose pink flowers. September-October. Sikkim. Endemic. 2000-2700 m. Threatened.
- C. caudatum** King & Pantl.
Epiphytic with white flowers. June-July. Sikkim. Endemic 500-1300 m. Threatened.
- C. cornutum** Lindl.
Epiphytic with reddish-brown flowers. May-June. Sikkim, Khasia Hills. 1000 m. Fair.
- C. elatum** Hook. f.
Epiphytic with dirty yellow purple spotted flowers. May. Sikkim. Endemic. 1700 m. Threatened.
- C. guttulatum** Hook. f.
Epiphytic with pale yellow purple spotted flowers. March-April. Sikkim, Khasia Hills. 750-1200 m. Threatened.
- C. ornatissimum** Reichb. f.
Epiphytic with light yellow purple shaded flowers. October-November. Sikkim, Assam. 500 m. Fair.
- C. parvulum** Hook. f.
Epiphytic with creamy flowers. August. Sikkim, Darjeeling. 2300-2500 m. Restricted.
- C. sikkimense** King & Pantl.
Epiphytic with greenish and brownish red marking flowers. Sikkim. Endemic. 500 m. Endangered.
- C. viridiflorum** Hook. f.
Epiphytic with brown purplish suffused with white flowers. October-November. Sikkim, Khasia Hills. 1500-2000 m. Restricted.
- Cleisostoma armigerum** King & Pantl.
Epiphytic with straw-coloured suffused with pink flowers. September. Sikkim. Endemic. 700 m. Threatened.
- C. bambusarum** King & Pantl.
Epiphytic with brownish yellow flowers. September. Sikkim. Endemic. 500 m. Threatened.
- C. brevipes** Hook. f.
Epiphytic with orange-yellow and two prominent purple band flowers. August. Sikkim, Assam, 700 m. Restricted.
- C. gemmatum** King & Pantl.
Epiphytic with purple flowers. July-August. Sikkim, Meghalaya. 700-1000 m. Fair.
- C. mannii** Reichb. f.
Epiphytic with minute yellow flushed with red flowers. August. Sikkim, Assam. 500 m. Fair.
- C. micranthum** King & Pantl.
Epiphytic with whitish and pink spotted

flowers. July-August. Sikkim, Khasia & Naga Hills. 1000 m. Fair.

C. spicatum Lindl.

Epiphytic with yellow suffused with brown purple flowers. June. Tista valley in Sikkim. Endemic. 300-400 m. Threatened.

Coelogyne barbata Griff.

Epiphytic with white flowers having dark brown hairs on the lip. April. Khasia & Naga Hills. 1300-1700 m. Fair.

C. corymbosa Lindl.

Epiphytic with creamy white having 4 large yellow eyes bordered with orange flowers, sweet scented. April-May. Sikkim, Khasia Hills. 1750-2400 m. Fair.

C. cristata Lindl.

Epiphytic with snow white flowers having fimbriate lamellae on the lip. March-April. Sikkim, Khasia Hills and Kumaon Hills. 1500-2400 m. Fair.

C. elata Lindl.

Epiphytic with white flowers, foul smell. May-June. Sikkim, Darjeeling and Garhwal. 1300-1800 m. Endangered.

C. flaccida Lindl.

Epiphytic with creamy white flowers. March-May. Sikkim, Khasia Hills. 1000-1500 m. Common.

C. graminifolia Par. & Reichb. f.

Epiphytic with white flowers, fragrant. April. Assam. Endemic. 800 m. Threatened.

C. nitida Lindl.

Epiphytic with white flowers having yellow eyes on the lip. April-May. Sikkim, Khasia Hills. 1000-2000 m. Common.

C. ovalis Lindl.

Epiphytic with pale yellow brown flowers. October-November. Tendong R.F. in Sikkim, Khasia Hills. 1400 m. Endangered.

C. uniflora Lindl.

Epiphytic with pale white or flesh coloured flowers. April-May. Sikkim, Khasia & Nilgiri Hills. 1000-1400 m. Fair.

Cryptochilus luteus Lindl.

Epiphytic with yellow flowers. May-June. Sikkim, Naga Hills. 1500-2000 m. Restricted.

C. sanguinea Wall.

Epiphytic with scarlet flowers. June-August. Sikkim, Khasia & Naga Hills. 1500-2200 m. Restricted.

Cymbidium aloifolium Sw.

Epiphytic with brownish red flowers. April-May. Sikkim, West Bengal and Assam. 300-1000 m. Threatened.

C. cochleare Lindl.

Terrestrial with greenish brown suffused with red flowers. October-November. Sikkim, Khasia & Naga Hills. 1200-1800 m. Threatened.

C. cyperifolium Wall.

Terrestrial with green flowers, lip spotted with red, scented. November. Chungthang in Sikkim, Khasia & Naga Hills. 1500 m. Threatened.

C. devonianum Paxt.

Terrestrial with olive green spotted with crimson flowers. May-June. Sikkim, Khasia Hills. 1700 m. Threatened.

C. eburneum Lindl.

Terrestrial with ivory white flowers, scented. March-April. Sikkim, Khasia Hills. 300-900 m. Common.

C. gammieanum King & Pantl.

Terrestrial with dirty yellow flushed with brown lines flowers. September-November. Sikkim. Endemic. 1500-2200. Endangered.

C. giganteum Wall.

Terrestrial with light yellow green suffused with red flowers, faintly scented. October-November. Sikkim, Khasia Hills. 1200-2000 m. Fair.

- C. grandiflorum** Griff.
Terrestrial with bright olive green suffused with yellow flowers, fragrant. February. Sikkim. Endemic. 1500-2500 m. Threatened.
- C. lancifolium** Hook. f.
Terrestrial with greenish white and red striped flowers. June. Sikkim, Khasia & Naga Hills. 1800 m. Restricted.
- C. longifolium** Don
Terrestrial with greenish white and purple streaked flowers. September-October. Sikkim, Khasia Hills. 1700 m. Fair.
- C. mastersii** Griff.
Terrestrial with white flushed with pink flowers, sweet scented. October — November. Sikkim, Khasia Hills. 1500-1800 m. Threatened.
- C. munronianum** King & Pantl.
Terrestrial with straw-coloured and purple dotted, scented. May. Tista valley. Endemic. 500 m. Threatened.
- C. pendulum** Sw.
Terrestrial with dark purple-brown and yellowish margined flowers. May. Sikkim, Darjeeling, Assam. 300 m. Fair.
- C. sikkimense** Hook. f.
Terrestrial with white flowers. May. Sikkim. Endemic. 2000 m. Endangered.
- C. simonsianum** King & Pantl.
Terrestrial with white and crimson lined flowers. August. Tista valley, Assam. 400 m. Restricted.
- C. whiteae** King & Pantl.
Terrestrial with yellowish-green and dull red spotted flowers. November. Gangtok in Sikkim. Endemic. 1700 m. Endangered.
- Dendrobium aduncum** Wall.
Epiphytic with purple translucent flowers. April-May. Sikkim, Darjeeling, Khasia Hills & Assam. 800 m. Fair.
- D. aggregatum** Roxb.
Epiphytic with drooping yellow flowers, scented. April-May. Sikkim, Assam. 1000-2000 m. Endangered.
- D. amoenum** Wall.
Epiphytic with white and purple spotted flowers, scented. June. Sikkim, Khasia Hills. 1000 m. Fair.
- D. anceps** Sw.
Epiphytic with yellowish green flowers inserted at the side of the stem. April-May. Sikkim, Assam, 350 m. Fair.
- D. bicameratum** Lindl.
Epiphytic with yellow specked with red stripes flowers. August-September. Sikkim, Khasia Hills, Orissa & Bihar. 100 m. Fair.
- D. candidum** Wall.
Epiphytic with white flowers and a yellow spot near the base, fragrant. May-June. Lachen valley in Sikkim, Khasia Hills & Manipur. 1000-2000 m. Restricted.
- D. cathcartii** Hook. f.
Epiphytic with golden yellow suffused with purple flowers. April-September. Sikkim, Orissa. 800 m. Restricted.
- D. chrysanthum** Wall.
Epiphytic with yellow flowers having two brownish purple patches. July-October. Sikkim, Khasia Hills. 900-1500 m. Fair.
- D. chrysotoxum** Lindl.
Epiphytic with golden yellow flowers. April-May. Sikkim, Khasia Hills and Assam. 400-1500 m. Fair.
- D. crepidatum** Griff.
Epiphytic with pinkish flowers. April-May. Sikkim, Khasia Hills & Assam. 1050 m. Fair.
- D. cumulatum** Lindl.
Epiphytic with pale purple flowers. June-July. Sikkim, Khasia Hills. 900 m. Fair.



Dendrobium aggregatum Roxb

Papilionanthe teres (Roxb.) Schltr





Cymbidium aloifolium (L.) Sw



Paphiopedilum insigne (Wall. ex Lindl.) Pfitz



Dendrobium amoenum Wall. ex Lindl.

- D. densiflorum** Wall.
Epiphytic with densely arranged yellow flowers, scented. April-May. Sikkim, Khasia Hills, 1300 m. Endangered.
- D. denudans** Wall.
Epiphytic with white flowers and red veins on the lip. September-October. Sikkim, Manipur and Kumaon. 1000-1500 m. Common.
- D. eriaeflorum** Griff.
Epiphytic with green flowers and lip spotted with dull purple. September-October. Sikkim, Khasia Hills. 900-1800 m. Fair.
- D. falconeri** Hook. f.
Epiphytic with white flowers suffused with amethyst, sweet scented. February-May. Sikkim, Khasia Hills and Manipur, 750 m. Fair.
- D. farmeri** Paxt.
Epiphytic with white flowers. April-May. Sikkim, Khasia Hills and Assam. 400-1200 m. Fair.
- D. fimbriatum** Hook. f.
Epiphytic with orange-yellow flowers. March-May. Sikkim, Khasia Hills, Manipur and Orissa. 1200 m. Fair.
- D. formosum** Roxb.
Epiphytic with white flowers and yellow lip. May. Sikkim, Khasia Hills and Assam. 350 m. Fair.
- D. gibeonii** Lindl.
Epiphytic with saffron-yellow to orange yellow flowers, scented. July-August. Sikkim, Khasia Hills and Assam. 750-1200 m. Fair.
- D. heterocarpum** Wall.
Epiphytic with white flowers having 2 purple blotches on lip. April. Sikkim, Khasia Hills. 1000 m. Fair.
- D. hookerianum** Lindl.
Epiphytic with golden yellow flowers have 2 oblique dark purple patches on lip. September. Sikkim, Khasia Hills and Assam. 1000-1500 m. Fair.
- D. infundibulum** Lindl.
Epiphytic with ivory white flowers having golden yellow blotch in throat. March-May. Sikkim, Khasia Hills and Assam. 780 m. Threatened.
- D. liluiflorum** Lindl.
Epiphytic with purplish white flowers. February-April. Sikkim, Assam and Manipur. 1500 m. Fair.
- D. moschatum** Wall.
Epiphytic with creamy suffused with reddish veins flowers, fragrant. May-July. Sikkim, Khasia Hills and Assam. 1300 m. Fair.
- D. nobile** Lindl.
Epiphytic with purplish white flowers. April-May. Sikkim, Khasia Hills and Assam. 1000-1500 m. Fair.
- D. ochreatum** Lindl.
Epiphytic with deep golden yellow flowers having a large maroon blotch, scented. February-April. Sikkim, Khasia Hills. 1570 m. Fair.
- D. Parishii** Reichb. f.
Epiphytic with purplish flowers, scented. February-May. Sikkim, Khasia Hills and Assam. 1000 m. Fair.
- D. pauciflorum** King & Pantl.
Epiphytic with yellowish purple flowers. June. Sikkim, Darjeeling and Assam. 700-1300 m. Fair.
- D. primulinum** Lindl.
Epiphytic with whitish pink flowers, scented. April. Sikkim, Khasia Hills and Mussourie. 1000 m. Fair.
- D. rotundatum** Benth.
Epiphytic with yellow pink veined flowers. April-May. Khasia Hills. Endemic. 1500-1800 m. endangered.
- D. sulcatum** Lindl.
Epiphytic with light yellow orange flowers. April-May. Sikkim, Khasia Hills and Assam. 1450 m. Fair.

- D. terminale** Par. & Reichb. f.
Epiphytic with whitish or pale pinkish flowers. April-May. Sikkim. Endemic. 1500 m. Endangered.
- D. transparens** Wall.
Epiphytic with white suffused with purple flowers. May. Sikkim, Khasia Hills and Assam. 100 m. Fair.
- D. wardianum** Warner.
Epiphytic with light reddish white flowers, scented. February-March. Khasia Hills. Endemic. 750 m. Threatened.
- D. williamsoni** Day & Reichb. f.
Epiphytic with creamy white flowers, scented. February -- April. Khasia Hills, Assam. 1000 m. Threatened.
- Didiciea cunninghami** King & Pantl.
Saprophytic with minute flowers. July. Sikkim, Khasia Hills. 450 m. Restricted.
- Eria acervata** Lindl.
Epiphytic with light yellow small flowers. June-July. Sikkim, Khasia Hills. 550-750 m. Fair.
- E. alba** Lindl.
Epiphytic with whitish yellow flowers. July-August. Sikkim, Khasia Hills. 1800 m. Fair.
- E. biflora** Griff.
Epiphytic with pale yellow flowers. September. Sikkim. Endemic. 350 m. Threatened.
- E. bractescens** Lindl.
Epiphytic with white or light pinkish flowers. April. Sikkim, Andaman Islands. 300-1000 m. Fair.
- E. carinata** Lindl.
Epiphytic with yellowish green and crimson veined flowers. November-January. Sikkim. Khasia Hills. 500-1200 m. Fair.
- E. clausa** King & Pantl.
Epiphytic with green and brown striped flowers. February-March. Sikkim. Endemic. 1000-1500 m. Endangered.
- E. confusa** Hook. f.
Epiphytic with brownish flowers. April. Tista valley in Sikkim. Endemic. 900 m. Endangered.
- E. convallaroides** Lindl.
Epiphytic with creamy flowers. July-August. Sikkim, Khasia Hills. 1300-1500 m. Fair.
- E. coronaria** Reichb. f.
Epiphytic with white flowers, sweet scent. November. Sikkim, Khasia Hills. 1500-2000 m. Fair.
- E. dasyphylla** Par. & Reichb. f.
Epiphytic, hirsute with greenish yellow flowers. May-June. Sikkim, Khasia Hills. 300-600 m. Endangered.
- E. excavata** Lindl.
Epiphytic with whitish yellow flowers. June. Sikkim, Khasia Hills. 1200-2000 m. Fair.
- E. graminifolia** Lindl.
Epiphytic with whitish yellow suffused with red flowers. July-August. Sikkim. Endemic. 1500-2000 m. Endangered.
- E. javanica** Bl.
Epiphytic with whitish or pale yellowish flowers. July-August. Sikkim. Endemic. 350 m. Endangered.
- E. muscicola** Lindl.
Epiphytic with yellowish green flowers. August. Sikkim, Khasia Hills. 1000-1300 m. Endangered.
- E. paniculata** Lindl.
Epiphytic with yellowish green having brownish blotches on lip. January-April. Sikkim, Khasia & Naga Hills. 950-1200 m. Fair.
- E. panneae** Lindl.
Epiphytic with woolly white flowers, scented. May. Sikkim. Endemic. 1000 m. Endangered.
- E. pumila** Lindl.
Epiphytic with white flushed with pink flowers. May. Sikkim, Khasia Hills. 900 m. Fair.
- E. pusilla** Lindl.
Epiphytic with solitary small flowers.

- May. Khasia Hills. Endemic. 1300-1800 m. Endangered.
- E. rufinula* Reichb. f.
Epiphytic with whitish pink flowers. May. Sikkim, Khasia & Naga Hills. 800 m. Fair.
- E. stricta* Lindl.
Epiphytic with whitish suffused with pink flowers. November-February. Sikkim, Khasia & Naga Hills. 400-1200 m. Fair.
- E. vittata* Lindl.
Epiphytic with greenish red flowers. March-April. Sikkim, Manipur. 1500-2000 m. Restricted.
- Eulophia bicarinata* Hook. f.
Terrestrial with long spike and green flowers. March-April. Sikkim, Khasia Hills and Assam. 750-950 m. Restricted.
- E. sanguinea* (Lindl.) Hook. f.
Terrestrial with dull brown flowers. May-June. Sikkim, Khasia Hills. 1000 m. Threatened
- Gastrochilus acutifolius* (Lindl.) Kuntze
Epiphytic with yellowish white and red spotted flowers. March-April. Sikkim, Khasia Hills. 100 m. Restricted.
- G. calceolaris* D. Don
Epiphytic with greenish yellow blotched with redbrown flowers. Scented. March-April. Khasia Hills. 500-950 m. Fair.
- G. dasypogon* O. Ktze.
Epiphytic with yellowish white suffused with brownish purple flowers. November-December. Sikkim, Assam. 450 m. Fair.
- Goodyera foliosa* Benth.
Terrestrial with pinkish yellow flowers. October-November. Sikkim, Khasia and Naga Hills, Assam. 1700-2000 m. Common.
- G. grandis* King & Pantl.
Terrestrial with dull-red flowers. August. Rumtek in Sikkim, Darjeeling. 1400 m. Fair.
- G. procera* Hook. f.
Terrestrial with white flowers. May. Sikkim, Khasia and Naga Hills, Assam. 450-1200 m. Common.
- Habenaria aristata* Hook. f.
Tuberous, terrestrial with light green flowers. August. Thungthang in Sikkim, Khasia Hills. 1300-1500 m. Restricted.
- H. constricta* Wall.
Tuberous, terrestrial with yellowish brown suffused with white flowers. June-July. Tista valley in Sikkim, Khasia Hills and Orissa. 450 m. Fair.
- H. geniculata* Don
Tuberous, terrestrial with white flowers. July-August. Sikkim, Khasia and Naga Hills. 700-1700 m. Fair.
- H. goodyeroides* Don
Tuberous, terrestrial with olive-green flowers, scented. May-July. Sikkim, Khasia Hills. 1000 m. Common.
- H. stenopetala* Lindl.
Tuberous, terrestrial with greenish-brown flowers. August-October. Sikkim, West Bengal and Naga Hills. 650-1000 m. Fair.
- Herminium angustifolium* Benth.
Terrestrial with greenish flowers. July-August. Sikkim, Khasia and Naga Hills. 1500-2000 m. Common.
- Hetaeria bicolor* Lindl.
Epiphytic with light reddish flowers. October-December. Sikkim, Khasia Hills. 2000 m. Fair.
- H. intermedia* (King & Pantl.) Hunt.
Epiphytic with pale green flowers. October-December. Tendong in Sikkim. Endemic. 2000 m. Endangered.
- H. paleacea* (Lindl.) Hunt.
Epiphytic with greenish white suffused with pink veins flowers. October-December. Sikkim. Endemic. 2000 m. Endangered.

- H. scariosa** (King & Pantl.) Hunt.
Epiphytic with greenish flushed with dull purple flowers. April-May. Sikkim, Khasia Hills. 1000-1400 m. Fair.
- Katherinea ampla** (Lindl.) Hawk.
Epiphytic with solitary flower having greenish brown and dark purple lip. October. Sikkim, Khasia Hills and Assam. 1200-1800 m. Fair.
- Liparis bistrata** Par. & Reichb. f.
Terrestrial with yellowish flowers. July-August. Sikkim, Khasia and Naga Hills. 2000-2300 m. Fair.
- L. bituberculata** Lindl.
Terrestrial with brownish purple flowers. June-July. Chungthang in Sikkim, Khasia Hills. 1500-2200 m. Fair.
- L. bootanensis** Griff.
Terrestrial with brownish green flowers. August. Sikkim, Khasia Hills. 1600 m. Fair.
- L. cathcartii** Hook. f.
Terrestrial with greenish purple flowers. August-September. Lachen valley in Sikkim. Endemic. 2000-2500 m. Endangered.
- L. cordifolia** Hook. f.
Terrestrial with green flowers. October-November. Sikkim, Khasia Hills. 1000-2000 m. Fair.
- L. deflexa** Hook. f.
Terrestrial with yellow flowers. August. Sikkim, Darjeeling. 750 m. Fair.
- L. gamblei** Hook. f.
Terrestrial with greenish purple flowers. June. Surcilin Sikkim. Endemic. 2000 m. Threatened.
- L. griffithii** Ridley
Terrestrial with yellowish green flowers. November. Pemiongshi in Sikkim. Endemic. 1500 m. Threatened.
- L. longipes** Lindl.
Terrestrial with green flowers. October. Sikkim Khasia Hills. 1500-1800 m. Fair.
- L. mannii** Reichb. f.
Terrestrial with yellowish green flowers. December. Sikkim, Assam. 400 m. Restricted.
- L. nepalensis** Lindl.
Terrestrial with purple flowers. May. Sikkim, Khasia Hills. 1200-1500 m. Fair.
- L. plantaginea** Lindl.
Terrestrial with green flowers. June-August. Sikkim, Khasia and Naga Hills. 350-800 m. Fair.
- L. platyrachis** Hook. f.
Terrestrial with light greenish flowers having four swellings on lip. September. Sikkim. Endemic. 1300-1700 m. Endangered.
- L. resupinata** Ridley
Terrestrial with golden brownish flowers. October-December. Sikkim, Khasia Hills. 1600-1700 m. Fair.
- L. viridiflora** Lindl.
Terrestrial with greenish white suffused with orange yellow flowers. November. Sikkim, Khasia Hills and Assam. 1000 m. Fair.
- Listera alternifolia** King & Pantl.
Terrestrial with olive green flowers. July. Lachen valley in Sikkim. Endemic. 3200 m. Endangered.
- L. brevicaulis** King & Pantl.
Terrestrial with olive green flowers. July. Lachen valley in Sikkim. Endemic. 3000 m. Endangered.
- Luisia filiformis** Hook. f.
Epiphytic with pale green flowers. March-April. Sikkim, Assam. 1000 m. Fair.
- L. inconspicua** Hook. f.
Epiphytic with yellowish green flowers. March-April. Sikkim, Assam. 750 m. Fair.
- L. tenuifolia** Bl.
Epiphytic with yellowish purple tinged flowers. May. Sikkim, Khasia Hills and West Bengal. 1000 m. Fair.
- L. volucris** Lindl.
Epiphytic with yellowish green suffused

with purple flowers. March-April. Sikkim, Khasia Hills. 350 m. Fair.

Malaxis cordifolia Reichb. f.

Terrestrial with greenish flowers. June-July. Sikkim. Endemic. 800 m. Endangered.

M. iridifolia Reichb. f.

Terrestrial with greenish white flowers. July. Sikkim, Khasia Hills. 1000 m. Fair.

M. obcordata Lindl.

Terrestrial with yellow-flowers. July-August. Sikkim, Khasia Hills. 1500-2000 m. Fair.

Monomeria barbata Lindl.

Epiphytic with yellow and brown marking flowers. February. Sikkim, Khasia Hills. 750 m. Fair.

Oberonia auriculata King & Pantl.

Epiphytic with small light brownish flowers. May. Sureil in Sikkim. Endemic. 1800 m. Endangered.

O. emarginata King & Pantl.

Epiphytic with small brownish flowers. September. Nomgah in Sikkim. Endemic. 2000 m. Endangered.

O. ensiformis Lindl.

Epiphytic with small orange flowers. November. Teesta valley in Sikkim, Khasia Hills. 500-800 m. Common.

O. falcata King & Pantl.

Epiphytic with small yellowish green flowers. August. Chungthang in Sikkim. Endemic. 1800-2000 m. Endangered.

O. iridifolia Lindl.

Epiphytic with small brownish flowers. September. Sikkim, Khasia Hills. 800 m. Common.

O. micrantha King & Pantl.

Epiphytic with small orange flowers. July. Tendong in Sikkim, Khasia Hills. 1800 m. Restricted.

O. pachyrachis Reichb. f.

Epiphytic with small brown flowers. November-March. Sikkim, Khasia Hills. 750-1200 m. Fair.

Orchis chusua Don

Terrestrial with dark purple flowers. July-August. Sikkim, Kumaon. 3000 m. Fair.

Ornithochilus fuscus Wall.

Epiphytic with greenish yellow-suffused with purplish stripes, scented. February-April. Sikkim, Khasia Hills. 1300-1700 m. Fair.

Otochilus fusca Lindl.

Epiphytic with white flowers having purplish brown lip. December. Sikkim, Khasia Hills and Assam. 1000-1200 m. Common.

O. porrecta Lindl.

Epiphytic with white flowers. October-January. Sikkim, Khasia Hills. 1000-2000 m. Common.

Paphiopedilum fairieanum (Lindl.) Stein

Terrestrial with large greenish purple flowers. October-December. Sikkim, Arunachal Pradesh and Bhutan. 1000-2500 m. Vulnerable.

P. hirsutissimum (Lindl. ex Hook.) Stein

Terrestrial with large greenish suffused with deep purple flowers. April-May. Meghalaya, Mizoram and Nagaland. 1000-2000 m. Rare.

P. insigne (Wall. ex Lindl.) Pfitz.

Terrestrial with large whitish, green and purple spotted flowers. October-December. Meghalaya, Nepal. 1000-2000 m. Rare.

P. spicerianum (Reichb. f.) Pfitz.

Terrestrial with large greenish white and red spotted flowers. October-December. Assam. Endemic. 1000-1850 m. Rare.

P. venustum (Wall. ex Sims.) Pfitz.

Terrestrial with large greyish green mottled with dark green patches flowers. December-February. Sikkim, Meghalaya. 1000-2000 m. Rare.

P. villosum (Lindl.) Stein

Terrestrial with large greenish white suffused with brown purple flowers. October-February. Mizoram. Endemic. 1000-2000 m. Rare.

***Papilionanthe teres* (Roxb.) Schltr.**

Epiphytic with rose coloured flowers, scented. March-April. Sikkim, Khasia Hills, Assam. 1000 m. Fair.

***Phajus albus* Lindl.**

Terrestrial with white flowers having lip suffused with purple veins. May. Sikkim, Khasia Hills. 1000-2000 m. Restricted.

***P. flavus* Lindl.**

Terrestrial with yellow flowers having red-brown linings on lip. April. Sikkim, Khasia Hills. 1000-1500 m. Threatened.

***P. mishmensis* Reichb. f.**

Terrestrial with white or rose coloured flowers. September-October. Sikkim, Assam and Mishmi Hills. 1200-2000 m. Threatened.

***P. tankervilleae* Bl.**

Terrestrial with buff coloured suffused with white flowers. March-April. Sikkim, Khasia Hills. 1500-2000 m. Threatened.

***Phalaenopsis mannii* Reichb. f.**

Epiphytic with drooping yellow suffused with brown markings flowers, fragrant. May. Teesta valley in Sikkim, Assam. 500 m. Restricted.

***P. parishii* Reichb. f.**

Epiphytic with whitish yellow spotted with purple flowers. March-April. Sikkim, Assam. 400 m. Restricted.

***Pholidota articulata* Lindl.**

Epiphytic with yellowish white flowers, scented. June-August. Sikkim, Khasia Hills. 750-1300 m. Common.

***P. imbricata* Lindl.**

Epiphytic with pink flowers. May-August. Sikkim, Khasia Hills. 700-1500 m. Common.

***P. protracta* Hook. f.**

Epiphytic with green flowers having four yellow patches on lip. October-December. Sikkim, Manipur and Nagaland. 2000 m. Fair.

***P. recurva* Lindl.**

Epiphytic with creamy white flowers.

August-September. Sikkim, Endemic. 700-1300 m. Threatened.

***Pleione humilis* D. Don**

Terrestrial/epiphytic with bluish white suffused with purplish crimson flowers. September-November. Sikkim. Endemic. 2000-3000 m. Vulnerable.

***P. maculata* Lindl.**

Terrestrial/epiphytic with white flowers. October-November. Sikkim, Khasia Hills and Assam. 1200-1600 m. Restricted.

***P. praecox* D. Don**

Terrestrial/epiphytic with rose-purple flowers, scented. November-December. Sikkim, Khasia Hills. 1600-2000 m. Restricted.

***Porpax fibuliformis* King & Pantl.**

Epiphytic with red flowers. October. Sikkim, Khasia Hills. 750-1000 m. Restricted.

***Renanthera imschootiana* Rolfe**

Epiphytic with dark red flowers. May-July. Assam. Endemic. 800-1500 m. Threatened.

***Rhynchostylis retusa* Bl.**

Epiphytic with purplish white flowers, scented. April-July. Sikkim, Khasia Hills and Assam. 750 m. Fair.

***Satyrium nepalense* D. Don**

Terrestrial with pink flowers. September-October. Karponang in Sikkim, Darjeeling. 2500-3000 m. Common.

***Spathoglottis ixiioides* Lindl.**

Terrestrial with bright yellow flowers having red spots on the lip. July-August. Lachung valley in Sikkim, Khasia Hills. 2200-2500 m. Restricted.

***Stauroopsis undulata* Benth.**

Epiphytic with white flowers suffused with pink. April-May. Sikkim, Khasia Hills and Manipur. 2000 m. Fair.

***Thelasis longifolia* Hook. f.**

Epiphytic with green flowers. July-August. Sikkim, Khasia Hills. 700-1000 m. Fair.

T. pygmaea Lindl.

Epiphytic with pale green flowers. July, Sikkim. 350 m. Restricted.

Thunia alba Reichb. f.

Terrestrial with white flowers having purple ridges on lip. June-July. Sikkim, Khasia Hills. 1000-2000 m. Restricted.

Vanda alpina Lindl.

Epiphytic with greenish yellow flowers. June-July. Sikkim, Khasia Hills. 1200-1700 m. Restricted.

V. cristata Lindl.

Epiphytic with olive green and purplish blotched flowers. May. Sikkim, Khasia Hills. 1200-1500 m. Restricted.

Zeuxine affinis Benth.

Terrestrial with whitish green flowers. April. Rangit valley in Sikkim, Khasia Hills. 1000 m. Restricted.

Z. goodyeroides Lindl.

Terrestrial with green flowers. September-October. Sikkim, Assam. 2000 m. Restricted.

Z. pulchra King & Pantl.

Terrestrial with pale brown flowers. August. Lachung valley in Sikkim. Endemic. 2500 m. Endangered.

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