

1. INTRODUCTION

1.1 Background

Nepal is a small country located between China and India. It extends from 26° 22' N to 30° 27' N latitudes and 80° 04' E to 88° 12' E longitudes with total area of about 147,181 sq km. Major part of the country is composed of the large mountains & rolling hills whereas a part is covered by flat land of the terai. Altitude ranges from 60m (Jhapa) above sea level to 8848 m (Mt. Everest). Variable topographic feature from southern lower elevation to northern higher elevation facilitate rich vegetation and flora. Over 6076 species of flowering plants belong to 216 family have been reported from Nepal (Press *et al.*, 2000).

1.2 Salient features of Orchidaceae

Orchids belong to Orchidaceae; which is one of the largest family of the flowering plants. Generally orchids are perennial herbs. They are widely distributed in the world, with their more concentration in the tropical rain forest. The great majority of the orchids are resident in Asia, which is considered to be their original home. Orchids grow as terrestrial, epiphyte, lithophyte or rarely saprophyte from tropical to subtropical, temperate, subalpine and alpine zones. Very few species can grow in water as aquatic plant (Bose & Bhattacharjee, 1980).

Orchids are perennial or rarely annual, epiphytic or terrestrial with roots which have multilayered spongy tissue consisting of several layers of short tracheides and characterized by a special development of the epidermis to form the velamen (Rendle, 1904). They are capable of absorbing and storing considerable quantity of moisture. In terrestrial species the roots are often swollen into tubers. Stems of epiphytic species are often thickened to form a pseudobulb with adventitious roots. Two type of growth habit are found in orchids *sympodial* and *monopodial*. In *sympodial* plants (e. g., *Bulbophyllum*, *Dendrobium*, *Thunia* etc.) new shoots may arise from any part of the older shoots where there is an axillary bud. In *monopodial plants* (e.g., *Aerides*, *Rhynchostylis*, *Vanda* etc.) the shoots have potential for indefinite apical growth.

The flowers of an orchid are usually bisexual, 3-merous, irregular, in racemes or panicles, sometimes they are solitary. The outermost whorl of floral segments consists of calyx of three sepals. The upper or dorsal sepal often differs from the other two lateral sepals in shape and size. Inside of the calyx is found the corolla which again consists of three segments. Two of these are the petals placed on each side of the dorsal sepal. The third segment of the corolla is a highly modified petal known as the *lip* (or *labellum*) of the orchid flower. The lip in most orchids is larger than other petals and is often three-lobed or even more complex and tripartite. The lip is often furnished with a central callus or several calli and may also be pubescent. The calli or hairs are often arranged longitudinally to direct a pollinator towards the back of the lip where a spur or saccate nectary may be found. The lip is usually lowered to act as a landing platform for insects.

Orchid flowers have undergone great reduction in the number of anthers and stigmatic surfaces. Both male and female reproductive organs are fused in to a single structure called the *column* (or *gynostemium*). In most of the orchids, the column bears a single anther held either at its apex or dorsally. The anther consists of a short filament attaching as anther-cap to the column and within anther-cap the pollen is concealed. Orchids hold their pollen in number of discrete pollen masses called *pollinia*. The number of pollinia commonly varies from 2 to 8 depending upon the orchid species. The column also bears the female reproductive surface known as stigma. In most of orchid species, part of one of the three

stigma lobes is modified to form a *rostellum*. The rostellum lies between the anther and stigma in the form of an entire, lobed or pointed flap. The ovary of the orchid lies beneath the point of insertion of the sepals and is termed an inferior ovary. It is trilocular. The seeds of orchids are extremely light. A single fruits of some orchid species can contain many thousands of seeds.

1.3 Orchids in Nepal

The orchid family is one of the largest among the flowering plants. Nepal is rich in orchids flora, which represents 2 percent of the world's orchid diversity. Orchids account for 6.6 percent of the total flowering plants of Nepal. Altogether 385 species of orchids are found in Nepal out of which 161 are epiphyte, 145 terrestrial, 7 saprophyte and 72 species thrive on mixed habitats. Majority of the epiphytic orchids (103) are found in the sub-tropical forest of eastern and central Nepal (IUCN, 2005). Eleven species are endemic to Nepal, namely, *Bulbophyllum ambrosia* subsp. *nepalensis*, *Eria baniaii*, *Eria nepalensis*, *Eria pokharensis*, *Liparis olivacea*, *Listera nepalensis*, *Malaxis monophyllos* var. *obtusae*, *Malaxis tamurensis*, *Oberonia nepalensis*, *Oreorchis porphyranthes* and *Pleione coronaria*.

The distribution orchids in Nepal show a gradual decrease from east to west. The terrestrial orchids are largely concentrated in the high mountains. Central and eastern region of the country are rich in orchid diversity (Dahal & Shakya, 1988).

Despite several Botanical exploration carried out by Nepalese, British and Japanese taxonomists, the study of orchid flora has been given less attention. With regard to the study of orchids, many part of the country remain yet poorly explored. Careful surveys may reveal many new addition to the orchid flora of Nepal.

1.4 Literature review

The first systematic plant collections including orchids in Nepal were done by Hamilton in 1802 and Wallich in 1820 mainly from the Katmandu valley (Rajbhandari, 1976). Their collections were studied by David Don.

The first systematic collection of plant including orchids in Nepal began in the beginning of 19th century with plant collection of Buchanan–Hamilton in 1802-1803 and N. Wallich 1820 mainly from Katmandu valley. Their collections were studied by David Don. Based on Hamiltons's collection, Don (1825) mentioned 24 genera with 52 species of orchids from Nepal in his book '*Prodromus Florae Nepalensis*'. Lindley mentioned 41 genera with 91 species of orchids from Nepal based on the plant collected by N. Wallich during 1820-1821.

A more complete treatments on Nepalese orchid is found in J. D. Hooker's *Flora of British India* published between (1872- 1897). A number of collection expeditions in Nepal took place and it resulted into a numbers of publications on Nepalese plants.

Botanical expedition by Japanese Universities such as Kyoto, Tokyo, Chiba and others in Nepal during (1952-53) recorded 22 genera and 33 species of Nepalese orchids in *Fauna and Flora of Nepal Himalaya* (Kihara, 1955).

Hara (1966) reported 44 genera and 114 species of orchids including Nepalese orchids in *The Flora of eastern Himalaya* as a result of Botanical Expedition to Eastern Himalaya, organized by Tokyo University 1960-63. In the second report, H. Hara (1971) mentioned 45 genera and 100 species of orchids in Bull.-2, *The Flora of eastern Himalaya*. In 1975, Third report was

published as Bull. no.-8 with 33 genera and 79 species of orchids. DMP (1967), '*Notes on flora of Rajnikunj*' (Gokarna Forest), listed two genera with 2 species (*Habenaria stenopetala* and *Malaxis accuminata*). DMP (1969), '*Flora of Phulchowki and Godawari*', mentioned 16 genera with 23 species of orchids. DMP (1970), '*Medicinal Plant of Nepal*', listed 5 genera and 5 species of orchids having medicinal value. DMP (1973), '*Flora of Nagarjun*' described 4 genera and 4 species of orchids with short description. DMP (1974), '*Flora of Phulchoki and Godavari*', (Supplement), listed 2 genera and 2 species. DMP (1976), '*Flora of Langtang and Cross sectional Vegetation Survey (Central Zone)*', included 24 genera and 28 species. DMP (1976), '*Catalogue of Nepalese Vascular Plants*', listed 52 genera and 136 species. DMP (1986), '*Flora of Kathmandu Valley*' described 45 genera and 126 species.

Based on various plant expeditions made by different collectors. Hara *et al.* (1978) enumerated 89 genera and 313 species of orchids with 4 endemic species to Nepal, in book '*An Enumeration of the Flowering Plants of Nepal, Vol. 1*'.

M.L Banerji and B. Thapa (1978) reported 57 genera with 190 species of orchids from Nepal in their book '*Orchids of Nepal*'. Later, Banerji and Pradhan (1984) described 343 species of orchids under 89 genera in their book '*Orchids of Nepal Himalaya*'.

Lancaster (1981) recorded 2 species of orchid during Arun-Barun valley visit (*Pleione praecox* and *Satyrium nepalense*) from Makalu side and Seduwa respectively and described in his book '*Plant Hunting in Nepal-Himalaya*'.

Paudyal and Shakya (1982) reported 39 genera and 98 species of orchids from the Southern range of Kathmandu valley.

Gupta (1984) listed 310 species of orchids belonging to 89 genera from Nepal. Dahal *et al.* (1988) mentioned 350 species of orchids under 90 genera from Nepal.

Bajracharya *et al.* (1994) mentioned more than 80 species of orchids from many locations ranged from 1000 to 5600 ft in Ilam district.

Shakya (1999) described 35 taxa including 33 species and 2 varieties of genus *Oberonia* during his study of genus *Oberonia* in the Himalayas.

Press *et al.* (2000) enumerated 327 species of orchids under 89 genera in *Annotated Checklist of the Flowering Plant of Nepal*.

White and Sharma (2000) described 151 species of orchids in book '*Wild Orchids in Nepal: A field guide to Wild Orchids from Tribhuvan Rajpath and Chitawan Jungle*'.

Paudyal and Subedi (2000) mentioned 74 species belonging 34 genera from Pokhara valley.

Rajbhandari & Bhattaraai (2001) mentioned 363 species of orchids under 97 genera and described 101 species of orchids with colour photograph in their book '*Beautiful Orchids of Nepal*'.

Chaudhary *et al.* (2002) studied species diversity and status of orchids of Arun River & Marsyngdi river valley of Nepal.

Ghimire (2002) reported 31 species of orchids belonging to 19 genera from Bajrabarahi forest during her M. Sc. Dissertation work *Orchids of Bajrabarahi of Kathmandu Valley*.

Karkee & Bhatta (2003) reported 33 species of terrestrial orchids from Langtang National Park.

Bajracharya, D.M. (2004) described 49 species of genus *Eria* during his taxonomic revision of genus *Eria* in the Himalayas.

Rajbhandari and Dahal (2004) mentioned 100 genera and 377 species of orchids in '*Orchids of Nepal*': A checklist.

'*Nepal's Illustrated Biodiversity Primer*' of IUCN (2005) mentioned 385 species of orchid altogether and listed 76 species of orchids under 28 genera from far western part of the country.

1.5 Economic importances

Orchids bloom with beautiful flower and have great importance in floricultural & gardening. It occupies one of top position among ornamental plants due to their attractive and durable flower. Some orchids emit scents that can cause headache in sensitive individual and hairy leaves of some species can cause skin infection (Heitz, 1995).

Some orchids species have religious influences over the world. Some species of *Cyrtopodium* in Brasil and *Geodorum nutans* in Philippines are used to make glues which are used in the manufacture of musical instrument. Vanilla and other orchids i.e. *Nigritella*, *Listera* & *Gymnadenia* are sources of vanilla glycoside & relative aromatic. Commercial vanilla is extracted from *Vanilla planifolia* (Bose & Bhattacharjee, 1980).

In Nepal, large numbers of native orchids are beautiful and carry horticultural importance. There are more than 38 species of terrestrial orchids having potential value for cut flowers (Karkee, 2005). The most beautiful orchids of Nepal belong to the following genera: *Aerides*, *Ascocentrum*, *Bulbophllum*, *Calanthe*, *Coelogyne*, *Cymbidium*, *Dendrobium*, *Eria*, *Pleione*, *Rhynchostylis* etc. (Rajbhandari & Bhattarai, 2001). Many species of orchids are also used as medicine. In Nepal, there are more than 35 species of orchids having medicinal value (Shrestha, 2000).

Pseudobulbs and root of some species are useful for medicinal preparation. Pseudobulbs of some orchid like *Flickingeria macraei*, *Coelogyne nitida* are exported to India in large amount, upto 500,000 plants at a time (Bailes, 1985). Pseudobulbs of *Eria muscicola* used to treat chest, heart, lungs and mental problem. Pseudobulbs of *Malaxis acuminata* is useful to cure tuberculosis and enhances sperm formation. Pseudobulbs of *Liparis nervosa*, *Malaxis muscifera*, and whole plant of *Pholidota imbricata* & root of *Satyrium nepalense* (Satyrion) are considered as tonic. Satyrion is used to treat malaria & dysentery. Leaves of *Rhynchostylis retusa* is used to treat rheumatic diseases (Bhattacharjee, 1998).

1.6 Objectives

The main objective of the study is to explore orchid flora in the forest of Makalu-Barun National Park. The specific objectives include:

- 1 Exploration of the orchid flora found in the study area.
- 2 Study of status and phenology of the orchid flora in the forest.
- 3 Study of habitat, relation between orchid flora and substratum

1.7 Justification

Makalu-Barun National Park is rich in orchids. Richness of orchid species diversity is due to great topographical variation, moist river valley of Arun river and monsoon rain. This area has never been explored giving special attention to orchids. Orchids are rapidly depleting from natural habitat due to deforestation. Thus, this area is selected to study orchids flora & their status.

1.8 Limitation of the study

This study intends to highlight the distribution and status of orchid species in Makalu-Barun National Park. Some diversions and particular routes were used to study most of the localities that ranged from 350m (Katlebhanjhang) to 3550m (Hunghundanda). It deals only with orchid species diversity in MBNP and concluded 108 species of orchid. Due to limited time and budget this study does not claim to have presented a complete list of orchid species inside whole Makalu-Barun National Park. However, this study should be taken as reference for the further studies of orchid flora and their development.

2. STUDY AREA

2.1 Topography

Makalu-Barun National Park is located in south east of Mt. Everest at the foot of the Mt. Makalu between 86° 45' E to 87° 34' E Longitudes. Altitude ranges from 350m to 8463 m above mean sea level. Area is bordered by Arun River on the east, Runa & Saunedanda on the south, Tibetan autonomous region of China on the north and a number of mountain ranges in the west. It includes Khumbu & Barun subsystem of Mahalangur. It is drained by Barun, Sankhuwa and other rivulets of Arun River and Dudhskoshi system (Khanal, 1992).

There are limited number of trekking routes destined to Makalu-Base Camp and also some diversions along this trail. Route 1 (Hile-Basantapur-Tumlingtar-Bhotebash-Chicila- Num-Seduwa- Tashigawn- Khongma- Mumbuk- Nehekharka- Merek- Makalu-Base Camp and back) is most popular trekking route used to reach Makalu-Base Camp (Baskota & Upadhaya, 1991).

The selected study area covers more than 30 localities ranging from 350 m (Tumlingtar) to 2475 m (Tashigawn) in the Seduwa sector and from 600m to 3550 m in the Hatiya sector. Tumlingtar sector included 8 localities i.e. Khandbari (1000m), Bumlingtar (600m), Chewabensi (450m) etc. Num sector included 7 localities i.e. Bhotebash (1600m), Chichila (1950m) and Deaurali (2025m) etc. Seduwa sector included 3 localities i.e. Tashigawn (1950m) and Uttisedanda (2100m). Hatiya sector included 12 localities i.e. Aquwa (1200m), Gola (1100m), Kimathanka (2450m) Chumsur (2020m), Chemtang (1850m) and Chepuwa (1900m) etc.

2.2 Climate

In general whole country has monsonic type of climate with wet summer and comparatively dry winter. But due to extreme altitudinal variation the rainfall and temperature are found different even with in a short range of compass. The temperature decreases along with altitude (Shakya, 1983).

The amount of rainfall recorded in the eastern part of Nepal is more than in western part because monsoon enters east and travel towards the west. In general flow of the precipitation from the east to west, it is found reduced toward the west (Shrestha, 1989). Meteorological data recorded at different stations (DOM, 2001 & 2002) are as follows:

Table 1,

S n.	Station	year	Annual rainfall mm	Monsoon	Maximum rainfall mm / Month	Minimum rainfall mm/ Month
1	Tumlingtar	1998	1717.1	1307.0	Aug. 513.6	Dec. 0.0
2	Tumlingtar	1999	1692.2	1199.5	Jul. 409.0	Dec. 0.0
3	Num	1998	4895.6	3533.9	Jun. 1246.4	Dec. 0.0
4	Num	1999	5136.2	4039.9	May. 1066.8	FEB. 10.5
5	Chepuwa	1998	2834.6	1853.4	Aug. 590.6	Jan. 0.0
6	Chepuwa	1999	2291.2	1523.5	Jul. 488.2	Dec. 12.9

2.3 Vegetation

About 32.2 % of Makalu-Barun National Park is covered by natural forest. Subtropical mixed hard wood forest represents 11 % of the total forest and 68 % land lie below 1000m. Deciduous mixed broad leafed forest represents 77 % of the total forest; it covers 81 % of total land between 2000-3000m. Coniferous mixed forest is 12 % of total forest (Khanal, 1992).

Tropical region is covered by dominant sal forest associated with other species i.e. *Terminalia tomentosa*, *Schima wallichii*, *Lagerostroemia parviflora* etc. Subtropical region is covered by *Schima wallichii*, *Daphniphyllum himalense*, *Rhododendron arboreum*, *Quercus semecarpifolia*, *Castanopsis tribuloides* etc. Temperate region is covered by *Castanopsis hystrix*, *Castanopsis tribuloides*, *Daphniphyllum himalense*, *Rhododendron arboreum*, *Eurya acuminata*, *Lyonia ovalifolia*, *Quercus semecarpifolia* etc. and subalpine region is covered by *Rhododendron arboreum*, *Rhododendron campanulatum*, *Daphniphyllum himalense*, *Eurya acuminata*, *Quercus semecarpifolia* etc.

3. MATERIALS AND METHOD

3.1 Floristic Study

Field survey was done during 1998-1999 in different parts of study area, along routes and also some diversions. During visit and collection, attention was given towards habitats, distribution and substratum of orchids. The studied areas were divided on the basis of altitude & climate in 4 major sectors i.e. Tumlingtar sector, Num Sector, Seduwa Sector and Chepuwa Sector.

3.1.1 Collection

Collection of orchids in Makalu-Barun National Park was carried out during November - December in 1998 and during September - October in 1999. The first collection covered localities of Tumlingtar; Num and Seduwa sectors for about 20 days and second was in different localities of Tumlingtar, Num and Chepuwa sectors for about 20 days.

During collection, all plant samples belonging to Orchidaceae were collected as living plants and the herbarium specimens were prepared. The localities, their status and substratum were also noted. The collected plants were potted in Central Department of Botany and Royal Botanical Garden, Godawari. When plants flowered, the sample was preserved and morphological study was made.

3.1.2 Identification

Plant identification was done on the basis of apparent morphological characters of species using relevant literature i.e. King & Pantling (1898), Duthie (1906), Banerjii and Pradhan (1984), Hooker (1890) etc. Both flowering and non-flowering specimens were cross-examined by matching with standard Herbaria of National Herbarium and Plant Laboratories, Godawari.

3.2 Keys to the species

An attempt has also been made to provide an artificial key to species particularly when more than single species were found belonging to the same genus. Key was prepared on the basis of morphological characters.

3.3 Description of the Species

The important morphological characters are described based on field observation, laboratory examination and standard literature. Description pattern followed King & Pantling (1898). Important references, illustrations, flowering time, their distribution are provided. The species are arranged artificially in alphabetical order.

3.4 Preparation of herbarium, photography and sketches

Herbaria of orchid species were prepared by standard techniques of herbarium preparation. Few important rare species were cultivated, in central department Botany and Royal Botanical garden. Herbarium sheets were prepared by standard techniques of standard literature. Herbaria were arranged in alphabetical manner and are deposited in National Herbarium and Plant Laboratories (KATH), Godawari and Tribhuvan University Central Herbarium (TUCH) for records. Some of pressed herbaria are also presented in the form of free hand sketch drawings.

4. RESULTS AND DISCUSSION

4.1 Orchid species in Makalu-Barun National Park

Makalu-Barun National Park showed rich diversity of orchid flora. Altogether 107 species of orchids belonging to 47 genera were recorded (**Table 10**). Among them 74 species were epiphyte, 31 species were terrestrial, 2 species were lithophyte, single species was saprophyte. 29 species belong to 19 genera were recorded as medicinal orchids, 9 species belong to 7 genera found rarely and only 8 species were recorded as very common species in the studied area.

Table 2, Subfamily and genera

1	Subfamily	Apostasioideae	
2	Subfamily	Cypripedioideae	Galeola
3	Subfamily	Spiranthoideae	Goodyera, Zeuxine, Spiranthes
4	Subfamily	Orchidoideae	Aorchis, Diphylax, Habenaria, Herminium, Pecteilis, Peristylus, Platanthera, Satyrium
5	Subfamily	Epidendroideae	Liparis, Malaxis, Oberonia, Geodorum, Cymbidium, Anthogonium, Tainia, Arundina, Calanthe, Thunia, Coelogyne, Otochilus, Panisea, Pholidota, Pleoine, Agrostophyllum, Cryptochilus, Eria, Thelasis, Dendrobium, Epigenium, Bulbopyllum, Ione,
6	Subfamily	Vandoideae	Acmpe, Aerides, Clisostoma, Gastrochilus, Luisia, Ornithochilus, Phaelaenopsis, Pteroceras, Rhynchostylis, Smitinandia, Trudelia, Vandopsis

Note: Arrangement of subfamily and genera according to Perce & Cribb 2002.

4.2 Description of Species

The species are described comparing important morphological characters, phenology, localities and distribution. All genera and species have been arranged alphabetically. Artificial key to the species is also given, wherever necessary and their morphological characters have been provided based on field observation, laboratory examination and standard literature.

1. *Acampe* Lindl.

Epiphyte. Leaves coriaceous, often keeled. Inflorescence racemose, floral bract minute, shorter than stalk ovary. Sepals & petals adnate to the column, with or without lateral lobes; apical lobe small. Column short; pollinia 4.

Acampe papillosa (Lindl.) Lindl., *Fol. Orchid.*, *Acampe* 4: 2, no.5 (1833); Tuyama in Hara, *Fl. E. Himal.* 2: 176 (1971); Hara, Stearn & William., *Enu. Fl. Pl. Nep.* 1: 30 (1978); Press, Shrestha & Sutton, *Ann. Check. Fl. Pl. Nep.* 208 (2000); Rajbhandari & Dahal, *Orch. Nep. Check.* 89 (2004).

Saccolabium papillosum Lindl., *Edw. Bot. Regist.* t. 1552 (1833).

Epiphytic herb. Stem erect, rigid. *Leaves* fleshy-coriaceous, 9-15 x 1.5-2.5 cm, curved, the apex truncate or obliquely notched. *Inflorescence* 1 to 2.5 cm long, 4 to 8 flowered raceme; *floral bract* 0.4 x 0.2 cm. *Flowers* greenish-yellow, with brown stripes. *Sepals* subequal, oblong-elliptic or oblong, subacute or obtuse, spreading; dorsal sepal 0.5 x 0.2 cm; lateral pair 0.7 x 0.2 cm. *Petals* 0.6 x 0.1 cm, linear-elliptic, obtuse. *Lip* white, 3-lobed, 0.8 x 0.3 cm, adnate to the base of the column, pubescent in lower half, papillose above; side lobes erect; apical lobe ovate-oblong, the upper surface transversely rugulose; spur conical, 0.3 cm long. *Column* short. *Capsule* 2-2.2 cm long.

Phenology-September-December.

Locality-Tumlingtar 425m, Baghkhori 600m, D. Karkee, 712 (KATH & TUCH).

Distribution- Nepal (E 200 m), Bhutan, Bangladesh, NE. India, Myanmar Thailand, Laos and Vietnam.

2. *Aerides* Lour.

Epiphyte. Leaves coriaceous, linear or terete. Flowers usually numerous, in racemes, sometime solitary. Sepals & petals broad, lateral lobes adnate to the base of column. Lip adnate to the column, spurred. Column short with foot; pollinia 2.

Aerides multiflorum Roxb., *Pl. Coromandel* 3:67, t. 271 (1820); Hook. f., *Fl. Brit. Ind.* 6:44 (1890); Duthie, *Ann. Roy. Bot. Gar. Cal.* 9:142(1906); Tuyama in Hara, *Fl. E. Himal.* 425 (1966); Hara, Stearn & William., *Enu. Fl. Pl. Nep.* 1: 31 (1978); Banerji & Pradhan, *Orch. Nep. Himal.* 478(1984); Press, Shrestha & Sutton, *Ann. Check. Fl. Pl. Nep.* 208(2000); Rajbhandari & Dahal, *Orch. Nep. Check.* 89 (2004).

Epiphytic herb. *Stem* 15-25 cm long. *Leaves* 10-28 x 1.3-1.5 cm, distichous, deeply channelled and keeled, bifid apex. *Inflorescence* 25-32 cm long, many flowered; *floral bract* 0.3 x 0.2 cm, triangular, dark brown. *Flowers* pinkish-white. *Sepals* elliptic oblong or orbicular, rounded. *Petals* oblong-spathulate, apex round. *Lip* clawed, adnate to the base of the column, 3-lobed, convex, margins recurved, basal half of the lip thick and with a retrose tooth or callus pointing across the mouth of the rectangularly bent spur; apex of the side lobes rounded; mid lobe cordate or hastate-ovate, apex rounded, slightly convex, above; *spur* pointing forward, short, straight, compressed. *Column* beaked, with two rounded auricles on the foot.

Phenology -May-July.

Locality -Num-Kaharte 790 m.

Distribution- Nepal (CE 200-1100 m), India, Myanmar, Thailand, Vietnam, Laos and Cambodia.

3. *Agrostophyllum* Blume.

Epiphyte. Stem compressed. Leaves membranous, distichous. Flowers small, white, single or pair. Sepals erect. Petals broad or narrow, spreading. Lip adnate to the column or to its foot. Column short; pollinia 8.

Agrostophyllum callosum Rchb. f., Seeman, Fl. Vit.:296 (1868); Hook. f., Fl. Brit. Ind. 5:824 (1890); Tuyama in Hara, Fl. E. Himal. 2: 77(1971); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 30 (1978); Banerji & Pradhan, Orch. Nep. Hima.172(1984); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.208(2000); Rajbhandari & Dahal, Orch. Nep. Check. 89 (2004).

Epiphytic herb. *Stem* erect. *Leaves* numerous, linear-oblong, sessile, 11-15 cm long, 0.8-1 cm broad. *Head* densely flowered; *floral bract* apathaceous. *Flowers* about 0.5 cm long. *Sepals* ovate blunt. *Petals* broadly elliptic, obtuse. *Lip* 3-lobed; side lobes broad, rounded; the mid-lobe decurved, the apex emarginate. *Column* stout with a short foot.

Phenology–June-July.

Localities Chichila 1950m, Kuwapani 1600m and Tashigawn 1950m, D. Karkee, 747.

Distribution- Nepal (CE 2100 m), NE. India, Myanmar, Bhutan, Thailand and Malaysia.

4. *Anthogonium* Wall. ex Lindl.

Terrestrial. Pseudobulbs small. Leaves linear, sessile. Inflorescence from the side of the pseudo-bulbs, bearing simple or slightly branched terminal lax raceme. Sepals oblanceolate. Petals elongate-spathulate. Lip adnate to the base of column. Column long, without foot; pollinia 4.

Anthogonium gracile Lindl., Gen. Sp. Orchid. Pl.:426 (1840); Hook. f., Fl. Brit. Ind. 5:822 (1890); Tuyama in Ohashi, Fl. E. Himal.3:137 (1975); Banerji & Thapa, Orch. Nep. 77 (1978); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 31 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.208(2000); Rajbhandari & Dahal, Orch. Nep. Check. 90 (2004).

Terrestrial herb. Whole plant 15-25 cm high. *Pseudobulb* ovoid. *Stem* sheathed at the base. *Leaves* 10-19 x 0.6-1.3 cm, 2-5, acuminate, sessile, sheathing at the base. *Scapes* 19-27 cm long, rising from the side of pseudobulb, slender, erect; *raceme* 5-9 cm long, sparsely flowered; *floral bract* lanceolate, 0.5 x 0.2 cm, minute. *Flowers* rose colored often at wide angle with the long stalked ovary. *Perianth* forming a tube, 1.4 cm long. *Lip* with dark purple color, 1.6 x 1.0 cm, white toward apex, the apex tri-lobulate, anterior part cuneate. *Column* 1.6 cm long. **Fig no-1.**

Phenology –August-October.

Locality – Chichila 1900m, D. Karkee, 892 (KATH & TUCH).

Distribution- Nepal (CE 1500-2000 m), NE. India, Bagladesh and Myanmar.

5. *Aorchis* Vermeulen

Terrestrial herb with tubers or fleshy fibrous roots. Leaves sheathing. Flowers medium-sized, pink or purple color. Sepals sub-equal, dorsal forming hood with petals, lateral spreading. Petals like sepal or smaller. Lip adnate to the base of column. Column very short.

- 1a Lip longer than the sepals, deeply 3-lobed ----- **A. roborowskii**
 1b Lip as long as the sepals, without sidelobes ----- **A. spathulata**

1. Aorchis roborowskii (Maxim.) Seidenf., Nordic J. Bot. 2:9 (1982); Rajbhandari & Dahal, Orch. Nep. Check. 92 (2004).

Orchis roborowskii Maxim., Bull. Acad. Imp. Sci. Saint-Petersbourg ser. 3, 31: 104 (1887).

Terrestrial herb. Plant 11-19 cm high, tuber small. *Stem* with two blunt tubular sheaths at the base. *Leaves* one to three, 3.5-5.5 x 0.8-1 cm, acute or acuminate. *Inflorescence* 3.5 long spike, one to many-flowered; *floral bract* 1-1.5 cm long, 0.3-0.5 cm broad, foliaceous, lanceolate, acuminate. *Flowers* pinkish-purple or pinkish white. *Sepals* oblong, obtuse; the dorsal erect; the lateral pair recurved. *Petals* broadly and obliquely ovoid, base truncate. *Lip* longer than the sepals, deeply 3-lobed, all lobes almost equal, oblong, obtuse; the side lobes diverging; *Spur* stout, cylindric. *Column* short.

Phenology-July-September.

Locality-Khogma-Thulopokhari, 3630m.

Distribution- Nepal (WCE 2400-4900 m), Bhutan, NE. India, China (Tibet) and Myanmar.

2. Aorchis spathulata (Lindl.) Vermeulen, Jahresber. Naturwiss. Vereins Wuppertal 25: 33 (1972); Rajbhandari & Dahal, Orch. Nep. Check. 90 (2004).

Galearis spathulata (Lindl.) P. F. Hunt, *op. cit.* 172 (1971).

Epiphytic herb. Plant 4- 8.5 cm high, 1 or 2 sheaths at the base. *Leaf* solitary at the base of the stem, subsessile or petiolate, elliptic, 3.5-4.5 x 1.5-2 cm, gradually tapering to the petiole, stem above the leaf long, slender and naked. Spike 5-7 cm long, 1-4 flowers; *floral bract* lanceolate, much larger than the flower. *Flowers* 1 cm across, deep purple. *Sepals* unequal; dorsal sepal oblong, obtuse; lateral sepals oblong-lanceolate, subacute, spreading. *Petals* broadly elliptic, subfalcate, shorter than sepals, erect, oblique apex. *Lip* as long as the sepals, broadly elliptic, upper surface with numerous grooves running from base to near the apex; *Spur* about half as long as the ovary, cylindric and straight.

Phenology -June-July.

Locality - Tiwagairy -Wana Danda, 3740m.

Distribution- Nepal (WCE 3300-5000 m), India, Bhutan and China.

6. Arundina Bl.

Terrestrial herb. Stem terete, sheathed. Leaves distichous, narrow. Flowers large red, in terminal or panicles. Sepals & petals many nerved. Lip large, broad. Column long, narrowly winged; pollinia 8.

Arundina graminifolia (D. Don) Hochr., Bull. New York Bot. Gard. 6: 270 (1910); Kihara, Faun. Flo. Nep. Himal.98 (1955); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:32 (1978); Banerji & Pradhan, Orch. Nep. Hima.134(1984); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.209(2000); Rajbhandari & Dahal, Orch. Nep. Check. 90 (2004).

Arundina bambusifolia Lindl., Gen. & Sp. Orchid. Pl.: 125 (1831).

Terrestrial herb. *Stem* erect, 100-200 cm high. *Leaves* 10-25 x 1.5-2.5 cm, narrowly oblong-lanceolate, acuminate. Panicle few branched, lax; *floral bract* broad, 0.6 x 0.4 cm, acute, stout keeled, persistent. *Flowers* few and at the termination of the branchlets, pinkish-purple. *Sepals* free, spreading sub equal; dorsal erect, 4 x 1 cm, oblong, acute; the lateral pair 4.5 x 2 cm, lanceolate, 3-nerved. *Petals* 4 x 0.8 cm, acute, spreading. *Lip* rosy-purple, 4.5 x 3 cm, cucullate, its base convolute round the column; basal lobe with recurved edges, anterior corrugated; apex broad and toothed. *Column* long, slender, narrowly winged. **Fig no-2**

Phenology -June-September.

Locality Yakuwa 1100m, D. Karkee, 908 (KATH).

Distribution- Nepal (CE 400-900 m), Bhutan, India, Bangladesh, Myanmar, Thailand, S. China, Malaysia and Tahiti.

7. *Bulbophyllum* Thouars

Epiphyte. Pseudo-bulbs from a creeping rhizome. Leaves solitary or in pair. Scape from the rhizome near the base of pseudo-bulbs. Flowers solitary, umbelate, spicate or racemose. Sepals subequal. Petals smaller than dorsal sepal. Lip jointed on the foot of column. Column very short; pollinia 4.

1a Flower solitary or 1-3-----	2
1b Flower in raceme or umbell.-----	3
2a Flower solitary with purple nerve -----	B. affine
2b Flower 1-3 spotted with purple -----	B. leopardinum
3a Flower in raceme -----	B. reptans
3b Flower in umbel -----	4
4a Flower pale yellow; lateral sepals partly coherent-----	B. scabratum
4b Flower white lateral sepals free-----	B. sterile

1. *Bulbophyllum affine* Lindl., Gen. Sp. Orchid. Pl.:48 (1830); Hook. f., Fl. Brit. Ind. 5:756 (1890); King & Pantl., Ann. Roy. Bot. Gard. Cal. 8:67, t91 (1898); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:32 (1978); Banerji & Pradhan, Orch. Nep. Hima. 362(1984); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.209(2000); Rajbhandari & Dahal, Orch. Nep. Check. 90 (2004).

Epiphytic herb. Rhizome densely rooting. *Pseudobulbs* about 2-3 cm long, 6-7.5 cm apart. *Leaves* 12-15 x 1.5-3.5 cm, narrowly oblong, obtuse; petiole 1-1.5 cm long, *Inflorescence* scape 0.6-0.8 cm long, bractiate. *Flowers* greenish-yellow with purple nerve, pedicel 4-4.5 cm long, smooth. *Sepals* subequal, lanceolate, subacute, 5-nerved; the lateral pairs falcate. *Petals* little shorter than the sepals, 3-nerved. *Lip* shorter than the petals lanceolate, thickened and concave at the base, the margin of the upper surface reddish brown. *Column* greenish-yellow, conical, foot short. *Capsule* 3 cm long.

Phenology –June-July.

Locality –Chichila 1900m and Num 1200m, D. Karkee, 780 (TUCH).

Distribution- Nepal (CE 1200-1500 m) and NE. India.

2. *Bulbophyllum leopardinum* (Wall.) Lindl., Gen. Sp. Orchid. Pl.:48 (1830); Hook. f., Fl. Brit. Ind. 5:756 (1890); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:33 (1978); Banerji & Pradhan, Orch. Nep. Hima. 380(1984); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.209(2000); Rajbhandari and Dahal, Orch. Nep. Check. 91 (2004).

Epiphytic herb. Rhizome with numerous fibrous sheaths. *Pseudobulbs* 3-3.5 cm long, slightly compressed. *Leaves* rigid, 10-12 x 4-4.5 cm, petiole 2-3 cm long, obtuse and notched at the apex. *Inflorescence* short, solitary or 2-3 flowered from the base of the pseudo-bulb; *floral bract* 0.9-1 x 1.3 cm, spotted with purple, lower bract closed, upper bract open, broadly ovate, acute. *Flowers* greenish or yellowish-brown, spotted with purple. *Sepals* broadly ovate, lanceolate, 9-nerved. *Petals* smaller than sepals, 7-nerved. *Lip* very small, shorter than petals, thick, deep purple, lanceolate, the base with small toothed auricles near its attachment to the much curved foot of the column, apex obtuse, the upper surface concave. *Column* thick, curved.

Phenology–July-August.

Locality – Gogone 1600m, Chichilla 1900m and Tashigawn 1950m, D. Karkee, 805.

Distribution- Nepal (CE 1800-3100 m) and NE. India.

3. *Bulbophyllum reptans* (Lindl.) Lindl., Gen. Sp. Orchid. Pl.:51 (1830); Hook. f., Fl. Brit. Ind. 5:768(1890); King & Pantl., Ann. Roy. Bot. Gard. Cal. 8:77, t106(1898); Duthie, Ann. Roy. Bot. Gard. Cal. 9:105(1906); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:33 (1978); Rajbhandari and Dahal, Orch. Nep. Check. 91 (2004).

Epiphytic herb. *Rhizome* thin, branching. *Pseudobulbs* smooth, 1.5-2 cm long. *Leaves* linear-oblong, obliquely notched at the apex, 9-15 x 0.8-1 cm, having very short petiole. *Inflorescence* scape 5.5-7.5 cm long, slender, peduncle sheathed at the base, bracteate; *floral bract* 0.3-0.4 cm long, oblong-lanceolate. *Flowers* yellowish with purple spots. *Sepals* subequal, lanceolate, 3-nerved, spreading, the lateral pair 0.8 x 0.3 cm; the dorsal 0.6 x 0.2 cm. *Petals* 0.3 x 0.15 cm, oblong, blunt, one nerved, spreading. *Lip* about as long as petals, expanded and grooved at the base, the apex narrowed and subacute, the margin more or less winged. *Column* with short lateral wings. **Fig no-3.**

Phenology- March-April.

Locality –Tashigawn 1950m, D. Karkee,795 (KATH).

Distribution- Nepal (WCE 2000 m) and NE. India and Bangladesh.

4. *Bulbophyllum scabratum* Rchb. f.,Walpers, Ann. Bot. Syst. 6: 259 (1861); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:34 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.210(2000); Rajbhandari and Dahal, Orch. Nep. Check. 91 (2004).

Cirrhopetalum caespitosum Wall. ex Lindl., Edw. Bot. Regist. 24 Misc.:35 (1838).

Epiphytic herb. *Pseudobulbs* much crowded, 1-1.5 cm long. *Leaf* 3.5-5.5 x 1-1.3 cm, acute, petiole 0.5 cm long. *Inflorescences* scape shorter than the leaves, slender, erect, minutely bracteate, bearing 3-5 flowers at the apex; *floral bract* lanceolate, 0.5 cm long, much shorter than stalked ovary. *Flowers* pale ochraceous yellow. *Sepals* dorsal sepals 0.6 x 0.3 cm, free at its base from the latter pair, very concave, ovate, shortly acuminate; lateral pair 1.4 x 0.3 cm, linear-lanceolate, obtusely acuminate, partly coherent, the bases and apices free, the edges erose. *Petals* 0.3 x 0.25 cm, broadly ovate, acute, the edge erose-dentate. *Lip* 0.4 cm long, subacute, entire, fleshy, very concave near the base. *Column* 0.2 cm long, thick, with minute sharp triangular apical processes foot rather long, much curved.

Phenology -April-May.

Locality – Chichila 1900m, D. Karkee, 743.

Distribution- Nepal (E 2000 m.) and NE. India.

5. *Bulbophyllum sterile* (Lamarck) Suresh, Nicolson *et al.*, Rheede, Hort. Malab. 298 (1988); Rajbhandari and Dahal, Orch. Nep. Check. 91 (2004).

Bulbophyllum caudatum Lindl., Wall. Cat. : 1983 (1829).

Epiphytic herb. *Rhizome* filiform; *Pseudobulbs* 1-1.5 cm long, 0.5 cm in diameter, ovoid. *Leaf* 2.9-3 x 1.2-1.3 cm, lanceolate, acute. *Inflorescence* equal or slightly longer than pseudobulb, bearing several sheaths near base; *floral bract* lanceolate. *Flowers* white, dorsally depressed, umbellately capitate. *Sepals* dorsal long, oblong-ovate, acuminate; lateral pair very long, lanceolate, with elongated filiform tips. *Petals* oblong-obovate, blunt. *Lips* as long as petals, oblong, with erect rounded side lobes. *Column* short, broad.

Phenology - June –July.

Locality – Tashigawn 1800m, D. Karkee, 789.

Distribution- Nepal (C) and NE. India.

8. *Calanthe* R. Br.

Terrestrial. Pseudostem variable in length, some time absent. Leaves more or less elliptic-oblong. Inflorescence from leaves or side of the pseudo-bulbs or stem. Flowers in erect raceme. Sepals more or less lanceolate. Petals usually narrower than sepals. Lip attached to the column. Column sort; pollinia 8.

1a Flower with spur -----	2
1b Flower without spur -----	C. puberula
2a Lip with out lateral lobes -----	3
2b Lip with lateral lobes -----	4
3a Floral bract half as long as ovary -----	C. alpina
3b Floral bract as long as or longer than the ovary ----	C. triliformis
4a Spur short -----	5
4b Spur half as long as ovary -----	C. chloroleuca
5a Lip attached to half of column-----	C. brevicornu
5b Lip attached to whole length of column-----	C. mannii

1. *Calanthe alpina* Hook. f. ex Lindl., Fol. Orchid. *Calanthe* 6, 7:4, no. 8 (1855); Hook. f., Fl. Brit. Ind. 5:850 (1890); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:30 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.(2000); Rajbhandari and Dahal, Orch. Nep. Check. 91 (2004).

Terrestrial herb. Plant 15-21 cm high. *Pseudobulb* with 2-3 annular marking, pseudostem very short. *Leaves* 10-15 x 3-5 cm. *Inflorescences* peduncle and raceme together longer than leaves, *raceme* 4-5 flowered, glabrous; *floral bract* lanceolate, 1 x 0.3 cm. *Flowers* white tipped with green. *Sepals* subequal, ovate-oblong, acuminate, concave. *Petals* elliptic-lanceolate, shorter than the sepals. *Lip* dull red shorter than sepals, with a cylindric pale yellowish spur. *Column* short, broadly-winged, margin toothed. *Capsule* 1.6-1.8 cm long. Phenology -July–August.

Locality –Chichila 1900m, D. Karkee, 821 (KATH).

Distribution- Nepal (WCE 2800-3200 m), Bhutan and India.

2. *Calanthe brevicornu* Lindl., Gen. Sp. Orchid. Pl. : 251 (1833); Hook. f., Fl. Brit. Ind. 5:848 (1890); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:34(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.210(2000); Rajbhandari and Dahal, Orch. Nep. Check. 91 (2004).

Terrestrial herb. *Pseudobulbs* small. *Leaves* 30-32 x 5-8 cm, usually 3. *Peduncle* and *raceme* 40-45 cm long; peduncle with few scattered short bracts; raceme laxly flowered; *floral bract* narrowly lanceolate, half as long as ovary. *Flowers* dull purple or brick red with white line on the mid ribs of the sepals and petals. *Sepals* subequal, oblong-lanceolate, all acute and spreading. *Petals* shorter than sepals, lanceolate. *Lip* attached to the lower half of the column, 3-lobed; the basal lobes oblong, blunt, diverging; the mid-lobe subabovate with a broad apex and irregularly toothed edges; *spur* short, broad, blunt, straight. *Column* short.

Phenology -May-July.

Locality -Namche Kharka 2180 m.

Distribution- Nepal (CE 2300-2600 m) and India.

3. Calanthe chloroleuca Lindl., Fl. Orchid. Clathe 6, 7: 10 no.36 (1855); Hook. f., Fl. Brit. Ind. 5:852(1890); King & Pantl., Ann. Roy. Bot. Gard. Cal. 8:71, t 231(1898); Banerji & Thapa, Orch. Nep. 84(1978); Rajbhandari and Dahal, Orch. Nep. Check. 92 (2004).

Terrestrial herb. *Pseudobulbs* ovoid. *Leaves* 2, elliptic-lanceolate, acute, 30-35 x 7-9 cm. *Inflorescences* longer than leaves, bearing 1 or 2 ovate sheath; *raceme* sparsely flowered; *floral bract* shorter. *Flowers* yellowish green, have perfume. *Sepals* ovate-lanceolate, acuminate, yellowish-green. *Petals* oblanceolate, acuminate, all spreading or subreflexed. *Lip* adnate to the column, longer than the sepals, dorsal lobe broadly oblong; apical lobe broad, divided in to two broad rounded lobules by a narrow sinus. *Column* short, broad.

Phenology -April - May.

Locality – Chhumsur 2220m.

Distribution- Nepal and India.

4. Calanthe mannii Hook. f., Fl. Brit. Ind. 5(2) :850 (1890); Duthie, Ann. Roy. Bot. Gard. Cal. 9:120(1906); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:34 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.210(2000); Rajbhandari and Dahal, Orch. Nep. Check. 92 (2004).

Terrestrial herb. *Pseudobulbs* small. *Leaves* apex acute, lowermost one sheathed at the base, 27-30 cm x 3.5-4.5 cm. *Inflorescence* from young leaves, 45-53 cm long, pubescent; *raceme* 14-17 cm long, sparsely flowered; *floral bract* minute, 0.3 cm long, lanceolate. *Flowers* dull brown. *Sepals* subequal, pubescent externally, ovate-oblong, subacute, concave. *Petals* oblong, acute, not spreading. *Lip* slightly shorter than the sepals, shortly spurred, 3-lobed, basal lobes large, broad, erect; terminal lobe deflexed, entire. *Column* short. *Capsule* 1.5-2 cm long.

Phenology - April-June.

Locality –Chhumsur 2020m, D. Karkee, 937 (KATH).

Distribution-Nepal (CE 2300-2500 m), NE. India and Bhutan.

5. Calanthe puberula Lindl., Gen. Sp. Orchid. Pl. : 252 (1833); Hook. f., Fl. Brit. Ind. 5:848 (1890); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:35 (1978); Banerji & Pradhan, Orch. Nep. Himal. 414(1984); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.210(2000); Rajbhandari and Dahal, Orch. Nep. Check. 92 (2004).

Terrestrial herb. *Pseudobulbs* small. *Leaves* 14-19 x 4.5-5.5 cm. *Peduncle* and *raceme* much longer than leaves; 30-36 cm long, the peduncle with a several scattered lanceolate bracts; *raceme* laxly-flowered; *floral bract* 1.8 x 0.5 cm, lanceolate, acuminate. *Flowers* puberulous externally. *Sepals* ovate, lanceolate, with broad base, acuminate, spreading; dorsal 1.5 x 0.55 cm; lateral pair 1.7 x 0.7 cm. *Petals* linear acute, 1.4 x 0.2 cm, spreading. *Lip* adnate to the base of the column, 1.3 cm long, oblong in general out line, shortly clawed, 3-lobed; side lobes flat, falcately oblong, blunt; mid-lobe without callous, ovate orbicular with a long apiculate. *Column* short, 0.6 cm, thick. *Capsule* 1.5-1.8 cm long.

Phenology -July-August.

Locality –Chichila 1900m, D. Karkee, 822 (KATH).

Distribution- Nepal (C 1800 m), NE. India and Bhutan.

6. Calanthe trulliformis King & Pantling, J. Asiat. Soc. Bengal 64(3): 337 (1896); King & Pantl., Ann. Roy. Bot. Gard. Cal. 8:168, t 226(1898); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:35 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.211(2000); Rajbhandari and Dahal, Orch. Nep. Check. 92 (2004).

Terrestrial herb. *Pseudostem* short. *Leaves* linear-lanceolate, acute, 20-24 x 5-6.5 cm. *Inflorescence* 26-30 cm long; *raceme* about 15 cm long; *peduncle* about same length, puberulus; *floral bract* 1.8 x 0.2 cm, linear-lanceolate. *Flowers* brownish, scattered. *Sepals* brownish, dorsal sepal ovate-lanceolate, acuminate; lateral pair lanceolate, falcate, longer than dorsal. *Petals* linear-lanceolate, acute, shorter than lateral sepals. *Lip* adnate to the whole length of the column, trowel shaped, the side irregularly crenate-dentate; *Spur* short, stout, cylindrical. *Capsule* 2 cm long.

Phenology -July-Aug.

Locality –Uttishedanda 2300m, D. Karkee, 798 (KATH).

Distribution- Nepal (E 2300-2600 m) and India.

9. *Cleisostoma* Bl.

Epiphyte. Stem usually elongate. Leaves terete or flat. Inflorescence racemes or paniculate. Sepals subequal. Petals smaller than sepals, spreading. Lip adnate to the base or foot of column. Column short; pollinia 2.

1a Leaves terete	-----	2
1b Leaves flat, bilobulate at apex	-----	C. aspersum
2a Stem pendulous, Inflorescence shorter than the leaves	---	C. filiforme
2b Stem erect, Inflorescence longer than the leaves	-----	C. simondii

1. *Cleisostoma aspersum* (Rehb. f.) Garay, Bot. Mus. Leafl. 23 (4): 169 (1972); Rajbhandari & Dahal, Orch. Nep. Check. 92 (2004).

Stereochilus bicuspidatum (Hook. f.) King & Pantl., Ann. Roy. Bot. Gard. Cal. 8: 236, t. 314 (1898)

Epiphytic herb. *Stem* short. *Leaves* 11-17 x 1.8-2.5 cm, deeply and obliquely bilobulate at the apex. *Inflorescence* slender, glabrous, usually longer than the leaves; *peduncle* with a few minute distant sheaths; *floral bract* minute. *Flowers* numerous but not crowded. *Sepals* subequal, spreading; the dorsal 0.5 x 0.25 cm, obovate-elliptic; the lateral pair 0.4 x 0.2 cm, broadly elliptic. *Petals* oblanceolate, 0.3 x 0.15 cm, blunt, oblique. *Lip* 0.4 x 0.3 cm. broad, adnate to the column; the base with a spur nearly as long as ovary, cylindrical towards the apex; its edges with broad rounded erose side lobes; the apical lobe broad, ovate, concave, acute. *Column* short, thick.

Phenology -July-August.

Locality –Manebhanjyang 1300m, Num 900m, D. Karkee, 781(KATH).

Distribution- Nepal (WC 600-1800 m), NE. India and Myanmar.

2. *Cleisostoma filiforme* (Lindl.) Garay, Bot. Mus. leafl. 23 (4): 171 (1972); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 35(1978); Banerji & Pradhan, Orch. Nep. Himal. 486(1984); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.211(2000); Rajbhandari and Dahal, Orch. Nep. Check. 92 (2004).

Sarcanthus filiformis Lindl., Bot. Reg. 28: misc. 61, no.69 (1842).

Epiphytic herb. *Stem* slender, pendulous. *Leaves* terete, 13-28 cm long, 0.2 cm in diameter. *Inflorescence* slender, 13-26 cm long; *peduncle* short, sheathed at the base only; *raceme* long and lax; *floral bract* short, broadly oblong, obtuse. *Flowers* purplish-brown. *Sepals* oblong, blunt, reflexed; dorsal concave toward apex. *Petals* linear, much smaller than the sepals, also reflexed. *Lip* purple with white, fleshy, adnate to foot of column; base with a long infundibuliform compressed sac; apical lobe small, triangular. *Column* with a broad base, tapered to the apex.

Phenology -July-September.

Locality-Baghkhor 700m, Tumlingtar 460m, D. Karkee, 729.

Distribution- Nepal (CE 150-1300 m), NE. India, Myanmar, Thailand and Indo-china.

3. Cleisostoma simondii (Gagnepain) Seidenf., Dansk Bot. Ark. 29 (3): 66 (1975); Rajbhandari & Bhattarai, Beaut. Orch. Nep.47 (2001); Rajbhandari & Dahal, Orch. Nep. Check. 92 (2004).

Echioglossum simondii (Gagnepain) Szlachetko, *loc. cit.* (1995).

Epiphytic herb. *Stem* erect. *Leaves* terete, 7-11 cm. *Inflorescence* 11-15 cm long, extra-axillary, dropping; *peduncle* with few small sheaths, 4.5-10 cm long; *floral bract* triangular, blunt, minute. *Flowers* greenish-yellow with purple or brownish-purple marking on sepals, petals and lip, old flower brown. *Sepals* 3-dark purple line on both dorsal and ventral side, unequal, spreading; dorsal sepal 0.6 x 0.3 cm, broadly oblong; the lateral pair smaller, 0.5 x 0.25 cm, acute. *Petals* smaller than lateral sepals, 0.4 x 0.2 cm, narrowly oblong, acute. *Lip* 3-lobed, longer than sepals, jointed to the foot of the column; *spur compressed*; side lobes broad at base but suddenly narrowed to a conical point; apical lobe fleshy, broadly triangular. *Column* 0.25 cm long with a thick short foot. **Fig no -4.**

Phenology-September-November.

Locality -Bumlingtar 600 m, D. Karkee, 878 (KATH).

Distribution- Nepal, India (Sikkim), Thailand, Vietnam, Laos, China and Myanmar.

10. Coelogyne Lindl.

Epiphyte. Pseudobulbs coespitose or attached to a rhizome. Leaves coriaceous or membranous and plicate. Inflorescence racemose, from the apex or base of pseudo-bulbs. Flowers without mentum or spur. Sepals subequal. Petals narrower, some time linear. Lip sessile on the base of column, oblong & 3 lobed. Column long, erect, winged or often hooded, foot noon; pollinia 4.

1a Inflorescences from between the pair of leaves-----	2
1b Inflorescences from the base of the pseudo-bulbs---	3
2a Flowering axis proliferous -----	4
2b Flowering axis not proliferous -----	C. ovalis
3a Flowers white -----	5
3b Flowers pale yellow or brown -----	C. fuscescens
4a Lip lamellae not crenulate -----	6
4b Lip lamellae crenulate -----	C. stricta
5a Lip not fimbriate -----	7
5b Lip fimbriate -----	C. cristata
6a Petals twisted -----	C. longipes
6b Petals not twisted -----	C. prolifera
7a Lip with four yellow eyes, with out ridge -----	C. corymbosa
7b Lip with two yellow blotch, with two ridge -----	C. nitida

1. Coelogyne corymbosa Lindl., Fol. Orchid. Coelogyne 5:7, no.16 (1854); Hook. f., Fl. Brit. Ind. 5:831 (1890); King & Pantl., Ann. Roy. Bot. Gard. Cal. 8:134, t 185 (1898); Banerji & Thapa, Orch. Nep. 45(1978); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 36 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.211(2000); Rajbhandari & Bhattarai, Beaut. Orch. Nep.49 (2001); Rajbhandari & Dahal, Orch. Nep. Check. 92 (2004).

Epiphytic herb. *Pseudobulbs* crowded, 3.5-4 cm long. *Leaves* 14-15 x 2.5-3 cm, acute, petiole 3 cm long. *Inflorescence* 12-14 cm long, from the base of the pseudo-bulb, erect or decurved; *raceme* shorter than the leaves, 3-5 flowered; *floral bract* 3 x 0.8 cm, lanceolate. *Flowers* large, pure white, sweet smelling. *Sepals* lanceolate or elliptic-lanceolate, acute. *Petals*

narrowly lanceolate, acute. *Lip* oblong, white; the posterior part is brown, the middle part with 4 large yellow eye bordered with orange-red, terminal part white, 3-lobed; the lateral lobes broad and blunt, erose; the terminal lobe ovate to ovate-lanceolate, the apex acute to acuminate and recurved. *Column* curved, slightly winged towards the apex.

Phenology -Jun-July.

Locality –Chichila 1975m, Tashigawn 2000m, D. Karkee, 806.

Distribution- Nepal (CE 2200-2800 m), NE. India, Bhutan and W.China.

2. *Coelogyne cristata* Lindl., Coll. Bot.: *sub t.* 33 (1821); Hook. f., Fl. Brit. Ind. 5:829 (1890); King & Pantl., Ann. Roy. Bot. Gard. Cal. 8:133, t 184 (1898); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 36 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.211 (2000); Rajbhandari & Dahal, Orch. Nep. Check. 92 (2004).

Cymbidium speciosissimum D. Don. Prodro. Fl. Nep. 35 (1825);

Epiphytic herb. *Pseudobulbs* sheathed at the base. *Leaves* sessile, 15-30 x 2-2.7 cm, narrowly lanceolate, acute. *Inflorescence* 1-30 cm long; *raceme* from base of pseudo-bulb, their bases sheathed with numerous small bracts, 3 to 10 flowered; *floral bract* 2-2.5 cm long, concave, acute, persistent. *Flowers* pure white with a shade of yellow. *Sepals* narrowly elliptic-oblong, undulate, subacute. *Petals* similar to sepals acute with entire undulate edges. *Lip* oblong, 3-lobed, with large rounded side lobes; mid lobe distinct, broad, short, with two broad yellow lamellae on its upper surface; disc between the side lobes with four yellow fimbriate lamellae. *Column* long and winged, its apex hooded. **Fig no-5, plate no-1.**

Phenology -March-April.

Locality–Kuwapani 1600m, Mude 1975m, D. Karkee, 738 (TUCH).

Distribution- Nepal (WCE 1000-2000 m) and NE. India.

3. *Coelogyne fuscescens* Lindl., Gen. Sp. Orchid. Pl. : 41(1830); Hook. f., Fl. Brit. Ind. 5:833 (1890); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 36(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.211(2000); Rajbhandari & Dahal, Orch. Nep. Check. 93 (2004).

Epiphytic herb. *Pseudobulbs* 6-8 cm long. *Leaves* in pair, 17-28 x 4.5-7.5 cm. *Inflorescence* from the base of the pseudo-bulb, drooping; *peduncle* stout rising from the rhizome; *raceme* rather shorter than leaves, 4-10 flowered; *floral bract* broadly ovate, acute, caducous. *Flowers* pale-yellow or brown. *Sepals* subequal, oblong-lanceolate, acute; dorsal 4.2 x 1.8 cm, lateral 3.8 x 1.1 cm. *Petals* linear, 3.8 x 0.5 cm, acute, reflexed. *Lip* 3.5 x 1.5 cm, oblong or elliptic-oblong, 3-lobed, whitish with a pale yellow-green central stripe and mark with brown; the basal half with two broad rounded side lobes; mid lobe wider than side lobes broadly ovate, elliptic, obtuse, the undulate; the disc between the side lobes with 3 bold smooth ridge. *Column* 3 cm long, curved. **Fig no-6, Plate no-2.**

Phenology –October-December.

Locality –Mude -Num 1750m and Tashigawn 1750m, D. Karkee, 770 (KATH).

Distribution- Nepal (C 1300 m), India, Bhutan and Maynmar.

4. *Coelogyne longipes* Lindl., Fol. Orchid. *Coelogyne* 5:10, no.25 (1854); Hook. f., Fl. Brit. Ind. 5:839 (1890); King & Pantl., Ann. Roy. Bot. Gard. Cal. 8:136, t189(1898); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 36(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.212(2000); Rajbhandari & Dahal, Orch. Nep. Check. 93 (2004).

Epiphytic herb. *Pseudobulbs* slender, 3.5-6.5 cm long, 0.8-1 cm in diameter. *Leaves* narrowly elliptic, 14-15 x 1.3-13.5 cm, petiole 3-3.5 cm long. *Inflorescence* 15-16 cm long; *peduncle* erect, terminal; *raceme* about 5 cm long; *floral bract* leathery, oblong, acute, almost as long as the flower. *Flowers* pale greenish flushed with yellow. *Sepals* subequal, spreading, oblong-lanceolate, subacute. *Petals* linear, twisted, reflexed. *Lip* oblong, concave at the base, 3-

lobed; side lobes narrow, entire; mid-lobe subquadrate, emarginate. *Column* straight, very slightly winged. *Capsule* 1.1-1.2 cm long.

Phenology -May-June.

Locality –Tashigawn 1950m, Mude2000m, D. Karkee, 766 (KATH & TUCH).

Distribution- Nepal (E 1500-2300 m) and India (Sikkim).

5. *Coelogyne nitida* (Wall. ex D. Don) Lindl., Gen. Sp. Orchid. Pl.: 40 (1830); Banerji & Pradhan, Orch. Nep. Hima.188(1984); Rajbhandari & Dahal, Orch. Nep. Check. 93 (2004).

Coelogyne ochracea Lindl., Edw. Bot. Regist. 32 : t. 69 (1846).

Epiphytic herb. *Pseudobulbs* 2.5-5 cm long. *Leaves* 10-15 x 1.5-2 cm. *Inflorescence* 10-20 cm long from the base of the old pseudobulb, shorter than the leaves (longer in fruit); *peduncle* with several large imbricating sheaths; *raceme* longer than peduncle, 6-8 flowered; *Floral bract* oblong, 3 x 1 cm, caducous. *Flowers* white, fragrant. *Sepals* narrowly oblong, subacute to obtuse; dorsal sepal 2.4 x 0.9 cm; lateral sepals 2.4 x 0.8 cm. *Petals* 2.2 x 0.6 cm, narrowly oblong-lanceolate, subacute. *Lip* 1.8 x 1.3 cm, upper surface of the lip with two elongated blotches of yellow margined with red on its side lobes and two united orbicular spot at the base of the mid-lobe; side lobes oblong to rounded; mid-lobe rounded to oblong, blunt. *Column* 1.4 cm long, narrowly clavate. **Plate no-3.**

Phenology -April-June.

Locality –Mude 2025m, D. Karkee, 765 (TUCH).

Distribution- Nepal (WCE 1300-2400 m), India, Bhutan, Bangladesh, Myanmar, China, Thailand, and Laos.

6. *Coelogyne ovalis* Lindl., Bot. Reg. 24: misc. 91, no.171 (1838); Hook. f., Fl. Brit. Ind. 5:836 (1890); Hooker, Ann. Roy. Bot. Gard. Cal.5:28 (1895); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:36 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.212(2000); Rajbhandari & Dahal, Orch. Nep. Check. 93 (2004).

Epiphytic herb. *Pseudobulbs* 5-6 cm long, two leaves at the apex. *Leaves* 13-15 x 2.5-3.5 cm, narrowly elliptic. *Inflorescence* 7-8.5 cm long; *raceme* from between the pair of leaves on the apex pseudobulb; 1-3 flowered, 7-8.5 cm long; *floral bract* coriaceous, ovate-lanceolate, caducous. *Flowers* pale brown. *Sepals* ovate-lanceolate, acute, spreading. *Petals* linear, acute, spreading or reflexed. *Lip* oblong, 3-lobed, having blackish marking and hair; the side lobes narrow, recurved; the mid-lobe broadly oblong, the discs with two crisped lamellae from base to apex. *Column* curved, broadly winged in its upper half.

Phenology -September-October.

Locality -Lamauwa-Besinda 1300 m.

Distribution- Nepal (WC 1300-1700 m), India, Bhutan and China (Tibet).

7. *Coelogyne prolifera* Lindl., Gen. Sp. Orchid. Pl.: 40 (1830); Hook. f., Fl. Brit. Ind. 5:838 (1890); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:37 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep. 212 (2000); Rajbhandari & Dahal, Orch. Nep. Check. 93 (2004).

Coelogyne flavida Hook. f. ex Lindl., Fol. Orch. Coelogyne :10 (1854).

Epiphytic herb. *Pseudobulbs* 4-5.5 cm long, 2.5-3.5 cm apart. *Leaves* in pair, 7-15 x 1.7-2.5 cm; *Inflorescence* 12-25 cm long, from between the pair of leaves on apex of pseudo-bulb; *peduncle* terminal, with small imbricate sheaths, often proliferos from the production of flowers severally year in succession on the annually lengthening axis, 10-10.5 cm long; *raceme* 5-8 cm long, laxly few-flowered; *floral bract* 1.7 x 0.7 cm, ovate, acute. *Flowers* pale yellow. *Sepals* subequal; dorsal sepal 0.8 x 0.4 cm; lateral sepals 0.8 x 0.3 cm, ovate, spreading, acute. *Petals* linear, 0.8 x 0.1 cm, spreading, obtuse. *Lip* 0.8 x 0.5 cm, 3-lobed;

lateral lobes small; terminal lobe cuneately obcordate, separated from side lobes by two sinuses. *Column* 0.6 cm long, slight winged near the apex. **Fig no-7.**

Phenology -May-June.

Locality - Num 1200m, D. Karkee, 777 (KATH).

Distribution- Nepal (CE 1000-1900 m), NE. India, Bhutan, Myanmar and Thailand.

8. *Coelogyne stricta* (D. Don) Schltr., Feddes Repert. Spec. Nov. Regni Veg. Beih. 4 : 184 (1919); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: (1978 Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep. 212(2000); Rajbhandari & Dahal, Orch. Nep. Check. 93 (2004)..

Coelogyne elata Lindl., Gen. Sp. Orch. Pl. : 40 (1830).

Epiphytic herb. *Pseudobulbs* 7.5-12.5 cm long. *Leaves* in pairs, 17.5-35 x 3.5-7 cm, acute; petiole 3.2-7.5 cm long. *Inflorescence* from the apex of pseudo-bulb between the leaves; *raceme* 10-15 cm long, peduncle laxly many flowered; *floral bract* 1.8 x 1.2 cm, acute, caudaceous. *Flowers* 3.2-3.5 cm across. *Sepals* sub equal, oblong, subacute, spreading; dorsal sepal 1.7 x 1.2 cm; lateral sepals 1.7 x 1.15 cm. *Petals* 1.7 x 0.3 cm, subacute. *Lip* elongate, 1.7 x 1.3 cm, having a broad spot yellow and pink on the lamellae on its mid lobes, the lower part of the lamellae being yellow, side lobes narrow, entire; anterior lobe undulate, obtuse, the disc with two erose-crenulate lamellae from the base to near the apex. *Column* white, winged in its upper half.

Phenology -April-May.

Locality – Deurali - Num 1800m, D. Karkee, 818.

Distribution- Nepal (CE 1400-1800 m), India, Bhutan, and N.Myanmar.

11. *Cryptochilus* Wall.

Epiphyte. Pseudo-bulbs crowded. Leaves coriaceous, 1-2. Scape terminal. Flowers in distichous spikes, shorter than bract. Sepals connate in subcylindric or urceolate tube. Petals narrow. Lip adnate to the foot of column. Column erect; pollinia 8.

Cryptochilus lutea Lindl., J. Proc. Linn. Soc., Bot. 3: 21 (1858); Hook. f., Fl. Brit. Ind. 5:827 (1890); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 37(1978); Banerji & Thapa, Orch. Nep. 48(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep. 212(2000); Rajbhandari & Dahal, Orch. Nep. Check. 93 (2004).

Epiphytic herb. *Pseudobulbs* crowded, cylindrical, 2-4.5 cm long. *Leaves* 7-13 x 2-3 cm, narrowly elliptic, acute. *Inflorescence* from the young pseudo-bulb, 7-12 cm long; *raceme* 5-8 cm long, with numerous flowers; *floral bract* much longer, 0.7-0.9 cm long, linear-lanceolate, pubescent. *Flowers* 0.3 cm across, 0.5 cm long, numerous in two rows, subglobular, glabrous and yellow. *Sepals* sepaline tube 0.4 cm long, urceolate. *Petals* narrowly or obliquely rhomboid, much narrowed at the base. *Lip* oblong, 0.4 cm long, and 0.15 cm broad, slightly expanded, grooved and thickened toward the apex, curved at the base. *Column* short, the foot narrow and very short.

Phenology – June-July.

Locality –Chichila 1925m, D. Karkee, 823 (TUCH).

Distribution- Nepal (CE 1200-2300 m), and NE. India.

12. *Cymbidium* Sw.

Epiphyte, rarely terrestrial. Stem short, rarely elongate. Leaves very long, narrow and coriaceous. Scape loosely sheathed. Flowers large in suberect or dropping racemes. Sepals and petals subequal, free, erect or spreading. Lip sessile at the base of column; side lobes erect; disc with usually 2 pubescent ridges. Column long; pollinia 2 or 4.

1a Apex of the leaves acute or acuminate -----	2
1b Apex of the leaves notched -----	C. aloifolium
2a Inflorescence laxly flowered -----	3
2b Inflorescence imbricately or densely flowered -----	C. longifolium
3a Inflorescence shorter than leaves -----	4
3b Inflorescence about as long as or longer than leaves --	C. hookerianum
4a Lip white spotted with purple -----	C. erythraeum
4b Lip creamy-white with brown stripe -----	C. gammieanum

1. Cymbidium aloifolium (L.) Sw., Nova. Acta Regiae Soc. Sci. Upsal. 6: 73 (1799); Hook. f., Fl. Brit. Ind. 6:10 (1890); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 37(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.212(2000); Rajbhandari & Dahal, Orch. Nep. Check. 93 (2004).

Cymbidium simulans Rolfe., Orchid Rev. 25 ; 175 (1917).

Epiphytic herb. *Pseudobulbs* short. *Leaves* linear oblong, slightly and obliquely notched at the apex, 43-51 x 2.5-2.8 cm. *Inflorescence* from the base of small pseudobulb; *peduncle* 7-10 cm long, bearing several tubular acute scarious sheath near the base; *raceme* many flowered, 20-40 cm long; *floral bract* ovate, minute. *Flowers* yellowish. *Sepals* subequal oblong, slightly oblanceolate, blunt the lateral pair some what falcate. *Petals* as long as sepals ovate-oblanceolate, blunt. *Lip* as long as the sepals, oblong, 3-lobed; the lateral lobes long, narrow, entire, pointing forwards; the mid-lobe ovate-oblong, much decurved. *Column* slightly thickened at the apex.

Phenology –May-July.

Locality –Tumlingtar 450m, D. Karkee, 704.

Distribution- Nepal (CE 300-600 m), India, Srilanka and Myanmar.

2. Cymbidium erythraeum Lindl., J. Proc. Linn. Soc., Bot 3: 30 (1859); Duthie, Ann. Roy. Bot. Gard. Cal. 9:137(1906); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 37(1978); Banerji & Pradhan, Orch. Nep. Himal. 432(1984); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.(2000); Rajbhandari & Dahal, Orch. Nep. Check. 93 (2004).

Cymbidium longifolium auct. nonn D. Don., Hook. f., Fl. Brit. Ind. 6:13 (1890).

Epiphytic herb. *Pseudobulbs* short. *Leaves* linear, acuminate, 24-47 x 0.8-1 cm. *Inflorescence* very stout, suberect in the lower but decurved in the upper half; peduncle sheathed nearly to the apex; *raceme* 10 to 15 flowered; *floral bract* minute, triangular. *Flowers* 6-7 cm across. *Sepals* subequal, oblong, subacute; dorsal 4.5 x1 cm, incurved; lateral pair 4.5 x 0.8 cm, spreading. *Petals* 4.5 x 0.5 cm, spreading. *Lip* 4 cm long, oblong, contracted near the base in to a short claw; side lobes long, narrow; mid-lobe thinly pubescent on its upper surface, decurved, orbicular, acute, the edge slightly undulated. *Column* erect, slightly saccate at the base.

Phenology -September-October.

Locality – Chichila 1900m, D. Karkee, 746.

Distribution- Nepal (CE 1800-2400 m), NE. India, Bhutan, N.Myanmar and China.

3. Cymbidium longifolium D. Don, Prodr. Fl. Nep.: 36 (1825); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:38(1978); Banerji & Pradhan, Orch. Nep. Himal. 440 (1984); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.213 (2000); Rajbhandari & Dahal, Orch. Nep. Check. 94 (2004).

Cymbidium elegans Lindl., Numer. List. : 246 n. 7354 (1832).

Epiphytic herb. *Pseudobulbs* short. *Leaves* narrowly linear, acuminate, slightly expanded at the base, 42-45 x 1.5-1.6 cm. *Inflorescence* axillary, decurved, about as long as leaves; *peduncle* longer than raceme, clothed to the apex by a few lanceolate sheaths; *raceme* imbricately and densely flowered; *floral bract* membranous. *Flowers* pale lemon yellow. *Sepals* oblanceolate, acute or subacute, slightly concave at the tips; dorsal sepal 4 x 0.9 cm.; lateral sepals 3.8 x 0.9 cm. *Petals* 3.8 x 0.7 cm, oblanceolate, acute or subacute. *Lip* 3.8 x 1 cm, narrowly oblong; the side lobes, rounded; apical lobe small, suborbicular or orbiculate. *Column* 3 cm long, slender. **Fig no-8, Plate no-4.**

Phenology -September-November.

Locality -Chichila 1950m & Tashigaawn 1950m, D. Karkee, 741 (TUCH).

Distribution- Nepal (CE 2100-2500 m), NE. India and Bhutan.

4. *Cymbidium x gammieanum* King & Pantling, J. Asiat. Soc. Bengal 64 (3): 339 (1896); King & Pantl. Ann. Roy. Bot. Gard. Cal. 8: 193, t 257(1898); Rajbhandari & Dahal, Orch. Nep. Check. 93 (2004).

Epiphytic herb, with a short stout *Pseudostem*. *Leaves* linear, acuminate, 42 -50 x 1.25 -1.5 cm. *Inflorescence* 43 - 48 cm long; *peduncle* suberect; sheaths acuminate, 8-9 cm long; *raceme* semi-dense rather shorter than the peduncle, bearing 13-14 flowers; *floral bract* minute, 0.4 cm long. *Flowers* greenish-yellow flushed with brown and with brown line. *Sepals* linear -lanceolate or linear-oblanceolate, 7-nerved; dorsal sepal 4.7 x 1.2 cm; lateral sepals 4.3 x 1.2 cm. *Petals* 4.5 x 0.7 cm, slightly curved, linear-lanceolate. *Lip* 3-lobed, oblong or oblong-elliptic, 3.5 x 2.2 cm; side lobes acute at the apex; apical lobe suborbicular, creamy-white with brown stripes on the adaxial surface; disc with 2 pubescent lamellae. *Column* slender, 3 cm long, slightly winged.

Phenology -October-November.

Locality-Deurali 2050m, D. Karkee, 905.

Distribution- Nepal (E) and India (Sikkim)

5. *Cymbidium hookerianum* Rchb. f., Gard. Chron. 1866 : 7 (1866); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:37(1978); Banerji & Pradhan, Orch. Nep. Himal. 434(1984); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.212(2000); Rajbhandari & Dahal, Orch. Nep. Check. 93 (2004).

Cymbidium grandiflorum Griff., Icon. Pl. Asiat. 3: t 321 (1881).

Epiphytic herb. *Pseudobulbs* very short. *Leaves* linear-oblong, acute, 40-60 x 2-3 cm. *Inflorescence* about as long as or longer than the leaves, decurved; *peduncle* enveloped in imbricate sheaths; *raceme* laxly 10 to 20 flowered; *floral-bracts* minute. *Flowers* pale green. *Sepals* oblong, acute; dorsal sepal incurved; the lateral pair slightly narrower subfalcate, spreading. *Petals* smaller than sepals, oblong, somewhat falcate, spreading. *Lip* as long as sepals, 3-lobed, pubescent, not saccate at the base; side lobes narrow, erect, their apices oblique, acute; apical lobe large, broadly oblong, deflexed, margin undulate. *Column* slightly winged from base to apex, straight.

Phenology -January-April.

Locality-Tashigawn 2100m, D. Karkee, 797.

Distribution- Nepal (E 200-2500 m), India, Bhutan and SW China.

13. *Dendrobium* Sw.

Epiphyte. Stem elongate or pseudobulbous. Leaves never plicate, sessile with sheathing base. Flowers raceme, often large. Sepals subequal; lateral pair obliquely adnate to foot of column. Lip contracted at the base, rarely clawed. Column short; pollinia 4.

1a Stem not compressed-----	2
1b Stem compressed -----	D. anceps
2a Stem with out black hairs on the sheath -----	3
2b Stem with deciduous black hairs on the sheath ---	D. longicornu
3a Flower small or medium sized, lip serrate -----	4
3b Flower large sized, lip not serrate -----	5
4a Dorsal sepal lanceolate -----	D. erriflorum
4b Dorsal sepal falcate -----	D. denudans
5a Lip not calceolar-----	6
5b Lip calceolar -----	D. moschatum
6a Lip longer than broad-----	7
6b Lip orbicular or sub orbicular-----	8
7a Lip trowel-shaped, yellow or white-----	D. heterocarpum
7b Lip ovate-oblong, maron or purple-----	D. nobile
8a Lip margin erose -----	D. aphyllum
8b Lip margin fimbriate-papilose -----	D. densiflorum

1. Dendrobium anceps Sw., Kongl. Vetensk. Acad. Nya. Handl. 21: 246 (1800); Hook. f., Fl. Brit. Ind. 5:724 (1890); Banerji & Thapa, Orch. Nep. 52 (1978); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 38(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.213 (2000); Rajbhandari & Dahal, Orch. Nep. Check. 94 (2004).

Epiphytic herb. *Stem* compressed, 15-60 cm long. *Leaves* 2.5-3 x 0.8-1.1 cm, lanceolate, acute. *Floral bract* minute, much shorter than ovary. *Flowers* produced single or rarely in pair, axillary, white or yellowish-green with a pink marking, 1-1.5 cm long. *Sepals* unequal, obtuse, elliptic; dorsal sepal 0.5 x 0.3 cm, lateral pair 0.6 x 0.3 cm. *Petals* 0.5 x 0.15 cm, broadly elliptic, blunt. *Lip* 1.1 x 0.5 cm, concave, obscurely 3-lobed, the entire in the lower part, crisped in the upper and at the broad 2-lobed apex. *Column* and its foot flat.

Phenology – April-May.

Locality –Tumlingtar-Chewabensi 450m, D. Karkee, 714.

Distribution- Nepal (E1200-1400 m), NE. India, Myanmar, Thailand, China, Vietnam, Laos and Cambodia.

2. Debdrobium aphyllum (Roxb.) C.E.C. Fisch., Fl. Madras 3:1416 (1928); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 38(1978); Banerji & Pradhan, Orch. Nep. Hima. 204(1984); Press, Shrestha & Sutton, Ann. F. Check 1. Pl. Nep.(2000); Rajbhandari & Dahal, Orch. Nep. Check. 94 (2004).

Epiphytic herb. *Stems* slender, 25-45 cm long. *Leaves* deciduous, 5-8 x 1.5-1.8 cm, linear-lanceolate or narrowly ovate, acute or acuminate. *Inflorescence* 1-3 flowered at each node, borne on old stems; *peduncles* from the slightly swollen nodes of the leafless stems; *floral bract* oblong, acute. *Flowers* white or rosy-mauve, fragrant. *Sepals* oblong-lanceolate, acute or obtuse; dorsal 2.2 x 0.6 cm.; lateral pair 2.7 x 0.6 cm. *Petals* broadly oblong-elliptic, acute or obtuse, 2.1 x 0.7 cm. *Lip* 2.8 cm long, tubular at base, shortly clawed, cream or pale yellow, purple-veined or marked at base, obscurely 3-lobed, pubescent above, margins erose, almost ciliate, apex rounded; callus at base, 3-ridged. *Column* 0.4 cm.

Phenology -April-June.

Locality- Phokharigawn 1650m, Hedangna –Yakuwa 1050m, D. Karkee, 820 (KATH).

Distribution- Nepal (CE 1100-1500 m), India, Bhutan, Myanmar, Thailand, Malaya, Indo-China and W. China.

3. Dendrobium densiflorum Lindl., Gen. Sp. Orchid. Pl.: 90 (1830); Hook. f., Fl. Brit. Ind. 5:748 (1890); Kihara, Fauna & Flo. Nep. Himal. 102 (1955); Tuyama in Hara, Fl. E. Himal. 432 (1966); Tuyama in Hara, Fl. E. Himal. 2:184 (1971); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep. 213 (2000); Rajbhandari & Dahal, Orch. Nep. Check. 94 (2004).

Epiphytic herb. *Stems* 4-angled, 7-12 noded, 30-50 cm tall, green, each node half covered in a white sheath, 3-5 leaved toward apex. *Leaves* 8-15 x 2-3 cm, elliptic or ovate, acute. *Inflorescence* pendent; *raceme* with many densely crowded flowers, cylindrical, 15-18 cm long; *floral bract* 2 x 1 cm, covering the bud, yellow, large, imbricate, acute. *Flowers* pale yellow, fragrant. *Sepals* ovate-oblong, obtusely acute; dorsal 1.8 x 1 cm; lateral 2.5 x 1 cm. *Petals* 2 x 1.8 cm, shortly clawed, rounded or obtuse. *Lip* 2.2 cm long, orange-yellow, clawed, convolute in its basal half; lamina orbicular, margin fimbriate-papillose, whole upper surface pubescent. *Column* 0.5 cm.

Phenology - April-May.

Locality – Num 900m, D. Karkee, 783.

Distribution- Nepal (C 900-2900 m), NE. India, Bhutan, Myanmar and Thailand.

4. Dendrobium denudans D. Don, Prodr. Fl. Nep.: 34 (1825); Hooker, Ann. Roy. Bot. Gard. Cal. 5:4 (1895); Duthie, Ann. Roy. Bot. Gard. Cal. 9:96 (1906); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep. 213 (2000); Rajbhandari & Dahal, Orch. Nep. Check. 94 (2004).

Epiphytic herb. *Stems* suberect, many-leaved, 15-20 cm long. *Leaves* 4-7.5 x 0.6-1 cm, narrowly oblong, acute or subacute, sometime obliquely notched, not narrowed to the sheathing base. *Inflorescence* 5-9 cm long; *raceme* slender, decurved, longer than leaves, many flowered; *floral bract* 0.2-0.3 x 0.1-0.15 cm. *Flowers* pale green or whitish. *Sepals* not wide-spreading, linear, acuminate, falcate; dorsal sepal 1.7 x 0.2 cm; lateral sepals 1.5 x 0.7 cm. *Petals* similar to sepals, 1.4 x 0.1 cm. *Lip* with crisped or serrate edge, 1.2 cm x 0.8 cm, decurved from the base, with two long narrow laciniate side lobes; the mid-lobe strongly recurved. *Column* 0.4 cm long; foot of the column red. **Fig no-9.**

Phenology - September.

Locality – Yakuwa 1000m, Hatiya 1200m, D. Karkee, 910 (KATH).

Distribution- Nepal (WCE 1500-2100 m) and India.

5. Dendrobium eriiflorum Griff., Icon. Pl. Asiat. 3: 307 (1851); Hook. f., Fl. Brit. Ind. 5:715 (1890); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:39 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep. 213 (2000); Rajbhandari & Dahal, Orch. Nep. Check. 94 (2004).

Epiphytic herb. *Stems* erect, many leaved, 5-15 cm long. *Leaves* 2-6 x 0.4-0.7 cm, linear-lanceolate, the apex blunt, oblique. *Inflorescence* 2.5-3.5 cm long, leaf-opposed axillary; *raceme* slightly longer than the leaves, many flowered; *floral bract* lanceolate, minute, 0.2 cm long. *Flowers* light green or greenish-white. *Sepals* subequal, dorsal lanceolate, 1.1 x 0.2 cm, acuminate; the lateral pair 1.1 x 0.6 cm, falcate, with very broad bases. *Petals* linear acute, 1.1 x 0.15 cm. *Lip* light green or greenish-white, 1.0 cm x 0.7 cm, slightly spotted with dull purple, very concave; the side lobes narrow, elongate, pectinate-serrate. *Column* slightly spotted with dull purple, 0.2 cm long.

Phenology - September - October.

Locality – Chumsur - Chepuwa 1900m, D. Karkee, 939.

Distribution- Nepal (CE 1500-2100 m), NE. India, Bhutan, Thailand and Malaya.

6. Dendrobium heterocarpum Lindl., Gen. Sp. Orchid. Pl.: 78 (1830); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:39 (1978); Banerji & Pradhan, Orch. Nep. Hima. 226 (1984); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep. 214 (2000); Rajbhandari & Dahal, Orch. Nep. Check. 94 (2004).

Epiphytic herb. *Stems* erect, sheathed, 15-45 cm long. *Leaves* 7.5-12.5 x 1.2-2.5 cm, narrowly elliptic-oblong, subacute. *Inflorescence* solitary or 2-3 flowered from leafless stems; *floral bract* much shorter than ovary. *Flowers* pale ochraceous or white, often tinged with green. *Sepals* subequal; the dorsal linear-oblong, 3 x 0.8 cm, subacute; the lateral pair lanceolate, 3 x 1 cm. *Petals* 3 x 1 cm, broadly lanceolate. *Lip* 3 cm long, yellow or white, with a yellow disc and many red or purple radiating lines, longer than the lateral sepals, trowel-shaped, acute, the edges undulate, sides of the base somewhat convolute. *Column* 1.5 cm long, broad above the foot, tapering.

Phenology - July - August.

Locality –Baghkor 500m, Chandanpur 1000m & Num 1600 m, D. Karkee, 732.

Distribution- Nepal (C 1230 m), India, Bhutan, Srilanka, Myanmar, Indonesia and Philippines.

7. *Dendrobium longicornu* Lindl., Gen. Sp. Orchid. Pl.: 80 (1830); Hook. f., Fl. Brit. Ind. 5:720(1890); King & Pantl., Ann. Roy. Bot. Gard. Cal. 8:46,t 64(1898); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 40(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.214(2000); Rajbhandari & Dahal, Orch. Nep. Check. 94 (2004).

Epiphytic herb. *Stems* slender, erect, 15-30 cm long, covered with black hairs on the sheath. *Leaves* deciduous, 4.5-5.5 x 0.8-1.2 cm, linear-lanceolate, slightly hairy, obliquely acute. *Inflorescence* solitary or 2-3 flowered raceme; *floral bract* ovate or lanceolate, acute, hairy, concave, 1.5 x 0.4 cm. *Flowers* 5-6 cm long, white, waxy, fragrant. *Sepals* dorsal sepal 1.8 x 0.8 cm, ovate, acute; lateral sepals 4 x 1cm, ovate-triangular. *Petals* 2 x 0.5 cm, lanceolate to ovate-lanceolate, acute or acuminate. *Lip* 3.2 x 2.8 cm, white streaked orange-red, 3-lobed, with a broad ridge running along its center from base to the apex; side lobes rounded; mid-lobe small, suborbicular, fimbriate. *Column* 0.6 cm.

Phenology –September-October.

Locality –Kuwapani 1800m, Chichila 1950m, Deurali 2025m, D. Karkee, 759.

Distribution- Nepal (CE 1600-2500 m), NE. India, Bhutan, China and Myanmar.

8. *Dendrobium moschatum* (Buch.-Ham.) Sw., Neu. J. Bot. 1: 94 (1806); D. Don., Prodr. Fl. Nep.34(1825); Duthie, Ann. Roy. Bot. Gard. Cal. 9:103 (1906); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.214(2000); Rajbhandari & Dahal, Orch. Nep. Check. 94 (2004).

Epiphytic herb. *Stems* erect or pendulous, bearing leaves in the apical half. *Leaves* 8 -15 x 3 - 4.5 cm, narrowly elliptic to oblong-ovate, acute. *Inflorescence* 20 cm long; *raceme* 1 or 2, 8 to 16 flowered; base of the peduncle stout and covered with imbricate bracts; *floral bract* lanceolate, 1.2 x 0.6 cm. *Flowers* pale or golden yellow, fragrant. *Sepals* oblong-elliptic obtuse; dorsal sepal 2.7 x 1.2 cm; lateral sepals 2.5 x 1.2 cm. *Petals* broadly elliptic, 2.7 x 1.8 cm, obtuse. *Lip* pale yellow with two large brownish-purple spot, 2.5 cm long, forming a subglobular or pyriform open-mouthed pouch (slipper-shaped). *Column* 0.5 cm long, its foot widening downwards.

Phenology -August.

Locality –Baghkor 450m, Chandanpur 1000m, D. Karkee, 726.

Distribution- Nepal (C 600 m), Bhutan, India, Bangladesh, Myanmar, Thailand and Laos.

9. *Dendrobium nobile* Lindl., Gen. Sp. Orchid. Pl.: 24 (1830); Hook. f., Fl. Brit. Ind. 5:740(1890); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 40(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.214(2000); Rajbhandari & Dahal, Orch. Nep. Check. 95 (2004).

Epiphytic herb. *Stems* erect, clustered, 30-50 cm long, thick near apex. *Leaves* distichous, oblong, 10-13.5 x 2-2.8 cm, obliquely notched. *Inflorescence* short; *racemes* from the leafy or leafless stem, solitary or 2-4 flowered; *floral bract* 0.6-0.7 cm long, ovate-oblong, obtuse or retuse. *Flowers* waxy, white at the base, fragrant. *Sepals* oblong-lanceolate, acute, or subacute. *Petals* ovate-oblong, obtuse, margin slightly entire or slightly undulate broader than the sepals. *Lip* 3.5 cm long, obovate-oblong, pubescent above and below. *Column* short, its foot with purple line.

Phenology –April-May.

Locality –Baghkhori 600m, D. Karkee, 723.

Distribution- Nepal (E), Bhutan, NE. India, Myanmar, China and Indo-China.

14. *Diphylax* Hook. f.

Terrestrial, small; rhizome elongate; tuber narrowly oblong. Leaves 1-3. Inflorescence terminal racemose, subaxillary-many flowered. Flowers small. Sepals & petals entire, subsimilar. Column short; pollinia 2.

Diphylax urceolata (C. B. Clarke) Hook. f., Icon. Pl. 19(n.s.9): t.1865 (June 1889); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 40(1978); Banerji & Pradhan, Orch. Nep. Hima.28(1984); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.214(2000); Rajbhandari & Dahal, Orch. Nep. Check. 95 (2004).

Habenaria urceolata C. B. Cl., J. Proc. Linn. Soc. Bot. 25: 73 t. 30 (1889).

Terrestrial herb. Plants 5-15 cm high. *Tuber* narrowly oblong. *Stems* slender, curved, single sheath at the base. *Leaf* usually solitary 2.5-3 x 0.5-1 cm, rising rather below the middle of the stem, narrowly elliptic-oblong, obtuse or sub acute. *Raceme* decurved, rather laxly flowered; *peduncle* with several bracts; *floral bract* linear lanceolate, 0.5 x 0.4 cm, erect, longer than ovary. *Flowers* white, narrowly campanulate. *Sepals* subequal, erect, not spreading, dorsal elliptic, blunt, lateral pair oblong, subacute. *Petals* as long as sepals, free, oblong, blunt, tapering slightly to base, somewhat falcate. *Lip* about as long as petals and sepals oblong, slightly concave; *spur* shorter than the sepals. *Column* elongate, the apex pointed.

Phenology-September-October.

Locality-Janteodar 3270m, Phematung-Mumbuk 3220 m.

Distribution- Nepal (CE 3300-4200 m), NE. India, Myanmar and China.

15. *Epigenium* Gagnepain

Epiphyte or lithophyte. Pseudobulbs ovoid, usually cloth in sheaths. Leaves 1 or 2. Inflorescence terminal, racemose, one to many flowered. Lip pandurate-oblong, simple to 3-lobed. Column short; foot long; pollinia 4.

Epigenium fuscescens (Griff.) Summerh., Kew Bull. 12 : 262 (1957); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:41 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.215(2000); Rajbhandari & Dahal, Orch. Nep. Check. 95 (2004).

Dendrobium fuscescens Griff., Not. Pl. Asiat. 3: 308 (1851).

Epiphytic herb. *Pseudobulbs* 3-4 cm long, ovoid widely separated in branched thick rhizome, several close sheaths at the lower part of the pseudo-bulb. *Leaves* 10-15 x 2-3 cm, sessile, narrowly oblong lanceolate, apex notched. *Flowers* solitary, 1 cm across, purplish brown; *floral bract* 2.5 x 0.75 cm, ovate-lanceolate, scarious. *Sepals* subequal, ovate-lanceolate acuminate; lateral sepals 1.7 x 0.6 cm, little broader, subfalcate; dorsal 1.6 x 0.3 cm. *Petals* 1.5 x 0.3 cm, narrower, falcate. *Lip* obovate-oblong, yellow; side lobes oblong, obtuse, margin undulate; mid-lobe orbicular-ovate, undulate; disk with crenulate lamellae between the side lobes. *Column* 0.8 cm.

Phenology-January-February.

Locality – Deurali 2025m, D. Karkee, 760.

Distribution- Nepal (E), India and China.

16. *Eria* Lindl.

Epiphyte. Pseudobulbs often elongate. Flowers never large or bright colored. Sepals free, adnate to the elongate foot of column. Lip sessile on the foot the column. Column short; pollinia 8.

1b Flower glabrous or pubescent -----	2
1a Flowers woolly -----	3
2a Plant large, pseudobulbs elongate or cylindric -----	4
2b Plant small, pseudobulbs globular -----	E. muscicola
3a Leaves two -----	E. stricta
3b Leaves more than two -----	E. paniculata
4b Pseudo-bulbs cylindric or tapering -----	5
4a Pseudo-bulbs long, thin -----	6
5a Inflorescence laxly flowered -----	7
5b Inflorescence densely flowered -----	E. spicata
6a Flowers few -----	E. coronaria
6b Flowers many -----	E. graminifolia
7a Flowers yellow, lip oblong -----	E. bractescens
7b Flowers dirty white, lip obovate -----	E. excavata

1. *Eria bractescens* Lindl., Bot. Reg. 27: misc.18, no.46 (1841); Hook. f., Fl. Brit. Ind. 5:796(1890); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:42 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.215(2000); Rajbhandari & Dahal, Orch. Nep. Check. 95 (2004).

Epiphytic herb. *Pseudobulbs* narrowly cylindric, tapering toward the apex, slightly curved, somewhat wrinkled at the flowering time, 5-7 cm long, 2 cm in diameter. *Leaves* 3-6 in number, 11-15 x 2.3-3 cm, elliptic-lanceolate, tapering to the base and pointed apex, petiole 2 cm long. *Raceme* several, 10-12 cm long, *scape* axillary from the upper leaves; *peduncle* sheathed at the base; *floral bract* 1.7 x 0.8 cm, elliptic-ovate, reflexed, shorter than the ovary. *Flowers* 3 -6, pale creamy or golden yellow, quite attractive, 1.5 cm in diameter. *Sepals* spreading, subacute; dorsal sepal 0.9 x 0.3 cm, narrowly elliptic; lateral pair 1.2 x 0.4 cm, broader. *Petals* narrowly oblong, 0.8 x 0.3 cm. *Lip* 0.9 cm long, oblong, 3-lobed; the lateral lobe erect, large, rounded; the terminal lobe entire, blunt. *Column* stout, 0.4 cm.

Phenology -April-May.

Locality –Baghkhori 700m, D. Karkee, 728.

Distribution- Nepal (E), India, Malaya and Myanmar.

2. *Eria coronaria* (Lindl.) Rchb. f., Ann. Bot. Syst. 6:271 (1864); Tuyama in Hara, Fl. E. Himal. 433 (1966); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 42(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.215(2000); Rajbhandari & Dahal, Orch. Nep. Check. 95 (2004).

Coegyne coronaria Lindl., Edw. Bot. Regist. 27 : 83 (1841).

Epiphytic herb. *Pseudobulbs* thin, cylindric, 8-10 cm long. *Leaves* two, terminal, subopposite, subsessile, thickly membranous, 10-12 x 2-3 cm, narrowly elliptic to ovate-lanceolate. *Raceme* terminal; few flowered; *peduncle* short and sheathed at the base; *floral bract* narrowly lanceolate. *Flowers* 4 - 6, white, 3.5-4 cm across. *Sepals* subequal, spreading; the dorsal sepal elliptic-oblong, 2 x 0.5 cm, subacute; lateral sepals 2 x 0.8 cm. with broad base attached to the side of column. *Petals* like dorsal sepal, 1.8 cm long. *Lip* oblong, 3-lobed; side

lobes large, white flush with purple; mid-lobe small, oblong, revolute, edge undulate. *Column* short, stout, longer than tapering foot. **Plate no-6.**

Phenology –Oct.-Nov.

Locality –Chichila 1950m, Tashigawn 1900m, D. Karkee, 742 (KATH).

Distribution- Nepal (CE 200-2300m), NE. India, Bhutan and W.China.

3. *Eria excavata* Lindl., Gen. Sp. Orchid. Pl.: 67 (1830); Hook. f., Fl. Brit. Ind. 5:795(1890); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 42(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.215(2000); Rajbhandari & Dahal, Orch. Nep. Check. 96 (2004).

Epiphytic herb. *Pseudobulbs* oblong, 3-4 cm long, tapering to each ends, compressed. *Leaves* 4-6, many nerved, elliptic-lanceolate or elliptic-oblong, acute, 4-4.5 x 0.7-1 cm. *Raceme* solitary, terminal, few flowers; *peduncle* long, ebracteate; *floral bract* lanceolate, 0.7 x 0.15 cm, slightly shorter than the stalked ovary. *Flowers* 1 cm across, dirty white. *Sepals* dorsal broadly elliptic, 1.2 x 0.45 cm; the lateral pair, 1 x 0.4 cm, falcate, 3-nerved. *Petals* narrower, 1 x 0.3 cm, 3-5 nerved. *Lip* 0.8 cm long, obovate, 3-lobed; the lateral lobe erect, rounded and two elongated calli between them; the terminal lobe decurved transversely oblong, bilobulate apex. *Column* 0.2 cm, foot also short. **Fig no-10.**

Phenology –May-July.

Locality –Mude 2025m, D. Karkee, 769 (KATH).

Distribution- Nepal (C) and NE. India.

4. *Eria graminifolia* Lindl., J. Proc. Linn. Soc., Bot. 3: 54 (1859); Hook. f., Fl. Brit. Ind. 5:794(1890); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 42(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.215(2000); Rajbhandari & Dahal, Orch. Nep. Check. 96 (2004).

Epiphytic herb. *Pseudobulbs* narrowly cylindrical, 9-11 cm long, young bearing several long tubular sheaths. *Leaves* two to six, many nerved, 6.5-12 x 0.8-1 cm, linear-lanceolate, acuminate. *Racemes* solitary or several produced from among the young leaves, somewhat shorter than leaves, erect; *peduncle* short; *floral bract* ovate, 1 x 0.35 cm, acuminate, shorter than ovary. *Flowers* white, 12-15, about 1.5 cm across. *Sepals* spreading, elliptic-lanceolate, subfalcate; lateral pair 0.9 x 0.4 cm, broader; the dorsal sepal 1.1 x 0.25 cm. *Petals* oblong, subacute, subfalcate, 1.0 x 0.35 cm. *Lip* 0.7 cm long, broadly oblong, 3-lobed; side lobes oblong, blunt, erect, incurved; terminal lobe oblong. *Column* 0.3 cm. **Fig no-11.**

Phenology –Jun-July.

Locality –Tashigawn, Uttisedanda 2200m, D. Karkee, 807 (TUCH).

Distribution- Nepal (E 2000-2600 m) and India.

5. *Eria muscicola* (Lindl.) Lindl., J. Proc. Linn. Soc., Bot. 3: 47 (1859); Hook. f., Fl. Brit. Ind. 5:789(1890); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 42(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.215(2000); Rajbhandari & Dahal, Orch. Nep. Check. 96 (2004).

Epiphytic herb. Plant 5 cm high. *Pseudobulbs* 0.8-1 cm long, depressed, globular. *Leaves* 3.5-4 x 0.5-0.6 cm, 2 to 4, oblanceolate, sessile. *Scape* slightly longer than leaves, 4-4.5 cm long, erect; *peduncle* with one or two bracts; *raceme* 3 to 6 flowered; *floral bract* lanceolate, 0.6 cm long, acuminate, longer than ovary. *Flowers* pale green. *Sepals* subequal, lanceolate, acuminate, spreading; lateral pair falcate. *Petals* narrower than sepals, spreading. *Lip* shorter than the sepals, lanceolate, concave, without side lobes. *Column* short with long curved foot.

Phenology -June-July.

Locality – Num 1300m, D. Karkee, 942 (KATH).

Distribution- Nepal (CE 1500-1800 m) and NE. India, Srilanka, Myanmar and Thailand.

6. Eria paniculata Lindl., Pl. Asiat. Rar. 1: 32, t. 36 (1830); Hook. f., Fl. Brit. Ind. 5:789(1890); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep. 215(2000); Rajbhandari & Dahal, Orch. Nep. Check. 96 (2004).

Epiphytic herb. *Stems* coespitose, pendulous, 30-60 cm long. *Leaves* numerous, fleshy 11-28 x 0.6-1 cm, linear, acuminate, sessile. *Raceme* in terminal fascicles of two or three, about as long as leaves, with long lanceolate bract as their base, woolly, many-flowered; *floral bract* lanceolate, acuminate, curved, glabrous, nearly as long as the ovary. *Flowers* 0.6-0.8 cm across, pale yellowish green. *Sepals* dorsal ovate; lateral triangular, subfalcate, spreading, all softly and sparsely pubescent outside. *Petals* about as long as the dorsal sepal, elliptic obovate, the edge slightly erose. *Lip* lavender with brownish blotches, suborbicular, 3-lobed; the side lobes oblong, subfalcate, terminal lobe broad, much decurved. *Column* stout with narrow straight foot.

Phenology –February-June.

Locality –Num 1000m, D. Karkee, 827 (KATH).

Distribution- Nepal (C 920), NE. India, Bhutan, Myanmar and China(Tibet).

7. Eria spicata (D. Don) Hand.-Mazz., Symb. Sin. 7: 1353 (1936); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 42(1978); Banerji & Pradhan, Orch. Nep. Hima.268(1984); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep. 216(2000); Rajbhandari & Dahal, Orch. Nep. Check. 96 (2004).

Octomeria spicata Don., Prodr. Fl. Nepal.: 31 (1825).

Epiphytic herb. *Pseudobulbs* crowded, 6-15 cm long, flattened and marked prominently by lengthwise groove, the young shoot covered with 1-2 sheath. *Leaves* 4-6 at the apex, 14-27 x 2.5-4.2 cm, elliptic-lanceolate or oblanceolate, acute or acuminate, loosely sheathed. *Inflorescence* spike cylindrical, decurved, densely many flowered, produced from the axil of the bract and leaves; *peduncle* stout; *floral bract* ovate-lanceolate, 1.0 x 0.3 cm, small, acute white, 3- nerved slightly longer than hairy ovary. *Flowers* numerous, white or straw yellow, 0.6-0.8 cm in diameter, glabrous. *Sepals* elliptic or ovate, obtuse; dorsal sepal 0.6 x 0.4 cm; lateral pair 0.7 x 0.55 cm, concave. *Petals* elliptic-obovate or oblanceolate-oblong, 0.6 x 0.2 cm, obtuse, spreading, narrower. *Lip* cuneate, 0.7 cm long, obscurely 3-lobed, concave. *Column* short, with curved foot.

Phenology –June–August.

Locality –Baghkor 500m, Num 1200m, Tashigawn 1950m, D. Karkee, 756 (TUCH).

Distribution- Nepal (C 1700-1900 m), NE. India, Myanmar, South China and Thailand.

8. Eria stricta Lindl., Coll. Bot. 8: t 41b (1826); Hook. f., Fl. Brit. Ind. 5:791(1890); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 42(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep. 216(2000); Rajbhandari & Dahal, Orch. Nep. Check. 96 (2004).

Epiphytic herb. *Pseudobulbs* crowded, often cohering, cylindrical, 7-10 cm long, fibrous sheath at the base. *Leaves* two, at the apex of pseudo-bulb, oblong-elliptic, sessile, tapering to each end, 10-12 x and 1.5-2.1 cm. *Spike* solitary, erect, rising from between the leaves, 12-15 cm long; *raceme* many flowered; *peduncle* naked, 3.5 cm long; *floral bract* ovate, acute, glabrous, shorter than the woolly ovary. *Flowers* 0.5 cm long, dirty white. *Sepals* densely woolly, subequal, ovate; dorsal sepal 0.25 x 0.15 cm; lateral sepals 0.2 x 0.2 cm. *Petals* 0.2 x 0.1 cm, blunt. *Lip* 0.25 cm long, concave, 3-lobed; the apical lobe very short, broad truncate; the side lobes shallow, rounded. *Column* short, broad. **Fig no-12.**

Phenology –Feb.-Apr.

Locality –Chandanpur 1000m, Num 1200m, D. Karkee, 733 (KATH).

Distribution- Nepal (C), NE. India, Myanmar and China.

17. Galeola Loureiro

Leafless, climbing or erect herb. Flowers rather in racemes or panicles. Sepals subequal, concave. Petals narrower or broader. Lip broad, with or without lateral lobes. Column incurved; pollinia 2.

Galeola lindleyana (Hook. f. & Thoms.) Rehb. f., Xenia Orchid. 2:78 (1862); Hook. f., Fl. Brit. Ind. 6:88 (1890); King & Pantl., Ann. Roy. Bot. Gard. Cal. 8:264, t352 (1898); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep. 216 (2000); Rajbhandari & Dahal, Orch. Nep. Check. 96 (2004).

Saprophytic herb. *Stem* 1-1.5 m, bearing short acute sheath. Leafless, panicles with short, lax, few flowered, dropping branches. *Flowers* bright yellow, subglobose, thick and somewhat spongy in texture; *floral bract* ovate, sessile. *Sepals* subequal; dorsal elliptic oblong, lateral pair wider, all with strong toothed. *Petals* broadly ovate blunt longer than sepals, margin ciliate. *Lip* cup-shaped with a very narrow obscurely 3-lobed, upper surface papillose, margin ciliate. *Column* clavate, slightly curved. *Capsule* 13-16 cm long, 1-1.5 cm in diameter, narrowed slightly at the base.

Phenology- August-September.

Locality - Rupsa village 2020 m.

Distribution- Nepal (E 1800-2800 m), NE. India and W. China.

18. Gastrochilus D. Don

Epiphyte without pseudo-bulbs. Leaves coriaceous, often keeled. Inflorescence subcorymbose, umbellate or paniced. Sepals and petals adnate to the column, usually consisting of a large saccate or cylindrical spur. Column short; pollinia 2.

1a Stem short or stem less -----	2
1b Stem elongate or slender -----	3
2a Apical lobe of the lip papillose hairy -----	G. calceolaris
2b Apical lobe of the lip smooth -----	G. dasypogon
3a Apical lobe of the lip triangular -----	G. acutifolius
3b Apical lobe of the lip reniform -----	G. distichus

1. Gastrochilus acutifolius (Lindl.) Kuntze, Revis. Gen. Pl. 2: 661 (1891); Banerji & Pradhan, Orch. Nep. Himal. 492 (1984); Rajbhandari & Dahal, Orch. Nep. Check. 97 (2004). *Saccolabium acutifolium* Lindl., Gen. Sp. Orch. Pl. : 223 (1833).

Epiphytic herb. *Stem* elongate, slender, 10-30 cm long, clothed with sheathes. *Leaves* 10-15 x 1.7-4 cm, linear or oblong-lanceolate, acute or acuminate, slightly and obliquely bifid. *Inflorescence* leaf opposed, 6-8 flowered, corymbose; *floral bract* broadly oblong, blunt. *Flowers* yellowish-red or more often yellowish-green and spotted or mottled brown. *Sepals* obovate-oblong, obtuse; dorsal sepal 0.7 x 0.4 cm; lateral sepals 0.8 x 0.4 cm. *Petals* similar but slightly narrower than sepals, 0.7 x 0.3 cm, oblong oblanceolate. *Lip* shorter than the petals, adnate to the column almost to its apex, the base forming a wide but rather shallow sac; side lobes very narrow, entire, white with yellow center and spotted with red; apical lobe reniform, the edges frimbriate-erose. *Column* short thick.

Phenology -October-December.

Locality -Chichila 1750m, D. Karkee, 826.

Distribution- Nepal and India.

2. Gastrochilus calceolaris (Buch.-Ham. ex Sm.) D. Don, Prodro. Fl. Nep.: 32 (1825); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 43 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.216(2000); Rajbhandari & Dahal, Orch. Nep. Check. 97 (2004).
Saccolabium calceolare Lindl., Gen. Orchid. Sp. Pl. : 223 (1833).

Epiphytic herb. *Stem* short, pendulous. *Leaves* 14-22 x 1.2-2 cm, narrowly oblong. *Racemes* many-flowered, much shorter than the leaves; *peduncle* with several short sheaths; *floral bract* 0.2 x 0.25 cm, broad, blunt. *Flowers* crowded, pale green with large reddish brown marking. *Sepals* unequal, spreading; the dorsal 0.7 x 0.35 cm, obovate-oblong; the lateral pair 0.8 x 0.4 cm, oblong, falcate. *Petals* oblong-obovate, 0.7 x 0.25 cm. *Lip* adnate to the lower half of the column; the base forming a wide short sac, about half as long as the ovary, sac bright yellow with brownish-red marking; side lobes absent; the apical lobe at right angle to sac, semicircular, covered with white hair like papillae expect triangular yellow pad. *Column* 0.3 cm, thick, reddish. **Fig no-13, plate no-7**

Phenology –February-March.

Locality – Chichila 1900m, Kuwapani 1800m, Mude 2000m, D. Karkee, 739.

Distribution- Nepal (WCE 1500-2200 m), NE. India, Bhutan, Myanmar and Malaysia.

3. Gastrochilus dasypogon (Sm.) Kuntze, Revis. Gen. Pl. 2: 661 (1891); Enum. Fl. Pl. Nep. 1:44 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.216 (2000); Rajbhandari & Dahal, Orch. Nep. Check. 97 (2004).

Saccolabium dasypogon (Sm.) Lindl., Gen. Orchid. Sp. Pl. : 222 (1833).

Epiphytic herb. *Stem* very short, stout. *Leaves* 6-8.5 x 1.8-2 cm, narrowly oblong, apex shallowly unequally two lobed. *Raceme* much shorter than leaves, few to several flowers; *floral bract* persistent, 0.5 x 0.3 cm, ovate-oblong, acute. *Flowers* crowded, pedicellate. *Sepals and Petals* ovate-oblong, spreading, fleshy, obtuse, entire, petals slightly narrower and shorter. *Lip* about as long as sepals and petals, saccate, side lobes shallow; apical lobe thick, semicircular. *Column* very short, foot less.

Phenology – September-November.

Locality-Hatiya – Gola 1100m, D. Karkee, 946.

Distribution- Nepal (C) and India (Sikkim).

4. Gastrochilus distichus (Lindl.) Kuntze, Revis. Gen. Pl. 2 : 661 (1891); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 44(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.216(2000); Rajbhandari & Dahal, Orch. Nep. Check. 97 (2004).

Saccolabium distichum Lindl., J. Proc. Linn. Soc., Bot. 3 : 36 (1859).

Epiphytic herb. *Stem* slender, pendulous, many-leaves, 15-30 cm long. *Leaves* fleshy, 2.5-3.5 x 0.2-0.5 cm, lanceolate, acuminate. *Peduncle* leaf opposed bearing 2 to 4 flowers in a lax raceme; *floral bract* oblong, subacute. *Flowers* 1-1.2 cm across, green of various shades, marked with brown spot. *Sepals & Petals* subequal, oblong-elliptic, obtuse. *Lip* about as long as sepals, adnate to the lower half of the column, the base with a wide blunt sac at right angle to ovary; side lobes absent; apical lobe pale yellow, fleshy, semicircular, entire, smooth, two blunt calli at the base. *Column broad*.

Phenology –March-May.

Locality –Chichila 1960m, Deurali 2050m, Tashigawn 1900m, D. Karkee, 758 (KATH).

Distribution- Nepal (CE 2200-2800 m), India and Bhutan.

19. *Geodorum* Jackson

Terrestrial. Leaves elliptic, plicate. Scape from base of pseudo-stem. Flowers rather crowded and narrow. Sepals equal, subacute. Petals blunt. Lip sessile, without side lobes. Column short; pollinia 2.

Geodorum densiflorum (Lamarck) Schltr., Feddes Repert. Sp. Nov. Regni Veg. Beih.4:259(1919); Rajbhandari & Dahal, Orch. Nep. Check. 97 (2004).

Geodorum pallidum D. Don., Prodr. Fl. Nepal. 31(1825);

Terrestrial herb. *Leaves* elliptic, 12-25 x 5-9 cm, acute. *Inflorescence* 23-25 cm long; *peduncle* bearing 3-4 sheathing bracts, densely flowered raceme, decurved; *floral bract* lanceolate, longer than the ovary. *Flowers* white or pinkish white. *Sepals* equal, 1.1 cm long, oblong, erect, acute. *Petals* as long as the sepals but broader, midrib thickened, apex obliquely acute. *Lip* 1 cm long, broadly ovate, ventricose at the base, without side lobes but slightly expanded near the base, bifid or emarginate, disc granulated. *Column* stout. *Capsule* 5 cm long.

Phenology - June-July.

Locality –Bumlingtar 450m, D. Karkee, 880 (KATH).

Distribution- Nepal (C) and India (Sikkim).

20. *Goodyera* R. Br.

Terrestrial herb. Stem short or elongate and creeping below. Leaves with wide sheath and petioles. Flowers small in often twisted spike. Sepals subequal, dorsal forming a hood with petals; lateral pair free. Lip sessile, attached to base of column, entire. Column short; pollinia 2.

1a Lip with smooth sac -----

G. repens

1b Lip with hispid sac -----

G. foliosa

1. *Goodyera foliosa* (Lindl.) Benth. ex C. B. Clarke, J. Linn. Soc., Bot. 25:73 (1889); Hooker, Ann. Roy. Bot. Gard. Cal.5:61(1895); Duthie, Ann. Roy. Bot. Gard. Cal. 9:166(1906); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.217(2000); Rajbhandari & Dahal, Orch. Nep. Check. 97 (2004).

Terrestrial herb, Plant 30 cm high. *Leaves* 4.5-6 x, 2.5-3 cm, 3 to 5 nerve, ovate, lanceolate, acute, petiole 2-2.5 cm long. *Peduncle* 5-8 cm long, pubescent, bearing several lanceolate sheath; *floral bract* 1.2 x 0.3 to 1.9 x 0.4 cm, 3-nerved, lanceolate, acuminate; *raceme* 6-7 cm long. *Flowers* pinkish or orange- colored, numerous, rather crowded. *Sepals* subequal, ovate-oblong, subacute. *Petals* obliquely rhomboid, acute apices and long clawed bases. *Lip* as long as the sepals, base with subglobular yellow sac, hispid within and contracted in to the oblong subacute apical lobe. *Column* rather long. *Capsule* 1.2-1.4 cm long. **Fig no-14.**

Phenology –Oct.-Nov.

Locality –Chichila 1850m, D. Karkee, 945 (KATH).

Distribution- Nepal (E), NE. India, Bhutan and Myanmar, China and Japan.

2. *Goodyera repens* (L.) R. Br., Hortus Kew. ed. 2(5): 198 (1813); Hook. f., Fl. Brit. Ind. 6:111 (1890); King & Pantl., Ann. Roy. Bot. Gard. Cal. 8:279,t370 (1898); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 44(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.217(2000); Rajbhandari & Dahal, Orch. Nep. Check. 97 (2004).

Terrestrial herb, whole plant 15-24 cm high. *Stem* glabrous, gradually passing in to the longer pubescent peduncle. *Leaves* 1.5-2.5 x, 0.5-1.8 cm, ovate elliptic, subacute. *Peduncle* 7.5-9 cm long; *raceme* 5-7.5 cm long, subsecund and sparsely pubescent or sometime subglabrous; *floral bract* linear-lanceolate, 0.5-1 cm long, longer than the ovary. *Flowers* white flushed with brownish-pink, globular, pointed. *Sepals* subequal, ovate, subacute. *Petals* about as long as the sepals, obliquely cuneate-oblong, acute, falcate, the edge slightly erose-dentate. *Lip* about as long as the sepals, saccate at the base; apical lobe short, oblong-ovate, subacute, concave. *Column* short. *Capsule* 0.5-0.9 x 0.3-0.4 cm.

Phenology- July-August.

Locality-Hunggaon 3300m, D. Karkee, 930 (KATH).

Distribution- Nepal (WCE 1000-4200 m), NE. India, Bhutan, Myanmar, China, Japan and N.America.

21. *Habenaria* Willdenow

Terrestrial herb. Leaves with sheathing base. Flowers spicate or racemed. Sepals subequal or the dorsal shorter; lateral pair spreading or reflexed. Petals smaller or larger, simple or 2-cleft. Lip adnate to the base of column, base with spur. Column very short; pollinia 2.

1a Side lobes of lip deeply pectinate -----	2
1b Side lobes of lip entire or toothed -----	H. plantaginea
2a Lip much longer than dorsal sepal -----	H. arietina
2b Lip as long as dorsal sepal -----	H. pectinata

1. *Habenaria arietina* Hook. f., Fl. Brit. Ind. 6(1):138 (1890); Hooker, Ann. Roy. Bot. Gard. Cal.5:64(1895); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.217(2000); Rajbhandari & Dahal, Orch. Nep. Check. 98 (2004).

Terrestrial herb. Plant 41 cm high, lower part of the stem stout. *Leaves* 4.5-11 x 1-2.5 cm, narrowly elliptic, acute or shortly acuminate. *Raceme* 12-16 cm long, many-flowered; *floral bract* 2.5-3.7 x 0.6-1.1 cm. *Flowers* white or slightly greenish, fragrant. *Sepals* narrowly oblong-elliptic; dorsal sepal 1.0 x 1.4 cm; lateral pair subfalcate, 1.4 x 0.5 cm, ciliolate margin. *Petals* broad, erect, inner margins almost straight, outer strongly curved, gibbous at the base. *Lip* 2 cm long; side lobes rather longer, pectinate on the outer margin but with few teeth; *spur* laterally compressed, 2.3 cm long.

Phenology –July-September.

Locality –Thungkocpa 2500m, D. Karkee, 932A (KATH).

Distribution- Nepal (WCE 2000-2900 m), NE. India, Bhutan and West China.

2. *Habenaria pectinata* (Sm.) D.Don, Prodr. Fl. Nep. 24 (1825); King & Pantl., Ann. Roy. Bot. Gard. Cal. 8:310,t406(1898); Rajbhandari & Dahal, Orch. Nep. Check. 98 (2004).

Habenaria ensifolia Lindl., Gen. Sp. Orch. Pl.: 321 (1835).

Terrestrial herb, Plant 37 cm high, lower part stout. *Leaves* 4-9 x 1-1.7 cm, oblong or linear lanceolate, acuminate and amplexicaul at the base, 3-nerved. *Raceme* 10-13 cm long; *floral bract* leaf-like, 4 x 1.1 cm, linear-lanceolate, longer than ovary. *Flowers* green. *Sepals* unequal; the dorsal lanceolate, 2 x 0.6 cm, erect; lateral sepals rather wider, 1.8 x 0.7 cm, subfalcate, acute or apiculate, erect. *Petals* forming hood with dorsal sepal, 2 x 0.3 cm, narrowly and falcately oblong, acute or apiculate. *Lip* 2 cm long, 3-lobed, pale-green; side lobes rather longer, deeply pectinate; mid-lobe linear, equal or shorter than side lobes. *spur* 2.1 cm long, laterally compressed.

Phenology -July-August.

Locality –Thungkocpa 2500m, D. Karkee, 932B (KATH).

Distribution- Nepal (WCE), India and China.

3. Habenaria plantaginea Lindl., Gen. Sp. Orch. Pl.: 323 (1835); Hook. f., Fl. Brit. Ind. 6:141 (1890); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 46(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.218(2000); Rajbhandari & Dahal, Orch. Nep. Check. 98 (2004).

Terrestrial herb, Plant 30 cm high. *Stem* 5 cm long. *Leaves* 4 or 5, radical, 5-8.5 x 1.2-2 cm, narrowly oblong or lanceolate, acute; bracts lanceolate, acuminate, lower ones larger and leaf like. *Spike* slender, 2.5-5 cm long, laxly flowered; *floral bract* 1.5 x 0.3 cm, lanceolate, acuminate. *Flowers* white. *Sepals* subequal, strongly 3-nerved; dorsal sepal erect, ovate-oblong, broader than the lateral sepals; lateral sepals falcately oblong, spreading. *Petals* linear-lanceolate, depressed to the dorsal sepal and forming a hood with it. *Lip* 3-lobed, flabelliform, nearly twice as long as the lateral sepals; mid-lobe linear-oblong, little shorter than the lateral, deflexed; side lobes semi-ovate, entire or toothed; *spur* very slender.

Phenology - September – October.

Locality -Haluwabesi 650 m, D. Karkee, 875 (KATH).

Distribution- Nepal (ECW 450-650 m), India and Srilanka.

22. *Herminium* R. Br.

Terrestrial herb. Leaves solitary or few. Flowers small. Sepals subequal, 1-nerved, dorsal conniving with petals to form a hood; lateral spreading. Petals usually smaller than sepals, connivent or spreading, entire. Lip adnate to the base of column, broad or narrow, entire or 3-5 lobed, base concave or very shortly saccate. Column very short; pollinia 2.

Herminium lanceum (Thunb. ex Sw.) Vuijk., Blumea 11(1): 228 (1961); Duthie, Ann. Roy. Bot. Gard. Cal. 9:197(1906); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 46(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep. 218 (2000); Rajbhandari & Dahal, Orch. Nep. Check. 98 (2004).

H. angustifolium (Lindl.) Benth. mss. C. B. Clarke, J. linn. Soc. Bot. 25 :73 (1889).

Terrestrial herb, Plant 20-27 cm high. *Stem* clothed in its lower part with tubular acute sheaths. *Leaves* two or three, 8-15 x 0.6-0.8 cm, linear, acuminate. *Spike* cylindrical, narrow, 6.5-11 cm long, many flowered; *floral bract* linear-lanceolate, 0.8 x 0.15 cm, acuminate, shorter than or as long as the ovary. *Flowers* 0.6-cm long, uniform green. *Sepals* subequal, oblong, obtuse; dorsal sepal 0.35 x 0.1 cm, lateral pair spreading, 0.30 x 0.1 cm. *Petals* 0.25 x 0.05 cm. *Lip* 0.5cm long, oblong in general outline; the mid-lobe very short; side lobes long, filiform, curved. *Column* nearly 0.01cm long. *Capsule* 0.4-0.5 cm long. **Fig no-15.**

Phenology –July-August.

Locality –Chhumsur 2100m & Kimathanka 2500m, D. Karkee, 925 (KATH).

Distribution- Nepal (WCE 1500-3500 m), India, China, Myanmar, Thailand, Vietnam, Laos, Malaysia, Japan and Cambodia.

23. *Ione* Lindl.

Epiphyte. Pseudobulbs from creeping rhizome. Leave one. Flowers elongate, solitary, in pairs or second or distichous racemes. Sepals membranous, lateral pair more or less coherent. Petals smaller than the sepals, spreading. Lip attached to the foot of column. Column short; pollinia 4.

Ione bicolor (Lindl.) Lindl., Fol. Orchid. Ione 2: 3, no. 6 (1853); Pearce & Cribb, Fl. Bhu. 3 (3): 481(2002); King & Pantl., Ann. Roy. Bot. Gard. Cal. 8:159,t216(1898); Rajbhandari & Dahal, Orch. Nep. Check. 98 (2004).

Sunipia bicolor Lindl., Gen. Sp. Orch. Pl. :179 (1835).

Epiphytic herb. *Pseudobulbs* 2.5-5 x 1.5-2.5 cm, obpyriform. *Leaves* 6-9 x 1.8-2 cm, linear, obliquely bifid at the apex, slightly narrow to base. *Scape* solitary or in pair, somewhat shorter than leaves; *peduncle* equal to the raceme, minutely bractiate; *racemes* with 6-8 distichous flowered; *floral bract* lanceolate, longer than the ovary. *Sepals* subequal, dorsal and lateral pair widely diverging, lanceolate, acute. *Petals* elliptic blunt, spreading at right angle to the sepals. *Lip* panduriform, truncate at the base and with two minute auricles; the anterior part expanded and deeply serrate except at the emarginate apex, upper surface slightly concave. *Column* short with very short foot.

Phenology -October-December.

Locality –Chichila 1950m, D. Karkee, 794 (KATH).

Distribution- Nepal (WCE 1500-2100 m), NE. India and Bhutan.

24. *Phalaenopsis* Bl.

Epiphyte. Stem very short. Leaves flat. Flowers usually large, in loose racemes. Sepals and petals widely spreading. Lip clawed or sessile, adnate to the base or foot of column, not spurred, more or less lobed. Column with or without foot; pollinia 2.

Phalaenopsis taenialis (Lindl.) E. A. Christenson & Pradhan, Selbyana 9:168 (1986);

Rajbhandari & Dahal, Orch. Nep. Check.103 (2004);

Kingidium taenialis (Lindl.) P. F. Hunt, Kew Bull. **24** : 98 (1970).

Epiphytic herb. *Roots* numerous, long and flat. *Leaves* pendulous, often solitary, absent during flowering time, 7.5-12.5 x 1.5-2 cm, narrowly elliptic-oblong, acute. *Raceme* pendulous, 6-8 flowered; *floral bract* broadly triangular, minute. *Flowers* delicate, pale purple. *Sepals* unequal, blunt; the dorsal sepal oblong, 1.1 x 0.4 cm, slightly oblanceolate; the lateral pair 0.9 x 0.4 cm, elliptic, blunt. *Petals* obovate, blunt, 0.9 x 0.4 cm. *Lip* adnate to the foot of the column, shorter than the petals, dark purple; hypochile produced below in to stout subcylindric spur; the epichile spathulate-oblong, entire, attached to the hypochile near the base, its upper surface with a forked appendage. *Column* 0.55 cm long, narrowly winged. *Capsule* 5-6 cm long. **Fig no-.**

Phenology –April-May.

Locality – Bhotebash 1600m, D. Karkee, 735 (KATH).

Distribution- Nepal (CE 1500-2300 m), NE. India, Bhutan and Myanmar.

25. *Liparis* L. C. Richard

Terrestrial or epiphytic. Pseudobulbus or not. Leaves 1 or more, with sheath. Flowers small in terminal racemes. Sepals spreading or recurved, margin often revolute. Petals much narrower than sepals. Lip adnate to the base of column, usually broad, often with calli near base. Column elongate, usually winged at apex; pollinia 4.

1a Leaves two or more-----	2
1b Leaf solitary -----	L. bootanensis
2a Epiphyte -----	3
2b Terrestrial -----	4
3a Leaves two -----	L. viridiflora
3b Leaves more than two-----	L. resupinata
4a Lip concave, column not curved -----	L. nervosa
4b Lip flat, column slightly curved -----	L. deflexa

1. *Liparis bootanensis* Griff., Itin. Pl. Khasyas Mts.:98 (1848); Hook. f., Fl. Brit. Ind. 5:700 (1890); King & Pantl., Ann. Roy. Bot. Gard. Cal. 8:30,t40(1898); Banerji & Pradhan, Orch. Nep. Hima.500(1984) Rajbhandari & Dahal, Orch. Nep. Check. 99 (2004).

Epiphytic herb. *Pseudobulbs* narrowly oblong, tapering slightly, 3-4.5 cm long, the sheath of the young growth lanceolate, acuminate. *Leaf* 15-21.5 x 2.5-3 cm, solitary from near the apex of pseudobulb, linear-oblong to lanceolate, acute. *Inflorescence* 23 cm long; *peduncle* ebracteate, slightly longer the lax few flowered raceme; *floral bract* 1.1 cm long, linear-lanceolate. *Flowers* greenish-brown. *Sepals* linear-lanceolate, 0.6 cm long; the dorsal sepal subreflexed; the lateral pair lying parallel below. *Petals* linear, 0.6 cm long, blunt, much decurved, revolute. *Lip* cuneately oblong, deflexed from below the middle, the apex broad, truncate, erose. *Column* curved, 0.3 cm long, with hook like triangular wings, thickened at the base.

Phenology -May-July.

Locality –Mude 1900m, D. Karkee, 774.

Distribution- Nepal and India (Sikkim).

2. *Liparis deflexa* Hook. f., Fl. Brit. Ind. 5 (2): 697(1890); King & Pantl., Ann. Roy. Bot. Gard. Cal. 8:25, t 31(1898); Duthie, Ann. Roy. Bot. Gard. Cal. 9:90(1906); Banerji & Pradhan, Orch. Nep. Hima.278(1984); Rajbhandari & Dahal, Orch. Nep. Check. 99 (2004).

Terrestrial herb. Plant 26 cm high. *Stem* cylindrical, covered by sheath. *Leaves* from near the top of the stem, 7-16 x 3.5-8.5 cm, elliptic. *Inflorescence* longer than the leaves, erect, striate; *raceme* laxly flowered; *floral bract* 0.6 - 1.5 x 0.1 -0.3 cm, reflexed; *peduncle* with a few lanceolate reflexed bracts. *Flowers* yellow. *Sepals* narrowly oblong; dorsal one acute; lateral pair obtuse. *Petals* narrowly oblong, obtuse, like the sepals, reflexed and with recurved margins. *Lip* flat, orbicular-reniform, the margin near the base quite entire, minutely erose. *Column* slightly curved, wings near the apex. *Capsule* 1.5 cm long.

Phenology –August.

Locality- Bumlingtar 450m, D. Karkee, 879 (KATH).

Distribution- Nepal and India.

3. *Liparis nervosa* (Thunb.) Lindl., Gen. Sp. Orch. Pl.: 26 (1830); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 47(1978); Tuyama in Ohashi, Fl. E. Himal.3:159(1975); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.219(2000); Rajbhandari & Dahal, Orch. Nep. Check. 99 (2004).

L. paradoxa (Lindl.) Rchb. f., Ann. Bot. Syst. 6: 218 (1861).

Terrestrial herb. *Pseudobulbs* narrow and ovoid, 1-1.5 cm long. *Stem* erect, whole plant 16-28 cm high, bearing several sheath. *Leaves* 2-3, rarely 4, alternate, elliptic lanceolate, 5.5-12 x 1.3-2.3 cm. *Inflorescence* 13-20 cm long; *raceme* 4-6 cm long, few flowered; *floral bract* 0.4 x 0.1 cm, ovate-lanceolate. *Flowers* greenish yellow with purplish lip. *Sepals* unequal, margin recurved; dorsal sepal 0.6 x 0.25 cm, linear, blunt, spreading; lateral sepals 0.55 x 0.25 cm, broadly ovate. *Petals* 0.6 x 0.1 cm, linear, reflexed, margin recurved. *Lip* obcordate or obovate, deflexed at the middle, concave, bearing 2 erect tooth-like calli, margin entire; 0.55 x 0.4 cm. *Column* 0.35 cm long, not curved. *Capsule* 1 cm long. **Fig no-16.**

Phenology –Aug.-Sep.

Locality –Bumlingtar 450m, D. Karkee, 862 (KATH).

Distribution- Nepal (CE 1800-2800 m), India, Srilanka, Thailand, China, Japan, Malaysia and Myanmar.

4. *Liparis resupinata* Ridley, J. Linn. Soc., Bot. 22 : 290 (1886); Hook. f., Fl. Brit. Ind. 5:705(1890); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 48(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep. 219 (2000); Rajbhandari & Dahal, Orch. Nep. Check. 99 (2004).

Epiphytic herb. Plant 15-23 cm high. *Pseudobulbs* ovoid-cylindric, 2-2.5 cm long. *Leaves* 2-4, alternate, linear-lanceolate, 7-10 x 0.6-1 cm. *Inflorescence* 12-18 cm long, subpendulous; *peduncle* slender with bracteoles; *raceme* long, laxly many-flowered; *floral bract* 0.5 x 0.2 cm. *Flowers* golden-brown. *Sepals* oblong, obtuse; the dorsal sepal 0.3 x 0.1 cm; the lateral pair spreading, 0.35 x 0.1 cm, the margin recurved. *Petals* linear, 0.3 cm long, spreading. *Lip* 0.25 x 0.15 cm, broadly oblong or ovate, sagittate at the base. *Column* 0.2 cm long, winged.

Fig no-17.

Phenology –Oct.-Dec.

Locality –Chichila 1650m, Deurali 1900, D. Karkee, 752(KATH).

Distribution- Nepal (E 1500-2600 m)) and NE. India.

5. *Liparis viridiflora* (Bl.) Lindl., Gen. Sp. Orch. Pl.: 31 (1830); Hook. f., Fl. Brit. Ind. 5:704(1890); Tuyama in Hara, Fl. E. Himal. 443 (1966); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 48(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.219(2000); Rajbhandari & Dahal, Orch. Nep. Check. 99 (2004).

Liparis longipes Lindl., Gen. Sp. Orch. Pl. : 30 (1830).

Epiphytic herb. *Pseudobulbs* close together in a row, 12-14 cm long. *Leaves* 2, 13-18 x 1.5-2 cm, acute or acuminate. *Inflorescence* 11-15 cm long, slender, densely many flowered, with few bract below raceme; *floral bract* small, lanceolate, acuminate. *Flowers* creamy-yellow. *Sepals* revolute, linear-ligulate, free, obtuse. *Petals* shorter than the sepals, linear, subacute, reflexed. *Lip* broadly ovate or oblong, recurved, winged, subacute, the apex broad with a small central apiculus. *Column* slightly curved, the wing very small. *Capsule* 0.3-0.4 cm long.

Phenology –September-November.

Locality –Faksinda 550m, D. Karkee, 940 (KATH).

Distribution- Nepal (E 700-2500 m), India, Bhutan, Malaya, Srilanka, Pacific Island and China.

26. *Luisia* Gaudichaud

Epiphyte. Stem rigid, terete, sheathed. Leaves terete, fleshy, spreading. Flowers dropping, usually small and dull in color, spicate or short or very short axillary rachis; floral bract persistence. Sepals subequal or decurved dorsal smaller. Petals equal to sepals or longer, narrower. Lip sessile on the base of column; hypochile concave; epichile wrinkled. Column short; pollinia 2.

Luisia zeylanica Lindl., Fol. Orchid. Luisia 4:3, no.7 (1853); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 48(1978); Banerji & Pradhan, Orch. Nep. Hima.502(1984); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.220(2000); Rajbhandari & Dahal, Orch. Nep. Check. 99 (2004).

Luisia teretifolia auct. non Gaud., Hook. f., Fl. Brit. Ind. 6: 22 (1890) p.p.

Epiphytic herb. *Stem* terete, rigid, 15-30 cm long. *Leaves* terete, variable in thickness, 15-18 cm long. *Inflorescence* axillary, 2-3 flowered, spikes very short; *floral bract* broad, pointed. *Flowers* pale pink or yellow. *Sepals* unequal; dorsal sepal 0.5 x 0.25 cm, elliptic, obtuse or subacute; lateral sepals lanceolate, 0.7 x 0.3 cm. *Petals* 0.8 x 0.25 cm, linear-oblong, obtuse, spreading. *Lip* 0.7 cm x 0.5 cm, broadly cordate above, gibbous at the base, 3-lobed, yellow or greenish and deep purple below. *Column* 0.3 cm long, stout. *Capsule* 0.8 cm long. **Fig no-18, plate no-8.**

Phenology –Apr.-June.

Locality –Chewabensi -Baghkor 425 - 450m, D. Karkee, 719 (KATH).

Distribution- Nepal (C 900 m), Bhutan, Srilanka and South East Asia.

27. *Malaxis* Solander ex Sw.

Herb with single or more leaves. Flowers small in terminal racemes. Sepals spreading or recurved. Petals as long as sepals but narrower. Lip adnate to the base of column, usually flat, with or without basal lobes. Column short; pollinia 4.

1a Leaves more than 2 (3-6) -----	2
1b Leaves 2 -----	M. muscifera
2a Flowers not crowded, lip slightly convex.-----	M. acuminata
2b Flowers much crowded, lip concave.-----	M. ophrydis

1. *Malaxis acuminata* D. Don, Prodr. Fl. Nep.:29 (1825); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 48(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep. 220 (2000); Rajbhandari & Dahal, Orch. Nep. Check. 99 (2004).
Microstylis wallichii Lindl., Ge. Sp. Orch Pl. : 20 (1830).

Terrestrial herb, Plant 30 cm high. *Stem* creeping with erect leafy branch, few sheaths below. *Leaves* three to four, 7.5-12 x 3-4.5 cm, sheathing at the base, acute or acuminate. *Inflorescence* terminal, 17-28 cm long; *peduncle* shorter than the raceme; *floral bract* lanceolate, 0.3 x 0.1 cm. *Flowers* yellowish green. *Sepals* oblong; the dorsal 0.65 x 0.2 cm, subacute; the lateral 0.5 x 0.3 cm, obtuse. *Petals* blunt, 0.65 x 0.1 cm. *Lip* 0.85 cm long, slightly convex, narrowly ovate in general outline; the basal lobe lanceolate. *Column* 0.2 cm. *Capsule* 1.2 cm long. **Fig no-19.**

Phenology –June-August.

Locality –Chichila 1850m, Bumlingtar 450m, D. Karkee, 888 (KATH).

Distribution- Nepal (CE 450-3050 m), India, Srilanka and Myanmar.

2. *Malaxis muscifera* (Lindl.) Kuntze, Revis. Gen. Pl. 2: 673 (1891); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:49 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.220(2000); Rajbhandari & Dahal, Orch. Nep. Check. 100 (2004).
Microstylis muscifera Ridl., J. Linn. Soc. Bot. **24**: 333 (1888).

Terrestrial herb, Plant 18-24 cm long. *Stem* from the apex of pseudo-bulb, 1.5 cm long, bearing tubular sheath. *Leaves* usually two, 5.5-7.5 x 2.5-4.5 cm, ovate to ovate-lanceolate. *Inflorescence* 10-15 cm long; *peduncle* terete, ebractiate; *raceme* rather lax; *floral bract* 0.3 cm long. *Flowers* yellowish green. *Sepals* subequal, broadly oblong-lanceolate, subacute, longer than linear petals. *Lip* broadly ovate, excavated at the base; the basal part with convex side-lobe. *Column* very short. *Capsule* 0.4-0.5- cm long.

Phenology –June-August.

Locality –Chichila 1900m, D. Karkee, 930 (KATH).

Distribution- Nepal (ECW 2600-2100 m), India, Bhutan, N. Myanmar and China.

3. *Malaxis ophrydis* (Koenig) Ormerod, Seidenfaden, Descrip. Epidend. Koenig 1791 :18 (1995); Rajbhandari and Dahal, Orch. Nep. Check. 100 (2004).
Malaxis latifolia J. E. Simth, Rees, Cycl. : 22 (1822).

Terrestrial herb, Plant 30-45 cm long. *Stem* thickened near the base. *Leaves* 3-6, elliptic-lanceolate, acute or acuminate, 15-24 x 7-11.5 cm. *Inflorescence* 15 to 35 cm long; *floral bract* lanceolate, acuminate. *Flowers* much crowded, yellowish green and purplish. *Sepals* oblong, subobtuse; lateral pair falcate. *Petals* linear, obtuse. *Lip* oblong, concave, basal part

without lobe, anterior part 3-lobed; lateral lobes narrow, elongated; apical lobe short, narrowly ovate, subacute. *Column* rather long. *Capsule* 0.8-1 cm long.

Phenology -June.

Locality – Chandanpur 1000m, *Kaarkee 730* (KATH).

Distribution- Nepal (CE 1800-2100 m), India, Bhutan, China, Srilanka, Thailand, Myanmar and Malaya.

28. *Oberonia* Lindl.

Epiphyte. Stem usually short. Leaves coriaceous or fleshy, ensiform, always distichous. Flowers in dense subcylindric spike or racemes. Sepals broadly ovate or oblong, subequal. Petals smaller. Lip concave, sessile, as wide as or narrower than sepals. Column very short, rarely winged; pollinia 4.

- | | |
|--|--|
| 1a Lip with lateral or basal lobes ----- | 2 |
| 1b Lip with out lateral lobes or basal lobes ----- | O. pachyrachis |
| 2a Terminal lobe with parallel lobules ----- | O. caulescens |
| 2b Terminal lobe with diverging lobules ----- | O. falcata |
| 3a Sinus with out protuberances ----- | O. acaulis |
| 3b Sinus with rounded protuberances ----- | O. parvula subsp. arunense |

1. *Oberonia acaulis* Griff., Itin. Pl. Khasyah Mts.: 76 (1848); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:50 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.221(2000); Rajbhandari & Dahal, Orch. Nep. Check. 101 (2004).

Oberonia myriantha Lindl., Fol. *op. cit.* no. 23 (1859).

Epiphytic herb, Plant 19-23 cm long. *Stem* short. *Leaves* 11-20 x 0.5-1 cm, falcate, unequal in size. *Inflorescence* much longer than the leaves, slender, densely many flowered; *peduncle* terete, rather thickly clothed with linear bracts; *floral bract* lanceolate, erose-frimbriate. *Flowers* light brown, numerous, more or less whorled. *Sepals* ovate, entire. *Petals* oblong, entire, truncate, spreading or reflexed on the ovary like the sepals. *Lip* longer than sepals and petals; lateral lobes broadly oblong, blunt, subcrenulate; the terminal lobe large, deeply cleft in to two broadly oblong blunt lobules; the upper surface of the lip with a few irregularly scattered watery blisters ultimately changing into scale. *Column* very short.

Phenology -September-December.

Locality –Chichila 1900m, Tashigan 1950m, D. Karkee, 745(KATH & TUCH).

Distribution- Nepal (CE 900-1500 m), NE. India, Thailand, Vietnam, Laos, West China and Cambodia.

2. *Oberonia caulescens* Lindl., Fol. Orchid. *Oberonia* 2:7, no.39 (1859); Hook. f., Fl. Brit. Ind. 5:682(1890); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:50 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.221(2000); Rajbhandari & Dahal, Orch. Nep. Check. 101 (2004).

Epiphytic herb, Plant 4.5-5 cm long. *Leaves* 1-2 cm x 0.2-0.3 cm, rather fleshy. *Inflorescence* erect, 5-6 cm long; *peduncle* terete, short, bracteate; *raceme* slender. *Flowers* reddish brown, minute; *floral bract* equal in length to the ovary, lanceolate. *Sepals* ovate, subacute, entire. *Petals* lanceolate acute, entire, spreading like the sepals. *Lip* nearly three times as long as sepals, 3-lobed; lateral lobe triangular falcate; terminal lobe deeply cleft at its apex into two caudate-acuminate lobules. *Column* very short. *Capsule* 0.15 cm long.

Phenology –November-December.

Locality –Seduwa 1100m, D. Karkee, 810 (KATH).

Distribution- Nepal (CE 2400 m) and NE. India and W.China.

3. *Oberonia falcata* King & Pantling, J. Asiat., Soc. Bengal 64(3): 329 (1896); Hooker, Ann. Roy. Bot. Gard. Cal.5:(1895); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:50 (1978); Banerji & Pradhan, Orch. Nep. Hima. 316(1984); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep. 221 (2000); Rajbhandari & Dahal, Orch. Nep. Check. 101 (2004).

Epiphytic herb, Plant 15-30 cm long. *Stem* flexuous. *Leaves* 2-5 x 0.2-0.4 cm, falcate. *Inflorescence* 6.5-13 cm long, erect, much longer than leaves; *peduncle* short, terete; *raceme* many flowered; *floral bract* ovate, subacute, erose. *Flowers* yellowish-green, minute, crowded. *Sepals* ovate, entire, reflexed or spreading. *Petals* linear-oblong, blunt, entire. *Lip* twice as long as sepals, broadly oblong; side lobes small, triangular, pointing outwards; the mid-lobe with two deep lanceolate slightly diverging terminal lobules. *Column* short with two wings. Capsule 0.2 cm long.

Phenology - June - July.

Locality – Seduwa 1500m, Tashigawn 1900m, D. Karkee, 744 (KATH & TUCH).

Distribution- Nepal (E 1500-2500 m), NE. India, Thailand and Indo-China.

4. *Oberonia pachyrachis* Rchb. f. ex Hook. f., Fl. Brit. Ind. 5(2): 681(1890); Duthie, Ann. Roy. Bot. Gard. Cal. 9:85(1906)Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:50(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.221(2000); Rajbhandari & Dahal, Orch. Nep. Check. 101 (2004).

Epiphytic herb, Plant 10-14 cm long. *Stem* very short. *Leaves* slightly falcate, 0.2-0.9 x 5-10 cm, acute. *Inflorescence* 3-6.5 cm long; *peduncle* short, broad compressed, adnate to leaves near apex; flower bearing rachis terete, erect; *floral bract* ovate, irregularly but deeply serrate. *Flowers* pale brown, minute. *Sepals* elliptic-obtuse, glandular on the back. *Petals* smaller than sepals, obtuse, linear-oblong, subentire. *Lip* orbicular-elliptic, obtuse, concave, quite entire or slightly erose at the apex. *Column* short.

Phenology -November-December.

Locality –Chichila 1650m, Yakuwa 1200m, Tashigawn 1800m, D. Karkee, 819 (KATH).

Distribution- Nepal (E 1400-1500 m), NE. India and Thailand.

5. *Oberonia parvula* King & Plant. subsp. **arunense** L. Shakya & R. P. Chaudhary

Herb 3-6 cm long and 2-2.5 cm broad. *Leaves* 4, 1.5-6 x 0.3-1 cm. *Flowers* ca. 1cm across, light orange. *Lip* ca. 0.8 x 0.75 mm, 3-lobed, veinless; lateral lobes bent upward, oblong; terminal lobe cleft in to two lobules; lobules oblong, obtuse; sinus with distinct rounded protuberance.

Phenology- Jan. –Feb.

Locality - Betghari 1095 m (from Num to Seduwa), L. Shakya, D. B. Karkee, V.N.P. Gupta and R. P. Chaudhary.

Distribution- Himalaya (Nepal-East)

Note- *Oberonia parvula* subsp. *arunense* is an endangered taxon discovered from Arun valley (East Nepal). It was collected during December 1998 as an epiphyte on *Ficus nemoralis* and brought to Kathmandu, after study the character of the sepals, petals and column of this plant show close affinity with *Oberonia parvula* King & Pantling, but differ in Habit and lip.

29. *Ornithochilus* (Lindl.) Bentham

Epiphyte. *Stem* very short. *Leaves* few. *Flowers* small. *Sepals* subequal, spreading, incurved at the apex. *Petals* much smaller, blunt. *Lip* much longer than sepals, claw with rectangularly bent subcylindric spur; side lobes subquadrate; apical lobe with 3-lobules, *Column* short, cylindrical; *pollinia* 2.

Ornithochilus difformis (Wall. ex Lindl.) Schltr., Feddes Repert. Spec. Nov. Regni Veg. Beih. 4: 277 (1919); Tuyama in Hara, Fl. E. Himal. 446(1966); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:51 (1978) Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.222(2000); Rajbhandari & Dahal, Orch. Nep. Check. 102 (2004).
Ornithochilus fuscus Lindl., Gen. Sp. Orch. Pl. : 242 (1833).

Epiphytic herb. *Stem* very short. *Leaves* subacute, narrow to sheathing base, 8-15 x 4-5 cm. *Inflorescence* 18-22 cm long; *floral bract* lanceolate, 0.3 cm long. *Flowers* 1.2 cm across. *Sepals* subequal, spreading, incurved at the apex; dorsal sepal 0.5 x 0.2 cm; the lateral pair obliquely obovate, 0.5 x 0.4 cm. *Petals* 0.4 x 0.1 cm, cuneate-oblong, blunt. *Lip* 0.8 cm long, adnate to the foot of the column; the claw with rectangularly bent subcylindric spur; *spur* 0.4 cm long; side lobes shallow, subquadrate; mid-lobe with 3-lobules. *Column* short, 0.2 cm long, cylindrical, stout.

Phenology -June-July.

Locality –Mude 2025m, D. Karkee, 767.

Distribution- Nepal (CE 1400-2400 m), NE. India, Bhutan, Myanmar, Thailand and Indo-China.

30. **Otochilus** Lindl.

Epiphyte. Stem jointed, formed superposed elongate pseudobulbous internode. Leaves in pair at node, elliptic or lanceolate. Flowers small, white. Sepals and petals subequal, spreading, free. Lip with two horned sac at the base and long terminal concave lobe. Column very long; pollinia 4.

- | | |
|---|------------------------|
| 1a Peduncle enclosed in imbricate sheaths ----- | 2 |
| 1b Peduncle enclosed in large sheaths ----- | O. albus |
| 2a Leaves linear-oblong, column short----- | O. fuscus |
| 2b Leave narrowly elliptic, column long----- | O. lancilabious |

1. Otochilus albus Lindl., Gen. Sp. Orchid. Pl.:35 (1830), *sphalm. alba.*; Hara, Stearn & William., Hook. f., Fl. Brit. Ind. 5:843 (1890); King & Pantl., Ann. Roy. Bot. Gard. Cal. 8:143,t 200(1898); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.222(2000); White & Sarma, Wild. Orch. Nep.253 (2000); Rajbhandari & Dahal, Orch. Nep. Check. 102 (2004).

Epiphytic herb. *Stem* subcylindric. *Leaves* 12-15 x 2-2.3 cm, acuminate, often narrow; petiole 2.5-3 cm long. *Raceme* shorter than leaves, laxly flowered; *peduncle* enveloped in large sheath; *floral bract* 0.9 x 0.7 cm, large, ovate-lanceolate, caducous. *Flowers* transparent white. *Sepals* oblong lanceolate, acute; 0.8 x 0.35 cm; the lateral sepals 0.8 x 0.25 cm, back not keeled. *Petals* narrower, linear-lanceolate, 0.75 x 0.1 cm, acute. *Lip* 0.65 x 0.25 cm; the saccate base with broad side lobes; mid-lobe oblong, apiculate, deflexed at the apex. *Column* 0.5 cm long, slender, winged and thickened towards the apex.

Phenology -June-July.

Locality –Kuwapani 1900m, Chichila 1900m, Deurali 2025m, D. Karkee, 761 (KATH).

Distribution- Nepal (CE 1700 m), NE. India and Thailand.

2. Otochilus fuscus Lindl., Gen. Sp. Orchid. Pl.:35 (1830), *sphalm. Fusa.*; Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 51(1978); Banerji & Pradhan, Orch. Nep. Hima. 334(1984); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.222(2000); Rajbhandari & Dahal, Orch. Nep. Check. 102 (2004).

Coelogyne fusca (Lindl.) Rchb. f., Ann. Bot. Syst. 6: 236 (1861).

Epiphytic herb. *Pseudobulbs* 5-6.5 cm long. *Leaves* 14-15 x 1-1.3 cm, shortly petioled, acuminate, petiole 1-2 cm long. *Racemes* about as long as leaves during flowering, longer than leaves when its fruit; *peduncle* short, enclosed in imbricate sheaths; *floral bract* 0.8 x 0.5 cm, longer than ovary. *Flowers* white. *Sepals* subequal, free, lanceolate or oblong, obtuse, spreading; dorsal sepal 0.7 x 0.25 cm; lateral sepals 0.7 x 0.15 cm; subacute, back with keel. *Petals* 0.7 x 0.1 cm, oblanceolate, spreading. *Lip* 0.55 x 0.2 cm, with short saccate bi-cornute base and mid-lobe; base brown with a tinge of pink; mid-lobe white, deflexed concave. *Column* brown, 0.7 cm long, without foot, slightly winged towards the apex. **Fig no-20.**

Phenology –October-December.

Locality –Mude 2025m, Deurali 2000m, Num 1200m, D. Karkee, 768 (KATH).

Distribution- Nepal (C 1100-2000 m), NE. India, Bhutan and N. Myanmar.

3. Otochilus lancilabius Seidenf., Bot. Tidsskr. 71: 13, t.11 (1976); Banerji & Pradhan, Orch. Nep. Hima. 336(1984); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.222(2000); White & Sarma, Wild. Orch. Nep.254(2000); Rajbhandari & Dahal, Orch. Nep. Check. 102 (2004).

Epiphytic herb. *Pseudobulbs* 6-12 cm long, 1-1.5 cm in diameter, often sheathed. *Leaves* 13-19 x 4-4.5 cm, acuminate, petiole 1.5-3 cm long. *Inflorescence* about 15 cm long, decurved racemes; *peduncle* enclosed in imbricate sheaths, laxly flowered; *floral bract* 0.9-1.2 cm long, linear, acute, caducous. *Flowers* white. *Sepals* subequal oblong-lanceolate; dorsal sepal 1.4 x 0.25 cm; lateral pair 1.3 x 0.25 cm, subfalcate and with fold near base. *Petals* 1.3 x 0.05 cm, linear, acute, spreading. *Lip* 1 cm x 0.35 cm, saccate and deflexed at the base; side lobes small and obtuse; mid-lobe oblong, acute, three strong veins at the base, a patch of brown on the sac of the lip. *Column* slender, 1 cm long, winged.

Phenology –October-December.

Locality –Chichila 1900m, D. Karkee, 755 (KATH).

Distribution- Nepal (WCE 1900-2300 m), NE. India, Bhutan, Myanmar and China.

31. Panisea (Lindl.) Steudel

Epiphyte. *Pseudobulbs* small. *Leaves* 2. *Inflorescences* from the base of pseudo-bulbs, racemes, laxly flowered. *Flowers* few, small. *Sepals* & *petals* narrow; lateral sepals slightly saccate at the base. *Lip* as long as sepals, adnate to the base of column. *Column* long, 2 wings above; *pollinia* 4.

Panisea demissa (D. Don) Pfitzer, Engler, Pflanzenr. (IV.50), coelog.: 141 t. 49 (1907); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 51(1978); Banerji & Pradhan, Orch. Nep. Hima. 338(1984); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.222(2000); Rajbhandari & Dahal, Orch. Nep. Check. 102 (2004).

Panisea parviflora Lindl., Fol. Orch. Panisea: 1 (1854).

Epiphytic herb. *Pseudobulbs* narrowly ovoid, 2-4 cm long. *Leaves* 8-10.5 x 1.2-1.5 cm, narrowly elliptic-lanceolate, acute, sessile. *Scape* filiform, decurved, about as long as leaves, the base with membranous sheath; *floral bract* lanceolate, 0.9 x 0.3 cm. *Flowers* white with brown streaks. *Sepals* keeled, dorsal sepal linear-oblong, 1 x 0.3 cm; lateral pair falcate, 1.1 x 0.3 cm, acute, gibbous at the base. *Petals* oblong, 0.85 x 0.3 cm, blunt. *Lip* 1 cm long, 0.2 cm broad, subacute, 3-nerved. *Column* 0.9 cm long, brown, apex 0.25 cm broad.

Phenology -October-December.

Locality –Mude 2000m, D. Karkee, 733 (KATH).

Distribution- Nepal (C 1600 m) and NE. India.

32. *Pecteilis* Rafinesque

Pecteilis susannae (L.) Raf., Fl. Tellur. 2: 38, no.125 (1836); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep. 222 (2000); Enm. Fl. Pl. Nep. 1:52 (1978); Rajbhandari & Dahal, Orch. Nep. Check. 102 (2004).

Habenaria susannae (L.) Blume, Bijdr. Fl. Nederl. Ind. 8: 402 (1825).

Terrestrial herb, Plants 50 -85 cm tall. *Stem* with sheaths at the base. *Leaves* 13-15 x 4.5-6 cm, mostly on the middle part of the stem, ovate-oblong, acute, upper leaves smaller and bracts like. *Raceme* very short, 3-5 flowered; *floral bract* foliaceous, longer than the ovary. *Flowers* white, fragrant. *Sepals* spreading, subequal, broad; dorsal sepal suborbicular, acute; lateral sepals subquadrately oblong, obtuse. *Petals* linear falcate, acute, thick. *Lip* as long as the lateral sepals; mid-lobe spatulate, margin recurved, lateral lobes broad, truncate, deeply pectinate; spur more than twice of the length of the ovary.

Phenology-September-October.

Locality - Tumlingtar 420 m.

Distribution- Nepal (CE 1000-1700 m), NE. India, China, Malaysia and Myanmar.

33. *Pholidota* Lihdl. ex Hook.

Epiphyte with jointed stem. Leaves usually in pair (solitary in *P. Imbricata*). Racemes terminal or from base of pseudobulbs. Flowers small. Sepals concave. Petals narrower than sepals. Lip usually without side lobes, saccate. Column very short, hooded or winged; polinia 4.

- | | |
|--|----------------------|
| 1a Leaves in pair----- | 2 |
| 1b Leaf solitary ----- | P. imbricata |
| 2a Raceme terminal on young pseudobulbs, as long as leaves-- | P. articulata |
| 2b Raceme several from joint of rhizome, shorter than leaves-- | P. protracta |

1. *Pholidota articulata* Lindl., Gen. Sp. Orchid. Pl.: 38 (1830); King & Pantl., Ann. Roy. Bot. Gard. Cal. 8:147, t 204 (1898); Rajbhandari and Dahal, orch. Nep. Check. 103 (2004).

Pholidota griffithii Hook. f., Fl. Brit. Ind. 5(2): 845(1890).

Epiphytic herb. *Stem* jointed, branching, 5-10 cm long. *Leaves* 8-13 x 1.5-2 cm, narrowly oblong, thickly membranous. *Raceme* dropping, terminal on young pseudobulbs, about as long as leaves, 8-11 cm long and densely flowered; *floral bract* deciduous. *Flowers* 0.3 cm across, translucent white. *Sepals*, dorsal sepal suborbicular, blunt; lateral pair ovate, keeled. *Petals* ovate-orbicular, blunt. *Lip* about as long as sepals, orange-red, broadly cymbiform with oblong broad middle lobe. *Column* slightly winged towards apex.

Phenology -May-July.

Locality - Lamauwa-Besinda 1290 m.

Distribution- Nepal (CE 1400 m) and NE. India.

2. *Pholidota imbricata* Hook., Exot. Fl. 2: t. 138 (1825); Hook. f., Fl. Brit. Ind. 5:845(1890); King & Pantl., Ann. Roy. Bot. Gard. Cal. 8:144, t 201(1898); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:53 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.223 (2000); Rajbhandari & Dahal, Orch. Nep. Check. 103 (2004).

Cymbidium imbricatum Rox., Fl. Ind. ed. 1832, 3:460 (1832).

Epiphytic herb. *Pseudobulbs* 5-6 cm long, ovoid-conical, furrowed. *Leaf* solitary, 17-26 x 4-5 cm, acute. *Raceme* dropping from the base of the pseudobulbs, 15-26 cm long; pendulous, dense many flowered; *floral bract* large, 0.6 x 0.5 cm, broadly elliptic. *Flowers* numerous, dirty pink, pedicellate. *Sepals* unequal, three nerved, entire; dorsal sepal oblong, 0.5 x 0.4 cm, suborbicular, obtuse; lateral sepals broadly sickle shaped, 0.6 x 0.2 cm. *Petals* linear-oblong, 0.5 x 0.15 cm, subfalcate, acute, entire. *Lip* 3-lobed, 0.6 cm long; the lateral lobes large, broad, boat shaped; terminal lobe, bilobed. *Column* golden brown, 0.3 cm long, winged.

Phenology -June-July.

Locality- Mude 1700m, Hatiya 1500m, Yakuwa 1200m, D. Karkee, 772 (TUCH).

Distribution- Nepal (CE 600-2900 m), India, Bhutan, Srilanka, Myanmar, W. China, Malaysia and Australia.

3. Pholidota protracta Hook. f., Icon. Pl. ser,3,19: t. 1887 (1889); Hook. f., Fl. Brit. Ind. 5:845(1890); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:53 (1978); Banerji & Pradhan, Orch. Nep. Hima. 348(1984); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.223 (2000); Rajbhandari and Dahal, orch. Nep. Check. 103 (2004).

Epiphytic herb. *Stem* slender. *Pseudobulbs* 2-8.5 cm long, fusiform, often bracteate at the base. *Leaves* 10-12 x 1.5-2 cm, narrowly elliptic, acute, short petioles. *Raceme* several from the joint of the rhizome, shorter than leaves, few flowered; *peduncle* short; *floral bract* broadly ovate, 0.3 x 0.2 cm, acute. *Flowers* greenish. *Sepals* subequal, broadly ovate, blunt, very concave. *Petals* broadly elliptic, obtuse, shorter than the sepals. *Lip* oblong, concave, gibbous near the base, the apex somewhat narrowed, corrugately trilobulate. *Column* rather broadly winged in its upper half. *Capsule* 0.5-0.9 cm long.

Phenology-June-August.

Locality- Kuwapani 1900m, Tashigawn 1950m, D. Karkee, 808 (KATH & TUCH).

Distribution- Nepal (CE 500-2100 m), NE. India (Sikkim & Nagaland) and Bhutan.

34. Peristylus Bl.

Peristylus nematocaulon (Hook. f.) M. L. Banerji & Pradhan, Banerji & P. Pradhan, Orchid. Nep. Hima.106(1984); Rajbhandari and Dahal, orch. Nep. Check. 103 (2004).

Platanthera juncea (King & Pantling) Kraenzl., Orchid. Gen. Sp. Pl.:1:942 (1901).

Terrestrial herb. Plants about 30 cm high. *Leaf* solitary, near the base of the stem, 4-5 x 2-2.5 cm. *Inflorescence* 16-23 cm long; *spike* few flowered, 7-10 cm long; *floral bract* equal or longer than ovary. *Flowers* 2-3 cm long. *Sepals* ovate-lanceolate, acute, dorsal sepal broader than laterals pair; lateral pair narrower than dorsal, spreading. *Petals* linear-oblong, tapering to the slightly incurved apex. *Lip* as long as the sepals, subacute, quite entire and ovate-lanceolate; *spur* shorter, subclavate, compressed and slightly curved. *Column* with its summit beaked.

Phenology- August-September.

Locality-Tashigawn - Khongma 3330m, Phematang 3400m.

Distribution- Nepal (C 3500 m) and India (Sikkim).

35. Platanthera L. C. Richard

Terrestrial. Root tuber. Inflorescence terminal, laxly or densely flowered. Lip spurred. Column short. Pollinia 2.

Platanthera clavigera Lindl., Gen. Sp. Orchid. Pl.: 289 (1835); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:54 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.224(2000); Rajbhandari and Dahal, orch. Nep. Check. 103 (2004).

Habenaria densa Wall. ex Lindl., Gen. Sp. Orch. Pl. : 326 (1835).

Terrestrial herb. Plant 25-60 cm high. *Leaves* 3 to 5, narrowly elliptic, 6-10 x 1.8-2 cm, acute. *Inflorescence* bearing a few bracts; *spike* short rather densely flowered; *floral bract* lanceolate, 1.0 x 0.2 cm, acuminate. *Flowers* green color. *Sepals* subequal, thick, ciliolate, elliptic-oblong, obtuse, the dorsal erect and concave, 0.25 x 0.2 cm; lateral pair narrower, 0.35 x 0.15 cm, reflexed. *Petals* 0.2 x 0.1 cm. elliptic-oblong, and oblique base and blunt apices. *Lip* 0.4 cm long, linear, obtuse, with a transverse callus at its base close to the column; *spur* clavate, 0.4 cm long, half as long as ovary, pendulous, compressed laterally. *Column* short, broad.

Phenology -July-August.

Locality –Kimathanka- Chhumsur 2450m, D. Karkee, 931(KATH).

Distribution- Nepal (WCE 2000-4600 m), India and Bhutan.

36. *Pleione* D. Don

- | | |
|---|----------------------|
| 1a Leaf solitary, flower solitary ----- | P. hookeriana |
| 1b Leaves in pair, flowers 1-2 ----- | P. praecox |

1. *Pleione hookeriana* (Lindl.) B. S. Williams, Orch.-Grow. Man. ed.6: 548 (1885); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:54 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.224(2000); Rajbhandari and Dahal, orch. Nep. Check. 104 (2004).
Coelogyne hookeriana Lindl., Fol. Orchid. Coelogyne 5: 14, no.37 (1854).

Epiphytic herb. *Pseudobulbs* ovoid, 2 -2.5 cm long, with few sheaths, not mottled. *Leaf* solitary from the base of the pseudo-bulb, 5- 6.5 x 1.5- 3 cm; petiole 2 -4 cm long. Flowering scape enveloped in tubular imbricate sheaths bearing a single flower; *floral bract* broadly obovate-elliptic. *Flowers* white with pinkish tint. *Sepals* subequal in length, spreading, elliptic-oblong, blunt; dorsal narrower than lateral pair; lateral pair broadly oblong. *Petals* as long as the sepals, oblanceolate, obtuse, spreading. *Lip* white with a large spot of yellow with dull reddish-mottling, cordate at the base, lobulate and minutely erose in its anterior, disc with 5-7 ciliate ridges from base nearly to apex. *Column* long, curved, broadly winged in its upper half, the wings widening apex.

Phenology -May-June.

Locality - Rongsong kharka 2260m, Rem Kharka 3180m.

Distribution- Nepal (CE 2300-3700 m), NE. India, Bhutan and China.

2. *Pleione praecox* (Sm.) D. Don, Prodr. Fl. Nep.:37 (1825); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:55(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.224(2000); Rajbhandari and Dahal, orch. Nep. Check. 104 (2004).
Coelogyne praecox (Sm.) Lindl., Coll. Bot.: sub t.37 (1821).

Epiphytic herb. *Pseudobulbs* 2-2.5 cm long, often shortly cylindrical, the surface mottled with brown or purple and imperfectly sheathed by loose brown fibers. *Leaves* in pair, 16-19 x 3.5-5.5 cm, elliptic or elliptic-oblong, sub acute, narrower at the base to the petiole, petiole 4 cm long; *peduncle* from the base and as long as mature pseudo-bulbs, 1-2 flowered; *floral bract* 2.3 x 0.8 cm, obovoid, very obtuse. *Flowers* large, rose colored. *Sepals* subequal, spreading oblanceolate or lanceolate; dorsal 6 x 1 cm; lateral sepals 6 x 1.2 cm. *Petals* 6.2 x 0.8 cm, spreading. *Lip* 5.8 x 4.8 cm, ovate-orbicular, without side lobes, the basal part convolute round the column; anterior part concave, the apex slightly bifid. *Column* 3.6 cm long, with a short sac at the base. **Fig no-22, Plate no-9.**

Phenology -September-November.

Locality –Chichila 1800m, Deurali 1880m, Tashigawn 2000m, D. Karkee, 897 (KATH).

Distribution- Nepal (CE 2000-2400 m), NE. India, Bhutan, Myanmar, Thailand and West China.

37. *Pteroceras* Hasskarl

Epiphyte. Stem short. Leaves few to many, broad. Inflorescence few to many flowered. Flowers small. Sepals & petals free, spreading; lateral sepals often broader than petals, adnate to the foot of column. Lip 3-lobed, mobile, spurred; lateral lobes large; mid lobe very short. Column short, stout; foot long; pollinia 2.

Pteroceras teres (Bl.) Holttum, Kew Bull. 14:271 (1960); White & Sarma, Wild. Orch. Nep.264 (2000); Rajbhandari & Dahal, Orch. Nep. Check. 104 (2004).
Sarcochilus suaveolens (Roxb.) Hook. f., Hook. f., Fl. Brit. Ind. 6(1):33 (1890).

Epiphytic herb. *Stem* pendulous, slender. *Leaves* 12-15 cm long, 3-3.1 cm in diameter, decurved, narrowly oblong, obliquely bifid the apex. *Raceme* pendulous, 20-25 cm long, many flowered; *peduncle* short and with few short broad bracts; *floral bract* minute, lanceolate. *Flowers* yellow, brown spotted, sweet-scented. *Sepals* subequal, 0.8 x 0.35 cm, narrowly ovate, blunt, the lateral pair slightly falcate. *Petals* 0.6 x 0.25 cm, oblong, subacute, slightly falcate. *Lip* 0.3 cm long, jointed to the foot of column, yellow at the base, upper is white and violate spot and dark purple tip; side lobes small, oblong; apical lobe very short. *Column* 0.2 cm long. **Fig no-23.**

Phenology –September-October.

Locality –Bumlingtar 600m, D. Karkee, 877 (KATH).

Distribution- Nepal (C), India (Sikkim & Darjeling), Bhutan, Thailand and Laos.

38. *Rhynchostylis* Bl.

Epiphyte. Stem elongate, stout. Leaves truncately or bluntly bilobed at the apex. Racemes pendulous, many flowered. Flowers brightly coloured. Sepals & petals spreading, obtuse; petals narrower than the sepals.. Lip adnate to the short foot of column. Column short, stout; pollinia 2.

Rhynchostylis retusa (L.) Blume, Bijdr.: 286, t. 49 (1825); Hook. f., Fl. Brit. Ind. 6:32(1890); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:55 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.224(2000); Rajbhandari & Dahal, Orch. Nep. Check. 104 (2004).

Epiphytic herb. *Stem* stout. *Leaves* curved, very closed together, apex bluntly bilobed. *Inflorescence* pendulous, *racemes* longer than leaves, densely flowered; *peduncle* short. *Flowers* white spotted with pink or violate, fragrant. *Sepals* lateral pair broadly ovate, 0.7 x 0.5 cm; dorsal sepal oblong, 0.8 x 0.4 cm. *Petals* elliptic, 0.7 x 0.25 cm. *Lip* concave, adnate to the short foot of column; epichile variable in size, cuneiform, entire or emarginated at the apex, purple above and white at the base; *spur* saccate, compressed. *Column* short.

Phenology –Jul-Aug.

Locality –Katléhanjyang 350m, Chewabensi 450m, D. Karkee, 718.

Distribution- Nepal (CE 1200-1500 m), India, Myanmar, Srilanka, Malaya, Vietnam, Laos, Philippines and Cambodia.

39. *Satyrium* Sw.

Terrestrial herb. Leaves large, with wide sheaths. Flowers in dense spikes. Sepals and petals sub-similar, free, spreading or reflexed. lateral spreading. Lip adnate to the base of column, broad, 2-spurred. Column terete; pollinia 2.

1a Spurs of lip long, equal or longer than 1 cm-----**S. nepalense**

1b Spurs of lip much short, less than 1 cm-----**S. nepalense** var. **ciliatum**

1. Satyrium nepalense D. Don, Prodr. Fl. Nep. 26 (1825); Hook. f., Fl. Brit. Ind. 6:168(1890); Kihara, Faun.& Flo. Nep. Himal.104(1955); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:56 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.225(2000); Rajbhandari & Dahal, Orch. Nep. Check. 104 (2004).

Terrestrial herb. Plant 23-35 cm high. *Stem* glabrous, sheathed near the base, bearing two or three leaves. *Leaves* 7-19.5 x 1.8-4 cm, base broad and sheathing. *Spike* 10-15 cm long; *floral bract* 1.1-1.5 x 0.5 cm, oblong-lanceolate, acuminate. *Flowers* rose pink, but occasionally it is pure white. *Sepals* linear-oblong, obtuse, ciliate, recurved; dorsal sepal 0.5 x 0.1cm; lateral sepals 0.6 x 0.2 cm. *Petals* 0.5 x 0.1 cm, entire, obtuse. *Lip* 0.6 x 0.8 cm, broadly oblong, hooded, strongly keeled on the back; *spurs* two, 1 cm long, longer than ovary. *Column* curved, 0.45 cm long. **Fig no.-25.**

Phenology –July-September.

Locality –Kimathanka 2450m, D. Karkee, 933 (KATH).

Distribution- Nepal (WCE 600-4600 m), India, Srilanka, W. China and N. Myanmar.

2. Satyrium nepalense var. **ciliatum** (Lindl.) Hook. f., Fl. Brit. Ind. 6(1):168 (1890); King & Pantl., Ann. Roy. Bot. Gard. Cal. 8:338, t 444 (1898); Rajbhandari & Dahal, Orch. Nep. Check. 104 (2004).

Satyrium ciliatum Lindl., Gen. Sp. Orchid. Pl.: 341 (1838).

Terrestrial herb. Plant 29-37 cm high. *Stem* glabrous, sheathed near the base, bearing two or three leaves. *Leaves* 11-15 x 2-2.3 cm, narrowly elliptic, subacute, base broad and sheathing. *Spike* 8 cm long; *floral bract* 1.2 x 1.5 - 2 x 0.7 cm, oblong-lanceolate, acuminate. *Flowers* rose-pink, but occasionally it is pure white. *Sepals* linear-oblong, obtuse, ciliate, recurve; dorsal sepal 0.5 x 0.08 cm; lateral sepals 0.6 x 0.15 cm. *Petals* 0.5 x 0.1 cm, entire, obtuse. *Lip* 0.55 x 0.6 cm, broadly oblong, hooded, strongly keeled on the back; *spurs* two, 0.3 cm long. *Column* curved. **Fig no-24.**

Phenology- September-October.

Locality- Hunggawn –Thungkocpa 3300m, D. Karkee, 929 (KATH).

Distribution- Nepal (WCE 2000-3500 m), India, Bhutan and China.

40. **Smitinandia** Holttum

Smitinandia micrantha (Lindl.) Holttum, Gard. Bull. Singapore 25: 106 (1969); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1:56 (1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.225(2000); Rajbhandari & Dahal, Orch. Nep. Check. 105 (2004).

Cleisostoma micranthum (Lindl.) King & Pantl., Ann. Roy. Bot. Gard. Cal. 8:234, t 312(1898).

Epiphytic herb. *Stem* stout *Leaves* 5-6.5 x 1.3-1.8 cm, narrowly oblong, keeled, obliquely truncate and slightly bifid. *Raceme* longer than leaves, bearing many flowers; *peduncle* and *rachis* stout; *floral bract* broad, blunt. *Flowers* numerous, white with pink spot. *Sepals* broadly ovate, obtuse, spreading; lateral sepals 0.4 x 0.25 cm; dorsal sepal 0.3 x 0.2 cm. *Petals* 0.3 x 0.1 cm, oblong, spreading. *Lip* pink or purple, as long as sepals, the base with wide blunt spur; lateral lobes small; the apical lobe oblong, convex, blunt; the edges erose, upper surface smooth. *Column* very short, with out foot.

Phenology –November-December.

Locality –Seduwa 1100m, D. Karkee, 785 (KATH).

Distribution- Nepal (C 1100 m), India, Malaya, Vietnam, Laos, Cambodia, Thailand and Malaya.

41. *Spiranthes* L. C. Richard

Terrestrial herb. Leaves linear. Flowers small, in a spiral spike. Sepals sub-equal, free or some time cohering with the petals. Lip erect, entire or 3-lobed, the base concave but nither saccate nor spurred. ve or very shortly saccate. Column short, terete; pollinia 4.

Spiranthes sinensis (Pers.) Ames, *Orchidaceae* 2: 53 (1908); Hara, Stearn & William., *Enu. Fl. Pl. Nep.* 1:56 (1978); Rajbhandari & Dahal, *Orch. Nep. Check.* 105 (2004).

Terrestrial herb. Plant 17-23 cm high. *Leaves* 5-7 x 0.6-0.8 cm, elliptic, shortly acuminate. Spike 6-12 cm long; *floral bract* ovate, 0.6 x 0.2 cm, longer than ovary. *Flowers* small, pink or white, crowded on a spiral spike. *Sepals* subequal, ovate-oblong; dorsal sepal 0.4 x 0.15 cm; lateral sepals 0.3 x 0.1 cm, obtuse. *Petals* 0.3 x 0.1 cm, linear, obtuse. *Lip* 0.3 cm long, oblong, dilated at the base and apex, the base subsaccate; apex truncate, erose. *Column* 0.1 cm long. *Capsule* 0.4-0.5 cm long. **Fig no-26.**

Phenology –Aug.-Sep.

Locality-Kimathanka 2350m, D. Karkee, 934 (KATH).

Distribution- Nepal (WCE 100-4600 m), Bhutan, India, China, Afghanistan, Japan, Myanmar, Siberia, Malaysia and Australia.

42. *Tainia* Bl.

Terrestrial herb. Leaves solitary, many nerved. Flowers rather small, dull colour. Sepals and petals sub-equal, narrow; lateral sepal falcate. Lip more or less hastately 3-lobed, the lateral lobes small, the terminal broad. Column slightly winged towards apex; pollinia 8.

Tainia minor Hook. f., Hook. f., *Fl. Brit. Ind.* 5(2): 821 (1890); King & Pantl., *Ann. Roy. Bot. Gard. Cal.* 8:102,t141(1898); Rajbhandari & Dahal, *Orch. Nep. Check.* 105 (2004).

Terrestrial herb. Rhizome stout. *Pseudobulbs* 3-4 cm long, narrowly fusiform, oblique, slightly curved, 1.5 cm apart, often covered with fibrous sheath. *Leaves* 12.5-17 x 3.5-4.5 cm, narrowly elliptic, petiole 7.5-12 cm long. *Scape* from the base of the pseudo-bulbs, erect, slender 26-40 cm long. *Racemes* bearing 6-8 flowers; *floral bract* linear, lanceolate, slightly shorter than ovary. *Capsule* 1.4-1.5 cm long, 0.4-0.5 cm in diameter. **Fig no-27.**

Phenology-July.

Locality –MudeDeurali 1880m, D. Karkee, 791(KATH).

Distribution- India (Sikkim & Calcutta).

43. *Thelasis* Bl.

Epiphyte, with few leaved pseudobulbs or with short compressed stem and leaf sheaths. Leaves narrowly oblong, flat or loriform. Flowers minute, in spikes. Sepals subequal, concave, kelled or winged. Petals narrow. Lip sessile on the base of the column, ovate or oblong. Column very short, without foot.

Thelasis longifolia Hook. f., *Fl. Brit. Ind.* 6(1): 87(1890); King & Pantl., *Ann. Roy. Bot. Gard. Cal.* 8:250,t332(1898); Banerji & Pradhan, *Orch. Nep. Himal.* 470(1984); Rajbhandari & Dahal, *Orch. Nep. Check.* 105 (2004).

Epiphytic herb. *Pseudobulbs* small, 2 cm long, conical, bearing a single leaf. *Leaf* narrowly oblong, very minutely bifid, 13 x 1.8 cm. *Scape* from the developing pseudo-bulbs, 21 cm long; *raceme* 6 cm long; *floral bract* broadly ovate, acute, much shorter than ovary. *Flowers* numerous but not crowded. *Sepals* without keels, the lateral pair ovate, blunt, the dorsal longer and narrower. *Petals* narrowly ovate, subacute. *Lip* elliptic blunt, minutely bifid at the apex, without side lobes, somewhat thickened in the middle. *Column* tapering to the apex.

Phenology -July-August.

Locality –Num 900m, D. Karkee, 944 (KATH).

Distribution- Nepal (CE 1100 m) and India (Sikkim).

44. *Thunia* Rchb. f.

Thunia alba (Lindl.) Rchb. f., Bot. Zeitung (Berlin)10: 764 (1852); Kihara, Fauna.& Flo. Nep. Himal.104(1955); Hara, Stearn & William., Enu. Fl. Pl. Nep. 1: 57(1978); Press, Shrestha & Sutton, Ann. Check. Fl. Pl. Nep.225(2000); Rajbhandari & Dahal, Orch. Nep. Check. 105 (2004).

Phajus albus Lindl., Pl. Asiat. Rar. 2: 85 t. 198 (1831).

Herb. *Stem* erect, 28 cm high. *Leaves* numerous, 9-18 x 1.5-2.5 cm, acuminate, sessile. *Raceme* terminal, dropping, 4-6 flowered; *peduncle* short; *floral bract* large, 3.5-6 x 1.2-2 cm, cymbiform, acute. *Flowers* 6 cm long, white. *Sepals* 6.5 x 1.5 cm, subequal, narrowly oblong, acute. *Petals* 6.5 x 1.2 cm, acute. *Lip* 5 x 3.5 cm, broadly oblong-pandurate when spread out, *spur* 1.5 cm long, white or yellow with purple or orange vein, the lower half convolute into a tube, the upper surface seven to nine dentate ridge. *Column* 2.7 cm long, slightly winged, with very short foot. *Capsule* 2 cm long. **Fig no-28.**

Phenology -June-Aug.

Locality –Facsinda 600m, Yakuwa 1100m, Num 1200m, D. Karkee, 941(KATH).

Distribution- Nepal (CE 500-1700 m), NE. India and Myanmar.

45. *Trudelia* Garay

Trudelia critata (Lindl.) Senghas, Scitr. Orchideen ed. 3, 1 (19-20) : 1211 (1988); Rajbhandari & Bhattarai, Beaut. Orch. Nep. 205 (2001); Rajbhandari & Dahal, Orch. Nep. Check.105 (2004).

Vanda cristata Lindl., Gen. Sp. Orchid. Pl.: 216 (1833);

Epiphytic herb. *Stem* 15-18 cm long. *Leaves* numerous, 5-9 x 1.2-1.5 cm, unequally bilobed at the apex. *Racemes* axillary, 2-5 flowered; *floral bract* 0.3-0.5 cm long, broadly obovate. *Flowers* pale green or yellow. *Sepals* subequal, spreading, obtuse; the dorsal sepal oblong, 1.8 x 0.6 cm; lateral sepals 1.7 x 0.8 cm, ovate-oblong. *Petals* 1.8 x 0.4 cm, obtuse, sometimes slightly falcate, olive-green. *Lip* greenish white, 2.0 cm long, blotched with dark purplish-brown, adnate to the base of column, 3-lobed; the mid-lobe oblong, with two lobules, the upper surface with dark purplish-brown line five carunculate ridge; *spur* half as long as the ovary. *Column* 0.6 cm long, white. **Fig no-29, Plate no-10.**

Phenology -April-May.

Locality –Baghkhori 600m, D. Karkee, 724.

Distribution- Nepal (CE 1200-2300 m), Bhutan, NE. India and China (Tibet).

46. *Vandopsis* Pfitzer.

Vandopsis undulata (Lindl.) J. J. Sm., *Natuurk. Tijdschr. Ned.-Indie.* 72: 77 (1912); Tuyama in Hara, *Fl. E. Himal.* 452(1966); Tuyama in Hara, *Fl. E. Himal.* 2:195(1971); Hara, Stearn & William., *Enu. Fl. Pl. Nep.* 1: 58(1978); Press, Shrestha & Sutton, *Ann. Check. Fl. Pl. Nep.* 226(2000); Rajbhandari & Dahal, *Orch. Nep. Check.* 105 (2004).

Stauroopsis undulatus (Lindl.) Benth. ex Hook. f., *Fl. Brit. Ind.* 6(1): 27(1890).

Epiphytic herb. *Stem* erect. *Leaves* 7-14 x 1.5-2.5 cm, distichous, bilobed at the apex. *Inflorescence* leaf-opposed, stout, blunt, recurved; *raceme* laxly few-flowered; *floral bract* 0.6 x 0.6 cm. *Flowers* white, flushed with pink sometimes tipped with green. *Sepals* oblong-spathulate, margin wavy; lateral sepals 2 x 0.8 cm, deflexed, dorsal sepal 2 x 0.7 cm. *Petals* 1.8 x 0.6 cm. *Lip* greenish-yellow striped with pink, 3-lobed; mid-lobe concave, laterally compressed; side lobes rounded, erect. *Column* very short, stout. **Fig no-30.**

Phenology –April-May.

Locality –Tashigawn 1950m, D. Karkee, 792 (KATH).

Distribution- Nepal (CE 2100 m), NE. India and Bhutan.

47. *Zeuxine* Lind.

Terrestrial herb. Leaves membranous. Flowers small, in racemes or spikes. Sepals subequal, the dorsal concave, forming a hood with petals; the lateral pair free. Lip adnate to the base of the column, cymbiform or saccate; the apical lobe shortly clawed or sessile. Column very short.

Zeuxine flava (Wall. ex Lindl.) Trimen, *Syst. Cat. Fl. Pl.:* 90 (1885); Hook. f., *Fl. Brit. Ind.* 6:108(1890); Hara, Stearn & William., *Enu. Fl. Pl. Nep.* 1: 58(1978); Banerji & Pradhan, *Orch. Nep. Hima.* 168(1984); Press, Shrestha & Sutton, *Ann. Check. Fl. Pl. Nep.* 226(2000); Rajbhandari & Dahal, *Orch. Nep. Check.* 106 (2004).

Terrestrial herb. Plant 9-18 cm high. *Stem* with sheaths at the base. *Leaves* three or four, 1-2.5 x 0.7-1.2 cm, ovate or ovate-lanceolate. *Peduncle* pubescent, bearing linear lanceolate bracts; *raceme* much shorter than peduncle, sparsely flowered; *floral bract* lanceolate, 0.15 cm long. *Flowers* 0.5 cm long. *Sepals* unequal, ovate-oblong, little lax hair; dorsal sepal large, concave; lateral pair rather smaller. *Petals* narrowerly oblong-elliptic. *Lip* longer than sepals, cymbiform at the base, anterior lobes with two terminal lobules. *Column* short, stout, curved apex. capsule 0.9- 1.1 cm long.

Phenology -April-May.

Locality –Tashigawn 1950m, D. Karkee, 793(KATH).

Distribution- Nepal (CE 1200-2300 m), India Srilanka Myanmar and Malaysia.

4.3 Orchids flora in Makalu-Barun National Park

During the exploration in Makalu-Barun National Park (1998-99), 107 species of orchids belonging to 47 genera were recorded (**Table 10**). It was observed that most of the epiphytic orchids (74 species) were on trunk and bark of the trees. The epiphytic orchids were associated with tall and small tree rather than shrubs, although there were no specific hosts for the orchids species. During the observation, it was noted that association of orchids species was poor with Jhuse bar (*Ficus*) and *Tetracentron sinensis*. It was due to smooth bark, because 'Smooth barked or dense-foliaged tree are usually unsuitable for orchids of any kind (Macmillan, 1989).

Acampe was abundantly found only in Tumling tar and Faksinda (550m) sectors. *Dendrobium densiflorum* was only recorded from Num (900m). *Cymbidium longifolium* was common from Bhotebash to Tashigawn. *Eria stricta* present in Chandanpur-Manebhanjyang (1000-1100m) and Arun river-Num (900-1200m). *Thunia alba* was very common as lithophytes rather than epiphyte from Faksinda (550m) to Gola (1200m).

Tainia minar was recorded in Deurali (1900m) and Tashigawn (1950m). *Oberonia falcata* and *Eria spicata* were very much common in most of localities. *Clisostoma simondii* and *Pteroceras teres* were in salforest of Bumblingtar (600m). Terrestrial orchids such as *Satyrium nepalense*, *Platanthera clavigera*, *Goodyera repens* and *Herminium lanaceum* were found only in Chepuwa sector. *Dendrobium denudans* was very common from Faksinda (500m) to Hatiya (1500 m).

It was noted that *Oberonia parvula* subsp. *arunense* and *Tainia minor* were collected first time in Nepal, after comparing available literatures such as D. Don (1825); J. F. Duthie (1906); H. Kihara (1952-53); H. Hara (1966, 1971 & 1975); Bulletins of Department of Medicinal Plant; 1967, 1969, 1970, 1973, 1974, 1976, 1976, 1994, 2001; Hara *et al.* (1978); Banerji and Thapa (1978); Roy Lancaster (1981); Banerji and Pradhan (1984); Press *et al.* (2000); K. White and B. Sharma (2000); K. R. Rajbhndari and S. Bhattra (2001). *Oberonia parvula* subsp. *arunense* is yet to be validly described.

4.4 Distribution of orchids in different sectors

Study of species distribution of orchids in MBNP was carried out in two ways. First on the basis of localities (**Table 3**) and second on the basis of altitudinal range. There was more than 30 localities altitude of which range from 350 m (Katile bhangjyang) to 2475 m (Uttisedanda) in Seduwa sector and from 550 m (Faksinda) to 3550 m (Hunghung danda) in Hatiya sector. It was observed that few very common species recorded in one sector were not recorded in other sectors (**Table 3**) due to variation in precipitation and monsoon (Table 1). It was also noted that maximum number epiphytic orchids were recorded in Num (subtropical region) sector (**Table 5**). Subtropical region comprised of highest number of orchid species in Nepal (Dahal, 1994). Maximum number of terrestrial orchids were recorded in Chepuwa sector due to high elevation (**Table 7**).

4.4.1 Orchids in Tumblingtar sector

Tumling tar sector ranged from 350m to 1100m and included more than 9 localities. The sector comprised of 24 species (**Table 4**). Among these, 18 species were epiphyte and 6 were terrestrial. Tree species like *Castanopsis indica*, *Mangifera indica*, *Shorea robusta*, *Schima wallichii*, *Quercus lamellosa* and *terminalia tomentosa* were found associated in this sector.

Table 4, Orchids distribution in Tumlingtar sector

Species		Distribution					
		Katle Tumlingtar (350 -450) m	Chewabensi Kattikeghat (450 - 500) m	Bagkhor (500 -850) m	Bumlingtar (500 - 650) m	Chandanpur (850 - 1000) m	Mane Khandbari. 1000 - 1300) m
1.	<i>Acampe papillosa</i> (Lindl.) Lindl.	+	+	+			
2.	<i>Cleisostoma aspersum</i> (Rehb. f.) Garay						+
3.	<i>Cleisostoma filiforme</i> (Lindl.) Garay	+		+			
4.	<i>Cleisostoma simondii</i> (Gagnap.) Seidenf.				+		
5.	<i>Cymbidium aloifolium</i> (L.) Sw.	+	+	+		+	+
6.	<i>Dendrobium anceps</i> Sw.	+	+				
7.	<i>Dendrobium heterocarpum</i> Lindl.			+		+	
8.	<i>Dendrobium moschatum</i> Sw.			+		+	
9.	<i>Dendrobium nobile</i> Lindl.			+			
10.	<i>Eria bractescens</i> Lindl			+			
11.	<i>Eria spicata</i> (D. Don) Hand-Mazz.		+	+			
12.	<i>Eria stricta</i> Lindl.					+	
13.	<i>Geodorum densiflorum</i> (Lam.) Schltr.				+		
14.	<i>Habenaria plantaginea</i> Lindl.	+			+		
15.	<i>Liparis deflexa</i> Hook. f.				+		
16.	<i>Liparis nervosa</i> (Thunb.) Lindl.				+		
17.	<i>Luisea zeylanica</i> Lindl.	+	+	+			
18.	<i>Malaxis acuminata</i> D. Don				+		
19.	<i>Malaxis ophrydis</i> (Koenig) Ormerod					+	
20.	<i>Oberonia falcata</i> King & Pantl.					+	
21.	<i>Pecteilis susannae</i> (L.) Raf.	+					
22.	<i>Pteroceras teres</i> (Blume) Hoitt.				+		
23.	<i>Rhynchostylis retusa</i> (L.) Bl.	+	+				
24.	<i>Trudelia cristata</i> (Lindl.) Sengh.			+			

4.4.2 Orchids in Num sector

Num sector ranged from 1100 m to 1950 m included more than 7 localities and comprised of 56 species (**Table 5**). Among these, 50 species were epiphyte and 6 were terrestrial. The dominant trees in forest of Chichila were *Castanopsis hystrix*, *Castanopsis tribuloides*, *Daphniphyllum himalense*, *Rhododendron arboreum*, *Eurya accuminata*, *Prunus cerasoides*, *Lyonia ovalifolia* and *Quercus semecarpifolia* etc.

Table 5, Orchids distribution in Num Sector

Species		Distribution					
		Bhotabash Gogone (1300 - 1600) m	Kuwapani (1600 - 1800) m	Chichila (1850 - 1950) m	Deurali (1950 - 2025) m	Mude (1700 - 2025) m	Num (900 -1500) m
1.	<i>Agrostophyllum callosum</i> Rehb. f.		+	+			
2.	<i>Anthogonium gracile</i> Lindl.			+			
3.	<i>Aerides multiflorum</i> Roxb.						+
4.	<i>Bulbophyllum affine</i> Lindl.			+			+

5.	<i>Bulbophyllum leopardinum</i> (Wall.) Lindl.	+	+	+			
6.	<i>Bulbophyllum scabratum</i> Rchb. f.			+			
7.	<i>Calanthe alpina</i> Hook. f. ex Lindl.			+			
8.	<i>Calanthe puberula</i> Lindl.			+			
9.	<i>Coelogyne corymbosa</i> Lindl.		+	+			
10.	<i>Coelogyne cristata</i> Lindl.		+	+		+	
11.	<i>Coelogyne fuscescens</i> Lindl.					+	+
12.	<i>Coelogyne longipes</i> Lindl.				+	+	
13.	<i>Coelogyne nitida</i> (Wall. ex D. Don) Lindl.					+	
14.	<i>Coelogyne prolifera</i> Lindl.					+	+
15.	<i>Coelogyne stricta</i> (D. Don) Schltr.				+	+	+
16.	<i>Cryptochilus lutea</i> Lindl.			+			
17.	<i>Cymbidium erythraeum</i> Lindl.			+		+	
18.	<i>Cymbidium longifolium</i> D. Don		+	+	+	+	
19.	<i>Cymbidium gammieanum</i> King & Pantl.				+		
20.	<i>Cymbidium hookerianum</i> Rchb. f.				+		
21.	<i>Dendrobium aphyllum</i> (Rxb.) C.E.C Fisch.			+			
22.	<i>Dendrobium densiflorum</i> Lindl.						+
23.	<i>Dendrobium heterocarpum</i> Lindl.						+
24.	<i>Dendrobium longicornu</i> Lindl.		+	+	+		
25.	<i>Epigeneium fuscescens</i> (Griff.) Summerh.			+	+		
26.	<i>Eria coronaria</i> (Lindl.) Rchb. f.		+	+			
27.	<i>Eria excavata</i> Lindl.					+	
28.	<i>Eria muscicola</i> (Lindl.) Lindl.						+
29.	<i>Eria paniculata</i> Lindl.						+
30.	<i>Eria spicata</i> (D. Don) Hand-Mazz.	+	+	+	+		+
31.	<i>Eria stricta</i> Lindl.						+
32.	<i>Gastrochilus acutifolius</i> (Lindl.) Kuntze			+			
33.	<i>Gastrochilus calceolaris</i> (Buch.-Ham. ex Sm.) D. Don		+	+		+	
34.	<i>Gastrochilus distichus</i> (Lindl.) Kuntze			+	+		
35.	<i>Goodyera foliosa</i> (Lindl.) Benth. ex C. B. Clarke			+			
36.	<i>Ione bicolor</i> (Lindl.) Lindl.			+			
37.	<i>Liparis bootanensis</i> Griff.					+	+
38.	<i>Liparis resupinata</i> Ridl.			+	+		
39.	<i>Malaxis acuminata</i> D. Don			+			
40.	<i>Malaxis muscifera</i> (Lindl.) O. Kuntze.			+			
41.	<i>Oberonia acaulis</i> Griff.			+			+
42.	<i>Oberonia falcata</i> King & Pantl.	+					
43.	<i>Oberonia pachyrachis</i> Rchb. f. ex Hook. f.			+			
44.	<i>Ornithochilus diformis</i> (Wall. ex Lindl.) Schltr.					+	
45.	<i>Otochilus albus</i> Lindl.	+	+	+	+		
46.	<i>Otochilus fuscus</i> Lindl.	+			+	+	+
47.	<i>Otochilus lancilabius</i> Seidenf.			+			
48.	<i>Panisea demissa</i> (D. Don) Pfitzer					+	
49.	<i>Phalaenopsis taenialis</i> (Lindl.) Chri.&Pra.	+					
50.	<i>Pholidota imbricata</i> Hook.					+	
51.	<i>Pholidota protracta</i> Hook. f.		+				
52.	<i>Pleione praecox</i> (Sm.) D. Don			+	+		
53.	<i>Cleisostoma aspersum</i> (Rehb. f.) Garay						+
54.	<i>Tainia minor</i> Hook. f.				+		
55.	<i>Thelasis longifolia</i> Hook. f.						+
56.	<i>Thunia alba</i> Rchb. f.						+

4.4.3 Orchids in Seduwa sector

Seduwa sector ranged from 900m (Arun bridge) to 2475m (Uttisedanda), included 3 localities and comprised of 30 species (**Table 6**). Among these, 26 species were epiphyte, 4 were

terrestrial and few species were lithophyte. The trees found in the forest of Tashigawn were *Castanopsis hystrix*, *Castanopsis tribuloides*, *Daphniphyllum himalense*, *Rhododendron arboreum*, *Eurya accuminata*, *Prunus cerasoides*, *Lyonia ovalifolia*, *Quercus semecarpifolia* and *Alnus nepalensis* etc.

Table 6, Orchids distribution in Seduwa Sector

	Species	Distribution		
		Seduwa (900 - 1600) m	Tashigawn (1600 - 2000) m	Uttisedanda (1900 - 2475)m
1.	<i>Agrostophyllum callosum</i> Rchb. f.		+	
2.	<i>Bulbophyllum reptans</i> (Lindl.) Lindl.		+	
3.	<i>Bulbophyllum leopardinum</i> (Wall.) Lindl.		+	+
4.	<i>Bulbophyllum sterile</i> (Lamarck) Suresh		+	
5.	<i>Calanthe trulliformis</i> King & Pantl.			+
6.	<i>Coelogyne corymbosa</i> Lindl		+	+
7.	<i>Coelogyne fuscens</i> Lindl.		+	
8.	<i>Coelogyne longipes</i> Lindl.		+	
9.	<i>Cymbidium longifolium</i> D. Don		+	+
10.	<i>Cymbidium hakerianum</i> Rchb. f.		+	+
11.	<i>Eria coronaria</i> (Lindl) Rchb. f.		+	
12.	<i>Eria graminifolia</i> Lindl.		+	+
13.	<i>Eria spicata</i> (D. Don) Hand-Mazz.		+	+
14.	<i>Gastrochilus calceolaris</i> (Buch.-Ham. ex Sm.) D.Don		+	
15.	<i>Gastrochilus distichus</i> (Lindl.) O.Kuntze		+	
16.	<i>Liparis resupinata</i> Ridl.		+	
17.	<i>Oberonia acaulis</i> Griff.	+	+	
18.	<i>Oberonia caulescens</i> Lindl.	+		
19.	<i>Oberonia falcata</i> King. & Pantl.	+	+	
20.	<i>Oberonia pachyrachis</i> Rchb. f.		+	
21.	<i>Oberonia parvula</i> k. & P. subsp. arunense	+		
22.	<i>Peristylus nematocaulon</i> (Hook. f.) Banerji & Pradhan		+	
23.	<i>Pholidota imbricata</i> Hook.	+		
24.	<i>Pholidota protracta</i> Hook.fil		+	
25.	<i>Pleione praecox</i> (Sm.) D.Don		+	+
26.	<i>Smitinandia micrantha</i> (Lindl) Holttium	+		
27.	<i>Tainia minor</i> Hook. f.		+	
28.	<i>Thunia alba</i> Reichb.	+		
29.	<i>Vandopsis undulata</i> (Lindl.) J.J Smith.		+	
30.	<i>Zeuxine flava</i> (Wall. ex Lindl.) Trimen		+	

4.4.4 Orchids in Chepuwa sector

Chepuwa sector included 12 different localities ranged from 550 m (Faksinda) to 3550 m (Hung-hung danda) comprised of 26 species (**Table 7**). Among these, 14 species were epiphyte, 10 were terrestrial and 2 were lithophyte.

Table 7, Orchids distribution in Chepuwa sector

Species	Distribution						
	Facsinda Hedangna (600 -1200) m	Yakuwa Gola (1100 - 1250)m	Hatia (1200 - 1800) m mm	Hunggaon (2250-3550) m	Thungkocpa Kimathanka (2350 - 2500)m	Khiokma Chhunsur (2000 - 2100)m	Chymtang Chepuwa (1900 - 2000)m
1. <i>Arundina graminifolia</i> (D. Don) Hochr.		+					
2. <i>Bulbophyllum sterile</i> (Lamarck) Suresh						+	
3. <i>Calanthe chloroleuca</i> Lindl.						+	+
4. <i>Calanthe mannii</i> Hook. f.							+
5. <i>Coelogyne corymbosa</i> Lindl		+	+				
6. <i>Coelogyne prolifera</i> Lindl.	+						
7. <i>Coelogyne nitida</i> (Wall. ex D. Don) Lindl.		+	+				
8. <i>Dendrobium aphyllum</i> (Roxb.) C.E.C. Fisch.	+	+					
9. <i>Dendrobium denudans</i> D.Don	+	+	+				
10. <i>Dendrobium erriflorum</i> Griff.							+
11. <i>Eria spicata</i> (D.Don) Hand-Mazz.		+	+				
12. <i>Gastrochilus dasypogon</i> (Smith) kuntze.		+	+				
13. <i>Goodyera repens</i> (L.) R. Br.				+			
14. <i>Habenaria arietina</i> Hook					+		
15. <i>Habenaria pectinata</i> (Sm.) D. Don					+		
16. <i>Herminium lanceum</i> (Thumb.) J. Vuijk.					+	+	+
17. <i>Liparis viridiflora</i> (Bl.) Lindl	+						
18. <i>Oberonia acaulis</i> Griff.		+	+				
19. <i>Oberonia falcata</i> King & Pantl.	+	+	+				
20. <i>Oberonia pachyrachis</i> Rchb. f. ex Hook. f.		+					
21. <i>Pholidota imbricata</i> Lindl.	+	+	+			+	
22. <i>Platanthera claviger</i> a Lindl.					+	+	
23. <i>Satyrium nepalense</i> D. Don				+	+		
24. <i>Satyrium nepalense</i> var. <i>ciliatum</i> (Lindl.) Hook. f.				+	+		+
25. <i>Spiranthes sinensis</i> (Pers.)Ames					+		
26. <i>Thunia alba</i> Rchb. f.	+	+	+				

4.5 Distribution of orchids in different climatic regions

Study of species distribution of orchids in MBNP was carried out in two ways. First on the basis of localities and second on the basis of altitudinal range (**Table 8**). Tropical (350 – 1000m) region comprised of 32 species, among them 25 were epiphyte and 7 species were terrestrial. Subtropical region included 14 localities and comprised of 71 species, among them 57 species were epiphytes, 14 were terrestrials and few were lithophyte. Temperate region (2000- 3000m) included 6 localities and comprised of 36 species, among them 23 were epiphyte and 13 species were terrestrial. Subalpine region (3000- 3500 m) comprised of 7 terrestrial species.

4.6 Study of herbarium specimens

Many botanist made several collection in Makalu-Barun National Park. They collected flowering plants as well as orchids from MBNP and deposited in National Herbarium and Plant Laboratories (KATH) Godawary. The orchids species based on study of herbarium specimen in KATH Godawary are also included in the list of orchid flora of MBNP (**Table 9**).

Table 9, Specimens collected from MBNP and deposited at KATH

Sn.	Species	Locality & Altitude (m.)	Collection year	Phenology
1	<i>Aerides multiflorum</i> Roxb.	Kharte, 790	1994	May-Jun.
2	<i>Calanthe brevicornu</i> Lindl.	NamcheKharka, 2180	1994	Jun-Jul.
3	<i>Calanthe chloroleuca</i> Lindl.	Chepuwa-Hunggaon, Chhumsur, 2220.	1965 1991	Apr.-May.
4	<i>Aorchis roborowskii</i> (Maxim.) Seidenf.	Khongma, 3630	1986	Aug-Sep.
5	<i>Cleisostoma filiforme</i> (Lindl.) Garay	Tumlingtar, 660	1986	Aug-Sep.
6	<i>Coelogyne corymbosa</i> Lindl.	ChakelaKharka, 2500	1994	Jun-Jul.
7	<i>Coelogyne fuscescens</i> Lindl.	Above Num, 1890.	1990	Oct.-Nov.
8	<i>Coelogyne prolifera</i> Lindl.	Lamauwa-Besinda, 1300	1994	Jun.
9	<i>Cologyne ovalis</i> Lindl.	Chitre-Ramite, 2000	1994	Sep. -Oct.
10	<i>Cryptochilus lutea</i> Lindl.	Chitre-Ramite, 2160	1994	Jun-Jul.
11	<i>Cymbidium aloifolium</i> (L.) Sw.	Manebhnjyang-Chandanpur, 840	1994	Jun.
12	<i>Dendrobium heterocarpum</i> Lindl.	Num Jungle, 1600	1977	Jul.-Aug.
13	<i>Dendrobium aphyllum</i> (Roxb.) C.E.C. Fisch.	Above Siswatar, 750 Yakuwa khola, 1010	1994	Apr. -Jun.
14	<i>Dendrobium longicornu</i> Lindl.	Arunvalley-Khandbari, 1036		Sep.-Nov.
15	<i>Diphylax urceolata</i> (C.B.Clarke) Hook. f.	Phematang, 3270	1986	Sep-Oct.
16	<i>Aorchis spathulata</i> (Lindl.) Vermeulen	TiwaGairi-wana Danda, 3740	1994	Jun-Jul.
17	<i>Galeola lindleyana</i> (Hook.f. & Thomson) Rchb.	Rupsa village, 2020	1986	Aug-Sep.
18	<i>Goodyera repens</i> (L.) R. Br.	Phematang, 3490	1986	Aug-Sep.
19	<i>Habenaria plantaginea</i> Lindl.	Tumlingtar, 1000 ft.	1981	Sep.-Oct.
20	<i>Liparis resupinata</i> Ridl.	Chichila-Hurure, 1950.	1990	Nov.-Dec.
21	<i>Oberonia acaulis</i> Griff.	Below Num, 2000 ft.	1981	Oct.-Nov.
22	<i>Otochilus fuscus</i> Lindl.	Above Num, 1660	1990	Dec.-Jan.
23	<i>Pectilis susannae</i> (L.) Raf.	Tumlingtar, 420	1986	Aug-Sep.
24	<i>Pholidota articulata</i> Lindl.	Lamauwa-Besinda, 1290	1994	May-Jun.
25	<i>Pholidota imbricata</i> Hook.	Ramitedandagaon, 1740	1994	Jun.-Jul.
26	<i>Peristylus nematocaulon</i> (Hook. f.) Banerji & Pradhan	Tashigoan-Khongma, 3330	1986	fruit, In Sep.
27	<i>Pleione praecox</i> (Sm.) D. Don	Hure-hurure, 1980	1986	Sep.-Oct.
28	<i>Pleione hookeriana</i> (Lindl.) B.S. Williams	Above Rongsong Kharka, 2260	1994	Jun.
29	<i>Satyrium nepalense</i> var. <i>ciliatum</i> (Lindl.) Hook. f.	Hile Kharka, 2950.	1986	Sep-Oct.
30	<i>Satyrium nepalense</i> D. Don	Chepuwa, 2100, Hure-Hurure, 2120.	1977, 1986	Jul.- Sep.
31	<i>Spiranthes sinensis</i> (Pers.) Ames	Hure-Hurure, 2100	1986	Aug-Sep.

5. CONCLUSION AND RECOMMENDATION

The study in Makalu-Barun National Park (1998-99) on “**Orchid Flora of Makalu-Barun National Park, Eastern Nepal**” indicate that the area is rich in Orchid diversity, which comprised of 107 species belong to 47 genera. It was observed that most of the epiphytic orchids (74 species) were on trunk and bark of the trees. The epiphytic orchids were associated with tall and small trees rather than shrubs, although there was no specific host for the orchids species. It was noted that *Oberonia parvula* subsp. *arunense* and *Tainia minor* were found first time from this area.

The maximum number species was represented by genera *Dendrobium* (9 species) followed by *Coelogyne* & *Eria* (8 species each). *Calanthe* comprised of (6 species), *Bulbophyllum*, *Cymbidium*, *Oberonia* & *Liparis* comprised of (5 species each), *Gastrochilus* comprised of (4 species), *Habenaria*, *Malaxis*, *Pholidota* & *Otochilus* comprised of (3 species each), *Cleisostoma*, *Goodyera*, *Platanthera*, *Geodorum*, *Pleione*, & *Satyrium* comprised of (2 species each). The genera with single species are *Acampe*, *Aerides*, *Agrostophyllum*, *Anthogonium*, *Arundina*, *Chusua*, *Cryptochilus*, *Diphylax*, *Epigenium*, *Galearis*, *Galeola*, *Herminium*, *Ione*, *Luisia*, *Ornithochilus*, *Panisea*, *Pecteilis*, *Phalaenopsis*, *Pteroceras*, *Rynchotylis*, *Smitinandia*, *Stereochilus*, *Spiranthes*, *Thelasis*, *Tainia*, *Thunia*, *Vanda*, *Vandopsis* and *Zeuxine*.

Maximum number of epiphytic orchids were found in forest of Chichila, Deurali and Tashigoan. it was noted that association of orchids species was poor with trees having smooth bark that is usually unsuitable for orchids of any kind (Macmillan, 1989). *Acampe* was abundantly found only in Tumling tar and Faksinda (550m) sectors. *Dendrobium densiflorum* was only recorded from Num 900m. *Cymbidium longifolium* was common from Bhotebash to Tashigawn. *Eria stricta* present in Chandanpur-Manebhanjyang (1000-1100m) and Arun river-Num (900-1200m). *Oberonia falcata* and *Eria spicata* were very much common in most of localities. *Clisostoma simondii* and *Pteroceras teres* were recorded only in Bumblingtar (600m.). *Dendrobium denudans* was very common from Facsinda (500m) to Hatiya (1500 m). *Dendrobium eriiflorum*, *Dendrobium denudans*, *Bulbophyllum leopardinum* and *Thunia alba* were observed as lithophytes also. *Thunia alba* was observed very common in Faksinda (550m) and Gola (1200m). Species richness of orchids was found rich on the basis of analysis of status of orchids in subtropical and temperate regions.

Tropical region (350-1000m) comprised of 32 species among them 25 were epiphyte. Subtropical region included 14 localities and comprised of 71 species, among them 57 species were epiphytes and few were lithophyte. Temperate region (2000-3000m) included 6 localities and comprised of 36 species, among these 23 species are epiphyte. Sub alpine region (3000-3500m) comprised of 7 terrestrial species.

Among 31 terrestrial species, Tropical Zone comprised of 7 species. Subtropical Zone comprised of 14 species. Temperate zone comprised of 13 species. Subalpine Zone comprised of 7 species.

In total, 29 species belong to 19 genera were recorded as medicinal orchids, 9 species belong to 7 genera found rarely and only 8 species were recorded as very common species in the studied area. Orchids found outside National Park are rapidly depleting from natural habitat due to deforestation. Local people are cutting trees for fire wood and *Ammomum subulatum* cultivation. People and farmers considered orchids as less valuable plants. Awareness on value of orchid has been found increasing very slowly. For the conservation following suggestions are recommended.

Conservation station: Conservation and sustainable use of orchids in their natural habitats with participation of local people or communities will be fruitful. Rich diversity area like Chhichla, Deaurali, Num and Tashigawn should be developed as *in-situ* conservation area for the orchids conservation. Collection of orchids species from this area for any purpose should be stopped.

Awareness programme : Awareness programme should be conducted in Makalu-Barun National Park. Local people or communities should be involved for the conservation of orchids diversity.

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Table 3, Distribution of Orchids, their habitat and status in MBNP

Name of Species	Habitat	Status	Sectors				
			Tumlingtar	Num	Sedtuwa	Chepuwa	
1	<i>Acampe papillosa</i> (Lindl.) Lindl.	Epiphyte	V.com.	+			
2	<i>Aerides multiflorum</i> Roxb.	Epiphyte	Occa		+		
3	<i>Agrostophyllum callosum</i> Rchb. f.	Terrestrial	V.com.		+	+	
4	<i>Anthogonium gracile</i> Lindl.	Terrestrial	Occa.		+		
5	<i>Aorchis roborowskii</i> (Maxim.) Seidenf.	Terrestrial					
6	<i>Aorchis spathulata</i> (Lindl.) Vermeulen	Terrestrial					
7	<i>Arundina graminifolia</i> (D. Don) Hochr.	Terrestrial	Occa				+
8	<i>Bulbophyllum affine</i> Lindl.	Epiphyte	V.com		+		
9	<i>Bulbophyllum sterile</i> (Lamarck) Suresh	Epiphyte	Com.			+	+
10	<i>Bulbophyllum leopardinum</i> (Wall.) Lindl.	Epiphyte	Com		+	+	
11	<i>Bulbophyllum reptans</i> (Lindl.) Lindl.	Epiphyte	Occa.			+	
12	<i>Bulbophyllum scabratum</i> Rchb. f.	Epiphyte	Occa		+		
13	<i>Calanthe alpina</i> Hook. f. ex Lindl.	Terrestrial	Com.		+		
14	<i>Clanthe brevicornu</i> Lindl.	Terrestrial					
15	<i>Calanthe chloroleuca</i> Lindl.	Terrestrial					+
16	<i>Calanthe manni</i> Hook. f.	Terrestrial	Occa				+
17	<i>Clanthe puberula</i> Lindl.	Terrestrial	Occa.		+		
18	<i>Calanthe trulliformis</i> King & Pantl.	Terrestrial	Occa,			+	
19	<i>Cleisostoma aspersum</i> (Rehb. f.) Garay	Epiphyte	Occa	+	+		
20	<i>Cleisostoma filiforme</i> (Lindl.) Garay.	Epiphyte		+			
21	<i>Cleisostoma simondii</i> (Gagnep.) Seidenf.	Epiphyte	Rare	+			
22	<i>Coelogyne corymbosa</i> Lindl	Epiphyte	Occa		+	+	+
23	<i>Coelogyne cristata.</i> Lindl.	Epiphyte	V.com		+		
24	<i>Coelogyne fuscescens</i> Lindl.	Epiphyte	Com.		+	+	
25	<i>Coelogyne longipes</i> Lindl.	Epiphyte	Com.		+	+	
26	<i>Coelogyne nitida</i> (Wall. ex D. Don) Lindl.	Epiphyte	Occa.		+		+
27	<i>Coelogyne ovalis</i> Lindl.	Epiphyte					
28	<i>Coelogyne prolifera</i> Lindl.	Epiphyte	V.com		+		+
29	<i>Coelogyne stricta</i> (D. Don) Schltr.	Epiphyte	V.com.		+		
30	<i>Cryptochilus lutea</i> Lindl.	Epiphyte	Occa		+		
31	<i>Cymbidium aloifolium</i> (L.) Sw.	Epiphyte	Com.	+			
32	<i>Cymbidium erythraeum</i> Lindl.	Epiphyte	Occa		+		
33	<i>Cymbidium longifolium</i> D. Don	Epiphyte	Com.		+	+	
34	<i>Cymbidium gammieanum</i> King & Pantl.	Epiphyte	Occa		+		
35	<i>Cymbidium hookerianum</i> Rchb. f.	Epiphyte	Occa.		+	+	
36	<i>Dendrobium anceps</i> Sw.	Epiphyte	Com	+			
37	<i>Dendrobium aphyllum</i> (Roxb.) C. E. C. Fisch.	Epiphyte	Occa		+		+
38	<i>Dendrobium densiflorum</i> Lindl.	Epiphyte	Rare		+		
39	<i>Dendrobium denudans</i> D. Don.	Epiphyte	Com.				+
40	<i>Dendrobium eriiflorum</i> Griff.	Litho.	Rare				+

Table 3, Distribution of Orchids, their habitat and status in MBNP

41	<i>Dendrobium heterocarpum</i> Lindl.	Epiphyte	Occa,	+	+		
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42	<i>Dendrobium longicornu</i> Lindl.	Epiphyte	V.com.		+		
43	<i>Dendrobium moschatum</i> (Buch.-Ham.) Sw.	Epiphyte	Occa	+			
44	<i>Dendrobium nobile</i> Lindl.	Epiphyte	Rare	+			
45	<i>Diphylax urceolata</i> (C.B. Clarke.) Hook. f.	Terrestrial					
46	<i>Epigenium fuscescens</i> (Griff.) Summerh.	Epiphyte	Com		+		
47	<i>Eria bractescens</i> Lindl.	Epiphyte	Occa.	+			
48	<i>Eria coronaria</i> (Lindl.) Rchb. f.	Epiphyte	Com.		+	+	
49	<i>Eria excavata</i> Lindl.	Epiphyte	Occa,		+		
50	<i>Eria graminifolia</i> Lindl.	Epiphyte	Com.			+	
51	<i>Eria muscicola</i> (Lindl.) Lindl.	Epiphyte	Rare		+		
52	<i>Eria paniculata</i> Lindl.	Epiphyte	Occa.		+		
53	<i>Eria spicata</i> (D. Don) Hand -Mazz.	Epiphyte	Com.	+	+	+	+
54	<i>Eria stricta</i> Lindl.	Epiphyte	Occa	+	+		
55	<i>Galeola lindleyana</i> (H. f. & Thom.) Rchb.f.	Sprophyte					
56	<i>Gastrochilus acutifolius</i> (Lindl.) Kuntze	Epiphyte	Occa.		+		
57	<i>Gastrochilus calceolaris</i> (Buch.-Ham. ex Sm.) D.Don	Epiphyte	Occa		+	+	
58	<i>Gastrochilus dasypogon</i> (Sm.) Kuntze	Epiphyte	Occa				+
59	<i>Gastrochilus distichus</i> (Lindl.) Kuntze	Epiphyte	Occa		+	+	
60	<i>Geodorum densiflorum</i> (Lam.) Schltr.	Terrestrial	Occa	+			
61	<i>Goodyera foliosa</i> (Lindl.) Benth. ex C. B. Clarke	Terrestrial	Occa		+		
62	<i>Goodyera repens</i> (L.) R. Br.	Terrestrial	Rare				+
63	<i>Habenaria arietina</i> Hook. f.	Terrestrial	Occa				+
64	<i>Habenaria pectinata</i> (Sm.) D. Don	Terrestrial	Occa				+
65	<i>Habenaria plantaginea</i> Lindl.	Terrestrial	Occa	+			
66	<i>Herminium lanceum</i> (Thunb.) Vuijk.	Terrestrial	Occa				+
67	<i>Ione bicolor</i> (Lindl.) Lindl.	Epiphyte	Occa		+		
68	<i>Liparis bootanensis</i> Griff.	Epiphyte	Occa		+		
69	<i>Liparis deflexa</i> Hook. f.	Terrestrial	Occa	+			
70	<i>Liparis nervosa</i> (Thunb.) Lindl.	Terrestrial	Occa	+			
71	<i>Liparis resupinata</i> Ridl.	Epiphyte	V.com		+	+	
72	<i>Liparis viridiflora</i> (Bl.) Lindl.	Epiphyte	Occa				+
73	<i>Luisia zeylanica</i> Lindl.	Epiphyte	Com	+			
74	<i>Malaxis acuminata</i> D. Don.	Terrestrial	Com	+	+		
75	<i>Malaxis ophrydis</i> (Koenig) Ormerod	Terrestrial	Occa	+			
76	<i>Malaxis muscifera</i> (Lindl.) Ktze.	Terrestrial	Occa		+		
77	<i>Oberonia acaulis</i> Griff.	Epiphyte	Com		+	+	+
78	<i>Oberonia caulescens</i> Lindl.	Epiphyte	Com			+	
79	<i>Oberonia falcata</i> King & Pantl.	Epiphyte	Com	+	+	+	+
80	<i>Oberonia pachyrachis</i> Rechb. f. ex Hook. f.	Epiphyte	Occa		+	+	+
81	<i>Oberonia parvula</i> k. & P. subsp. <i>arunense</i> L. Shakya & R.P. Chaudhary	Epiphyte	Rare			+	
82	<i>Ornithochilus difformis</i> (Wall. ex Lindl.) Schltr.	Epiphyte	Occa		+		
83	<i>Otochilus albus</i> Lindl.	Epiphyte	Com		+		
84	<i>Otochilus fuscus</i> Lindl.	Epiphyte	Com		+		
85	<i>Otochilus lancilabius</i> Seidenf.	Epiphyte	Com		+		

Table 3, Distribution of Orchids, their habitat and status in MBNP

86	<i>Panisea demissa</i> (D. Don) Pfitzer	Epiphyte	Rare		+		
87	<i>Pectilis susannae</i> (L.) Raf.	Terrestrial		+			
88	<i>Phaelaenopsis taenialis</i> (Lindl.) Chri.&Pra.	Epiphyte	Occa		+		

89	<i>Pholidota articulata</i> Lindl.	Epiphyte					
90	<i>Pholidota imbricata</i> Hook.	Epiphyte	Com		+	+	+
91	<i>Pholidota protracta</i> Hook. f.	Epiphyte	Com		+	+	
92	<i>Platanthera clavigera</i> Lindl.	Terrestrial	Occa				+
93	<i>Peristylus nematocaulon</i> (Hook. f.) Banerji & Pradhan	Terrestrial				+	
94	<i>Pleione hookeriana</i> (Lindl.) B.S. Williams	Epiphyte					
95	<i>Pleione praecox</i> (Sm.) D. Don	Epi / Lith.	Com		+	+	
96	<i>Pteroceras teres</i> (Blume) Holtt.	Epiphyte	Occa	+			
97	<i>Rhynchostylis retusa</i> (L.) Blume	Epiphyte	Com	+			
98	<i>Satyrium nepalense</i> var. <i>ciliatum</i> (Lindl.) Hook. f.	Terrestrial	Com				+
99	<i>Satyrium nepalense</i> D. Don	Terrestrial	Com.				+
100	<i>Smitinandia micrantha</i> (Lindl.) Holtt.	Epiphyte	Occa			+	
101	<i>Spiranthes sinensis</i> (Pers.) Ames	Terrestrial	Occa				+
102	<i>Tainia minor</i> Hook. f.	Terrestrial	Occa		+	+	
103	<i>Thelasis longifolia</i> Hook. f.	Epiphyte	Occa		+		
104	<i>Thunia alba</i> (Lindl.) Rchb.f.	Epi /Litho	Com		+	+	+
105	<i>Trudelia cristata</i> (Lindl.) Senghas	Epiphyte	Com	+			
106	<i>Vandopsis undulata</i> (Lindl) j. J. Sm.	Epiphyte	Occa			+	
107	<i>Zeuxine flava</i> (Wall. ex Lindl.) Trimen	Terrestrial	Rare			+	

Com.=Common, Occa.=Occasional., Epi.=Epiphyte, Lith.= Lithophyte.

Table 8, Orchids distribution in different climatic zones

S.n.	Species	Tropical. 350-1000m	Subtropical. 1000-2000m	Temperate. 2000-3000m	Subalpine. 3000-3500m.	Phenology
1	<i>Acampe papillosa</i> (Lindl.) Lindl.	+				Sep.- Dec.
2	<i>Aerides multiflorum</i> Roxb.	+				May. - Jul.
3	<i>Agrostophyllum callosum</i> Rchb. f.		+	+		Jun. - Jul.
4	<i>Anthogonium gracile</i> Lindl.		+			Aug. - Oct
5	<i>Aorchis roborowskii</i> (Maxim.) Seidenf.				+	Jul-Sept.
6	<i>Aorchis spathulata</i> (Lindl.) Vermeulen				+	June.-Jul.
7	<i>Arundina graminifolia</i> (D. Don) Hochr.		+			Jun.-Sep.
8	<i>Bulbophyllum affine</i> Lindl.		+			Jun. - Jul.
9	<i>Bulbophyllum sterile</i> (Lamarck) Suresh		+			Jun.-Jul.
10	<i>Bulbophyllum leopardinum</i> (Wall.) Lindl.		+			Jul.- Aug.
11	<i>Bulbophyllum reptans</i> (Lindl.) Lindl.		+			Mar. Apr.
12	<i>Buibophyllum scabratum</i> Rchb. f.		+			Apr.-May.
13	<i>Calanthe alpina</i> Hook. f. ex Lindl.		+			Jul.-Aug.
14	<i>Clanthe brevicornu</i> Lindl.			+		May.-Jul.
15	<i>Calanthe chloroleuca</i> Lindl.		+	+		Apr.-May.
16	<i>Calanthe manni</i> Hook. f.			+		Apr.-Jun.
17	<i>Calanthe trulliformis</i> King & Pantl.			+		Jul.-aug.
18	<i>Clanthe puberula</i> Lindl.		+			Jul.-Aug.
19	<i>Cleisostoma aspersum</i> (Rehb. f.) Garay	+	+			Jul.-Aug.
20	<i>Clisostoma filiforme</i> (Lindl.) Garay.	+				Jul.- Sep.
21	<i>Cleisostoma simondii</i> (Gagnep.) Seidenf.	+				Sep.-Nov.
22	<i>Coelogyne corymbosa</i> Lindl		+	+		Jun. - Jul.
23	<i>Coelogyne cristata</i> . Lindl.		+			Mar. - Apr.
24	<i>Coelogyne fuscescens</i> Lindl		+			Oct. - Dec.
25	<i>Coelogyne longipes</i> Lindl.		+	+		May.-Jun.
26	<i>Coelogyne nitida</i> (Wall. ex D. Don) Lindl.		+	+		Apr. - jun.
27	<i>Coelogyne ovalis</i> Lindl.		+	+		Oct. - Dec.
28	<i>Coelogyne prolifera</i> Lindl		+			May.-Jun.
29	<i>Coelogyne stricta</i> (D. Don) Schltr.		+			Apr. - May.
30	<i>Cryptochilus lutea</i> Lindl.		+			Jun. - Jul.
31	<i>Cymbidium aloifolium</i> (L.) Sw.	+				May - Jul.
32	<i>Cymbidium erythraeum</i> Lindl.		+			Sep- Oct.
33	<i>Cymbidium longifolium</i> D. Don		+			Sep. - Nov.
34	<i>Cymbidium gammieanum</i> King & Pantl.		+	+		Oct. - Nov.
35	<i>Cymbidium hookerianum</i> Rchb. f.		+	+		Jan.-Apr.
36	<i>Dendrobium anceps</i> Sw.	+				Apr. - May.
37	<i>Dendrobium aphyllum</i> (Roxb) C.E.C.Fisch.		+	+		Apr-Jun.
38	<i>Dendrobium densiflorum</i> Lindl.	+	+			Apr. - May.
39	<i>Dendrobium denudans</i> D. Don.	+	+			Aug.-Sep.
40	<i>Dendrobium eriiflorum</i> Griff.			+		Sep. - Oct.

Table 8, Orchids distribution in different climatic zones

41	<i>Dendrobium heterocarpum</i> Lindl.	+	+			Jul. -Aug.
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42	<i>Dendrobium longicornu</i> Lindl.		+	+		Sep. – Nov.
43	<i>Dendrobium moschatum</i> (Buch-Ham.) Sw.	+	+			Jun. - Aug.
44	<i>Dendrobium nobile</i> Lindl.	+				Apr. - May.
45	<i>Diphylax urceolata</i> (C.B.Clarke.)Hook. f.				+	Sep.-Oct.
46	<i>Epigenium fuscescens</i> (Griff) Summerh.		+	+		Jan. - Feb.
47	<i>Eria bractescens</i> Lindl.	+				Apr. - May.
48	<i>Eria coronaria</i> (Lindl.) Rchb. f.		+	+		Oct. - Nov.
49	<i>Eria excavata</i> Lindl.		+	+		May s- Jul.
50	<i>Eria graminifolia</i> Lindl.		+	+		Jun. - Jul.
51	<i>Eria muscicola</i> (Lindl.) Lindl.		+			Jun.-Jul.
52	<i>Eria paniculata</i> Lindl.	+	+			Feb.-Jun
53	<i>Eria spicata</i> (D. Don) Hand -Mazz.	+	+	+		Jun. - Aug.
54	<i>Eria stricta</i> Lindl.	+	+			Feb. - Apr.
55	<i>Galeola lindleyana</i> (Hook. f.&Thom) Rchb. f.			+		Aug. - Sep.
56	<i>Gastrochilus acutifolium</i> (Lindl.) Kuntze		+			Oct.- Dec.
57	<i>Gastrochillus calceolaris</i> (Buch.-Ham. ex Sm.) D.Don		+			Feb. - Mar.
58	<i>Gastrochilus dasypogon</i> (Sm.) Kuntze		+			Sep. - Nov.
59	<i>Gastrochilus distichus</i> (Lindl.) Kuntze		+	+		Mar.-May.
60	<i>Geodorum densiflorum</i> (Lam.) Schltr.	+				Jun.-Jul.
61	<i>Goodyera foliosa</i> (Lindl.) Benth. ex C. B. Clarke		+			Sep.-Oct.
62	<i>Goodyera repens</i> (L.) R. Br.			+	+	Sep.-Oct.
63	<i>Habenaria arietina</i> Hook. f.			+		Jul.-Sep.
64	<i>Habenaria pectinata</i> (Sm.) D. Don			+		Jul.-Aug.
65	<i>Habenaria plantaginea</i> Lindl.	+				Sep. -Oct.
66	<i>Hermidium lanceum</i> (Thunb.) Vuijk.		+	+		Jul.-Aug.
67	<i>Ione bicolor</i> (Lindl.) Lindl.		+			Oct.-Dec.
68	<i>Liparis bootanensis</i> Griff.		+			May.-Jul.
69	<i>Liparis deflexa</i> Hook. f.	+				Aug.
70	<i>Liparis nervosa</i> (Thunb.) Lindl.	+				Aug.-Sep.
71	<i>Liparis resupinata</i> Ridl.		+	+		Oct.-Dec.
72	<i>Liparis viridiflora</i> (Bl.) Lindl.	+				Sep.-Nov.
73	<i>Luisea zeylanica</i> Lindl.	+				Apr.-jun.
74	<i>Malaxis acuminata</i> D. Don.	+	+			Jun.-Aug.
75	<i>Malaxis ophrydis</i> (Koenig) Ormerod	+	+			Jun.
76	<i>Malaxis muscifera</i> (Lindl.) Ktze.		+			Jun.-Aug.
77	<i>Oberonia acaulis</i> Griff.		+			Sep.-Dec.
78	<i>Oberonia caulescens</i> (Sm.) Lindl.		+			Nov.-Dec.
79	<i>Oberonia falcata</i> King & Pantl.	+	+			Jun.-Jul.
80	<i>Oberonia pachyrachis</i> Rchb. f. ex Hook. f.		+			Nov.-Dec.
81	<i>Oberonia parvula</i> King & Pantl. subsp. <i>arunense</i>		+			Jan.-Feb.
82	<i>Ornithochilus difformis</i> (Wall. ex Lindl.) Schltr.		+			Jun.-Jul.
83	<i>Otochilus albus</i> Lindl.		+			Jun.-Jul.
84	<i>Otochilus fuscus</i> Lindl.		+	+		Oct.-Dec.
85	<i>Otochilus lancilabii</i> Seidenf.		+			Oct.-Dec.

Table 8, Orchids distribution in different climatic zones

86	<i>Panisea demissa</i> (D. Don) Pfitzer		+			Oct.-Dec.
87	<i>Pectilis susannae</i> (L.) Raf.	+				Aug - Sep.
88	<i>Phalaenopsis taenialis</i> (Lindl.) Chri. & Pra.		+			Apr.-May.
89	<i>Pholidota articulata</i> Lindl.		+			May-Jul.
90	<i>Pholidota imbricata</i> Hook.	+	+	+		Jun.-jul.

91	<i>Pholidota protracta</i> Hook. f.		+	+		Jun.-Aug.
92	<i>Platanthera clavigera</i> Lindl.			+		Jul.-Aug.
93	<i>Peristylus nematocaulon</i> (Hook. f.) Banerji & Pradhan					Aug.-Sep.
94	<i>Pleione hookeriana</i> (Lindl.) B.S. Williams			+	+	May.-Jun.
95	<i>Pleione praecox</i> (Sm.) D. Don		+	+		Sep.-Nov.
96	<i>Pteroceras teres</i> (Bl.) Holtt.	+				Sep.-Oct.
97	<i>Rhynchostylis retusa</i> (L.) Bl.	+				Jul.-Aug.
98	<i>Satyrium nepalense</i> var. <i>ciliatum</i> (Lindl.) Hook. f.		+	+	+	Sep.-Oct.
99	<i>Satyrium nepalense</i> D. Don			+	+	Jul.-Sep.
100	<i>Smitinandia micrantha</i> (Lindl.) Holtt.	+	+			Nov.-Dec.
101	<i>Spiranthes sinensis</i> (Pers.) Ames			+		Aug.-Sep.
102	<i>Tainia minor</i> Hook. f.		+	+		July
103	<i>Thelasis longifolia</i> Hook. f.	+	+			Jul.-Aug.
104	<i>Thunia alba</i> (Lindl.) Rchb. f.	+	+			Jun.-Aug.
105	<i>Trudelia cristata</i> (Lindl.) Senghas	+				Apr.-May.
106	<i>Vandopsis undulata</i> (Lindl.) J. J.Sm.		+			Apr.-May.
107	<i>Zeuxine flava</i> (Wall. ex Lindl.) Trimen		+			Apr.- May.

Table 10, Information on Orchids substratum, localities / altitude and remarks

Sn	Species	Substratum	Localities/Altitude/ m	Remark
1	<i>Acampe papillosa</i> (Lindl.) Lindl.	Ficus bengalensis	Tumlingtar, 450	Medicinal.
2	<i>Aerides multiflorum</i> Roxb.	Castanopsis indica	Num, 1000	Medicinal.
3	<i>Agrostophyllum callosum</i> Rchb. f.	Castanopsis sp	Chichila, 1950	
4	<i>Anthogonium gracile</i> Lindl.	Terrestrial	Chichila, 1900	
5	<i>Aorchis roborowskii</i> (Maxim.) Seidenf.	Terrestrial	Khongma, 3630	
6	<i>Aorchis spatulata</i> (Lindl.) Vermeulen	Terrestrial.	TiwaGairi-wana Danda, 3740	
7	<i>Arundina graminifolia</i> (D. Don) Hochr.	Terrestrial	Yakuwa, 1100	Orna./Medi.
8	<i>Bulbophyllum affine</i> Lindl.	Schima wallichii	Num,1200	
9	<i>Bulbophyllum sterile</i> (Lamarck) Suresh	Prunus sp	Tashigawn, 1800	
10	<i>Bulbophyllum leopardinum</i> (Wall.) Lindl.	Lithophyte	Tashigawn,1950	Ornamental.
11	<i>Bulbophyllum reptans</i> (Lindl.) Lindl.	Daphniphyllum	Tashigawn, 1950	Ornamental.
12	<i>Bulbophyllum scabratum</i> Rchb. f.	Castanopsis sp	Chichila ,1900	Ornamental.
13	<i>Calanthe alpina</i> Hook. f. ex Lindl.	Terrestrial	Chichila, 1900	Ornamental.
14	<i>Calanthe brevicornu</i> Lindl.	Terrestrial		Ornamental.
15	<i>Calanthe chloroleuca</i> Lindl.	Terrestrial	Chhumsur,2220m	Ornamental.
16	<i>Calanthe manni</i> Hook. f.	Terrestrial	Chhumsur, 2020 m.	Ornamental.
17	<i>Calanthe puberula</i> Lindl.	Terrestrial	Chichila, 1900 m.	Ornamental.
18	<i>Calanthe trulliformis</i> King & Pantl.	Terrestrial	Uttisedanda,2100	Ornamental.
19	<i>Cleisostoma aspersum</i> (Rehb. f.) Garay	Schima wallichii Persea sp.	Pangma,1300 Num, 900	
20	<i>Cleisostoma filiforme</i> (Lindl.) Garay.	Ficus sp	Tumlingtar, 460m.	Ornamental.
21	<i>Cleisostoma simondii</i> (Gagnep.) Seidenf.	Acacia catechu	Bumlingtar, 600m.	
22	<i>Coelogyne corymbosa</i> Lindl.	Quercus lamelosa	Uttisedanda, 2300m.	Medicinal.
23	<i>Coelogyne cristata</i> Lindl.	Ficus lacor	Bhotebas, 1600m.	Medicinal.
24	<i>Coelogyne fuscescens</i> Lindl	Castanopsis sp	Mude, 1750m.	Medicinal.
25	<i>Coelogyne longipes</i> Lindl.	Daphniphyllum	Tashigawn, 1950m. Mude,2000	Ornmental.
26	<i>Coelogyne nitida</i> (Wall. ex D. Don) Lindl.	Castanopsis sp	Mude,2025	Ornamental.
27	<i>Coelogyne ovalis</i> Lindl.		Chitre-Ramite, 2000	Medicinal.
28	<i>Coelogyne prolifera</i> Lindl.	Schima wallichii	Num, 1200	Medicinal.
29	<i>Coelogyne stricta</i> . (D. Don)Schltr.	Castanopsis sp.	Num,1800	Medicinal.
30	<i>Cryptochilus lutea</i> Lindl.	Castanopsis sp.	Chichila, 1925	Ornamental.
31	<i>Cymbidium aloifolium</i> (L.) Sw.	Lagerstroemia sp.	Chewabensi,450	Medicinal.
32	<i>Cymbidium erythraeum</i> Lindl.	Eurya acuminate	Chichila,1900	Medicinal.
33	<i>Cymbidium longifolium</i> D. Don	Castanopsis sp	Chichila,1950	Medicinal.
34	<i>Cymbidium gammieanum</i> King & Pantl.	Eurya acuminate	Deurali,2050	Ornamental.
35	<i>Cymbidium hookerianum</i> Rchb. f.	Daphniphyllum sp.	Tashigawn,2100	Ornamental.
36	<i>Dendrobium anceps</i> Sw.	Mangifera indica	Chewabensi,450	Ornamental.
37	<i>Dendrobium aphyllum</i> (Roxb.) C. E. C. Fisch.	Catanopsis sp	Pokharigaon,1650	Medicinal.
38	<i>Dendrobium denudans</i> D. Don.	Castanopsis sp	Yakuwa,1100	Ornamental.
39	<i>Dendrobium densiflorum</i> Lindl.	Schima wallichii	Num,900	Ornamental.
40	<i>Dendrobium eraieflorum</i> Griff.	Lithophyte	Chhumsur,1900	Ornamental.
41	<i>Dendrobium heterocarpum</i> Lindl.	Schima wallichii	Chandanpur,1000	Ornamental.
42	<i>Dendrobium longicornu</i> Lindl.	Rhododendron sp	Deurali,2025	Ornamental.
43	<i>Dendrobium moschatum</i> (Buch.-Ham) Sw.	Schima wallichii	Bagkhor,650	Ornamental.
44	<i>Dendrobium nobile</i> Lindl.	Schima wallichii	Bagkhor,600	Medicinal.
45	<i>Diphylax urceolata</i> (C. B. Clarke) Hook. f.	Terrestrial	Phematang, 3270	
46	<i>Epigenium fuscescens</i> (Griff) Summerh.	Eurya acuminate	Deurali,2025	Ornamental.
47	<i>Eria bractescens</i> Lindl.	Schima wallichii	Bagkhor,700	Ornamental.

Table 10, Information on Orchids substratum, localities / altitude and remarks.

48	<i>Eria coronaria</i> (Lindl.) Rchb. f.	Eurya acuminate	Chichila,1950	Ornamental.
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49	<i>Eria excavata</i> Lindl.	<i>Eurya accuminata</i>	Mude,2025	Ornamental.
50	<i>Eria graminifolia</i> Lindl.	<i>Quercus</i> sp.	Uttisedanda,2200	Ornamental.
51	<i>Eria muscicola</i> Lindl.	<i>Schima wallichii</i>	Num, 1300	Medicinal.
52	<i>Eria paniculata</i> Lindl.	<i>Castanopsis</i> sp	Num,1000	
53	<i>Eria spicata</i> (D. Don) Hand-Mazz.	<i>Castanopsis</i> sp	Kuwapani,1975	Medicinal.
54	<i>Eria stricta</i> Lindl.	<i>Schima wallichii</i> <i>Schima wallichii</i>	Chandanpur,1000 Num, 900	
55	<i>Galeola lindleyana</i> (Hook. f. &Thom.) Rchb. f.	Sapro. / Terr.	Rupsa village, 2020	
56	<i>Gastrochilus acutifolium</i> (Lindl.)Kuntze	<i>Castanopsis</i> sp	Chichila,1950	Ornamental.
57	<i>Gastrochilus calceolaris</i> (Buch.-Ham. ex Sm.) D.Don	<i>Eurya</i> sp	Chichila,1900	Ornamental.
58	<i>Gastrochilus dasypogon</i> (Sm.) Kuntze	<i>Castanopsis</i> sp	Gola,1100	Ornamental.
59	<i>Gastrochilus distichus</i> (Lindl.) Kuntze	<i>Eurya accuminata</i>	Kuwapani,1960	Ornamental.
60	<i>Geodorum densiflorum</i> (Lam.) Schltr.	Terrestril	Bumlingtar,600	
61	<i>Goodyera foliosa</i> (Lindl.) Benth. ex C. B. Clarke	Terrestrial	Chichila, 1900	
62	<i>Goodyera repens</i> (L.) R. Br.	Terrestrial	Hungdanda,3300	
63	<i>Habenaria arietina</i> Hook. f.	Terrestrial	Thungkocpa, 2500	
64	<i>Habenaria pectinata</i> (Sm.) D. Don	Terrestrial	Thungkocpa. 2500	
65	<i>Habenaria plantaginea</i> Lindl.	Terrestrial	Haluwabesi, 650	
66	<i>Herminium lanceum</i> (Thunb.) Vuijk.	Terrestrial	Kimathanka, 2500	Medicinal
67	<i>Ione bicolor</i> (Lindl.) Lindl.	<i>Castanopsis</i> sp	Chichila, 1950	
68	<i>Liparis bootanensis</i> Griff.	<i>Castanopsis</i> sp	Mude,1900	
69	<i>Liparis deflexa</i> Hook. f.	Terrestrial	Bumlingtar, 600	
70	<i>Liparis nervosa</i> (Thunb.) Lindl.	Terrestrial	Bumlingtar, 450	Medicinal.
71	<i>Liparis resupinata</i> Ridl.	<i>Rhododendron</i> sp	Chichila,1650	Ornamental.
72	<i>Liparis viridiflora</i> (Bl.) Lindl.	<i>Persea</i> sp.	Facsinda,550	Ornamental.
73	<i>Luisia zeylanica</i> Lindl.	<i>Quercus</i> sp	Kattikeghat,450	Medicinal.
74	<i>Malaxis acuminata</i> D. Don.	Terrestrial	Kuwapani,1850	Medicinal.
75	<i>Malaxis ophrydis</i> (Koenig) Ormerod	Terrestrial	Candanpur,1000	
76	<i>Malaxis muscifera</i> (Lindl) Ktze.	Terrestrial	Chichila,1900	
77	<i>Oberonia acaulis</i> Griff.	<i>Castanopsis</i> sp	Chichila,1900	
78	<i>Oberonia caulescens</i> Lindl.	<i>Ficus lacur</i>	Seduwa,1100	Medicinal.
79	<i>Oberonia falcata</i> King & Pantl.	<i>Castanopsis</i> sp <i>Castanopsis hystrix</i>	Chichila,1950 Seduwa,1500	
80	<i>Oberonia pachyrachis</i> Rch.f.ex Hook.f.	<i>Castanopsis</i> sp	Pokharigaon,1650	
81	<i>Oberonia parvula</i> k. & P. subsp. arunense L. shakya & R. P. Chaudhary.	<i>F. nemoralis</i>	Bethbari, 1095	
82	<i>Ornithochilus difformis</i> (Wall. ex Lindl.) Schltr.	<i>Castanopsis</i> sp	Mude,2025	Ornamental.
83	<i>Otochilus albus</i> Lindl.	<i>Rhododendron</i> sp	Kuwapani,1900	Ornamental.
84	<i>Otochilus fuscus</i> Lindl.	<i>Castanopsis</i> sp	Mude, 2025	Ornamental.
85	<i>Otochilus lancilabius</i> Seidenf.	<i>Lyonia ovalifolia</i>	Chichila,1900	Ornamental.

Table 10, Information on Orchids substratum, localities / altitude and remarks.

86	<i>Panisea demissa</i> (D. Don) Pfitzer	<i>Castanopsis</i> sp	Mude,2000	Ornamental.
87	<i>Pecteilis susannae</i> (L.) Raf.	Terrestrial.	Tumlingtar,420	
88	<i>Phaেলাenopsis taenialis</i> (Lindl) Chri.&Pra.	<i>Ficus lacur</i>	Bhotebash, 1600	
89	<i>Pholidota griffithii</i> Hook. f.		Lamauwa-Besinda, 1290	Ornamental.

90	<i>Pholidota imbricata</i> Hook.	Castanopsis sp	Mude, 1700	Medicinal.
91	<i>Pholidota protracta</i> Hook. f.	Rhododendron sp Daphniphyllum	Kuwapani, 1900 Tashigawn, 1950	Ornamental.
92	<i>Platanthera clavigera</i> Lindl.	Terrestrial	Kimathanka, 2450	Edible
93	<i>Peristylus nematocaulon</i> (Hook. f.) Banerji & Pradhan	Terrestrial	Tashigawn- Khongma, 3330	
94	<i>Pleione hookeriana</i> (Lindl.) B.S. Williams	Daphnephyllum	Tashigawn, 1950	Ornamental.
95	<i>Pleione praecox</i> (Sm.) D. Don	Daphnephyllum	Tashigawn, 2000	Medicinal.
96	<i>Pteroceras teres</i> (Blume) Hoitt	Schima wallichii	Bumlingtar, 600	
97	<i>Rhynchostylis retusa</i> (L.) Bl.	Terminalia chebula	Kattikeghat, 450	Medicinal.
98	<i>Satyrium nepalense</i> var. <i>ciliatum</i> (Lindl.) Hook. f.	Terrestrial.	Hunggaon-Kima,	Medicinal
99	<i>Satyrium nepalense</i> D. Don	Terrestrial	Kimathanka, 2450	Medi./ Edi.
100	<i>Smitinandia micrantha</i> (Lindl.) Holtt.	Bauhinia variegata	Num- Bridge, 850	Ornamental.
101	<i>Spiranthes sinensis</i> (Pers.) Ames	Terrestrial	Kimathanka, 2450	Medicinal.
102	<i>Tainia minor</i> Hook. f.	Terrestrial	Tashigawn, 2100 Deurli, 1880	
103	<i>Thelasis longifolia</i> Hook. f.	Schima wallichii	Num, 1050	
104	<i>Thunia alba</i> (Lindl.) Rchb.f.	Lithophyte	Facsinda-Yakuwa,	
105	<i>Trudelia cristata</i> (Lindl.) Senghas	Shorea robusta	Baghkhora, 650	Medicinal.
106	<i>Vandopsis undulata</i> (Lindl.) J. J. Sm.	Castanopsis sp	Tashigawn, 1950	Medicinal.
107	<i>Zeuxine flava</i> (Wall. ex Lindl.) Trimen	Terrestrial	Tashigawn, 1950	