CHAPTER 1
INTRODUCTION

1.1 Background

The 'Flora' refers to the plants occurring within a geographical region as well as publication of description of plants. It may contain simple list of plants occurring in an area to a detailed account of those plants. A Flora usually contains scientific names with author citation (may also include common names and local names), reference to source of original publication, synonymy, comprehensive description, habitats, geographical distribution, illustrations, notes, etc. There may or may not be a keys for families, genera, species or even infraspecific levels. Generally, the plants are described within a classification system (Bentham and Hooker, Engler and Prantl, Cronquist, Takhtajan, etc.) that indicates which plants are most similar or are closely related.

Plants are regarded as the most important component of natural resources upon which people and animals are highly dependent. These are also very important in a sense that plant diversity is the store house for particular genetic informations (genetic material) which are stored within their body. A sound knowledge on floristic composition of particular area is essential to understand the resources, their use and conservation. Such knowledge is also important to formulate environmental policies for sustainable development of any country.

Nepal, a small country in the Himalayas occupying an area of 147,181 sq. km and lying between $26^0$22'N to $30^0$27'N Latitudes and $80^0$4'E to $88^0$12'E Longitudes, is well known as nature's paradise for its rich biodiversity. It is transitional mountainous area in between Indo-Gangetic plain in the south and the Tibetan plateau on the north (Rajbhandari 2001). Due to the great geographic diversity along with climatic variation, Nepal is endowed with the tropical to alpine vegetation (Chaudhary 1998).

Nepal lies at an intervening zone of different phytogeographical and zoogeographical zones. Broadly, Nepal lies at the junction of two major phytogeographical divisions of the world, the Holarctic kingdom in the North and the Paleotropical kingdom in the South. Moreover, in terms of the regional phytogeographical demarcation. Nepal is situated on the cross-roads of many floristic regions such as Sino-Japanese floristic region, mainly in the East; Irano-Turanian floristic region, in the North-West; Central Asiatic floristic region, in the North; South-East Asian Malaysian floristic region, in the South-East; Indo-Gangetic floristic

region, in the South and Sudano-Zambian floristic region in the South-West. Nepal's position in the Central sector of the Himalayas is that of a transitional zone of interpretation between the two differing environment of the Eastern Himalayas and Western Himalayas (Shrestha and Joshi 1996). Thus Nepal offers unique opportunity to conserve biodiversity of many phytogeographical provinces in this small territory. It has biological richness of both the Indo-Malayan and Paleartic realms, including endemic Himalayan flora. In the six phytogeographical provinces of the country, scientists have identified 118 ecosystems, 75 types of vegetation and 35 types of forests harbouring more than 6500 species of flowering plants (Dobremez 1972, Stainton 1972, IUCN 1988).

Of the total estimated 6500 species of flowering plants, about 4% are endemic to the country and 30% are endemic to the Himalayas (Shrestha 2001). Although Nepal shares about 0.09% of world's total land by area, it's share in world's total flowering plant species is more than 2% (MFSC 2002). This country occupies the 10^{th} position on richness of flowering plants diversity in Asia; the number of flowering plants enumerated in Nepal is 6067 belonging to 216 families and 1534 genera (*Press et al.* 2000).

Physiography

Vegetation of Nepal has been studied by many workers and they have classified the vegetation into various phytogeographical divisions. Stearn (1992) divided Nepal into three regions- Western (Kumon frontier to 83^0E), Central (83^0E to $86^0$30'E) and Eastern ($86^0$30'E to Sikkim frontier). Stainton (1972) divided Nepal into six regions in relation to the climate (a) Terai, Bhabur, Dun valleys and outer foothills, (b) Midland areas, (c) Humla-Jumla areas in the north – west, (d) Drier river valleys, (e) inner valleys and (f) Trans-Himalayan arid zone. Chaudhary (1998) has recognized following five vegetative zones. Considering the view of different phytogeographers, the country's vegetation can be described under following vegetation zones:

1. Tropical zone (up to 1000m altitude) is characterized by Indian and SE Asian-Malaysian elements. The dominant elements of this zone are *Shorea robusta*, *Acacia catechu, Dalbergia sissoo*, *Bombax ceiba* etc.
2. Subtropical Zone (1000-2000m altitude) is characterized by SE Asian-Malaysian, Indian and Sino-Japanese elements. This zone is mainly

represented by *Schima wallichi*, *Quercus* species, *Castanopsis* species, *Pinus roxburghii*, etc.

3. Temperate zone (2000-3000m altitude) is characterized by Sino-Japanese elements. This zone is dominated by evergreen *Quercus* species, *Rhododendron* species, Conifers, etc with deciduous Magnolias.
4. Subalpine zone (3000-4000m altitude) with much influence of Central Asiatic elements. This zone is mainly represented by *Betula utilis*, *Cedrus deodara*, *Juniperus* species, *Rhododendron* species, etc.
5. Alpine And Nival Zone (above 4000m altitude) characterized by dominant central Asiatic elements. This zone is represented by busy rhododendrons junipers; seabuck thorn, various gesses, etc.

1.2 Objectives

The overall aim of the study is to make an inventory of the plant species of the study area. The study fulfills the following specific objectives:

- Collection, identification of plants, systematic description of family, genera and species with accepted names, basionyms, synonyms and vernacular names.
- Preparation of artificial keys for the identification of genera and species.
- Analysis of distribution pattern (regional and altitudinal), phenology and uses of the plants described.
- Comparative study of distribution of plants with respect to Upper Manang.

1.3 Justification

Most of the floristic works in Nepal are focused in the midhills. Botanical expenditions carried out in different parts of Nepal is compiled in different literatures (*Hara et al*., 1978; *Rajbhandari*, 1994 and 2002).

Botanical exploration in Nepal was started in the beginning of 19th century by Buchanan Hamilton (1802-1803). Based on collection made by Hamilton and N. Wallich (1920-21), D. Don (1825) published a first account of Nepal's Flora in *Prodrumus Florae Nepalensis*. Among the other collectors in 19th century and beginning of 20th century include: Nathaniel Wallich (1820-1821), J.D. Hooker (1848-1849), I.H.Burkill (1901) etc. A serious attempt to collect plants from different

parts of Nepal started during 1950, when British collectors started collecting plants. Plants collection was strengthened also by Japanese collections in collaboration with the Nepalese counterpart during 1950. Despite, several collections have been made from different parts of Nepal, Manang remains still less explored botanically. It seems that researchers have undertaken Central Nepal in their priority, but quite a few have stepped up in Manang like Kawakita 1952-1953; Pohle 1990 (Rajbhandari 2002).

However, the Manang area especially Gyasumdo and its adjoining area remained largely unexplored floristically. Therefore the present study will be a comprehensive account of flora is described.

1.4 Limitation

The present study is strictly limited to lower Manang especially focusing on the adjacent areas of Gyasumdo Valley i.e. Talekhu, Chame, Koto and Tal, etc. However, plants where also collected from Humde, Pisang, Dhukurpokhari. This work could be regarded as an important contribution to supplement floristic study of Manang district since plant species from Nar, Phoo, Nysehang, etc. areas have been described earlier (Pokharel 2004 and Bhatta 2005). Due to poor representation of herbarium specimens in TUCH, time constraints, insufficient relevant literatures, identification of the plant specimens was too difficult, few species are still unidentified.

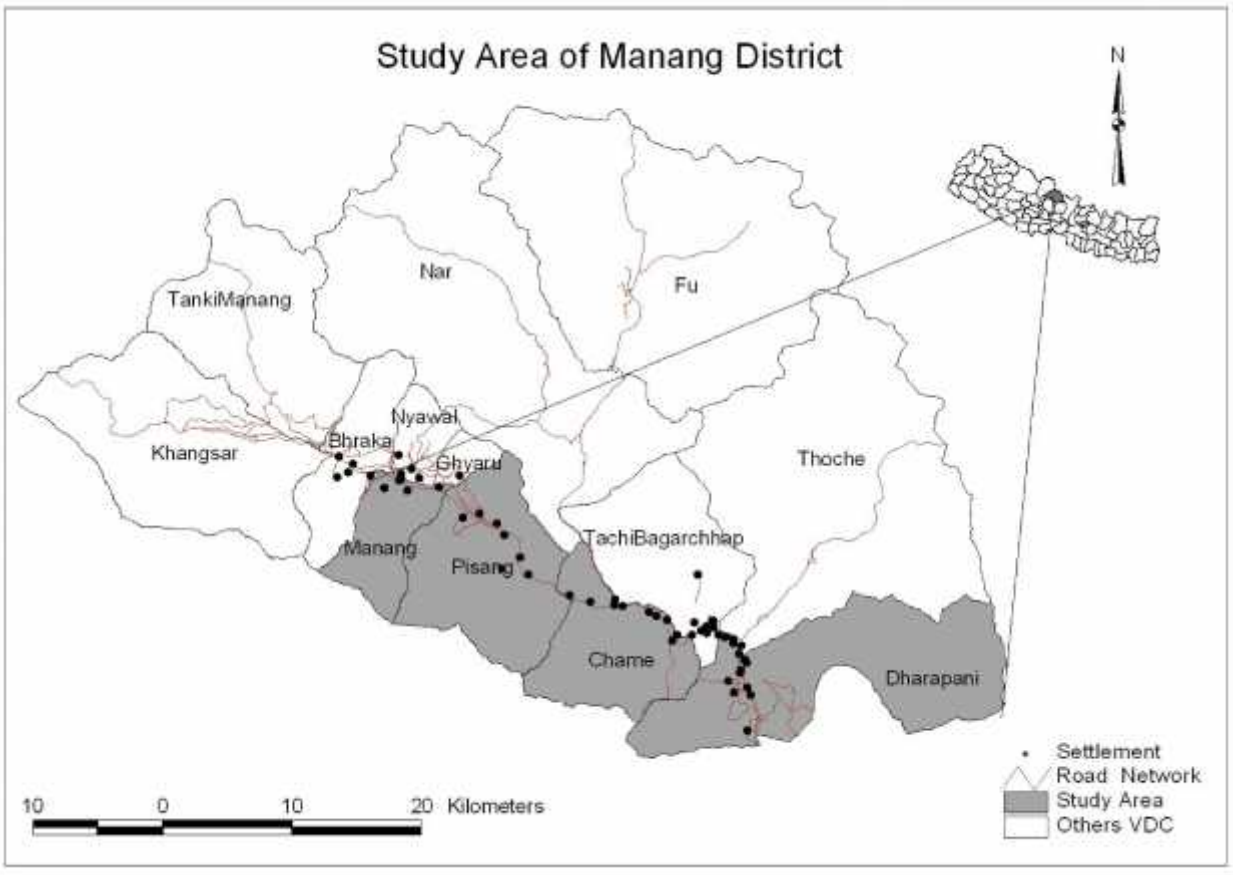
1.5 Study Area

Location and Physiography

Manang district lies in the extreme northern side of Gandaki Zone in the north-central part of Nepal, with an area of 2246 sq. km at $28^0$27' to $28^0$54'N Latitudes and $83^0$50' to $84^0$34'E Longitudes within Annapuna Conservation Area. To the south, the district is connected with Lamjung and Kaski District, in the north borders to Tibet, on the west to Mustang and in the east to Gorkha district. This district is the part of trans-Himalayan zone of Nepal having semi-arid type of climate and phytogeography. The district is surrounded by Himalayan mountain; Annapurna and Lamjung Himal from south; Muktinath and Damodar Himal from west; Peri, Himlung and Cheo Himal from north; Manaslu Himal from East. The altitude of that region varies from 1600m to 8156m from the mean sea level.

The district harbours high Himal and high mountains. Almost 83.56% of the total area is occupied by mountain and hill. Forest and shrubs cover only 4.58% of the total area whereas pasture and lake and river cover 10.92% and 0.29% respectively. The cultivated land covers only 0.65% of total land. About one third of area forms U-shaped valley along the river's course, which is favorable to settlement and agriculture (Pohle 1990).

Marsyangdi River along with its tributaries Narkhola, Dudhkhola and Jharkhola drains from north to south forming longitudinal valleys. On the basis of existing microecozones, the district is divided into 3 ecozones (valleys): Gyasumdo valley (occupying southern region of the district), Nar-phoo valley (occupying northern region of the district) and Nyeshang valley (occupying western region of the district). All the three valleys include 13 villages, the headquarter of which is Chame at an altitude of 2680m



Source: Department of Survey

Climate

There is a great variation in the climate of Manang due to the extreme variation in altitude and aspect with different landscape. The humid winds and clouds of monsoon from south is blocked by barrier of great mountain ranges of Annapurna, Lamjung and Manaslu which separate humid outer Himalaya form dry inner and continental Tibetan Himalaya (Kitamura 1955, Pohle 1990).

There remains the influence of summer monsoon in Gyasumdo while Nysehang and Upper Manang are beyond its reach. From October to March, Nar and Nyeshang valleys are covered by snow after that snow begin to melt and the area receives little rainfalS. But in Gyasumdo the snow fall occurs generally from December to February. The annual precipitation in Gyasumdo about 915.475 mm (Chame station, 2002-2006) whereas in Nyeshang it is less than 476 mm (Manang Bhot station 1986-1990, annual precipitation data of 2002-2006 was not available). The average monthly temperature & precipitation are presented below in Appendix I (Chame station 2002-2006).

Vegetation of Manang

The Gyasumdo Valley receives more precipitation and humid climate and is at low altitude. Therefore there is rich subtropical vegetation, dominated with Oak and Rhododendron forest in lower belt and conifers (*Tsuga dumosa, Picea smithiana*) in upper region. But in the Nyeshang valley those species are replaced by Pine forest (*Pinus wallichiana*) with an upper belt of fir (*Abies spectabilis*) and birch (*Betula utilis*). However, the south facing slopes of Marsyangdi valley have pine and Juniper forest. The large area of Nar and Phoo valley are above the timberline and the vegetation of these areas are species of typical desert type that are rich in steppe-vegetation of the Tibetan Plateau (species of C*aragana, Berberis, Astragalus, Juniperus, Rosa, Ephedra,* etc) and extensive grasslands (meadows) predominated with grasses (Pohle 1990).

In the alpine zone of the valley, abundant grass is found besides juniper, Caragana and other bushers. Such alpine zones change their characteristics gradually to the semidesert like bushland in the southern slopes of lower altitudes. There is the marked difference in vegetation of northern and southern slopes between Thonje and Manangbhot basin. In the southern slope of Chulu, the trees in upper limit are *Betula utilis*, in the lower part there are Pine and Juniper mixed with *Abies*. The forest limit

of southern slope of Kazan gateway is composed of Pine trees while in Manangbhot basin, upper limit is birch but not pine.

Small pieces of land in V-shaped valley are covered by only grasses on the both side of Marsyangdi Khola. But the extensive grassland are only above 4500m in north facing as well as south facing slopes in the Nyeshang as well as Nar and Phoo area. But there is marked difference in the species richness between the North and Southern slopes. The southern slopes because of being much drier than the northern slopes have sparce grass vegetation.

The people and Culture

In Gyasumdo, about two thirds of the total inhabitants are Gurungs, a Tibeto-Burman ethnic group, the rest of the population are Gyasumdopas. The Gurungs represent a rural population groups which is culturally oriented partly towards Tibetan Buddhist tradition and partly toward Nepalese Hindu traditions while Gyasumdopas are strictly Buddhists and follow cultural tradition of Tibet.

1.6 Plant exploration in Manang and its adjoining areas

Several foreign and Nepalese plant explorers collected plants from Annapurana region and its adjoining area but plant exploration from Manang district is scanty. D.G. Lowndes in 1950 collected plants from Manang and Marsyangdi valley which were deposited in Royal Botanic Garden, Kew. In 1954, The British Meseum organized a trip including Stainton, Sykes and Williams, who extensively collected plants from Dhaulagiri and Annapurna area. In 1976, a Japanese expedition team (including H. Tabata, K. Tsuchiya, Y. Ksnao and K.R. Rajbhandari) explored Muktinath area along with Dhorpatan, Lamjung Himal. M.A. Farille (in 1981) collected plants from Dhorpatan, Muktinath and Lamjung Himal areas.

After 1983, plant explorers showed much interest in the high altitude areas and several expedition team were organized to explore Kaligandaki valley, Marsyangdi valley, Yak kharka, Manaslu and Annapurna Himal. The expendition teams that made major plant collections in Manang and its adjoining area are shown in the Appendix II.

Nepalese explorers were also interested to collect plant to some extent from the high altitude areas such as D.P. Joshi and T.K. Bajracharya (1974) collected plants from Pokhara-Mustang; S.B Rajbhandari, M.P. Singh and P.R.Shakya (1976)

collected plants from Pokhara-Muktinath; N.K. Bhattarai, D.P. Joshi, M. Subedi and N. Pradhan (1985) collected plants from Kaski, Myangdi and Mustang (Rajbhandari 2002).

1.7 Floristic works in Manang and its adjoining areas from CDB, TU

A large number of M. Sc students of Central Department of Botany (CDB) and the teachers have collected number of plants specimens from different parts of Nepal. These specimens have been deposited in TUCH (Tribhuvan University Central Hebarium) that holds about 20000 specimenns including Cryptogams (Shrestha 2000). The number of plants specimens deposited in TUCH has been increasing tremendously by each year. The floristic works conducted from CBD, TU in Manang and its adjoining areas are listed below.

Natural History Museum, London in collaboration with Central Department of Botany Published *Annotated Checklist of the Flowering Plants of Nepal* (*Press et al.* 2000) which enlisted 5345 species, 163 subspecies and 51 forma of angiosperms and gymnosperms belonging to 1534 genera and 216 families. Under the same collaboration *Catalogue of Type Specimens from Nepal* (Shrestha and Press, 2000) was also published.

Shrestha, Sah and Ghimire (1995). Studied qualitative analysis of some major high altitude medicinal plants of Gyasumdo Valley, Manang.

Thapa (1996) recorded 93 species of weed flora including 95 species of vascular plants and 2 sps of Bryophytes from maize fields of Pokhara.

Chhetri, Dil Bahadur (1999) recorded a total of 90 species of medicinal and aromatic plants belonging to 81 genera and 51 families from Manang Valley and Gyasumdo.

Kshetri (2003) reported 204 species of flowering plants belonging to 173 genera and 63 families from Chock Chisapani area of Tanahun district.

Subedi (2003) reported 125 species of Orchids belonging to 51 genera from Seti and Marsyandi river valleys.

Shrestha (2004) reported 312 species under 149 genera from Dolpo and its surroundings.

Pokhrel (2004) reported 246 species belonging to 128 genera from Nyeshang Valley of Manang district.

Ghimire (2005) reported 24 species from sub-slpine region of Manang district.

Bhatta (2005) reported 220 species under 135 from upper Manang district.

Subedi (2006) reported 113 species from Manang district.

CHAPTER 2
METHODOLOGY

2.1 Collection and Preservation

Plants specimens from the study area were collected by three botanical expedition organized by NUFU project from June.10.20062006. The first and third visit was made from the Humde to Tal while second trip was limited to Danaque. For each species, at least 3 specimens were collected as far as possible. The collection route and area has been shown in the map. The voucher specimens were properly tagged in the field during collection with appropriate field notes. The collected specimens were dried and mounted on herbarium sheets (28 x 44cm). The specimens were poisoned using insecticide. Herbarium specimens were prepared and managed using techniques of Forman and Bridson (1989).

2.2 Identification

Identification of collected plant specimens were done mainly using relevant literatures such as: Hooker (1883-1897), Collett (1925), Duthiei (1903-1929), Lawrence (1965), HMG (1976,1986), Davis and Cullen (1988), Grierson and Long (1983-2001), Noltie (1994, 2000,2002), Cook (1996), WU Zheng-Yi and Raven P.H. (1996-2003), Polunin and Stainton (1984), etc. Identification of few collected plant specimens were also done with the help of experts of TU. Identification of most of the monocot were done with the help of Dr. H.J. Noltie and Prof. Dr. R.P. Chaudhary. While most of the orchids identification were done with the help of Dr. Lokesh Ratna Shakya. These specimens were then compared with herbarium specimens in TUCH as far as available.

2.3 Description

For the arrangement of families of described genera and species , the modified Engler system of Melchior (1964) has been followed as in the *"Flora of Bhutan"* exception on the families Liliaceae and Hypoxidaceae arranged on the basis of Dahlgren, Clifford and Yeo (1985). Dichotomous keys have been prepared to genera and species for the families which contain more than one genus and for the genera which contain more than one species, respectively. The species were cited using latest taxonomic literatures. The basionyms and synonyms are also given whenever possible

which must be accepted for synonyms. The local names were obtained from field note or from secondary literatures.

Description format:

FAMILY (Capital and Bold)

Description of family

Key to the Genera

GENUS (Capital and Bold) followed by auther citations.

Description of Genus

Key to the species

Species (Bold letters) followed by authors and bibliographic citations.

Basionym and Synonyms (if any) in Italics.

Local Vernacular Name: In Nepali (Roman) followed by English.

Description of Species: The description of species basically follows the pattern of *Flora of Bhutan*.

Uses: If any

Field note: Habitat

Representative Collection: District, exact locality of collection, altitude date of collection (Phenology), collector(s), collection number.

Distribution: Nepal (regional, altitudinal) followed by worldwide distribution, and if any specific note.

2.4 Illustration

For easy identification, hand sketches of some species have been given with proper scaling.

CHAPTER 3 RESULTS

3.1 Floristic Composition

*Altogether from the study area 245 species under 203 genera and 79 families including 5 varieties (2 species were identified upto generic level only) were identified and described upto the species level. Among them, 189 species of Dicotyledonae belong to 153 genera and 65 families and 56 species of Monocotyledonae belong to 50 genera and 14 families (Table No. 1).

Table No. 1.a: Floristic Composition of the study area

No. of	**Dicotyledoneae**				**Monocotyledoneae**		**Total Number of species**
	Archichlamydeae		**Sympetalae**				
	Number	Percentage	Number	Percentage	Number	Percentage	
Family	39	49.367	26	32.911	14	17.721	79
Genera	79	38.916	74	36.453	50	24.630	203
Species	93	37.959	96	39.183	56	22.857	245
Unidentified							40

TableNo. 1.b: Floristic Composition of the study area

No. of	**Dicotyledoneae**		**Monocotyledoneae**		**Total Number of species**
	Number	Percentage	Number	Percentage	
Family	65	82.278	14	17.721	79
Genera	153	75.369	50	24.630	203
Species	189	77.142	56	22.857	245
Unidentified					40

***** 40 Species are under the identification which were remained to unidentified until this report.

3.2 Comparative study with other related field

By comparing the finding made from the present floristic study at family level with that of other studies in related area, some of finding have been found to be similar whereas some others have been found to be different with them (Table No. 2).

Table No. 2: Dominating Families in the Present Study Compared with other works

Present Study (2007)	Hara et al. (1978, 1979 & 1982) & Press et al (2000)	Chaudhary (1978)	Shrestha (1983)	Ohba & Akiyama (1992)	Ohba & Malla (1988, 1999)
Compositae	Compositae	Compositae	Compositae	Compositae	Compositae
Labiatae	Gramineae	Gramineae	Gramineae	Saxifragaceae	Saxifragaceae
Rosaceae	Orchidaceae	Labiatae	Leguminosae	Rosaceae	
Gramineae	Leguminosae	Rosaceae	Labiatae	Scrophulariaceae	
Orchidaceae	Rosaceae	Rubiaceae	Euphorbiaceae		
Leguminosae	Cyperaceae	Urticaceae			
Ranunculaceae	Scrophulariaceae				
Polygonaceae	Labiatae				
Scrophulariaceae	Ranunculaceae				
& Cyperaceae	Umbelliferae				
Gentianaceae					
Umbelliferae					

3.3 Description of plant species

Family 1. JUGLANDACEAE

Monoecious rarely dioecious trees or rarley shrubs. Leaves exstipulate, alternate, pinnately compound, deciduous. Flowers unisexual, male flowers in pendulous catkins. Perianth 3-6 lobed, adnate to bracts. Stamens 6-40, anther oblong. Female flowers in catkins or racemes. Perianth of 4 segments borne on lobed bract or within involucre. Ovary inferior, 1-locular, style 2 branched, ovule 1, basal. Fruit drupe or winged nut.

1. Juglans L.

Monoecious tree. Leaves odd-pinnate. Male flowers in simple, raceme like catkins. Female flowers 1-3 in short terminal racemes, each with 4 lanceolate perianth segments adnate to brownish tomentose 4-toothed involucre. Style branches plumose. Fruit an ovoid drupe, fleshy outside, hard shelled within, cotyledons lobed and folded.

1. Juglans regia L., *Sp. Pl.* 997(1753); Grierson and Long in *Fl. Bhu.* 1(1):58(1983); Press et al. in *Ann. Check. Fl. Pl. Nep.*:148(2000). Fig.1.a.

Nep.: Akharota/Okhar, Eng.: Walnut

Tree 6-25m. Leaflets in 2-5 pairs, oblong-lanceolate, 5-15×2.5-7cm, acuminate, base obliquely rounded, margin entire. Male catkins 7-15cm, each flower composed of 10-40 sessile anthers an short side branch 3-8 mm. Fruit 4-5×3-4 cm.

Uses: Medicinal, religious and edible.

Field note: On open moist rocky area.

Representative collection: Manang, Koto, 2560m, 5.7.2006 (Fr.), K. Adhikari et al. 126.

Distribution: Nepal (WCE, 1200-2100m), Himalaya (Kashmir to Bhutan), N.E. India (Meghalaya), China (Xizang).

Family 2. SALICACEAE

Dioecious or rarely bisexual trees or shrubs. Leaves alternate or rarely subopposite, entire or serrulate, pinnately veined, sometimes palmately 3-5 veined at base, deciduous. Stipules free deciduous, scale like rarely leafy. Flowers in erect or pendulous spikes or racemes. Catkins terminal on short lateral shoots or sessile, axillary. Flowers solitary in the axil of a membranous, deciduous or persistent bract. Male flowers with 2-many stamens. Filaments free or united. Female flowers with ovary solitary. Style short 2-branched. Ovules numerous, parietal Capsules ovoid, 2-4 valved. Seeds few or numerous.

1. SALIX L.

Stems erect usually pubescent or silky villous at first. Leaves alternate or rarely sub-opposite elliptic or obovate, margins entire or glandular-serrulate, venation pinnate. Stipules usually present. Flowers usually few or numerous in erect or pendulous, sessile or pendulate catkins. Male flowers usually with 2, sometimes 1, rarely 6-12 stamens. Female flowers with style bifid. Capsule 2 valved.

1.Salix wallichinana Anders. in *Kugal. Svensk. Vet Akad. Handl*.1850: 477(1851); Grierson and Long in *Fl. Bhu.* 1(1):65(1983); Press et al. *Ann. Check. Fl. Pl. Nep.* : 283(2000). Fig.1.b.

Nep.: Bais

Small tree, branchlets pubescent. Leaves elliptic, 5.5-14×2-5 cm, acuminate or acute, base cuneate, margins serrulate, glabrous. Petioles 0.5-1.5 cm. Stipules present, ovate, semicordate, c1cm. Catkins sessile or on penduncles c1cm. Male catkins erect. 1.5-2.5 cm. Femle catkins ovoid, attenuate, c8 mm, densely pubescent, borne on pedicels. Styles almost absent, with short, bilobed branches.

Field note: On open slopy place.

Representative collection: Manang, Below Koto, 2550m, 5.7.2006 (Fl. and Fr.), K. Adhikari et al. 127.

Distribution: Nepal (WCE,1500-3500m), Afghanistan, Himalaya (Kashmir to Bhutan), Assam, Tibet, N. Burma, China.

Family 3. BETULACEAE

Monoecious, deciduous trees or shrubs. Leaves alternate, simple, stipulate. Male flowers in pendulous, bracteate catkins, perianth minute, 4-fid or absent, staments 2-20. Female flowers in erect or catkinate spikes or in clusters, perianth minute or absent. Ovary superior or inferior, 2-locular. Styles 2, simple, pendulous. Fruit a winged achene or nutlike.

Key to genera

1a. Leaves elliptic, entire, male catkins terminal……..……...**1. Alnus**
1b. Leaves ovate, serrate, male catkins axillary……...…… **2. Betula**

1. ALNUS Miller

Trees. Leaves elliptic, entire. Male catkins in terminal panicles, linear, pedulous. Bracts 3-lobed each bearing 3 flowers. Perianth 4-toothed. Anthers 4. Female spikes erect, 6-10 in axillary racemes below male infloresence. Perianth absent, styles 2-short. Fruiting spikes, conelike, with woody, persistent scales. Fruit a compressed achene.

1. Alnus nepalensis D. Don, *Prodr. Fl. Nep.*: 58(1825); Grierson and Long in *Fl. Bhu.* 1(1):72(1983); Press et al. in *Ann. Check. F1. P1. Nep*.:27(2000). Fig.1.c.

Nep.: Utis

Deciduous tree. Leaves broadly elliptic, 9-15×4-9cm, acute, base rounded or cuneate, pubescent on veins. Petiole 0.8-25cm. Stipules oblong, auriculate. Male catkins in terminal panicles to 10 com long. Female catkins short, cone like. Nut 1-seeds winged.

Uses: For timber and fuel wood.

Field note: Along stream banks and fragile slopy lands.

Representative collection: Manang, Below Danaque, 2700m, 13.10.2006 (Fr.), K. Adhikari et al. 408.

Distribution: Nepal (WCE,500-2600m), Himalya(Uttar Pradesh to Bhutan), NE India, Myanmar, Ind-China, W. China. **Not reported at 2700m altitude in Press et al. 2000.**

2. BETULA L.

Trees. Leaves ovate, serrate. Male catkins solitary or few, axillary. Scales orbicular, concave, each bearing several flowers. Perianth minute, 4-lobed. Stamens 2, anthers divided at apex, Female spikes erect or pendulous, terminal on side shoots. Scales with 3 deep, linear lobes. Perianth absent. Styles 2, filiform, simple. Fruit a compressed, winged achene.

1. Betula utilis D. Don, *Prodr. Fl. Nep.* 58(1825); Grierson and Long in *Fl. Bhu.* 1(1):71(1983); Press et al. in *Ann. Check. Fl. Pl. Nep*.:27(2000).

Betula bhojpattra Lindl. in Wall., *Pl. As. Rar*. 2:7(1831).

Nep.: Bhojpatra/Bhujapat, Eng.: Himalayan silver birch

Tree to 15m. Bark white or pinkish, peeling in papery sheets. Branchlets warty glandular. Leaves ovate, 3-10×2-8cm, acute, base rounded, margins serrate, pubescent on veins and glandular beneath. Petioles 0.8-2cm. Stipules ovate-ellipic, c1.2cm, deciduous. Male catkins solitary, axillary. Female spikes 2-4×1-1.5cm, scales c3 mm, with 1-3 ovaries at base. Fruit winged achene.

Uses: Bark used as paper and medicinal.

Field note: Found in north facing slope above pinus forest.

Representative collection: Manang, Danaque, 2700m,13.10.2006 (Fr.), K. Adhikari et al. 410.

Distribution: Nepal (WCE, 2700-4300m), Himalaya, W. China.

Family 4. CANNABACEAE

Dioecious, erect annual herbs. Leaves alternate or opposite at base, palmately compound, stipulate. Male flowers in short pendulous panicles. Perianth of 5 free segmants, stamens 5. Femlae flowers sessile, crowded in short leafy spikes, perianth unlobed. Ovary sessile, 1-locular. Style deeply 2-fid, filiform. Ovule solitary, pendulous. Fruit an achene.

1. CANNABIS L.

Description as for Cannabaceae.

1. Cannabis sativa L., *Sp. Pl.* 1027(1753); Griersons & Long in *Fl. Bhu.* 1(1): 134(1983); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 36(2000). Fig.1.d.

Nep.: Bhang/Bhango/cares/Ganja, Eng.: True hemp/Indian hemp/Mariguana

Herbs about 10cm tall. Leaves with 3-6 narrowly elliptic or lanceolate leaflets, serrate, finely pubescent beneath. Stipules linear, 3-5 mm long. Male panicles 1-4 cm long. Perianth segments elliptic. Female spikes 2-3cm, flowers minutely glandular. Achenes ovoid, 3-3.5 mm.

Uses: Source of fibres and oil and also for an intoxicating.

Field note: On sandy soil of cultivated land.

Representative collection: Manang, Kota area, 2620m, 6.7.2006 (Fl. and Fr.), K. Adhikari et al. 139.

Distribution: Nepal (WCE, 200-3150m), Temperate and tropical regions of C. Asia.

Family 5. URTICACEAE

Herbs or shrubs, rarely trees, sometimes with stigning hairs. Leaves simple, alternate or opposite, rarely whorled, palmately 3-veined at base or pinnately veined. Usually stipulate, stipules free and lateral or connate and axillary. Flowers minute, usually unisexual, actinomorphic, 3-5 merous. Male flowers with perianth deeply lobed, stamens opposite lobes with rudimentary ovary. Female flowers with deeply divided. Ovary superior, 1-celled, style simple deciduous or persistent or stigma sessile and brush like. Ovule 1, basal. Fruit an achene, free or enclosed by dry perianth.

1. URTICA L.

Monoecious, rarely dioecious perennial herbs with stinging hairs. Leaves opposite, serrates or crenate, pinnate, pinnately veined above, palmately 3-5 veined at base, cystoliths puncate. Stipules free or connate and interpetiolar. Flowers in axillary clusters. Male flowers with deeply 4-lobed perianth and stamens 4. Female flowers with 4-lobed perianth. Ovary ovoid, stigma sessile, brush -like. Achenes compressed, enclosed by 2 enlarged perianth segments.

1. Urtica dioica L., *Sp. Pl.* 984(1753); Grierson and Long in *Fl. Bhu.*1(1):107(1983); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 322(2000). Fig.2.a.

Nep.: Lekh sisnu/Sisnu Jhya, Eng.: Stinging neetle

Plants monoecious, all parts bearing scattered white stinging hairs. Leaves ovate-lanceolate, 2-6×1-3m, acuminate, base rounded or cordate, margin coarsely serrate. Petioles 1-3 cm. Stipules lanceolate. Panicles 2-5cm long. Male flowers 2 mm diamenter, perianth segments orbicular. Female flowers c1.5 mm diameter. Achenes ovoid or ellpsoid.

Uses: Plants used as vegetable.

Field note: On sandy moist and open area.

Representative collection: Manang, Danaque, 2250m, 6.9.2006 (Fr.), K. Adhikari et al. 254.

Distribution: Nepal (WC,3000-4500m), Europe, Himalaya, W.China. **Not reproted at 2250 m altitude in Press et al. 2000.**

Family 6. POLYGONACEAE

Herbs, subshrubs or climbers, sometimes spinous. Leaves simple, entire, margins rarely sinuate or serrulate, alternate or rarely subopposite, pinnate venation. Stipules usually united around stem to form ocrea. Flowers in racemes, panicles or clusters, actinomorphic, bisxual, sometimes unisexual. Perinath segments 3-6, usually connate below. Stamens 1-9, adnate to perianth. Ovary superior, unilocular. Styles 2-3, simple, minutely capitate, rarely hooked or fimbricate. Ovule solitary, basal. Fruit a trigonous, flattened or biconvex achene.

Key to genera

1a. Stamens 6, style fimbricate 2

1b. Stamens other than 6, style various.....3
2a. Perianth segements 4, 2 outer smaller and 2 inner larger .....**4. Oxyria**
2b. Perianth segments 6, 3 outer smaller and 3 inner larger .....….**8. Rumex**
3a. Stamens 4-5 .....**6. Polygonum**
3b. Stamens other than 4-5 4
4a. Leaves margin entire, ocrea cylindrical 5
4b. Leaves margin various, ocrea other than cylindrical 6
5a. Flowers in panicles .....**1. Aconogonum**
5b. Flowers in racemes spikes or capitate .....**5. Persicaria**
6a. Style rounded, achenes 3-winged…….... .....**7. Rheum**
6b. Style capitate, achenes biconvex, trigonous or ovoid……..…..……...7
7a. Ocrea spilt obliquely, stamens 8.....**2. Bistorta**
7b. Ocrea oblique, stamens 3 .....**3. Fagopyrum**

1. ACONOGONUM (Meisner) Reichenbach

Herbs or undershrubs, rarely dioecious. Leaves elliptic or ovate, apex acuminate, entire margin. Ocreae cylindrical, truncate or lanceolate, membranous. Flowers in panicles. Perianth 5-partite, connate in lower half or near base. Stamens 7-8. Styles 2-3, short, capitate. Achenes trigonous or biconvex, enclosed by persistent perianth.

1. Aconogoum molle (D. Don) H. Hara, *Fl. E. Himalaya:* 68(1966); Grierson and Long in *Fl. Bhu*. 1(1):156(1983); Press et al. in *Ann. Check. Fl. Pl. Nep*.: 236(2000).
Polygonum molle D. Don, *Prodr. Fl. Nep.* 72(Feb. 1825).
Coccoloba totnea Buch.-Ham, ex D. Don, *Prodr. Fl. Nep.* 74(1825).
Ampelygonum molle (D.Don) Roberty and Vautier in *Boissiera* 10:31(1964).
Nep.: Patu svan/Thotne/Tuknu, Eng.: Vegetable smart weed.

Subshrub, 1-2m. Leaves elliptic, 10-15×3-5, acuminate, base cuneate, rounded, appressed pubescent on both surfaces, more densely beneath. Petioles 1-2cm. Ocrea 2-4cm, membranous, lanceolate. Panicles richly branched. Perianth cream coloured, c3mm, white, segments oblong-elliptic. Pedicels 1-1.5mm. Achenes, enclosed in blackish, fleshy perianth.
Field note: On slopy and rocky open place.
Representative collection: Manang, above Chame, 2730m, 11.10.2006 (Fl.), K. Adhikari et al. 294.
Distribution: Nepal (WCE, 1200-2400m), Himalaya (Uttar Pradesh to Sikkim). **Not reported at 2730m altitude in Press et al. 2000.**

2. BISTORTA Scop

Herbs or dwarf shrubs. Rootstock creeping, woody or herbaceous. Stems usually simple. Leaves ovate, elliptic or lanceolate, margins usually crenulate with thickened veins. Ocrea spilt obliquely, lacerate or entire. Flowers in spike-like racemes. Perianth 5-partite, not enlarged in fruit. Stamens 8. Styles 2-3, elangate, minutely capitate. Achenes biconvex or trigonous.

1. Bistorta amplexicaulis (D.Don) Greene, *Leafl.* 1:21(1904); Grierson and Long in *Fl. Bhu.* 1(1):167(1983); Pres et al. in *Ann. Check. Fl. Pl. Nep*.: 237(2000).
Polygonum amplexicaule D.Don, *Prodr. Fl. Nep.* 70(1825).
Polygonum petiolatum D.Don, *Prodr. Fl. Nep.* 70(1825).
Polygonum speciosum Meisn., *Monogr. Polyg*. 66(1826).

Erect herb with thick rhizomes, branched. Leaves ovate, 6-10×3-5cm, base cordate margin entire, apex acuminate. Upper leaves sessile, amplexicaul, glabrous. Ocreae 1-4cm, brown, membranous, entire. Racemes 2-5cm, borne on slender peduncles 3-8cm. Flowers numerous. Perianth c6mm, pink, pedicels 5-6mm. Stamens not exserted. Achenes 5-6, brown.
Field note: On moist, shady and slopy side.
Representative collection: Manang, below Naya Bazar, 2880m, 7.7.2006 (Fl.), K. Adhikari et al. 170.
Distribution: Nepal (WCE, 2100-4800 m), Afghanistan, Himalaya.

3. FAGOPYRUM Miller

Erect annual herbs. Leaves ovate, acute or acuminate, base cordate, hastate or deltoid. Ocreae oblique, entire. Flowers in dense cymes or branching spike-like racemes. Perianth segments 5, connate near base, not accrescent. Stamens 3, attached near base perianth and alternating with prominent glands. Styles 3, recurved, persistent, capitate. Achenes ovoid, trigonous, at least twice as long as perianth.

1. Fagopyrum tataricum (L.) Gaertn. in *Fruct. Sem*. 2: 182, t. 119, f. 6(1791); Grierson and Long in *Fl. Bhu.* 1(1):171(1983); Press et al. in *Ann. Check. Fl. Pl. Nep.* : 238(2000)
Polygonum tataricum L., *Sp. Pl.* 364(1753).

Stems up to 1m, often reddish. Leaves usually cordate, sessile, broadly deltoid up to 8 cm long and broad. Ocreae 0.6 -1.3cm, acute, brown. Flowers in branching racemes. Perianth segments c2mm, greenish. Achenes 5-8mm, angles rounded at base, surface grooved.
Uses: Achenes ground to make flour.
Field note: On moist, slopy and sandy soil.
Representative collection: Manang, Above Bagarchhap, 2140m, 8.7.2006 (Fl.and Fr.), K. Adhikari et al. 182.
Distribution: Nepal (WCE, 1400-3900m), C. Asia, Himalays, Siberia, often cultivated and escaped.

4. OXYRIA Hill

Erect perennial herbs. Leaves basal, broadly ovate or suborbicular, cordate at base. Ocreae broad, sheathing. Flowers in bracnched terminal racemens. Perianth segments 4, 2 outer smaller becomming reflexed and 2 inner larger, erect, scarcely accrescent in fruit. Stamens 6. Ovary elliptic, flattened. Syles 2, fimbricate. Fruit subcompressed, surrounded by a broad wing.

1. Oxyria digyna (L.) Hill, *H. Kew*. 158(1768); Grierson and Long in *Fl. Bhu.* 1(1):175(1983); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 238(2000). Fig.2.b-c.
Rumex digynus L., *Sp. Pl.* 337(1753).

Stens 5-50cm. Leaves 2-7cm, acute or obtuse. Petioles 3-25 cm. Ocreae 0.75-1.5cm, brown, acute, brittle. Leafblade fleshy, pale green, rounded or kidney shped. Perianth segements obovate or oblanceolate. Fruit orbicular, notched at apex. Embryo ovate, surrounded by a brown, membranous wing 1-1.75 mm.
Uses: Leaves are edible, both raw and cooked.
Field note: Found in open moist hillsides.
Representative collection: Manang, way from Dhukur Pokhari to Pisang, 3150, 1.7.2006 (Fl. and Fr.), K, Adhikari et al. 5.
Distribution: Nepal (WCE, 2400-5000), Europe, W and C. Asia, Himalaya (Kashmir to Bhutan0, Siberia, W. China, Japan, N. America, Greenland.

5. PERSICARIA L.

Annual or perennial herbs with branching stems, sometimes bearing short recurved spines, without basal leaves at flowering time. Leaves ovate, elliptic or lanceolate, rarely deltoid, entire margin. Ocreae cylindric. Flowers in racemens, spikes or capitate heads, perianth 4-5 partite. Stamens 5-8. Styles 2-3, elongate, capitate. Achenes biconvex, compressed or trigonous.

1. Persicaria nepalensis (Meisn.) H. Gross, *Bot. Jaharb*. 49:277(1913); Grierson and Long in *Fl. Bhu.* 1(1):164(1983); Press et al. in *Ann. Check. Fl. Pl. Nep.* : 239(2000).
Polygonum nepalense Meisn., *Monogr. Polyg*. 84, t. 7, f 2(1826).
Polygonum alatum Buch. -Ham. ex Spreng., *Syst.Veg., Cur, Post*. 154(1827).

Prostrate annual herb, stem branched, 10-30cm, distantly leafy, internodes 2-4cm. Leaves ovate or elliptic, 1-5×0.7-3cm, acute, base rounded, lamina decurrent. Petioles upto 1.5 cm and auriculate at base, glabrous. Ocreae 6-9mm, membranous, truncate, sparsely pubescent. Flowers in globose heads. Peduncles upto 2 cm, glandular pubescent at apex. Perianth pink, 2.5-3.5mm, trigonous or biconvex, strongly pitted, black.

Field note: Found in moist and shady place at cropland.

Representative collection: Manang, above Bagarchhap, 2140m, 8.7.2006 (Fl. and Fr.), K. Adhikari et al. 181.

Distribution: Nepal (WCE, 1200-4100m), Tropical Africa, Afghanistan Himalaya, India, east to China and Japan, Malaysia.

6. POLYGONUM L.

Prostrate, much branched herbs. Stem differentiated into nodes and internodes. Leaves narrow, stipulate, elliptic. Petioles short up to 5mm, auriculate. Ocreae 2-lobed, membranous becomong lacerate. Flowers 2-5 in axillary clusters. Perianth 4-5 partite. Stamens 4-5. Styles 2-3. Achenes trigonous or biconvex.

Key to species

1a. Leaves elliptic, margin entire, fruits achenes ..... **1. P. aviculare**

1b. Leaves linear, margins incurved, fruit nut rhomboid.....**2. P. tubulosum**

1. Polygonum aviculare L., *Sp. Pl.* 362(1753): Grierson and Long in *Fl. Bhu.* 1(1):170(1983); Press et al. in *Ann. Check. Fl. Pl. Nep.* : 240(2000).

Prostrate or ascending annual herbs. Stems upto 30cm, branched usually from base. Petiole c2mm. Leaffblade elliptic, 10-25×2.7mm, base cuneate or attenuate, margin entire, apex acute or obtuse, glabrous. Ocreae c6mm, membranous, with few ribs. Flowers 2-5 in axillary clusters, scarcely exserted. Perianth white or pink. Achenes c3m.

Field note: Found along the foot train on rocky place.

Representative collection: Manang, near Chame, 2760m, 10.10.2006 (Fl.and Fr.), K. Adhikari et al. 286.

Distribution: Nepal (WC, 2200-3800m), widely distributed in temperate and subtropical regions.

2. Polygonum tubulosum Boiss., *Diagn. Pl. Or. Nov. ser.* 1, 7:83(1846); Hook. f. in *Fl. Brit. Ind*. 5:(1886); Press et al. in *Ann. Check. Fl. Pl. Nep.* : 240(2000).

Annual herbs 15-25cm with short prostrate or asending leafy angular but not grooved branches, glabrous, internodes very short. Leaves linear, acute, margins incurved, 1-2.5cm. Stipules hyaline subentire lacerate or fimbricate. Flowers axillary, sessile. Perianth ovoid, tube longer than the small, rounded white or pink lobes. Nut rhomboid, smooth shining.

Field note: On open sandy foot trail.

Representative collection: Manang, Khangsar, 3800m, 8.10.2006 (Fr.), K Adhikari et al. 231.

Distribution: Nepal (C, 3000-3200m), Pakistan (Chitral), Himalaya (Kashmir to Nepal), China (Xizang). **Not reported at 3800m altitude in Press et al. 2000.**

7. RHEUM L.

Perennial erect herbs with thick roots. Leaves large, ovate, entire or sinuate. Ocreae membranous, sometimes large. Flowers in racemes or panicles, red. Penduncles pale yellow. Perianth segments 6, connate at base. Stamens 7-9, borne on a ring adnate to perianth. Ovary triquetrous. Styles 3, very short, rounded. Achenes 3-winged larger than perianth.

1. Rheum australe D. Don, *Prodr. Fl. Nep.* 75(1825); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 240(2000).

Large herbs upto 3m, branched. Basal leaves upto 30×25cm, acute, sparsely pubescent beneath, upper leaves smaller. Petioles 12-25cm. Ocreae 5-10 cm, brown. Flowers in axillary or terminal panicles. Perianth segments c2mm, dark red. Pedicels 5mm, jointed near base. Fruits ovate, c10×8mm, rounded or acute at apex. Achene wings broad.

Use: Used medicinal.

Field note: On moist, shady and slopy area.

Representative collection: Manang, near Chame, 2820m, 11.10.2006 (Fl.), K. Adhikari et al. 330.

Distribution: Nepal (CE, 3200-4200m), Himalayan(Himachal pradesh to Nepal, ? Bhutan), China (Xizang). **Not reported at 2820 altitude in Press et al. 2000.**

8. RUMEX L.

Erect, annual or perennial herbs. Leaves ovate, lanceolate or hastate. Ocreae membranous, deciduous. Flowers bisexual or unisexual in axillary clusters in whorls forming simple or panicled racemes. Perianth segemetns 6, the outer 3 smaller and inner 3 larger and enveloping the fruits. Stamens 6, simple. Ovary trigonous. Styles 3, fimbricate. Achenes sharply angular.

1. Rumex nepalensis Spreng, *Syst. Veg*. 2: 159(1825); Grierson and Long in *Fl. Bhu.* 1(1):173 (1983); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 241(2000).

Nep.: Hali, Eng.: Yellow doek.

Perennial herbs. Stems upto 1.5 m. Leaves oblong-ovate, lower larger 8- 15×4-8cm, obtuse or subacute, base cordate, margin serrulate, apex acute. Ocreae 2-4cm, outer perianth segments oblanceotate, 2.25mm entire, inner ones ovate, c3×2mm in flower, toothed in lower half. Achenes 3-4×c2mm.

Uses: Leaves are used as vegetable, roots are used medicinally for curing skin disease, Urination etc.

Field note: On moist, shady and sandy soil.

Representative collection: Manang, upperside of Chame, 2720m, 4.7.2006 (Fr.), K. Adhikari et al. 83.

Distribution: Nepal (WCE, 1200-4200m), SW Europe, W. Asia, Himalaya, India, East to W. and C. China.

Family 7. PHYTOLACCACEAE

Fleshy perennial herbs. Leaves alternate, pinnately veined, entire, exstipulate. Flowers in leaf-opposed or terminal bracteate racemes, bisexual, actinomorphic. Perianth of 4-5 segments, connate at base. Stamens 8-12, inserted at base of perianth, filaments persistent . Ovary superior, subglobose. Ovule 1 per carpel. Style filiform, terminal on each carpel, Fruit berry-like, subglobose, of 6-8 fleshy 1- seeded carpels.

1. PHYTOLACCA L.

Description as for Phytolaccaceae.

1. Phytolacca acinosa Roxb. *Fl. Ind. ed* 2, 2:458(1832); Grierson and Long in *Fl. Bhu.* :1(2):191(1984); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 233(2000). Fig.2.d.

Pircunia latbenia Moq. in DC., *Prodr.* 13(2):29(1849).

Nep.: Jaringo, Eng.: Indian poke/Poker weed

Stems erect, 40-120m. Leave elliptic, 8-25×2.5-10cm, acute, base attenuate, entire, glabrous. Petioles 1-4cm. Racemes dense, 6-15cm, pinkish. Pedicels 6-10mm. Bracts and bracteoles linear. Perianth segments elliptic, c 5×3mm, obtuse. Fruit depressed -globose, 8-10mm across. Carpel c4 mm.

Field note: On slopy, moist and stony open area.

Representative collection: Manang, above Koto, 2670m, 12.10.2006 (Fl. and Fr.), K. Adhikari et al. 342.

Distribution: Nepal (WC, 2200-32000m), Himalaya (Kashmir to Arunchal Pradesh), NE India, Laos, W. China.

Family 8. CARYOPHYLLACEAE

Annual, biennial or perennial herbs. Leaves opposite, simple, entire rarely serrulate. Stipules scarious or absent. Flowers actinomorphic, usually bisexual, solitary or in cymes. Sepals 4-5, free or united into a tube. Petals usually as many as sepals, sometimes with a basal claw concealed within calyx. Stamens up to 10, free, filaments of those opposite sepals. Ovary superior free, central, style free or connate. Receptacle sometimes elongated bearing petals, stamens and ovary. Fruit a capsule opening by apical tooth like valves.

Key to genera

1a. Petals notched at apex **1.Cerastium**
1b. Petals bifid at least to middle.....2
2a. Stipules present, capsule 3-valved .....**2. Drymaria**
2b. Exstipulate, capsule 6- valved .....**3. Stellaria**

1. CERASTIUM L.

Slender herbs with small leaves. Flowers in terminal cymes. Sepals 5, free, margins scarious. Petals 5, notched at apex. Stamens 10. Receptacle not elongted. Ovary 1-celled, styles 5, filiform capsule cylindrical, 10-valved. Seeds numeruous.

1. Cerastum fontanum subsp-**trivale** var. **angustifolium** (Franch.) H. Hara, *J. Jap. Bot.* 52:258(1977); Press et al. in *Ann. Check. Fl. Pl. Nep.*:53(2000).

Cerastium vulgatum L. var. *trivale* Edgew. & Hook. f. in *Fl. Brit. Ind.* 1:228(1874).

Herbs about 30 cm tall. Stem simple, erect, pilose. Basal leaves ovate, c1.5×0.8 cm, both surface pilose, base attenuate into a petiole. Cauline leaves subsessile, ovate. Cyme terminal, spreading. Bracts leaf-like, glandular pubescent. Sepals oblong, c6mm, densely glandular pubescent. Petals shorter than sepals, apex 2 lobe. Stamens shorter than petals. Style 5, linear. Capsule cylindric, c1cm.

Field note: On sliding sandy soil.

Representative collection: Manang, above Thanchok, 2630m, 13.10.2006 (Fl.), K. Adhikari et al. 364.

Distribution: Nepal (WCE, 2200-5000m), Himalaya, China, Taiwan, Korea, Japan.

2. DRYMARIA Schuttes

Prostrate or subrect branching herbs. Leaves rounded, stipules small scarious. Flowers in axillary or terminal cymes. Sepals 5, margins scarious. Petals 5, white, bifid to below middle. Stamens 2-3(-5). Ovary 1-celled. Styles 2-3 united nearly to middle. Capsule 3- valved, seeds 1 or many.

1. Drymaria cordata (L.) Willd. ex Roem and Schult., *Syst. Veg*. 5: 406(1819); Grierson and Long in *Fl. Bhu.* 1(2):215(1984); Press et al. in *Ann. Check. Fl. Pl. Nep.* 40(2000). Fig.2.e-h. *Holosteum cordatum* L., *Sp. Pl.* 88(1753).

Nep.: Abijalo

Creeping glabrous herb, rooting at nodes. Leaves sessile or petiole upto 4 mm, simple, broadly ovate or orbicular, 0.5-1.5×0.5-1.5cm, acute or obtuse, base shallowly cordate, margin entire, glabrous. Flowers small. Penducle much larger, finely papillose haired, bracts scarious. Sepals 5, ovate-elliptic, c0.3cm, 3-veined, margins scarious. Petals 5, as long as sepals, linear-lanceolate, acute, scarious, white. Stamens 5-6, anther white. Capsule ovoid.

Uses: Plant medicinally used for stomach problems.

Field note: Found in moist, shady meadow near forest.

Representative collection: Manang, below Thanchok, 2630m, 13.10.2006 (Fl.), K. Adhikari et al. 385.

Distribution: Nepal (WCE, 2200-4300m), Africa, America, naturalized in Nepal and India, Pacific Islands.

3. STELLARIA L.

Diffuse or mat-forming herbs, rarely scrambling. Leaves ovate-lanceolate or linear. Flowers in cymes, rarely solitary. Sepals 5 or 4, ovate-lanceolate, often scarious-margined. Petals 5 or 4, bifid to middle or to base , white, sometimes absent. Stamens 10 or 8, rarely as few as 3. Ovary 1- celled. Styles 3-5. Capsule short, opening by 6 valves. Seeds numerous or rarely few.

1. Stellaria vestita Kurz., *J. Bot*. 11:194(1873); Grierson and Long in *Fl. Bhu*. 1(2):206(1984); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 44(2000).

Stellaria saxatilis Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.* 215(1825).

Weak, greyish, stellately pubescent herbs. Stems prostrate. Leaves ovate, 0.6-3×0.3-0.8cm, acute or acuminate, base rounded, sessile. Flowers few, in loose cymes, Sepals lanceolate, c6mm. Petals c4mm, bifid almost to base. Capsule ovoid as long as sepals.

Field note: On busy foot trail side.

Representative collection: Manang, bet^{n} Talekhu and Chame, 2770m, 3.7.2006 (Fl.), K. Adhikari et al. 45.

Distribution: Nepal (WCE, 1600-2500m), Himalaya (Nepal to Bhutan), India, Indo-China, W. China, Taiwan, Malaysia. **Not reported at 2770m altitude in Press et al. 2000.**

Family 9. CHENOPODIACEAE

Annual herbs. Leaves alternate, simple , exstipulate, with white scales or stellate-pubesent. Flowers in axillary clusters, or terminal panicle, unisexual or bisexual, actinomoriphic. Perianth segments, 3-5 free or connate, persistent. Stamens 2-5, opposite perianth segments, filaments free or connate at base. Ovary superior, 1-celled. Ovary 1. Styles usually 2, linear. Fruit an achene.

1. CHENOPODIUM L.

Branched erect herbs. Leaves entire, dentate shallowly lobed or pinnatifid, mealy with whitish bladder like scales or yellowish gland-dotted. Flower clusters aggregated into terminal panicles. Flowers bisexual or universal. Perianth segments 3-5, herbaceous, connate at base.

1. Chenopodium album L., *Sp. Pl.* 219(1753); Grierson and Long in *Fl. Bhu.* 1(2): 216(1984); Press et al. in *Ann. Check. Fl. Pl. Nep.* : 46(2000). Fig.2.i.

Nep.: Bethe/Bethuva/Ikanca, Eng.: Lamb's quarter.

Erect herb upto 1m. Leaves ovate-deltoid, 2.5-6×0.7-4cm, base cuneate, margins entire or shallowly dentate, apex subacute, sometimes weakly 3-lobed, many beneath. Flower in dense clusters sessile, forming slender panicles, upper bisexual, lower uisexual. Female flower c0.75mm diameter. Perianth segments 5. Stamens 5.seeds black.

Uses: Plants used as vegetable.

Field note: Found near agriculture land.

Representative collection: Manang, Koto area, 2620m, 6.7.2006 (Fl.), K. Adhikari et al. 140.

Distribution: Nepal (WC, 1800-4000m), China, Korea, Japan, Bhutan.

Family 10. AMARANTHACEAE

Herbs, shrubs or woody climbers. Leaves simple, alternate or opposite, entire, exstipulate, Flowers in heads, spikes or panicles, actionomophic, bisexual or sometimes unisexual. Usually 2 bracteoles. Perianth segments 3-5, mostly free, papery or rigid. Stamens 3-5, opposite perianth segments, 1- or 2- celled, free or filaments connate into a basal ring or tube. Ovary superior, 1-celled, ovules 1 or several. Styles 1-3. Fruit a capsule or utricle, sometimes circumscissile rarely a berry.

Key to genera

1a. Perennial herbs, all flowers fertile .....**1. Achyranthes**

1b. Perennial herbs or shrubs both fertile and sterile flowers present…….**2. Cyathula**

1. ACHYRANTHES L.

Perennial herbs. Leaves opposite. Flowers all fertile in elongate terminal or axillary spikes, bisexual. Bracts and bracteoles spine tipped. Perianth segments 5, rigid. Stamens 5, anthers 2- celled, filaments connate at base into short cup, toothed pseudostaminodes. Ovary oblong, style filiform, stigma capitate. Fruit 1- seeded, indehiscent, shed with perianth and bracteoles.

1. Achyranthes bidentata Blume, *Bijdr.* 545(1825); Grierson and Long in *Fl. Bhu.* 1(2):227(1984); Press et al. in *Ann. Check. Fl. Pl. Nep.*:7(2000). Fig. 2.j.

Nep.: Dativan/Rate apamarga, Eng.: Hill Chaff flower

Erect herb with long branches upto 1m. Leaves ovate elliptic, 4-11×1.5-5cm, acute, base cuneate, texture softer. Flowers in spikes shorter upto 12 cm. Basal part of bracts 0.75-1mm, free from spine except at base. Perianth segments ovate lanceolate, 3-4mm, greenish, rigid. Pseudostaminodes very short.

Field note: Near water body and shady place.

Representative collection: Manang, near Danaque, 2750m, 13.10.2006 (Fl.), K. Adhikari et al. 404.

Distribution: Nepal (CE, 1200-2100m), Tropical Africa, Himalaya, India east to China, Malaysia. **Not reported at 2750m altitude in Press et al. 2000.**

2. CYATHULA Blume

Perennial herbs or subshrubs. Leaves opposite. Flower clusters forming terminal spikes or dense heads, each clusters composed of 1-2 central fertile flowers and an outer 1-2 sterile flowers. Fertile flowers bisexual. Perianth segments 5, rigid or papery. Stamens 5, anthers 2-celled, filaments connate at base into a cup, alternating with short pseudostaminodes. Ovary obovoid or oblong, style filiform with capitate stigma. Capsule ellipoid, 1-seeded.

1. Cyathula prostrate (L.) Blume, *Bijdr*. 549(1825); Grierson and Long in *Fl. Bhu.* 1(2): 226(1984); Press et al. in *Ann. Check. Fl. Pl. Nep.* : 8(2000).

Achyranthes prostrata L. ,*Sp. Pl.* ed. 2, 296(1762)

Creeping perennial herbs. Leaves rhombic-elliptic, 2-6×1.5-3cm, acute, base cuneate, sparsely hirsute. Petioles 2-8mm. Flower clusters forming slender spikes 4-6mm broad. Fertile flowers with perianth segments c2mm, c1mm in sterile flowers. Capsule ellipsoid, 1-seeded, indehiscent.

Field note: In dense forest.

Representative collection: Manang, below Thanchok, 2630m, 13.10.2006 (Fl.), K. Adhikari et al. 387.

Distribution: Nepal (CE, 900-1100m), Africa, Himalaya, India to S. China Taiwan, Malaysia, Australia, Polynesia. **Not reported at 2630m altitude in Press et al. 2000.**

Family 11. LAURACEAE

Deciduous or evergreen tree or shrubs, often aromatic. Leaves alternate, sometimes opposite or clustered, simple, pinnately veined or strongly 3-veined, exstipulate. Flowers in panicles, racemes or umbels. Unisexual or bisexual, actinomorphic. Perianth segments usually 6, free, in two whorls of 3. Fertile stamens usually 9 in whorls of 3, often with inner whorl staminodes. Female flowers with 9 or 12 staminodes. Ovary usually superior, ovule 1, apical, style short. Fruit a drupe.

1. LINDERA Thunberg

Deciduous or evergreen tree or shrubs. Shoots with or without conspicuous terminal vegetative buds. Leaves alternate, pinnately veined or 3-veined from base. Dioecious. Flowers unisexual. Perianth segments usually 6. Fertile stamens 9 with 2-celled anthers, all introse. Fruit ovoid or globose, entire or toothed perianth cup.

1. Lindera nacusua (D.Don) Merr. in *Lingnan Sc1. J*. 15:419(1936); Press et al. in *Ann. Check. Fl. Pl. Nep.*:161(2000). Fig. 3.a.

Laurus nacusua D.Don, *Prodr. Fl. Nep.* 64(1825).

Daphnidium bifarium Nees in Wall., *Pl. As. Rar*. 2:63(1831).

Nep.: Pahelo Khapate

Evergreen tree upto 10m. Young shoots smooth, tomentose. Leaves thinly coriaceous, elliptic, 6-11×2-3cm, shortly acuminate. Umbels sessile, densely clustered, silky pubescent. Fruit globose, 6mm, on persistent perianth cup, on short pedicel c4mm.

Uses: Medicinally used.

Field note: On moist open area.

Representative collection: Manang, Temang, 2600m, 13.10.2006 (Fr.), K. Adhikari et al. 398.

Distribution: Nepal (WC, 1300-1800m), Himalaya (Uttar Pradesh to Nepal), NE India (Assam, Manipur), W.and S.China, Indo-China. **Not reported at 2600 m altitude in Press et al. 2000.**

Family 12. RANUNCULACEAE

Annual or perennial herbs, erect or stoloniferous, rarely shrubs or woody climbers. Leaves basal and on stems, alternate, rarely opposite, entire or palamtely, ternately or pinnately disected, exstipulate. Inflorescence solitary cymose, racemes or paniculate. Flowers actinomorphic or zygomorphic, bisexual or rarely unisexual. Sepals 3-8, mosltly 5. Petals sometimes absent, 1-many, free. Stamens many. Carpels 1-many, superior, free or shortly connate at base. Ovules 1, basal or marginal. Fruit a cluster of 1-seeded indehiscent achenes or few to many seeded follicles.

Key to the genera

1a. Climbing or rarely erect shrubs or sub-shrubs .....**3. Clematis**
1b. Annual or perennial erect herbs.....2
2a. Flowers in slender axillary racemes or terminal panicles, sepal 4-5.....3
2b. Flowers solitary or other than above, sepal other than 4-5.....4
3a. Fruit a cluster of follicles, carpels 3-5.....**2. Cimicifuga**
3b. Fruit a head of stalked or sessile achenes, carpels 5-10 or more.....**5. Thalictrum**
4a. Petal absent, sepals 5-6, petaloid……..…….**1. Anemone**
4b. Petal usually 5, sepals 3-5, deciduous……..……**4. Ranunculus**

1. ANEMONE L.

Perennial erect herbs. Leaves basal, petiolate, lobed, often ternately. Flowers actinomorphic, solitary, or several in umbellate cymes on scapes, with an involucre of 2-3 leafy bracts. Sepals 5-6, petaloid. Petals absent. Stamens many. Carpels numerous, ovule one. Fruit a head of glabrous, pubescent or woolly achenes. Style persistent, minute or short.

1. Anemone vitifolia Buch.-Ham. ex DC., *Syst. Nat*. 1:211(1817); Grierson and Long in *Fl. Bhu.* 1(2):292(1984); Press et al. in *Ann. Check. Fl. Pl. Nep*.:251(2000).

Herbs. Leaves simple, broadly ovate, 7-20 cm long, acute, base cordate, margins serrate, whitish tomentose beneath. Petioles 10-20cm. Umbellate cyme, one bearing a single flower. Sepals obovate-elliptic, 15-2×0.7-1.2cm, obtuse or acute, white within, purplish outside. Achenes ellipsoid.

Field note: On the side of foot trail of moist and shady area.

Representative collection: Manang, Tealekhu, 2788m, 2.7.2006 (Fl.), K. Adhikari et al. 29.

Distribution: Nepal (WCE, 1300-3300m), Himalaya (Kashmir, Uttar Pradesh to Bhutan), NE India, N. Myanmar, W. China.

2. CIMICIFUGA L.

Erect perennial herbs. Leaves alternate, 2-5 times ternately compound. Flowers in slender axillary racemes or terminal panicles, actinomorphic. Sepals 4-5, petaloid, caduceous. Petals 4-5, fleshy, bifid with 2 rounded lobes at apex. Stamens many. Carpels 3-5(-8), styles elongate, thickened. Fruit a cluster of follicles.

1. Cimicifuga foetida L., *Syst. Nat. ed*. 12, 2:659(1767); Grierson and Long in *Fl. Bhu.* 1(2):309(1984); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 252(2000).

Actaea cimicifuga L., *Sp. Pl.* 504(1753).

Erect perennial herbs. Stem 1-2m. Lower leaves upto 30cm, leaflets broadly ovate or somewhate trilobed, 4-8×2.5-5cm, acute, base rounded, margins coarsely and irregularly serrate, sparsely pubescent, petioles 2-6cm. Sepals obovate, 3-4×2-3mm, greenish. Petals elliptic or ovate, terminal lobes pale. Stamens white. Follicles oblong, papery.

Field note: On moist, slopy and shady area.

Representative collection: Manang, Chame, 2800m, 11.10.2006 (Fl.), K. Adhikari et al. 301.

Distribution: Nepal (WCE, 3000-4000m), Himalaya (Kashmir, Uttar Pradesh to Bhutan), N. Myanmar, W. and N. China, Mongolia, Korea. **Not reported at 2800m altitude in Press et al. 2000.**

3. CLEMATIS L.

Climbing or rarely erect shrubs or subshrubs. Leaves opposite, simple or more often ternate, biternate or pinnate. Petioles often twining. Flower actionomorphic, solitary or in panicles, axillary or terminal. Sepals 4(-8), petaloid, valvate. Petals absent. Stamens numerous. Carpels many, each with one ovule. Fruit a head of achenes. Style plumose with long straight hairs, stout and without plumose hairs.

Key to species

1a. Petioles thickened at base, leaves margins coarsely serrate or 3-lobed ……
……**1. C. buchananiana**

1b. Petioles simple, leaves margins coarsely toothed or lobed……..**2. C. tongluensis**

1. Clematis buchananiana DC., *Syst. Nat*. 1:140(1817); Grierson and Long in *Fl. Bhu.* 1(2):289(1984); Press et al. in *Ann. Check. Fl. Pl. Nep.*:252(2000).

Clematis buchananiana var *rugosa* Hook. f. and Thoms., *Fl. Ind*. 1:11(1885)

Woody climber, brownish pubescent throughout. Leaves ternate, leaflets 3, broadly ovate, 6.5-12×4-10cm, acute or shortly acuminate, base rounded or cordate, margins coarsely serrate or 3-lobed. Petioles thickened at base. Panicles bearing a pair of coarsely toothed leafy bracts at each node. Sepals greenish yellow, ovate, 2-3×0.5-0.7cm, filaments hairy.

Field note: On the pine tree as climber.

Representative collection: Manang, way from Dharapani to Tal, 1640m, 14.10.2006 (Fr.), K. Adhikari et al. 451.

Distribution: Nepal (CE, 1800-3300m), Himalaya (Nepal to Arunachal Pradesh), W China, N. Myanmar, Indo-China. **Not reported at 1640m altitude in Press et al. 2000.**

2. Clematis tongluensis (Bruhl) Tamura, *Acta Phytotax. Geobot*. 19(2-3):77(1962); Grierson and Long in *Fl. Bhu.* 1(2):286(1984); Press et al. in *Ann. Check. Fl. Pl. Nep.*:253(2000).

Clematis montana var. *tongluensis* Bruhl in *Ann. B.G. Calc*. 51: 74(1896).

Clematis montana subsp. *sinchugica* Kuntze in *Verh. B. Ver. Brand*. 26:141(1885).

Woody climber . Leaves ternate, leaflets ovate, 1.5-7×1-3.5cm, acute, base rounded, margins coarsely toothed or lobed, sparsely appressed- pubescent. Petioles 4-7cm. Flower usually 1 per axil. Pedicels longer, 12-30cm. Sepals 4-6×1-2cm, acuminate. Anthers purple. Achenes ovate, c5×4mm.

Field note: On slopy and dry area.

Representative collection: Manang, way from Dharapani to Tal, 1640m, 14.10.2006 (Fl.), K. Adhikari et al. 443.

Distribution: Nepal (E, 2600-3000m), Himalaya (Nepal to Bhutan). **Not reported in Central Nepal and at 1640m altitude in Press et al. 2000.**

4. RANUNCULUS L.

Annual or perennial, terrestrial or aquatic herbs. Leaves basal or alternate on stems, often ternately lobed or divided, rarely entire, auricles membranous or absent. Flowers actinomorphic, solitary or few in a corymb. Sepals 3-5, deciduous. Petals usually 5, each with a nector-pit near base. Stamens many. Carpels many, style short, ovule 1. Fruit a head or spikes of achenes.

Key to species

1a. Leaves just divided, flowers solitary terminal……..……**1. R. brotherusii**

1b. Leaves divided almost to base, flowers several……..….**2. R. scleretus**

1. Ranunculus brotherusii Fregn in *Bull. Herb. Boiss*. 6:885(1898); Grierson and Long in *Fl. Bhu.* 1(2):302(1984); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 255(2000); Wu Zheng-Yi & Peter H. Raven in *Fl. Ch1*. 6:409(2001). Fig.3.c.

Suberect herbs. Basal leaves 1-2cm long and broad reniform, leaflets deeply cut into linear-lanceolate. Leafblade 0.5-1.5×0.7-1.5cm, divided into 3 lobes, apex acute, lateral lobes unequally 2-partite. Upper stem leaves sessile, segments linear. Flowers solitary, terminal. Sepals 5, ovate, 2-3mm. Petals 5, obovate 4-6mm. Achenes glabrous.

Field note: On moist open area.

Representative collection: Manang, near Thanchok, 2630mm, 13.10.2006 (Fl.), K. Adhikari et al. 367.

Distribution: Nepal (WCE, 3000-5000m), C. Asia, Himalaya (Kashimr to Uttar Pradesh), China. **Not reported at 2630m altitude in Press et al. 2000.**

2. Ranunculus scleretus L., *Sp. Pl.* 551(1753); Grierson and Long in *Fl. Bhu.* 1(2):303(1984); Press et al. in *Ann. Check. Fl. Pl. Nep.* :257(2000).

Ranunculus umbellatus Roxb. ex Willd., *Enum. H. Bersol*. 588(1809).

Nep.: Nakakore, Eng.: Crow- foot/Butter cup/ Crown foot.

Erect annual herbs, glabrous. Basal and lower stem leaves reniform or suborbicular, 2-4×1-2.5cm, divided almost to base into 3 obovate segements. Petioles 2.5cm, auricles, scarious. Flowers several, diffusely racemose. Sepals elliptic, pubescent. Petals yellow. Achenes obovoid. Style minute.

Field note: On moist and slopy area.

Representative collection: Manang, Temang, 2600m, 13.10.2006 (Fl and Fr.), K. Adhikari et al. 395.

Distribution: Nepal (WCE, 800-1700m), N. America, Europe, C. Asia, N. India, China, Japan, Mongolia, Siberia. **Not reported at 2600 m altitude in Press et al. 2000.**

5.THALICTRUM L.

Erect perennial herbs. Leaves pinnate or ternate with 3-7 leaflets. Petioles sheathing at base, sometimes with stipule like auricles. Flowers actinomorphic, erect or pendent in diffuse racemose or panicles, axillary. Sepals 4-5, petaloid. Petals absent. Stamens 5-many. Carpels 5-10 or more. Ovule 1. Fruit a head of stalked or sessile achenes. Styles persistent or deciduous.

Key to species.

1a. Sepals narrowly elliptic, greenish white, leaves glandular hairy……..**1. T. cultratum**

1b. Sepals obovate, white outside and mauve within, leaves smooth.....**2. T. foliolosum**

1. Thalictrum cultratum Wall., *Pl. As, Rar*. 2:26(1831); Grierson and Long in *Fl. Bhu.* 1(2):297(1984); Press et al. in *Ann. Check. Fl. Pl. Nep.*:257(2000).

Thalictrum chelidonii var. *cultratum* (Wall.) Hook. f. and Thoms., *Fl. Ind.* 1:13(1855).

Herbs 0.5-1.2m tall, glabrous or pubescent. Stems branched distally. Basal and proximal cauline leaves. Leaflets bluntly-toothed, glandualr hairs minute, 0.5-1×0.3-1cm , base rounded, apex acute. Inflorescene paniculate. Sepals deciduous, greenish white, narrowly elliptic 3-4mm. Stamens more than 10. Achenes obliquely obovate.

Field note: On rocky and slopy dry place.

Representative collection: Manang, bet^{n} Pisang and Bhratang, 2920, 1.7. 2006 (Fl.), K. Adhikari et al.9.

Distribution: Nepal (WCE, 2400-4200m), Himalaya (Kashmir, Uttar Pradesh to Bhutan), China.

2. Thalictrum foliolosum DC., *Syst. Nat*. 1:175(1817); Grierson and Long in *Fl. Bhu.*1(2):298(1984); Press et al. in *Ann. Check. Fl. Pl. Nep.* 257(2000).

Thalictrum falconeri Lecoyer in *Bull. S.B. Belge* 24:192 and 271, t. 4, f. 12(1885).

Herb upto 2m glabrous. Leaflets broadly ovate, 1.5-3×1-2.5, acute or obtuse, bluntly toohed or lobed, smooth. Sepals obovate, c4×2mm, white outside, mauve within, caducous. Anthers 2-3mm, acute. Achenes ellipsod, c3mm, strongly ribbed, sessile, glabrous, style deciduous.

Field note: On slopy stony open area.

Representative collection: Manang, bet^{n} Pisang and Bhratang, 3000m, 1.7.2006 (Fl.), k. Adhikari et al 8.

Distribution: Nepal (WCE, 1300-3400m), Himalaya (Kashmir, Uttar Pradesh to Arunchal Pradesh), N. Myanmar, China (Xizang).

Family 13. BERBERIDACEAE

Shrubs, often spiny. Leaves alternate, simple or 1-pinnate, herbaceous or coriaceous, exstipulate. Flowers solitary or several or many in fascicles or racemes, bisexual, actinomorphic. Sepals and petals similar, usually 6 in two whorls of 3, free, yellow or greenish, sometimes tinged with red, petals with 2 oblong glands near base. Stamens 6, anthers opening by valves. Ovary superior, ovules few, basal, style short or absent, stigma rounded. Fruit a berry.

1. BERBERIS L.

Spiny shrubs. Stems bearing 3-5 fid spines, rarely without spines. Leaves simple usually spinous, borne in clusters on stunted short shoots. Sepals 6-12 in 2-4 whorls. Petals 6, ovate free. Stamens 6, anther introse, longitudinally dehiscent. Fruit a berry.

Key to species

1a. Stems grooved brownish, leaves margin spiny.....**1. B. aristata**
1b. Stems normal yellowish, leaves margin entire .....**2. B. asiatica**

1. Berberis aristata DC., *Syst. Nat*. 2:8(1821); Hook. f. and Thoms. in *Fl. Brit. Ind.* 1:110(1872); Press et al. in *Ann. Check. Fl. Pl. Nep.*:25(2000).

Nep.: Cutro/kinsi/Kirmando, Eng.: Barberry/Nepal barberry

Shrubs c2m, deciduous. Stems brownish, grooved, spines 1-2 cm, Leaves obovate, 1.5-3×0.5-1.5cm, base attenuate, obtuse or acute, margin with spines. Racemes 4-5cm. Sepals outer one ovate and inner obovate. Petals obovate, 6-7×3-4mm with 3 distinct unbranched veins. Berries narrowly eliipsoid with style 1mm.

Uses: Fruits are edible.

Field note: Found in stony forest area.

Representative collection: Manang, Talekhu, 2780m, 2.7.2006,(Fr.), K. Adhikari et al. 19.

Distribution: Nepal (WC, 1800-3000m), Himalaya (Nepal to Bhutan), India.

2. Berberis asiatica Roxb. ex DC, *Syst. Nat*. 2:13(1821); Grierson and Long in *Fl. Bhu.* 1(2):326(1984); Press et al. in *Ann. Check. Fl. Pl. Nep.*:25(2000). Fig.3.d.

Nep.: Cutro, Eng.: Common berberry

Evergreen shrubs upto 2m. Stem yellowish, spines 5-7mm. Leaves coriaceous, obovate, 2-4×1-2.5cm, acute or obtuse, mucronate at apex, base attenuate, margin entire. Racemes short at flowering outermost sepals broadly ovate and inner obovate. Petals obovate, c8×6mm. Ovary ellipsoid. Ovules 2-4, Berries ellipsoid, c10×7mm.

Field note: On stony slopy place.

Representative collection: Manang, Talekhu, 2790m, 10.10.2006 (Fr.), K. Adhikari et al. 285.

Distribution: Nepal (WCE, 1200-2500m), Himalaya (Uttar pradesh to Bhutan), NE India, China (Uunnan). **Not reported at 2890m altitude in Press et al. 2000.**

Family 14. PIPERACEAE

Small herbs or shrubs, often climbing. Leaves simple, alternate, opposite or whorled, entire, usually palmately veined at base rarely pinnately veined. Stipules present or absent,

caducous. Flowers in terminal or leaf-opposed spikes, unisexual or bisexual, minute. Perianth absent. Male flowers with 2-4 stamens. Female flowers with superior 1-celled ovary, stigma sessile, brush like or 3-5, simple. Ovule 1. Fruit a drupe, free or fleshy spike.

1. PEPEROMIA Ruiz and Pavon

Small succulent herbs. Leaves alternate, opposite or whorled. Palmately 3-5 veined from base or pinnately veined, exstipulate. Flowers bisexual, in axil of peltate bract. Stamens 2, reniform. Ovary minute with 1 brush -like stigma. Drupes minute, sessile.

1. Peperomia heyneana Miq., *Syst. Pip*. 123(1843); Grierson and Long in *Fl. Bhu.* 1.(2):344(1984); Press et al. in *Ann. Check. Fl. Pl. Nep.*:234(2000). Fig.3.e.

Bushy succulent herbs 6-15cm, much branched at base and often rooting at nodes. Stems ribbed, glabrous. Leaves more thinly fleshy, oblanceolate or narrowly obovate, 8-15×3-6mm, base attenuate, pinnately veined with distinct midrib. Petioles 4-7 mm, glabrous. Spikes glabrous, terminal axillary. Drupes ellispid.

Field note: On open moist area.

Representative collection: Manang, Tal, 1630m, 9.7.2006 (Fl.), K. Adhikari et al. 196.

Distribution: Nepal (CE, 1200-2500m), Himalaya (Uttar pradesh to Bhutan), India.

Family 15. FUMARIACEAE

Annual or perennial usually glabrous herbs, sometimes climbing. Leaves alternate, sometimes upper opposite, mostly 1-4 pinnatisect or ternatisect, exstipulate. Flowers in racemes or spikes, zygomorphic, bisexual. Sepals 2, small. Petals in 2 dissimilar pairs, outer pair larger, one or both spurred or swollen at base, inner pair narrower. Petal spurs enclosing a nectariferous gland. Stamens usually 6, connate into two bundles. Ovary superior 1-celled with 2 parietal placentae. Style 1. Fruit a 2- valved few to many seeded capsule or nutlet

Key to genera

1a. Erect or decumbent herb, style filiform .....**1. Corydalis**
1b. Climbing herb, style slender .....**2. Dicentra**

1. CORYDALIS Venterat

Perennial erect or decumbent glabrous herbs. Leaves pinnatisect or ternatisect, alternate or stem leaves opposite. Flowers in terninal racemes, sometimes condensed and subumbellate, zygomorphic. Petals yellow, blue, purple or white. Stamens 6 in 2 bundles, upper bundle with a basal nectariferous gland. Style filiform, stigma 2. Capsule dehiscing to leave seed-bearing placentae attached to style.

1. Corydalis juncea Wall., *Tent. Fl. Nep.* 54, t. 42,f. dextra(1826); Grierson and Long in *Fl. Bhu.* 1(20):393 (1984); Press et al. in *Ann. Check. Fl. Pl. Nep.* 229(2000). Fig.3.f.

Erect herb 8-25cm. Basal leaf usually solitary, biternate or trifoliate, petiolate. Leaflets variable, simple, elliptic, more deeply palmatisect. Stem leaf usually solitary, linear, 0.5-1.5cm, entire. Racemes 5-20 flowered. Bracts linear, entire. Upper petal 9-10mm, broad spur c3.5×2mm, Keel broadly crested. Lower lip deflexed, crested. Style filiform. Fruit capsule.

Field note: On moist, sandy and shady place.

Representative collection: Manang, above Thanchok, 2630m, 8.7.2006 (Fl. and Fr.), K. Adhikari et al. 187.

Distribution: Nepal (CE, 2500-5100m), Himalaya (Nepal to Bhutan), NE India (Arunchal Pradesh), China.

2. DICENTRA Bernhardi

Climbing herbs with perennial rootstock. Leaves repeatedly ternate with terminal leaflet usually replaced by a branched tendril. Leaflet entire. Flowers in pendulous recemes, often corymbose, dissymmetric. Outer petals coherent and keeled forming tube, inner petals

exposed at mouth. Stamens 6 in 2 bundles, filaments adherent to outer petals. Ovary elongate, style slender, stigma flattened, ovules many. Capsule ellipsoid or cylindric. Seeds papillate.

1. Dicentra macrocapnos Prain, *J. Asiat. Soc. Bengal* 65:12(1896); Press et al. in *Ann. Check. Fl. Pl. Nep.*:2:35(1979); Polunin et al. in Fl. Him. 32(1997); Press et al. in *Ann. Check. Fl. Pl. Nep.*:231(2000). Fig.4.a.

Dactylicapnos macrocapnus (Prain) Hutch. in *Kew Bull.* 1921: 105 (1921).

Nep.: Jhumke Bulanki

Glabrous climber to 2m. Petiole c1cm. Leaves dichotomous, biternate with a terminal tendril. Leaflets ovate or ovate-elliptic, 0.8-3.5×0.5-2.5cm, acute or obtuse, base rounded, entire. Flowers 2-2.5cm long, yellow. Sepals triangular. Outer 2 petals with flat bases, inner 2 long-stalked, keeled. Capsule cylindrical with papery valves.

Uses: Plants used as fodder.

Field note: On moist, sandy area.

Representative collection: Manang, Tal, 1640m, 9.7.2006 (Fl.), K. Adhikari et al. 199.

Distribution: Nepal (CE, 1200-2500m), Himalaya (Uttar Pradesh to Nepal).

Family 16. CRUCIFERAE

Annual, biennial or perennial herbs, rarely woody, glabrous or bearing simple, branched or stellate hairs. Leaves alternate, exstipulate, simple, sometimes pinnately divided. Flowers solitary, racemes or corymbs, actinomorphic, bisexual. Sepals 4, free, in two opposite pairs. Petals usually 4, rarely absent, free, atternating with sepals Stamens 6, the outer pair shorter than inner 4. Ovary superior, ovules 1-many on two parietal placentae. Style simple, stigma often capitate. Fruit pod-like, usually dehiscent.

Key to the genera

1a. Pods obconical or obcordate, compressed, seeds in two rows…….**2. Capsella**
1b. Pods linear, seeds in 1 row 2
2a. Stigma slightly 2-lobed, flower in ebracteate racemes.....**1. Barbarea**
2b. Stigma capitate, flower in corymbose racemens .....**3. Erysimum**

1. BARBAREA Brown

Biennial or perennnial herbs with erect angular stems, glabrous or with sparse simple hairs. Lower leaves lyrate, pinnatisect, upperones pinnatifid or nearly entire. Flowers in ebracteate racemes. Petals yellow, distinctly longer than sepals. Pods linear, 4 angled. Stigma slightly 2- lobed. Seeds in a single row.

1. Barbarea intermedia Boreau, *Fl. C. Fr. ed.* 1, 2:48(1840); Grierson and Long in *Fl. Bhu.* 1(2):434(1984); Press et al. in *Ann. Check. Fl. Pl. Nep.*:79(2000).

Barbarea vulgaris var. *sicula* Hook. f. and Anders. in *Fl. Brit. Ind.* 1:135(1872).

Campe intermedia (Boreau) Rauschert in *Fedde, Repert.* 73:224(1966).

Herbs with erect angular stems, glabrous, 20-30cm. Lower leaves 6-8cm, with 3-8 pairs of elliptic or obovate lateral segments. Upper leaves similar with linear or oblanceolate segments. Flowers ebracteate, racemes. Sepals ovate-elliptic, c2.5×1mm. Petals obovate, c4×2mm, yellow. Pods linear, 10-15mm.

Field note: On the side of running water and open place.

Representative collection: Manang, Dharapani, 1960m, 8.7.2006 (Fl. and Fr.), K. Adhikari et al. 178.

Distribution: Nepal (WC, 3000-3600m), S. and C. Europe, N. Africa, C. Asia, Himalaya, India, China (Xizang). **Not reported at 1960m altitude in Press et al. 2000.**

2. CAPSELLA Medikus

Erect annual or biennial herbs with simple and stellate hairs. Basal leaves in a rosette. Stem leaves sessile, auriculate. Flowers in ebracteate, racemes. Sepals spreading. Petals

obovate, white. Pods obconical or obcordate, laterally compressed, valves deeply boat-shaped, septum narrow. Seeds numerous in two rows.

1. Capsella bursa-pastoris (L.) Medicus., *Pfl. Gatt*. 1:85(1792); Grierson and Long in *Fl. Bhu.* 1(2):423(1984); Press et al. in *Ann. Check. Fl. Pl. Nep.*:80(2000).
Thlapsi bursa-pastosis L., *Sp. Pl.* 647(1753).
Nep.: Chhortene

Annual herbs with simple hairs upto 70cm. Basal leaves runcinate-pinnatifid, 3-10×0.3-4cm, acute, base shortly petiolate. Stem leaves ovate-lanceolate, 1.5-5×0.1-2cm, acute, sharply auriculate at box. Sepals ovate, 1.5×1mm. Petals c2.5×1mm. Pods 6-7mm long and broad, septum elliptic, c6×1mm.
Field note: Found on foot trail, in the bank of irrigation canal.
Representative collection: Manang, above Chame, 3120m, 11.10.2006 (Fl. and Fr.), K. Adhikari et al. 316.
Distribution: Nepal (WCE, 1800-4500m), widely distributed in temperate region.

3. ERYSIMUM L.

Annuals or perennials with appressed 2-3 branched. Stems leafy, leaves simple, attenuate. Flowers in corymbose racemes, ebracteate or bracteate only at base. Sepals erect. petals clawed, yellow or orange. Pods linear, valves roundd or keeled. Stigma capitate, seeds numerous in 1 row.

1. Erysimum hieracifolium L., *Cent. Pl.* 1:18(1755); Grierson and Long in *Fl. Bhu.* 1(2):439(1984); Press et al. in *Ann. Check. Fl. Pl. Nep.* 82(2000). Fig.4.b.
Erysium robustum D.Don, *Prodr. Fl. Nep.* 202(1825).

Annual herbs upto 50cm, stem slightly ribbed. Leaves oblanceolate, 3-10×0.5-2cm, acute, base atenuate, margin slightly toothed, sparsely pubescent. Flowers in corymbose racemes. Sepals narrowly ovate or oblong, 5-8mm. Petals orange claw 5-9mm, limb oblong or obovate, 5-7×2-5mm, rounded. Pods 5-8cm.
Field note: On open sandy soil.
Representative collection: Manang, bet^{n} Talekhu and Chame, 2770m, 3.7.2006 (Fl.), K. Adhikari et al. 46.
Distribution: Nepal (WCE, 1600-3800m), Europe, Caucasus , C. Asia, Himalaya, Mongolia, Siberia

Family 17. CRASSULACEAE

Succulent herbs, sometimes woody at base. Leaves alternate, opposite or subverticillate, sometimes a basal rosette, usually simple, pinnately veined, exstipulate. Flowers in cymes, corymbs or panicles, actinomorphic, mostly 5-merous, bisexual or unisexual. Sepal united at base. Petals free, sometimes tubular, Stamens as many or twice as many as petals, free or united. Carpels superior or semi-inferior. Fruit a cluster of follicles often surrounded by perianth. Seeds few or numerous.

1. SEDUM L.

Annual, biennial perennial or monocarpic herbs. Stem erect or ascending. Radicle leaves absent from flowering stems, cauline leaves alternate, opposite or whorled, simple. Inflorescence loosely or densely cymose. Flowers bisexual. Sepals 4-6. Petals 4-6, free or basally connate. Stamens 8-12, opposite to petals. Carpels 4-6, basally connate or nearly free.

Key to the species
1a. Leaves linear-lanceolate, petals as long as sepals..... **1. S. multicaule**
1b. Leaves oblong-lanceolate, petals larger than sepals .....**2. S. oreades**

1. Sedum multicaule Wallich ex Lind., *Edward's Bot. Reg.* 1840: Misc. 58(1840); Grierson and Long in *Fl. Bhu.* 1(3):484(1987); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 78(2000). Fig.4.c.

Perennial herbs. Stems sprawling, 5-10cm. Leaves linear lanceolate, 1-2×0.1-0.5cm, acuminate, margin entire. Cymes with spreading spike-like branches up to 5cm. Sepals oblong –lanceolate, 5-6×1-1.5mm, acuminate. Petals as long as sepals, acuminate, free to base. Stamens 10.Carpels connate from base.

Field note: On moist, slopy and shady area of hanging rock.

Representative collection: Manang, above Chame, 2800m, 11.10.2006 (Fl.), K.Adhikari et al. 305.

Distribution: Nepal (WCE, 1500-3200m), Himalaya (Kashmir, Uttar Pradesh to Bhutan), NE India, Myanmar, W and S. China.

2. Sedum oreades (Decaisne) Raym. Hamet, *Bull. Soc. Bot. France* 56:571(1909); Grierson and Long in *Fl. Bhu.* 1(3):485(1987); Press et al. in *Ann. Check. Fl. Pl. Nep.*:78(2000); Fu Kunjun and Ohba in *Fl. Ch1.* 8:226(2001).

Umbilicus oreades Decaisne in Jacq., *Voy. Inde*. 4(Bot.):62(1844).

Small herbs upto 15cm. Leaves oblong-lanceolate, 6-20×2-4mm, acute, Flowers cyme corymbiform, 1-several flowers. Sepals lanceolate, 5-6×1.5-2mm, acuminate. Petals yellow, oblanceotate, c10×2.5mm, connate from base. Stamens 10. Carpels lanceolate, shortly connate at base.

Field note: On the naked open rock.

Representative collection: Manang, Koto, 2600m, 13.10.2006 (Fr.), K. Adhikari et al. 362.

Distribution: Nepal (WCE, 3200-5200m), Himalaya (Kashmir, Himanchal Pradesh to Bhutan, NE India, Myanmar, China (Xizang, Yunan). **Not reported at 2600m altitude in Press et al. 2000.**

Family 18. SAXIFRAGACEAE

Herbs. Basal leaves sometimes rosetted, stem leaves alternate, rarely opposite, simple, pinnate or ternate, exstipulate but sometimes stipule like sheathing. Flowers actinomorphic, bisexual or sometimes unisexual, solitary or in cymes, racemes or panicles. Calyx 4-5 often united at base and adnate to ovary. Petals usually 5, free, sometimes absent. Stamens 5-10, free. Ovary superior or semi-inferior, styles 2. Fruit a capsule, seeds numerous.

Key to the genera

1a. Leaves bi or triternate, flowers elongate terminal panicles .....**1. Astilbe**
1b. Leaves entire, flowers solitary or several, loosely racemose or corymbose…...**2. Saxifraga**

1. ASTILBE D.Don

Erect rhizomatous perennial herbs. Leaves alternate, bi-or triternate, petiole base sheating, stipule like. Flowers small in elogate terminal panicles, branches narrowly recemose. Calyx shortly adnate to base of ovary, lobes(4-)5. Petals(4-)5 or absent. Stamens 5 or(8-)10. Carpels connate below, dehiscing ventrally.

1. Astilbe rivularis Buch. -Ham. ex D. Don, *Prodr. Fl. Nep.* 211 91825); Grierson and Long in *Fl. Bhu.* 1(3):488(1987); Press et al. in *Ann. Check. Fl. Pl. Nep.*:286(2000).

Nep.: Thulo ausado/Budho ausadi/Bedango/Ganegurjo

Perennial herbs, stems sparsely brown villous. Leaves upto 35cm long and broad, leaflets ovate or elliptic, 4-12×2-7cm, acuminate, base rounded or cordate, margin serrate, Peduncles pale brownish pubescent. Calyx divided almost to base into lanceolate teeth. Petals

absent. Stamens 5, opposite sepals, c3mm. Ovary semi inferior. Capsule ovoid. Seeds ellipsoid.

Uses: Medicinally used.

Field note: On open busy and stony side.

Representative collection: Manang, Chame, 4.7.2006 (Fl.), K. Adhikari et al. 104.

Distribution: Nepal (WCE, 2000-36000m), Himalaya (Kashmir to Bhutan), Thailand, N. Indo-China, W. China.

2. SAXIFRAGA L.

Perennial herbs, mostly small. Basal leaves rosulate, stem leaves alternate or opposite usually entire. Flowers solitary or several, loosley racemose or corymbose, bisexuual or unisexual. Calyx adnate to base of ovary, lobes 5. Petals 5, rarely absent, yellow or white, sometimes red or purple. Stamens 10. Ovary semi-inferior, carpels 2, united below.

1. Saxifraga mucronulata Royle, *III B. Him*. 227(1835); Grierson and Long in *Fl. Bhu.* 1(3):499(1987); Press et al. in *Ann. Check. Fl. Pl. Nep*.:289(2000). Fig.4.d.

Herbs upto 12 cm, glandular pubescent stems. Basal leaves rosetted, oblanceolate, c10×3mm, acuminate, attenuate at base, margin serrulate. Flowers 3-10 usually in a subumbellate raceme surrounded at base by linears bracts, c8×1mm, pedicels 3-8mm. Calyx 5-6mm, glandular, lobes ovate-lanceolate. Petals obovate, c8×3mm, yellow.

Field note: On moist and sandy place.

Representative collection: Manang, Chame, 2820m, 12.10.2006 (Fl.), K. Adhikari et al. 327.

Distribution: Nepal (WCE, 3800-4800m), Himalaya (Kashmir to Nepal). **Not reported at 2820m altitude in Press et al. 2000.**

Family 19.HYDRANGEACEAE

Tree or shrubs sometimes climbing. Leaves opposite, simple, exstipulate, pinnately veined. Flowers in terminal cymosely branched corymbs or panicles, bisexual or outer flower sterile with 4-5 large. Petaloid sepals, Calyx tube adnate to ovary, 4-5 lobed. Petals 4-5 free or cohering. Stamens 8-12. Ovary inferior or semi-inferior, 2-6 celled, styles numerous, ovules many on parietal placentae. Fruit a capsule or berry.

1. HYDRANGEA L.

Description as for Hydrangeaceae.

1. Hydrangea anomala D. Don, *Prodr. Fl. Nep.* 211(1825); Grierson and Long in *Fl. Bhu.* 1(3):520(1987); Press et al. in *Ann. Check. Fl. Pl. Nep*.: 147(2000). Fig.4.e-h.

Hydrangea altissima Wall. , *Tent. Fl. Nap. t.* 50(1826).

Nep.: Landun/Bauni Kath

Climbing shrub, sparsely pubescent. Leaves ovate, 6-13×4-8cm, acuminate, base cuneate, margin serrate, pubesent along midrib above and with a few brown hairs in vein axils beneath. Petioles 2-4cm. Corymbs loose, spreading. Bracts elliptic, 0.7-1.5×0.1-0.3cm, glabrous. Fertile flower: Calyx lobes glabrous, acute. Petals c2.5mm. Stamens c4mm, styles 3, spreading. Capsule subglobose. Seeds compressed, broadly elliptic surrounded by a wing. Sterile flowers:Calyx lobes broadly obovate, 1-2×0.8-1.5cm, rounded, entire, whitish.

Field note: On open moist place.

Representative collection: Manang, Tal, 1630m, 9.7.2006 (Fl.), K. Adhikari et al. 203.

Distribution: Nepal (WCE, 1900-2700m), Himalaya (Uttar Pradesh to Bhutan), NE India, N. Myanmar, W. and C. China, Taiwan. **Not reported at 1600m altitude in Press et al. 2000.**

Family 20. ROSACEAE

Trees, shrubs or herbs, sometimes armed, simple hairs. Leaves alternate, simple or pinnately, palmately or pedately compound, pinnately veined. Stipules usually present. Flowers solitary or often in fascicles, racemes, cymes, corymbs or panicles, actinomorphic, bisexual, rarely unisexual. Calyx lobes 4-6, sometimes with as epicalyx. Petals 4-5 or many, free. Stamens 4-many. Ovary of 1-many free, superior carpels or 4-6 celled, inferior or semi-inferior and united to calyx tube. Style simple, free, sometimes united. Ovules 1 or more per cell. Fruit an achene, follicle, drupe or pone.

Key to the genera

1a. Herbs 2
1b. Shrubs or small tree, rarely herbs 4
2a. Epicalyx absent .....**1. Agrimonia**
2b. Epicalyx present 3

3a. Petals white, inflorescene 1-3 flowered .....**4. Fragaria**
3b. Petals yellow, inflorescence always solitary .....**3. Duchesnia**
4a. Leaves compound, stipule adnate to petiole 5
4b. Leaves often simple, stipule small deciduous or subpersistent or absent……....6
5a. Stems bearing prickles, calyx tube turbinate .....**8. Rosa**
5b. Stems without prickles, calyx tube concave with epicalyx .....**5. Potentilla**
6a. Spiny shrubs, drupe ellipsoid, thinly fleshy.....**6. Prinsepia**
6b. Spine absent, fruits various other than drupe 7
7a. Stipules absent, calyx cup concave, lobes triangular .....**11. Spirea**
7b. Stipules present, calyx tube turbinate or cup shaped or funnel shaped.....8
8a. Calyx tube turbinate, fruit 1-seeded stony or pome fleshy 9
8b. Calyx tube broad cup-shaped or funnel shaped, fruit a clusters of fleshy 1- seeded or globose-pyriform 1-2 seeded.....10
9a. Flowers solitary or several to many corymbose cymes, fruit 1-seeded stony .....**2. Cotoneaster**
9b. Flowers in corymbose cymes, fruit pome fleshy .....**7. Pyracantha**
10a. Calyx with broad cup-shaped tube, fruit a cluster of fleshy 1-seeded drupes…...**9. Rubus**
10b. Calyx tube funnel shaped, fruit globose pyriform, 1-2 seeded in each cell……**10. Sorbus**

1. AGRIMONIA L.

Erect perennial herbs. Leaves interruptedly pinnate. Stipules adnate to petioles. Flowers many in terminal spike-like racemes. Calyx tube turbinate, accrescent, lobes 5, surrounded by numerous hooks at base of teeth. Epicalyx absent. Petals 5. Stamens 5-10. Carpels 2 free, included in Calyx tube, style slender. Achenes 1 or 2 enclosed in persistent hook-curved calyx tube.

1. Agrimonia pilosa var. **nepalensis** (D.Don) Nakai, *Bot. Mag*.(Tokyo) 47: 247(1933); Grierson and Long in *Fl. Bhu.* 1(3):582(1987); Press et al. in *Ann. Check. Fl. Pl. Nep*.:260(2000).

Agrimonia nepalensis D.Don, *Prodr. Fl. Nep.* 229(1825).

Erect perennial herbs, stems pilose. Basal leaves with elliptic or obovate leaflets. Stems leaves 10-15cm, larger, elliptic, acute or obtuse, base rounded or cuneate, margins serrate, sparsely pilose and minutely glandular on both surfaces. Stipules free, obliquely ovate, 1.5-2.5×1-1.5cm, leafy. Racemes 20-50 flowered. Calyx tube, lobes ovate. Petals yellow, narrowly obovate 3-4mm. Stamens 5-10.

Uses: Plant used as fodder.

Field note: On slopy and sandy dry soil.

Representative collection: Manang, below Naya Bazar, 2740m, 7.7. 2006 (Fl.), K. Adhikari et al. 162.

Distribution: Nepal (WCE, 1000-3000m), Himalaya (Kashmir to Bhutan),NE India, Myanmar, China.

2. COTONEASTER L.

Shrubs or small trees. Leaves simple, entire. Stipules small, deciduous or subpersistent. Flowers solitary or several to many in terminal corymbose cymes. Calyx tube turbinate, lobes 5, persistent. Petals 5, erect or spreading. Stamens 10-20. Carpels 2-5, united, inferior, borne within and adnate to calyx tube. Fruit 1 seeded stones.

Key to the species

1a. Leaves tomentose, margin normal .....**1. C. frigidus**
1b. Leaves smooth, margin enrolled .....**2. C. microphyllus**

1. Cotoneaster frigidus Wall. ex Lindl., *Edward's Bot. Reg*. 15:t.1229(1829); Grierson and Long in *Fl. Bhu.* 1(3): 590(1987); Press et al. in *Ann. Check. Fl. Pl. Nep*.:261(2000).

Small tree 3-6m. Leaves elliptic or obovate, 7.5-13×1.5-3.5cm, tomentose beneath, acute or obtuse, base cuneate. Petioles upto 0.5cm. Flowers many, pedicels pubescent. Calyx lobes 3-4mm, pubescent. Petals white, suborbicular, 3-4mm diameter. Fruit globose scarlet
Uses: Young shoots dried and used to make tea.
Field note: Open area of sandy soil.
Representative collection: Manang, near Bhratang, 2800m, 10.10.2006 (Fr.), K. Adhikari et al. 272.
Distribution: Nepal (WC, 2200-3400m), Himalaya (Uttar Pradesh to Arunchal Pradesh), NE India, China.

2. Cotoneaster microphyllus Wall. ex Lindl. in *B. Reg*. 13: t.1114(1827); Grierson and Long in *Fl. Bhu.* 1(3):589(1987); Press et al. in *Ann. Check. Fl. Pl. Nep.*:262(2000).

Low growing much branched shrub upto 20 cm. Leaves elliptic or obovate, 5-10×2.5-5mm, coriaceous, base cuneate, margin inrolled, smooth. Petioles upto 3mm. Flower solitary. Caylx lobes c4mm, pubescent. Petals white, suborbicular. Fruit subglobose 7-10mm.
Uses: Fruit uses medicinally.
Field note: Found in open pasture.
Representative collection: Manang, below Naya Bazar, 2620m, 7.7.2006 (Fl.), K. Adhikari et al. 149.
Distribution: Nepal (WE, 2000-5400m), China. **Not reported from Central Nepal in Press et al. 2000.**

3. DUCHESNEA Smith

Perennial herbs with slender prostrate stolons. Leaves palmately 3-foliate. Stipules adnate to petioles. Flowers solitary. Epicalyx segments obovate. Petals yellow. Stamens numerous. Carpels numerous, free, style short, sub-basal. Achenes minute borne on surface of enlarged fleshy persistent receptacle.

1. Duchesnea indica (Andrews) Focke, *Pflanzenfam. III*-3:33(1888); Grierson and Long in *Fl. Bhu.* 1(3):579(1987): Press et al. in *Ann. Check. Fl. Pl. Nep.*:263(2000).
Fragaria indica Andr., *Fl. Brit. Ind.* 2:344(1878).
Nep.: Sarpe Kaphal

Prostrate herb with stout rootstock giving several stolons. Leaflets elliptic or obovate, 0.75-3×0.5-2cm, obtuse, margins crenately serrate, appressed pubescent. Petioles upto 6cm. Penduncles 2-4cm. Calyx cup c4mm, lobes ovate 3-5mm, entire. Epicalyx segments shorter than calyx lobes, obovate. Petals yellow, obovate, 4-5×2-3mm. Fruiting receptacle conical, red, flesh insipid, 2cm.
Uses: Fruits edible.
Field note: On moist and slopy open area with mosses.
Representative collection: Manang, Temang, 2600m, 13.10.2006 (Fl.), K. Adhikari et al. 393.
Distribution: Nepal (WCE, 1000-2500m), Afghanistan, Himalaya, India, east to China and Japan, Malaysia. **Not reported at 2600m altitude in Press et al. 2000.**

4. FRAGARIA L.

Perennial herbs with slender prostrate stolons. Leaves palmately 3-foliate(sometimes becoming pinnate with 2 additional minor leaflets). Stipules adnate to petioles. Inflorescence 1-3 flowered. Calyx cup 5-lobed and bearing 5 acute or acuminate epicalyx segements. Petals 5 white. Stamens numerous. Carpels numerous, free. Style short, sub-basal. Achenes sunk in surface of enlarged fleshy receptacles and persistent upon it.

1. Fragaria nubicola Lindl. ex Lacaita in *J. Linn. Soc. Bot*. 43:467(1916); Grierson and Long in *Fl. Bhu.* 1(3):578(1987); Press et al. in *Ann. Check. Fl. Pl. Nep.*:263(2000).
Fragaria versa var. *nubicola* Hook. f. in *Fl. Brit. Ind.* 2:344(1887).
Nep.: Bhui ainselu/Shafaltang, Eng.: Strawberry/Alpine strawberry

Prostrate herbs with stout rootstock. Leaflets obovate or elliptic, 2-5×1-3cm, obtuse, base cuneate, margins serrate, silky whitish pubescent beneath. Petioles 1-5cm. Calyx cup 3-

5mm diameter, lobes triangular 5-8×1-2mm, entire. Epicalyx segments elliptic-lanceolate, acuminate, entire. Petals broadly obovate, 5-8×5-6mm, white. Achenes borne on succculent red globose receptacle.

Uses: Fruits edible.

Field note: Found on open moist area.

Representative collection: Manang, Telekhu, 2783m, 2.7.2006 (Fr.), K. Adhikari et al. 21.

Distribution: Nepal (WCE, 1600-4000m), Himalaya (Kashmir to Bhutan), N. Burma, W.China.

5. POTENTILLA L.

Perennial herbs or shrubs. Leaves 3-foliate, palmate or pinnate, rarely 1-foliate, serrate, stipules adnate to petiole. Flowers solitary or few in cymes or corymbs. Calyx tube concave, lobes 5 with epicalyx segments. Petals 5, usually yellow. Stamens numerous. Carpels numerous free. Style subterminal, deciduous. Achenes numerous, borne on a flat or conical dry receptacle.

1. Potentilla saundersiana Royle, *3. Bot. Himal. Mts* 1(6):207, t. 41(1835); Grierson and Long in *Fl. Bhu.* 1(3):568(1987); Press et al. in *Ann. Check. Fl. Pl. Nep.*:266(2000). Fig.5.a.
Potentilla multifida var. *saundersiana* (Royle) Hook. f. in *Fl. Brit. Ind.* 2:354(1878).

Herbs. Flowering stems 10-20cm, white tomentose and pilose. Radicle leaves 2-5cm including petiole. Stipules brown, membranous. Leafblade palmately 3-5 foliate. Leaflets sessile, adaxially green or greyish green, oblong-obovate, 0.5-1.5cm×4-10mm, abaxially densely white tomentose, margin serrate. Cauline leaves 1 or 2, leafblade 3-5 foliate. Indflorescene ternminal, 1- or 2- flowered. Sepals triangular-lanceolate, apex acute. Petals yellow, obovate. Style subterminal. Achenes c1.5mm.

Field note: On open sandy area.

Representative collection: Manang, Koto area, 2620m, 6.7.2006 (Fl.), K. Adhikari et al. 138.

Distribution: Nepal (CE, 3100-4900m), Himalaya (Nepal, Bhutan), China. **Not reported at 2620m altitude in Press et al. 2000.**

6. PRINSEPIA Royle

Deciduous spiny shrubs. Leaves simple, unlobed, stipules minute deciduous. Flowers in short axillary racemes borne at base of spines. Calyx persistent cup-shaped, lobed 5, concave. Petals 5. Stamens c30. Ovary monocarpellate, style subterminal. Drupes ellipsoid, thinly fleshy.

1. Prinsepia utilis Royle, *3. Bot. Himal. Mts*. 2:t. 38, f. 1(1834); Grierson and Long in *Fl. Bhu.* 1(3):543(1987); Press et al. in *Ann. Check. Fl. Pl. Nep.*:267(2000).

Shrubs upto 6 m, branches bearing ascending spines upto 2cm. Leaves elliptic-lanceolate, 2.5-7×0.7-2cm, acuminate, base attenuate or rounded, minutely serrate, petiolate, upto 6mm, glabrous. Racemes 3.5-7cm, 2-5 flowered. Calyx lobes suborbicular, 4-6mm. Petals elliptic or obovate 6-7×c5mm, borne on persitent calyx cup. Style subterminal. Drups ellipsoid.

Uses: Useful as a hedge plant, seeds contain an oil used in lamps.

Field note: On open stony soil of river bank.

Representative collection: Manang, Dharapani, 1940m, 13.10.2006 (Fl.and Fr.), K. Adhikari et al. 429.

Distribution: Nepal (WEC, 1500-2900m), Himalaya,(Pakistan to Bhutan), NE. India, W.China

7. PYRACANTHA Roemer

Evergreen spinous shrubs. Leaves simple, stipules minute, caducous. Flower in corymbose cymes terminal on short lateral shoots. Calyx tube turbinate, lobes 5. Petals 5. Stamens c20. Carpels 4-5, partly adnate to calyx tube, each with 2 fertile ovules. Styles 4-5 free. Fruit pome fleshy, stones 4-5, free.

1. Pyracantha crenulata (D.Don) M. Roemer, *Syn.* 3:220(1847); Grierson and Long in *Fl. Bhu.* 1(3):592(1987); Press et al. in *Ann. Check. Fl. Pl. Nep*.:268 (2000).
Mespilus crenulata D.Don, *Prodr. Fl. Nep.* 238(1825).

Shrubs 2-3m, branches bearing stout spines 0.5-1.5cm. Leaves oblong or obovate 1-4×0.5-1.7cm, obtuse, base cuneate or attenuate, margin slightly crenate-serrate, glabrous. Petioles 2-6mm. Cymes 5-10 flowered . Calyx tube c2mm, lobes triangular c1mm. Petals white, obovate 3-5×2-3mm. Pomes globose, red.
Uses: Wood used to make walking sticks.
Field note: On moist open area.
Representative collection: Manang, Danaque, 2250m, 6.9.2006 (Fr.), K. Adhikari et al. 257.
Distribution: Nepal (WCE, 1200-2500m), Himalaya,(Kashmir to Bhutan), Myanmar, China

8. ROSA L.

Erect or scrambling shrubs, stems bearing prickles. Leaves pinnate, stipules adnate to petioles. Flowers solitary or several, corymbose, showy. Calyx tube turbinate, lobes 4-5. Petals 4-5 or more. Stamens numerous. Carpels numerous, free, sessile within calyx tube. Style free or connate above. Fruiting calyx tube fleshy containing numerous hairy ellipsoid achenes.

Key to the species
1a. Scrambling shrub, stem bearing scattered recurved prickles……. **1. R. brunonii**
1b. Erect shrub, stem bearing paired straight prickles .....**2. R. macrophylla**

1. Rosa brunonii Lindl. Manogr. Rosa 120, t. 14(1820); Grierson and Long in *Fl. Bhu.* 1(3):586(1987); Press et al. in *Ann. Check. Fl. Pl. Nep.*:268(2000).
Nep.: Bhainsi Kanda/Bhainsi kande gulsph,Eng.: Himalaysn musk rose

Scrambing shrubs upto 6m, stems bearing scattered recurved prickles. Leaves 8-15cm, leaflets 5-9, ovate-elliptic, 2-6×1-3cm, acute or acuminate, base rounded, margin serrate. Stipules 1-1.5cm adnate to petiole along most of their length, free and subulate at apex. Flowers fragant in large terminal corymbs. Calyx tube turbinate, lobes lanceolate, 1.5-2cm acuminate. Petals creamy white, obovate, 1.5-3×1-2.5cm. Styles united club-shaped.
Field note: On sandy and open area.
Representative collection: Manang, Danaque, 2700m, 13.10.2006 (Fr.), K. Adhikari et al. 409.
Distribution: Nepal (WCE, 1500-2400m), Himalaya (Kashmir to Bhutan), NE India, Myanmar, W. China.

2. Rosa macrophylla Lindle., *Monogr. Rosa* 35, t. 12 (1820); Grierson and Long in *Fl. Bhu.* 1(3):587(1987); Press et al. in *Ann. Check. Fl. Pl. Nep.*:268(2000). Fig.5.b-d.
Rosa macrophylla var. *hookeriana* Hook f. in *Fl. Brit. Ind.* 2: 366(1978).

Erect shrub 1-5m, stems bearing paired straight prickels below leaves. Leaves 7-20cm, leaflets 7-11, ovate-elliptic, 1.5-7×1-3cm, acute, base rounded, margin serrate. Stipules oblong, elliptic 10-20×2-5mm, purple, ciliate. Flowers 1-2, terminal on short lateral shoots. Calyx tube ellipsoid c1cm, purplish, lobes lanceolate, 2-3cm, acuminate. Petal obovate, 2.5-3×2-2.5cm, deeep pink. Styles 5-7 free.
Field note: On open area.
Representative collection: Manang, Talekhu, 2735m, 2.7.2006 (Fl.), K. Adhikari et al. 26.
Distribution: Nepal (WCE, 2100-3800m), Himalaya (Kashmir to Bhutan)

9. RUBUS L.

Erect or spreading shrubs or creeping herbs, often prickly or bristly. Leaves alternate, simple often lobed or 3-foliate, pinnately, palmately or pedately compound, stipulate. Flowers in terminal and axillary panicles or corymbs, sometimes few or solitary. Calyx with a broad cup-shaped tube and 5 persistent lobes. Petals 5. Stamens many. Carpels many, on a convex

receptacle with subterminal style. Fruit a cluster of fleshy 1-seeded drupes on conical receptacle.

1. Rubus biflorus Buch. Ham. ex Sm., *Cyclop*. 30: Rubus n. 9(1819); Grierson and Long in *Fl. Bhu.* 1(3):558(1987); Press et al. in *Ann. Ckeck. Fl. Pl. Nep*.:269(2000).

Shrub 1-2m, stems smooth with white bloom and stout recurved prickles 4-10mm. Leaves 3-5 foliate, leaflets ovate, terminal leaflet often deeply lobed. Flowers and pedicels subglabrous and eglandular. Calyx cup without prickles, lobes ovate, 6-9mm, short pointed glabrous. Petals white, 7-10m, fruit orange, drupe.

Uses: Fruits edible.

Field note: On south facing slope of moist sandy soil.

Representative collection: Manang, Chame, 2720m, 4.7.2006 (Fr.), K. Adhikari et al. 99.

Distribution: Nepal (WCE, 2100-3300m), Himalaya (Nepal to Bhutan), W. China

10. SORBUS L.

Deciduous trees. Leaves alternate, simple or 1-pinnate, margins mostly serrate. Stipules deciduous or persistent. Flowers in terminal cymes or corymbs. Calyx tube funnel-shaped or obconic, lobes 5, persitent or deciduous. Petals 5. Stamens 20 or more. Ovary inferior or semi-inferior, 2-5celled, adnate to calyx tube. Style 2-5, free or united below. Friut globose or pyriform, flesh smooth or granular, 2-5 celled, each cell 1-2 seeded.

1. Sorbus microphylla Wenzing in *Linnaea* 38:76(1873); Grierson and Long in *Fl. Bhu.* 1(3):597(1987); Press et al. in *Ann. Check. Fl. Pl. Nep*.:271(2000).

Shrubs. Leaves borne on short lateral shoots, pinnate, 8-13cm, rachin wings and glandurar. Leaflets 9-12 pairs, oblong-elliptic, 10-20x5-8mm, acute or mucronate, base obliquely rounded, ressile, margins serrate almost to base. Stipules subulate. Corymbs 4-7cm across, many flowered. Calyx lobes triangular. Petals rose pink, 3-5mm. Stamens pinkish. Styles 5. Fruit globose.

Field note: On moist and shady place.

Representative collection: Manang, Chame, 3150m, 11.10.2006 (Fr.), K. Adhikari et al. 318.

Distribution: Nepal (WCE, 3000-4500m), Himalaya (Himanchal Pradesh to Bhutan), NE. India.

11. SPIRAEA L.

Dioecious or bisexual shrubs, stems usually branched, sometimes simple. Leaves simple, unlobed. Stipules absent. Flowers in terminal corymbs or corymbose panicles. Calyx cup concave, lobes 5 triangular. Petals 5. Stamens 20-25, reduced to staminodes in female flowers. Carpels usually 5, free, absent or reduced to pistillodes in male flowers. Styles short. Follicles 5, ovoid, immersed or exserted from calyx cup, few seeded.

1. Spiraea micrantha Hook. f. in *Fl. Brit. Ind.* 2:325(1878); Grierson and Long in *Fl. Bhu.* 1(3):534(1987); Press et al. in *Ann. Check. Fl. Pl. Nep*.:272(2000). Fig.5.e.

Spirea japonica var. *himalaica* Kitam. in *Acta. Phyt. Geobot*. 15:160(1954).

Rhizomatous branched shrubs 1-1.5m. Leaves ovate-lanceolate, 4-15×2-5cm, gradually acuminate, base cuneate, margin double serrate. Petioles 5-10mm. Panicles 8-20cm, Calyx cup concave, lobes 5 triangular. Petals white. Carpels 5, free. Styles short. Folicles 1.5 -2mm, pubescent.

Field note: On slopy and moist rocky side.

Representative collection: Manang, Chame, 2800m, 11.10.2006 (Fr.), K. Adhikari et al. 299.

Distribution: Nepal (WCE, 1400-3000m), Himalaya (Nepal to Bhutan), NE India.

Family 21. LEGUMINOSAE

Trees, shrubs or herbs, sometimes twining or climbing. Leaves alternate, sometimes simple or trifoliate, bipinnately or digitately pinnate. Stipules usually present. Flowers zygomorphic and bisexual or actinomorphic. Inflorescene of a terminal or axillary. Calyx campanulate or tubular, 5-toothed. Petals mostly 5 or sometimes numerous, filaments

variously united, rarely free. Ovary monocarpellate superior, unilocular. Ovules one or more, style filiform or capitate. Fruit a pod (legume).

Subfamily: PAPILIONOIDEAE

Leaves simple or with 2 to many leaflets arranged digitately or pinnately. Flowers zygomorphic, small or large. Calyx often somewhat unequal, 4-5 lobed. Petals usually 5, uppermost (standard) generally longer than the others. Stamens usually 10, filametns free or more usually united as monadelphous or diadelphous or more rarely in two bundle of 5. Style usually upwardly curved, hooked or sometimes coiled.

Key to the genera

1a. Shrubs .....**5. Piptanthus**
1b. Herbs 2
2a. Stamens monadelphous, pods linear, flattened.....**1. Argyrolobium**
2b. Stamens mostly diadelphous rarely monadelphous, pods other than linear, flattened 3
3a. Stipules free, calyx tube very short .....**2. Desmodium**
3b. Stipules adnate to petiole, calyx campanulate.....4
4a. Pods compressed, flowers in axillary racemes .....**3. Hedysarum**
4b. Pods linear-oblong or elongated or elliptic, flowers solitary, or 2 or axillary peduncles or in umbles or racemes heads 5
5a. Keels slightly hooked distally, pods linear-oblong .....**4. Parochetus**
5b. Keels rounded or acute at apex, pod elongated, elliptic or linear ……**6. Trigonella**

1. ARGYROLOBIUM Eckl. et Zeyh.

Prostrate or erect herbs. Leaves trifoliate, leaflet round or emerginate, entire, petiolate. Flowers solitary or few-flowered racemes, red or pink. Calyx 2-lipped, standard longer than keel and wings. Stamens monadelphous. Pod linear, flatted.

1. Argyrolobium roseum (Campbess.) Jaub. and Spach in *Ann. Sc1. Nat. Ser*. 2, 19:51(1843); Hook. f. in *Fl. Brit. Ind.* 2:64(1976); Press et al. in *Ann. Check. Fl. Pl. Nep.*:165(2000).

Cytisus roseus Cambess. in *Jacquem., Voy*. 4(Bot.) 35, t. 40(1844).

Small much branched prostrate herbaceous plant. Stems upto 3cm. Leaflets obovate, 4-10×2-6mm, base cuneate, margins entire, apex round. Flower red, borne in axillary stalked, few flowered, clusters. Pedicels much longer than leaves. Calyx 2-lipped, tube c4mm, teeth c4mm. Petals c1cm. Pods 2-3×0.2-04cm.

Field note: On moist and shady place.

Representative collection: Manang, Talekhu, 2742m, 2.7.2006 (Fl.), K. Adhikari et al. 33.

Distribution: Nepal (WC, 1900-3200m), W. Asia (Iran to Iraq), Himalaya (Kashmir to Nepal).

2. DESMODIUM Desveaux

Perernnial herbs, shrubs or trees. Leaves pinnately 3-foliate, sometimes 1-foliae, margin entire or undulate. Stipules free, persistent or deciduous. Flowers in axillary or terminal racemes, panicles, corymbs or umbels. Bracts persistent or deciduous. Calyx tube very short, teeth 5, upper 2 and lower lip 3-dentate. Petal clawed, wings adherent to keel. Stamens monadelphous or diadelphous. Pods compressed.

Key to the species

1a. Stipules ovate-lanceolate, racemes axillary and terminal, pods hairy…….**1. D .confertum**
1b. Stipules lanceolate, racemes axillary or terminal, pods hook hairy.....**2. D. heterocarpon**

1. Desmodum confertum DC. in *Ann. Sc1. Nat.* 4:101(1825); Grierson and Long in *Fl. Bhu.* 1(3):677(1987);Press et al. in *Ann. Check. Fl. Pl. Nep*.:172(2000).

Hedysarum dioicum Buch. Ham. ex Don, *Prodr. Fl. Nep.* 244(1825).

Desmodium dioicum(Buch.-Hm.ex D. Don) DC., *Prodr.* 2:338(1825).

Shrubs upto 1m. Leaves coriaceous, 3-foliate, leaflets elliptic or obovate, 4-12×2-6.5cm, obtuse or acute, base rounded. Petioles 3-5cm. Stipules ovate-lanceolate. Racemes axillary and terminal. Calyx 3-5mm. Petals purplish, 10-14mm, standard obovate, 5-7mm broad. Pods densely pale hirsute, 7-10×3-4mm.

Field note: On moist and shady place.

Representative collection: Manang, way from Dharapni to Tal, 1640m, 14.10.2006 (Fl.), K. Adhikari et al. 445.

Distribution: Nepal (CE, 300-2000m), Himalaya (Nepal to Bhutan), China.

2. Desmodium heterocarpon (L.) DC., *Prodr.* 2:337(1825); Grierson and Long in *Fl. Bhu.* 1(3):674(1987); Press et al. in *Ann. Check. Fl. Pl. Nep.*:172(2000).

Shrubs upto 2m. Leaves usually 3-foliate, leaflets elliptic or obovate, 2-5×1-2cm, obtuse, base rounded, appressed greyish pubescent beneath. Petioles 1-2cm. Stipules lanceolate, 7-10×2-3mm. Racemes elongate, axillary or terminal. Calyx 2.5-3mm. Petal purplish 4.5-8mm, standard elliptic to suborbicular 4-6 broad, wings and keel oblong or obovate, blades 3.5-5×1.5-2.5mm. Pods undulate along lower suture, sparsely pubescent with hooked hairs.

Field note: Inside the forest area of moist and river bank.

Representative collection: Manang, way from Dharapani to Tal, 1640m, 14.10.2006 (Fl. and Fr.), K. Adhikari et al. 444.

Distribution: Nepal (WCE, 400-1700m), Himalaya (Uttar Pradesh to Bhutan), Sri Lanka, India, east to China, Japan, Pacific Islands, Malaysia, Australia.

3. HEDYSARUM L.

Rhizomatous perennial herbs. Leaves odd-pinnate, leaflets entire, stipules connate, scarious. Flowers in axillary racemes. Calyx campanulate, divided to middle into 5 subequal teeth. Petals clawed, wings with linear appendages at base, keel upwardly curved. Stamens diadelphous. Pods compressed, indehiscent.

1. Hedysarum sikkimense Benth. ex. Baker in *Fl. Brit. Ind.* 2(5):146(1878); Grierson and Long in *Fl. Bhu.* 1(3):723(1987); Press et al. in *Ann. Check. Fl. Pl. Nep.*:175(2000).

Perennial herbs upto 20cm, sparsely pubescent. Leaves odd-pinnate, 5-8cm, leaflets 15-25, ovate-ellitic, 5-13×2.5-7mm, obtuse, base rounded, glabrous above, sparsely pubescent beneath. Stipules oblong, 5-9mm, bifid at apex, brown, sheathing. Racemes 12-20 flowered on peduncles. Calyx 8mm, teeth lanceoloate, brownish pubescent. Petals purple, 1-3×0.5-1.5cm, standard obovate, wings narrowly oblong, keel spathulate. Pods constricted into 1-3 elliptic segments, thinly pubescent.

Field note: In the dense pine forest.

Representative collection: Manang, bet^{n} Talekhu and Chame, 2880m, 3.7.2006 (Fl.), K. Adhikari et al. 68.

Distribution: Nepal (E, 3500-4700m), Himalaya (Nepal to Bhutan), W. China.

Not reported in Central Nepal and at 2880m altitude in Press et al. 2000.

4. PAROCHETUS D.Don

Prostrate perennial herb, rooting at lower nodes. Leaves digitately 3-foliate, stipules shortly adnate to base of petiole. Flowers solitary or 2 on axillary peduncles. Calyx campanulate, unequally 5-toothed, upper 2 teeth connate to near apex. Standard obovate, wings oblong, keel shorter than wings and slightly hooked distally. Stamens diadelphous. Pods linear-oblong, seeds 8-20.

1. Parochetus communis Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.* 240(1825); Grierson and Long in *Fl. Bhu.* 1(3):728(1987); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 178(2000).

Parochetus major D. Don, *Prodr. Fl. Nep.* 241(1825).

Nep.: Cemgi phul/Jangali badame jhar, Eng.: Blue clover

Perennial herbs. Leaflets broadly obovate, 0.5-2.5×0.5-2cm, base cuneate, margin crenate, glabrous above, appressed pubescent beneath. Petioles 3-6cm. Stipules lanceolate,

c5mm. Peduncles present. Calyx 6mm, toothed to middle. Petals blue, standard obovate, 15mm, wings and keel 10mm. Pods 15-20×3-4. Seeds rounded, blackish.

Field note: On open sandy soil.

Representative collection: Manang,Thanchok, 2260m, 8.7.2006 (Fl.), K. Adhikari et al. 186.

Distribution: Nepal (WCE, 900-4000m), Africa, Himalaya (Himanchal Pradesh to Bhutan), Sri-Lanka, NE India. S.E. Asia, Malaysia, China.

5. PIPTANTHUS Sweet

Deciduous shrubs. Leaves digitately 3-foliate, petiolate, leaflets entire, sessile, stipules connate. Flowers in short terminal racemes. Calyx campanulate, teeth 5. Petals long clawed, subequal, standard sub-orbicular, wings oblong, keel slightly incurved, rounded at apex. Stamens free. Pods linear-oblong, shortly stalked, compressed.

1. Piptanthus nepalensis (Hook.) D. Don, *Brit. Gard*. 3: t. 264(1828); Grierson and Long in *Fl. Bhu.* 1(3):737(1987); Press et al. in *Ann. Check. Fl. Pl. Nep.*:179(2000).

Baptisia nepalensis Hook., *Exot. Fl. t*. 131(Nov. 1824).

Shrubs upto 3m, young shoots pubescent. Leaflets ovate-elliptic, 5-8×1.5-2.5cm, acuminate, base cuneate, glabrous. Petioles 1-3cm. Stipules boat-shaped, 7-10mm, bifid at apex, deciduous leaving annuar scars an stems. Calyx tube c1cm, teeth lanceolate, 8-10×3mm, lower ones becoming reflexed. Petals yellow, 2-3cm, standard erect, c2cm broad, wings and keel 7-8mm broad. Pods 3-7×1-1.5cm, thinly coriaceous, shortly pebescent. Seeds reniform, blackish.

Field note: On the shady and moist place.

Representative collection: Manang, bet^{n} Talekhu and Chame, 2760m, 3.7.2006 (Fr.), K. Adhikari et al. 74.

Distribution: Nepal (WCE, 2000-3000m), Himalaya (Himanchal Pradesh to Bhutan), Myanmar, W. China.

6. TRIGONELLA L.

Annual or perennial herbs. Leaves pinnately 3-foliate, leaflets toothed or denticulate, stipules adnate to petioles. Flowers solitary or few in umbels or more numerous in small racemes heads. Calyx tube campanulate, teeth subequal. Petals free from staminal tube, standard obovate or oblong, wings narrowly oblong, keel rounded or acute at apex. Stamens ± diadelphous. Pod elongated, elliptic or linear, dehiscent.

1. Trigonella emodi Benth., *3. Bot. Himal. Mts*. 1(6):197(1835); Grierson and Long in *Fl. Bhu.* 1(3):729(1987); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 181(2000). Fig.5.f.

Trigonella emodi var. *himalaica* Sirj., *Op. Cit*. 20(1928).

Perennial herbs. Stems erect upto 30cm, appressed pubescent. Leaves pinnately 3-foliate, leaflets obovate, 10-15×5-10mm, obtuse, mucronate, base rounded, margins denticulate, glabrous. Petioles 0.5-2cm. Stipules lanceolate 5-8mm, coarsely dentate. Racemes 5-10 flowered, peduncles 3-6cm. Calyx tube c3mm, pubescent, lanceolate. Petals yellow, standard obovate or suborbicular, 10-12mm, wings oblong, keel upwardly curved and acute at apex. pods elliptic, 12-20×c4mm, compressed, 2-5 seeded.

Uses: Plant used as goat fodder.

Field note: On open moist area.

Representative collection: Manang, Talekhu, 2742m, 2.7.2006 (Fl.), K. Adhikari et al. 34.

Distribution: Nepal (WCE, 1300-4900m), Afghanistan, Turkestan, Himalaya (Kashmir to Nepal).

Family 22. GERANIACEAE

Herbs. Leaves opposite or alternate, lobed or palmately dissected, palmately veined, stipulate. Flowers solitary, or in few flowered cymes, or umbellate, bisexual, actinomorphic. Sepals 5, free. Petals 5, free, sometimes alternating with 5 nectaries. Stamens 10, usually all fertile, rarely 5 without anthers, filaments free or united at base. Ovary superior, 5-celled, styles 5. Capsule 5-lobed, mericarpic dehiscing with part of break breaking and coiling.

1. GERANIUM L.

Perennial herbs with woody rhizomes. Flowers solitary or in few flowered cymes, rarely umbellate, actinomorphic. Sepals all equal. Petals alternating with nectaries. Stamens all fertile, filaments not united at base. Ovary superior, 5-celled, styles 5. Capsule 5-lobed.

Key to the species

1a. Peduncles compact with suberect branches, corolla bright violet blue ……..**1. G. pratense**
1b. Peduncles with 2-flowered, corolla red, purple……...….2
2a. Petioles smooth, sepals with glandular hairs……..**3. G. wallichianum**
2b. Petioles sparsely glandular pubescent, sepals smooth……**2. G. procurrens**

1. Geranium pratense L., *Sp. Pl.* 681(1753); Hook. f. in *Fl. Brit. Ind.* 1:429(1979); Press et al. in *Ann. Check. Fl. Pl. Nep.*:120(2000).

Perennial with stout, oblique rhizome. Stems 30-50cm, erect, with deflexed hair below, glandular hairs above. Petioles upto 15cm. Leaflets 1.3-5cm, across, divided almost to base into 5-7 ovate, deeply pinnatified lobes, segments oblong acute. Inflorescence compact with suberect branches. Sepals 11-15mm, including awnlike tip. Petals 15-20mm, ovate, entire, bright violet- blue. Capsule 5-lobed.

Field note: Found in open dry areas.

Representative collection: Manang, bet^{n} Talekhu and Chame, 2770m, 3.7.2006 (Fl.), K. Adhikari et al. 44.

Distribution: Nepal (WC, 2000-4000m), Europe, C. Asia, Himalaya, Kashmir to Nepal.

2. Geranium procurrens Yeo., *Bot. Mag*. 179:t. 644(1973); Grierson and Long in *Fl. Bhu*. 1(3):746(1987); Press et al. in *Ann. Check. Fl. Pl. Nep.*:120(2000). Fig.5.g.

Decumbent herbs, stems upto 50cm. Basal leaves suborbicular, 4-8cm across, cordate, divided into 5 lobes, finely pubescent. Petiolate, sparsely glandular-pubescent. Stipules oblong-lanceolate, 4-9mm, free at base and apex. Peduncles upto 7cm, 2-flowered. Pedicels slender, 1-5cm mostly glandular pubescent. Sepals 6-8mm, smooth. Corolla red, purple, 1-2cm. Filaments, anther and style black. Fruit including beak.

Field note: On moist and sandy soil.

Representative collection: Manang, Koto area, 2600m, 6.7.2006 (Fl.), K. Adhikari et al. 131.

Distribution: Nepal (CE, 2100-3500m), Himalaya (Uttar Pradesh to Bhutan), N. and NE India.

3. Geranium wallichianum D. Don ex Sweet, *Geran.* 1:t. 90(1821); Hook. f. in *Fl. Brit. Ind.* 1:430(1874); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 120(2000).

Trailing or scrambling perennial much branched stem upto 120cm. Petioles upto 8cm, smooth, leaflets 2-5cm across, divided into 3-5 lobes, pubescent on both surfaces. Peduncles 2-flowered. Flowers red-purple. Sepals 3-6mm with glandular hair. Petals purple with blackish middle, 2-3cm across. Filaments, anthers and style black. Fruit including beak up to 2.5cm.

Field note: On moist area.

Representative collection: Manang, Chame, 2720m, 4.7.2006 (Fr.), K. Adhikari et al. 89.

Distribution: Nepal (WC, 2100-4200m), Afghanistan, Himalayan (Kashmir to Bhutan).

Family 23. EUPHORBIACEAE

Trees, shrubs or herbs rarely climbing, often with milky sap. Leaves alternate, sometimes opposite or whorled, simple, sometimes palmately lobed, venation pinnate or palmate at base, usually stipulate. Monoecious or dioecious. Flowers small, solitary or in clusters, spikes, racemes, panicles or cymes or in cup-like cyathia, unisexual, actinomorphic. Calyx of 3-6(-12) free or partly united segments. Petals 3-6(-10), or often absent. Stamens 2-many, free or variously united. Ovary superior, 2-4(-15) celled, styles 2-4, free or united, simple or bifid. Ovules 1-2 per cell, axile. Fruit usually a capsule.

1. EUPHORBIA L.

Annual or perennial herbs or succulent cactus like shrubs or small trees with milky juice. Leaves alternate or opposite, rarely in whorls of 3. Stipules absent or present. Monoecious, flowers in solitary, clustered or umbellate cyathia, each cyathium composed a cup-like involucre. Female flowers with a short pedicel and 3-celled, ovary bearing 3 free or united, simple or bilobed styles. Perianth absent. Male flowers with a single stamen, perianth absent. Fruit a 3-valved trigonous capsule.

1. Euphorbia sikkimensis Boiss., *Prodr.* 15(1):113(1864); Grierson and Long in *Fl. Bhu.* 1(3):764(1987); Press et al. in *Ann. Check. Fl. Pl. Nep.*:108(2000). Fig.5.l.

Perennial herb with creeping rhizomes and erect annual stems upto 70cm. Leaf simple, glabrous. Petioles 2-4mm, exstipulate. Upper most leaves 6-8 in a whorl, each subtending an umbel-ray. Cyathia campanulate 3-5mm across, bearing 4-5 orange semicircular glands at margin. Style c3mm, united in lower recurved above bilobed stigma. Capsule globose-trigonous, smooth.

Field note: On moist and shady area.

Representative collection: Manang, Bhratang, 2900m, 1.7.2006 (Fr.), K. Adhikari et al.10.

Distribution: Nepal (E, 2400m), Himalaya (Nepal to Bhutan), China (Xizang). **Not reported in Central Nepal and at 2900m altitude in Press et al. 2000.**

Family 24. RUTACEAE

Trees or shrubs, rarely herbs. Leaves, flower and fruits usually bearing numerous oil glands. Leaves opposite or alternate, simple or compound. Monoecious or dioecious. Flowers actinomorphic, unisexual or bisexual, in axillary or terminal racemes, corymbs or panicles, sometimes solitary. Calyx 4-5 lobed. Petals 4-5, free, valvate or imbricate. Stamens 4-5 or 8-10 or more, filaments free or connate, in female flower staminodes present. Ovary superior, 4-5 or more free or connate carpels, in male flowers pistillode present. Fruit a capsule, clusters of follicles, berry or drupe.

Key to the genera

1a. Herbs, leaves bi or triternate……..……...**1. Boenninghausenia**
1b. Shrubs, leaves trifoliate or odd-pinnate, rachis often winged. ……**2. Zanthoxylum**

1. BOENNINGHAUSENIA Reichenbach

Perennial herbs. Leaves alternate, bi or triternate, leaflets entire. Flowers bisexual, in terminal cymes. Calyx cup shaped, 4-5 lobed. Petals 4-5, oblanceolate. Stamens 6-8. Ovary 3-5 lobed, lobes connate only at base. Fruit a capsule on elongated gynophore. Seeds 6-8 in each cell.

1. Boenninghausenia albiflora (Hook.) Reichenb. ex Meissn., *Consp.* 197(1828); Grierson and Long in *Fl. Bhu.* 2(1):7(1991); Press et al. in *Ann. Check. Fl. Pl. Nep.*:279(2000).
Ruta albiflora Hook., *Exot. Fl.* 1:t. 79(1823).

Nep.: Dampate/Hirimir jhar/Makhe mauro/Ankuri, Eng.: Killer

Perennial herbs upto 50cm. Leaves 3-8cm, leaflets elliptic-obovate, 5-20×3-10mm, pale green, glabrous. Calyx 1-2mm. Petals 5-8×2-3mm white. Stamens 6 longer than petals. Fruit a capsule c4mm.

Field note: On moist rocky area.

Representative collection: Manang, bet^{n} Talekhu and Chame, 2770m, 3.7.2006 (Fl.), K. Adhikari et al. 50.

Distribution: Nepal (WCE, 600-3300m), Himalaya (Kashmir to Bhutan), India, China, Taiwan, Malaysia.

2. ZANTHOXYLUM L.

Shrubs, often armed with stout spines. Leaves alternate, trifoliate or odd-pinnate, rachis often winged bet^{n} leaflets and sometimes bearing at their points of insertion. Dioecious, flowers unisexual, in terminal or axillary panicles. Perianth either uniseriate with 4-8

undifferentiate segments or biseriate with 4-5 sepals and petals. Stamens 4-8, male flowers usually with 1-4 reduced carpels. Female flowers with 1-4 distinct carples surrounded by staminodes. Fruit 1-5 globose, coriaceous or fleshy 1-seeded carpels.

Key to the species

1b. Leafstalk and rachis winged……...……...….**1. Z . acanthopodium**
1a. Leafstalk and rachis unwinged…….…….**2. Z. nepalense**

1. Zanthoxylum acanthopodium DC., *Prodr.* 1:727(1824); Grierson and Long in *Fl. Bhu.* 2(1):13(1991); Press et al. in *Ann. Check. Fl. Pl. Nep.*:281(2000). Fig.6.a.

Nep.: Bogya timur

Shrub or small tree upto 5m. Shoots glabrous, stipules spines upto 0.7cm. Leaves upto 30cm, leaflets ovate or lanceolate upto 10×3cm, acuminate, base rounded, margin serrate. Leafstalk and rachis winged. Inflorescence axillary in short dense clusters. Male flowers with 6-8 stamens. Female flowers with 2 ovoid carpels. Fruit reddish ovoid.

Field note: On moist and shady area.

Representative collection: Manang, bet^{n} Talekhu and Chame, 2770m, 3.7.2006 (Fl.), K. Adhikari et al. 51.

Distribution: Nepal (CE, 1600-2800m), Himalaya (Uttar Pradesh to Bhutan), NE India (Meghalaya), east to China, Malaysia.

2. Zanthoxylum nepalense Babu, *Bull. Bot. Surv. Ind.* 16:60(1974); Polunin et al. in *Fl. Him.* 73(1997); Press et al. in *Ann. Check. Fl. Pl. Nep.*:281(2000).

A small tree with numerous long straight spines on branchlets and leaf-stalks, with pinnate leaves. Flowers in short stalkless flat- topped branched clusters. Leafstalks and rachis unwinged and with oval leafless 1-3cm, with prominent lateral veins. Flowers one-sexed. Petals absent. Stamens 6-8. Ripe capsule c4mm, glandular, red, wringled, aromatic. Seeds shining black.

Field note: On moist rocky area.

Representative collection: Manang, Tal, 1640m, 9.7.2006 (Fr.), K. Adhikari et al. 210.

Distribution: Nepal (CE, 2700-3100m). **Not reported at 1640m altitude in Press et al. 2000.**

Family 25. CORIARIACEAE

Shrubs. Leaves opposite, simple, entire, palmately veined, exstipulate. Flowers actinomorphic, bisexual, in terminal or axillary racemes. Sepals 5, imbricate. Petals 5, distinct. Stamens 10, in 2 whorls, anther openning by longitudinal slits. Carpels 5, superior, each with a slender style. Fruit of separate, laterally compressed achenes.

1. CORIARIA L.

Discription as for Coriariaceae.

1. Coriaria nepalensis Wall., *Pl. Asiat. Rar.* 3(12): 67, t. 289(1832); Grierson and Long in *Fl. Bhu.* 2(1):53(1991); Press et al. in *Ann. Check. Fl. Pl. Nep.*:75(2000). Fig.6.b.

Shrubs upto 4m. Leaves elliptic or ovate, 3-10×2-8cm, acute, base rounded or shallowly cordate, glabrous, 3-5 veined at base. Flowers in racemes borne in clusters from the axils of leaves. Bracts oblanceolate, c3mm. Sepals ovate, rounded. Petals elliptic, 3-4×1-2mm, black in fruit. Filaments c3mm, Carples c1mm, styles linear, thickish. Achenes ovoid, 2-2.5×1-1.5mm, surrounded by persistent fleshy petals.

Field note: On sandy soil.

Representative collection: Manang, Koto, 2550m, 5.7.2006 (Fr.), K. Adhikari et al. 110.

Distribution: Nepal (WCE, 1200-2400m); Himalaya (Kashmir to Bhutan), NE India, N. Myanmar, W. China. **Not reported at 2550 m altitude in Press et al. 2000.**

Family 26. ANACHARDIACEAE

Shrubs or tree. Leaves alternate, rarely opposite, pinnate or trifoliate or simple, exstipulate. Monoecious or dioecious. Flowers actinomorphic, bisexual or unisexual, in terminal or axillary panicles. Sepals and petals usually 5. Sepals usually connate at base, petals free or rarely absent. Stamens 5-10 in bisexual and male flowers. Ovary free or immersed in disc, rarely inferior. Carpels(1-)3(-5); styles 1-5. Ovules solitary in each cell. Fruit drupaceous with resinous or waxy mesocarp, rarely a dry achene.

1. RHUS L.

Shrubs or trees. Leaves alternate, trifoliate or odd-pinnate. Flowers usually unisexual, in terminal or axillary panicles. Calyx 5-lobed. Petals 5, imbricate. Stamens 5, inserted at base of disc, sterile in female flowers. Ovary ovoid or globose, 1-celled. Styles 3, stigma captitate or simple, reduced to a pistillode in male flowers. Drup dry, stone compressed.

1. Rhus succedanea L., Mant, *Pl.* 2:221(1771); Grierson and Long in *Fl. Bhu.* 2(1):56(1991); Press et al. in *Ann. Check. Fl. Pl. Nep.*:10(2000). Fig.6.c.
Rhus acuminata DC., *Prodr.* 2:68(1825).
Nep.: Bhalayo/Rani bhalayo,Eng.: Wax tree/Japanese wax tree.

Small tree upto 13m. Leaves 15-30cm, leaflets membranous, 2-6 pairs, ovate, oblong or lanceolate, 4.5-13×1.2-4.5cm, acuminate, base cuneate, margin entire. Panicles axillary. Calyx c1mm. Petals 2×0.5mm. Stamens 5, reduced to staminodes in female flowers. Ovary ovoid. Drupe subglobose, 5-8mm.
Field note: On very moist, open sandy place.
Representative collection: Manang, Danaque, 2630m, 13.10.2006 (Fr.), K. Adhikari et al. 414.
Distribution: Nepal (WCE, 1300-2400m), Himalaya (Kashmir to Bhutan), NE India, Myanmar, Thailand, China. **Not reported at 2630m altitude in Press et al. 2006.**

Family 27. ACERACEAE

Deciduous trees. Leaves opposite, simple often palmately lobe. Stipules absent. Dioecious or monoecious. Flowers in axillary or terminal pendulous racemes or panicles, actinomorphic, some or all unisexual. Sepals and petals mostly 5. Stemens(4-)8(-12); filaments distinct. Ovary bilocular; styles 2 mostly connate at base. Fruit a double somra, each with terminal wing, mericarps 1-seeded.

1. ACER L.

Description as for Aceraceae.

1. Acer caudatum Wall., *Pl. Asiat. Rar*. 2(5):4(1830) p.p.:28, t. 132(1831); Hara in *Enum. Fl. Pl. Nep.*:5(2000). Fig.7.a.
Acer papilio King in *J. As. S. Beng*. 65(2):115(1896).

Tree about 12m. Leaves 5 lobed, 10-15cm long and broad, lobes 4-6cm caudate-acuminate, base cordate, margin serrate, petioles 3-7cm. Flowers in dense panicles. Sepals acute, 2-3mm. Petals as long as sepals. Anthers scarcely exserted. Fruit a double samara, each with terminal wing.
Field note: On moist forest area.
Representative collection: Manang, Bagarchhap, 2140m, 8.7.2006 (Fr.), K. Adhikari et al. 180.
Distribution: Nepal (CE, 3000-4000m), Himalaya (Uttar Pradesh to Bhutan), China (Xizang). **Not reported at 2140m altitude in Press et al. 2000.**

Family 28. BALSAMINACEAE

Annual or perennial herbs, often rather fleshy. Stem erect to procumbent, often rooting at the lower nodes. Leaves alternate, opposite or whorled, toothed, pinnately veined, exstipulate. Inflorescence racemose or solitary or clustered at the leaf axils. Flowers bisexual, zygomorphic. Sepals 3 or 5, lowermost one generally modified into a spur. Petals 5, all free or

the lower 4 united in two lateral pairs. Stamens 5. Ovary superior, carpels 5, united. Style solitary very short or obsolete. Ovules solitary to many. Fruit a capsule or pseudoberry.

1. IMPATIENS L.

Annual or perennial herbs, fleshy. Stem erect to procumbent, often rooting at the lower nodes. Leaves alternate, opposite or whorled, toothed, pinnately veined, exstipulte. Inflorescence racemose or solitary or clustered at the leaf axils. Flowers bisexual, zygomorphic. Sepals 3 or 5. Petals 5, lateral petals always united together in pairs. Stmens 5. Ovary superior. Capsule dehiscing elastically to eject seeds.

Key to the species

1a. Leaves ovate- elliptic, flowers mauve spotted with yellow brown in throat ….**1.I. sulcata**

1b. Leaves lanceolate-elliptic, flowers pale yellow lined with reddish purple in throat ……..…….....**2. I. urticifolia**

1. Impatiens sulcata Wall. in Roxb, *Fl. Ind*. 2:458(1824); Grierson and Long in *Fl. Bhu.* 2(1):100(1991); Press et al. in *Ann. Check. Fl. Pl. Nep*.:23(2000).
Impatiens gigantea Edgew. in *Tr. Linn. Soc.* 20:38(1846).
Nep.: Phosormindo/Mujuro

Annual herb upto 1m, glabrous. Leaves opposite, ovate elliptic, 3-10×1-4cm, base cuneate. Inflorescene racemes, flowers mauve spotted with yellow brown in throat. Peduncle 2-6cm. Lower sepal saccate, abruptly constricted into an incurved spur 5-10mm. Dorsal petal 10-18×13-22mm, slightly crested above, lateral united petals 15-25 mm, upper lateral petal oval, with a short recurved acute apex, 10-12×6-9mm, lower lateral petal elliptic- triangular, 10-15×5-11mm, subobtuse. Capsule cylindric-clavate.
Field note: On open area of rocky soil.
Representative collection: Manang, Koto area, 2600m, 5.7.2006 (Fl.), K. adhikari et al. 114.
Distribution: Nepal (WCE, 1700-4100m), Himalaya (Kashmir to Bhutan).

2. Impatiens urticifolia Wall. in Roxb., *Fl. Ind*. 2:457(1824), Grierson and Long in *Fl. Bhu.* 2(1):102(1991); Press et al. in *Ann. Check. Fl. Pl. Nep*.:24(2000). Fig.7.b.

Perennial herb upto 1m. Leaves elliptic, lanceolate-elliptic, 4-15×1-5cm, glabrous. Inflorescence dropping, 2-7-flowered racemes. Flowers pale yellow lined with reddish purple in throat. Peduncle 4-7cm. Lateral sepals toothed edge. Lower sepal deeply navicular, pointed. Dorral petal cucullate, 8-10-×6-15mm, shallowly crested above, lateral petals 30-40mm, upper lateral petal triangular, obtuse, 8-10×5-6mm, lower lateral petal triangular-lanceolate, 20-25×6-8mm. Capsule linear-cylindrical.
Field note: On open area of rocky soil.
Representative collection: Manang, Koto, 2600m, 5.7.2006 (Fl. and Fr.), K. Adhikari et al. 113.
Distribution: Nepal (WCE, 2700-3800m), Himalaya (Nepal to Bhutan), China (Xizang). **Not reported at 2600m altitude in Press et al. 2000.**

Family 29. BUXACEAE

Evergreen shrubs or small trees. Leaves alternate or opposite, simple, entire, pinnately veined or 3-veined at base, exstipulate. Monoecious or rarely dioecious. Flowers in short axillary bracteate racemes or clusters, unisexual, actinomorphic. Perianth of 4(-6) free segments. Male flowers; stamens 4, opposite perianth segments, pistillode sometimes present. Ovary superior, 3-celled, style 3, free. Ovules 2 per cell, axile. Fruit a capsule or indehiscent and berry.

1. SARCOCOCCA Lindley

Shrubs. Leaves alternate, coriaceous, pinnately veined or 3-veined at base. Flowers in short axillary racemes. Upper male, lower few female or sometimes all female. Perianth

segments oblong, obtuse, concave. Styles short recurved. Fruit a 3-seeded berry with persistent styles.

1. Sarcococca hookeriana Baill., *Monogr. Buxac.* 53(1859); Grierson and Long in *Fl. Bhu.* 2(1):131(1991); Press et al. in *Ann. Check. Fl. Pl. Nep.*:32(2000). Fig.7.c.
Sarcococca pruniformis var. *hookeriana* (Baill.) Hook. f. in *Fl. Brit. Ind.* 5:267(1887).

Small shrubs 0.5-1.5m. Leaves narrowly elliptic-lanceolate, 5-9×1-2cm, acuminate or acute, base cuneate, pinnately veined, glabrous. Petioles 5-8mm. Flowers strongly fragrant recemes. Bracts ovate c2.5cm. Perianth segments greenish, c2mm. Stamens white, long exerted. Ovary ovoid. Berries subglobose, c1cm.
Field note: On sandy dry soil.
Representative collection: Manang, Chame, 2720m, 4.7.2006 (Fr.), K. Adhikri et al. 92.
Distribution: Nepal (WCE, 1800-3500m), Himalaya (Nepal to Bhutan), NE India, W. China (var.).

Family 30. MALVACEAE

Herbs, shrubs, trees or climbers, indumentum usually stellate. Stems often fibrous. Leaves alternate, simple or lobed, usually palmately 3-7 veined from base sometimes pinnate stipulate. Mostly monoecious. Flowers axillary, solitary or 2-many flowered, terminal or axillary, solitary racemes or panicles, mostly bisexual, actinomorphic. Usually epicalyx of 3-many. Calyx 4(-5). Petals 5 free, adnate to base of staminal column. Stamens united around style. Ovary superior, 2-many celled. Style simple or 2-many branched. Fruit a loculicidally dehiscent, rarely indehiscent capsule or schizocarpic.

1. MALVA L.

Annual, biennial or perennial herbs. Leaves unlobed or lobed. Stipules persistent. Flowers bisexual, axillary, solitary or fascicled. Epicalyx of 3 free segments. Sepals 5, connate to middle, lobes triangular. Petals 5, cuneate to obovate. Staminal column included, divided at apex into numerous filaments. Ovary 5-15 celled. Style branches as numerous as cells. Stigma decurrent. Fruit of 8-15, 1-seeded indehiscent mericarps.

1. Malva sylvestris L., *Sp. Pl.*:689(1753); Grierson and Long in *Fl. Bhu.* 2(1):189(1991); Press et al. in *Ann. Check. Fl. Pl. Nep.*:194(2000). Fig.7.d.
Malva mauritiana DC., *Prodr.* 1:432(1824).

Herbs, stem erect, 70-120cm, spreading hairs. Leaves suborbicular, shallowly 5-lobed, 3-7×2-4cm, base cordate, margin crenate, sparsely pubescent. Petiole 2-4cm. Stipules c5mm. Flowers in dense, axillary 4-8 flowered fascicles. Epicalyx segments oblong-lanceolate, 4-5mm. Sepals 5-7mm. Petals purple as long sepals. Staminal column 4-5mm. Fruit surrounded by calyx, mericarps, dorsally flat, pubescent.
Field note: On side of foot trail on sandy soil.
Representative collection: Manang, Temang, 2630m, 13.10.2006 (Fr.), K. Adhikari et al. 391.
Distribution: Nepal (C, 2400m), Europe, N. Africa, Himalaya, N. Asia, often cultivated. **Not reported at 2630m altitude in Press et al. 2000.**

Family 31. THYMELAEACEAE

Shrubs or trees, rarely herbs, with tough fibrous inner bark. Leaves alternate, simple, pinnately veined, entire, exstipulate. Flowers in axillary or terminal, umbellate or globose heads, bisexual, actinomorphic. Perianth tubular, lobes 4-5, spreading. Stamens 8-10, adnate to perianth tube, often in 2 whorls. Ovary superior, 1-2 celled. Ovules 1-2 per cell. Style slender, stigma capitate to oblong. Fruit a capsule, drupe or nut, 1-2 seeded.

1. STELLERA L.

Perennial, simple, erect, annual leafy shoots. Leaves spirally arranged in 4 ranks. Flowers in rounded terminal heads. Perianth 5- lobed, without scales. Disc forming a linear

appendage on one side. Stamens 8-10, in 2 whorls. Ovary 1-celled. Style short. Stigma capitate. Fruit indehiscent, 1-seeded.

1. Stellera chamaejasme L., *Sp. Pl.* 559(1753); Grierson and Long in *Fl. Bhu.* 2(1):210(1991); Press et al. in *Ann. Check. Fl. Pl. Nep.*:309(2000). Fig.7.e.
Wikstroemia chamaejasme (L.) Domke in *Notizble* 11:362(1932).

Herbs, annual upto 35cm, glabrous. Leaves elliptic to lanceolate, 1-2.5×0.5-1cm, acute, base cuneate or rounded, sessile. Flowers heads terminal, surrounded by a pseudo-involucre of whorled upper leaves. Perianth tube 6-10mm, red, lobes c3mm, white within, red outside. Fruit ovoid.
Field note: On moist place.
Representative collection: Manang, Tal, 1640m, 9.7.2006 (Fl. and Fr.), K. Adhikari et al. 209.
Distribution: Nepal (WC, 2700-4200m), C. Asia, Himalaya (Garhwal to Bhutan), Mongolia, S. Siberia, N. China. **Not reported at 1640m altitude in Press et al. 2006.**

Family 32. ELAEAGNACEAE

Trees or shrubs, mostly with silvery, yellow or brown scales, sometimes spiny. Leaves usually coriaceous, simple, alternate, pinnately veined, petiolate. Stipules absent. Monoecious or dioecious. Flowers solitary or in clusters or racemes, actinomorphic, bisexual or unisexual. Sepals 2-8, united. Petals absent. Stamens 4-8, inserted on calyx, free. Ovary superior, 1-celled, style elongate. Fruit drupe like, indehiscent, containing a single stone.

Key to the genera
1a. Flowers bisexual, fruit drupe like……...……...……**1. Elaeagnus**
1b. Flowers unisexual, fruit globose or elliptic berry……...…….**2. Hippophae**

1. ELAEAGNUS L.

Leaves entire. Flowers clustered on short axillary shoots, bisexual. Calyx tube constricted above the ovary, lobes 4, usually spreading. Stamens 4, inserted in mouth of calyx. Style not exerted. Ovary superior, 1-celled. Fruit drupe like, indehiscent.

1. Elaeagnus parvifolia Wall. ex Royle, *3. B. Him*. 323, t. 81, f. 1(1836); Grierson and Long in *Fl. Bhu.* 2(1): 215(1991); Press et al. in *Ann. Check. Fl. Pl. Nep.*:100(2000).
Elaeagnus umbellata subsp. *Parvifolia* (Wall. ex Royle) Servett. in *Bull. Herb. Boiss. Ser.* 2, 8:383, in clave(1908).
Nep.: Gunyali/Kankoli, Eng.: Oleaster

Spiny shrub, 1-4m. Leaves narrowly oblong-elliptic, 2-6×1-2.5cm, acute, base cuneate to rounded. Lower leaf surface silver-white, densely scaly, upper surface glabrescent. Petiole 3-8mm. Flowers 1-3 in leaf axils. Calyx 1-15cm, above constriction narrowly obconical, 9-10mm, white to greenish yellow, densely scaly, lobes ovate, 3-3.5mm. Stamens inserted, anther subsessile. Style hairy. Fruit red, ellipsoid.
Field note: On open and moist area.
Representative collection: Manang, Danaque, 2250m, 6.9.2006 (Fl. and Fr.), K. Adhikari et al. 260.
Distribution: Nepal (WCE, 1300-3000m), Afghanishtan, Himalaya (Kashmir to Bhutan), NE India, W. China.

2. HIPPOPHAE L.

Spiny deciduous shrubs or small tree. Leaves entire, lower surface densely stellate or peltate hairy, shortly petiolate. Dioecious. Male flowers in small catkins that appear before the leaves. Perianth segments 2. Stamens 4. Female flowers in small racemes, appearing with leaves. Perianth segments fused, 2-lobed. Style stigmatic on one side. Fruit a globose or elliptic berry.

1. Hippophae salicifolia D. Don, *Prodr. Fl. Nep.* 68(1825); Grierson and Long in *Fl. Bhu.* 2(1):216(1991); Press et al. in *Ann. Check. Fl. Pl. Nep.*:100(2000). Fig.8.a.

Elaeagnus salicifolia (D. Don) A. Nelsonin, *Am. J. B.* 22:682(1935).

Nep.: Ashuk/Khurpu, Eng.: Seabuck thorn

Small tree upto 5m. Leaves linear oblong, 4-7×0.5-0.9cm, margin revolute, upper surface stellate-hairy, lower surface tomentose, whitish. Petiole 2-4mm. Male flowers 2.5-3mm, anthers 2-2.5mm. Female flowers c2mm. Fruit globose, 5-8×4-7mm, orange-yellow at riped condition.

Uses: Fruits used to prepare juice.

Field note: On fragile slopy and bank of the river.

Representative collection: Manang, Chame, 2620m, 12.10.2006 (Fr.), K. Adhikari et al. 338.

Distribution: Nepal (WC, 2200-3500m), Himalaya (Punjab to Bhutan), China (Xizang).

Family 33. VIOLACEAE

Herbs, shrubs or small trees. Leaves alternate, simple, stipulate. Flowers solitary or fasciculate, bisexual, actinomorphic or zygomorphic. Sepals 5, free. Petals 5, free. Stamens 5, all alike with filaments distinct or connate into an annular disc, connectives all enlarged apically or the two lower-most produced at base into petal spur. Ovary 3-valved, superior, 1-celled. Ovules 1-many, placenttion parietal. Style simple. Fruit a loculicidal capsule.

1. VIOLA L.

Annual or perennial herbs, sometimes stoloniferous. Leaves all basal or alternate on stems. Stipules free or adnate to petiole. Flowers solitary, axillary, zygomorphic. Peduncles usually with a pair of bracts. Sepals 5, persistent. Petals 5, unequal, oblong or obovate, the lower most one prolonged behind into a short spur. Anthers connivent around ovary. Style enlarged distally. Stigma simple or lobed. Fruit a loculicidal capsule.

Key to the species

1a. Leafblade broadly ovate, stipules entire, sepals rounded…….....**1. V. biflora**

1b. Leafblade ovate-cordate, stipules toothed, sepals acute…..……..**2. V. canescens**

1. Viola biflora L., *Sp. Pl.* 936(1753); Grierson and Long in *Fl. Bhu.* 2(1):224(1991); Press et al. in *Ann. Check. Fl. Pl. Nep.*:326(2000).

Viola manaslensis F. Maekawa in *Acta. Phyt. Gesbot*. 25:110(1973).

Perennial with nodular rootstock upto 15cm herbs. Petiole c1cm. Leafblade broadly ovate, 10-16×12-20mm, pubescent especially on upper surface. Stipules ovate, leafy, entire. Peduncles with linear bracts 1-3mm. Sepals lanceolate, c4mm, shortly ciliate, rounded. Petals c9mm, yellow, upper 4 sharply reflaxed, lowermost petal reddish purple, spur saccate. Capsule ovoid, glabrous.

Field note: On sandy moist and shady area.

Representative collection: Manang, Bagarchhap, 2140m, 8.7.2006 (Fl.), K. Adhikari et al. 185.

Distribution: Nepal (WCE, 2100-4500m), Europe, Siberia, N. Korea, Japan, W. and N. America.

2. Viola canescens Wall., *Fl. Ind*.(Roxburgh) ed. 2, 2:450(1824); Hook. f. in *Fl. Brit. Ind.* 1:184(1872); Press et al. in *Ann. Check. Fl. Pl. Nep.*:326(2000). Fig.8.b.

Viola serpens Wall. var. *canescens* (Wall.) Hook. f. and Thoms in *Fl. Brit. Ind*. 1:184(1872).

Perennial herbs about 10cm. Petiole 1-2cm. Leafblade ovate-cordate, obtuse or acute, 3-5×2-3.5cm, crenate-serrate margin, pubescent. Stipules toothed. Flowers axillary. Sepals acute, c4mm. Petals c1cm, light yellow, spur saccate. Capsule globose, pubescent.

Field note: On sandy soil.

Representative collection: Manang, Koto, 2600m, 13.10.2006 (Fl.), K. Adhikari et al. 360.

Distribution: Nepal (WC, 150-2400m), Himalaya (Kashmir to Bhutan). **Not reported at 2600m altitude in Press et al. 2000.**

Family 34. BEGONIACEAE

Succulent herbs, rootstocks tuberous or rhizomatous, stemless or stemmed. Leaves alternate, simple, palmately or pinnately veined, often ovate, asymmetrically cordate at base. Stipules leafy. Monoecious. Flowers in terminal or axillary cymes, unisexual. Perianth parts petaloid. Male flowers; perianth of 2 outer, valvate, opposite segments and 0-2 smaller, inner segments stamens numerous, free or connate below. Female flowers; perianth of 2-5 segments, placentation axile, ovules numerous. Styles (2-)3(-4), free or connate at base. Fruit a capsule, often unequally winged, seeds minute and numerous.

1. BEGONIA L.

Description as for Begoniaceae.

1. Begonia picta Sm., *Exot. Bot*. 2: 81, t. 101(1805); Grierson and Long in *Fl. Bhu.* 2(1):242(1991); Press et al. in *Ann. Check. Fl. Pl. Nep.*:25(2000). Fig.8.c.
Begonia erosa Wall., *Cat.* 129, n. 3688(1831).
Nep.: Magor Kace/Sovapani, Eng.: Begonia

Rootstock tuberous, stems upto 10cm. Leaves 2 basal and cauline leaf, ovate, 5-8×3-6cm, acuminate, base cordate, margins serrate-dentate, coarsely hairy on upper surface. Petioles 1-4cm. Outer perianth segments broadly elliptic, 1-1.5×0.5-0.7cm, white. Stamens numerous. Styles 3, connate at base. Capsule ellipsoid, wings present, triangular.
Field note: On moist open rocky area.
Representative collection: Manang, Tal area, 1640m, 9.7.2006 (Fl.), K. Adhikari et al. 226.
Distribution: Nepal (WCE, 600-2800m), Himalaya (Punjab to Bhutan), NE India.

Family 35. CUCURBITACEAE

Climbing or trailing herbs or subshrubs. Leaves alternate, simple, palmately or pedately lobed or compound, exstipulate, tendrils axillary, solitary, simple or branched. Monoecious or dioecious. Flowers in axillary racemes, corymbs, panicles, fascicles or solitary. Calyx tubular or campanulate, sepals rarely free. Petals tube, free or connate. Male flowers; stamens inserted on calyx tube, mostly 3, sometimes 5, anthers straight, curved or conduplicate, pistillode may or may not present. Female flowers; perianth as usually as male, ovary inferior, carpels 3, style 3, free or connate, stigmas often bifid, staminodes present or not. Fruit a dehiscent or indehiscent berry or capsule, erect or pendulous.

1. HERPETOSPERMUM Hook. f.

Leaves simple, lobed, tendrils bifid. Dioecious. Male peduncles; two per axil, 1-flowered. Calyx cylindric. Corolla yellow, tubular at base, campanulate above. Stamens 3, anthers connate. Female flowers; usually solitary, calyx and corolla as male, ovary oblong. Stigma 3-valved to middle, seeds oblong, compressed smooth.

1. Herpetospermum pedunculosum (Ser.) Baill., *Hist. Pl.* 8:445(1886); Grierson and Long in *Fl. Bhu.* 2(1): 267(1991); Press et al. in *Ann. Check. Fl. Pl. Nep.*:85(2000). Fig.8.d.
Bryonia pedunculosa Seringe in DC., *Prodr.* 3:306(1828).
Nep.: Kurkure Kakro/ Murmure

Climbers, leaves ovate, 7-10×4-8cm, slightly to moderately 3-5 lobed, acuminate, base cordate, margin serrate, pubescent on both surfaces. Petiole up to 5cm. One male peduncle, 1-flowered, 5-10cm, the other many flowered, 10-15cm, ebracteate. Calyx tube 2-3cm, broad at apex, teeth filiform. Corolla lobes ovate, c2.5×1.5-2cm, anthers 5-6×3mm. Female peduncles 1-3cm. Fruit ellipsoid, stiffy hirsute, seeds oblong.
Field note: On moist open area.
Representative collection: Manang, Temang, 2600m, 13.10.2006 (Fr.), K. Adhikari et al. 396.
Distribution: Nepal (WCE, 1500-3600m), Himalaya (Kulu to Bhutan), NE India, W.& S. China.

Family 36. ONAGRACEAE

Perennial or annual herbs. Leaves opposite or spiral, simple, entire or toothed. Stipules absent or reduced. Flowers actinomorphic or zygomorphic, 2-or 4- merous, bisexual, solitary or axillary or in racemes. Floral tube short or absent. Sepals 2-5(-7), valvate. Petals 2-5(-7), Free. Stamens as many as or twice as many as sepals. Anthers versatile or basifixed. Ovary inferior, style simple. Stigma lobed or globose. Fruit a capsule, berry or nut.

1. EPILOBIUM L.

Herbs erect or decumbent, densely pubescent to glabrous. Leaves opposite or spiral, denticulate or serrulate or entire. Flowers in axillary racemes. Sepals 4, equal, free or basally connate. Petals 4, notched at apex or entire, free or basally connate. Stamens 8. Stigma 4-lobed, capitate or clavate. Capsules elongate, slender, 4-celled, loculicidal. Seeds many.

1. Epilobium wallichianum Hausskn. in *Oesterr. B. Zeits*. 19:54(1879); Grierson and Long in *Fl. Bhu.* 2(1): 319(1991); Press et al. in *Ann. Check. Fl. Pl. Nep.*:207(2000). Fig.9.a.

Suberect herbs up to 50cm, simple. Leaves subcoriaceous, oblong to elliptic, 2-4×0.5-1.5cm, obtuse, base cuneate, sparsely appressed stiffy hairy on veins and margins, serrulate, shortly petiolate c3mm. Inflorescence nodding. Floral tube with hairs. Sepals 4-8×1-2mm. Petals pink, 5-10×3-4mm, apical notch. Ovaries hairy and glandular. Style with hairy. Capsule elongate, slender.

Field note: On moist place.

Representative collection: Manang, Talekhu, 2790m, 10.10.2006 (Fl. and Fr.), K. Adhikari et al. 282.

Distribution: Nepal (WCE, 1700-4100m), Himalaya (Nepal to Bhutan), Tibet, N. Burma, W. China.

Family 37. TORICELLIACEAE

Tree or shrubs. Leaves alternate, serrate-dentate. Dioecious. Inflorescence many-flowered, hanging panicle. Male flowers; calyx tube short, 5-lobed, petals 5, stamens 5, ovary reduced to pistillode. Female flowers; petals and stamens absent, styles 3. Fruit small, ovoid, few seeded, black when ripe.

1. TORICELLIA DC.

Description as for Toricelliaceae.

1. Toricellia tiliifolia DC., *Prodr.* 4:257(1830); Grierson and Long in *Fl. Bhu.* 2(1):331(1991); Press et al. in *Ann. Check. Fl. Pl. Nep.*:310(2007). Fig.9.b.

Shrubs. Leaves broadly ovate or orbicular, 6-10×4-9cm, acute, base cordate, margin conspicuously serrate-dentate, tomentose on upper surface. Petiole upto 7cm. Male and female panicles 10-15cm. Male flowers reddish green, c3.5mm long, petals oblong, c3mm. Stamens shorter than petals. Female flowers c 2.5 mm. Styles 1mm. Fruit c6×5mm, glabrous, black when riped.

Field note: On open sandy soil.

Representative collection: Manang, Dharapani, 1960m, 8.7.2006 (Fr.), K. Adhikari et al. 188.

Distribution: Nepal (WC, 1600-2500m), Himalaya (Nepal to Bhutan), W.& S. China.

Family 38. ARALIACEAE

Trees or shrubs, sometimes climbing, rarely herbs. Leaves alternate or whorled, pinnately or palmately compound, trifoliate or simple. Flowers in umbels, perfect or unisexual, umbels usually in panicles, very often 5-merous. Calyx small around apex of ovary, sometimes obsolete. Petals 5-10, valvate or sometimes imbricate. Stamens as petals. Ovary inferior 2-5 or 10-celled. Styles as many as cells, distinct or connate. Fruit a drupe or berry.

Key to the genera

1a. Leaves palmately compound……..……..…..……..……. **1. Acanthopanax**
1b. Leaves simple, sometimes lobed……..……..……...…….**2. Hedera**

1. ACANTHOPANAX Miq.

Shrubs or small tree, glabrous or pubescent, the branches often prickly. Leaves alternate, stipulate, petioled, palmately compound, leaflets toothed. Inflorescence simple umbels or paniculately compound. Flowers polygamous or hermaphrodite, actinomorphic. Calyx teeth 5, minute. Petals usually 5, valvate in bud. Stamens as many as the petals. Ovary 2-5 locular. Style 2, free or connate to the top. Fruit globose or slightly flattended. Seeds flattened laterally.

1. Acanthopanax cissifolius (Griff. ex Seem.) Harms, *Pflanzenfam. 3*.8:50(1897); Dep. Med. Pl. in Fl. Kath. Val. 345(1986); Press et al. in *Ann. Check. Fl. Pl. Nep.*:15(2000).
Aralia cissifolia Griff. ex Seem. in *J. B.* 6:134(1864).

A thorny climber. Leaves petioled, petiole 8-15cm, stipules 0.8cm long, ovate, acute, petiole with scattered prickles and sheathing base, palmately compound, leaflets 3-5 in number, 4-11.5×1-3.5cm, lanceolate, acuminate, serrate, pilose on both surfaces. Inflorescence simple, spherical umbels. Flowers pedicellate, bracteate white. Calyx teeth 5, minute. Petals 5, c 3mm, triangular. Stamens 5, free, anther dorifixed. Style 5, united at the top. Stigma 5, simple. Fruit a berry, black.

Field note: On fragile slopy place.

Representative collection: Manang, Bagarchhap, 2630m, 13.10.2006 (Fl. and Fr.), K. Adhikari et al. 419.

Distribution: Nepal (WCE, 3000-4000m), Himalaya (Uttar Pradesh to Bhutan) W. China. **Not reported at 2630 m altitude in Press et al. 2000.**

2. HEDERA L.

Climbing shrub, stems bearing adhesive rootlets. Leaves simple, sometimes lobed. Umbels few-flowered, borne in short panicles. Pedicels not articulated at base of ovary. Calyx rim subentire. Petals 5. Stamens 5. Ovary 5-celled, stigmas connate. Fruit berry-like.

1. Hedera nepalensis K. Koch, *H. Dendr*. 284(1853); Grierson and long in *Fl. Bhu.* 2(1):346(1991); Press et al. in *Ann. Check. Fl. Pl. Nep.*:16(2000). Fig.9.c.
Hedera himalaica Tobler, Gatt. Hedera 67, f. 31-38(1912).

Nep.: Dudela/kathe laharo, Eng.: Nepal ivy climber

Climbing shrubs. Leaves coriaceous, ovate-lanceolate, 4-8×2-4cm, acuminate, base rounded or cuneate, entire, glabrous. Umbels in terminal panicles. Petals 5, ovate, 3mm. Stamens 5. Ovary 5-celled. Fruit subglobose, orange.

Field note: On sandy slopy place.

Representative collection: Manang, Talekhu, 2780m, 10.10.2006 (Fl.& Fr.), K. Adhikari et al. 279.

Distribution: Nepal (WCE, 3000-4000m), Afghanistan, Himalaya (Kashmir to Bhutan), NE India, Myanmar, China (var.). **Not reported at 2780m altitude in Press et al. 2000.**

Family 39. UMBELLIFERAE

Annual, biennial or perennial herbs. Leaves basal or alternate, pinnately, rarely simple. Petiole with sheathing base. Flowers small, borne in simple or compound umbels, rarely compact heads. Rays of umbels subtended by a whorl of bracts. Calyx tube wholly fused to ovary, teeth free. Corolla free lobes regular or outer enlarged. Stamens alternate with petals. Ovary with 2 carpels. Style distinct, usually swollen at base. Fruit a dry schizocarp.

Key to the genera

1a. Leaves simple, entire, usually at length parallel veined…… …..……..**1. Bupleurum**
1b. Leaves pinnately or ternately lobed, reticulate veined…….…….…..…..…….2
2a. Petals incurved, acuminate……..…….....……**2. Carum**

2b. Petals emarginate or 2-lobed, obovate……..…….…….……3
3a. Bracts absent, fruit ellipsoid orbicular…….....**3. Heracleum**
3b. Bracts linear a sometimes pinnatifid, fruit ovoid……..……**4. Selinum**

1. BUPLEURUM L.

Annual or perennials, glabrous herbs. Leaves entire, simple, usually at length parallel veined. Umbels loosely compound, bracts and bracteoles leaflike. Flowers yellow, sometimes tinged green or purple, shortly stalked. Calyx teeth absent. Petals obovate, emarginated. Stylopodium broadly conical. Fruit oblong or ovoid, slightly compressed laterally.

1. Bupleurum falcatum L., *Sp. Pl.* 237(1753); Grierson and Long in *Fl. Bhu.* 2(2):468(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:311(2000). Fig.10.2006a.

Perennial herbs with erect upto 50cm tall. Leaves linear-oblanceolate, 3-9×0.2-0.5cm, attenuate at base, apex acute. Flowers umbels, small, 5-7mm, rays slender. Bracteoles similar to bracts. Petals yellow green with brown midrip. Fruit oblong, c5×1mm, ribed.

Field note: On moist, shady and sandy area.

Representative collection: Manang, Dhrapani to Tal, 1640m, 14.10.20062006 (Fr.), K. Adhikari et al. 447.

Distribution: Nepal (WC, 2500-3800m), Himalaya (Kashmir to Bhutan).

2. CARUM L.

Biennial or perennial herbs with fusiform tuberous taproots. Leaves 2-3 pinnatisect, base of petioles expanded, papery and sheathing the stem. Umbels compound, rather erect, bracts similar to stem leaves. Bracteoles linear, few or absent. Calyx teeth obsolete. Petals obovate with an incurved, acuminate tip. Stylopodium domed. Fruit oblong-ellipsoid, glabrous, mericarps 5-ribbed.

1. Carum carvi L., *Sp. Pl.* 263(1753); Grierson and Long in *Fl. Bhu.* 2(2):470(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:312(2000).

Stem erect up to 30cm tall. Leaves 5-10×1-3cm. Umbels 6-10 rayed. Bracteoles linear. Calyx tecth obsolete. Petals obovate, purplish pink with an incurved acuminate tip. Stylopodium domed. Fruit oblong ellipsoid, glabrous, 3-4×1-2mm.

Field note: On the roadside, open moist place.

Representative collection: Manang, Koto area, 2620m, 6.7.2006 (Fl.), K. Adhikari et al. 146.

Distribution: Nepal (WC, 2500-5100m), Karakorum, Himalaya (Kashmir to Bhutan), Tibet

3. HERACLEUM L.

Perennial herbs. Leaves 1-3 pinnately or ternately divided, leaflets often lobed. Umbels compound, rays usually numerous, bracts absent, few, usually deciduous, bracteoles usually linear deciduous or persistent. Calyx teeth small or obsolete. Petals obovate, emarginated or 2-lobed. Fruits ellipsoid orbicular, dorsally much compressed.

1. Heracleum obtusifolium Wall. ex DC., *Prodr.* 4:191(1830); Grierson and Long in *Fl. Bhu.* 2(2):499(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:13(2000).

Erect up to 70cm tall, finely pubescent. Stem base surrounded by leaf base. Leaves ternate or pinnate with 5 leaflets, 5-20×2-10cm, leaflets broadly ovate to suborbicular, 2-6×1-4cm, apex rounded, base obtuse, margin crenate to bluntly serrate. Petioles 3-8cm, broadly sheathing in upper leaves. Umbels many rayed. Bracts lanceolate. Bracteoles linear oblanceolate, 3-6mm. Calyx teeth unequal. Petals white, 6×7mm. Fruit obovoid.

Field note: On road side, open moist place.

Representative collection: Manang, Thanchok, 2640m, 13.10.2006 (Fl.), K. Adhikari et al. 369.

Distribution: Nepal (C, 2400-3350m), Himalaya (Nepal to Bhutan). **Not reported at 2640m altitude in Press et al. 2000.**

4. SELINUM L.

Dwarf a medium sized perennial herbs. Leaves 3-4 pinnately divided, triangular in outline, glabrous above. Umbels compound, rays numerous, bracts linear or sometimes pinnatifid. Calyx teeth small, linear, unequal. Petals obovate, emarginated, somewhat unequal. Fruits ovoid, usually dorsally great compressed, lateral ribs winged.

1. Selinum wallichianum (DC.) Rainzada and Saxena, *Indian Forester* 92:323(1966); Grierson and Long in *Fl. Bhu.* 2(2):490(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:317(2000).

Herbs up to 80cm, erect stem, surrounded by fibrous leaf remains at base. Leaves 3-pinnate, leaflets ovate-oblong, acute, finely pubescent on the rachis and veins beneath. Petioles up to 15cm long with broad at base. Umbels many rayed, bracts linear, bracteoles linear-lanceolate. Calyx teeth 1mm. Petals white, c1.5-2×1mm, some what unequal. Fruit elliptic to circular, 3-5×2-3mm.

Field note: On moist, shady and sandy area.

Representative collection: Manang, bet^{n} Talekhu and Chame, 2890m, 3.7.2006 (Fl.), K. Adhikari et al. 71.

Distribution: Nepal (WCE, 2700-4800m), Himalaya (Kashmir to Bhutan), NE. India, China.

Family 40. MONOTROPACEAE

Saprophytic or partly parasitic, perennial herbs without chlorophyll. Roots fleshy. Leaves alternate, scale-like, entire. Flowers solitary or racemose, actinomorphic, bisexual. Sepals 3-5, free, imbricate, scale-like. Petals 3-5, free, saccate at base. Stamens 6-10, usually twice of petals. Anthers opening by slits or lids. Ovary superior, 1- or 5-celled. Ovules numerous, parietal or axile. Style simple, stigma capitate. Fruit an indehiscent berry or capsule.

1. MONOTROPA L.

Saprophytic or partly parasitic herbs without chlorophyll. Roots fleshy. Leaves alternate, scale-like, entire. Flowers solitary or racemose. Sepals 3-5. Petals 3-5, entire or toothed. Anthers opening by slits. Ovary 5-celled, ovules axile. Fruit a globose capsule, seeds spindle-shaped.

1. Monotropa hypopithys L., *Sp. Pl.* 387(1753); Grierson and Long in *Fl. Bhu.* 2(1):356(1991), Press et al. in *Ann. Check. Fl. Pl. Nep.*:198(2000). Fig.10.2006b.

Monotropa hypopithys var. *japonical* Franch. and Sav., *Enum. Pl. Jap* 2:428(1876).

Herbs up to 20cm. Leaves ovate, 7-10×4-5mm. Flowers brownish-white, racemose, subtended by leaf like bracts. Sepals ovate-oblanceolate, c6mm, pubescent. Petals obovate, rounded, margin entire. Filaments pubescent. Style short. Capsule globose, grooved, many seeded.

Field note: On moist and shady inside dense forest.

Representative collection: Manang, bet^{n} Talekhu & Chame, 2770m, 3.7.2006 (Fl.), K. Adhikari et al. 66.

Distribution: Nepal (WC, 2400-3700m), Europe, Himalayan(Kashmir to Bhutan), NE India (Meghalaya), Thailand, China, Siberia, Japan, N. & C. America.

Family 41. ERICACEAE

Trees, shrubs or subshrubs, often evergreen, sometimes epiphytic. Leaves alternate, sometimes pseudowhorls, simple, pinnately veined, exstipulate. Flowers in racemes, corymbs, panicles, clusters or solitary, actinomorphic or zygomorphic, bisexual. Calyx of 5 (-8) sepals, free or united into tube at base. Corolla 5(-10) united, tubular, barrel-shaped, campanulate, funnel-shaped. Stamens (5-) 10 (-18), free. Ovary inferior or superior, 4-5 (-20) celled. Style cylindric, stigma simple, ovules numerous, axil. Fruit a berry or valved capsule, sometimes enclosed by fleshy calyx.

Key to the genera

1a. Flowers in simple axillary racemes…….....……..……**1. Lyonia**
1b. Flowers in terminal condensed recemes, rarely solitary……...…**2. Rhododendron**

1. LYONIA Nuttalla

Evergreen or deciduous shrubs or trees. Leaves alternate, entire. Flowers in simple axillary racemes. Sepals 5, united at base. Petals 5, united into cylindric or urn-like tube, pubescent. Stamens 10. Ovary superior, 5 celled. Fruit a 5-lobed, globose capsule. Seeds many, linear, curved.

1. Lyonia ovalifolia (Wall.) Drude, *pflanzenfam*. 4(1):44(1889): Grierson & Long in *Fl. Bhu.* 2(1):395(1991); Press et al. in *Ann. Check. Fl. Pl. Nep.*:102(2000).
Andromeda ovalifolia Wall. in *As. Research*. 13:391, t. 11(1820).
Nep.: Angeri/Anjir/Govre tissi/Jaggucal, Eng.: Lyonia

Small tree c5m. Leaves ovate, 4-8×1.5-4cm, apex acuminate, base rounded or cordate. Petioles c1cm. Racemes with 1-2 leaf-like bracts. Sepals triangular, c1.5mm. Corolla cylindric, 8-12×2.5-5mm, pubescent. Filaments hairy towards base, anthers with 2 spreading. Capsule globose 2.5-4×2-5mm, seeds c1mm.
Field note: On the open & moist slopy area.
Representative collection: Manang, Chame, 2700m, 11.10.2006 (Fr.), K. Adhikari et al. 289.
Distribution: Nepal (WCE, 1300-3300m), Himalaya (Punjab to Bhutan), NE India, Myanmar, China, Malay Peninsula.

2. RHODODENDRON L.

Evergreen shrubs or trees, often aromatic, indumentum of simple or compound hairs or peltate scales. Leaves alternate or clustered at ends, coriaceous, entire. Flowers in terminal condensed racemes, rarely solitary, weakly zygomorphic. Calyx 5 (-8) lobed. Corolla campanulate, funnel shaped or salver-shaped, rarely cylindric with 5-10 lobes. Stamens (5-) 10(-8). Ovary 5-20 celled, stigma capitate. Capsule 4-20 valved.

Key to the species

1a. Branchlets glabrous, flowers racemes……...……...…**1. R. campanulatum**
1b. Branchlets scaly, flowers 1-2 terminal……....……**2. R. lepidotum**

1. Rhododendron campanulatum D.Don, *Mem. Wern. Nat. Hist. Soc*. 3:410(1821); Grierson and Long in *Fl. Bhu.* 2(1):375(1991); Press et al. in *Ann. Check. Fl. Pl. Nep.*:103(2000).
Rhododendron aeruginosum Hook. f., *Rhod. Sik. Him. n.* 23, t. 22(1851).
Nep.: Ceriel/Ciraidu/Nilo cimal/Teosta

Shrubs up to 4m, branchlets glabrous. Leaves thinly coriaceous, elliptic, 7-11×3-5cm, acute, base rounded, glabrous, with fine, pale brown to lower surface. Petioles glabrous c1.5cm. Flowers racemes, glabrous. Calyx c1mm, glabrous. Corolla open-campanulate, 2.5-3.5cm, 5-lobed, white. Stamens 10, filaments few hairs at base. Ovary glabrous. Capsule curved.
Field note: On moist area.
Representative collection: Manang, Chame, 3300m, 11.10.2006 (Veg.), K. Adhikari et al. 320.
Distribution: Nepal (WCE, 2800-4400m), Himalaya (Kashmir to Nepal), NE India.

2. Rhododendron lepidotum Wall. ex G. Don, *Gen. Syst.* 3:845(1834); Grierson & Long in *Fl. Bhu.* 2(1): 384(1991); Press et al. in *Ann. Check. Fl. Pl. Nep.*:103(2000). Fig.10.2006c-d.
Rhododendron salignum Hook. f., *Rhod. Sik. Him. n.* 24, t. 23A(1851).
Nep.: Bhate sunpate/Ciniya gurans/Sunpate

Aromatic mat forming subshrubs 15-60cm, branchlets scaly. Leaves obovate, oblanceolate or elliptic, 5-15×3-5mm, acute or rounded, base cuneate. Shortly petiolate. Flowers 1-2, terminal. Calyx 5-lobed, lobes rounded 3-4mm, scaly. Corolla campanulate,

pink. Stamens 10, filaments pubescent towerds base. Ovary scaly. Style short, deflexed. Fruit a capsule.

Field note: On moist & rocky area.

Representative collection: Manang, bet^{n} Dhukur Pokhari & Pisang, 3027m, 1.7.2006 (Fl.), K. Adhikari et al.7.

Distribution: Nepal (WCE, 2100-4700m), Himalaya (Kashmir to Arunchal Pradesh), N. Myanmar, W. & S. China.

Family 42. MYRSINACEAE

Trees, shrubs or woody climbers, often evergreen. Leaves alternate, simple, pinnately veined, exstipulate, often gland-dotted. Flowers in racemes, panicles, cymes, umbels or fascicles, bisexual or unisexual, actinomorphic(4-) 5-merous. Sepals united at base, sometimes adnate to ovary. Petals united at least at base, rotate or tubular. Stamens opposite petals, free or borne on corolla tube. Ovary superior or semi-inferior. Style simple. Stigma capitate, flattened or lobed. Ovules 1-many, axile or free-central. Fruit a drupe or berry.

1. MAESA Forsskal

Shrubs or small trees. Leaves serrate or entire. Dioecious. Flowers in racemes or panicles, functionally unisexual, 5-merous, bracteoles 2. Calyx tube adnate to ovary. Corolla tubular at base. Stamens adnate to corolla tube. Ovary semi-inferior, ovules many. Style simple, with capitate or lobed stigma. Fruit many seeded berry.

1. Maesa chisia Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.* 148(1825); Grierson & Long in *Fl. Bhu.* 2(2):507(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:202(2000). Fig.10.2006e.
Maesa dioica A. DC. in DC., *Prodr.* 8:79(1844).

Nep.: Bilaune

Small tree up to 3m, branchlets glabrous. Leaves smooth, lanceolate or elliptic, 5-12×2-4cm, acuminate, base cuneate, margins subentire, glabrous. Petioles up to 1.5cm. Racemes simple branched. Sepals ovate, clmm. Corolla white, c2mm. Fruit globose, c4mm diameter.

Uses: Used to make thatches and fences.

Field note: On open area.

Representative collection: Manang, Dharapani to Tal, 1640m, 14.10.2006 (fr.), K. Adhikari et al. 436.

Distibution: Nepal (WCE, 1200-2600m), Himalaya (Nepal to Bhutan), NE India, N. Myanmar.

Family 43. PRIMULACEAE

Herbs, usually rhizomatous, perennial or annual. Leaves simple, sometimes all radical or cauline, alternate or opposite, exstipulate. Flowers bisexual, regular, mostly 5-merous, axillary, solitary or in heads, umbels or spikes. Flowers monomorphic or dimorphic(Pin and thrum-flowers) with styles and stamens. Calyx teeth connate or at least coherent at base. Corolla rotate with cylindrical basal tube. Stamens as many corolla, adnate. Ovary superior, ovoid, globose, unilocular, stigma often capitates. Fruit capsule 5-7 valved or upper part as a cap or bursting irregularly.

Key to the genera

1a. Erect, sometimes stoloniferous or cushion furming, annual or perennial herbs
……...….....**1. Androsace**
1b. Rhizomatous, perennial herbs……...……**2. Primula**

1. ANDROSACE L.

Perennial or annual erect herbs, sometimes stoloniferous or cushion forming. Leaves sometimes dimorphic, rosulate at rhizome part, or in dense clusters. Flowers usually 5-merous, rarely 6-8merous, solitary or in umbels, pedicellate or sessile. Calyx campanulate,

densely or sparsely pubescent. Corolla salver-shaped with short tube, annualate. Stamens 5, subsessile, included in corolla tube. Ovary subglobose, style short. Capsule ovoid or globose, 5-valved.

1. Androsace strigillosa Franch. in *Bull. S.B. Fr.* 32:10(1885); Grierson and Long in *Fl. Bhu.* 2(2):560(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:243(2000). Fig.11.a.
Androsace sarmentosa var. *grandiflora* Hook. f. in *Fl. Brit. Ind.* 3:498(1882).

Herbs up to 25cm. Rosettes usually solitary. Leaves dimorphic, linear to oblanceolate, 2-5×1-2cm, obtuse, base attenuate, margin entire, pubescent, petioles up to 6cm. Peduncles 1 per rosette. Umbels many flowered. Bracts lanceolate, c5mm. Calyx c3mm, sparsely ciliate. Corolla lobes obovate, 2-3×1-3mm, entire. Capsule ovoid, 5-6mm.
Field note: On moist and shady place.
Representative collection: Manang, Talekhu, 2780m, 2.7.2006 (Fl. and Fr.), K. Adhikari et al. 20.
Distribution: Nepal (WC, 2400-4700m), Himalaya (Nepal to Bhutan), China (Xizang).

2. PRIMULA L.

Rhizomatous perennial herbs. Leaves all radicle, often obovate, spathulate, rarely orbicular and petiolate. Flowers on peduncles, solitary or few, or in heads, umbels or whorls, monomorphic or dimorphic. Calyx tubular or funnel-shaped, teeth 5. Corolla usually rotate with cylindrical basal tube, sometimes, blades funnel shaped, campanulate or saucer shaped with corolla tube. Stamens 5, included. Capsule globose or ovoid, 5-valved.

1. Primula sikkimensis Hook. f., *Bot. Mag.* 77t. 4597(1851); Grierson and Long in *Fl. Bhu.* 2(2):539(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:247(2000).
Primula pudibunda W.W. Sm. in *Rec. B. Surv. Ind*. 6:38(1913).
Primula hopeana Bolf. f. and Cooper in *Tr. B.S. Edinb*. 27:236(1917).
Nep.: Medosero

Evergreen perennial herbs. Leaves oblanceolae, 4-25×1-6cm, apex obtuse, base attenuate, margin dentate, glabrous. Peduncle 10-25cm. Bracts linear-lanceolate. Flowers solitary. Calyx tubular, c6mm, divided to middle into lanceolate teeth. Corolla campanulate, tube 1-2cm, lobes suberect, entire or emarginated. Capsule oblong, c1cm.
Field note: On moist and shady area of dense forest.
Representative collection: Manang, Chame, 3300m, 11.10.2006 (Veg.), K. Adhikari et al. 321.
Distribution: Nepal (WCE, 2900-4800m), Himalaya (Nepal to Bhutan), NE India, Myanmar.

Family 44. OLEACEAE

Trees or shrubs, occasionally lianes. Leaves opposite, rarely alternate, simple, trifoliate or pinnate, peltate glands present on undersurface. Stipules usually absent. Flowers mostly bisexual, actinomorphic, in axillary or terminal inflorescence. Calyx 4-5 lobed, rarely absent. Petals united into a tube, typically 4-(6-12)-lobed, rarely absent. Stamens 2, epipetalous, introse. Pistil 1, ovary superior with axile placentation. Ovules usually 2 per locule-(4-10), anatropous. Style 1 or none, stigma 1-2. Fruit a berry, drupe, loculicidal capsule or samara.

1. JASMINUM L.

Scandent or erect shrubs. Leaves simple, 3-foliate or pinnate with a terminal leaflet, alternate or commonly opposite. Inflorescence 2-or 3-chotomous cyme, sometimes axillary or terminal. Bracts and bracteoles linear or ovate. Flowers often scented. Calyx 4-9 fid, funnel shaped tube. Corolla fused tube with 4-10 patent, spreading lobes. Stamens subsessile. Stigmas 2, linear. Fruit a drupe.

1. Jasminum humile L., *Sp. Pl.* 7(1753); Grierson and Long in *Fl. Bhu.* 2(2):592(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:205(2000). Fig.11.b.
Jasminum wallichianum Lindl. in *B. Reg.* 17.t. 1409(1831).
Nep.: Chameli, Eng.: Yellow jasmine

Shrub about 2m. Leaves alternate, pinnate with 2-4 pairs and one terminal leaflet Petiole up to 3 cm. Leaflets ovate-lanceolate to elliptic, apex acute to attenuate, base cuneate, margins often revolute. Inflorescence 3-9 flowered, contracted cyme, axillary. Flowers scented, calyx minutely hirsute, 5-lobes, triangular. Corolla tube c1cm, lobes 5, 5-8×4-6mm. Fruit ovoid, 5-9mm, solitary or paired.

Field note: On sandy soil.

Representative collection: Manang, Naya Bazar, 2640m, 7.7. 2006 (Fr.), K. Adhikari et al. 155.

Distribution: Nepal (WC, 1600-3400m), C. Asia, Afghanistan, Myanmar W. China.

Family 45. GENTIANACEAE

Annual or perennial mostly herbs, erect, twining or sometimes saprophytic, usually glabrous. Leaves opposite, rarely alternate, simple, entire, palmately veined from base or pinnately veined, exstipulate. Flowers solitary or in panicles, cymes or umbels, bisexual, actinomorphic. Calyx and corolla tubular, 4-5 lobed, sometimes divided almost to base. Stamens 4-5, borne within corolla tube, alternate with corolla. Ovary superior, ovules many, parietal. Style linear or absent. Fruit a capsule or berry.

Key to the genera

1a. Twining……..……..……**4. Tripterospermum**
1b. Erect or decumbent herbs…….…….2
2a. Corolla tube very short, stigma decurrent……..……**2. Lomatogonium**
2b. Corolla tube rotate or campanulate, stigma bilobed……...……..……3
3a. Stamens attached at base of corolla lobe sinuses, flowers pedicellate, 4-or 5- merous, in leafy panicles of axillary and terminal clusters.....……....**3. Swertia**
3b. Stamens attached at apex of corolla tube, flowers 4-merous, in axillary cymes forming a loose terminal panicles……...……**1. Halenia**

1. HALENIA Borkhausen

Annual biennial or perennial erect herbs. Stems quadrangular, branched. in upper part sometimes narrowly winged. Leaves membranous, upper mostly sessile. Flowers in axillary cymes, forming a loose terminal panicle, 4-merous. Bracts leaf-like, sessile. Calyx divided almost to base. Corolla tube mauve, blue or white, tube campanulate, spurred at the base of each lobed. Stamens attached at apex of corolla tube. Ovary 1-celled, style cylindric. Stigma bilobed, oblong, lobes reflexed. Fruit a sessile, ovoid capsule.

1. Halenia elliptica D. Don in *London Edinb. Philos. Mag. J. Sc1.* 8:77(1836); Grierson and Long in *Fl. Bhu.* 2(2): 611(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:116(2000).
Swertia peloris Griff., *Itin. Notes* 197(1848).

Erect about 50cm. Leaves elliptic or ovate, 0.5-6×0.3-1.5cm, acute, upper leaves sessile. Bracts ovate-elliptic, acute or rounded. Calyx tube c1mm, lobes elliptic or ovate, 2-6×1-3mm, lobes ovate, apex mucronate. Corolla tube 1-3mm, lobes ovate, 4-6×2-4.5mm, apex mucronate, spurs 2.5-8mm. Base of filaments thickened, anthers ovate. Ovary ovoid, ellipsoid, capsule ovoid-ellipsoid, 7-9×3-5mm, enclosed by persistent calyx and corolla.

Field note: On shady and moist place.

Representative collection: Manang, Danaque, 2250m, 6.9.2006 (Fl.), K. Adhikari et al. 242.

Distribution: Nepal (WCE, 2000-4500m), W. Asia, Himalaya (Uttar Pradesh to Bhutan), NE India, Myanmar, N. and W. China.

2. LOMATOGONIUM A. Braun

Erect or decumbent branched annuals. Stems solitary or tufted, quadrangular. Leaves sessile or with broad petiole. Flowers in axillary or terminal cymes or solitary, terminal, 4-5-merous. Calyx tube very short. Corolla pale blue, white, tube base mostly with pairs of fimbricate glands, tube short. Filaments linear, anthers ovate-oblong, globose, minute or

sometimes nearly equal to filaments. Ovary oblong-ellipsoid, flattened, sessile, 1-celled. Style absent, stigma decurrent on ovary. Fruit a capsule.

1. Lomatogonium sikkimens (Burkill) H. Sm. in *Grana. Palyn*. 7:145(1947); Grierson and Long in *Fl. Bhu.* 2(2): 620(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:117(2000).
Swertia sikkimensis Burkill in *J. As. S. Beng. n. s.*, 2:322(1906).

Erect herbs about 12cm. Leaves ovate or spathulate, 5-12×3-5mm, acute or obtuse, sessile apical stem leaves. Flowers 5-merous, solitary. Bracts present. Calyx tube 1-2mm, lanceolate, c4×2mm, acute or rounded. Corolla blue violet, pairs of nectaries at base with long fimbricate, lobes obovate, 8-16×5-10mm. Ovary oblong. Style absent, stigma decurrent. Fruit 12-20×3mm.

Field note: On open dry area.

Representative collection: Manang, Thanchok, 2670m, 13.10.2006 (Fl. and Fr.), K. Adhikari et al. 375.

Distribution: Nepal (CE, 3000-5000m) Himalaya (Nepal to Bhutan). **Not reported at 2670m altitude in Press et al. 2000.**

3. SWERTIA L.

Annual, biennial or perennial, erect or decumbent herbs. Stem terete, angled or winged. Leaves opposite, whorls, rosulate or alternate, sessile or petiolate. Flowers pedicellate, 4-or 5-merous, in leafy panicles of axillary and terminal clusters. Bracts leaf-like, opposite, sessile. Calyx deeply lobed. Corolla tube rotate, lobes with 1 or 2 nectariferous glands or pits, naked or nearly covered by a scale or flaps, glabrous, fringed or fimbricate. Stamens as many corolla lobes, attached at base of corolla lobe sinuse. Ovary 1-celled, sessile or sometimes with short stipe. Style slender or absent. Stigma bilobed. Fruit a capsule, ovoid, oblong or flattened.

Key to the species

1a. Each corolla lobed with 1 glands……..…….…….2
1b. Each corolla lobed with 2 glands……..…….…….3
2a. Stems slightly winged, flowers 5-merous, calyx margin ciliate……..**4. S. paniculata**
2b. Stems winged, flowers 4-merous, calyx margin smooth……...….**1. S. angustifolia**
3a. Flowers 5-merous, calyx lobes elliptic-lanceolate, corolla white……...**3. S. macrosperma**
3b. Flowers 4-merous, calyx lobes linear-lanceolate, corolla greenish yellow….**2. S. chirayita**

1. Swertia angustifolia Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.* 127(1825); Grierson and Long in *Fl. Bhu.* 2(2): 626(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:117(2000).
Ophelia angustifolia(Buch.-Ham. ex D. Don) G. Don, *Gen. Syst*. 4:178(1837).
Nep.: Chiraito

Annual herbs. Stems quadrangular, winged. Leaves lanceolate to linear, 1.5-5×0.7×3cm, acute, base attenuate. Flowers 4-merous, in panicles. Bracts linear or lanceolate. Calyx lobes linear-lanceolate, 3-8×1-2mm, acute, margin smooth. Corolla elliptic or oblong, 5-8×2-4mm, acute, gland 1 per lobe, with pocket-like flap, fimbricate at apex. Filaments linear. Ovary ellipsoid.

Field note: On moist area.

Representative collection: Manang, Danaque, 2250m, 6.9.2006 (Fl.), K. Adhikari et al. 241.

Distribution: Nepal (WCE, 600-2600m), Himalaya (Kashmir to Bhutan), N. India, Myanmar, S. China.

2. Swertia chirayita (Roxb. ex Fleming) Karsten, *Deutche Fl.* 1025(1883); Grierson and Long in *Fl. Bhu.* 2(2):626(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:118(2000).
Gentiana chirayita Roxb. ex Fleming in *As. Res.* 11:167(1812).

Annual about 60cm. Stem quadrangular, slightly winged. Leaves glabrous, ovate or elliptic, 2-6×0.5-2cm, sessile. Flowers 4-merous, in numerous small clusters on branches of panicles. Bracts present. Calyx tube c 1mm, fimbricate, lobes linear-lanceolate, 3-4×c1mm, acute or acuminate. Corolla tube c1.5mm, lobes greenish yellow, ovate, c4×2mm, acuminate,

glands 2 per lobe, oval or oblong, fimbricate. Filaments free, linear. Ovary ovoid with short stipe. Capsule ovoid, 4-9×2.5-3mm.

Uses: Medicinally used.

Field note: On open moist and cultivated land.

Representative collection: Manang, Danaque, 2250m, 6.9.2006 (Fl.), K. Adhikari et al. 232.

Distribution: Nepal (CE, 1500-2500m), Himalaya (Kashmir to Bhutan), NE India.

3. Swerita macrosperma (C. B. Clarke) C. B. Clarke in *Fl. Brit. Ind.* 4:123(1883); Press et al. in *Ann. Check. Fl. Pl. Nep*.:118(2000).

Ophelia macrosperma C. B. Clarke in *J. Linn. S.B.* 14:448(1875).

Annual or biennial about 50cm. Stems quadrangular. Leaves ovate, 1.5-5×0.5-2.5 cm, sessile. Flowers 5-merous, in panicles. Bracts ovate, acuminate. Calyx tube c0.5mm, base with hairs on inner surface, lobes elliptic-lanceolate, c2×1mm, acuminate. Corolla tube c0.5mm, lobes white, ovate or elliptic, 2-4×1-2mm, acuminate, glands 2 per lobe, oval, fimbricate. Filaments linear with hairs at base. Ovary ovoid. Style stout. Capsule ovoid, c5×3mm.

Field note: On shady and moist place.

Representative collection: Manang, Naya Bazar, 2640m, 7.7.2006 (Fl.), K. Adhikari et al. 158.

Distribution: Nepal (CE, 2000-3200m), Himalaya (Nepal to Bhutan), Kashmir, Burma.

4. Swertia paniculata Wall., *Pl. As. Rar*. 3:3, t. 205(1832); Grierson and Long in *Fl. Bhu.* 2(2):624(1999); Press et al. in *Ann. Check. Fl. Pl. Nep*.:118(2000).

Ophelia paniculata (Wall.) D. Don in *Tr. Linn.* S.17:525(1837).

Ophelia wallichii G. Don, *Gen. Syst*. 4:178(1837).

Erect annual herbs. Stems quadrangular, slightly winged, stem glabrous. Leaves linear-lanccolate, 2-6×0.5-1cm. Flowers 5-merous. Bracts linear, acuminte. Calyx tube c1mm, lobes c6×2mm, margin ciliate. Corolla tube c2mm, lobes elliptic, c6×3mm, acuminate, white with purple band. Gland 1 per lobe. Filaments free. Ovary ellipsoid. Capsule ellipsoid, 7-13×2-4mm.

Field note: On moist and shady area.

Representative collection: Manang, Dharapni to Tal, 1640m, 14.10.2006 (Fl.), K. Adhikari et al. 461.

Distribution: Nepal (WCE, 1500-4000m), Himalaya (Kashmir to Bhutan), NE India, Myanmar, China (Xizang).

4. TRIPTEROSPERMUM Blume

Twining perennials, stem terete, spirally twisted. Leaves membranous or coriaceous, glabrous or glandular, 3-5 veined from base. Flowers in axillary or terminal cymes, pendulous, 5-merous. Calyx tubular. Corolla greenish-yellow or white. Stamens asymmetric. Filaments attached below middle of corolla tube, unequal, curved near apex, nectary glands enclosed in a collar-like disc. Style linear, stigma 2-lobed. Fruit a capsule or berry.

1. Tripterospermum volubile (D. Don) H. Hara, *J. Jap. Bot*. 40:21(1965); Gierson and Long in *Fl. Bhu.* 2(2):610(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:119(2000). Fig.11.c.

Crawfurdia fasciculate Wall., *Tent. Fl. Nep.* 63, t. 47(1826).

Twining, stem terete, glabrous. Leaves lanccolate to ovate, 2-8×0.5-2.5cm, acuminate, base rounded or cordate, margin denticulate. Petiole 2-10mm. Calyx tube winged, lobes linear, c8×1mm, acuminate. Corolla lobes ovate, 2-5×3-4mm, acuminate. Filaments 8-20mm. Ovary cylindrical. Style bifid. Fruit an ellipsoid red berry, 17-28×7-15mm.

Field note: On the moist, slopy and densely forest area.

Representative collection: Manang, Chame, 2900m, 11.10.2006 (Fr.), K. Adhikari et al. 310.

Distribution: Nepal (WCE, 2000-3200m), Himalaya (Nepal to Bhutan), China (Xizang), N. Myanmar.

Family 46. ASCLEPIADACEAE

Woody climbers, shrubs or perennial herbs, white latex usually present. Leaves simple, generally entire, opposite or whorled with extrafloral nectaries. Inflorescence cymose, often umbellate, usually axillary. Flowers 5-merous, actinomorphic, hermaphrodite. Calyx fused and deeply divided almost to base. Corolla fused with lobes contorted or valvate. Stamens inserted at base of corolla or corolline coronal scales. Filaments short to absent. Anthers usually fused into a ring and united with style. Ovary superior or partly inferior. Fruit a follicles or solitary, seed flattened, ovate to oblong, with silky white hairs.

Key to the genera.

1a. Twining, rarely erect herbs, corolla forming a crown over mouth of long corolla tube ……...……..**1. Ceropegia**

2b. Small erect herbs, corolla without crown and short tube, lobes divided almost to base ……..……...…**2. Vincetoxicum**

1. CEROPEGIA L.

Twining, rarely erect herbs. Leaves opposite, extrafloral nectaries present. Inflorescence umbelliform cymes, sometimes solitary. Flowers yellow greenish or purple. Calyx lobes linear to linaer-lanceolate. Corolla tube long, straight or curved, forming a crown over mouth of corolla tube. Staminal scales of one or two rows. Anthers subsessile. Stigmatic head depressed or shortly bifid, included. Follicles usually in pairs, slender, cylindric, smooth. Seeds ovate-oblong with long coma.

1. Ceropegia pubescens wall., *Pl. Asia. Rar*. 2(8):81, t. 187(1831), Grierson and Long in *Fl. Bhu.* 2(2):729(1999); Press et al in *Ann. Check. Fl. Pl. Nep.*:18(2000).

Nep.: Mirke laharo/Van simi

Climbers, stem glabrous. Leaves ovate, 6.8-7.6×1.7-3cm, apex acuminate, base cordate to rounded, sparsely hispid on both sides. Petiole 1-3cm, sparsely pubescent. Inflorescence 4-5 flowered. Peduncles c3cm. Calyx lobes c5mm, recurved. Corolla long and slender connate at tips forming an crown, 2-4cm long, lobes linear with ovate base. Fruit c6×0.5cm. Seeds ovate-oblong with long coma.

Field note: On moist and slopy area.

Representative collection: Manang, near Tal, 1640m, 9.7.2006 (Fl.), K. Adhikari et al. 212.

Distribution: Nepal (CE, 900-2700m), India, Sri-Lanka, Myanmar, east to W and S. China.

2. VINCETOXICUM Wolf

Small erect herbaceous perennials. Leaves opposite, sub-coriaceous to coriaceous, extrafloral nectaries present. Inflorescence sessile or shortly pedunculate umbellate cymes, 2-9 flowered. Calyx lobes ovate–lanceolate to linear–lanceolate. Corolla tube short, lobes divided almost to base, linear–oblong to lanceolate. Follicles narrowly conical, usually paired, glabrous.

1. Vincetoxicum hirundinaria Medicus in *Hist. Common. Acad. Elect. Theod.–Palat. Phys.* 6:44(1790): Grierson & Long in *Fl. Bhu.* 2(2):699(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:20(2000).

Asclepias vincetoxicum L., *Sp. Pl.* 216(1753).

Stem erect upto 1m, simple. Leaves variable in size & shape, large & broadly ovate, apex acute to acuminate or shortly mucronate, base broadly cordate to rounded, 2-6 x 1-4cm, pubescent. Calyx lobes lanceolate, c2×1mm, acute, green, ciliate. Corolla tube 2-3mm long, campanulate, lobes ovate to lanceolate, 3-3.5 x 1-2mm, glabrous. Staminal column c1mm long. Follicles 3.4-4.6×0.5-0.8m. Seeds ovate, coma 1.5-2.5cm.

Field note: On moist, dense & shady forest area.

Representative collection: Manang, Talekhu, 2735m,. 2.7.2006 (Fr.), K. Adhikari et al. 24.

Distribution: Nepal (C, 2300-3600m), Pakistan, S. Tibet, W. Asia, Europe.

Family 47. RUBIACEAE

Tree, shrubs or herbs. Leaves opposite & decussate or whorled, usually entire, stipules interpetiolar, rarely leaf–like. Inflorescence axillary or terminal, usually cymose, sometimes panicles, capitate, fasciculate or solitary. Flowers actinomorphic, bisexual, sometimes dimorphic, 4-5(-6)-merous. Calyx united at base with ovary into a hypanthium. Corolla infundibular, campanulate or rarely rotate, 4-5(-6)-lobed, tube rarely curved. Stamens 4-5(-6), inserted in tube. Ovary inferior. Style 1, terminal with capitate or lobed stigma, rarely styles 2 with simple capitate or cylindric stigmas. Fruit a capsule, berry or drupe, sometimes schizocarp.

Key to the genera

1a. Scrambling or climbing herbs, fruit dry…….. ……**2. Rubia**
1b. Weak erect or scandent herbs, fruit fleshy……. ……...**1. Galium**

1. GALIUM L.

Annual or perennial, weak erect or scandent herbs, often clinging to other herbage by hooks or hairs. Stem 4–angled, winged or not. Leaves in whorls of 4-8. Stipules similar to leaves, lamina orbicular to linear. Inflorescence paniculate, axillary & terminal pedunculate cymes or rarely axillary, solitary flowers. Calyx tube absent above hypanthium. Corolla rotate or very shortly infundibular, lobes(-3)4(-5), valvate, often papillose. Stamens 4. Ovary bilocular, stigma capitate, globose. Fruit dry, mericarps glabrous, tuberculate, warty or with hooked hairs.

Key to the speices

1a. Leaves in whorls of 6, linear–oblanceolate, corolla ovate-triangluar ……
……...**1. G. aparine** var. **echinospermum**
1b. Leaves in whorls of 4, linear-elliptic or linear lanceolate, corolla ovate, cuspidate……...
……..……...**2. G. hirtiflorum**

1. Galium aparine L. var. **echinospermum** (Wallroth) Cufodontis in *Oesterr. B. Zeits.* 89:245(1940); Grierson & Long in *Fl. Bhu.* 2(2):830(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:273(2000).

Galium agreste var. *echinospermon* Wallroth, *Sched. Crit. Fl. Halen*. 59(1822).

Galium vaillanttii DC., *Fl. Br*. 4:263(1805).

Scrambing, forming mats. Stems about 60cm, pale green. Leaves in whorls of 6, linear-oblanceolate , 5-10 | 0.3-0.9 mm, base gradually attenuate, nodes sparsely hispid. Flowers in axillary & terminal, leafy. Corolla cream, pale green, diameter, lobes ovate-triangular, c6mm. Fruit dry, reniform or subglobose.

Field note: On stony soil and shady area.

Representative collection: Manang, Chame, 2720m, 4.7.2006 (Fl.), K. Adhikari et al. 85.

Distribution: Nepal (WC, 900-3600m), Africa, Temperate Eurasia, widely naturalized.

2. Galium hirtiflorum Requien ex DC., *Prodr*. 4:600(1830); Grierson and Long in *Fl. Bhu.* 2(2):828(1999); Press et al. in *Ann. Check. Fl. Pl. Nep*.:274(2000).

Nep.: Lute jhar

Scrambling, suberect or decumbent herbs. Stem highly branched about 40cm, hirsute with thin hairs. Leaves in whorls of 4, thin & membranous, linear-elliptic or linear-lanceolate, 8-20 | 0.5-2mm, apex obtuse, base attenuate, surface hirsute all over. Inflorescence terminal and axillary, dichotomously cymose, form small panicles. Corolla greenish white, ovate, hirsute towards apex, cuspidate. Mericarps greyish covered by hooked hairs.

Field note: On moist, shady in the forest.

Representative collection: Manang, Koto, 2800m, 12.10.2006 (Fr.), K. Adhikari et al. 348.

Distribution: Nepal (CE, 1200-2200m), Himalaya (Kashmir to Sikkim). **Not reported at 2800m altitude in Press et al. 2000.**

2. RUBIA L.

Scrambling or climbing perennial herbs, stems quadrangular, often minutely prickly. Leaves in whorls of 4-8, often rough to touch. Petioles present or absent. Flowers (4-)5-merous, solitary or in diffuse axillary and terminal bracteate panicles. Calyx adnate to ovary, lobes absent. Corolla subrotate, with very short tube. Stamens inserted on corolla tube. Ovary 2-lobed, 2-celled, style 2, free or partly united. Stigma capitate. Fruit bilobed, subglobose, fleshy, smooth and glabrous.

1. Rubia manjith Wall. ex G. Don, *Prodr. Fl. Nep.* 133(1825); *Bull. Dep. Med. Pl. in Fl. Nagarjun:* 30(1973); Press et al. in *Ann. Check. Fl. Pl. Nep.*:278(200). Fig. 12.a.

A weak climber, stems quadrangular, minutely prickly. Leaves in whorls of 4-6, rough to touch, petioles c2cm, Flowers 5-merous, solitary axillary. Corolla subrotate, Stamens inserted on corolla tube. Ovary 2-lobed. Style 2. Stigma capitate.

Field note: On stony soil.

Representative collection: Manang, Chame, 2795m, 11.10.2006 (Fr.), K. Adhikari et al. 326.

Distribution: Nepal (CE, 1200-2100m), Himalaya (Himachal Pradesh to Bhutan), NE India (Meghalaya). **Not reported at 2795m altitude in Press et al. 2000.**

Family 48. CONVOLVULACEAE

Usually perennial twiners or climbers sometimes erect shrubs or prostrate annual or perennial herbs. Leaves alternate, entire, lobed or pinnatisect, exstipulate. Inflorescences terminal or axillary, simple or compound, cymose. Flowers actinomorphic, hermaphrodite. Sepals 5, free or rarely connate at base. Corolla gamopetalous, infundibular, campanulate or salverform, often hairy. Stamens 5, epipetalous, included or exserted. Ovary superior, 1-3 locular, 2-ovules per loculus. Styles 1(rarely 2), stigmas 2(-4), capitate and 2-lobed. Fruit indehiscent or capsule or berry.

1. ARGYREIA Loureiro

Herbaceous or woody, often large twiners or scramblers. Stems hairy. Leaves large, usually cordate at base, petiolate hairy or not. Cymes sessile or pedunculate, capitate or corymbose, bracteate. Flowers pink, purple or rarely white and showy. Sepals lanceolate to orbicular. Corolla infundibular, limb very shortly lobed. Stamens included. Ovary 2-or 4-celled, 4-ovuled. Style filiform. Stigma 2, globose. Fruit indehiscent, berry like.

1. Argyreia hookeri C.B. Clarke in *Fl. Brit. Ind.* 4(10):185(1883); Grierson and Long in *Fl. Bhu.* 2(2):842(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:72(2000). Fig.12.b-e.

Climbers stems hairy. Leaves broadly ovate, 5-10 | 3-7cm, acuminate, base deeply cordate, densely hairy. Petiole 3-5cm long. Peduncles 6-10cm, hairy. Cymes dichotomous, few flowered. Sepals ovate c8mm, appressed grey villous. Corolla pink, infundibular, c4cm, silvery-white hairs. Stamens and style included. Fruit globose.

Field note: On moist stony area.

Representative collection: Manang, Tal, 1640m, 9.7.2006 (Fl.), K. Adhikari et al. 208.

Distribution: Nepal (CE, 800-2300m), Himalaya (Nepal to Bhutan).

Family 49. CUSCUTACEAE

Twining parasitic herbs with little or no chlorophyll. Stems slender, yellowish-brown or reddish-purple, spirally twisting and attached by haustoria. Leaves reduced to small thin ovate or cup-shaped scales. Inflorescence a raceme or globose clusters. Calyx gamosepalous, lobes(4-)5(-6), fleshy or not. Corolla gamopetalous, (4-)5(-6)- merous, tubular, lobes acute or obtuse, erect or inflexed. Stamens as many as corolla lobes alternate, filament present or absent. Ovary bilocular with 2 ovules per locule. Style 1 or 2 free or united. Stigma linear or capitate. Fruit a capsule.

1. CUSCUTA L.

Description as for family Cuscutaceae.

1. Cuscuta reflexa Roxb. var. **brachystigma** Engelm. in *Tr. Acad. Sc1. St. Louis* 1:519(1859); Grierson and Long in *Fl. Bhu.* 2(2):863(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:73(2000). Fig.12.f-i.

Cuscuta reflexa Roxb. subsp. *Anguina* (Edgeworth) Yuncker

Cuscuta anguina Edgew. in *Tr. Linn. S.* 20:87(1851).

Nep.: Akasveli/Amar lata/Amarvel, Eng.: Dodder

Stem light brown, twining herbs, c2mm thick, branched. Inflorescence a short lax racemes. Calyx lobes 5, ovate-obtuse, c4⏐2mm, margin scarious. Corolla creamy white, lobes obtuse, erect, finally reflexed, c3⏐1mm. Stamens 5, filaments linear, anthers basifixed. Stigmas 2, unequal, thick erect. Capsule globose-conical.

Uses: Medicinally used.

Field note: On the road side and sandy area as a twining on *Prinsepia sp.*

Representative collection: Manang, Danaque, 2700m, 13.10.2006 (Fl.), K. Adhikari et al. 411.

Distribution: Nepal (CE, 200-2200m). **Not reported at 2700m altitude in Press et al. 2000.**

Family 50. BORAGINACEAE

Tree, shrubs or most commonly herbs. Leaves usually alternate, simple, stipules absent. Inflorescence paniculate, corymbose, racemose or spike-like. Flowers sometimes solitary in axils of bracts or leaves. Flowers actinomorphic or sometimes zygomorphic, hermaphrodite or rarely polygamous(4-)5- merous. Calyx cylindrical to infundibular, gamosepalous. Corolla gamopetalous, rotate to cylindrical or infundibular. Stamens epipetalous, alternate with corolla or more usually gynobasic. Fruit usually a group of up to 4 dry nutlet rarely fleshy or dry drupe.

Key to the genera

1a. Inflorescence elongate racemes, corolla tube spreading at mouth……**1. Lindelofia**

1b. Inflorescence a rounded terminal cluster of forked cymes, corolla enlarged below and distinctly narrowed at mouth……..…**2. Maharanga**

1. LINDELOFIA Lehm

Perennial or biennial herbs, pubescent. Stems solitary or branched usually from base. Leaves alternate. Inflorescence elongate racemes. Flowers blue or purple. Calyx 5-fid. Corolla tubular or funnel shaped. Corolla tube with scales in throat forming a cone and with spreading lobes. Fruit nutlets with hooked bristles.

Key to the species

1a. Upper leaves sessile, flower with funnel shaped lobes..……..…….**1. L. anchusoides**

1b. Upper leaves sessile clasping stem, flowers with spreading lobes…….…..….**2. L. longiflora**

1. Lindelofia anchusoides Lehm. in Lanna. 216(1851); C.B. Clarke in *Fl. Brit. Ind.* 4:161(1885).

Perennial herb up to 60cm, root stock stout. Stems with appressed hairs. Lowers leaves petiolate, upper ones sessile. Leafblade lanceolate, 4-15⏐1-5cm, base attenuate, margin entire, apex with appressed greyish hairs. Flowers bright blue, funnel-shaped, clustered at the ends of slender branhched stems. Calyx lobes oblong, wholly haired. Corolla 10-12mm long, wider at the throat.

Uses: Plant used as medicine in fever.

Field note: On rocky soil.

Representative collection: Manang, below Koto, 2600m, 5.7.2006 (Fl. & Fr.), K. Adhikari et al. 115. **New report to the "Flora of Nepal."**

2. Lindelofia longiflora (Benth.) Baill., *Hist. Pl.* 10:379(1890); Polunin et al. in *Fl. Him.* 280(1997); Press et al. in *Ann. Check. Fl. Pl. Nep.*:30(2000).

Cynoglossum longiflora (Benth.) A. DC. in DC., *Prodr.* 10:158(1846).

Pardacaryum longiflorum (Benth.) Boiss, *Diagn. Pl. Nov. Or*. 11:132(1849).

Herbs, stems branched. Leaves alternate. Basal leaves lanceolate long, stalked, upper leaves sessile clasping stem, 4-8cm. Flowers deep blue to purple, spreading rounded lobes, borne in dense or lax elongated clusters. Calyx lobes oblong-elliptic, shorter than the corolla tube, hairy. Nutlets with hooked bristles.

Field note: On moist and open area.

Representative collection: Manang, Chame, 2720m, 4.7.2006 (Fl.), K. Adhikari et al. 82.

Distribution: Nepal (W, 3300-4600m), Himalaya (Kashmir to Nepal). **Not reported in Central Nepal and at 2720m altitude in Press et al. 2000.**

2. MAHARANGA A. P. de Candole

Perennial herbs, roots usually with characteristic dye. Stems several, suberect, 20-50cm, hispid with long setae and also with minute hairs. Leaves oblanceolate, 5-20 | 0.5-3.5cm, acute or acuminate, base attenuate. Inflorescence a rounded terminal cluster of forked cymes with bracts 5-10mm. Calyx 5-10mm, green, hispid, lobes 5, triangular. Corolla purple-red or blue violet, 5-lobed, enlarged below and distinctly narrowed at the mouth. Style 10-15mm, exserted.

1. Maharanga emodi (Wall.) A. DC., *Prodr*. 10:71 91846); Hook. f. in *Fl. Brit. Ind*.4:170(1885); Press et al. in *Ann. Check. Fl. Pl. Nep.*:30(2000). Fig.12.j.

Onosma emodi Wall. in Roxb., *Fl. Ind*. 2:11(1824).

Nep.: Maharangi /Nevar maharangi/Bhringi/Marangi

Perennial, taproot stout with characteristic reddish dye. Stems decumbent or suberect. Leaves oblanceolate, 5-18 | 0.7-3cm, acute or acuminate, base attenuate, antrose hispid with short hairs. Inflorescence a rounded terminal cluster of usually forked cymes with small bracts 5-10mm. Calyx 6-10mm, green, hispide, lobes triangular, 3-6mm. Corolla purple red, 5-lobed, style 10-12mm, exserted.

Uses: Roots used to extract dye which is used to colour wool.

Field note: On sandy busy area.

Representative collection: Manang, bet^{n} Bhratang and Talekhu, 2825m, 1.7.2006 (Fl.), K. Adhikari et al. 16.

Distribution: Nepal (WCE, 2200-4500m), Himalaya (Uttar Pradesh to Bhutan), China (Xizang).

Family 51. VERBENACEAE

Herbs, shrubs or trees, often triangular, indumentum of simple or stellate, often with gland dots or scales. Leaves opposite, sometimes whorled, simple or palmately compound, exstipulate. Flowers in heads, racemes, cymes, corymbs or panicles, zygomorphic rarely actionmorphic, bisexual. Calyx tubular at base, 2-6-lobed. Corolla tubular below, salverform, funnel-shaped or 2-lipped, 4-6 lobed. Stamens(2-)4(-6), anthers included or exserted. Ovary superior, 2-8-celled, axile placentation. Fruit a dry or drupaceous capsule.

1. CALLICARPA L.

Trees or shrubs, with mealy, stellate or branched indumentum, sometimes with shiny gland dots. Leaves opposite, rarely whorled. Flowers in lax axillary cymes. Calyx campanulate, entire or minutely 4-lobed. Corolla campanulate or tubular at base, 4-lobed. Stamens 4, anthers exserted. Ovary 2-celled. Style slender. Stigma swollen, slightly bifid. Fruit a globose drupe.

1. Callicarpa macrophylla Vahl, *Symb. Bot*. 3:13, t. 53(1794); Grierson and long in *Fl. Bhu.* 2(2):920(1999); Press et al in *Ann. Check. Fl. Pl. Nep*.:323(2000). Fig.13.a-b.

Callicarpa incana Roxb., *Fl. Ind. ed.* 2,1:393(1832).

Nep.: Dahicamel/Guyallo

Shrubs upto 2m, branchlets densely white stellate-villous. Leaves coriaceous, elliptic, 5-12 | 2-7cm, acute or acuminate, base narrowly rounded, margin crenate, densely white stellate villous beneath. Petiole 0.8-2cm. Flowers in dense axillary cymes. Calyx tube funnel-

shaped, tomentose and gland dotted. Corolla white, tube c3mm, gland dotted. Drupes white, globose.

Field note: On slopy dry area.

Representative collection: Manang, Tal, 1630m, 9.7.2006 (Fl. & Fr.), K. Adhikari et al. 220.

Distribution: Nepal (WCE, 300-1500m), Himalaya (Kashmir to Bhutan), India, Myanmar, S. China, Indo-china. **Not reported at 1630m altitude in Press et al. 2000.**

Family 52. LABIATAE

Herbs, subshrubs or shrubs, often aromatic. Stems usually quadrangular. Leaves simple, rarely pinnatisect or compound, opposite or usually decussate or rarely whorled. Stipules absent. Inflorescence of cymes, often condensed, paired and verticillasters, in spike like, capitate or paniculate. Bracts caducous or persistent, bracteoles present or absent. Flowers usually hermaphrodite. Calyx usually 5-lobed, bilabiatale to regular or oblique. Corolla gamopetalous regular to zygomorphic, 4-5-lobed. Stamens 4, equal or varying in length. Ovary superior, 4-lobed. Style completely gynobasic or partly gynobasic, 2-lobed or rarely punctate. Fruit of 4, usually dry, one seeded nutlets.

Key to the genera

1a. Calyx bilabiatle……..…..……2
1b. Calyx regular or sub-bilabiatle……..……7
2a. Inflorescence remote many flowered verticillasters in axils of upper leaves …… ……...……...**2. Clinopodium**
2b. Inflorescence various types other than above ……..……...…….3
3a. Calyx upper lip with large single lobe, lower lip with small 4-lobe or calyx 3-& 2- lobed, upper corolla lip 4- lobed and lower lip 1-lobed……..……4
3b. Calyx upper lip 3-lobed, lower 2-lobed, upper corolla lip 2-lobed and lower lip 3-lobed ..5
4a. Calyx upper lip 3-lobed, lower lip 2-lobed, leaves margin serrate, crenate or crenulated, nutlets oblong or ovoid……..…..……**5. Isodon**
4b. Calyx upper lip with large 1-lobed, lower 4-lobed, leaves margin toothed, nutlets globose……...…….**10. Plectranthus**
5a. Stamens 2, staminodes 2, corolla upper lip straight……...……**13. Salvia**
5b. Stamens 4, corolla tube narrow, dilated abruptly at throat or upper lip hooded……...6
6a. Calyx obconical, lip truncate at apex, upper lip of corolla hooded, ……..**12. Prunella**
6b. Calyx tubular, corolla dilated abruptly at throat……...……..……**8. Nepeta**
7a. Calyx teeth 8-10……..…….**6. Leucas**
7b. Calyx teeth 5……..……...……8
8a. Calyx equal……..……..9
8b. Calyx unequal……..……...…10
9a. Leaves margin serrulate or crenulate, inflorescence of 6-8 flowers verticillasters axillary .……....**3. Colquhounia**
9b. Leaves margin usually entire, inflorescence a cluster of terminal corymbose cymes forming a panicles……..……**9. Origanum**
10a. Inflorescence capitate or elongate verticillasters in axils of leave.....11
10b. Inflorescence spikes slender or stout, terete, wholly usually conferted or shortly pedunculate cymes in middle and upper left axils…….……...…12
11a. Upper corolla lip lobe shorter than lower lip, anther 1-celled, nutlets with large scar ……....**1. Ajuga**
11b. Upper corolla lip lobe larger than lower lip, anther 2-celled, nutlets with small scar ……...…**14. Stachys**
12a. Leaves almost sessile, leaves margin thickened, entire……**7. Micromeria**
12b. Leaves petiolate or subessile, leaves margin serrate or crenate- serrate.....13
13a. Spikes slender or stout, terete, whorls usually conferted, corolla sub- bilabiatae or bilabiatae……...…...**4. Elsholtzia**
13b. Inflorescence spike like, either solitary or terminal and axillary, distant or conferted, corolla subequally 4- lobed or biLabiatae……..…**11. Pogostemon**

1. AJUGA L.

Annual or short-lived perennial herbs. Stems prostrate or ascending. Leaves sessile to petiolate, crenate-serrate or dentate. Inflorescence sometimes with leaf-like bracts, capitate or elongate, verticillasters. Calyx regular to sub-biLabiatae, campanulate, teeth 5, subequal. Corolla biLabiatae, upper lip short, 2-lobed, lower lip longer than upper, 3-lobed, at least middle lobe emarginated. stamens 4, didynamous, anthers 1-celled. Style not fully gynobasic, 2-lobed. Nutlets with large attachment scar, rugose.

Key to the species

1a. Leaves ovate to oblong-elliptic, margin crenate-serrate…….... **1. A. bracteosa**
1b. Leaves obovate, margin coarsely toothed……...……**2. A. lupalina**

1. Ajuga bracteosa Wall. ex Benth., *Pl. Asiat. Rar*. 1(3):59(1830); Grierson and Long in *Fl. Bhu.* 2(2): 944(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:151(2000).
Ajuga integrifolia Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.* 108(1825).
Nep.: Rato Pate amile jhar

Small herbs about 25cm, stems densely villous. Leaves ovate to oblong-elliptic, 2.5-4⏐1-3cm, apex obtuse, base cuneate, margin crenate-serrate, both surface hairy. Petiole 4-7mm. Verticillasters in axils of upper leaves or leaf-like bracts. Bracts conspicuous, exceeding flowers. Calyx 5-lobes, acute. Corolla biLabiatae, pale mauve, in two lip of 2 & 3-lobed. Fruit nutlets.
Field note: On moist open area.
Representative collection: Manang, Danaque, 2250m, 6.9.2006 (Fl.), K. Adhikari et al. 256.
Distribution: Nepal (WCE, 1200-5100m), Himalaya (Kashmir to Bhutan), India, Pakistan, China, S. Japan, Malaysia, Afghanistan.

2. Ajuga lupalina Maxm., *Bull. Acad. Imp. Sc1. Saint-Petersbourg* 23: 391(1877); Polunin et al. in *Fl. Him.* 319(1997); Press et al. in *Ann. Check. Fl. Pl. Nep.*:151(2000).

Herbs about 20cm, densely hairy. Leaves obovate, petiolate, coarsely toothed, 3-6⏐1-2.5cm, apex obtuse, base cuneate. Flowers whitish with mauve markings and bluish tube, borne in whorl aggregated into a dense ovoid spike. Bracts long c2cm, ovate-lanceolate, overlapping spreading much beyond the flowers. Calyx 5-lobed, campanulate. Corolla c8mm, in two lip with 2 & 3-lobed. Stamens 4, didymamous. Fruits nutlet
Field note: On the moist open area.
Representative collection: Manang, Humde, 3180m, 1.7.2006 (Fl.), K. Adhikari et al. 3.
Distribution: Nepal (WC, 2200-4500m), Himalaya (Kashmir to Bhutan), India, China.

2. CLINOPODIUM L.

Erect or ascending perennial herbs. Leaves shortly petiolate, serrate to subentire. Inflorescence of remote many flowered verticillasters in axils of upper leaves. Calyx biLabiatae, tubular, curved, teeth 5, slightly unequal. Corolla biLabiatae, upper lip emarginated, pilose, lower lip slightly longer with 3 broad lobes. Stamens 4, didynamous, included under upper lip of corolla. Anthers 2-celled. Style unequally bifid. Nutlets ellipsoid to subglobse.

1. Clinopodium umbrosum (M. Bieb.) C. Koch in *Linnea.* 21:673(1848); Grierson and Long in *Fl. Bhu.* 2(2):977(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:152(2000).
Melissa umbrosa M. Bieb., *Fl. Taler.-Caw*. 2:63(1808).
Thymus repens D. Don, *Prodr. Fl. Nep.* 113(1825).

Ascending herbs about 30cm, pubescent. Leaves ovate, 1.5-4.5⏐0.5-3cm, acute, base rounded to broadly cunneate, margin serrate, sparsely pilose. Petioles 3-12mm. Calyx 5-6mm, ciliate, upper 3 triangular, lower subulate, 5-lobes. Corolla pink, 7-8mm. Stamens 4, didynamous. Style bifid. Nutlets ellipsoid.
Field note: On dry sandy soil.

Representative collection: Manang, Bhratang, 2800m, 10.10.2006 (Fl.), K. Adhikari et al. 267.

Distribution: Nepal (WCE, 180-3400m), Iran, Afghanistan, Chitra,) Pakistan, Himalaya (Kashmir to Bhutan), India, Burma, Ceylon, Tibet, China, Taiwan, Malaysia.

3. COLQUHOUNIA Wall.

Large, aromatic, sprawling or scandent shrubs. Stem with dendroid hairs, branched. Leaves petiolate, serrulate or crenulated, both surfaces dendroid hairy. Inflorescence of 6-8 flowered verticillasters in axils of upper leaves, sometimes crowded and short spike. Calyx regular, tubular campanulate, dendroid-pubescent, teeth 5, equal. Corolla biLabiatae, tube curved, broad at throat, upper lip entire, lower lip 3-lobed, medium lobe small. Stamens 4, anthers 2-celled. Style unequally bifid. Nutlets narrowly ellipsoid, flattened at apex.

1. Colquhounia coccinea Wall. in *Tr. Linn. S. London* 13:609(1822); Grierson and Long in *Fl. Bhu.* 2(2): 966(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:152(2000). Fig.13.c.

Nep.: Jhip jhip/Sano tusare

Small shrub about 2m, tomentose. Leaves ovate to elliptic, 2.5-9⏐1.5-4cm, acuminate, base rounded, margins serrulate or crenulated, both surface hairy, lower surface whitish. Petiole 1-3cm. Calyx c1cm, densely whitish pubescent, teeth triangular. Corolla orange, biLabiatae into two lip. Stamens 4. Style unequally bifid. Fruit nutlets.

Field note: On slopy and rocky area.

Representative collection: Manang, Thanchok, 2640m, 13.10.2006 (Fl.), K. Adhikari et al. 370.

Distribution: Nepal (WCE, 1200-4200m), Himalaya (Uttar Pradesh to Bhutan), S.W. China.

4. ELSHOLTZIA Willdenow

Herbs or shrubs. Stems erect. Leaves petiolate or subsessile margin serrate or crenate-serrate. Inflorescence spike like, terminal and axillary, spikes slender or stout, terete, whorls usually conferted. Flowers small. Bracts linear to suborbicular. Calyx regular or not, 5-toothed, subequal. Corolla sub-biLabiatae or biLabiatae, upper lip emarginated, lower lip 3-lobed. Stamens 4, didynamous, anthers 2-celled, becoming 1-celled. Style subequally 2-lobed. Nutlets smooth or tubercled.

Key to the species

1a. Spikes secund, nutlets obovoid……...….……**1. E. ciliata**
1b. Spikes normal, nutlets ellipsoid or oblong……..……..2
2a. Leaves sessile, bracts lanceolate, nutlets oblong ……..…. ……....**3. E. fructicosa**
2b. Leaves petiolate, bracts ovate-acuminate or linear, nutlets ellipsoid……3
3a. Small shrubs, bracts ovate- acuminate……...……...….**2. E. flava**
3b. Herbs, bracts linear……....**4. E. stachyodes**

1. Elsholtzia ciliate (Thunb.) Hyland. in *B. Notsister* 1941:129(1941); Grierson and Long in *Fl. Bhu.* 2(2):982(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:153(2000). Fig.13.d.

Sideritis ciliata Thunb., *Fl. Jap*. 245(1784)

Mentha Patrini Lepech. in *Nov. Act. Petrop*. 1:336(1787).

Erect herb up to about 60cm. Stems quadrangular with white hairs. Leaves ovate, 1-5⏐0.5-3cm, acute or acuminate, base cuneate, and margin crenate-serrate, pubescent, with sessile glands on lower surface. Petiole 0.5-2cm. Spikes secund, bracts broadly ovate, apiculate, ciliate. Calyx c2mm, teeth triangular. Corolla purple, c4mm. Stamens slightly exserted. Nutlets obovoid.

Field note: On open sandy soil.

Reprsentative collection: Manang, Koto, 2570m, 5.7.2006 (Fl.), K. Adhikari et al. 122.

Distribution: Nepal (WCE, 1500-3400m), C. Europe, N. Asia, Afghanistan, Himalaya, Tibet, N. India, China, Indo-China, Japan.

2. Elsholtizia flava (Benth.) Benth., *Lab. Gen. Sp*. 161(1833); Grierson and Long in *Fl. Bhu.* 2(2):980(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:153(2000).
Aphanochilus flavus Benth. in Wall, *Pl. As. Rar*. 1:28, t. 34(1830).

Aromatic small shrubs about up to 1m. Stems pubescent. Leaves broadly ovate to ovate-oblong, 6-9 | 3-4cm, acuminate, base cuneate, rounded or subcordate, margins crenate-serrate, pubescent on main veins, lower surface with sessile glands. Petioles 2-5cm. Spikes pubescent. Bracts ovate-acuminate. Calyx c5mm, teeth triangular. Corolla yellow, c8mm. Nutlets ellipsoid.

Field note: On open slopy area.

Representative collection: Manang, Chame, 2710m, 11.10.2006 (Fr.), K. adhikari et al. 291.

Distribution: Nepal (CE, 1900-2700m), Himalaya (Uttar Pradesh to Sikkim), NE India, China. **Not reported at 2710m altitude in Press et al. 2000.**

3. Elsholtzia fructicosa (D. Don) Rehder in *Sarg., Pl. Wilson*. 3:381(1916), Grierson and Long in *Fl. Bhu.* 2(2):981(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:153(2000).
Perilla fructicosa D. Don, *Prodr. Fl. Nep.* 115(1825).

Shrub about 1m. Stems pubescent, subterete. Leaves sessile, margin serrate or crenate-serrate, both surfaces pubescent and densely sessile glandular. Spikes pubescent. Bracts lanceolate, c5mm. Calyx c1.5mm, teeth triangular. Corolla cream, 4-6mm. Nutlets oblong.

Field note: Shady area with sandy soil.

Representative collection: Manang, Naya Bazar, 2640m, 7.7.2006 (Fl.), K. Adhikari et al. 174.

Distribution: Nepal (WCE, 1800-4200m), Punjab, Himalaya (Kashmir to Bhutan), India, Myanmar, China.

4. Elsholtzia stachyodes (Link) Raizada and Sexena, *India Forester* 92:309(1960); Grierson and Long in *Fl. Bhu.* 2(2):981(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:153(2000).
Hyptis stachyodes Link, *Enum. Pl. H. Berol*. 2:106(1822).

Nep.: Silam

Slender herbs about 60cm. Stem erect, pubescent. Leaves ovate, coarsely crenate-serrate, 2-5 | 1-3cm, acute or acuminate, base cuneate, pubescent, lower surface with sessile glands. Petioles 1-3cm. Spikes slender. Bracts linear. Calyx pubescent, teeth narrowly triangular, c1mm. Corolla pale violet, c2mm. Nutlets ellipsoid.

Field note: On rocky and shady area.

Representative collection: Manang, Dharapani to Tal, 1910m, 14.10.2006 (Fl.), K. Adhikari et al. 472.

Distribution: Nepal (WCE, 1200-1800m), Himalaya (Kashmir to Assam), N. India, Myanmar, China. **Not reported at 1910m altitude in Press et al. 2000.**

5. ISODON(Bentham) Spach

Shrubs, subshrubs or herbs. Leaves petiolate, serrate, crenate or crenulate. Inflorescence terminal & axillary of lax cymes forming panicles or more rarely, dense cymes forming spikes. Bracts persistent, small. Calyx equal or subequally 5-toothed or biLabiatae with upper lip 3-toothed. Corolla biLabiatae, tube exserted, gibbous, upper lip 4- lobed, usually recurved, lower lip concave, entire. Stamens 4, declinate, didynamous. Anthers 1-celled. Style 2-lobed. Nutlets oblong or ovoid.

1. Isodon lophanthoides (Buch.-Ham. ex D. Don) H. Hara, *J. Jap. Bot*. 60(8): 235(1985); Grierson and Long in *Fl. Bhu.* 2(2): 995(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:154(2000).
Rabdosia lophanthoides (D.Don.) Hara in *Jap. B.* 47:17(1972).

Perennial herbs. Stem erect to ascending, 30-60cm, slender, quadrangular, white tomentose. Leaves ovate, 1-5 | 0.5-2.5cm, base truncate to cuneate, apex acute or acuminate, margin crenate to crenate-serrate, hairy and numerous dark red sessile glands on lower surface. Upper leaves sessile. Bracts ovate, leaflike. Calyx biLabiatae, broadly campanulate,

hairy. Corolla mauve with purple making, straight, upper lip recurved. Stamens exserted. Nutlets oblong-ellipsoid.

Field note: On rocky area.

Representative collection: Manang, Thanchok, 2640m, 13.10.2006 (Fl.), K. Adhikari et al. 373.

Distribution: Nepal (WCE, 1300-2700), Himalaya (Kashmir to Bhutan), NE India, China.

6. LEUCAS R. Brown

Annual or perennial herbs. Leaves sessile or shortly petiolate, entire or serrate. Inflorescence of many flowers verticillasters, crowded or distant. Bracts ovate-lanceolate to subulate. Calyx tubular apex straight or oblique, not bilabiatae, teeth 8-10. Corolla bilabiatae, upper lip entire, densely hirsute, lower lip 3-lobed, longer than upper lip, median lobe larger than lateral lobes. Stamens 4, anthers 2-celled. Style bifid. Nutlets oblong, trigonous, scar small.

1. Leucos lanata Benth. in Wall., *Pl. Asiat. Rar.* 1(3):61(1830); Grirson and Long in. *Fl. Bhu.* 2(2):962(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:155(2000).

Perennial herbs. Stem erect c25cm with lanate indumentum. Leaves ovate-oblong, 3-6 | 1-2.5cm, acute, base rounded to cuneate, margin serrate, dense white indumentum. Petiole 0.3-1cm. Verticillasters distant in leaf axils. Calyx c1cm, apex straight, teeth 10, triangular, mucronulate, 0.5-1.2mm. Corolla white, c1cm, tube annulate, style bifid. Nutlet oblong.

Field note: On sandy dry soil.

Representative collection: Manang, bet^{n} Talekhu and Chame, 2770m, 3.7.2006 (Fl.), K. Adhikari et al. 47.

Distribution: Nepal (WCE, 700-1100m), Himalaya (Kashmir to Sikkim), India, China. **Not reported at 2770m altitude in Press et al. 2000.**

7. MICROMERIA Bentham

Aromatic perennial herbs. Stems ascending, pubescent to villous. Leaves almost sessile, margin thickened, entire, sparsely hairy, lower surface with sessile glands. Inflorescence shortly pedunculate cymes in middle and upper leaf axils. Calyx sub-biLabiatae, distinctly ribbed, teeth 5, unequal. Corolla bilabiatae, upper lip emarginate, lower lip slightly longer with 3-broad lobes. Stamens 4, didynamous, anthers 2-celled. Style unequally bifid. Nutlets ellipsoid.

1. Micromeria biflora (Buch.-Ham. ex D. Don) Benth., *Lab. Gen. Sp.* 378(1834); Grierson and Long in *Fl. Bhu.* 2(2):976(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:156(2000).
Thymus biflorus Buch.-Ham. Ex D. Don, *Prodr. Fl. Nep.* 112(1825).

Herbs about 30cm, pubescent. Leaves ovate to elliptic, 0.5-0.8 | 0.2-0.4 cm, acute, base rounded, margin thickened, entire, sparsely hairy, lower surface with sessile glands. Calyx sub-bilabiatae, teeth 5, unequal, ciliate, upper 3 triangular, lower 2-subulate. Corolla mauve, upper lip emarginated. Stamens 4, style unequally bifid. Nutlets ellipsoid.

Field note: On dry sandy soil.

Representative collection: Manang, Bhratang, 2800m, 10.10.2006 (Fl.), K. Adhikari et al. 265.

Distribution: Nepal (WC, 900-4000m), Afghanistan, Pakistan, Punjab, Himalaya (Kashmir to Bhutan), India, Myanmar.

8. NEPETA L.

Herbs. Leaves simple, petiolate or sessile. Inflorescence terminal, verticillasters many-flowered, in short dense spikes and sometimes in uppermost leaf axils. Bracts present. Calyx bilabiatae, tubular, 1 upper lip 3-toothed, lower lip 2-toothed. Corolla biLabiatae, tube narrow, dilated abruptly at throat, upper lip sub-equal to lower, 2-lobed. Stamens 4. Nutlets ellipsoid to obovoid.

1. Nepeta lamiopsis Benth. ex Hook. f., *Fl. Brit. Ind.* 4(12):659(1885); Grierson and Long in *Fl. Bhu.* 2(2):952(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:156(2000).

Decumbent herbs. Stem often unbranched, glandular pubescent to tomentose. Leaves ovate to broadly ovate, 1-3 | 0.5-2cm, obtuse, base subcordate, margin slightly crenate, upper surface with scattered pilose hairs and lower surface glandular-pubescent. Petiole 0.5-1.5cm. Bracts present. Calyx purplish-black, teeth subulate, biLabiatae, upper lip slightly longer than lower. Corolla biLabiatae, purple to deep violet Nutlets ellipsoid.
Field note: On sandy dry soil of pine forest.
Representative collection: Manang, Bhratang, 2800m, 10.10.2006 (Fl.), K. adhikari et al. 266.
Distribution: Nepal (WCE, 3300-5300m), Himalaya (Nepal to Bhutan), India, China (Xizang). **Not reported at 2800m altitude in Press et al. 2000.**

9. ORIGANUM L.

Perennial herbs and subshrubs. Leaves petiolate, usually entire. Inflorescence a cluster of terminal corymbose cymes forming a panicle. Bracts obovate to elliptic. Calyx regular, tubular, equally 5-toothed. Corolla biLabiatae, upper lip 2-lobed, lower lip 3-lobed, slightly longer than upper. Stamens 4, didynamous, included or exserted. Anthers 2-Celled. Style unequally bifid. Nutlets smooth, ellipsoid.

1. Origanum vulgare L., *Sp. Pl.* 590(1753); Grierson and Long in *Fl. Bhu.* 2(2):977(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:157(2000).
Origanum normale D. Don, *Prodr. Fl. Nep.* 113(1825).

Small herbs about 15cm. Leaves ovate, 1-2.5 | 0.5cm, acute, base rounded, margin entire, sparrely villous with punctate glands. Petiole 1-3mm. Bracts obovate to elliptic, purplish. Calyx tubular, tecth 5, hairy, triangular, equal c3mm. Corolla biLabiatae, pink. c5mm. Style unequally bifid. Nutlets ellipsoid.
Field note: On sandy soil.
Representative collection: Manang, Chame, 2720m, 4.7.2006 (Fl.), K. Adhikari et al. 91.
Distribution: Nepal (WC, 600-4000m), Throughout Europe, Asia and N. America.

10. PLECTRANTHUS L. Heritier

Subshrubs or herbs. Leaves petiolate, toothed. Inflorescence paniculate or spike like with lax, few-flowered cymes or appearing verticillate. Bracts obovate to ovate. Calyx bilabiatae, upper lip with single large tooth, lower lip 4-toothed. Corolla bilabiatae, upper lip 4-lobed, lower lip concave, boat shaped, entire. Stamens 4, didynamous. Style 2-lobed. Nutlets globose, slightly flattened laterally.

1. Plectranthus mollis (Aiton) Spreng., *Syst. Veg.* 2:690(1825); Grierson and Long in *Fl. Bhu.* 2(2):992(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:158(2000).
Ocimum molle Aiton, *H. Kew*. 2:322(1789).
Plectranthus incanus Link., *Enum. H. Berol*. 2:120(1822).

Herbs about 50cm, quadrangular stem, pubescent above. Leaves ovate, 3-8 | 2-6cm, base cordate, apex acute, margins crenate-serrate, both surface pubescent. Petiole 0.5-3cm. Bracts obovate. Inflorescence branched, lax spikes. Calyx campanulate, densely glandular hairy, biLabiatae, upper lip shorter than lower. Corolla pale pink or mauve, c8mm, tube c4.5mm. Stamens 4. Nutlets globose.
Field note: On open moist area.
Representative collection: Manang, Danaque, 2250m, 6.9.2006 (Fl.), K. Adhikari et al. 252.
Distribution: Nepal (CE, 900-1500m), Himalaya (Uttar Pradesh to Sikkim), India, Sri-Lanka. **Not reported at 2250m altitude in Press et al. 2000.**

11. POGOSTEMON Desfontaines

Herbs or undershrubs, stem often swollen at or above nodes. Indumentum of simple or rarely stellate hairs. Leaves serrate opposite or verticillate, broad or linear, sub-sessile or petiolate. Inflorescence spike-like either solitary or terminal and axillary, distant or conferted. Bracts persistent. Flowers sessile or pedicellate. Calyx regular or not, teeth 5, subequal.

Corolla subequally 4-lobed or biLabiatae. Stamens 4, exserted, straight or declinate, filaments hairy. Anthers 1-celled. Style 2-lobed. Nutlets ovoid, ellipsoid or subglobose.

1. Pogostemon glaber Benth., *Pl. Asiat. Rar*. 1(2):31(1831 Grierson and Long in *Fl. Bhu.* 2(2):985(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 158(2000).

Nep.: Basuki

Large herbs up to 120cm, stem dark purple. Petioles 2-4cm. Leaves ovate to ovate-oblong, 4-9 | 2-3.5cm, acute to acuminate, base cuneate to attenuate, margins serrate, sparsely pilose and with minute glands on lower surface. Spikes broader, c1.3cm. Calyx obovoid, teeth triangular-ovate, ciliate. Corolla white, acute or obtuse. Stamens 4, exserted, straight. Style 2-lobed. Nutlets ovoid.

Field note: On moist place.

Representative collection: Manang, Tal, 1640m, 14.9.2006 (Fl.and Fr.), K. Adhikari et al. 464.

Distribution: Nepal (WC, 300-1900m), Himalaya (Nepal to Sikkim), NE India, China, Indo-China.

12. PRUNELLA L.

Perennial herbs with creeping rhizome. Stems procumbent to erect. Leaves petiolate, entire to obscurely serrate. Inflorescence a dense terminal spike. Bracts broadly ovate. Calyx biLabiatae, obconical, lips subequal, lip truncate at apex, with 3 small teeth, lower lip 2-toothed. Corolla biLabiatae, upper lip hooded, longer than lower, lower lip-3 lobed. Stamens 4, didynamous, included. Anthers 2-celled. Nutlets obovoid, scar small.

1. Prunella vulgaris L., *Sp. Pl.* 600(1753); Grierson and Long in *Fl. Bhu.* 2(2):955(1999); Pess et al. in *Ann. Check. Fl. Pl. Nep.*:158(2000).

Herbs with creeping rhizome. Stems about 25cm, pilose. Leaves ovate to ovate-oblong, 1.5-4 | 0.5-2cm, acute, base rounded, margin entire to obscurely serrate, both surfaces pilose. Petiole 0.5-1.5cm. Flowers spike. Calyx biLabiatae, tube c3mm, teeth of lower lip triangular. Corolla biLabiatae, deep purple, 10-12 mm. Stamens 4, didynamous. Nutlets obovoid, scar small.

Field note: On sandy soil.

Representative collection: Manang, Talekhu, 2742m, 2.7.2006 (Fl.), K. Adhikari et al. 35.

Distribution: Nepal (WCE, 1200-3800m), Europe and Temperate Asia.

13. SALVIA L.

Perennial, biennial or annual herbs. Leaves petiolate, simple, rarely pinnate, serrate to crenate margin. Inflorescence of distant or conferted verticillasters arranged in a spike. Calyx biLabiatae, tubular or campanulate, upper lip entire or 3-toothed, lower lip 2-toothed. Corolla biLabiatae, upper lip straight, lower lip 2-toothed. Corolla biLabiatae, upper lip straight, lower lip 3-lobed, middle lobe largest. Stamens 2, staminodes 2. Style 2-lobed. Nutlets obovoid or sub-orbicular, trigonous.

Key to the species

1a. Leaves margin serrate to crenate, corolla yellow, upper lip straight……**1. S. campanulata**

1b. Leaves margin double crenate and lobulate, corolla rose coloured, upper lip long arched ……..……...……....**2. S. moorcroftiana**

1. Salvia campanulata Wall. ex Benth. in Wall., *Pl. As. Rar*. 1:67(1831); Grierson and Long in *Fl. Bhu.* 2(2):972(1999); Press et al. in *Ann. Check. Fl. Pl. Nep.*:158(2000).

Robust, glandular perennial herbs. Stem erect, 30-70cm with spreading capitate-glandular hairs above, tomentose to glabrescent below. Leaves ovate to ovate-oblong, 6-15 | 3-7cm, acute to obtuse, base cordate, serrate to crenate margin, both surface hairy and with sessile glands on lower surface. Petiole 3-5cm, stem leaves sometimes sessile and smaller. Inflorescence branched, bracts ovate, acuminate. Verticillasters distant 2-6-flowered. Calyx

campanulate, densely glandular-hairy. Corolla yellow, upper lip straight, lower lip subequal in length, deflexed. Nutlets obovoid.

Field note: On moist area.

Representative collection: Manang, Bagarchhap, 2140m, 8.7.2006 (Fl.), K. Adhikari et al. 183.

Distribution: Nepal (CE, 2400-3800m), Himalaya (Garhwal to Bhutan), India, Tibet. **Not reported at 2140m altitude in Press et al. 2000.**

2. Salvia moorcroftiana Wall. ex Benth. in *Wall., Pl. As. Rar.* 1:67(1830); Hook. f. in *Fl. Brit. Ind.* 4:654(1885); Press et al. in *Ann. Check. Fl. Pl. Nep.*:158(2000).

Robust, woolly. Leaves long-petioled, oblong or oblong-cordate, doubly crenate and lobulate and under white and rose coloured, 10-15⏐5-8cm, base rounded or cordate. Calyx campanulate, equally spinous, 5-toothed, scabrid. Corolla c2.5cm, rose coloured, tube slender, upper lip long arched, very narrow. Nutlets subglobose.

Field note: On slopy moist area.

Representative collection: Manang, Chame, 2800m, 11.10.2006 (Fr.), K. Adhikari et al. 303.

Distribution: Nepal (W, 2000-3000m), Punjab, Himalaya (Kashmir to Nepal), India. **Not reported in Central Nepal in Press et al. 2000.**

14. STACHYS L.

Herbs. Leaves sessile to petiolate, crenate-serrate or serrate. Inflorescence of many flowered verticillasters in axils of leaves. Bracts present. Calyx regular or not, campanulate to tubular-campanulate, teeth 5, subequal. Corolla biLabiatae, upper lip entire, lower lip subequal to or longer than lower lip, 3-lobed, median lobe largest, emarginate. Stamens 4, didynamous, anthers 2-celled. Nutlets obovoid, scar minute.

1. Stachys sericea Wall. ex Benth, *Pl. As. Rar. 1.* 64, and cat. 2077(1792); Hook. f. in Fl. Br. Ind. 4:675(1885); Press et al. in *Ann. Check. Fl. Pl. Nep.*:159(2000).

Herbs, erect, more or less densely villous with long silky hairs. Leaves shortly petioled, ovate-or oblong-cordate, acute, crenate, whorls many fid. Inflorescence in axillary and in terminal spikes. Calyx teeth spinescent, spines coloured, 5-lobed. Corolla biLabiatae. Stamens 4, didynamous, anthers 2-celled. Nutlets obovoid, scar minute.

Field note: On dry sandy area.

Representative collection: Manang, Bhratang, 2800m, 10.10.2006 (Fl.), K. Adhikari et al. 268.

Distribution: Nepal (W, 2400-3900m), Afghanistan, Pakistan (Chitral), Himalaya (Kashmir to Bhutan), India. **Not reported in Central Nepal in Press et al. 2000.**

Family 53. SOLANACEAE

Herbs, shrubs, trees or lianas. Leaves usually simple and alternate, exstipulate. Flowers often showy, solitary and axillary or extra-axillary, or in racemes, spikes, panicles, corymbs or cymes, usually hermaphrodite, actinomorphic. Calyx(3-)5(-10)-lobed, campanulate or tubular, usually persistent. Corolla rotate, campanulate, infundibular, lobes 5(-10), equal. Stamens(4-)5(-6), epipetalous, sometimes didynamous. Ovary superior, 2-4(-5)-locular, placentation axile. Fruit a berry or capsule, seeds many.

Key to the genera

1a. Flowers solitary, corolla infundibular or tubular, stamens attached middle or base of corolla tube ……...……**1. Datura**

1b. Flowers in cymes or racemes rarely solitary, corolla rotate or shortly campanulate, stamens attached near mouth part of corolla ….....**2. Solanum**

1. DATURA L.

Annual or perennial herbs or soft-wooded shrubs. Leaves alternate. Flowers solitary, erect. Calyx tubular, elongate, circumcissile at base with 5 teeth at apex. Corolla infundibular or tubular. Stamens 5, attached near middle of corolla tube or towards base. Anthers oblong,

slightly curved, basifixed, free. Style filiform, stigma 2-lobed. Ovary usually bilocular. Fruit a globose or ovoid capsule dehiscing irregularly or by 4 valves. Pericarps spiny a tuberculate. Seeds laterally compressed.

1. Datura metal L., *Sp. Pl.* 179(1753); Press et al. in *Ann. Check. Fl. Pl. Nep.*:302(2000); Grierson and Long in *Fl. Bhu.* 2(3):1067(2001).

Nep.: Kalo Dhaturo

Erect about 1m, small shrubs. Leaves alternate with elliptic to broadly ovate, 3-12×1-8cm, acute or acuminate, base obtuse, margin entire. Flowers solitary in axils, erect. Pedicels pubescent. Calyx tubular 3-6mm, minutely pubescent, teeth unequal, triangular-acuminate. Corolla white-yellow, tube 6-10cm, infundibular, pubescent, 5-cuspidate. Fruit capsule, pericarps with spines.

Uses: As medicine for stomach problem of domestic animals.

Field note: On open area.

Representative collection: Mannang, Danaque, 2750m, 13.10.2006 (Fl.&Fr.), K. Adhikari et al. 405.

Distribution: Nepal (WCE, 300-1200m), tropical America, widely cultivated and naturalized elsewhere. **Not reported at 2750m altitude in Press et al. 2000.**

2. SOLANUM L.

Herbs, lianas, shrubs or small trees, unarmed or armed with prickles or spines, often with stellate hairs. Leaves simple or lobed. Flowers in cymes or racemes sometimes axillary rarely solitary. Calyx campanulate or cup-shaped, 5-lobed, corolla rotate or shortly campanulate, actinomorphic or slightly zygomarphic, lobes 5, spreading or recurved. Stamens attached near mouth of corolla tube, exserted. Fruit a variously colored berry.

Key to the species

1a. Prickles absent, berry black when riped……..……...…**1. S. nigrum**
1b. Prickles all parts except corolla, berry yellow when riped……...**2. S. surattense**

1. Solanum nigrum L., *Sp. Pl.* 186(1753); Hook. f. in *Fl. Brit. Ind.* 4:229(1885); Press et al. in *Ann. Check. Fl. Pl. Nep.*:304(2000). Fig.13.e.

Nep.: Kali gedi/ Jangali vihi, Eng.: Black nightshade

Herbs about 60cm. Leaves alternate, ovate-oblong, 2-7×1.5-3.5cm, acuminate, base cuneate, margin entire, sinuate toothed or lobed. Petiolate c1cm. Flowers in subumbellate raceme, small, white. Calyx 5-toothed, ovate, obtuse apex. Corolla 5-lobed, narrow tubular, 0.6-0.7×0.3-0.5cm. Fruit berry, black when riped.

Uses: Berry used to eat.

Field note: On the road side.

Representative collection: Manang, Thanchok, 2630m, 13.10.2006 (Fr.), K. Adhikari et al. 378.

Distribution: Nepal (WCE,900-2900m), almost cosmopolitan. **Not reported at 2630m altitude in Press et al. 2000.**

2. Solanum surattense Burme f., *Fl. Ind.* 57(1768); Press et al. in *Ann. Check. Fl. Pl. Nep.* 304(2000); Grierson and Long in *Fl. Bhu.* 2(3):1060(2001).

Solanum xanthocarpum Schrader and Wendl. in Schrader, *Sert. Hanov*. 1:8, t. 2(1795).

Nep.: Kanthkari

Spiny herbs about 1m. Prickles numerous present on all parts except corolla, straight, glabrous. Leaves ovate or elliptic-oblong, 3-9×2-6cm, sinuate or deeply lobed, pubescent, acute, base unequally truncate. Inflorescence a 2-6 flowered racemose pedunculate cyme. Peduncles 1-2cm, Calyx c5mm, lobes acute. Corolla mauve, lobes c1.5, ovate triangular. Anthers yellow. Berry globose, yellow when ripe.

Uses: Medicinal used and for making soap.

Field note: On open rocky area.

Representative collection: Manang, Thanchok, 2630m, 13.10.2006 (Fl.), K. Adhikari et al. 377.

Distribution: Nepal (WCE, 300-900m), Himalaya, N. India, China, S. E. Asia, Malaysia, Australia, Polynesia. **Not reported at 2630m altitude in Press et al. 2000.**

Family 54. SCROPHULARTACEAE

Herbs, more rarely shrubs or trees , autotrophic, hemiparasitic or parasitic. Leves alternate, opposite or sometimes whorled, simple, lobed or pinnately dissected. Inflorescence a thyrse, raceme or spike or solitary. Flowers hermaphrodite, usually zygomorphic. Calyx deeply or slightly divided into(2-) 4-5 segments. Corolla sympetalous, (3-) 4-5 lobed, biLabiatae or not, sometimes spurred or saccate. Stamens attached to corolla tube 2,4 or 5 sometimes staminode. Ovary superior, bilocular. Style terminal, stigma capitate. Fruit usually a septicidal, loculicidal or poricidal capsule rarely barry or schizocarp.

Key to the genera

1a. Calyx lobes 5……..…….…….2
1b. Calyx lobes 4, 2-5 or 4-5…….……...…..……..4
2a. Corolla usually inconspicuous, greenish……...……...……**5. Scrophularia**
2b. Corolla well developed, coloured…….……3
3a. Leaves dimorphic orbicular or fasciculate and needle like……...…….**2. Hemiphragma**
3b. Leaves simple or divided, basal leaves in a rosette, sessile or short petiolate, cauline leaves numerous and small……..……...….**6. Verbascum**
4a. Leaves with well marked radicle and cauline…….……..5
4b. Leaves all similar…….…….……...…….6
5a. Inflorescence often secund, scapose, terminal bracteate, racemes, upper lip of corolla erect…….……**3. Mazus**
5b. Inflorescence a lax or condense sometimes spike like racemes, upper lip of corolla hooded……..……**4. Pedicularis**
6a. Stem eglandular or glandular hairy, corolla 5-lobed. ……..…….**1. Euphrasia**
6b. Stem smooth, corolla 4-lobed……..……**7. Veronica**

1. EUPHRASIA L.

Hemiparasitic, annual herbs, stems pubescent. Indumentum of eglandular or glandular hairs. Leaves subsessile, opposite or upper ones subopposite, crenate or dentate. Flowers axillary, solitary, subsessile or sessile. Calyx 4-toothed. Corolla mostly white, biLabiatae, upper lip hooded shortly 2-lobed, lower lip out spread, 3-lobed, lobes emarginated. Stamens 4, curved. Ovary 2-locular, stigma capitate. Capsule, seed fusiform, striate.

1. Eupharasia himalayica Wettst., *Monogr. Euphrasia*: 180, t.4, f. 291-295(1896); Press et al. in *Ann. Check. Fl. Pl. Nep.*:292(2000).

Erect herb, hemiparasitic 10-20cm. Leaves ovate, saw toothed, 4-10mm. Stems slender with erect branches. Inflorescence a terminal spike-like cluster of small white. Calyx campanulate with narrow triangular, bristly hairy, 4-lobes. Corolla biLabiatae c8mm, the lower lip 3-lobed and upper 2-lobed. Stamens 4, didynamous. Stigma dilated. Capsule.

Field note: On sandy, slopy and shady area of dense forest.

Representative collection: Manang, Koto, 2550m, 5.7.2006 (Fl.), K. Adhikari et al. 119.

Distribution: Nepal (WCE, 3200-4200m), Afghanishtan, Himalaya (Kashmir to Bhutan). **Not reported at 2550m altitude in Press et al. 2000.**

2. HEMIPHRAGMA Wall

Slender creeping perennial herbs. Leaves dimorphic according to season, either opposite, very shortly petiolate, orbicular or fasciculate and needle like. Flowers sessile, axillary. Calyx lobes 5, narrow. Corolla shortly campanulate with 5-lobes, spreading, subequal, coloured. Stamens 4. Style shorter than corolla tube. Stigma minute. Fruit a fleshy berry like septicidal capsule.

1. Hemiphragma heterophyllum Wall., *Trans. Linn. Soc. London* 13:612(1822); Press et al. in *Ann. Check. Fl. Pl. Nep.* 292(2000); Grierson and Long in *Fl. Bhu.* 2(3):1129(2001). Fig.14.a.

Slender creeping perennial herbs about 15cm. Stems sparsely pubescent. Leaves dimorphic; cauline leaves short petiolate, opposite, orbicular to reniform, base cordate, margin crenate, 8-16mm broad, radical leaves numerous, 4-6mm long. Calyx 5-lobed, tubular, subequal. Corolla 5-lobes with pink colours. stigma minute. Fruit ovoid, fleshy and shining red.

Field note: On moist and shady area of forest.

Representative collection: Manang, Naya Bazar, 2880m, 7.7.2006 (Fr.), K. Adhikari et al. 168.

Distribution: Nepal (WCE, 1800-3500m), Himalaya (Uttar Pradesh to Bhutan), NE India, Myanmar, W. & C. China, Taiwan, Philippines.

3. MAZUS Loureiro

Annual or perennial herbs, sometimes stoloniferous. Leaves crowded in a basal rosette, cauline opposite below and alternate above. Inflorescence an often secund, scapose, terminal, bracteate raceme. Calyx infundibular to campanulate, 4-fid, lobes equal or subequal. Corolla personate, tube very short, limb biLabiatae, upper lip erect, lower lip spreading 3-lobed larger than upper lip. Stamens 4, didynamous, inserted in corolla tube, anthers 2-celled. Fruit a loculicidal 2-valved capsule.

1. Mazus surculosus D. Don, *Prodr. Fl. Nep.* 87(1825), Press et al. in *Ann. Check. Fl. Pl. Nep.* 295(2000); Grierson and Long in *Fl. Bhu.* 2(3):1101(2001). Fig.14.b.

Mazus harmandii Banati in *Bull. Herb. Boiss. ser*. 2, 8:533(1908).

Perennial stoloniferous. Flowering stem decumbent c10cm, eglandular- pubescent below and glandular-pubescent above. Leaves all basal, petiolate 1-5×0.5-3cm, both surface hairy and with sessile glands. Inflorescence secund. Bracts linear. Calyx infundibular-campanulate, c5mm. Corolla c0.7cm, upper lip mauve, lower lip white. Capsule ovoid to subglobose.

Field note: On sandy busy area.

Representative collection: Manang, Chame, 2720m, 4.7.2006 (Fl.), K. Adhikari et al. 80.

Distribution: Nepal (WCE, 900-3000m), Himalaya (Kashmir to Bhutan), NE. India, W.China.

4. PEDICULARIS L.

Perennial or annual, hemiparasitic herbs. Stem single or tufts, erect, decumbent or prostrate. Radical leaves usually present. Cauline leaves alternate, opposite or whorled, lamina variously pinnatifid or pinnatisect, sometimes crenate only. Inflorescence a lax or condensed sometimes spike-like raceme, or flower axillary or arising directly from crown. Bracts present. Flowers pedicillate or rarely sessile. Calyx cylindrical, tubular, campanulate, tube often membranous with 2-5(-6) teeth. Corolla various colours and shape, comprising a tube equal to or longer than calyx, 3-lobed lower lip and a hooded upper lip which may be erect or bent at middle. Stamens 4, didynamous. Style very long. Fruit a capsule.

Key to the species

1a. Bracts leaf-like, leaves mostly cauline……...……**1. P. longiflora**

1b. Bracts linear-lanceolate, leaves mostly basal……..……...…….**2. P. oederi**

1. Pedicularis longiflora Rudolph var. **tubiformis** (Klotzsch) Tsoong in *Acta. Phyta. Sin.* 3:278,318(Jan. 1955); Press et al. in *Ann. Check. Fl. Pl. Nep.* 297(2000); Grierson and Long in *Fl. Bhu.* 2(3):1228(2001).

Pedicularis tubiformis Klotzsch, *B. Reise Pr. Walden.* 106, t. 57(1862).

Nep.: Lugar-mindro

Herbs about 60cm. Stem erect, glabrous. Leaves mostly cauline alternate, glabrous, lamina linear to oblong, 1.5- 4×0.5-1cm, pinnatifid with 6-10 pairs of segments, segments ovate, acute, glabrous. Flowers axillary. Bracts leaf- like with petioles. Calyx tubular, 0.7mm. Corolla bright yellow with 2-reddish brown, tube c3.5cm. Stamens inserted, filaments all pilose. Capsule lanceolate- ellipsoid.

Field note: On sandy and busy area.

Representative collection: Manang, bet^{n} Bhratang and Talekhu, 2800m, 1.7.2006 (Fl.), K. Adhikari et al. 13.

Distribution: Nepal (WCE, 2500-4100m), Himalaya (Kashmir to Bhutan), S.E. Tibet, W. China.

2. Pedicularis oederi Vahl in Hornemem., *Dansk Oek. Pl. ed.* 2:580(1806); Hanbi, Holmgren and Mill in *Fl. Ch1*. 18:195(1998); Press et al. in *Ann. Check. Fl. Pl. Nep.*:298(2000).

Herbs. Leaves mostly basal. Petiole to 3cm, pubescent. Leaf blade 1.5-7cm, pinnatisect, segments c15 paris, ovate to oblong, dentate. Stem leaves 1 or 2, similar to basal leaves but smaller. Bracts linear-lanceolate, usually woolly. Calyx c1cm, lobes 5. Corolla yellow with purple galea, tube 1.2-1.6cm, lower lip 5-7mm×0.7-1.4cm, middle lobe rounded. Stigma slightly exserted.

Field note: On the moist and slopy area.

Representative collection: Manang, Chame, 2600m, 12.10.2006 (Fl.&Fr.), K. Adhikari et al. 341.

Distribution: Nepal (WCE, 3000-5500m), Himalaya (Uttar Pradesh to Bhutan), China (Xizang). **Not reported at 2600m altitude in Press et al. 2000.**

5. SCROPHULARIA L.

Perennial herbs. Stem quadrangular, sometimes winged. Leaves petiolate or subsessile, usually ovate, toothed. Inflorescence usually a large terminal panicle of cymes sometimes terminal cluster. Cymes pedunculate or sessile, sometimes dichotomously branched. Bracteoles present. Calyx lobes 5, oblong, ovate or suborbicular. Corolla usually inconspicuous and greenish. Stamens 4, didynamous, included or exserted. Staminode present or absent. Fruit a capsule.

1. Scrophularia elatior Benth., *Scrop. Ind.* 18(1835); Press et al. in *Ann. Check. Fl. Pl. Nep.* 299(2000); Grierson and Long in *Fl. Bhu.* 2(3):1092(2001).

Herbs about 60cm, stem winged, globrous below, glandular above. Petioles 1-2cm. Lamina ovate, acute, base cordate, margin doubly dentate. Inflorescence a large terminal many flowered panicle with few axillary inflorescence below. Bracteoles linear-lanceolate, glabrous. Calyx lobe ovate-lanceolate, c3mm, acute or subacute, glabrous. Corolla green, c6mm, 2 posterior lobes larger. Stamens long exserted. Capsule ovoid to subglobose.

Field note: On road side of rocky area.

Representative collection: Manang, Thanchok, 2670m, 13.10.2006 (Fr.), K. Adhikari et al. 376.

Distribution: Nepal (CE, 1600-3800m), Himalaya (Uttar Pradesh to Bhutan), NE India.

6. VERBASCUM L.

Biennial herbs, often pubescent. Leaves alternate, simple or divided; basal ones in a rosette, sessile or shortly petiolate, cauline numerous, smaller. Inflorescence a branched or unbranched spike or raceme. Flowers solitary or in clusters in bract axils. Calyx 5-lobed, regular or zygomorphic, lobes lanceolate. Corolla yellow, mostly actinomorphic, flattened-rotate, tube very short or absent. Stamens 5. Filments inserted. Style filiform or thickened towards apex. Ovary bilocular. Capsule globose or oblong ovoid, septicidal.

1. Verbascum thapsus L., *Sp. Pl.* 177(1753); Hook. f. in *Fl. Brit. Ind.* 4:250(1885); Press et al. in *Ann. Check. Fl. Pl. Nep.*:300(2000).

Nep.: Gan pucchre/ Phosor mindro

Herbs greyish yellow stellate hairs. Basal leaves petiolate, 3-8×1.5-4cm, crenate; cauline leaves smaller, sessile, margin subentire, apex acute. Inflorescence dense, simple

spike 6-15cm, tomentose. Flowers in clusters of 2-7. Bracts ovate to lanceolate, bracteoles 2. Calyx c8mm. Corolla yellow c1cm in diameter. Stamens 5, filaments wool whitish-yellow. Anthers orange. Capsule ovoid.

Field note: On dry open sandy soil.

Representative collection: Manang, bet^{n} Humde and Manang, 3485m, 30.6.2006 (Fl.), K. Adhikari et al. 2.

Distribution: Nepal (WCE, 1800-4000m), Himalaya (Kashmir to Bhutan), W and C. China.

7. VERONICA L.

Erect or prostrate perennial or annual herbs. Stem glabrous. Leaves opposite or upper ones alternate, petiolate or sessile, simple or sometimes with 3-5 lobes, entire or usually crenate or serrate. Flowers in terminal or axillary racemes or spikes or solitary in axils of leaf like bracts. Calyx lobes 4-5, 2 lower ones usually larger than upper. Corolla rotate, slightly zygomorphic, tube broader than long, lobes 4, unequal. Stamens 2. Fruit a bilocular capsule dehiscing loculicidally or septicidally.

1. Veronica anagallis -aquatica L., *Sp. Pl.* 12(1753); Press et al. in *Ann. Check. Fl. Pl. Nep.* 300(2000); Grierson and Long in *Fl. Bhu.* 2(3):1135(2001).

Nep.: Dhapre Jhar

Erect herb. Stem 50-80cm, succulent, unbranched. Leaves opposite, sessile, semi-amplexicaul, oblong to oblong-lanceolate, 2-6×0.5-3cm, acute, shallowly serrate, glabrous. Inflorescence opposite racemes in axils of leaves. Bracts linear-lanceolate. Calyx lobes ovate-lanceolate, acute, c4mm. Corolla mauve, c5mm diameter. Capsule orbicular.

Field note: On shady area.

Representative collection: Manang, Tal, 1940m, 9.7.2006 (Fl.), K. Adhikari et al. 201.

Distribution: Nepal (WC, 2800-4700m), Temperate Europe, Africa, W. and C. Asia, Himalaya (Kashmir to Bhutan), Siberia, China, Korea. **Not reported at 1940m altitude in Press et al. 2000.**

Family 55. BIGNONIACEAE

Trees, shrubs and woody climbers, rarely herbs. Leaves opposite, decussate or alternate, rarely in whorls of rosettes, pinnately compound, 3-foliate with branched or simple tendril. Flowers bisexual, zygomorphic, 5-merous, in panicles, cymes or solitary, terminal or on short lateral branches, bracts inconspicuous. Calyx campanulate, gamosepalous, 2-5-lobed. Corolla campanulate or tubular, with 2-lipped mouth or 5 slightly unequal lobes. Fertile stamens mostly 4. Ovary superior, 2-celled, subsessile. Style filiform. Stigma 2-lobed, elliptic. Fruit an elongate capsule.

1. INCARVILLEA Jussieu

Annual or perennial herbs. Basal leaves in rosette or stem leaves alternate rarely opposite, pinnate or pinnatisect, rarely undivided. Flowers 5-merous, terminal, solitary or racemose, occasionally paniculate, zygomorphic. Calyx tube campanulate, lobes ovate, lanceolate, subulate or reduced to minute points. Corolla tube cylindrical at base, campanulate above, lobes subequal, rounded or emarginated. Stamens 4 in didynamous. Stigma elliptic. Capsule cylindrical, quadrangular or 6-winged.

1. Incarvillea arguta (Royle) Royle, *3. B. Him.* 296(1836); Hook. f. in *Fl. Brit. Ind.* 4:385(1885); Press et al. in *Ann. Check. Fl. Pl. Nep.*:28(2000). Fig.14.c-f.

Amphicome arguta Royle, *3. B. Him. f.* 72, f. 1(Dec. 1835).

Incarvillea diffusa Royle, *3. B. Him. t.* 72, f.1(1835).

Herbs about 30cm. Stems branched, glabrous. Leaves c10cm, leaflets c10×3cm, petioles c3cm, lanceolate. Flowers 5-merous, terminal, solitary, zygomorphic. Calyx tube campanulate c1cm, teeth caudate- acuminate. Corolla tube glabrous, cylindric base of the tube c1cm. Stamens 4 in didynamous. Stigma elliptic. Capsule c8×0.3 cm, cylinder.

Field note: On the bank of riverside with rocky moist place.

Representative collection: Manang, Tal, 1640m, 9.7.2006 (Fl.), K. Adhikari et al. 202.

Distribution: Nepal (WC, 1800-3500m), Punjab, Himalaya (Uttar Pradesh to Nepal), NE India, W. China. **Not reported at 1640m altitude in Press et al. 2000.**

Family 56. ACANTHACEAE

Herbs or shrubs rarely climbers. Leaves opposite, decussate, simple, exstipulate. Flowers usually in cymes, racemes or spikes but sometimes solitary or in axillary whorls, bisexual, often zygomorphic. Bracts & usually bracteoles present. Calyx 4-5 lobed. Corolla usually 5-lobed but often 2-lipped with lower lip 3-lobed and upperlip notched. Epipetalous, usually 4m in two dissimilar pairs. Ovary superior. Style 1, stigma 2-lobed. Fruit a loculicidal capsule, usually cylindrical or clavate in shape.

Key to the genera

1a. Leaves entire, stamens 2, corolla tube short……..……...…..**1. Justicia**
1b. Leaves toothed rarely entire, stamens 4, corolla tube long …… **2. Strobilanthes**

1. JUSTICIA L.

Herbs or shrubs. Leaves entire. Inflorescence spicate or racemose rarely solitary. Bracts present. Bracteoles linear or absent. Calyx subequally 5-lobed, lobes linear-subulate. Corolla 2-lipped, tube short, upper lip notched, lower lip 3-lobed. Stamens 2. Stigma 2-lobed. Capsule clavate, 4-seeded.

1. Justicia procumbens L. var. **simplex** (D. Don) Yamazaki in *Fl. E. Him.* 302(1966); Press et al. in *Ann. Check. Fl. Pl. Nep*.:2(2000).
Justicia simplex D. Don, *Prodr. Fl. Nep.* 118(1825).

Herbs perennial. Stem ridged procumbent. Leaves opposite, petiole c0.5cm. Tuberulous leaf blade broadly elliptic c3-3.6×1.5-2cm. Leaf margin entire, apex acute, base cuneate. Inflorescence axillary terminal spikes. Flower white tinged with pink spots. Calyx 4. Corolla 2-lipped, lower lip 3-lobed, upper 2-lobed. Stamens 2. Stigma 2-lobed. Capsule.
Field note: On open area.
Representative collection: Manang, Tal, 1640m, 9.7.2006 (Fl.), K. Adhikari et al. 192.
Distribution: Nepal (WCE, 700-2500m), E. Africa, Himalaya, India, Sri-Lanka, Myanmar, Thailand, Malaya.

2. STROBILANTHES Blume

Shrubs, undershrubs or rarely herbs. Leaves toothed rarely entire, sometimes oblique at base, usually in each pair. Inflorescence very varied, flowers in axillary and terminal spikes, heads and cymes or scattered. Bracts persistent or deciduous. Calyx 5-lobed to near base, lobes subequal or one distinctly longer than others. Corolla 5-lobed, funnel-shaped, usually straight and gradually widened but sometimes bent or abruptly widened and strongly ventricose. Stamens 4, included. Capsule 2-4 seeded oblong.

Key to the species

1a. Stem smooth, flowers in dense clusters at ends of tricholomously forked axillary branchlets……..……..……**3. S. multidens**
1b. Stem pubescent, flowers in simple pedunculate, axillary heads or in spikes terminal on main stem and on axillary brachlets…….…….2
2a. Shrubs, peduncle smooth……...…….…..**1. S. capitata**
2b. Herbs, peduncle glandular hairy……...…...**2. S. lachenensis**

1. Strobilanthes capitata (Nees) T. Anders., *J. Linn. Soc. Bot*. 9:475(1867); Wood, J.R. J., *Edinburgh J. Bot.* 51:224(1994); Press et al. in *Ann. Check. Fl. Pl. Nep.* 3(2000); Grierson and Long in *Fl. Bhu.* 2(3):1263(2001). Fig.14.g-l
Goldfussia capitata Nees

Shrubs. Stem ascending glabresent below thinly pilose above. Petioles slightly hairy, c2cm. Leaves unequal, shape ovate, 8-12×4-6.5cm, dentate, acuminate, base oblique, dorsally

slightly hairy except vein, ventrally hairy on vein area only. Peduncle smooth, flowers in simple pedunculate axillary heads. Calyx glandular hairy, c0.7cm, linear oblanceolate, equal. Corolla blue, tubular, lower portion hairy. Capsule c1.3cm.

Field note: On moist, sandy slopy and shady area.

Representative collection: Manang, Dharapani, 1940m, 13.10.2006 (Fl.), K. Adhikari et al. 428.

Distribution: Nepal (CE, 200-2000m), Himalaya (Nepal to Bhutan), NE India Manipur, Meghalaya, Nagaland, W. Bengal, China (Xizang), Myanmar.

2. Strobilanthes lachenensis C. B. Clarke, *Fl. Brit. Ind.* 4(12):465(1885); Wood, J.R.1., *Edinburgh J. Bot.* 51:245(1994); Press et al. in *Ann. Check. Fl. Pl. Nep.* 4(2000); Grierson and Long in *Fl. Bhu.* 2(3):1270(2001).

Pteracanthus lachenensis (C. B. Clarke) Bremek. in *Verh. Ned. Akad. Wetens. Afd. Nat. Sect.* 2, 41(1):200(1944).

Herbs, gregarious and nearly rhizomatous. Stem erect woody root stock, hairy. Leaves equal, ovate, 3-13×2-6.5cm, serrate, acute, base rounded, hairy on both surface except vein region. Peduncle glandular hairy. Flowers in spikes terminal on main stem and on axillary branchlets. Spikes interrupted at base. Calyx lobes near with one longer and becoming spathulate in fruit, c0.8-2cm, lobes linear. Corolla tubular, slightly tubular on apical aprt. Capsule.

Field note: On moist, sandy, slopy and shady area.

Representative collection: Manang, Darapani, 1940m, 13.10.2006 (Fl.), K. Adhikari et al. 423.

Distribution: Nepal (E, 1800-4300m), Himalaya (Nepal to Arunchal Pradesh), China (Xizang). **Not reported in Central Nepal in Press et al. 2000.**

3. Strobilanthes multidense C. B. Clarke in Hook. f. in *Fl. Brit. Ind.* 4:461 (1885); Wood, J.R. I, Edinburgh J. Bot. 51:247(1994); Press et al. in *Ann. Check. Fl. Pl. Nep.* 4(2000); Grierson and Long in *Fl. Bhu.* 2(3):1266(2001).

Strobilanthes agrestis C. B. Clarke in Hook. f. in *Fl. Brit. Ind.* 4:466(1885).

Undershrubs. Stem erect, smooth, angular. Petiole smooth, c1.6cm. Leaves unequal, ovate, 10-18×4-7cm, serrate, long acuminate, base attenuate, dorsally highly pubescent than ventral surface. Peduncle smooth. Flowers in dense clusters at ends of trichotomously forked axillary branchlets. Calyx hairy, c0.5cm, lobes linear. Corolla tubular blue, smooth. Fruit capsule.

Field note: On moist, shady area.

Representative collection: Manang, Danaque, 2850m, 13.10.2006 (Fl.), K. Adhikari et al. 400.

Distribution: Nepal (CE, 900-1700m), Himalaya (Nepal to Arunchal Pradesh), NE India (W. Bengal and Meghalaya). **Not reported at 2850m altitude in Press et al. 2000.**

Family 57. GESNERIACEAE

Herbs or shrubs. Leaves simple, opposite, alternate or whorled, pair equal or unequal, plant sometimes with only 1 leaf. Inflorescence usually cymose, rarely racemose or flowers solitary. Flowers hermaphrodite, zygomorphic. Calyx 5-lobed or divided to base. Corolla tube, limb often 2-lipped. Stamens 2 or 4, inserted, staminodes 1 or 3. Ovary superior. Ovules many. Fruit often a linear capsule rarely a berry.

Key to the genera

1a. Bracts absent……...……...……**2. Corallodiscus**

1b. Bracts present……...……...….....2

2a. Corolla bilabiatae, lobes suborbicular to ovate, stigma obliquely 2-lipped……...
……...**3. Didymocarpus**

2b. Corolla lobes rounded, subequal, stigma normal one or bilobed..... **1. Chirita**

1. CHIRITA D. Don

Annual or perennial herbs, sometimes stemless, rarely shrubby. Leaves opposite, rarely alternate. Flowers solitary or in few-flowered cymes. Bracts paired, deciduous. Calyx 5-lobed. Corolla funnel-shaped, tube often pouched, lobes 5, rounded, subequal. Stamens 2, included, staminodes 3. Ovary linear, stigma one or bilobed lip. Capsule long linear, loculicidal.

1. Chirita pumila D. Don, *Prodr. Fl. Nep.* 90(1825); Press et al. in *Ann. Check. Fl. Pl. Nep.* 120(2000); Grierson and Long in *Fl. Bhu.* 2(3):1317(2001).

Annual herbs about 25cm. Stems hairy. Leaves oblong-elliptic to ovate-elliptic, 3-6×1-3.5cm, apex acute, base rounded, margin serrate, scattered hairs. Petioles c1cm long. Inflorescence 1-3 flowered in axils of uppermost leaves. Peduncles c2cm. Bracts ovate-lanceolate. Calyx tube c5mm, deeply divided, 5-lobed, acute, glandular hairy. Corolla 5-lobes, glandular hairy, funnel shaped, tube light whitish yellow. Stamens 2. Stigma bilobed. Fruit capsule.

Field note: On moist open rocky area.

Representative collection: Manang, Tal area, 1640m, 9.7.2006 (Fl.), K. Adhikari et al. 225.

Distribution: Nepal (WCE, 910-2300m), Himalaya, NE India, Thailand, Indo-China, W. China.

2. CORALLODISCUS Batalin

Perennial stemless rosulate herbs, stoloniferous or not. Leaves thick-textured, base attenuate. Peduncles axillary, flowers 1-many, cymose. Bracts absent. Calyx deeply divided into 5-lobes. Corolla tubular, 5-lobed, upper lip smaller than lower. Stamens 4, didynamous, included, staminode 1. Ovary conical, stigma equally bilobed. Capsule oblong or linear-oblong, either septicidal or loculicidal.

1. Corallodiscus lanuginosus (Wall. ex DC.) Burtt in *G. Chron. Ser*. 3, 122:212(1947); Press et al. in *Ann. Check. Fl. Pl. Nep.* 120(2000); Grierson and Long in *Fl. Bhu.* 2(2):1322(2001). Fig.15.a.

Didymocarpus lanuginosus Wall. ex DC., *Prodr.* 9:268(1845).

Didissandra lanuginose (DC.) C. B. Clarke in DC., *Monogr. Phan*. 5:66(1883).

Herbs. Leaves thick-textured, broadly rhomboid, 3-7×2-4cm, apex obtuse, base cuneate, margin entire, hairy. Petiole 2-3cm long. Peduncles c3cm long. Calyx tube, lobes triangular, acute, c3×1.5mm. Corolla tube violet-blue, c2cm long. Stamens 4, didynamous, included, staminode 1. Fruit a capsule.

Field note: On moist open and rocky area.

Representative collection: Manang, Koto area, 2600m, 6.7.2006 (Fl.), K. Adhikari et al. 132.

Distribution: Nepal (WCE, 1000-3400m), Himalaya (Uttar Pradesh to Bhutan), NE India (Meghalaya).

3. DIDYMOCARPUS Wall.

Perennial herbs with or without well developed stem. Leaves opposite or alternate, sometimes 3-4 whorled. Flowers few to many, cymose. Bracts and bracteoles paired, persistent or caducous. Calyx usually 5-lobed. Corolla tube cylindric or narrowly funnel-shaped, limb biLabiatae, lobes suborbicular to ovate. Stamens 2, included, staminodes 3. Ovary stipitate or not, linear. Stigma obliquely 2-lipped. Capsule linear-oblong or oblong-elliptic.

1. Didymocarpus albicalyx C. B. Clarke in DC., *Monogr. Phan*. 5:78(1883); Hara in *Enum. Fl. Pl. Nep.* 121(2000); Grierson and Long in *Fl. Bhu.* 2(3): 1312(2000).

Didymocarpus leucocalyx C. B. Clarke in *Fl. Brit. Ind.* 4:348(1884).

Nep.: Kumkum

Herbs about 13cm. Leaves broadly elliptic to ovate, opposite unequal, 3-6×1.5-4.5cm, apex acute to obtuse, base rounded, margin serrate, hairy. Petioles 1-3cm. Flowers many in cymes. Bracts ovate. Calyx pale, campanulate, 5-lobed, lobes rounded, c3mm long. Corolla glabrous, purple, c2cm long, lobes rounded. Ovary glabrous Fruit a capsule.

Field note: On moist open rocky area.

Representative collection: Manang, Tal area, 1640m, 9.7.2006 (Fl.), K. Adhikari et al. 224.

Distribution: Nepal (E, 1200-1800m), Himalaya (Nepal to Bhutan). **Not reported in Central Nepal in Press et al. 2000.**

Family 58. OROBANCHACEAE

Annual or perennial, herbaceous root parasites, leafless and without chlorophyll. Stems usually simple, scaly. Flowers solitary on slender shoots or in axils of scales or in spikes or racemes, bisexual, zygomorphic. Calyx 4(-5)-lobed or sheath-like and unlobed. Corolla 2-lipped, tube curved, upper lip simple or 2-lobed, lower lip 3-lobed. Stamens 4 in 2 pairs. Ovary superior, 1-celled, ovules numerous, placentation parietal. Style 1, stigma 2-lobed. Fruit a capsule.

1. OROBANCHE L.

Erect annual to perennial herbs. Stem short, often scaly. Flowering shoots simple or branched, scaly pubescent. Flowers in dense or lax bracteate spikes, with or without bracteoles. Calyx 4(-5)-lobed. Corolla 2-lipped, upper lip 3-lobed. Stamens 4. Ovary superior, placentation parietal. Style 1, stigma 2-lobed. Fruit a capsule.

1. Orobanche aegyptiaca Pers., *Syn. Pl.* 2:181(1807); Press et al. in *Ann. Check. Fl. Pl. Nep.* 227(2000); Grierson and Long in *Fl. Bhu.* 2(3):1332(2001). Fig.15.b-c.

Orobanche indica Buch.-Ham. ex Roxb., *Fl. Ind*. 3:27(1832).

Nep.: Nile jhar/Thakara jhar, Eng.: Broom rape

Annual herbs about 16cm. Stem short, scaly. Flowering shoots erect, pubescent. Spikes lax, c4cm. Bracts scale like, bracteoles 2. Calyx c1cm, unequally 4-lobed. Corolla tube slightly curved, lobes ciliate. Anthers woolly. Capsule oblong to subglobose, c1cm.

Field note: On sandy dry place.

Representative collection: Manang, Chame, 2720m, 4.7.2006 (Fl.), K. Adhikari et al. 103.

Distribution: Nepal (WC, 150-3100m), Himalaya, Arabia to Pakistan, N. Africa.

Family 59. PLANTAGINACEAE

Perennial herbs. Leaves simple, entire, dentate or sometimes lobulate towards base. Inflorescene spicate and sometimes lax. Flowers bisexual, regular, 4-merous, sessile or subsessile. Sepals free or abaxial pair fused. Corolla gamopetalous, tubular. Stamens inserted, anthers versatile. Ovary superior, 2-celled. Style filiform. Capsule ovoid, circumscissile near base.

1. PLANTAGO L.

Description as for family Plantaginaceae.

1. Plantago erosa Wall. in Roxb., *Fl. Ind.* 1:423(1820); Press et al. in *Ann. Check. Fl. Pl. Nep.* 235(2000); Grierson and Long in *Fl. Bhu.* 2(3):1342(2001). Fig.15.d.

Nep.: Ishabgol, Eng.: Ispaghula/Ripple grass

Herbs about 15cm. Leaves simple, elliptic, 3-6×1-3.5cm, subacute, attenuate base, subentire. Petioles 1-2cm. Inflorescence spike. Flowers subsessile. Bracts ovate, concave, acute. Sepals 4-lobed, c3×1.5mm. Corolla whitish, tube c3mm, 4-lobed, lobes ovate, obtuse. Fruit a capsule.

Field note: On open and moist area.

Representative collection: Manang, Koto, 2250m, 5.7.2006 (Fl.), K. Adhikari et al. 123.

Distribution: Nepal (WCE, 900-4100m), India, Ceylon, Himalaya (Kumaun to Bhutan), Assam, Burma, S. E. Tibet, W. China.

Family 60. CAPRIFOLIACEAE

Herbs, shrubs or small trees, sometimes climbing. Leaves simple or compound. Stipules present or absent. Flowers hermaphrodite, usually in corymbs or short spikes rarely paniculate. Calyx adnate to ovary, usually 5-lobed. Corolla gamopetalous, actinomorphic or

zygomorphic, usually 5-lobed. Corolla gamopetalous, actinomorphic or zygomorphic, lobes usually 5. Stamens mostly 5 rarely 6. Ovary inferior (1-)2-8 locular. Stigma capitate or lobed. Ovules solitary, few or many. Fruit a drupe or berry.

Key ot the genera

1a. Flowers in short terminal or axillary spikes, fruit a berry, seeds numerous...**1. Leycesteria**.
1b. Flowers in terminal corymbs or panicles, fruit a drupe fleshy 1-seeded …….**2. Viburnum**

1. LEYCESTERIA Wall.

Shrubs. Stem solid or hollow. Leaves simple, entire or toothed. Interpetiolar stipules present or absent. Flowers in short terminal or axillary spikes, regular or not. Calyx 5-lobed. Corolla 5-lobed, gibbous at base, lobes subequal. Stamens 5. Ovary 5- or 7-8- locular. Fruit a berry, seeds numerous.

1. Leycesteria formosa Wall. in Roxb., *Fl. Ind*. 2:182(1824); Press et al. in *Ann. Check. Fl. Pl. Nep.* 37(2000); Grierson and Long in *Fl. Bhu.* 2(3):1355(2001).

Shrubs. Stem arching, hollow, c3m. Leaves ovate-acuminate, 3-8×1.5-4cm, entire petiole c1cm. Stipules absent. Bracts ovate acuminate, dull red or purple, enlarging in fruit. Calyx 5-lobed, densely glandular, lobes linear, unequal. Corolla 5-lobed, funnel-shaped, c1.5cm, white to pink. Berry subglobose.

Field note: On sandy and moist place.

Representative collection: Manang, Koto, 2550m, 5.7.2006 (Fl. and Fr.), K. Adhikari et al. 124.

Distribution: Nepal (WCE, 2000-3200m), Himalay(Kashmir to Bhutan), NE India, Myanmar, W. China.

2. VIBURNUM L.

Deciduous or evergreen shrubs or small trees. Leaves opposite, entire, toothed or rarely lobed. Stipules present or absent, small, often caducous. Flowers in terminal corymbs or panicles, bracteolate, hermaphrodite. Calyx 5-lobed, lobes equal, persistent. Corolla regular or not, rotate or campanulate to tubular, 5-lobed. Stamens 5, inserted. Ovary 1-3-locular, style 3-lobed. Ovule solitary. Drupe fleshy, 1-seeded, various colour when mature.

Key to the species

1a. Leaves ovate, long acuminate, margin serrate……..**3. V. mulaha**
1b. Leaves elliptic to narrowly oblong-elliptic, acute or shortly acuminate, margin regulate serrate dentate or serrulate……..……..……2
2a. Leaves margin regulate serrate dentate, corolla rotate…….....**1. V. colebrookianum**
2b. Leaves margin serrulate, corolla tubular-campanulate……**2. V. erubescens**

1. Viburnum colebrookianum Wall ex DC., *Prodr*. 4:325(1830); Press et al. in *Ann. Check. Fl. Pl. Nep.* 284(2000); Grierson and Long in *Fl. Bhu.* 2(3):1358(2001).

Deciduous shrub about 5m. Leaves oblong-elliptic, 7-15×3-6cm, shortly acuminte, base cuneate, regulate serrate-dentate, glabrous. Petiole 1-2cm. Flowers in umbelliform corymbs on pendent branches. Peduncles 2-4cm. Calyx 1.5-2mm. Corolla rotate, 2-2.5mm, white lobes. Drupe oblong-ellipsoid, purplish black, 4-5mm ×3-4mm.

Field note: On the slopy area.

Representative collection: Manang, Thanchok, 2650m, 13.10.2006 (Fr.), K. Adhikari et al. 374.

Distribution: Nepal (E, 300-900m), Himalaya (Nepal to Bhutan), NE India, N. Myanmar, Indo-China, China (Hainan). **Not reported in Central Nepal and at 2650m altitude in Press et al. 2000.**

2. Viburnum erubescens Wall. ex DC., *Prodr*. 4:329(1830); Press et al. in *Ann. Check. Fl. Pl. Nep.* 284(2000); Grierson and Long in *Fl. Bhu.* 2(3):1359(2001).

Deciduous shrub about 3m. Leaves elliptic to narrowly oblong-elliptic, 4-10×2-4.5cm, acute, base cuneate, serrulate. Flowers in corymbs. Peduncle 1-3cm, glabrous. Calyx 2-3mm. Corolla tubular-campanulate, 8.5-12mm, lobes 3-3.5mm. Stamens inserted. Drupe ellipsoid, purplish black, 6.5-9×5-6mm.

Filed note: On the rocky and slopy area.

Representative collection: Manang, bet^{n} Dharapani to Tal, 1640m, 14.10.2006 (Fr.), K. Adhikari et al. 437.

Distribution: Nepal (WCE, 1500-3000m), Himalaya (Uttar Pradesh to Arunchal Pradesh), NE India, N. Myanmar, W. and C. China.

3. Viburnum mullaha Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.* 141(1825); Press et al. in *Ann. Check. Fl. Pl. Nep.* 284(2000); Grierson and Long in *Fl. Bhu.* 2(3):1357(2001).

Nep.: Mulla/Mahelo/Molo/Kavase

Deciduous tree about 3m. Leaves ovate, 4-7×2-3.5cm, long acuminate, base cuneate to truncate serrate, sparsely hairy on both surface. Petiole 0.5-1.5cm. Flowers in umbelliform sessile or corymbs. Peduncle hairy. Calyx 1.4-1.8mm, lobes 0.4-0.5mm. Corolla rotate, c2mm, white sometimes tinged pink, lobes 1.2-1.5mm. Drupe globose, black, c7.5×7.5mm.

Field note: On the moist slopy area.

Representative collection: Manang, Chame, 2730m, 11.10.2006 (Fr.), K. Adhikari et al. 296.

Distribution: Nepal (WCE, 1800-2700m), Himalaya (Kashmir to Arunchal Pradesh), NE India, Indo-China.

Family 61. VALERIANACEAE

Annual or perennial herbs, often with strong-smellings rhizomes. Leaves opposite or in basal rosettes, simple or compound. Stipules absent. Flowers in corymbose cymes that may be paniculate or capitate, zygomorphic, usually hermaphrodite. Calyx very small in flower, enlarging in fruit, rarely absent. Corolla superior, 5-lobed, often unequal or spurred at base. Stamens 1-4, inserted. Ovary 1-3 locular, usually only 1 locule fertile. Fruit an achene.

Key to the species

1a. Fibrous root, basal leaves oblong to suborbicular, margin subentire……**1. V. barbulata**

1b. Thick woody rhizome, basal leaves cordate, margin obscurely dentate…...**2. V. jatamansi**

1. Valeriana barbulata Diels in *Not. B. G. Edinb*. 5:295(1912); Press et al. in *Ann. Check. Fl. Pl. Nep.* 323(2000); Grierson and Long in *Fl. Bhu.* 2(3):1367(2001).

Roots fibrous. Basal leaves few, simple, oblong to suborbicular, 1-2.5×0.5-1.5cm, margin subentire. Cauline leaves similar small. Flowers in dense corymbose cymes. Calyx very minute. Corolla obconical c4mm, pale pink. Fruit ovate-oblong, glabrous.

Field note: On sandy soil.

Representative collection: Manang, bet^{n} Talekhu and Chame, 2780m, 3.7.2006 (Fl.), K. Adhikari et al. 54.

Distribution: Nepal (E, 4250m), Himalaya (Nepal, Bhutan), N. Myanmar, W. China.

Not reported in Central Nepal and at 2780m altitude in Press et al. 2000.

2. Valeriana jatamansi Jones, *Asiat. Res*. 2:405, f. and 416(1790); Press et al. in *Ann. Check. Fl. Pl. Nep.* 324(2000); Grierson and Long in *Fl. Bhu.* 2(3):1366(2001).

Nep.: Jatamasi

Thick woody rhizome. Basal leaves simple, cordate, persistent, 4-9×2-5cm, appressed hairy above, pubescent below, margin obscurely dentate. Petiole 2-4cm. Cauline leaves few, opposite, acuminate, margin obscurely dentate. Flowers in corymbase cymes. Calyx very small. Corolla obconical, c3mm, white tinged pink, lobes obtuse. Fruit elliptic.

Uses: Medicinally important.

Field note: On moist and shady area.

Representative collection: Manang, Koto area, 2600m, 6.7.2006 (Fl.), K. Adhikari et al. 137.

Distribution: Nepal (WCE, 1500-3300m), Afghanistan, Himalaya (Kashmir to Bhutan), NE India, Myanmar, W. and C. China.

Family 62. DIPSACACEAE

Herbs. Leaves opposite or whorled, simple, often pinnatifid or lobed. Stipules absent. Flowers in cymes or dense heads, hermaphrodite, usually subtended by bracteoles. Calyx superior, very small. Corolla superior, gamopetalous, zygomorphic, 4-5-lobed. Stamens 4, attached to corolla tube. Style slender. Ovary inferior, unilocular with 1 pendulous ovule. Fruit 1-seeded.

1. DIPSACUS L.

Erect herbs. Leaves opposite, basal petiolate, entire or pinnatifid. Involucre of bracts subtending long pedunculate, capitate flower-heads. Bracteoles shorter than flowers, pessistent. Involucel scarcely ovary. Calyx tubular, very small. Corolla 4-lobed. Stamens 4. Stigma elliptic, oblique.

1. Dipsacus intermis Wall. in Roxb., *Fl. Ind*. 1:367(1820); Press et al. in *Ann. Check. Fl. Pl. Nep.* 99(2000); Grierson and Long in *Fl. Bhu.* 2(3):1370(2001). Fig.16.a.
Dipsacus strictus D. Don, *Prodr. Fl. Nep.* 160(1825).

Perennial herbs. Basal and mid cauline leaves pinnatifid, 8-15×3-5cm, margin serrate or crenate-serrate, appressed hairy. Terminal lobe elliptic to oblong. Upper cauline leaves lanceolate, serrate. Involucral bracts linear-oblong. Flowers in globose heads, hairy. Calyx very small. Corolla 4-lobed tubular, cream, lower lobe longer than others.
Field note: On sandy soil.
Representative collection: Manang, Danaque, 2250m, 6.9.2006 (Fl. and Fr.), K. Adhikari et al. 245.
Distribution: Nepal (WC, 1500m), Afghanistan, Himalaya (Kashmir to Bhutan), Burma, Tibet, W. China. **Not reported at 2250m altitude in Press et al. 2000.**

Family 63. MORINACEAE

Perennial herbs. Leaves opposite or whorled, usually spiny. Petioles connate forming sheaths around stem. Bracts conspicuous. Flowers gamopetalous, hermaphrodite, zygomorphic, in verticillate spikes or capitate heads. Involucel present, spiny at apex, persistent. Calyx superior, 2-lipped or oblique at apex. Corolla often curved, 5-lobed, obscurely 2-lipped. Stamens 4 or 2 with 2 staminodes, attached to corolla tube. Nectaries at base of corolla. Ovary inferior, 1-locular. Ovule solitary, pendulous. Style slender, stigma disc-shaped. Fruit an achene.

1. MORINA L.

Perennial herbs. Leaves in pairs or whorls of 3 margin spinose. Flowers in several verticils forming spike. Bracts free. Involucel tubular. Calyx 2-lipped, lips lobed. Corolla obscurely 2-lipped. Upper lip 2-lobed, lower lip 3-lobed, lobes spreading. Stamens 2-inserted, staminodes 2. Nectary 3-lobed. Fruit an chene.

1. Morina nepalensis D. Don, *Prodr. Fl. Nep.* 161(1825); Hook. f. in *Fl. Brit. Ind.* 3:217(1881); Press et al. in *Ann. Check. Fl. Pl. Nep.*:99(2000).
Morina nata Wall. ex DC., *Prodr.* 4:645(1830).
Morina bectonicoides Benth. in Hook., *Ic. Pl.* 12:63, t. 1171(1873).

Herbs about 15cm, pubescent upwards. Leaves c10×1cm, entire, sinuate, glabrous. Leaves near the flower whorls spinous, obscurely toothed. Flowers few approximate whorls, forming one small terminal head. Calyx 2 lip, c0.5cm, obovate, mucronate. Corolla tube c1cm, 2-lipped. Fruit an achene.
Field note: On rocky and shady area in the dense forest.
Representative collection: Manang, Talekhu, 2780m, 10.10.2006 (Fr.), K. Adhikari et al. 278.
Distribution: Nepal (WCE, 3000-4500m), Himalaya (Nepal to Bhutan), NE India, N. Myanmar, W. China. **Not reprted at 2780m altitude in Press et al. 2000.**

Family 64. CAMPANULACEAE

Herbs, usually with milky juice. Leaves simple, alternate, rarely opposite or spirally arranged. Stipules absent. Flowers bisexual, actinomorphic or zygomorphic, solitary or in racemose inflorescene. Calyx(4-)5-lobed, persistent. Corolla(4-)5- lobed, gamopetalous. Stamens 5, alternate with corolla, filaments free, anthers free or connate. Ovary usually inferior, sometimes superior 2-5 locular. Fruit a capsule or sometimes fleshy and berry-like.

1. CAMPANULA L.

Biennial or perennial herbs. Leves alternate. Flowers solitary or in few flowered racemes, sometimes forming panicles. Calyx 5-lobed, tube adnate to ovary. Corolla 5-lobed. Stamens 5, free. Ovary inferior, 3-locular. Style 3-lobed. Capsule dehiscing by pores.

1. Campanula argyrotricha Wall. ex A. DC., *Prodr.* 7:473(1939); Press et al. in *Ann. Check. Fl. Pl. Nep.* 33(2000); Grierson and Long in *Fl. Bhu.* 2(3):1378(2001). Fig.16.b.

Small herbs about 25cm, stems branched hairy. Leaves sessile or subsessile, elliptic to ovate, 0.6-1.8×0.3-0.8cm, margin subentire, tomentose, whitish beneath. Flowers solitary. Calyx lobes triangular, 5-lobed, c0.5cm. Corolla tubular-campanulate, c1.5cm, blue to violet, lobes ovate-oblong. Capsule broadly obovate.

Field note: On open moist area.

Representative collection: Manang, Danaque, 2250m, 6.9.2006 (Fl.), K. Adhikari et al. 233.

Distribution: Nepal (CE, 2800-4700m), Himalaya (Kashmir to Bhutan). **Not reported at 2250m altitude in Press et al. 2000.**

Family 65. COMPOSITAE (Asteraceae)

Annual, biennial or perennial herbs, sometimes shrubs, rarely trees, sometimes containing milky sap, glabrous, pubescent, tomentose. Leaves alternate or sometimes opposite, exstipulate, entire, toothed, lobed or variously dissected. Individual flowers usually numerous surrounded by an involucre of 1-many series of phyllaries, phyllaries free, rarely connate. Flowers epigynous, bisexual, male, female or sterile. Calyx absent replaced by a pappus of 1 or more series of bristles or scales or both. Corolla gamopetalous, tubular or dilated or 1(-2)-lipped above or 1-5 toothed at apex, rarely absent. Stamens (1-) 5, epipetalous, filaments free. Ovary inferior, 1-celled basal ovule. Style usually branches into two. Fruit an achene (cypsela) usually bearing a persistent or deciduous pappus.

Key to the genera

1a. Capitula ligulate……2
1b. Capitula radiate, disciform or discoid……3
2a. Acaulescent herbs, leaves all basal, rosulate, oblanceolate……**15. Taraxacum**
2b. Erect herbs, leaves basal as well as cauline, commonly broadly ovate to oblanceolate ……**17. Youngia**
3a. Capitula disciform or with minute ligules……4
3b. Capitula radiate or discoid……7
4a. Involucre hemisphaerical, pappus absent……**5. Cotula**
4b. Involucre campanulate, pappus present……5
5a. Flowers unisexual……**1. Anaphalis**
5b. Flowers two types-Ray flower and disc flowers(bisexual)……6
6a. Capitula corymbose or paniculate, leaves margin entire or coarsely toothed, 3-lobed or pinnatifid……**4. Conyza**
6b. Capitula in axillary clusters forming a more or less interupted leafy spikes, leaves margin entire .....**8. Gnaphalium**
7a. Pappus absent……**12. Myriactis**
7b. Pappus in various form……8
8a. Leaves palmately dissected, petioles with sheathing base ……**11. Ligularia**
8b. Leaves various types other than palmately dissected, petioles without sheathing base…...9
9a. Leaves opposite, receptacle conical……**7. Galinsoga**

9b. Leaves alternate, receptacle convex or flat……...……..…..10
10a. Ray flowers neuter……..……..……...……**3. Bidens**
10b. Ray flowers when present female or all flowers bisexual only…...……11
11a. All flowers bisexual……...……...12
11b. Ray flowers(unisexual) and disc flowers(bisexual) present……..……...14
12a. Style branches filiform, obtuse, phyllaries in several seriate……**13. Saussurea**
12b. Style branches subulate, obtuse, phyllaries 1 or several seriate…….....13
13a. Receptacles flat, naked or hairy, phyllaries in several seriate…….**16. Vernonia**
13b. Receptacles convex, naked, phyllaries in 1-seriate…….**9. Gynura**
14a. Phyllaries 1-seriate, leaves simple or lyrately, pinnately or palmately divided.**14. Senecio**
14b. Phyllaries many-seriate, leaves simple, sometimes in basal rosette, entire to toothed or lobed……..…….15
15a. Involucres hemispherical, capitula solitary or in lose racemes……**6. Erigeron**
15b. Involucres broadly campanulate, capitula 1-many or in corymb, sometimes also borne single in long axillary peduncles……..….16
16a. Style branches linear, obtuse, phyllaries linear, recurved, villous ……....**10. Inula**
16b. Style branches flattened with a sterile lanceolate or triangular appendage, phyllaries generally broad, subequal or imbricate……...…**2. Aster**

1. ANAPHALIS DC.

Perennial herbs or subshrubs, stem usually cottony tomentose. Leaves simple, alternate, entire. Capitula many in terminal corymbs, rarely solitary. Flowers unisexual, capitula disciform and of two types, each with one sex much predominate, usually female. Involucre broadly campanulate, phyllaries several seriate, scarious, inner petaloid, white or yellowish. Receptacle convex, naked. Corolla of female flowers filiform, 3-4 toothed at apex. Corolla of male flowers narrowly tubular-campanulate, 5-toothed, anthess tailed, style branches obtuse. Achenes oblong, usually papilose-pubescent. Pappus simple.

Key to the species

1a. Leaves oblong or elliptic to spathulate, stem white tomentose……...**3. A. triplinervis**
1b. Leaves linear-lanceolate or narrowly elliptic or lanceolate, stem greyish tomentose……..2
2a. Leaves base decurrent, outer phyllaries larger than inner ……...**1. A. busua**
2b. Leaves base without decurrent, middle phyllaries largest…..…….**2. A. margaritacea**

1. Anaphalis busua (Buch.-Ham. ex D. Don) DC., *Prodr.* 6:275(1838); Press et al. in *Ann. Check. Fl. Pl. Nep.* 49(2000); Grierson and Long in *Fl. Bhu.* 2(3):1517(2001).
Gnaphalium busua Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.* 173(1825).
Nep.: Seto ekle ghans, Eng.: Pearly everlasting

Herbs about 25-35cm, sparsely greyish tomentose. Stem erect. Leaves linear-lanceolate, 3-7×0.5-1cm, acuminate, base decurrent, sparsely tomentose above, greyish tomentose beneath. Capitula numerous, in corymbs, involucre many seriate. Phyllaries ovate to elliptic, acute, white above, outer one larger than inner. Corollas c3mm. Achenes papillose.
Field note: On moist open and cultivated area.
Representative collection: Manang, Danaque, 2250m, 6.9.2006 (Fl.), K. Adhikari et al. 239.
Distribution: Nepal (WCE, 1500-2900m), Himalaya (Kashmir to Bhuatan), NE India (Meghalaya), Myanmar.

2. Anaphalis margaritacea (L.) Benth. in Benth. and Hook. f., *Gen. Pl.* 2:303(1873); Press et al. in *Ann. Check. Fl. Pl. Nep.* 50(2000); Grierson and Long in *Fl. Bhu.* 2(3):1517(2001).
Gnaphalium margaritaceum L., *Sp. Pl.* 850(1735).
Antennaria timmua Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.* 174(1825).

Herbs about 20-40cm. Stems greyish tomentose. Leaves narrowly elliptic or lanceolate, 2-9×0.4-2cm, acuminate, sessile, sometimes auriculate, not decurrent, thinly tomentose. Capitula clusters in dense corymbs. Involucre many seriate, phyllaries white,

brownish at base, middle ones longest, oblong elliptic c5mm, obtuse to acuminate. Corolla c4mm. Achenes papillose.

Field note: On moist sandy area.

Representative collection: Manang, Chame, 2820m, 11.10.2006 (Fl.), K. Adhikari et al. 333.

Distribution: Nepal (CE, 1800-3100m), N. America, N. Pakistan, Himalaya (Kashmir to Bhutan), Indo-China, China, Japan.

3. Anaphalis triplinervis (Sims) C.B. Clarke, *Comp. Ind*. 105(1876); Press et al. in *Ann. Check. Fl. Pl. Nep.* 50(2000); Grierson and Long in *Fl. Bhu.* 2(3):1522(2001). Fig. 16.c.
Antennaria triplinervis Sims in *B. Mag*. 51:t. 2468(1824).

Herbs c15cm. Stems densely white tomentose. Lower leaves oblong or elliptic to spathulate, 3-7×1.5-2.5cm, subacute to acuminate, petiolate, semi- amplexicaul, 3 or 5 veined, whitish tomentose on both surface. Capitula many per inflorescence. Involucre 8-9 seriate. Phyllaries brownish below, white above, middle ones largest, lanceolate, acuminate. Corollas c3mm. Achenes papillose.

Field note: On moist slopy area.

Representative collection: Manang, Talekhu, 2788m, 2.7.2006 (Fl.), K. Adhikari et al. 40.

Distribution: Nepal (WCE, 2900-4100m), Himalaya, S. China, Taiwan. **Not reported at 2788m altitude in Press et al. 2000.**

2. ASTER L.

Perennial herbs or shrubs, often rhizomatous, sometimes stoloniferous. Leaves alternate, simple, sometimes in basal rosette. Capitula 1-many, radiate. Involucre campanulate, several-seriate. Phyllaries many seriate, generally broad, subequal or imbricate. Receptacle flat or convex. Ray flowers female. Ligules white, mauve or bluish. Disc flowers bisexual. Corolla tubular-campanulate, 5-toothed at apex, usually yellow. Styles branches flattened with a sterile lanceolate or triangular appendage. Achenes oblong or obovoid, compressed. Pappus bristles scabrous.

Key to the species

1a. Pappus brownish, simple…….....…..**1. A. albescens**
1b. Pappus reddish with a short slender outer hairs ……..……..…..**2.A. trinervius**

1. Aster albescens (DC.) Hand. -Mazz, in *Acta. H. Gothob*. 12:205(1938); Press et al. in *Ann. Check. Fl. Pl. Nep.* 51 (2000); Grierson and Long in *Fl. Bhu.* 2(3):1533(2001).
Amphirhaphis albescence DC., *Prodr.* 5:343(1836).

Erect shrub, sparsely pubescent intermixed with glands. Leaves ovate-lanceolate, 3-7×1-2cm, acute or acuminate, cuneate, sessile or shortly petiolate, finely serrate, sparsely pubescent beneath. Capitula numerous, in terminal corymbs. Phyllaries many, linear-lanceolate, purplish at tip. Ray flowers: Corolla tube c2mm, ligule blue. Disc corolla yellow. Pappus brownish, simple.

Field note: On open area.

Representative collection: Manang, bet^{n} Talekhu and Chame, 2780m, 3.7.2006 (Fl.), K. Adhikari et al. 52.

Distribution: Nepal (WCE, 1500-4200m), Himalaya (Kashmir to Bhutan), NE India, Myanamar, W. China.

2. Aster trinervius Roxb. ex D. Don, *Prodr. Fl. Nep.* 177(1825); Hook. f. in *Fl. Brit. Ind.* 3:252(1881); Press et al. in *Ann. Check. Fl. Pl. Nep.* 52(2000).

Herbs about 10cm, stems hairy; leafy slender. Leaves sessile or petioled, lanceolate, obtuse, 2-6cm long, acute or acuminate, coarsely serrate, scabrid on both surfaces. Heads corymbose, involucre bracts linear obtuse acute. Ligules 12-15 short, achenes hairy. Pappus reddish with a few short slender outer hairs.

Field note: On moist slopy area.

Representative collection: Manang, Tal, 1640m, 9.7.2006 (Fl.), K. Adhikari et al. 207.

Distribution: Nepal (WCE, 1500-2600m), NE India, Myanmar.

3. BIDENS L.

Erect annual herbs. Leaves alternate entire to partly tripinnatifid. Capitula 1-several, terminal or axillary, radiate or discoid, paleate. Involucres broadly campanulate, 2-seriate. Phyllaries shortly connate at base, outer ones herbaceous, sometimes foliaceous, inner ones scarious. Receptacle convex. Ray flower neuter, corolla white or yellow. Disc flowers bisexual, corolla tubular-campanulate, 5-lobed, yellow. Achenes obovoid or linear, 4- angled or compresed. Pappus of 2-5 stiff retrorsely barbed awns.

1. Bidens biternata (Lour.) Merr. and Sherff, *Bot. Gaz*. 88:293(1929); Press et al. in *Ann. Check. Fl. Pl. Nep.* 52(2000); Grierson and Long in *Fl. Bhu.* 2(3):1620(2001).
Coreopsis biternata Lour., *Fl. Cochinch*. 508(1790).
Nep.: Kurro

Herbs about 18cm, stem sparsely pilose. Basal primary leaflets ternate and upper three leaflets simple, lobes, 2-4×1-2.5cm. Primary leaflets ovate, ultimate segments elliptic, subacute to acuminate, sparsely pilose on both surface, coarsely dentate. Capitula radiate. Outer phyllaries oblong-spathulate, ciliate, inner phyllaries broadly oblong. Corolla yellow. Ray flowers 3-5, ligules elliptic to obovate. Achenes linear. Pappus awns.
Field note: On the road side of rocky area.
Representative collection: Manang, Dharapani, 2000m, 13.10.2006 (Fl.), K. Adhikari et al. 428.
Distribution: Nepal (WC, 1100-2000m), widespread in Africa, Asia, Australia.

4. CONYZA Lessing

Annual or perennial herbs. Leaves alternate, simple, entire or coarsely toothed, 3-lobed or pinnatifid. Capitula corymbose or paniculate, disciform or with minute ligules. Involucre campanulate, 2-3 seriate, phyllaries narrow. Receptacle flat or convex, naked. Ray flower female, usually numerous, corollas filiform, sometimes with minute ligule. Inners flowers bisexual, tubular-campanulate, usually few. Style branches flattened, acute. Achene compressed, pappus hairs 1-seriate.

1. Conyza stricta Willd., *Sp. Pl.* 3:1922(1803); Press et al. in *Ann. Check. Fl. Pl. Nep.* 21(2000); Grierson and Long in *Fl. Bhu.* 2(3):1544(2001).

Annual herbs about 28cm, pubescent. Leaves linear-oblanceolate, simple, 3-lobed or pinnatisect, 1-4×0.5-1.5cm, acute or obtuse, attenuate at base, petiolate or sessile, dentate, pubescent on both surfaces. Capitula numerous in dense terminal corymbs. Phyllaries 2-3 seriate, lanceolate, acuminate, pubescent. Flowers yellowish. Female corolla eligulate. Achenes obovoid, pappus whitish.
Field note: On open and cultivated land.
Representative collection: Manang, Danaque, 2250m, 6.9.2006 (Fl.), K. Adhikiari et al. 234.
Distribution: Nepal (WCE, 600-2000m), Himalaya, India, W. Asia, Africa, Myanmar. **Not reported at 2250m altitude in Press et al. 2000.**

5. COTULA L.

Annual, often prostrate. Leaves 1-2-pinnatisect, alternate, sessile. Capitula solitary, disciform. Involucre hemispherical. Phyllaries several seriate, margins scarious. Receptacle naked, flat. Flowers sparsely subsessile-glandular. Ray flowers many-seriate, female, corolla absent or poorly developed. Disc flowers fewer, bisexual, almost sessile, corollas short, tubular-campanulate, deeply 4-toothed. Style branches truncate. Achene obovoid, dorsally compressed. Pappus absent.

1. Cotula hemisphaerica (Roxb.) Wall. ex C.B. Clarke, *Comp. Ind*. 150(1876); Press et al. in *Ann. Check. Fl. Pl. Nep.* 56(2000); Grierson and Long in *Fl. Bhu.* 2(3):1568(2001).
Artemisia hemisphaerica Roxb., *Fl. Ind. ed*. 2, 3:422(1832).
Machalis hemisphaerica (Roxb.) DC., *Prodr.* 6:140(1838).

Small herbs about 12cm. Lower leaves 1-2 pinnatisect, 2-3.5×1-1.5cm, obovate, ultimate segments oblong to linear, acuminate. Upper leaves smaller, usually 1-pinnatisect.

Capitula subsessile. Involucre 2-seriate. Outer phyllaries oblong, inner ones smaller. Ray flower female, 5-6 seriate, without corollas. Disc corollas present. Achenes on stipes, obovoid.

Field note: On moist and shady area.

Representative collection: Manang, Chame, 2950m, 11.10.2006 (Fl.), K. Adhikari et al. 312.

Distribution: Nepal (C, 1400-1800m), India, Himalaya. **Not reported at 2950m altitude in Press et al. 2000.**

6. ERIGERON L.

Annual or perennial herbs, stem prostrate, ascending or erect, simple or branched. Leaves alternate, simple, entire, toothed or lobed. Capitula radiate, solitary or in loose racemes. Involucres hemispherical. phyllaries 3-4 seriate. Receptacle flat or slightly convex, naked. Flowers dimorphic or trimorphic. Ray flowers usually numerous, female, ligule purplish or white, narrow. Disc flowers bisexual, corolla tubular-campanulate, 5-lobed. Style branches with short subacute or obtuse appendage. Eligulate female flowers sometimes present between ray and disc flowers. Achenes obovoid, compressed. pappus simple or double bristles.

1. Erigeron multiradiatus (Lindl. ex DC.) C.B. Clarke, *Comp. Ind*. 56(1876); Press et al. in *Ann. Check. Fl. Pl. Nep.* 59(2000); Grierson and Long in *Fl. Bhu.* 2(3):1541(2001).

Stenactis multiradiatus Lindl. ex DC., *Prodr*. 5:299(1836)

Erect herbs about 20cm, simple, sparsely pubescent and glandular above. Leaves variable, basal one oblanceoloate, 3-8×0.5-2cm, acute, attenuate, sparsely pubescent, upper leaves lanceolate to oblong, acute or acuminate, sessile, semi-amplexicaul. Capitula solitary, involucre 3-seriate. phyllaries linear-oblanceolate, acuminate, pubescent. Flowers dimorphic. Ray flowers many, 3-seriate, corolla tube, ligule mauve red. Disc corollas yellow, bisexual. Achenes oblong or obovoid. Pappus brownish double.

Field note: On the soil of roadside.

Representative collection: Manang, Talekhu, 2740m, 2.7.2006 (Fl.), K. Adhikari et al. 37.

Distribution: Nepal (WCE, 2600-4400m), Himalaya (Kashmir to Bhutan), China.

7. GALINSOGA

Annuals. Stems erect or spreading. Leaves simple, opposite, 3-veined at base. Capitula radiate, paleate, in cymose clusters, peduncles slender. Involucre 2-seriate, hemispherical. Phyllaries outer ones 1-3, inner ones 5, opposite a ray flower. Receptacle conical. Paleae flat, dimorphic. Ray flowers female, corolla tube spreading-pilose, ligules obovate-quadrate, white. Disc flowers bisexual, corolla tubular campanulate, 5-lobed, yellow. Style branches linear, flattened, acute. Achenes obconical, blackish. Pappus fimbricate lanceolate scales.

1. Galinsoga quadriradiata Ruiz and Pavon, *Syst. Veg*. 1:198(1798); Press et al. in *Ann. Check. Fl. Pl. Nep.*:59(2000).

Adventina ciliata Rafin, *New Fl. An.* 1:67(1836).

Galinsoga ciliate (Rafin.) Blake in *Rhodora* 24:35(1922).

Nep.: Jhuse cillang, Eng.: Hairy galinsoga

Annual. Stem erect, branched. Leaves simple, opposite. Capitula radiate, peduncles slender. Involucre 2-seriate, hemispherical. Phyllaries outer one 2, inner ones 5, opposite a ray flower. Paleae flat, dimorphic. Ray flower female, corolla tube spreading-pilose, ligules obovate-quadrate. Disc flowers bisexual, corolla tubular campanulate, 5-lobed, yellow. Achenes obconical. Pappus firmbricate.

Field note: On moist and sandy place.

Representative collection: Manang, Koto, 2560m, 5.7.2006 (Fl.), K. Adhikari et al. 125.

Distribution: Nepal (C, 1400-1700m), Cosmopolitan. **Not reported at 2560m altitude at Press et al. 2000.**

8. GNAPHALIUM L.

Annual herbs. Leaves oblanceolate, alternate, entire. Capitula in axillary cluster forming a more or less interrupted leafy spike, disciform. Involucres campanulate. Phyllaries 2-3 seriate, scarious, pale brownish. Receptacle naked, glabrous. Ray flowers female, filiform, numerous. Disc flowers bisexual, few, corollas narrowly tubular. Campanulate, 5-toothed. Achenes oblong, sparsely papillose. Pappus simple, free, bristles slightly.

1. Gnaphalium affine D. Don, *Prodr. Fl. Nep.* 173(1825); Press et al. in *Ann. Check. Fl. Pl. Nep.* 60(2000).

Gnaphalium luteoalbum var. *multiceps* (Wall. ex DC.) Hook. f. in *Fl. Brit. Ind.* 3:288 (1881).

Nep.: Bokre phul/Kairo jhar, Eng.: Golden cud weed.

Herbs about 20cm. Stems erect, brownish glandular. Leaves oblanceolate, alternate, entire, 2-4×0.5-1.5cm, sessile, semiamplexicaul at base, glandular pubescent above, white tomentose beneath. Capitula disciform. Involucres campanulate. Phyllaries 3 seriate. Ray flowers female. Inner flowers bisexual, corollas tubular-campanulate, 5-toothed. Achenes oblong, pappus simple, free.

Field note: On moist cultivated land.

Representative collection: Manang, Danaque, 2250m, 6.9.2006 (Fl.), K. Adhikari et al. 238.

Distribution: Nepal (WCE, 600-3700m), India, Himalaya, Myanmar, Thailand, Indochina, Java, China, Japan.

9. GYNURA Cassini

Perennial herbs. Stem erect or scrambling. Leaves alternate, simple, serrate or pinnatifid. Capitula in 1-several, corymbose heads or panicle in an open inflorescence, discoid. Involucre cylindrical or almost campanulate phyllaries many in 1-seriate, linear, subequal, margins scarious, usually with filiform bracts at base. Receptacle convex, naked. Flowers bisexual tubular campanulate. Corollas 5-toothed above. Style branches erect, slender, subulate tips. Achense oblong, 10-ribbed. Pappus of filiform bristles, white.

1. Gynura nepalensis DC., *Prodr.* 6:300(1838); Press et al. in *Ann. Check. Fl. Pl. Nep.* 60(2000); Grierson and Long in *Fl. Bhu.* 2(3):1600(2001). Fig.17.a.

Herbs about 80cm. Stems greyish brown pubescent. Leaves ovate-elliptic, 4-8×2-3.5cm, acute, base attenuate, margins distantly serrate, pubescent on both surface. Capitula few, borne in corymbs. Phyllaries narrowly oblong, acuminate, pubescent. Corolla teeth acuminate, pubescent. Style branches erect. Achenes oblong. Pappus white.

Field note: On sandy and cultivated land.

Representative collection: Manang, Koto area, 2620m, 6.7.2006 (Fl.), K. Adhikari et al. 145.

Distribution: Nepal (WCE, 250-2000m), Himalaya (Kashmir to Bhutan), Assam, Burma, Thailand, China. **Not reported at 2620m altitude in Press et al. 2000.**

10. INULA L.

Coarse perennial herbs or small shrub. Leaves simple, alternate, usually finely toothed. Capitula few in terminal corymb, sometimes also borne single in long axillary peduncles, radiate. Involucres broadly campanulate, many seriate. Phyllaries linear, many seriate, recurved, villous. Receptacle convex, naked. Ray flowers 2-3 seriate, female, ligules long, linear, yellow. Disc flowers bisexual, yellow, tubular campanulate, 5-toothed at apex. Style branches, linear, obtuse. Achenes angular, oblong, glabrous. Pappus bristles 1-seriate.

1. Inula cappa (Buch.-Ham. ex D. Don) DC., *Prodr.* 5:469(1836); Press et al. in *Ann. Check. Fl. Pl. Nep.*:61(2000).

Conyza cappa Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.* 176(1825).

Inlula eriophora DC., *Prodr.* 5:470(1836).

Nep.: Gai tihare/Kan pate, Eng.: Golden samphire/Sheep's car

Aromatic shrubs about 1m, with woolly or silky hairy branches, leaves and inflorescence. Leaves leathery, oblong-lanceolate, acute, densely white, 3-7×1.5-3cm. Involucres campanulate, many seriate. Phyllaries linear. Ray flowers 2 seriate, female,

yellow. Disc flowers bisexual, tubular campanulate, 5-toothed at apex. Style branches. Achenes oblong. Pappus bristles.

Field note: On slopy rocky area.

Representative collection: Manang, Dharapani to Tal, 1910m, 14.10.2006 (Fl.), K. Adhikari et al. 468.

Distribution: Nepal (WCE, 150-2500m), Himalaya (Kumanun to Bhutan), Assam to China, Thailand, Japan.

11. LIGULARIA Cassini

Erect perennial herbs, stem leafy. Leaves alternate, simple or palmately dissected. Petiolate, petioles with sheathing bases. Capitula solitary, few or numerous in racemes or corymbs, discoid or radiate. Involucre cylindrical, obconic or campanulate. Phyllaries 1-seriate, subequal. Receptacle flat, naked. Corollas yellow. Ray flowers 0-many. Disc flowers tubular-campnulate. Anther base shortly auriculate. Style branches truncate with obtuse marginal papillae. Achenes oblong, glabrous. Pappus of capillary bristles, white or reddish.

1. Ligularia amplexicaulis DC. Var. **nepalensis** S. W. Liu and T. N. Ho., *Acta Phytotax. Sin.* 39(6):558(2001). Fig.17.b.

A robust, nearly hairless perennial, with large rounded heart shaped stalked lower leaves. Flowers in terminal raceme about 12 flowers. Ray florets c2cm, involucral bracts c8mm, oblong acute, fused below, hairless. Lower leaves with blade 10-15cm broad and interruptedly wingled leaf-stalk. Upper leaves with very broad sheathing basal boat-shaped lobes. Fruit with pappus.

Field note: On slopy and sandy soil.

Representative collection: Manang, below Naya Bazar, 2800m, 7.7.2006 (Fr.), K. Adhikari et al. 164.

12. MYRIACTIS Lessing

Erect annual herbs. Leaves simple, alternate. Inflorescence of rather few capitula, usually in an open leafy panicle. Capitula radiate. Involucre globose or hemispherical. Phyllaries 2-4 seriate, inner one often shorter and concealed. Ray flowers 2-to many seriate, female, corolla tube obsolete. Disc flowers bisexual, tubular campanulate, 5-toothed. Style branches with short lanceolate appendages. Receptacle domed or conical, naked. Achenes obovate. Pappus absent.

1. Myriactis nepalensiss Less in Linnaea 6:128, t. 2F(1831); Press et al in *Ann. Check. Fl. Pl. Nep*. 63(2000); Grierson and Long in *Fl. Bhu.* 2(3):1529(2001).

Myriactis wallichii Less. in *Linnaea* 6:129(1831).

Herbs about 25cm. Stems finely appressed pubescent. Leaves ovate-elliptic, 5-10×0.5-6cm, acute, obtuse to attenuate at base, often with petiole broadly winged, semi-amplexicaul, usually serrate-dentate, pubescent on both surfaces. Capitula globose. Outer phyllaries lanceolate, acuminte. Corollas yellow. Ray flowers many seriate, ligules ovate. Style branches. Achenes obovate.

Field note: On sandy soil.

Representative collection: Manang, Bhratang, 2800m, 10.10.2006 (Fr.), K. Adhikari et al. 274.

Distribution: Nepal (WCE, 1400-3900m), Caucasus, Jran Iran, Turkestan, Afghanistan, Himalaya, W. China, Thailand, Indo-China, Indonesia.

13. SAUSSUREA DC.

Acaulecent to medium-sized perennial herbs. Leaves alternate, simple, entire to pinnate or bipinnafifid. Capitula 1-many, discoid, sometimes enveloping in long wool or surrounded by leaf-like, coloured bracts. Involucre campanulate to ovoid. Phyllaries several seriate. Receptacle flat or convex, usually densely setose, rarely naked. Flowers bisexual. Corollas purplish or violet, narrowly tubular-campanulate, limb deeply 5-lobed. Anther bases

caudate, lacerate or woolly, filaments glabrous. Style branches filiform, obtuse. Achenes oblong or obovoid. Pappus inner and outer present.

1. Saussurea fastuosa (Decne.) Sch. Bip., *Linnaea* 19:331(1846); Press et al. in *Ann. Check. Fl. Pl. Nep.* 65(2000); Grierson and Long in *Fl. Bhu.* 2(3):1440(2001). Fig.17.c.
Haplotaxis fastuosa Decne. in Walpers, *Report. B. Syst.* 669(1843).
Aplotaxis denticulata Wall. ex DC., *Prodr.* 6:539(1838).

Herbs, 20-60cm, stems sparsely pubescent. Leaves ovate-elliptic to lanceolate, 3-7×1-3cm, acute or acuminate, rounded at base. Petiolate or sessile, finely serrate, green and subglabrous above, finely while tomentose beneath. Capitula loosely racemose. Phyllaries ovate to lanceolate with blackish margin. Paleae linear, incurved and coloured at apex. Corolla tubular-campanulate, 5-lobed. Achenes linear, pappus single.
Field note: On moist, slopy, rocky and bank of river.
Representative collection: Manang, Koto, 2670m, 12.10.2006 (Fl.), K. Adhikari et al. 355.
Distribution: Nepal (WC, 2900-3800m), Himalaya (Uttar Pradesh to Sikkim), N. Myanmar, S. and W. China.

14. SENECIO L.

Erect or scrambling, rarely decumbent, perennial or annual herbs. Stems usually leafy. Leaves alternate, simple or lyrately, pinnately or palmately divided. Capitula few to numerous, in simple or compound corymbs, radiate or discoid, erect or cernuous. Involucres calyculate, hemispherical, campanulate or cylindrical. Phyllaries many, free, 1-seriate, margins scarious. Receptacle flat, naked. Ray flowers many, yellow, female. Disc flowers many, yellow, tubular- campanulate, corollas 4-5 toothed, anther bases sagittate. Style branches truncate or convex with obtuse marginal papillae. Achenes oblong, ribbed, glabrous or pubescent. Pappus of capillary bristles.

Key to the species
1a. Leaves narrowly to broadly elliptic, shrubs……..**1. S. cappa**
1b. Leaves ovate, herbs……...……..**2. S. scandens**

1. Senecio cappa Buch. -Ham. ex D. Don, *Prodr. Fl. Nep.* 179(1825); Polunin et al. in *Fl. Him.* 200(1997); Press et al. in *Ann. Check. Fl. Pl. Nep.*:67(2000).

A shrubby perennial with large narrowly to broadly elliptic leaves with their undersides with appressed. Leaves stalked, c10cm, hairless. Stems stout. White cottony hairs like inflorescence and involucral bracts. Flowers-heads small, c6mm long, in terminal branched clusters. Ray florets 8-10, short; woolly involucral bracts 8-12, linear acute. Achenes oblong. Pappus of capillary bristles.
Field note: On moist forest and dense area.
Representative collection: Manang, Danaque, 2250m, 6.9.2006 (Fl.), K. Adhikari et al. 259.
Distribution: Nepal (CE, 1300-2900m), Himalaya (Nepal to Bhutan), NE India (Meghalaya), Sylhet, N. Myanmar, W. China.

2. Senecio scandens Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.* 178(1825); Press et al. in *Ann. Check. Fl. Pl. Nep.* 67(2000); Grierson and Long in *Fl. Bhu.* 2(3):1593(2001).
Senecio stipulatus DC., *Prodr.* 6:370(1838).
Nep.: Paheli lahara

Herbaceous, perennial. Stems sparsely pubescent. Leaves ovate, 4-9×1-3.5cm, subentire, acuminate, truncate at base or attenuate, glabrous on both surface. Petiole 1-2cm. Capitula radiate, in corymbs. Phyllaries oblong, glabrous. Ray flowers 8-10. Disc flowers numerous, corolla tubular campanulate. Achenes oblong, pubescent. Pappus white.
Field note: On busy area.
Representative collection: Manang, Bhratang, 2800m, 10.10.2006 (Fl.), K. Adhikari et al. 257.
Distribution: Nepal (CE, 2100-2800m), Himalaya (Uttar Pradesh to Arunchal Pradesh), NE India, N. Myanmar, India, Sri-Lanka, Thailand, S. China, Philippines, Japan.

15. TARAXACUM Weber

Acaulescent perennial herbs. Leaves basal, rosullate, runcinate-pinnatifid to subentire, oblanceolate. Scapes erect, hollow. Capitula many flowered, ligulate. Involucre 2-seriate. Inner phyllaries erect, linear-lanceolate, subequal, outer phyllaries shorter than inner, appressed or reflexed, phyllaries tips thin. Flowers white to yellow or reddish. Style branches filiform. Achenes oblong-oblanceolate, unevenly ribbed. Pappus capillary, persistent.

1. Taraxacum eriopodum DC., *Prodr.* 7(1):147(1838); Press et al in *Ann. Check. Fl. Pl. Nep.* 69(2000); Grierson and Long in *Fl. Bhu.* 2(3):1466(2001).
Taraxacum officinale var. *eriopoda* (DC.) Hook. f. in *Fl. Brit. Ind.* 3:401(1881).

Acaulscent herbs about 20cm. Leaves basal, moderately lobed, 3-10×1.5-3 cm, lateral lobes 2-4 parirs, usually obtuse, entire to sparsely dentate. Scapes erect, hollow. Capitula many flowered. Involucre 2-seriate. Phyllaries callose. Stigma dark green. Achene oblong-oblanceolate. Pappus white, persistent.
Field note: On sandy soil.
Representative collection: Manang, bt^{n} Talekhu and Chame, 2730m, 3.7.2006 (Fl.), K. Adhikari et al. 43.
Distribution: Nepal (WCE, 3300-4600m), Himalaya (Kashmir to Bhutan), NE India, Western China. **Not reported at 2730m altitude in Press et al 2000.**

16. VERNONIA Schreber

Herbs, shrubs, sometime scrambling or small trees. Leaves alternate, simple. Capitula in terminal panicles, often corymbose, discoid. Involucres oblong or campanulate. Phyllaries linear or narrowly ovate in several series. Flowers bisexual. Corollas equal, tubular-campanulate, 5-toothed, pink or red to dull purple or bluish. Style branches subulate. Receptacle flat, naked or hairy. Achenes oblong, ribbed, terete. Pappus deciduous, reddish or dirty white.

1. Vernonia cinerea (L.) Lees, Linaea. 4:291(1829); Hook. f. in *Fl. Brit. Ind.* 3:233(1881); Press et al. in *Ann. Check. Fl. Pl. Nep.*:71(2000).
Conyza cinerea L., *Sp. Pl.* 862(1753).

An erect herbs. Stem terete, pubescent. Leaves ovate or lanceolate, 2.5-5×0.7-2cm, apiculate, base attenuate, margin serrate or crenate, hairy on either sides. Capitula in corymbose. Involucre campanulate, multi-seriate, linear-lanceolate, silky outside. Corolla pinkish-white, 5-toothed. Style branches subulate. Receptacle flat. Achenes grey pubescent. Pappus whitish.
Field note: On the roadside.
Representative collection: Manang, Koto, 2570m, 13.10.2006 (Fl.), K. Adhikari et al. 358.
Distribution: Nepal (WCE, 100-2300m), Tropical Africa, Asia and Australia. **Not reported at 2570m altitude in Press et al. 2000.**

17. YOUNGIA Cassini

Annual or perennial herbs. Stem elongate and erect, short or absent. Leaves basal and cauline broadly ovate to oblanceolate, entire or commonly lyrate or runcinate pinnatified or pinnatisect. Capitula ligulate, many flowered. Involucres cylindrical or narrowly campanulate. Outer phyllaries short, usually few, inner phyllaries 8-12 in 1 series. Ligules yellow. Style branches slender, filiform. Achenes narrowly ovoid or oblong. Pappus usually persistent, finely capillary.

1. Youngia japonica (L.) DC., *Prodr.* 7(1):194(1938); Press et al. in Ann. Check. Fl. Pl. Nep.:71(200); Grierson and Long in *Fl. Bhu.* 2(3):1457(2001).
Prenonthes japonica L., *Mant.* Pl. 1:107(1767).
Youngia napiflolia Wight, *Ic. Pl. Ind. Or.* 3:t. 1147(1846).

Annual herbs about 40cm, stems pubescent. Leaves mostly basal, variable, usually lyrate pinnatisect, 4-10 | 1-3.5cm. Sparsely pubescent, segments obtuse to acuminate, subentire to coarsely dentate. Capitula loosely corymbose, numerous.

Involucre cylindrical. Outer phyllaries ovate, inner ones narrowly oblong-lanceolate. Flowers many, corolla hairy. Achenes oblong-elliptic, pappus white.

Field note: On slopy & moist place.

Representative Collection: Manang, Chame, 2856m, 11.10.2006 (Fl.), K. Adhikari et al. 307.

Distribution: Nepal (WCE, 230-2900m), Pakistan, Himalaya (Uttar Pradesh to Bhutan), India, Sri Lanka, China, Japan, Indo-China, Philippines, Malaysia, Hawii, Widely introduced throughout tropics.

Family 66. SMILACACEAE

Dioecious shrubs or semi-woody climbers. Roots tuberous. Stems often with stout recurved prickles. Leaves alternate, simple, often coriaceous, with prominent parallel veins linked by weaker reticulate veins. Petioles commonly persistent, winged in lower part, with tendrils arising from apex of wings. Inflorescence of pedunculate umbels, borne singly or in racemes in axils of leaves. Flowers unisexual, of 2 slightly differentiated whorls each of 3 free tepals, or tubular with 3 apical lobes. Male flowers usually with 6 stamens, filaments free or fused. Ovary superior, trilocular. Fruit a berry.

1. SMILAX L.

Dioecious shrubs or semi-woody climbers. Stems often with stout recurved prickles. Leaves alternate, simple, often coriaceous. Petioles commonly persistent. Inflorescence of pedunculate umbels, borne singly or in racemes in axils of leaves. Flowers unisexual. Flowers with 6 tepals free to base. Male flowers with filaments free to base, stamens- 6. Ovary superior, trilocular. Fruit a berry.

1. Smilax elegans Wall. ex Kunth, *Enum. Pl.* 5:163(1850); Noltie in *Fl. Bhu.* 3(1):35(1994); Press et al. in *Ann. Check. Fl. Pl. Nep.* 187(2000).

Climbers, stems zigzag, without prickles. Leaves lanceolate, rounded at base, glaucous beneath, subacute, 3-8 | 1.5-4 cm, costae 5. Petiole wings oblong, with free triangular tips, tip of petiole expanded & often recurved. Inflorescence a single umbel borne in axil of lateral shoots. Flowers unisexual. Male flowers smaller than female flowers. Outer tepals c2 | 1mm(female), 2-2.4 | 0.7-1.1mm(male), staminodes 3-6. Ovary superior. Fruit a berry.

Field note: On shady & sandy place.

Representative collection: Manang Danaque, 2700m, 13.10.2006 (Fl.), K. Adhikari et al. 412.

Distribution:Nepal (CE, 1600-2450m), Himalaya (Nepal to Assam), NE India (Manipur), N. Myanmar. **Not reported at 2700m altitude in Press et al. 2000.**

Family- 67. CONVALLARIACEAE

Perennial, usually rhizomatous herbs. Leaves in basal rosettes, or spiral, opposite or whorled along a stem, linear or differentiated into blade and petiole. Inflorescence a spike-like raceme on a leafless scape or in a terminal panicle or raceme or borne in axillary clusters on a leafy stem. Flowers bisexual, actionomorphic, hypo or epigynous. Tepals usually 6, commonly all similar & tubular below. Stamens usually 6, filaments free or fused below. Ovary usually 3-loculed, superior or partly inferior. Style simple, stigma capitate or 3-lobed. Ovules 2-many per locule, basal or axile. Fruit a berry or capsule.

Key to the genera

1a. Scale leaves at base, stem leaves alternate, in opposite pairs or whorls of 3 or more……**1. Polygonatum**

1b. Leaves all basal, linear, distichous with overlapping sheathing bases, bladeless sheaths present, decreasing in size to base……..**2. Theropogon**

1. POLYGONATUM Miller

Rhizomatous herbs. Stems simple, scale leaves present at base. Stem leaves alternate, in opposite pairs or whorls of 3 or more. Flowers pedicellate, 1 or more on a common peduncle in leaf axils. Perianth tubular, with 6 lobes. Stamens 6, included. Filaments attached above middle of tube. Anthers linear, dorsifixed. Ovary 3-locular with 2 or more ovules. Style slender, stigma capitate or 3-lobed. Fruit globose berry.

1. Polygonatum verticillatum (L.) All., *Fl. Pedemont* 1:131(1975); Noltie in *Fl. Bhu.* 3(1):45(1994); Press et al. in *Ann. Check. Fl. Pl. Nep.* 77(2000).
Convallaria verticillata L., *Sp. Pl.* 315(1953).
Convallaria leptophylla D.Don, *Prodr. Fl. Nep.* 47(1825).

Herbs about 70cm. Leaves in whorls of 3-4 except in lower part of stem, lanceolate, subacute, narrowed to sessile base, 5-9 | 0.5-1cm. Inflorescence borne in peduncles with 2-flowered. Flowers creamy white, tube c0.6mm. Stamens 6, included, filaments attached to tube. Ovary ellipsoid, style stender. Fruit c1cm, berry.
Field note: On moist & shady area.
Representative collection: Manang, Koto, 2550m, 5.7.2006 (Fl.), K. Adhikari et al. 111.
Distribution: Nepal (WCE, 2400-4700m), Europe, Asia Minor, C.Asia, Himalaya, NE India (Manipur), W. China.

2. THEROPOGON Maximowicz

Tufted perennial herbs. Roots thickened. Leaves all basal, linear, distichous with overlapping sheathing bases, bladeless sheaths present, decreasing in size to base. Inflorescence a terminal raceme on a flattened, leafless scape. Flowers borne singly. Tepals 6, in two whorls, free to base. Stamens 6, inserted, filaments wide, anthers basifixed. Ovary superior. Style simple, filiform. Fruit a several seeded berry.

1. Theropogen pallidus (Kunth) Maxim. in *Bull. Acad. Imp. Sc1. St. Petersb.* 15:90(1871); Noltie in *Fl. Bhu.* 3(1):50(1994); Press et al. in *Ann. Check. Fl. Pl. Nep.* 80(2000).

Leaves grass-like, channeled, actue, 9-25 | c0.5cm, midrib prominent, sheathing bases papery. Scape c6cm, several angled. Inforescence many-flowered. Bracts & bracteoles linear. Flower subglobose, white. Tepals 6, apex slightly hooded, thick textured in two whorls. Stamens 6, inserted. Ovary globose. Style simple, filiform. Berry, c5mm.
Field Note: On the shady & moist place.
Representative collection: Manang, Koto, 2600m, 5.7.2006 (Fr.), K. Adhikari et al. 118.
Distribution: Nepal (WCE, 1800-2700m), Himalaya (Uttar Pradesh to Bhutan), NE India (Meghalaya), China (Xizang).

Family 68. ASPARAGACEAE

Rhizomatous, shrubby or climbing, perennials, stem herbaceous or woody. Leaves reduced to scales which may become spiny. Flowers solitary or in clusters or racemes, radially symmetric, unisexual or bisexual, tepals 6, tubular at base. Stamens 6, filaments free. Anthers dorsifixed. Ovary superior, 3-locules, ovules axile. Style with 3-stigmatic lobes. Fruit a berry.

1. ASPARAGUS L.

Herbaceous or woody, rhizomatous perennial herbs, shrubs or climbers. Roots usually tuberous. True leaves reduced scale-like. Cladodes linear, borne singly or in whorls in axils of scale leaves. Flowers hermaphrodite or functionally unisexual, borne in singly, in clusters racemes or occasionally panicles. Perianth segments 6, similar, fused into short tube at base. Stamens 6, anthers dorsifixed. Ovary 3-locular,

each with 2 or more axile ovules. Style 3-stigmatic lobes. Berry red or black, 1-3 seeded.

1. Asparagus filicinus Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.* 49(1925); Noltie in *Fl. Bhu.* 3(1):61(1994); Press et al. in *Ann. Check. Fl. Pl. Nep.* 184(2000). Fig.18.a.
Nep.:Van Kurilo, Eng.:Wild asparagus

Stem 20-150cm, herbaceous, without spines. Cladodes in whorls of 4-6, flat, curved, unequal in length within whorls, very narrow, 4-10 | c1mm. Flowers borne single in axils of cladode whorls. Flowers white or greenish. Perianth segments 6, similar, narrowly oblanceolate, rounded. Anthers rounded. Ovary obovoid to globose. Berry black, c6mm.

Field Note: On moist & shady area.

Representative collection: Manang**,** Talekhu, 2788m, 2.7.2006 (Fr.), K. Adhikari et al. 28.

Distribution: Nepal (WC, 2100-2900m), Himalaya (Kashmir to Arunchal Pradesh), NE India (Meghalaya, Nagaland), Myanmar, Thailand, Indo-China, China.

Family 69. HYPOXIDACEAE

Rhizomatous or corymbose perennial herbs. Leaves basal, linear or with lanceolate, sometimes pleated blade, sometimes petiolate. Inflorescence on a leafless scape. Flowers bracteate, borne single, in few-flowered umbels, or in raceme which may be condensed & capitate. Flowers actionomorphic. Perianth segments 6, outer 3 usually hairy on outside, free a fused into tube below. Stamens 6, attached to base of segments, filaments free. Ovary inferior, 3-loculed. Ovule axile. Fruit a capsule or berry.

1. HYPOXIS L.

Rootstock a corm with fibrous tunics. Leaves linear. Scapes slender, flowers single or in few-flowered umbels(or racemes). Tepals free to base. Anthers with bases sagittate, style short, stout. Ovary clavate. Fruit a capsule dehiscing longitudinally rarely by a lid. Seeds ovoid, papillose, with prominent raphe.

1. Hypoxis aurea Lour., *Fl. Cochin*. 200(1790); Noltie in *Fl. Bhu.* 3(1):66(1994); Press et al. in *Ann. Check. Fl. Pl. Nep.* 147(2000). Fig.18.b.
Hypoxis minor D. Don, *Prodr. Fl. Nep*. 53(1985).

Plants slender. Roots fleshy. Leaves 10-18 | 0.4-0.5 cm, long white hairs. Scapes 1-flowered. Flowers pedicellate, subtended by a filiform bract. Tepals oblong c5mm, outer three yellow on inside. Capsule 0.5-1cm, oblong-ellipsoid, crowned by persistent perianth.

Field note: On open sandy soil.

Representative collection: Manang, Tal, 1640m, 9.7.2006 (Fr.), K. Adhikari et al. 198.

Distribution: Nepal (WCE, 1700-2900m), Himalayan(Kashmir to Assam), India, Burma, Inod-China, Japan, Malaysia. **Not reported at 1640m altitude in Press et al. 2000.**

Family 70. ANTHERICACEAE

Perennial herbs, roots often swollen or tuber-bearing. Leaves in basal sheathing. Inflorescence terminal on leafless scape, racemose, simple or compound. Flowers radially symmetric or slightly zygomorphic. Tepals 6, free or tabular at base. Stamens 6 rarely 3, filaments free, anthers basifixed or dorsifixed. Ovary superior, 3-loculed with many axile ovules. Style simple, stigma simple or 3-lobed. Fruit a loculicidal capsule.

1. CHLOROPHYTUM Ker Gawler

Leaves linear or oblanceolate. Raceme usually branched. Flowers borne in small groups subtended by a bract. Flowers white. Tepal 6, mostly similar, free. Stamens 6, inserted, basifixed. Style filiform, simple. Fruit an emarginated, 3-lobed capsule.

1. Cholorophytum arundinaceum Baker in *J. Linn. Soc. Bot.* 15:323(1876); Noltie in *Fl. Bhu.* 3(1):74(1944); Press et al. in *Ann. Check. Fl. Pl. Nep*. 184(2000). Fig.18.c.

Roots bearing tubers. Leaves rosette, blade oblanceolate, acute apex, 12-22 | 1-2.5cm. Raceme long, simple or with short branch, very dense. Bracts lanceolate, acute, membranous. Flowers in groups of 3, erect. Tepal 6. Stamens 6, basifixed. Style simple, filiform. Fruit a capsule.

Field note: On rocky open area.

Representative collection: Manang, Tal, 1640m, 9.7.2006 (Fl. & Fr.), K. Adhikari et al. 205.

Distribution: Nepal (CE, 500-1200m), Himalaya (Nepal to Bhutan), NE India, Myanmar. **Not reported at 1640m altitude in Press et al. 2000.**

Family 71. ALLIACEAE

Perennial, bulbous or rhizomatous herbs, often strongly smelling. Leaves linear to ovate, basal or sheathing lower part of scape. Inflorescence a terminal umbel or spike on a leafless scape. Flowers radially symmetric. Tepal 6, free or tubular at base. Stamens 6, inserted on tube or at base of tepals. Ovary superior, 3-loculed with 2 or more ovules. Style simple. Stigma simple or 3 lobed. Fruit a loculicidal capsule.

1. ALLIUM L.

Bulbous perennials(rarely biennials), strongly smelling. Leaves basal or a long lower part of stem, linear, tubular or sometimes differentiated into blade & petiole, bases sheathing. Stem solid or hollow. Inflorescence a few-to many flowers umbel. Tepals 6, free to base. Stamens inserted, anthers dorsifixed. Ovary tri-locular with 2-ovules. Style filiform. Capsule loculicidal.

1. Allium wallichii Kunth, *Enum. Pl*. 4:443(1843); Noltie in *Fl. Bhu.* 3(1):79(1994); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 9(2000). Fig.18.d-g.

Allium violaceum Wall. ex Regel, *Allior. Monogr*. 143(1875)

Nep.:Jimbu jhar/Van lasun/Dhvapa, Eng.:Wild-garlic

Bulb cylindric, c1.5 cm, erect. Leaves 4-5, basal, flat, keeled beneath, 25-45 | 0.7-1cm, bases sheathing. Umbel hemispheric, loose, many-flowered. Spathe deciduous. Perianth red-purple. Tepals 6, narrowly oblong-elliptic, acute c7 | 2mm. Stamens erect, anthers dorsifixed. Style filiform. Fruit capsule.

Field note: On moist, shady area.

Representative collection: Manang, Koto, 2720m, 12.10.2006 (Fl.), K. Adhikari et al. 352.

Distribution: Nepal (WCE, 2400-4650m), Himalaya (Nepal to Bhutan), W. China.

Family 72. LILIACEAE

Perennial, bulbous herbs. Stem erect, herbaceous. Leaves basal or arranged along stem, glabrous, linear to ovate, bases sheathing, apex sometimes developing into tendril. Inflorescence terminal, racemose, umbel-like, or reduced to a single flower. Flower actinomorphic or weakly zygomorphic. Tepal 6, free, with basal nectaries. Stamens 6, filaments free. Ovary superior, 3-loculed with many ovules, axile. Style simple, stigma simple, 3-lobed or of 3-crests. Fruit a loculicidal capsule.

Key to the genera

1a. Bulb free, leaves spirally arranged ……..…… **1. Lilium**

1b. Bulb coverted by a brownish papery tunic, leaves basal….....**2. Notholirion**

1. LILIUM L.

Bulbs of many, fleshy, overlapping scales. Leaves usually linear to lanceolate, spirally arranged. Inflorescence a terminal racemes(some times reduced to a single flower) on a leafy stem. Flowers funnel-shaped, weakly zygomorphic or campanulate, actinomorphic. Tepals often reflexed, papillose at apex. Anthers dorsifixed. Stigma simple or capitate. Fruit a capsule.

1. Lilium nepalense D. Don in *Mem. Werner. Nat. Hist. Soc.* 3:412(182); Noltie in *Fl. Bhu.* 3(1):102(1994); Press et al. in *Ann. Check. Fl. Pl. Nep.* 185(2000).
Lilium orchroleucum Wall. Ex Baker in *J. Linn. Soc. Bot.* 14:231(1874).
Nep.:Khiraula, Eng.:Tiger Lily

Bulb oblong-ovate, c2.5cm. Rooting stems spreading horizontally, bearing secondary bulbs. Flower stem about 60cm. Leaves narrowly elliptic to oblong-lanceolate, subacute apex, 3-7 | 1-2.5cm. Inflorescence a single terminal flower subtended by a whorl of 4-5 leaf like bracts. Flowers drooping, funnel-shaped, apex of tepals reflexed. Tepals lanceolate, blunt tip, narrowed towards base, c6 | 1cm, filaments free, anthers dorsifixed. Ovary cylindric. Fruit a capsule.
Field note: On moist, shady area.
Representative Collection: Manang, bet^{n} Bhratang & Talekhu, 2810m, 1.7.2006 (F1.), K. Adhikari et al. 14.
Distribution: Nepal (WCE, 2300-3400m), Himalaya (Uttar Pradesh to Arunchal Pradesh).

2. NOTHOLIRION Wall. ex Boissier

Bulb oblong-ovate. Bulb covered by a brownish papery tunic. Flower stem about 40cm. Leaves linear, basal, 5-12 | 1.5-3cm, acute apex. Inflorescence terminal, racemose. Flowers drooping, funnel-shaped. Tepal 6, stamen 6, anthers dorsifixed. Ovary cylindric. Stigma with 3 recurved lobes. Fruit a capsule.

1. Notholirion macrophyllum (D.Don) Boiss., *Fl. Orient.* 5:190(1882); Noltie in *F1. Bhu.* 3(1):105(1994); Press et al. in *Ann. Check. Fl. Pl. Nep.* 186(2000). Fig.18.h-k.
Fritillaria macrophylla D. Don, *Prodr. F1. Nep.* 51(1825).
Lilium hookeri Baker in *Gard. Chron.* 1871:201(1871).

Bulb scales lanceolate, whitish. Stem c25cm. Leaves 3-6 inserted evenly along stem, linear-lanceolate, tapering gradually from near base to blunt apex, 6-14 | 0.5-0.8cm. Inflorescence few flowered raceme, flowers subtended by leaf-like bracts. Tepals oblanceolate, blunt. Anthers dorsifixed. Ovary cylindric. Capsules segments oblong, truncate.
Field note: In busy shadow area.
Representative collection: Manang, Tal, 1640m, 9.7.2006 (F1.), K. Adhikari et al. 195.
Distribution: Nepal (WCE, 2700-4400m), Himalaya (Nepal to Bhutan), China (Xizang). **Not reported at 1640m altitude in Press et al. 2000.**

Family 73. IRIDACEAE

Perennial herbs with underground storage organs. Leaves usually narrow, with parallel veins & sheathing bases, arranged in two ranks. Flowers in terminal, cymose inflorescence which may be spike-like, or reduced to a single flower. Flowers usually subtended by 2 bracts(spathes). Flowers bisexual with 6 perianth segments in two whorls, free or united base. Segments all similar, or outer 3 different from inner. Stamens 3, opposite outer perianth. Style with 3 branches. Ovary inferior of 3 fused carpels. Ovules numerous, axile. Fruit a 3-loculed capsule.

1. IRIS L.

Herbs, rhizomatous, or growing from cluster of fleshy storage roots. Leaves usually bases overlapping. Flower stems branched or simple. Flowers terminal, solitary or in few-flowered groups, subtended by two bracts(spathes). Two perianth whorls strongly differentiated, the outer with a narrow half & expanded, usually reflexed, blade, the inner narrower. Stamens attached to outer perianth, filaments free, anthers basifixed. Style petaloid arching over & closely appressed to stamens.

1. Iris kemaonensis D. don ex Royle, *III. Bot. Himal.* 1:372(1839); Hara in *Enum. Fl. Pl. Nep.* 1:64(1978); Noltie in *Fl. Pl. Nep.*: 148(2000). Fig.19.a.
Iris kingiana Foster in *Gard. Chron.* 1887(1):611(1887).

Rhizomes very compact, stem tufted, subtended by fibrous remains of old leaves. Leaves linear, tapering to acute apex, 20-35 | c1cm. Flower stem hidden by bract-like leaves. Spathe single-flowering, shorter than tube. Outer perianth(fall) reflexed, oblong, blunt, with central beard of club-shaped, inner periath(standard) erect. Margins of style lobes crenate. Capsule ovoid, c2cm.
Field note: On slopy sandy area.
Representative collection: Manang, bet^{n} Talekhu and Chame, 2760m, 3.7.2006 (Fl.), K. Adhikari et al. 60.
Distribution: Nepal (WCE, 2500-4300m), Himalaya (Uttar Pradesh to Arunchal Pradesh), N. Myanmar, China (Yuanan).

Family 74. JUNCACEAE

Usually perennial, rhizomatous herbs. Leaves linear with sheathing bases, glabrous or with long ciliate hairs, sometimes basal scale leaves only present. Inflorescence cymose, simple or compound, terminal or pseudolateral, sometimes condensed or reduced to a single flower, usually subtended by a spathe-like bract. Flowers bisexual, tepals 6 in two whorls. Stamens free, 3 or 6. Ovary superior of 3 fused carpels, 1-3 locular. Stigamas 3. Fruit a loculicidal capsules.

1. JUNCUS L.

Glabrous herbs, sometimes stoloniferous. Flowers stems with basal scale leaves and usually also laminar leaves with sheathing bases. Sheath often continued upwards into membranous auricles. Flowers often aggregated into 'capitula" or sometimes borne singly. Inflorescense often compound with capitula arranged in anthelate cymes. Tepals 6, stamens 3 or 6. capsule many seeded.

1. Juncus thomsonii; Buchenau in *Bot. Ziet.* 25:148(1867); Noltie in *Fl. Bhu.* 3(1):268(1994); Press et al. in *Ann. Check. Fl. Pl. Nep.*:150(2000). Fig.19.b.

Rhizomes short. Flowers stem about 9 cm, tufted. Scale leaves reddish-brown. Stem leaves usually 2, sub-basal, upper part of stem naked, blades linear, tip blunt, 3-6cm | 0.1 cm. Sheaths with membranous margins, auricles curved, acute, free. Inflorescence 3-10 flowered. Lowest bracts subequal, broadly lanceolate to ovate, boat shaped. Tepals lanceolate 6. Ovary ellipsoid 2-4mm, tapered into style. Stigma lobes 0.8-2mm. Capsule narrowly ellipsoid-trigonous.
Field Note: On slopy and stony area.
Representative collection: Manang, Koto area, 26oom, 5.7.2006 (Fl.), K. Adhikari et al. 117.
Distribution: Nepal (WCE, 2700-5200m), C. Asia, Himalaya, Mongolia, China. **Not reported at 2600m altitude in Press et al. 2000.**

Family 75 COMMELINACEAE

Commonly perennial, often semi-succulent herbs. Roots often fleshy, sometimes tuberous. Stem usually decumbent at base and rooting from lower nodes. Leaves commonly lanceolate, sheaths tubular, fused margins usually hairy. Inflorescence terminal and or lateral, of cymose branches aggregated into thyrses, or

simple when often subtended by spathe-like bracts. Flowers bisexual or bisexual and male. Sepals 3, persistent. Petals usually 3, ephemeral, 2 similar and one smaller or absent(zygomorphic) or 3 subequal(actinomorphic). Stamens(5-)6, filaments glabrous or hairy. Ovary superior, 2-3 loculed, ovules axile. Style filiform. Stigma often indistict. Fruit a usually loculicidal capsule.

Key to the Genera

1a. Petals unequal, antherodes 3, cruciform, leaf sheaths present……**1. Commelina**
1b. Petals similar, antherodes 3-lobed, leaf sheaths absent……**2. Murdannia**

1. COMMELINA L.

Perennial or annual herbs. Roots sometimes thickened or tuberous. Stems usually decumbent at base, rooting from lower nodes, branches arising within and splitting leaf sheaths. Leaves commonly lanceolate, sheaths shortly hairy on fused margins often hairy. Inflorescence terminal and/or leaf-opposed, composed of conduplicate, or funnel-shape spathes. Flowers bisexual, or bisexual and male, bilaterally symmetric, white or blue. Petals 2 large, third smaller, lanceolate or clawed or absent. Sepals usually 2 wider than third, underground. Stamens 3, antherodes 3, cruciform. Ovary 2-3 loculed, dehiscent or indehiscent.

1. Commelina benghalensis L., *Sp. Pl*. 41(1753); Noltie in *Fl. Bhu.* 3(1):238(1994); Press et al. in *Ann. Check. Fl. Pl. Nep.*:48(2000).

Nep:Kanejhar/ Kanesag/ Patpate/ Vankane, Eng:Day flower

Much branched small herbs, decumbent stolons. Leaves with distict petiole like bases, blades oblong-elliptic, rounded or subacute, margin ciliate, base rounded to truncate, 2-5 | 1-2.5cm. Spathes stalked, terminal on main and lateral branches. Spathes ovate, acute, margins fused funnel-shaped, densely hairy. Cymes of bisexual flowers and a single male flower on long, exserted pedicel. Petals blue, 2 clawed, 1 laceolate. Style coiled at apex. Capsule oblong, retuse.

Field Note: On most open abundant and cultivated land.

Representation collection: Manang, Danaque, 2250m, 6.9.2006 (Fr.), K. Adhikari et al. 230.

Distribution: Nepal (WCE, 900-1800m), Africa, Himalaya, India, east to China, Japan, Malaysia. **Not reported at 2250m altitude in Press et al. 2000.**

2.MURDANNIA Royle

Perennial or annuals. Leaves lanceolate borne in a basal and/or along stem, not narrowed into a petiole. Inflorescence a thyrse, a terminal, several-flowered cincinnus or fascicles of 1- flowered cymes in leaf or bract axils, usually borne on leafy stem, occasionally on a leafless scape. Bracteoles persistent or caducous, tubular or open. Petals free, all similar. Stamens 2-3, filaments hairy or glabrous. Staminodes 3-4. Antherodes commonly 3-lobed. Ovary 3-locules, ovules axile, 1-many per cell. Fruit a 3-valved capsule.

1. Murdannia spirata (L.) Bruckner in Engler, *Pfl.-fam. ed-2,* 15a:173(1930); Noltie in *Fl. Bhu.* 3(1):229(1994); Press et al. in *Ann. Check. Fl. Pl. Nep.* 48(2000). Fig.19.c.
Commelina spirata L., *Mant. Pl. Alt*. 176(1771).
Aneilema spiratum (L.) Wight ex Wall., *Number. List:181*, n. 5211(1831- 32)

Slender annual, much branched from base. Stem leafy, 2-4 | 0.5-1.5cm. Upper leaves linear-lanceolate, acute, base abruptly rounded. Inflorescence paniculate with several filiform branches each bearing many flowers. Bracteoles persistent,minute. Filaments usually glabrous, fertile anther 3. Fruit a capsule.

Field Note: On road side and moist place.

Representative collection: Manang, Thanchok, 2630m, 13.10.2006 (Fl.), K. Adhikari et al. 381.

Distribution: Nepal (CE, 550-1800m), Himalaya, India, east to China, Taiwan, Malaysia. **Not reported at 2630m altitude in Press et al. 2000.**

Family 76. GRAMINEAE(Poaceae)

Annual or perennial, tufted, rhizomatous or stoloniferous. Leaves in basal, vegetative shoots and inserted distichously along stems(culms), blade usually linear, sheath open or closed, with a commonly membranous ligule at junction with base of blade. Culms herbaceous or woody, jointed, internodes usually hollow. Inflorescence composed of spikelets. Spikelets of distichously arranged bracts, the lower pair sterile, called glumes, and one or more florets, if more than one then inserted along a slender axis(rachilla) that may be break up or persist. Florets composed of a lemma and a usually 2-keeled palea subtending a single flower. Flower usually bisexual, ovary with a single ovule. Stigma commonly 2, feathery. Stamens usually 3(rarely 1, 2 or 6), subtended by 2(3 or more) minute scales(lodicules). Fruit an indehiscent grain(caryopsis), pericarp sometimes free, rarely fleshy.

Key to the Genera

1a. Inflorescence panicle or paniculate……..……..2
1b. Inflorescence other than panicle or paniculate…….....……10
2a. Vegetative shoots arising within leaf sheaths or at base and outside of leaf sheaths(extravaginal),or culms simple, spikelets lateral compressed, with 2-6 florets……..... 3
2b. Shoots variously modified, spikelets broad, singly or floret 2……..4
3a. Lower glume 1-3 veined, paleas linear…….....**14. Poa**
3b. Lower glume usually 1-veined, paleas narrow, commonly bifid….....**9. Festuca**
4a. Glumes longer than spikelet……..…..…….6. **Danthonia**
4b. Glumes either equal or shorter than spikelet…….....… 5
5a. Lemma broadly oblong-elliptic, basal leaves often narrower than culm leaves ……..**1. Agrostis**
5b. Lemma narrowly oblong-elliptic or linear, culm leaves narrow than basal leaves. 6
6a. Culms mostly solid, leaves inserted along culm, palea silvery, ciliate, sometimes reduced or absent…….....**15. Saccharum**
6b. Culms more or less herbaceous, palea hyaline or epaleate.....7
7a. Inflorescence paniculate, branched to 2 or more orders, primary branches slender, whorl, ultimate branches filiform, persistent, glabrous, each bearing a single raceme…….....……**5. Capillipedium**
7b. Infloresecence paniculate or panicle, branches inserted single or whorled, appearing subdigitate with racemes ……..…….. 8
8a. Spikelet floret-1, culms erect or geneculately ascending…..……**4. Calamagrostis**
8b. Spikelets florest- 2, culms erect…….....…….... 9
9a. Spikelets subtended by involucres of callus hairs, palea lanceolate, lower flower sterile…….....**11. Miscanthus**
9b. Spikelets without subtended by involucres of callus hairs, palea oblong lanceolate, lower flower sterile or male…….....**2. Arundinella**
10a. Culms simple, unbranch……..……..……11
10b. Culms branching rarely unbranched, rooting from lower nodes…….....13
11a. Infloresence a lax panicle, branches, slender, whorled, spreading…**12. Oryzopsis**
11b. Infloresence a single terminal fascicles of raceme(digitate)or of several whorled on a short axis or linear, spike like…….....12
12a. Spiketets similar, floret 2, the lower sterile…….....**8. Eulalia**
12b. Spiketets borne singly, alternating or opposite side of rachis, flowers bisexual ……..**3. Brachypodium**
13a. Inflorescence terminal and spike like…….....**13. Pennisetum**
13b. Inflorescence of linear receme, racemes digitate or inserted along a short axis..14

14a. Culms commonly decumbent at base, leaf-blades linear, spikelets borne in a pairs or groups of 3-5, floret-2….....**7. Digitaria**
14b. Culms usually branching or slender and erect, leaf blades narrowly elliptic to linear, floret 1-2…….....**10. Microstegium**

1. AGROSTIS L.

Tufted perennials, sometimes rhizonmatous or stoloniferous. Culms leafy, erect or geniculately ascending, sometimes scrambling, sometimes branched near base. Basal leaves often narrower than culm leaves. Culm leaf blades flat or inrolled, ligules membranous. Inflorescence a panicle, branched whorled. Spikelets usually under 4mm, single flowered, gaping, disarticulating above glumes, callus usually glabrous, penicillate rachilla rudiment occasionally developed. Glumes usually equalling spikelet, nearly lanceolate, equal to unequal, keeled, 1-veined, papery. Lemma usually shorter than glumes, widely oblong-elliptic, strongly convex, weakly 5-veined, outer veins sometimes developed into apical setae, glabrous or hairy, usually hyaline, unawned or awned. Palea hyaline.

Key to the Species

1a. Leaf blades upto 30cm long, ligule truncate-lacerate, callus glabrous. …….....**1. A. pilosula**
1b. Leaf blades 5-9 cm long, ligule acute, callus hairy…… **2. A. triaristata**

1. Agrostis pilosula Trin. in *Mem. Acad. Sc1. Petersb. ser*. 6, 6:372(1841); Noltie in *Fl. Bhu*. 3(2):607(2000); Press et al. in *Ann. Check. Fl. Pl. Nep*.: 122(2000).
Calamagrostis pilosula (Trin.) Hook. f., *Fl. Brit. Ind*. 7:263(1896).
Calamagrostis jacquemontii Hook. f., *Fl. Brit. Ind*. 7:265(1896).

Slender, tufted perennial. Culms about 40cm. Culm leaf blades upto 30 | 0.5cm, linear lanceolate, acute, glabrous. Sheaths smooth, ligule truncate-lacerate. Inflorescence greenis, laxy pyramidal, branches filiform. Glumes subequal, lanceolate, acuminate keel hispid. Callus glabrous. Lemma awned, 1.5-2 mm, subacute to truncate, surface covered with long white hairs. Palea 0.4-0.8mm.
Field note: On slopy rocky area.
Representative collection: Manang, Talekhu, 2788m, 2.7.2006 (Fl. & Fr.), K. Adhikari et al. 31.
Distribution: Nepal (WCE, 2000-4600m), Himalaya (Kashmir to Sikkim), India.

2. Agrostis triaristata (Hook. f.) Bor., *Grass. Ind*. 391(1960); Noltie in *Fl. Bhu*. 3(2):604(2000); Press et al. in *Ann. Check. Fl. Pl. Nep*.:123(2000).
Deyeuxia triaristata Hook. f., *Fl. Brit. Ind*. 7:266(1896).

Slender, tufted perennial. Culms about 30cm. Basal leaves short, filifrom. Culm leaf blades 5-9 | 5cm wide, linear lanceolate, acute, glabrous, sheaths smooth. Ligule acute, c4mm. Inflorescence purplish, laxly pyramidal, branch filiform. Glumes equal or subequal, narrowly lanceolate, 3-veined, keel green, hispid. Callus hairy. Rachilla rudiment developed, hairy. Lemma awned, broadly lanceolate. Palea c2mm, linear lanceolate, acute.
Field note: On slopy area.
Representative collection: Manang, Koto, 2720m, 12.10.2006 (Fl.& Fr.), K. Adhikari et al. 346.
Distribution: Nepal (E, 3600-3700m), Himalaya (Nepal, Sikkim). **Not reported in Central Nepal and at 2720m altitude in Press et al. 2000**

2.ARUNDINELLA Raddi

Perennials, rhizomes commonly short, so plant tufted. Culms erect, simple or branched. Leaves blades more or less linear, flat. Ligule short, truncate, membranous rim, with fringe of long cilia behind at base of blade. Inflorescence paniculate,

branches inserted singly or whorled. Spikelets born in unequally pedicelled pairs. Spikelets lanceolate, gaping, floret 2, the upper early deciduous, the lower persistent. Glumes persistent, thickly herbaceous, lower lanceolate, acuminate, 3-veined, upper longer acuminate, 5-veined equal or shorter than spikelets. Lower floret male or sterile. Lemma oblong-lanceolate, 3-veined, herbaceous. Palea oblong-lanceolate, acuminate, hyaline, margins inflexed. Upper floret bisexual, lemma narrowly lanceolate, margins incurved, with or without geniculate awn. Palea oblong-lanceolate as lower palea.

1. Arundinella nepalensis Trin., *Gram. Panic*. 62(1826); Noltie in *Fl. Bhu.* 3(2):752(2000); Press et al. in *Ann. Check. Fl. Pl. Nep.*:124(2000). Fig.20.a.

Nep: Ikro/Kharuki/Yanru

Tufted, rhizomes short, woody. Culms about 1m, slender, basally branched. Leaf blade 6-12 | 0.5-1cm, oblong, apex acute, hairy on both surface. Sheaths glabrous, margin ciliate. Ligule short, truncate, minutely fimbricate. Inflorescence purplish, c10cm, branches numerous, slender. Spikelets erect. Lower glume glabrous, veins hispid. Lemma narrowly lanceolate, acute, minutely hispid awn. Palea c2mm.

Field note: On sandy mount area.

Representative collection: Manang, Dharapani to Tal, 1640m, 14.10.2006 (Fr.), K. Adhikari et al. 453.

Distribution: Nepal (WCE, 500-2500m), Himalaya (Nepal, Sikkim). India, SE Asia, China

3. BRACHYPODIUM P. Beauvois

Tufted perennial. Culm simple. Leaf blade flat or inrolled. Ligules membranous. Inflorescence linear, spike-like, rachis tough, internodes flattedened. Spiketets borne singly, alternating on opposite sides of rachis, shortly pedicelled. Flowers bisexual, similar. Rachilla internodes glabrous, falling with florets. Glumes opposite, unequal, shorter than spikelet, narrowly lanceolate to oblong, convex, thinly herbaceous, margins narrowly hyaline. Lower 4-5 veined, upper longer & wider, 6-8 veined. Lemmas narrowly oblong-lanceolate, strongly convex, gradually narrowed above into awn. Awn hispid, straight, slender. Paleas narrowly oblong-elliptic, truncate, hyaline, 2-keeled, keels pectinately hispid above, margin inflexed.

1. Brachypodium sylvaticum (Huds.) Beauvois, *Ess. Agrost*.101, 155(1812); Nolite in *Fl. Bhu.* 3(2):636(2000); Press et al. in *Ann. Check. Fl. Pl. Nep.*:126(2000). Fig.20.b.

Festuca sylvatica Huds. , *Fl. Angl*. 1:38(1762).

Brachypodium wattii C.B. Clarke in *J. Linn. Soc. Bot*. 25:90, t.40(1889).

Culms about 50 cm, very slender, nodes hairy. Leaf blades 10-15×0.5-0.8 cm, linear lanceolate, flat or inrolled, acute, hairy, denser above than beneath. Sheaths with long, spreading hairs. Ligule c2mm, apex truncate, erect, rachis glabrous minutely hispid, spikelets not overlapping. Fertile florets 5-12, pedicels minutely puberscent. Glumes glabrous, lower narrowly lanceolate-triangular, acuminate, blunt, upper oblong. Lemma of lowest floret glabrous. Palea c7mm. Rachilla internode bearing secund floret.

Field note: On the Road side of moist & sandy sliding soil.

Representative collection: Manag, Thanchok, 2630m, 13.10.2006 (Fr.), K. Adhikari et al. 365.

Distribution: Nepal (WCE, 1800-3500m), Europe, temperature Asia, Nepal, NE India, China (Xizang).

4. CALAMAGROSTIS Adanson

Tufted perennials, sometimes rhizomatious or stoloniferous. Basal leaves flat or inrolled. Culms erect or geniculately ascending, leafy. Leaf blades flat or inrolled. Ligule membranous. Inflorescence a panicle, branches whorled or not, spreading or

appressed. Spikelets usually over 4mm, gaping, disarticulating above glumes, floret 1. Callus hairy. Pedicillate rachila rudiment sometimes developed. Glumes equalling or shorter than spikelet, lanceolate or not equal to unequal, keeled, papery, the lower 1-veined, upper 3-veined. Lemma usually shorter than glumes, lanceolate or not strongly convex, apex irregularly toothed, glabrous or scabrid, awned or unawned, hyaline or papery. Awn geniculate or straight. Palea 2-keeled, hyaline.

1.Calamagrostis lahulensis G. Singh, *Taxon* 33(1):94(1984), nom.nov; Noltie in *Fl. Bhu.* 3(2):613(2000).

Calamogrostis pulchella Grisebach

Rhizomes slender, spreading. Leaves mainly basal, blades erect, 3-13 | 0.5-3mm, inrolled, linear, acute, minutely scabrid on veins. Sheath papery, persistent. Culms 7-60cm, erect, slender, 2-3 leaved. Leaf blades small, 1.9-9cm | 0.7-2.6mm, inrolled. Sheaths narrow, scabrid on veins. Ligule 2-4.2mm blunt. Inflorescence dark purple, erect, 3.3-10 | 1-3.5cm, narrowly cylindric, dense, branches short, erect. Spikelets 3.7-5.7mm, hyaline tipped. Gulmes dark purple, equal or subequal lanceolate, acuminate, 1-veined, margin hyaline, sides papery, the lower 3.7-5.7mm, the upper 3.5-5.5mm. Rachilla rudiment penicillate, 3.4-5.5mm. Lemma awned, 2.8-4.8, lanceolate, papery, apex irregularly 4-tooth, awn commonly subasical, 1.7-5mm, slender, exserted. Palea 2-3.2mm, linear, blunt. Anthers 1.4-2.3mm.

Field note: On rocky open area.

Representative collection: Manang, upperside of Chame, 2720m, 4.7.2006 (Fr.), K. Adhikari et al. 102. **New records for "Flora of Nepal."**

5. CAPILLIPEDIUM Stapf

Tufted perennials. Culms erect or long and scrambling , simple or branched. Leaf blades flat. Ligule membranous, truncate short. Inflorescence paniculate, branched to 2 or more orders, primary branched slender, whorled, ultimate branched filiform, persistent, glabrous, each bearing a single raceme. Spikelets differing. Sessile spikelet awned, florets 2, the lower sterile, upper bisexual, both epaleate. Callus truncate. Glumes membranous, the lower 2-keeled, keels ciliate, blunt to acute, margins inflexed, upper 1-keeled, sides channeled equal or shorter than spikelets. Lower lemma small, blunt, hyaline. Upper lemma consisting entirely of an awn. Stamens 3. Pedicelled spikelet awnless, floret single, male, epaleate. Lower glume more or less flat, strongly ribbed, lemma hyaline, blunt.

1. Capillipedium assimile (Steudel) A. camus in *Fl. Gen. Indochine* 7:314(1922); Noltie in *Fl. Bhu.* 3(2):794(2000); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 126(2000). Fig.20.c.

Andodropogon assimilis Steudel in Zoll., *Syst. Verz.* 58(1854).

Andropogon glaucopsis Steudel, *Syn. Pl. Glum.* 1:397(1854).

Scrambling, culms about 1m, glabrous, nodes bearing clusters of branches. Leaf blades 6-10 | 0.3-0.7cm, acuminate, tapered to base, hairy. Sheath glabrous. Ligule membranous. Inflorescence pyramidal racemes. Spikelets flushed pinkish. Callus hairy. Lower glume oblong-elliptic, acute, truncate, 5-veined. Keels long hispid. Upper glume oblong-lanceolate, acuminate. Lower lemma c2mm, lanceolate, subacute.

Field note: On the large hanging rock of open area.

Representative collection: Manang, Dharapani, 1940m, 13.10.2006 (Fl. & Fr.), K. Adhikari et al. 425.

Distribution: Nepal (WCE, 600-2100m), Himalaya (Kashmir to Sikkim), India, Myanmar, Indo-China, China, Malaysia.

6. DANTHONIA DC.

Tufted perennial, rhizomes short. Culms unbranched. Leaf blades inrolled, filiform, sheaths glabrous. Ligule a ciliate rim. Inflorescence a terminal panicle or

raceme. Spikelets borne singly, pedicelled, gaping, disarticulating above glumes and between florets. Rachilla internodes persistent with florets. Flowers bisexual, uppermost sometimes reduced, callus hairy. Glumes oblong-lonceolate, exceeding spikelet, subequal 3-veined, papery. Lemmas lanceoalte, apex bifid, lobes with slender awns, chartaceous. Palea oblong, 2-keeled, back concave, margins inflexed.

1. Danthonia comminsii Hook. f., *Fl. Brit. Ind*. 7:282(1896); Noltie in *Fl. Bhu.* 3(2):644(2000); Press et al. in *Ann. Check. Fl. Pl. Nep*.:128(2000). Fig.20.d.
Danthonia cachemyriana var. *minor* Hook. f., *J.C*.(1896).

Culms about 20cm. Leaf blades 10-13 | 0.3cm, filiform, glabrous above, hairy beneath, sheaths glabrous. Ligule c0.5mm. Inflorescence c6cm, racemose with ascending branches. Spikelets variable in size, the lowest largest. Glumes subacute and bifid, the lower oblong- lanceolate. Lowest floret, lemma c5mm, margins hairy in lower half, with band of hairs around base of awn. Palea apex round. Callus hairy c2mm.

Field note: On rocky soil.
Representative collections: Manang, between Talekhu and Chame, 2760m, 3.7.2006 (Fr.), K. Adhikari er al. 59.
Distribution: Nepal (WCE, 2200-4100m), Himalaya (Swat to Bhutan), China, Malaysia.

7. DIGITARIA Haller

Perennial or annuals. Culms commonly decumbent at base and rooting from lower nodes. Leaf blades flat, linear. Ligule membranous, blunt. Inflorescence of linear racemes, racemes digitate or inserted along a short axis, occasionally with short basal branches. Raceme rachis broadly winged or slightly winged. Spikelets borne in pairs or groups of 3-5, upper glume adjacent to rachis, florets 2, unequally pedicelled. Lower glume smaller or absent. Lower floret sterile, lemma equaling or shorter than upper lemma, flat. Upper floret bisexual, compressed. Lemma convex, coriaceous, margin reflexed, broad. Palea similar to lemma. Stamens 3.

1. Digitaria cruciata (Nees ex Steudel) A. Camus in *Fl. Gen. Indo-Chine* 7:399(1922); Noltie in *Fl. Bhu.* 3(2):730(2000); Press et al. in *Ann. Check. Fl. Pl. Nep*.: 129(2000).
Panicum cruciatum Nees ex Steudel, *Syn. Pl. Glum.* 1:39(1854).
Pasplum sanguinale Lam. var. *crucuatum* Hook. f., *Fl. Brit. Ind*. 7:14(1896).

Annual, culms about 20cm, base decumbent and rooting from nodes. Leaf blade 3-10 | 0.4-0.8cm, oblong-lanceolate, acute, margin hispid. Sheaths hairy. Ligule c3mm long. Inflorescence laxer, with a terminal pair and 1-3 single racemes along an elongate axis. Spikelets shorter and wide, oblong-elliptic, 2-3 | c1mm. Upper glume less than spikelet, blunt, apex of upper lemma abruptly apiculate and protruding aboved lower lemma.

Field note: On the dry side of road.
Representative collection: Manang, Thanchok, 2630m, 13.10.2006 (Fr.), K. Adhikari et al. 384.
Distribution: Nepal (WCE, 1800-3200m), Himalaya, NE India (Meghalaya), Myanmar, China, Indo-China.

8. EULALIA Kunth

Perennials, usually tufted, sometimes rhizomatous, rarely annuals. Culms simple. Leaf blade flat, linear, margins thickened. Ligule very short, membranous, truncate, ciliate. Inflorescence a single terminal fascicle of racemes(digitate) or of several whorls on a short axis. Racemes bearing pairs of sessile and pedicelled spikelets, axis breaking up or occasionally persistent, hairy on angles. Spikelets similar, florets 2, the lower sterile, epaleate. Glumes equaling spikelets, coriaceous, the lower oblong-lanceolate, acute or bidentulate, flat or slightly concave, 2-keeled,

narrowly lanceolate. Lower hyaline, upper lemma composed of awn, usually bidentate at apex, awn geniculate, twisted. Palea small, hyaline or absent.

1. Eulalia mollis (Griseb.) Kuntze, *Revis. Gen.* 2:775(1891); Noltie in *Fl. Bhu.* 3(2):774(2000); Press et al. in *Ann. Check. Fl. Pl. Nep.*:132(2000).
Erianthus mollis Griseb. in *Nachr. Ges. Wiss*, Gottingen 1868:92(1868).
Pollinia mollis (Griseb.) Hackel in DC., *Monogr. Phan.* 6:161(1889).

Tufted perennial. Culms about 25cm, appressed hairy below inflorescence. Leaf blade flat, 5-10 | 0.3-0.5cm, sparsely hairy. Sheaths hairy above. Inflorescence c5cm. Racemes 4-7 densely hairy, pinkish silvery, axis breaking up, bearing sessile and pedicelled spikelet pairs, hairs silver flushed violet, longer than spikelets. Callus hairs c3mm. Glume long hairy. Keel appressed hairy above. Lower lemma c4mm, linear-lanceolate, sides hairy at apex.
Field note: On slopy open rocky area.
Representative collection: Manang, Dharapani to Tal, 1910m, 14.10.2006 (Fr.), K. Adhikari et al. 466.
Distribution: Nepal (WCE, 2000-3700m), Himalaya (Himachal Pradesh to Sikkim). **Not reported at 1910m altitude in Press et al. 2000.**

9. FESTUCA L.

Perennials, vegetative shoots arising within leaf sheaths or at base and outside of leaf sheaths(extravaginal). Culm leaves blades flat or inrolled, sometimes auriculate at base. Sheaths sometimes with erect, apical auricles at each side of the membranous ligule. Inflorescence a panicle. Spikelets laterally compressed, with 3-6 fertile florets, disarticulating above glumes and between florets. Glumes shorter than spikelet, the lower usually 1-veined, upper 3-veined, herbaceous. Lemmas rounded on back, awned from apex, obscurely 5-veined, usually thickly herbaceous. Paleas narrow, commonly bifid, keels usually ciliate. Ovary glabrous or hairy at apex, stigmas terminal.

1. Festuca gigantean (L.) Vill., *Hist. Pl. Dauph.* 2:110(1787); Noltie in *Fl. Bhu.* 3(2):536(2000); Press et al. in *Ann. Check. Fl. Pl. Nep.*:133(2000).
Bromus giganteus L., *Sp. Pl.* 77(1753).

Loosely tufted, shoots arising within leaf sheath(extravaginal). Culms about 60cm. Leaf blades flat, 15-25 | 0.8-1.3cm, apex finely tapered, with clasping, auriculate bases. Ligule truncate. Inflorescence c10cm. Spikelet c1cm, rachilla internodes well developed. Lemmas rough on surface. Glumes longer, the lower c4mm, upper c5mm.
Field note: On dry road side.
Representative collection: Manang, Thanchok, 2640m, 13.10.2006 (Fr.), K. Adhikari et al. 368.
Distribution: Nepal (WC, 2300-2600), Europe, temperate Asia, introduced into N. America. **Not reported at 2640m altitude in Press et al. 2000.**

10. MICROSTEGIUM Nees

Sprawling perennials, or delicate, tufted annuals. Culms usually much branching and rooting from lower nodes, or slender and erect. Leaf blades flat, narrowly elliptic to linear, narrowed at base. Ligules membranous, truncate. Inflorescence of terminal, digitate racemes. Racemes bearing pairs of sessile and pedicelled spikelets, internodes clavate or flattish and winged. Spikelets similar, floret 1-2, the lower when present male or sterile, consisting of a palea, the upper bisexual. Glumes equalling spikelets, the lower oblang-lanceolate, grooved or concave on back, usually bidentate, 2-keeled, margins inflexed. Upper lemma composed mainly of awn, basal margins hyaline, usually bidentate at apex, awn geniculate, twisted. Palea small, hyaline or absent. Anthers 2-3.

1. Microstegium nudum (Trin.) A. Camus in *Ann. Soc. Linn. Lyon n.s.* 68:201(1921); Noltie in *Fl. Bhu.* 3(2):784(2000); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 136(2000).

Pollinia nuda Trin. in *Mem. Acad. Sc1. Petersb. ser.* 6, 2:307(1833).

Culms slender, about 30cm. Blades of culm leaves 2-6 | 0.4-0.8, lanceolate, acuminate, sparsely hairy. Sheaths sparsely hairy. Ligule truncate, hairy. Racemes 2-4, lower spreading at ring angles to axis, 3-6cm, internodes glabrous. Sessile spikelet c4mm, callus hairs c1mm. Lower glume pale green, narrowly lanceolate, sharply bidentate. Keels minutely hispid. Upper palea absent. Pedicelled spikelet similar to sessile spikelet.

Field note: On shady moist place.

Representative collection: Manang, Thanchok, 2630m, 13.10.2006 (Fr.), K. Adhikari et al. 366.

Distribution: Nepal (WCE, 1800-3200m), India, SE Asia, China, Korea, Japan.

11. MISCANTHUS Andersson

Tufted perennials. Culms stiffly erect. Leaf blades flat, ligule membranous, apex ciliate. Inflorescence paniculate, appearing subdigitate with racemes arranged in half-whorls along a short, stout axis. Racemes bearing pairs of unequally pedicelled spikelets, axis not breaking up. Spikelets similar, subtended by involucres of callus hairs. Florets 2, the lower sterile, epaleate. Glumes 2, subequal, lower lemma lanceolate, upper lemma with bifid apex and terminal awn. Glume equal to spikelets. Pelea lanceolate.

1. Miscanthus nepalensis (Trin.) Hackel in DC., *Monogr. Phan.* 6:104(1889); Noltie in *Fl. Bhu.* 3(2):769(2000); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 136(2000).

Eulalia nepalensis Trin. in *Mem. Acad. Sc1. Petersb. Ser.* 6, 2:333(1831).

Culms about 60cm, stout. Leaf blades 8-20 | 0.3-0.6cm, hairy. Leaf sheath hairy at apex. Ligule 1-3mm, apex rounded. Inflorescence nodding , golden brown, plumose, c7cm, axis shorter than racemes. Spikelets c3mm. Callus hairy grey, c1cm. Lower glume golden brown, oblong-laceolate, subacute, emarginate. Upper glume longer than lower lanceolate. Lower lemma c3mm, lanceolate, acute, hyaline. Palea lanceolate.

Field note: On slopy open rocky area.

Representative collection: Manang, Koto, 2670m, 12.10.2006 (Fr.), K. Adhikari et al. 353.

Distribution: Nepal (WCE, 1100-3000m), Himalaya (Uttar Pradesh to Bhutan), NE India, Myanmar, W. China.

12. ORYZOPSIS Michaux

Tufted perennials. Culms erect, unbranched. Leaf blades flat, linear to narrowly oblong, very acute, ligule membranous. Inflorescence a lax panicle, branches slender, whorled, spreading. Spikelets pedicelled, borne singly, disarticulating above glumes. Floret single bisexual, callus short, obtuse, glabrous. Glumes equal or unequal and similar, equalling spikelet, oblong-lanceolate, convex, acuminate, 5-7 veined, thinly herbaceous. Lemma brown, coriaceous, oblong to linear-lanceolate, convex, apex acuminate, mostly straight awn, appressed-hispid, 5-veined, margins incurved, clasping edges of palea. Palea brown, coriaceous, narrowly lanceolate, acuminate, appressed-hispid, 2-veined, keels rounded, margins inflexed. Lodicules 3, large, hyaline.

1. Oryzopsis aequiglumis Duthie ex Hook .f. *Duthie Grass. N.W. Ind. 27;* Noltie in *Fl. Bhu.* 3(2):531(2000).

Piptatherum aequiglumis (Duthie ex Hook.f.) Rozhevitz.

Culms about 50cm. Leaf blades 10-20 | c1mm, smooth above, minutely hispid on veins beneath, glaucous beneath. Sheaths minutely hispid on veins, ligule c5mm,

apex rounded. Inflorescence c12cm, branches mainly paired, slender, flexuous. Glumes surface glandular. Lemma brown, linear-lanceolate, c5mm, about equalling glumes, gradually narrowed at apex into persistent awn, awn 1.5cm, palea longer and narrower, c7mm.

Field note: On shady sandy area.

Representative collection: Manang, Below Koto, 2570m, 13.10.2006 (Fr.), K. Adhikari et al. 357. **New records for "Flora of Nepal."**

13. PENNISETUM Richard ex Persoon

Rhizomatous perennials or annuals. Culms simple or branched sometimes prostrate and mat-forming. Leaf blades flat, linear-lanceolate apex very acute. Ligule a fringe of hairs or truncate-ciliate. Inflorescence terminal and spike like or concealed in leaf sheaths, if spike-like then cylindric. Spikelets similar or sometimes some male only, bristles usually unbranched, one usually longer than rest. Spikelets lanceolate in outline, florets 2. Lower glume shorter than upper or absent. Upper glume commonly lanceolate, usually shorter than spikelet, hyaline. Lower floret usually male, lemma often equalling spikelet, lanceolate acuminate or oblong with 3 -toothed apex, convex. Palea oblong, keels usually minutely hispid, margins inflexed. Upper floret bisexual, lemma and palea similar to lower floret. Stamens 3.

1. Pennisetum sp.

Fields note: On moist slopy area.

Representative collection: Manang, above Chame, 3050m, 11.10.2006 (Fr.), K Adhikari et al. 315.

14. POA L.

Annuals or perennials, tufted or rhizomatous. Culm simple erect. Leaf blades usually linear, ligule membranous. Inflorescences paniculate, branches sometimes short, so narrow and condensed. Spikelets laterally compressed, florets 2-6, disarticulating above glumes and between florets, sometimes 'viviparous' with florets proliferating vegeatatively, callus sometimes bearing long, woolly hairs. Glumes lanceolate, keeled, margins usually hyaline, lower usually shorter than lower lemma, 1-3-veined, surface glabrous or variously hairy, apex and margins usually hyaline. Paleas linear, keel scabrid or ciliate. Anthers 3.

1. Poa pratensis L., *Sp. Pl*. 67(1753); Noltie in *Fl. Bhu.* 3(2):558(2000); Press et al. in *Ann. Check. Fl. Pl. Nep.*:140(2000).

Poa angustifolia L., *Sp. Pl*. 67(1753).

Poa pratensis var. *angustifolia* (L.) Wahlenb., *Fl. Lapp*. 41(1812).

Perennial with slender, extensively creeping rhizomes. Culms about 19cm, smooth. Leaf blades 3-12 | 0.2cm, glabrous. Sheath smooth, ligule c2mm, blunt. Inflorescence c8cm, triangular in outline. Spikelets green, narrowly elliptic, florets 3-5, callus wool plentiful. Glumes acuminate, 1-3 veined in lower and 3-veined in upper glumes. Lemmas narrowly lanceolate, acute, c3mm, keel ciliate, surface punctuate. Palea of lowest floret c3mm, keels scabrid, back punctuate.

Field note: On slopy rocky area.

Representative collection: Manang, Talekhu, 2788m, 2.7.2006 (Fr.), K. Adhikari et al. 29.

Distribution: Nepal (C, 4100-4400m), Widespread in N. Hemisphere, introduced into temperte hills of Nepal and India. **Not reported at 2788m altitude in Press et al. 2000.**

15. SACCHARUM L.

Stout to massive, rhizomatous perennials. Culms solid branched or unbranched. Leaves inserted along culm, blades flat, margin serrate, lamina sometimes very narrow. Ligule membranous, ciliate. Inflorescence paniculate, often

decompound, plumose, hairs arising from callus, raceme axis. Racemes bearing pairs of sessile and pedicelled spikelets, axis disarticulating. Spikelets mostly identical, florets 2, the lower sterile, epaleate. Glumes equal or unequal, about as long as spikelet, hyaline or chartaceous, 2-keeled, the upper 1-keeled, lower lemma silvery-hylina, upper lemma silvery-hyaline, awned or awnless, sometimes reduced and linear. Palea silvery, ciliate, sometimes reduced or absent.

1. Saccharum sp.
Field note: On open area.
Representative collection: Manang, above Tal, 1820m, 14.10.2006 (Fr.), K. Adhikari et al. 458.

Family 77. ARACEAE

Perennial herbs of diverse habit including climbers, floating, and geophytes. Underground stem absent, rhizomatous or tuberous, aerial stems variously produced or not. Leaves alternate or basal, usually petiolate with sheathing bases, often subtended by cataphylls, blades various simple to compound. Inflorescence subtended by cataphylls, consisting of a spadix subtended by a spathe. Spadix bearing bisexual or unisexual flowers. Bisexual flowers; tepal 0, 4 or 6, stamens 4-6, filaments free. Unisexual flowers, stamens single or synandria of 2- | fused stamens, ovaries single, commonly unilocular, ovule 1- many per locule, parietal, basal or apical. Neuter flower may be present at apex of male or female flowers. Fruit usually a head of 1-several seeded berries, commonly red.

Key to the genera

1a. Spathe persistent, leaves blade ovate……**2. Remusatia**
1b. Spathe deciduous, leaves linear or elliptic-lanceolate…… 2
2a. Leaves blades hastate, spathe swollen, margins strongly overlapping, narrow……..
……**3.Typhonium**
2b. Leaves blades simple, spathe tubular below, expanded into blade above……...
……..……..**1.Arisaema**

1. ARISAEMA Martius

Rootstock a subglobose corm or cylindric rhizome. Leaves few, basal or with overlapping bases forming a pseudostem. Blades trifoliate elliptic lanceolate, radiate, palmate or pedate. Petioles smooth or verrucose, subtended by membranous cataphylls. Monoecious or dioecious(sex depending on nutrition). Inflorescence borne with or before leave, pedunculate. Spathe tubular below, expanded into blade above, deciduous. Spadix sessile, in monoecious plants female below, male above, neuters sometimes present on stipe of appendix. Ovaries unilocular with several basal ovules. Style distinct, stigma peltate, papillose. Synandria of 2-6 fused stamens, sessile or on a united filaments. Berries red, few-seeded.

Key to the species

1a. Spathe with narrow white stripe, corm c1.5cm diameter, plant about 20cm tall……
…….……..……**i A. jacquemontii**
1b. Spathe without stripe, corm c4cm diameter plant about 150cm tall……..
……..……..……**2. A. tortuosum**

1. Arisaema jacquemontii Blume, *Rumphia* 1:95(1836); Noltie in *Fl. Bhu.* 3(1):146(1994); Press et al. in *Ann. Check. Fl. Pl. Nep.* 14(2000). Fig. 21.a.
Arisaema exile Schotf in *Bonplandia* 7:26(1859)

Dioecious. Corm c1.5cm diameter. Plant about 20cm, pseudo-stem. Cataphylls whitish. Leaf 2, palmate, leaflets 5, leaflet oblanceolate to elliptic, shortly acuminate, base cuneate, sessile, 5-8 | 1.5-5-2cm, palegreen. Petiole 4-6cm. Peduncle exseeding

leaves. Spathe pale green with narrow whitish stripes, tube c5cm, blade arching over spadix, acuminate into ascending filiform tail about 6cm. Appendix decurved, tapering, base swollen, smooth, stipe c0.5cm. Synandria sessile, cream. Fruiting peduncle erect.

Field note: On moist area.

Representative collection: Manang, Talekhu, 2.7.2006 (Fl.), K. Adhikari et al. 30.

Distribution: Nepal (WCE, 2700-4000m), Afghanistan, Himalaya (Kashmir to Bhutan), NE India, China (Xizang).

2. Arisaema tortuosum (Wall.) *Schott in Schott and Endl., Melet. Bot.* 17(1832); Noltie in *Fl. Bhu.* 3(1):147(1994); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 14(2000). Fig. 21.b.

Arum tortuosum Wall., *Pl. Asiat. Rarior.* 2:10, t.114 (1783)

Arisaema helleborifolium Schott, *Synops. Aroid.* 29(1856).

Nep:Banko/ Birbanka/ Sarpa ko makai

Monoecious. Corm c4cm diameter. Plant about 150cm, cataphylls, pseudostem and petioles variously blotched with pinkish, grey. Leaves 2-3, pedate. Leaflets elliptic to oblong-elliptic, shortly acuminate, base cuneate. Petiole c18cm, sheath with conspicuous apical auricles. Spath tube 5cm, blade spreading, not striped. Appendix asceding, gradually tapering from sessile base, greatly exceeding spathe. Fruiting peduncle erect.

Field note: On open slopy and moist area.

Representative collection: Manang, Chame, 2720m, 4.7.2006 (Fr.), K. Adhikari et al. 95.

Distribution: Nepal (WCE, 1300-2900m), Himalaya (Punjab to Bhutan), NE India (Meghalaya, Manipur), N. Myanmar, W. China.

2. REMUSATIA Schott

Perennial herbs with cormose tuber. Bulbil bearing stolons arising from of corm, bulbil scaly. Leaves blade more or less ovale, asymmetrically peltate, primary veins multiple, radiating from petiole and pinnately from midrib of main lobe. Flowering with or before leaves. Spathe with persistent, closed, green, basal section enclosing female part of spadix and yellowish-cream, deciduous blade. Monoecious. Flowers unisexual, lacking perianth. Spadix with terminal club-shaped male, intermediate slender stipe male neuters, basal female section, sometimes with a single, apical whorl of female neuters. Synandria of 2-3 fused stamens locule 4-6, opening by circular pore. Ovaries subglobose, 1-loculed, ovules basal or parietal. Stigma discoid, sessile.

1. Remusatia hookeriana Schott in *Oesterr. Bot. Wochenbl.* 7:133(1857); Noltie in *Fl. Bhu.*3(1):135(1994); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 15(2000)

Perennial herbs with cormose tuber. Leaf blade ovate, asymmetricallyt peltate, acuminate short, c6 | 5cm, yellowish green. Basally sheathing, petiole c9cm. Spathe narrowed to base, green outside apiculate, blade narrowly lanceolate. Stipe broader, synandria 2-loculed. Ovary subglobose. Stigma discoid, sessile.

Field note: On moist area.

Representative collection: Manang, Tal, 1640m, 9.7.2006 (Fr.), K. Adhikari et al. 223.

Distribution: Nepal (WCE, 1500-2400m), Himalaya (Himachal Pradesh to Sikkim).

3. TYPHONIUM Schott

Perennial herbs from a cormose tuber. Leaves petiolate, blades hastate, linear, 3-lobed or pedatifidly divided, present at flowering. Inflorescence pedunculate. Spathe with lower part persistent, swollen, margins strongly overlapping, upper part deciduous, narrow. Flowers bisexual, lacking perianth. Spadix with 4 sections from base; female-sterile zone, basal part bearing filiform to clavate neuters, upper part

with papillae, male-shortly stipitate, smooth terminal appendix. Stamens single or fused in pairs, anthers sessile. Ovaries 1-loculed with 1-2 basal ovules. Stigma sessile, punctate. Berries 1(-2) seeded.

1. Typhonium diversifolium Wall. ex Schott, *Aroid*. 13, t.20(1855); Noltie in *Fl. Bhu.* 3(1): 140(1994); Pres et al. in *Ann. Check. Fl. Pl. Nep.*: 92(2000).
Heterostalis diversifolia (Wall. ex Schott) Schott in *Oesterr. Bot. Wochenbl.* 7:261(1857).

Corm c1.5cm diameter. Cataphylls whitish, membranous. Leaves lanceolate, 4-7 | 1-2.5cm. Petiole c12cm. Inflorescence one per corm. Peduncle c4cm. Spathe c7cm, blade oblong-lanceolate, finely acuminate, margins inrolled, green with dark purplish-red lines. Spadix very shortly stipitate, shorter than and enclosed by spathe.
Field note: On sandy soil.
Representative collection: Manang, between Talekhu and Chame, 2780m, 3.7.2006 (Fl.), K. Adhikari et al. 56.
Distribution:Nepal (WCE, 2400-4300m), Himalaya (Uttar Pradesh to Bhutan), China (Xizang).

Family 78. CYPERACEAE

Perennial or annual herbs, often rhizomatous. Stems commonly trigonous. Leaves basal and/or cauline, often 3-ranked, usually grass-like blades, bases sheathing. Sheaths open or closed, apex often ligulate. Inflorescence simple(eg. spike) or compound(eg. panicle or anthelodium) composed of 1-many spikelets, usually bracteate. Plants sometimes dioecious. Flowers bisexual or unisexual, perianth of scales or bristles or absent, subtended by glumes, arranged spirally or distichously in spikelets. Stamens 1-3, anthers basifixed. Ovary 2 or 3 fused carpels, unilocular with 1-ovule. Stigmas 2 or 3, style often thickened at base. Fruit usually a biconvex or trigonous nut.

Key to the genera

1a. Flowers always unisexual……..... **1.Carex**
1b. Flowers either bisexual or both unisexual and bisexual……..…2
2a. Inflorescence terminal, commonly irregularly umbellate, bearing spikelets or partial inflorescence or unequal peduncles…….....3
2b. Inflorescence terminal several-times compound panicle or reduced to a few spikelets or dense of 1-3 heads of sessile spikelets…….....4
3a. Stigmas 2, nut biconvex…….....**5. Pycreus**
3b. Stigmas 3, nut trigonous…….....**2. Cyperus**
4a. Stems trigonous to triquetrous, stigmas 2, inflorescence dense of 1-3 heads of sessile spikelets…….....**4. Kyllinga**
4b. Stems obscurely trigonous, stigma 3, inflorescence several-times compound panicle or reduced to a few spikelets..... **3. Erioscirpus**

1. CAREX L.

Perennial herbs. Rhizomes short or elongate and creeping. Leaves borne mainly vegetative shoots, mainly at base of culm, blades usually linear, bases sheathing. Culms (flowering stems) commonly trigonous, upper part leafless or leafy, sometimes bearing bladeless sheaths at base. Flowers unisexual each subtended by a glume. Male flowers with usually 3 stamens. Female flowers each of a single pistil enclosed with in a utricle, stigmas 2 or 3, ovary developing to biconvex or trigonous nut. Flowers arranged in spikes which may be entirely female or male or mixed. Spikes arranged in panicles or racemes or sometimes single. Bracts subtending spikes or partial inflorescence, leaf-like.

Key to the Species

1a. Leaf sheaths persisting as fibres, leaves blades shorter than culms……
……..…….…….....**3. C. inaequalis**
1b. Leaf sheaths not persisting as fibres, leaves blades about equalling culm or exceeding inflorescence…….....2
2a. Leaf blade about equalling culms, spike primarily female……....**2. C. filicina**
2b. Leaf blade exceeding inflorescence, spike primarily male……..**1. C. condensata**

1. Carex condensata Nees ex in *Wight,Contrib. Bot. Ind.:123(1834)*; Noltie in *Fl. Bhu.* 3(1):379(1994).
Carex cruciata Wahlenb. in Kongl. Vetensk. Acad. Nya Handl., Stockh. 24:149 (1803).

Rhizomes stout, woody, stems clothed at apex by old leaves, bases of sheaths pale brown not persisting as fibres. Leaves subbasal and on lower part of culm, blades exceeding inflorescence, c9mm. Inflorescence very dense, spike bearing branchlets of partial inflorescence. Spikes primarily male. Utricles narrowly ellipsoid-trigonous, gradually tapered into curved beak, 3-4 | 0.8-0.9mm, exceeding glumes, hispid. Female glumes ovate, 2.1-3 | 0.9-1.6mm. Male glumes 2.5-3.5 | 1-1.4mm.
Field note: On open area with associated grasses.
Representative collection: Manang, Dharapani to Tal, 1640m, 14.10.2006 (Fr.), K. Adhikari et al. 456.

2. Carex filicina Nees in *Wight. Contrib. Bot. Ind*. 123(1834); Noltie in *Fl. Bhu.* 3(1):377(1994); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 88(2000). Fig.21.c.
Cyperus caricinus D.Don, *Prodr. Fl. Nep.* 39(1825).

Plant stout, rhizomes woody, creeping. Bases of leaf sheath persistent, not becoming fibrous. Bladeless sheaths present. Leaves basal 1-3 on culm, blades about equalling culms, c6mm wide. Culms to 20cm. Inflorescene to 10cm. Bracts shorter than inflorescence. Partial panicles open, rigid, triangular, axis hispid. Spikes primarily female, utricle lax, evenly space. Urticles curved, narrowly ellipsoid-trigonous, gradually narrow to beak, 2-3.3 | 0.7-1mm, glabrous, strongly ribbed. Stigma 3. Female glumes ovate, acute, 1-1.9 | 0.8-1.2mm. Male glumes lanceolate, 1.7-3.2 | 0.6-1.2 mm.
Field note: On moist sandy soil.
Representative collection: Manang, Koto, 2670m, 12.10.2006 (Fr.), K. Adhikari et al. 354.
Distribution: Nepal (WCE, 1200-4000m), Himalaya, E. India, east to China and Taiwan, south to Malaysia.

3. Carex inaequalis Boott ex C.B. Clarke in *Hook. f. Brit. Ind*. 6:762(1894); Noltie in *Fl. Bhu.* 3(1):385(1994); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 88(2000).

Tufted. Bases of leaf sheaths persisting as fibres. Leaves basal on lower part of culm, blades shorter than culms, c2mm wide. Culm c20mm, angles rounded. Inflorescence long, slender, flexuous. Fascicles with 2-4 unequal, slender, erect. Bracts with blades shorter than inflorescence, sheaths membranous. Spikes on peduncles female, those on longer male spikes. Female spike linear, 1-2cm, urticles erect. Urticles narrowly ellipsoid-trigonous, 2.9-3.5 | 0.6-1mm, curved beak, stigmas 3. Female glumes oblong-elliptic subacute, 2.4-2.8 | 1-1.4mm, reddish brown with hyaline apex and margins. Male glumes narrowly oblanceolate, c0.5 | 1.5mm, shortly excurrent midrib.
Field note: On shady place.
Representative collection: Manang, Talekhu, 2788m, 2.7.2006 (Fr.), K. Adhikari et al. 27.
Distribution: Nepal (C, 2600-3500m), Himalaya (Nepal-Sikkim).

2. CYPERUS L.

Annuals or perennials. Rhizomes short or long, sometimes stoloniferous, stolons sometimes bearing tubers. Stems trigonous, with sheathing leaves at or near base. Inflorescence terminal, commonly irregularly umbellate, bearing spikelets or partial inflorescence on unequal peduncles(rays). Rays surrounded at base by tubular bracts(cladoprophylls). Inflorescence subtebded by an involucre of leaf-like bracts usually greatly exceeding inflorescence. Spikelets arranged in spikes along a rachis or in heads, bisexual. Spikelets compressed. Glumes concave, midrib sometimes keeled. Perianth absent. Stamens 1-3. stigmas 3. Nut trigonous.

1. Cyperus squarrosus L., *Cent. Pl. 2.6.* 1756; Noltie in *Fl. Bhu.* 3(1):305(1994).

Dwarf, tufted annual. Stems trigonous, 3.5-15cm, 0.9-1.7mm, wide. Leaf single, sub-basal, blade flat about equalling stem, 1-3.4mm wide. Sheaths reddish-purple. Inflorescence c3 | 1.5cm long, compound with 2-5 rays. Partial inflorescence spicate, spikes elongate-hemispheric, 0.6-1.5 | 0.7-1.1cm with spreading spikelets. Spikelets oblong-fimbricate. Glumes 7-13, suberect, linear, mucronate gradually tapered. Stamen 1. Nuts trigonous.

Field note: On the gravel road.

Representative Collection: Manang, above Talekhu, 2790m, 10.10.2006 (Fr.), K. Adhikari et al. 384. **New record for "Flora of Nepal."**

3. ERIOSCIRPUS Palla

Densely tufted perennials. Stems solid, obscurely trigonous. Leaves basal, blades narrow, channeled. Inflorescence a terminal, several-times compound panicle or reduced to a few spikelets. Inflorescence bracts leaf-like, bracts subtending inflorescence branchlets glume-like. Spikelets with numerous glumes spirally inserted on persistent axis. Flowers bisexual. Perianth of numerous hypogynous bristles, bristles papillose near apex, growing after anthesis spikelets finally plumose. Stamens 1-2, stigma 3. Nut narrow, compressed-trigonous.

1. Erioscirpus comosus (Wall.) Palla, *Bot. Zeitung, 2. Abt*. 54(1):148, in Obs., 151, in Clav1. 1896; Noltie in *Fl. Bhu.* 3(1):281(1994).

Eriophorum comosum (wall) wall ex Nees. Sha

Density tufted perennials. Leaves greatly exceeding stem, c3mm wide, margins minutely serrate. Sheath persistent, margins fimbrilose. Stems leafless, about 40cm. Inflorescene panicle, c10cm. Inflorncence bracts leaf like, greatly exceeding inflorescence. Spikelets borne singly or in pairs, narrowly ellipsoid, sessile and peduncled. Glumes narrowly ovate to oblong, blunt to acute, 2.3-3 | 0.6-1.2mm, densely streaked orange brown, midrib green, excurrent as short. Stamens 1-2, connective extended as red-brown, acute point. Stigmas 3, erect, papillose. Nut compressed-trigonous, oblong, shining.

Field note: On the fragile stony soil.

Representative collection: Manang, Bagarchhap, 2630m, 13.10.2006 (Fr.), K. Adhikari et al. 420.

4. KYLLINGA Rottboell

Perennials with short or extensively creeping rhizomes, sometimes annual. Stem trigonous to triquetrous. Leaves basal and sub-basal with linear blades. Inflorescence dense of 1-3 heads of sessile spikelets, subtended by spreading, leaf-like bracts. Spikelets small, compressed, falling entire at maturity. Glumes 3-5, distichous, conduplicate, spikelets; lower 1-2 sterile, middle bisexual, upper male or sterile. Perianth absent. Stamens 1-3. Stigmas 2. Nut biconvex.

1. Kyllinga squamulata Tonn. ex Vahl, *Enum. Pl.* 2:381(1806); Noltie in *Fl. Bhu.* 3(1):325(1994); Press et al. in *Ann. Check. Fl. Pl. Nep.*: 95(2000). Fig.22.a.

Kyllinga cristata Afzel., *Remed Guin.* 10:71(1817).

Perennial, rhizomes extensively creeping, tufted. Stems shorter and stouter usually shorter than leaves. Leaves basal, c3mm wide. Inflorescence hemispheric, c1x1cm, greenish in life, subtended by spreading leaf-like bracts. Spikelets lanceolate, sessile, 2-3 x c1mm, usually with 3 glumes. Midrib of glumes bearing long, flattened whitish teeth, sides of glumes white. Nut narrowly oblong-obovate to oblong, elliptic, truncate.

Field Note: On the road side and dry place.

Representative collection: Manang, Thanchok, 2630m, 13.10.2006 (Fr.), K. Adhikari et al. 380.

Distribution: Nepal (C, 2600m), Tropical Africa, Madagascar, India, Indo-China, introduced into West Indies. **Not reported at 2630m altitude in Press et al. 2000.**

5. PYCREUS P. Beauvois

Annuals or perennials. Rhizomes short or long, sometimes stoloniferous, stolons sometimes bearing tubers. Stem trigonous with sheathing leaves at or near base. Inflorescence terminal, commonly irregularly umbellate, bearing spikelets or partial inflorescence on unequal peduncles(rays). Rays surrounded at base by tubular bracts(cladoprophylls). Inflorescence subtended by an involucre of leaf-like bracts usually greatly exceeding inflorescence. Spikelets arranged in spikes along a rachis or in heads, bisexual. Spikelets compressed. Glumes concave, midrib sometimes keeled. Perianth absent. Stamens 1-3. stigma 2. Nut biconvex.

Key to the Species

1a. Glumes side dark reddish-brown, stamens 2……. **1. P. sanguinolentus**

1b. Glumes side straw coloured, stamens 3…..…….....**2. P. unioloides**

1. Pycreus sanguinolentus (Vahl) Nees ex C.B. Clarke in Hook. f., *Fl. Brit. Ind*. 6:590(1893); Noltie in *Fl. Bhu*. 3(1):319(1994); Press et al. in *Ann. Check. Fl. Pl. Nep*.:96(2000). Fig.22.b.

Cyperus sanguinolentus Vahl, *tom; Cit*. 351(1806).

Slender, tufted. Stem not decumbent at base, about 7cm, slender. Leaves sub-basal, blades shorter than stems, c2mm wide. Sheaths reddish brown. Inflorescence a dense head of many spikelets. Involucral bracts 2-3, longest, c5cm. spikelets oblong, subacute, c1cm. Glumes ovate, blunt, c2 | 1.5mm, keeled, midrib green, 3-veined, sides dark reddish- brown. Stamens 2. Style short. Stigmas 2. Nut ellipsoid, apiculate, c1.5 | 1mm.

Field note: On road side and dry area.

Representative collections: Manang, Thanchok, 2630m, 13.10.2006 (Fr.), K. Adhikari et al. 379.

Distribution: Nepal (CE, 800-2900m), Widely spread from C. Asia and India through China to the temperate far East, Malaysia, Oceania, Africa.

2. Pycreus unioloides (R. Br.) Urban, *Symb. Antill*. 2:164(1900); Noltie in *Fl. Bhu*. 3(1):320(1994); Press et al. in *Ann. Check. Fl. Pl. Nep*. 96(2000). Fig.22.c.

Cyperus unioloides R. Br., *Prodr. Fl. Nov. Holl*. 1:216(1820).

Cyperus bromoides Link in Sprengel, *Schrader and Link, Jahrb. Gewachsk* 1, 3:85(1820).

Annual. Stems tufted, 10cm. Leaves short half stem length, blades c2mm wide. Sheaths pale-browm. Inflorescence capitate, compound, 3-4 rays. Involucral bracts 2 longer than spikelets. Spikelets oblong elliptic, acute, c8x3mm. Glumes narrowly ovate, truncate, c3x2mm, keeled, midrib green, 3-veined, sides straw coloured. Stamens 3. Nut broadly obovate to suborbical, smooth.

Field note: On the road side of moist sandy area.

Representative collection: Manang, Bagarchhap, 2630m, 13.10.2006 (Fr.), K. Adhikari et al. 418.

Distribution: Nepal (C.), Pantropical. **Not provided altitude data in Press et al. 2000.**

Family 79. ORCHIDACEAE

Plants perennial, terrestrial, epiphytic or lithophytic sometimes mycotrophic, growth monopodial or sympodial. Roots adventitious, often aerial, sometimes assimilatory. Stems usually leafy, often with one or more swollen internodes forming pseudobulb. Leaves usually entire, alternate or opposite, membranous or coriaceous, usually sheathed. Inflorescence erect or pendent, spicate, racemose or paniculate, 1-to many flowered, basal, lateral or terminal. Flowers zygomorphic, sessile or variously pedicellate, resupinate or non-resupinate. Sepals three, free or connate. Petals 3, usually free. Lip entire or variously lobed. Column with or without a basal foot, winged or lacking wings. Fertile anther one(rarely 2 or 3), terminal or incumbent cap like or dehiscing. Stigma 3-lobed; ovary inferior, mostly. unilocular with pariental placentation. Fruit a capsule. Seeds numerous, dust-like.

Key to the genera

1a. Plants lacking chlorophyll, leafless…….....6. **Gastrodia**
1b. Plants having chlorophyll with 1 to many leaves …….....2
2a. Leaves 2, opposite …….....**10. Listera**
2b. Leaves 1-many, spirally arranged or basal when single……3
3a. Pollinia either 4 or 8……..4
3b. Pollinia 2 ……..……..7
4a. Pollinia 8…….....**5. Eria**
4b. Pollinia 4 …….....5
5a. Inflorescence lateral arising from pseudobulb base, leaves 1 or 2 from pseudobulbs apex…….....**1. Bulbophyllum**
5b. Inflorescence lateral or terminal, 1-to many leaves …….....6
6a. Foot present, stems variously modified including pseudobulb, flowers resupinate or non-resupinate …….....**3. Dendrobium**
6b. Foot absent, stems modified into a leafy pseudobulb, flowers non-resupinate…… …….....**11. Malaxis**
7a. Leaves solitary, soft plicate appear after flowering, petiolate, suborbicular with cordate base …….....**13. Nervilia**
7b. Leaves 1 to many, appear before flowering, petiolate or sessile, various form and shape…….....8
8a. Leaves 2, always terrestrial …….....**12. Neottianthe**
8b. Leaves 1 to many, either terrestrial or epiphytic …….....9
9a. Lip unlobed, rostellum long, deeply cleft …….....**7. Goodyera**
9b. Lip lobed, rostellum variously modified and short or absent, if long globose……10
10a. Sepals free, subsimilar, connivent or spreading……11
10b. Dorsal sepal forming a hood over column with the petals or dorsal sepal free or connivent, hooded, lateral sepals spreading or recurred……...12
11a. Epichile flat or slightly convex with raised swelling at base, rostellum large and globose, column short …….....**4. Epipactis**
11b. Epichile recurved with longitudinal ridges, rostellum short or absent, column long ……..…….……..**2. Cephalanthera**
12a. Lip 2-3 lobed, flat …….....**9. Herminium**
12b. Lip entire or lobed, spurred …….....13
13a. Tubers pubescent, root long fleshy …….....**8. Hebenaria**
13b. Tubers entire, fusiform or ovoid …….....**14. Platanthera**

1. BULBOPHYLLUM Thouars

Plants epiphytic or lithophytic, small to large. Rhizome long or short, creeping to pendent, covered by scarious sheath. Pseudobulbs stout, sessile, often angled,

distant or clustered on rhizome. Leaves 1 or 2 from pseudobulb apex, thin-textured to coriaceous, erect, suberect, spreading or pendent. Inflorescence lateral, arising from pseudobulb base, racemose to capitate, 1-to many flowered, rachis sometimes flattened. Dorsal sepal free, lateral sepals connate at base to column foot to form a saccate mentum. Petals free. Lip simple to 3-lobed, sometimes fleshy, often ciliate or pubescent, recurved or erect. Column short, erect, aristate teeth or wings. Anther terminal pollinia 4, waxy.

1. Bulbophyllum scabratum Rchb. f. in Walpers, *Ann. Bot. Syst*. 6:259(1861); Press et al. in *Ann. Check. Fl. Pl. Nep.* 210(2000); Pearce & Cribb in *Fl. Bhu.* 3(3):470(2002). Fig.23.a.

Cirrhopetalum caespitosum Wall**.** Ex Lindl. in *Bot. Reg. 24:misc*. 35, no. 53(1838).

Bulbophyllum confertum Hook. f., *Fl. Brit. Ind*. 5(2):757(1980).

Plant epiphytic about 8cm tall. Rhizome attenuate, roots filiform. Pseudobulbs caespitose, fibrous-sheathed, c1 | 0.5cm. Leaf 1, linear-oblong, subacute to acute, strongly keeled beneath, 5-6 | c1cm. Petiole c1cm long. Inflorescence basal, erect, shorter than leaves, subumbellately 3-5 flowered. Peduncle filiform, sheathed at base & glabrous above, c2cm. Floral bracts lanceolate, acuminate. Lateral sepals linear-lanceolate. Petals broadly ovate, acute, margins erose-dentate, 3-veined, c3mm. Lip simple, fleshy, oblong, subacute, entire margins. Fruit globose, stalked.

Field note: On the open rocky area.

Representative collection: Manang, Tal, 1640m, 9.7.2006 (Fl.), K. Adhikari et al. 191.

Distribution: Nepal (E, 2000m), Himalaya (Nepal, Sikkinm), NE India (Meghalaya).

Not reported in Central Nepal & at 1640m altitude in Press et al. 2000.

2. CEPHALANTHERA L.C. Richard

Plants terrestrial. Roots numerous, fibrous. Stem erect, leafy. Leaves sessile, plicate. Inflorescence terminal, racemose, laxly to densely flowered. Flowers suberect, white, pink or yellow. Ovary sessile. Sepals & petals subsimilar, free, connivent. Lip 2-lobed, adnate to column base; hypochile concave to saccate. Epichile recurved, with longitudinal ridges. Column long, erect. Stigma large, rostellum short or absent. Anther hinged, pollinia 2, clavate, mealy. Fruit erect.

1. Cephalanthera longifolia (L.) Fritsch, *Oesterr. Bot. Z.* 38:81(1888); Press et al. in *Ann. Check. Fl. Pl. Nep.* 211(2000); Pearce & Cribb in *Fl. Bhu.* 3(3):40(2002).

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

Cephalanthera ensifolia **(**L.) L.C. Richard in *Mem. Mus. Hist. Nat*. 4:60(1818).

Plant about 40cm tall, rhizomes short, c1.5cm, roots clustered. Leaves many, lanceolate to linear-lanceolate, sheathing, alterate, 5-7 | 1.5-2.5cm. Inflorescence a fairly dense, secund raceme of up to 20 flowers, rachis c6cm long. Floral bracts small, lanceolate, acute to acuminate c5mm. Flowers semi-open, c1.5cm long. Pedicel & ovary slender, glabrous, c0.7cm long. Sepals similar, ovate-lanceolate, acute, c1.5 | 0.5cm. Petals ovate, subacute, c0.8 | 0.3cm. Lip 2-lobed, hypochile lobes triangular, epichile broadly cordate, apically papillose-tuberculate. Column long, terete. Fruit ridged.

Field note: On the shady area.

Representative collection: Manang, Talekhu, 2735m, 2.7.2006 (Fl.), K. Adhikari et al. 25.

Distribution: Nepal (WC, 1200-3200m), Europe, N. Africa, Afghanistan, Himalaya (Kashmir to Bhutan), China (Xizang), W. Siberia.

3. DENDROBIUM Sw.

Plants epiphytic, lithophytic or rarely terrestrial. Stems either(a) rhizomatous,(b) erect & many nodded,(c) erect & 1-or several nodded from a many-noded rhizome, or(d) lacking a rhizome, the new stems many nodded, arising from

base of the old ones, tough & fleshy, swollen at base or along whole length. Leaves 1 to many, apical from pseudobulb or arranged distichously along stem, linear-lanceolate, oblong or ovate, papery or coriaceous, apex usually 2-lobed or emarginated. Inflorescence racemose, 1-to many-flowered. Flowers often showy, resupinate or non-resupinate, ephemeral or long-lived. Sepals short to filiform, lateral sepals adnate to column foot form mentum. Petals similar to sepals. Lip entire to 3-lobed, base joined to the column foot, often forming spur, disc 1-to 7-keeled, usually ecallose. Pollinia 4 in appressed pairs, naked.

1. Dendrobium porphyrochilum Lindl. In *J. Proc. Linn. Soc., Bot*. 3:18(1858); Press et al. in *Ann. Check. Fl. Pl. Nep.* 214(2000); Pearce & Cribb in *Fl. Bhu.* 3(3):420(2002). Fig.23.b.

Plant about 5 cm tall, roots caespitose. Stem pseudobulbous, slender yellowish, covered by overlapping, sheaths. Leaf sheath membranous. Leaves 3-4, linear-oblong, obtuse, sessile, 3-4 | c0.5cm. Inflorescence terminal from pseudobulb, solitary 5-10 flowered. Penducle slender, basal sheath. Rachis weaky zigzag, glabrous. Floral bracts linear-lanceolate, acuminate. Flowers 1cm across. Sepals & petals pale green-yellow with red veins, lip purple. Lip simple, elliptic-sagittate, subacute, decurved from base, margin entire, c3 | 1.5mm.

Field note: Above the open rock.

Representative collection: Manang, Tal, 1640m, 9.7.2006 (Fl.), K. Adhikari et al. 191.

Distribution: Nepal (CE, 2500m), Himalaya (Nepal, Sikkim), NE India (Meghalaya), N. Myanmar.

4. EPIPACTIS Zinn.

Plants terrestrial, usually autotrophic, rarely mycotropic. Rhizome horizontal with fleshy roots. Leaves spirally arranged, plicate. Inflorescence terminal, racemose, more or less secund, laxly to densely few to manyflowered. Peduncle erect, leafy. Flowers pedicellate, spreading or pendent. Ovary pedicellate. Sepals and petals free, sub-similar, spreading or connivent. Lip 2-lobed, fleshy. Hypochile concave, epichile flat to slightly convex with raised swelling at base. Column short, rostellum large and globose. Pollinia 2, mealy.

1. Epipactis royleana Lindl., *Gen. Sp. Orchid. Pl*. 461(1840); Press et al. in *Ann. Check. Fl. Pl. Nep.* 215(2000); Pearce & Cribb in *Fl. Bhu.* 3(3):44(2002).
Cephalanthera royleana (Lindl.) Regel in *Trudy Imp. S.-Peterburgsk. Bot. Sada* 6:490(1876).

Plant glabrous about 30cm. Rhizome elongate, with fibrous roots. Leaves many, plicate, alternately clasping the stem, ovate-elliptic to broadly lanceolate, acute, 2-6 | 1-3cm. Inflorescence laxly many flowered. Floral bracts pale green, leafy, lanceolate, acuminate. Sepals greenish-pink. Lip yellowish with purple veins. Sepals spreading ovate-lanceolate. Dorsal sepal tapering, acuminate, concave, keeled, lateral sepals falcate, oblique, acuminate. Petals erect, ovate, oblique, acute, c1.5 | 0.6cm. Lip in two parts, hypochile concave, epichile oblanceolate. Anther cap terminal. Fruit-ellipsoid.

Field note: On shady area.

Representative collection: Manang, Humde to Manang, 3450m, 30.6.2006 (Fl.), K. Adhikari et al. 1.

Distribution: Nepal (WC, 1600-3500m), Pakistan, Himalaya (Kashmir to Bhutan), China (Xizang).

5. ERIA Lindl.

Plants epiphytic, rarely terrestrial. Stems pseudobulbous, or a cone-like with(1-)2 to many leaves. Leaves flat or terete, thin textured or coriaceous. Inflorescence terminal or axillary, racemose or rarely 1-flowered. Rachis often hirsute

or woolly. Sepals free(rarely connate), glabrous or hirsute. Lateral sepals adnate to elongate. Column foot to form a short to long, spur-like or gibbous mentum. Lip sessile on column foot & incumbent. Column short, broad, often 2-winged, foot prominent. Anther imperfectly 4-loculed. Pollinia 8, waxy, pyriform or broadly ovoid to a viscidium.

1. Eria stricta Lindl., *Coll. Bot.* 8:t. 41b(1826); Press et. al. in *Ann. Check. Fl. Pl. Nep.* 216(2000); Pearce and Cribb in *Fl. Bhu.* 3(3):378(2002).
*Mycaranthes Stricta (*Lindl.) Lindl., *Gen. Sp. Orchid*. Pl.63(1830).

Plant about 12cm tall, roots linear, branching. Stem pseudobulbs, bases covered with sheaths, membranous, 2-3cm. Leaves arising from pseudobulb apex, oblong-elliptic, shortly acuminate. Petiole grooved. Inflorescence 1, erect arising from psudobulb apex, racemose, densely many-flowered. Rachise c6cm long. Floral bracts ovate, acute, glabrous. Flowers densely woolly externally, lip white. Petals similar, white, obtuse, c3 | 2mm. Lip suborbicular, concave.
Field note: On the open rock.
Representative collection: Manang, Tal, 1645m, 9.7.2006 (Fl.), K. Adhikari et al. 193.
Distribution: Nepal (C.) Himalaya (Nepal, Sikkim), NE India, Myanmar, China (Xizang).

6. GASTRODIA R. Br.

Plants terrestrial, mycotrophic, leafless, lacking chlorophyll. Rhizomes tuberous. Inflorescence terminal, erect, laxly racemose. Sepals & petals united into a ventricose tube, with a 5-lobed apex in front between the lateral sepals, which are shortly or extensively, connate. Lip adnate to the column foot, spurless. Column more or less elongate, rarely short, slender with a short foot. Anther incumbent. Pollinia 2, granulose. Stigma at base of column.

1. Gastrodia falconeri D.L. Jones & M.A. Clements in *Orchadian*, 12(8): 350 (1988), nom. nov. (IK); Pearce & Cribb in *Fl. Bhu.* 3(3):31(2002).
Gastrodia orobanchoides (Falconer) Bentham, *non. F. Mueller* 1873.

Plants about 50cm. Rhizome tuberous. Stem glabrous, Inflorescence laxly many flowered. Rachis c7cm long, floral bracts lanceolate, long acuminate, 1-1.5cm long. Flowers fleshy, c1cm across. Sepals & petals pale yellowish-green, edged with pale brown. Lip & column white. Sepals subequal, elliptic-lanceolate, acute, adnate to petals, c1cm long. Petals similar to sepals, acute, c1cm long. Lip obscurely 3-lobed, ovate-oblong. Column curved, c3mm long. Fruit ovoid.
Field note: On the decaying pine wood associated with mosses & shady place. **Representative collection:** Manang, upperside of Chame, 2720m, 4.7.2006 (Fl.), K. Adhikari et al. 94. **Not reported in Press et al. 2000.**

7. GOODYERA R. Br.

Plants terrestrial or occasionally epiphytic, rhizome creeping, rooting at nodes. Stems erects leafy. Leaves basal or clustered, fleshy, several, usually petiolate from inflated sheaths, sometimes reticulately patterned. Inflorescence terminal, erect, few to many-flowered, racemose. Peduncle & rachis often pubescent. Flowers often secund & pubescent or glandular. Sepals parallel to the floral axis or with lateral sepals spreading, Dorsal sepal forming a hood with petals. Lip unlobed, hollow or saccate at base narrowed to an acute apex which is often recurved. Column short. Rostellum long, deeply cleft. Stigma undivided, large. Pollinia 2, often deeply cleft, granulose, pyriform a clavate, viscidium elongate.

1. Goodyera repens (L.) R.Br. in Aiton, *Hortus Kew. ed.* 2(5):198(1813); Press et al. in *Ann. Check. Fl. Pl. Nep.* 217(2000); Pearce & Cribb in *Fl. Bhu.* 3(3):93(2002). Fig.23.c.
Statyrium repens L., *Sp. Pl.* 945(1753)

Epipactis repens (L.) Crantz, *Stirp. Aust. Fasc. ed*. 2:473(1769).

Plant slender about 12cm tall. Rhizome creeping, with stolon above the soil. Stem erect, glandular pubscent, leaves crowded near base. Leaves elliptic-ovate to cordate, reticulate, 2-3.5 | 1-1.5cm, petiolate. Inflorescence cylindric, weakly spiral, laxly many flowered. Rachis c5cm long. Floral bracts lanceolate, acute 0.5-1.2cm long. Flowers pendent, cream. Sepals similar, ovate, dorsally glandular pubescent, c5mm long. Petals lanceolate, c4mm long, lip undivided, column c2mm long. Rostellum bifid.

Field note: On the moist, shady associated with mosses.

Representative collection: Manang, Talekhu, 2735m, 2.7.2006 (Fl.), K. Adhikari et al. 32.

Distribution: Nepal (WCE, 1000-4200m), Europe, Himalaya (Kashmir to Bhutan), NE India, Myanmar, China, Japan, N. America.

8. HEBENARIA Willdenow

Plant terrestrial(rarely epiphytic), tubers pubescent. Root long fleshy. Stem erect, few-to many-leaves, bearing bladeless sheaths below. Leaves thin-textured, narrowly elliptic to orbicular, sheathing at base, uppermost bract-like. Inflorescence terminal, racemose, laxly to densely many-flowered. Flowers white, green, or pink. Dorsal sepal forming a hood over column with the petals, lateral sepals spreading. Petals entire, 2-lobed or bifid. Lip spurred, entire or 3-lobed. Column short or long. Anther erect or reclinate, pollinia 2, sectile clavate, stigmas 2. Rostellum 3-lobed.

1. Hebenaria pectinata (J.E. Smith) D. Don, *Prodr. Fl. Nep.* 24(1825); Press et al. in Ann. Check Fl. Pl. Nep. 218(2000); Pearce & Cribb in *Fl. Bhu.* 3(3):151(2002).
Orchis pectinata sensu J.E. Smith, *Exot. Bot*. 2:77, t. 99(1806).

Plant erect, tuber fusiform. Roots filiform. Stem leafy, c25cm. Basal sheaths overlapping. Leaves 6-8, distant along stem, laceolate, acute, sessile, shortly sheathing at base, 3-7 | 1-2.5cm. Sheath clasping. Inflorescence many flowered. Rachis glabrous, c4cm. Floral bracts leafy, lanceolate, acuminate, c2.5 | 0.6cm. Sepals & petals green. Dorsal sepal erect, ovate-lanceolate, acute, 5-veined, c2 | 0.5cm, lateral sepals, spreading, ovate- lanceolate, oblique, acute. Petals erect, oblong-lanceolate, acute, c1.5 | 0.4cm. Lip 3-lobed. Column stout. Pollinia elliptic. Stigmatic lobes linear.

Field note: On sandy soil.

Representative collection: Manang, Tal, 1650m, 9.7.2006 (Fl.), K. Adhikari et al. 213.

Distribution: Nepal (WCE, 900-3200m), Himalaya (Himachal Pradesh to sikkim), China (Xizang).

9. HERMINIUM L.

Plant terrestrial, small, glabrous. Tuber cylindric, undivided. Stem with bladeless sheaths at base. Leaves single or few. Inflorescence terminal, racemose, erect, laxly to densely many-flowered. Floral bracts small, lanceolate. Flowers small. Sepals subsimilar, dorsal sepal free or connivent, hooded, lateral sepals spreading. Petals smaller than the sepals, forming hood with the dorsal sepal. Lip 2-or 3-lobed, flat. Column short, anther 2-locular, adnate to the face of the column. Pollinia 2, vicidia 2. Staminodes prominent, stigma 2-lobed, convex, clavate. Rostellum short.

1. Herminium lanceum (Thunberg ex Sw.) Vuijk in *Blumea* 11(1):228(1961); Press et al. in *Ann. Check. Fl. Pl. Nep.*:218(2000); Pearce & Cribb in *Fl. Bhu.* 3(3):162(2002).
Ophrys lancea Thunberg ex Sw. in *Kongl. Vetensk. Acad. Nya. Handl*. 21:223(1800).
Satyrium lanceum **(**Thunberg ex Sw.) Persoon, *Syn. Pl*. 2:507(1807).

Plant about 30cm tall. Tubers small, ovoid. Stem erect, distantly 3 leaved, bracteate above leaves. Basal sheaths overlapping, tubular, c4cm long. Leaves linear

to linear-lanceolate, acuminate, sessile, sheathing at base, 5-9 | c0.5cm. Inflorescence slender, densely many flowered. Rachis glabrous, about 8cm long. Floral bracts ovate-lanceolate to lanceolate, long acuminate, c1 | 0.1cm. Flowers greenish-white. Dorsal sepal concave, ovate, hooded, 1-veined, c3 | 1mm, lateral sepals oblique, ovate, obtuse. Petals linear lanceolate, hooded, c1.5 | 1mm. Lip 3-lobed. Fruit ovoid, sessile, erect.

Field note: On the sandy soil of road side.

Representative collection: Manang, Koto, 2570m, 13.10.2006 (Fl.), K. Adhikari et al. 356.

Distribution: Nepal (WCE, 1500-3500m), Himalaya (Himachal Pradesh to Sikkim), India, Myanmar, Thailand, Indo-China, China, Japan, Malaysia.

10. LISTERA R. Br.

Plants terrestrial, root branched, fasciculate & fibrous. Leaves 2, opposite. Inflorescence terminal, loosely or subdensely racemose. Peduncle erect. Flowers small. Sepals & petals subsimilar, subequal, spreading or reflexed. Lip porrect or pendent, entire or bifid. Column short, erect-curved, lacking a foot. Anther retrorse-inclined. Pollinia mealy, 2-parted. Stigma terminal, transverse.

1. Listera pinetorum Lindl. in *J. Proc. Linn. Soc., Bot*. 1:175(1857); Press et al. in *Ann. Check. Fl. Pl. Nep.* 220(2000); Pearce & Cribb in *Fl. Bhu.* 3(3):220(2002). Fig.23.d.

Diphryllum pinetorum **(**Lindl.) Kuntze, Revis. Gen. Pl. 2:659(1981).

Plant 10cm tall; roots tuberulous, clustered. Stem glabrous, sheathed at base, evaginate above. Leaves 2, opposite at stem apex, sessile, broadly cordate, acute, c3 | 2.5cm. Inflorescence laxly few flowered. Rachis, c4cm long. Floral bracts ovate-lanceolate, acuminate. Flowers c1cm long. Sepals & petals pale green-white. Column reddish-brown with a green apex. Sepals subequal, spreading, ovate-oblong, subacute, c3 | 2mm. Petals linear-oblong, subacute, c4 | 1mm. Lip simple, obovate-oblong, apex deeply bifid, c8 | 5mm. Column cylindric, curved, c3mm long, Rostellum obtuse. Pollinia clavate. Fruid ovoid, ridged, erect.

Field note: On moist, shady & in the dense forest.

Representative collection: Manang, Koto, 2600m, 6.7.2006 (Fl.), K. Adhikari et al. 130.

Distribution: Nepal (C, 3000-3800m), Himalaya (Nepal to Bhutan), China (Xizang). **Not reported at 2600 m altitude in Press et al. 2000.**

11. MALAXIS Solander ex Sw.

Plants terrestrial, lithophytic or epiphytic, caespitose or with a distinct rhizome, occasionally mycotrophic & leafless. Stem modified into a leafy pseudobulb, fleshy. Leaves 1 to several, membranous or fleshy, plicate to conduplicate, sometimes petiolate. Inflorescence terminal, pedunculate, racemose to subumbellate, laxly to densely many-flowered. Flowers small to minute, non-resupinate. Sepals free, subequal, spreading, lateral sepals often connate at base. Petals filiform, coiled. Lip free from column, sessile, entire or lobed, cordate or auriculate. Column short, lacking a foot. Pollinia 4, waxy. Stigma transverse, confluent.

Key to the species

1a. Pseudobuld ovoid, stem arising from apex of pseudobulb, leaves 2……
……**2. M. muscifera**

1b. Pseudobulb conical, stem arising from base of pseudobulb, leaf 1……
……**1. M. cylindrostachya**

1. Malaxis cylindrostachya (Lindl.) Kuntze, *Revis. Gen. Pl.* 673(1897); Press et al. in *Ann. Check. Fl. Pl. Nep.* 220(2000); Pearce & Cribb in *Fl. Bhu.* 3(3):218(2002).

Dienia cylindrostachya Lindl. in *Wall. Cat*. 1934 (1829).
Microstylis cylindrostachya (Lindl.) Rchb. f. in *Walpers, Ann. Bot Syst*. 6:207(1861).

Plant terrestrial about 20cm tall, roots fasciculate. Pseudobulbs conical, c1 | 1cm. Stem arising from base of pseudobulb, sheathed. Sheaths 2 to 3, clasping. Leaf 1, elliptic or orbicular, obtuse, long petiolate, finely reticulately veined, c6 | 4cm. Petiole tubular, sheathing stem, 3cm long. Inflorescence racemose, cylindric, densely many-flowered. Rachis ridged, c9cm long. Floral bracts lanceolate, acute, c2mm long. Flowers c2mm long, uniformly yellowish-green. Sepals subsimilar, ovate, acuminate, c2 | 1mm. Petals linear-lanceolate, acute, c1.5 | 0.5mm. Lip fleshy, broadly ovate. Column stout.

Field note: On shady & moist place.

Representative collection: Manang, Koto area, 2550m, 5.7.2006 (Fl), K. Adhikari et al. 112.

Distribution: Nepal (CE, 2600-3500m), Himalaya (Himachal Pradesh to Sikkim), India, Myanmar, China (Xizang). **Not reported at 2550m altitude in Press et al. 2000.**

2. Malaxis muscifera (Lindl.) Kuntze, *Revis. Gen. Pl*. 2:673(1981); Press et al. in *Ann. Check. Fl. Pl. Nep*. 220(2000); Pearce & Cribb in *Fl. Bhu*. 3(3):218(2002).
Dienia muscifera Lindl. in *Wall. Cat*. 1935(1829).
Microstylis muscifera (Lindl.) Ridley in *Journ. Linn. Soc*. 24:333(1888)

Plant terrestrial, about 15cm. Rhizome short. Pseudobulb ovoid, sheathed, 1-1.5cm tall. Stem arising from apex of pseudobulb, sheathed. Leaves 2, ovate-oblong to lanceolate-oblong, obtuse to subacute, subsessile, finely reticulately veined, 2-8 | 0.8-5cm. Inflorescence racemose, densely many-flowered. Rachis c8cm. Floral bracts lanceolate, acute, c3 | 1mm. Flowers erect, pale green. Sepals subequal, broadly oblong-lanceolate, subacute, c2 | 1mm. Petals broadly linear-lanceolate to linear, acute or subacute, c2 | 0.5mm. Lip superior, fleshy, broadly ovate. Column fleshy, with 2 small, spreading 3-lobed wings. Fruit erect, ovoid.

Field note: On the moist, shady area in the dense forest.

Representative collection: Manang, Koto, 2900m, 12.10.2006 (Fr.), K. Adhikari et al. 349.

Distribution: Nepal (WCE, 2600-4100m), Himalaya (Kashmir to Bhutan), N. Myanmar, China (Xizang).

12. NEOTTIANTHE Schltr.

Plants terrestrial, slender, tubers 2, cylindric or ellipsoid. Stem with several basal, bladeless sheaths. Leaves 2, basal. Inflorescence terminal, racemose, few-to many-flowered(rarely 1-flowered), often secund. Floral bracts leaf-like. Flowers resupinate. Ovary subsessile, cylindric to fusiform, twisted, glabrous. Sepals & petals similar, connivent to form a hood. Lip 3-lobed, spurred, usually papillose above. Spur decurved, conical. Column suberect, Rostellum 3-lobed. Pollinia 2. Caudicels very short. Viscidia placed closed together & parallel above the stigma.

1. Neottianthe cucullata (L.) Schltr. in *Feddes Repert. Spec. Nov. Regni Veg*. 16:292(1919); Press et al. in *Ann. Check. Fl. Pl. Nep.* 220(2000); Pearce & Cribb in *Fl. Bhu*. 3(3):168(2002).
Orchis cucullata L., *Sp. Pl*. 939(1753).
Gymnadenia cucullata **(**L.) L.C. Richard in *Mem. Mus. Hist. Nat*. 4:57(1818).

Plant erect about 12cm tall. Tubers ovoid. Basal sheaths lanceolate, acuminate. Leaves 2, basal lanceolate-ovate, acute, reticulate markings, 4-7 | 0.5-1cm. Petiole extending into sheathing base. Inflorescence racemose, many flowered. Rachis glabrous, c5cm long. Floral bracts lanceolate, acuminate c8 | 1mm. Dorsal sepal lanceolate, acute, 1-veined, c3.5 | 1.5mm, lateral sepals lanceolate, acute, 1-veined. Petals filiform, forming a hood with dorsal sepal. Lip 3-lobed, spurred, surface glandular pubescent.

Field note: On shady & moist place. **Representative collection:** Manang, Chame, 2730m, 11.10.2006 (Fr.), K. Adhikari et al. 295.

Distribution: Nepal (C, 3000m), W. Europe, Siberia, China, Korea, Japan. **Not reported at 2730m altitude in Press et al. 2000.**

13. NERVILIA Commerson ex Gaudichaud

Plants terrestrial with joined tubes. Leaves solitary, soft plicate, petiolate, suborbicular with cordate base, appering after flowering. Inflorescence terminal, erect, racemose, 1-to several-flowered. Peduncle brittle. Flowers not opening widely, pendent. Sepals & petals similar, free, gaping, rarely subspreading, lanceolate, acute. Lip erect, simple or 3-lobed, spurless. Column elongate, clavate, wingless. Anther incumbent. Pollinia 2, granulose. Stigma oblong.

1. Nervilia aragoana Gaudichaud, in *Freycinet, Voy. Uranie*:422, t. 35(1826); Press et al. in *Ann. Check. Fl. Pl. Nep.* 221(2000); Pearce & Cribb in *Fl. Bhu.* 3(3):61(2002).

Pogonia carinata **(**Roxb.) Lindl., *Gen. Sp. Orchid. Pl*. 414(1840).

Plant upto 40cm tall. Tuber small, globose, c1.5 | 1.5cm. Leaf petiolate, reniform, rounded at base. Inflorescence terminal, erect, subdensely many-flowered. Peduncle enclosed in inflated sheaths below. Rachis c8cm long. Floral bracts linear-lanceolate, acuminate, reflexed, c1cm long. Flowers c2cm long. Sepals & petals greenish-yellow, lip pink veined. Sepals & petals similar, oblong-linear, acuminate, c1cm long. Lip 3-lobed, base cuneate, lateral lobes ovate-triangular, acute, mid-lobe ovate, acute, obtuse. Column straight, clavate, c5mm long. Fruit ovoid to globose, stalked.

Field Note: On the bank of river.

Representative collection: Manang, Nayabazar, 2640m, 7.7.2006 (Fl.), K. Adhikari et al. 157.

Distribution: Nepal (C, 800m), Himalaya (Uttar Pradesh), Myanmar, Thailand, Malaysia, Polynesia. **Not reported at 2640m altitude in Press et al. 2000.**

14. PLATANTHERA L.C. Richard

Plants terrestrial or sometimes epiphytic. Rootstock tuberous or of a fascicle of fleshy, tapered roots. Tuber entire, fusiform or ovoid. Stem erect, with basal, bladeless sheaths, leafy or not. Leaves basal or cauline. Inflorescence terminal, racemose laxely to densely flowered. Floral bracts leaf-like. Ovary cylindric to fusiform, curved, twisted, glabrous. Dorsal sepal and petal usually connivent to form a hood, lateral sepals free, spreading or recurved. Lip entire or lobed, spurred. Spur variable, filiform, cylindric or clavate. Column short, truncate. Rostellum flattened, triangular. Anther broad, Pollinia 2, clavate or cleft into 2 halves. Caudicels attached to naked viscidia. Stigma variable, either 2, distinct & lateral or conjoined above or below the spur.

1. Platanthera edgeworthii (Hook. f. ex Collett) R.K. Gupta, *Fl. Nainitalensis*:349(1968); Pearce & Cribb in *Fl. Bhu.* 3(3):187(2002).

Hebenaria edgeworthii Hook. f.ex Collett in Collett, *Fl. Siml*. 504, f. 166(1902).

Plant about 15cm tall. Tubers small, fusiform, ellipsoid to subglobose, c2 | 1cm. Stem leafy, basal sheath tubular. Leaves 3 or 4, lower broadly ovate, bract-like above, sessile, 5-7 | 2-4cm. Stem bracts lanceolate, acute. Inflorescence cylindric, subdensely many flowered. Rachis c6cm long. Floral bracts narrowly lanceolate, acute, c1 | 0.2cm. Flowers 3-5mm long. Sepals green, petals yellowish-green. Lip yellow. Dorsal sepal ovate, concave, lateral sepals broadly ovate. Petals lanceolate, incurved & hooded with the dorsal sepal. Stigma oblong. Rostellum triangular.

Field note: On open moist area.

Representative collection: Manang, Above Chame, 2720m, 4.7.2006 (Fl.), K. Adhikari et al. 105. **New records for "Flora of Nepal."**

CHAPTER 4
DISCUSSION

Flora refers to plant occurring within a geographical region as well as publication of description of plants. The main aim of the present study is to contribute to the Flora of Manang, which will also contribute to the Flora of Nepal. Floristic composition of any area serves as a useful tool to develop strategy for conservation, sustainable management and utilization of biodiversity. This study was carried out with the objectives to enumerate and describe the flowering plants from upper subtropical to lower subalpine zone of Manang focusing to the Gyasumdo part of Manang and its adjoining areas.

The present study revealed some new addition to the Flora of Nepal. Altogether four species including 1 variety are newly record for Nepal. Two species viz. *Lindelofia anchusoides* Lehm. (Boraginaceae) and *Gastrodia falconeri* D.L; Jones & M.A. Clements (Orchidaccae) were reported as new record of species for Nepal by Pokharel (2004) & Rajbhandari (2004) respectively, are also reported in this study. *Lindelofia anchusoides* Lehm. has also been reported from Agrakhachhi district and described recently as a new record for Nepal (Panthi & Chaudhary 2007). The newly recorded taxa are: *Calamagrostis lahulensis* G. Singh (Gramineae) *Oryzopsis aequiglumis* Duthie ex Hook. f. (Gramineae), *Cyperus squarrosus* L. (Cyperceae) and *Platanthera edgeworthii* R.K. Gupta (Orchidaceae), which are determined and approved at the Royal Botanic Garden, Edinburgh (E) by H.J. Noltie and R.P. Chaudhary. Altogether 13 species are added as with new locality in Central Nepal and 79 species are found with different altitudinal ranges in which 41 species recorded at higher altitude and 38 species recorded at lower altitude than reported in *Hara et al.* (1978, 1979 and 1982) and *Press et al.* (2000) (Appendix V).

Out of 285 species, 40 species were identified up to family level only in the present study. The largest family was Compositae (30 species), followed by Labiatae (22 species), Rosaceae and Gramineae (16 species in each), Orchidaceae (15 species), Leguminosae (14 species), Ranunculaceae (12 species), Polygonaceae (10 species), Scrophulariaceae and Cyperaceae (8 species in each), Gentianaceae (7 species), and Umbelliferae (5 species) and so on in descending order. Altogether 245 species that were identified at species level belong to 203 genera and 79 families. Compositae

with 17 genera and 21 species is followed by Labiatae with 14 genera and 19 species, Gramineae with 15 genera and 16 species, Orchidaceae with 14 genera and 15 species, Rosaceae with 11 genera and 13 species, Polygonaceae with 8 genera and 9 species, Scrophulariaceae with 7 genera and 8 species, Ranunculaceae and Cyperaceae with 5 genera and 8 species each, Leguminosae with 6 genera and 7 species, Gentianaceae with 4 genera and 7 species, Araceae with 3 genera and 4 species, Acanthaceae and Caprifoliaceae with 2 genera and 4 speices each then families Rutaceae, Ericaceae, Rubiaceae, Boraginanceae, Solanaceae having only 3 species. Likely, Betulaceae, Amaranthaceae, Fumariaceae, Saxifragaceae, Elaegnaceae, Araliaceae, Primulaceae, Asclepiadaceae, Convallariaceae, Liliaceae and Commelinaceae having 2 species each and rest families under the study having 1 genus and 1 species each.

The largest genera recorded from current study are *Swertia, Elsholtzia* with 4 species each followed by *Geranium, Strobilanthes, Viburnum, Anaphalis* and *Cares* with 3 species each followed by *Thalictrum, Berberis, Sedum, Cotoneaster, Rosa, Desmodium, Zanthoxylum, Impatiens, Viola, Rhododendron, Galium, Lindelofia, Ajuga, Salvia, Solanum, Pedicularis, Valeriana, Aster, Senecio, Agrostis, Arisaema, Pycreus* and *Malaxis* with 2 species and rest of the genera are represented by 1 species each.

By comparing the finding made from the present floristic study at family level with that of other studies in related area, some of finding have been found to be similar whereas some others have been found to be different with them. Some of the examples have been summarized in the underlying paragraph.

An Enumeration of Flowering Plant of Nepal (*Hara et al.* 1978, 1979 and 1982) and Annotated Checklist of the Flowering Plants of Nepal (*Press et al.* 2000) enumerated the plants found in Nepal in which Compositae represents the largest family which is followed by Gramineae, Orchidaceae, Leguminosae, Rosaceae, Cyperaceae, Scrophulariaceae, Labiatae, Ranunculaceae, Umbelliferae. All these families lies within top ten largest families under this study and Rosaceae and Gramineae are the third largest families which show a different rank in the dominancy of the families. This may be because of fact that present study was carried out only in upper part of subtropical to lower part of subalpine zone in Manang.

Chaudhary (1978) in the study of weed Flora of Kathmandu Valley (Central Nepal) reported Compositae (31 spp.), Gramineae (15 spp.), Labiatae (14 spp.),

Rosaceae (14 spp.) Rubiaceae (13 spp.) and Urticaceae (12 spp.) as dominant families. Similar results come from the present study.

Shrestha (1983) in the Floristic study of Dhulikhel and Panchkhal (Central Nepal) found Compositae (28 spp.), Gramineae (23 spp.), Leguminosae (23 spp.), Labiatae (14 spp.) and Euphorbiaceae (10 spp.) as dominant families. Except Euphorbiaceae, more or less similar results was found while Euphorbiaceae contains only 1 species in the present study.

Ohba and Akiyama (`1992) reported 577 species Angiospermae in the Alpine Flora of Jaljale Himal (East Nepal) in which 493 species belong to Dicotyledonae. Compositae is the largest family (53 spp.) followed by Saxifragaceae (46 spp.), Rosaceae (41 spp.) and Scrophulariaceae (39 spp.). Saxifragaceae and Scrophulariaceae families contain only 2 species and 8 species respectively which may be due to more wet monsoon in Eastern part of Nepal as compared to Manang.

Obha and Mall (1988, 1999) in the Himalayan Plants reported a total of 1229 species of Dicotyledonae. The largest family Compositae is similar to the finding of present study. However, Saxifragaceae represents second dominant family in their findings which is different from the present study.

Adhikari (2003) in Forest Flora of Durandada, Lamjung (Cental Nepal) reported that the largest family is Compositae (11 spp.) followed by Orchidaceae (10 spp.), Leguminosae (9 spp.), Rubiaceae (9 spp.), Labiatae (8 spp.), Verbenaeae (8 spp.), Euphorbiaceae (7 spp.), Urticaceae (7 spp.), Gramineae (6 spp.) and Rosaceae (6 spp.). The largest family Compositae is similar to the finding of present study. However, Rubiaceae, Verbenceae, Euphorbiaceae and Urticaceae are different from the present study as these are represented by Rubiaceae (only 3 spp. and rest by only 1 species) which may be due to altitudinal and climate variations between these two areas although they are adjoining districts.

Adhikari et al. (2003) in Flora of Champadevi and its adjoining areas (Central Nepal) reported 160 species where dominant families in the descending order were Rosaceae, Compositae, Gramineae, Cyperaceae. In the present study Compositae and Labiatae are dominant families. This may be because Manang lies within the trans-Himalayan range while Chamadevi and it's adjoining areas are different from such range.

Kshetri (2003) reported 204 species from Chock Chisapani VDC of Tanahun district (Central Nepal) in which Compositae stands first dominant with 25 species

followed by Gramineae (22 spp.), Labiatae (13 spp.), Leguminosae (11 spp.), Euphorbiaceae (10 spp.), Moraceae (10 spp.), Urticaceae (7 spp.) and Cyperaceae (7 spp.). There is no record of Moraceae from Manang in this study and Euphorbiaceae and Urticaceae are represented by only 1 species. From floristic point of view Chisapani VDC lies in the subtropical zone whereas the study area in Manang falls in upper part of subtropical to lower subalpine zone.

Shrestha (2004) in trans-Himalayan Dicot Flora of NW Nepal: Dolpa and its surrounding recorded 312 species in which the largest family is Compositae (37 spp.) as in present study.Then it is followed by Ranunculaceae, Leguminosae, Cruciferae, Scrophulariaceae, Labiatae and Primulaceae. The present study is more or less similar to the above findings. This may be because of Dolpa and Manang are adjoining districts with more or less similar physiography and climatic conditions.

Pokharel (2004) in his contribution to the Flora of Nyeshang, upper Manang, Central Nepal (Gymnospermae and Dicotyledonae) recorded 239 species of Dicotyledonae. The largest family was Compositae (34 spp.) followed by Leguminosae (13 spp.), Ranunculaceae (13 spp.), Rosaceae (12 spp.), Labiatae (11 spp.), Scrophulariaceae (10 spp.), Gentianaceae (9 spp.), Umbelliferae and Polygonaceae (8 spp.) in each. These findings are similar except Labiatae which is the second largest family under present study instead of Leguminosae. This may be due to the altitudinal variation in the study area.

Bhatt (2005) in Floristic Study of the Grassland and Cultivated land in upper Manang recorded 217 species of Angiospermae in which largest family was found to be Compositae (32 spp.) followed by Rosaceae (16 spp.), Labiatae (15 spp.), Leguminosae (13 spp.), Gramineae (10 genera and 6 spp., most of the species remaining unidentified), Brassicaceae (12 spp.), Polygonaceae (11 spp.), Orchidaceae (3 genera). Almost similar results are obtained in the present study except Brassicaceae and Orchidaceae. In this study Orchidaceae is one of the dominant family while Brassicaceae is represented by only 3 species. The present study includes two monotypic families Cannabaceae and Toricelliaceae.

The horizontal and vertical distribution pattern of the total identified taxa from the study area throughout the country on the basis of *Hara et al*. (1978, 1979 and1982) and *Press et al*. (2000) is as follow:

Out of 245 identified species, 12 species were collected at 3000m and above 3000m altitudes, likely 189 species were from above 2000m to below 3000m altitude

and 44 species were from 1600m to 2000m altitude which represents lower region of subalpine, temperate and upper region of subtropical vegetation zone respectively. Out of the 245 identified species, 133 species are found in West, Central as well as East Nepal; 14 species in Central Nepal only; 9 species in East Nepal only, 3 species in West Nepal only, 1 species in West and East Nepal only, 37 species in West and Central Nepal and 37 species in Central and East Nepal (Appendix X). Eleven species are unreported in *Hara et al*. (1978, 1979 and 1982) and *Press et al*. (2000) for their distribution which may be due to either new species or data not available.

The present study shows that horizontal distribution of plant species is found to be more Eastern elements as compared to Western elements i.e. 9 species such as *Agrostis triaristata* (Hook.f.) Bor., *Bulbophyllum scabratum* Rchb.f., *Clematis tongluensis* (Bruehl) Tamura, *Didymocarpus albicalyx* C.B. Clarke, *Euphorbia sikkemense* Boiss, *Hedysarum sikkimense* Benth ex Baker, *Strobilanthes lachenensis* C.B. Clarke, *Valeriana barbulata* Diels and *Viburnum colebrookianum* Wall. ex DC. which are considered to be Eastern elements are present in the study area, Manang. While only 3 speices such as *Lindelofia longiflora* (Benth.) Baill, *Salvia moorcroftiana* Wall. ex Benth. and *Stachys sericea* Wall. ex Benth. which are considered to be Western elements are present in the study area.

However, within Manang, Nar-Phoo Valley (upper Manang) resembles to Western elements in the floristic elements distributions. This may be due to the fact that upper Manang is closer to the parts of Western Nepal like Mustang, Dolpa, Mugu etc and the climate and physiography of this area is almost similar to those of areas (Bhatta 2005) in Western Nepal. But in Gyasumdo and its adjoining areas (lower Manang) have more Eastern type of floristic elements distribution i.e. this part of lower Manang is relatively wet resembly to Eastern part of Nepal. Climatological data also support this fact (Appendix I).

CHAPTER 5

RECOMMENDATIONS

The study area lies within the territory of Annapurna Conservation Area. The area is one of the sparsely settled area of Nepal, so there is not so serious problems of deforestation, over exploitation, habitat destruction, etc which may cause threat to flora and fauna of any place. Due to the harse climate, difficult accessible places and time limitations, the area could not be visited thouroughly and in times. Altogether from the study area 245 species under 203 genera and 79 families including 5 varieties (2 species were identified upto generic level only) were identified and described upto the species level. Therefore in addition to research finding some recommendations have been proposed for the conservation, exploration and utilization of plants and their products of Manang region which will be fruitful for the sustainable development of the local peoples as well as of the whole nation.

- Here botanical expeditions should be made for number of times in different seasons to make a thorough collection of plant species properly.
- Proper attention should be paid to collect plant materials from high altitude and represent in the herbaria, so that their experts and other taxonomists could accurately identify. This will be helpful to explore the plant wealth.
- Such type of floristic work should be done in collaboration with government and non-government agencies.
- The local peoples of Manang are rich in ethnobotanical knowledge. Their ethnobotanical knowledge should be integrated into scientific world, which will be fruitful for Manangis.

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APPENDICES

Appendix - I
Climatological Statistics of Manang District
(Chame station 2002-2006)

Months	Mean Rainfall (mm) (R)	Mean Temperature (^{0}C) (T)
January	43.92	7
February	26.6	8.36
March	51.2	11.93
April	75.73	13.55
May	71.0	14.26
June	101.08	14.42
July	170.65	14.22
August	207.325	13.9
September	137.74	13.8
October	8.25	11.67
November	11.33	9.26
December	10.75	5.45
	R X915.475	T_i X137.82

(Mean of temperature and rainfall from 2002-2006) Latitude: 28^{0}33'
Station: Chame District: Manang Longitude: 84^{0}14'
Period of records: 5 years Ecozone: Temperature Elevation: 2680m
(2002-2006) Climate zone: Semiarid

Appendix - II
Chronology and major plant collection in Manang and its adjoining areas.

Year of Collection	Members	Area of Collection
1983(Jul.-Aug.)	H. Ohba, H. Kanai, M. Wakabayashi, M. Sujuki, S. Akiyama, K.R.Rajbhandari	Kali Gandaki and Marsyandi Valley via Thorungla.
1983(Aug.-Sep.)	T.Namba, M. Mikage, T. Tomimoi, S. Kojima, M. Tamura, T. Tamura, N. Shrestha, K. Komatsu, a. Takanoi, S. Hada, NP. Manandhar	Kali Gandaki Valley
1986(Aug.-Oct.)	T. Namba, T. Tamimori, T. Tamura, S. Kojima, K. Nomatsu, M. Mikage, N.Shrestha	Kali Gandaki Valley, Yak Kharka
1988 (Aug.-Sep.)	T. Maeda, R.Watanabe	Kali Gandaki Valley, Tukucha, Yak Kharka
1991 Apr.	T. Namba, K. Komatsu, K. Matsushige, K. Sakamori, S. Yamaji, I. Okunda, H. Ohsubo	Jomsom-Muktinath
1993(Jul.-Aug.)	A. Yoshida, H. Ohtsubo, M. Mikage, N. Kondo, Y. Sakata	Jomsom-Muktinath
1994(Jul.-Aug.)	K. Yoda, M. Suzuki, M. Mikage, N. Kondo, T. Kajita, M. Fujii, L. Joshi, N. Acharya	Manaslu and Annapurna Himal
1995(Sep.-Oct.)	K.Kondo, K. Yonekura, M. Mikage, N. Anjiki, R.Lacoul	Kali Gandaki, Thorungla
1996(Jul.-Aug.)	H. Koba, M. Amano, M. Sato, N. Miyahi, S. Takatsuko, T. Toshina, K.R.Rajbhandari, P.Sharma	Kali Gandaki Valley
1999(Aug.-Sep.)	K. Fujikawa	Jomsom-Yak Kharka

2000 Jul.	K. Kano, Y. Lokawa, Y. Takahashi, M.N. Subedi	Upper Mustang area
2001(Jul.-Aug.)	M. Amano, S. Nashiro, T. Kurosawa, Y. Lokawa, M.N. Subedi	Upper Mustang area, Danodar Kund

Source: Rajbhandari (2002)

Appendix - III
Localities of Collection

S.N.	Date of collection	Locality	Altitude (m)	Latitude	Longitude
1.	30.6.2006	Humde to Pisang	3450	$28^0$29'303" N	$84^0$02'530" E
2.	1.7.2006	Humde to Pisang	3180	$28^0$36'386" N	$84^0$09'739" E
3.	1.7.2006	Dhukur Pokhari	3045	$28^0$35'222" N	$84^0$11'262" E
4.	1.7.2006	Bhratang	2900	$28^0$34'465" N	$84^0$11'230" E
5.	1.7.2006	Bet^n Bhratang & Talekhu	2800	$28^0$33'412" N	$84^0$13'564" E
6.	2.7.2006	Talekhu	2780	$28^0$33'563" N	$84^0$13'162" E
7.	3.7.2006	Bet^n Talekhu & Chame	2730	$28^0$33'183" N	$84^0$14'330" E
8.	4.7.2006	Chame	2720	$28^0$33'192" N	$84^0$30'95" E
9.	5.7.2006	Koto	2550	$28^0$33'044" N	$84^0$15'813" E
10.	6.7.2006	Koto	2600	$28^0$33'426" N	$84^0$15'679" E
11.	7.7.2006	Koto	2620	$28^0$33'040" N	$84^0$15'215" E
12.	7.7.2006	Naya Bazar	2640	$28^0$33'022" N	$84^0$15'926" E
13.	8.7.2006	Bagar Chhap	2140	$28^0$31'858" N	$84^0$19'108" E
14.	9.7.2006	Tal	1640	$28^0$30'132" N	$84^0$23'689" E
15.	6.9.2006	Danaque	2250	$28^0$31'998" N	$84^0$19'805" E
16.	10.10.2006	Bhratang	2800	$28^0$33'412" N	$84^0$13'564" E
17.	10.10.2006	Talekhu	2780	$28^0$33'563" N	$84^0$13'162" E
18.	11.10.2006	Chame	2700	$28^0$33'349" N	$84^0$13'942" E
19.	12.10.2006	Chame	2600	$28^0$33'094" N	$84^0$15'412" E
20.	13.10.2006	Koto	2570	$28^0$33'078" N	$84^0$16'150" E
21.	13.10.2006	Thankchok	2640	$28^0$32'775" N	$84^0$17'347" E
22.	13.10.2006	Danaque	2700	$28^0$31'980" N	$84^0$19'533" E
23.	13.10.2006	Dharapani	1940	$28^0$31'007" N	$84^0$21'435" E
24.	14.10.2006	Dharapani to Tal	1940	$28^0$30'689" N	$84^0$22'41" E

Appendix - IV
List of Families with Genera and Species

S.N.	Name of Families	No. of genera	No. of species including subspecies & varieties
1	Acanthaceae	2	4
2	Aceraceae	1	1
3	Alliaceae	1	1
4	Amaranthaceae	2	2
5	Anacardiaceae	1	1
6	Anthericaceae	1	1
7	Araceae	3	4
8	Araliaceae	2	2
9	Asclepiadaceae	2	2
10	Asparagaceae	1	1
11	Balsaminaceae	1	2

12	Begoniaceae	1	1
13	Berberidaceae	1	2
14	Betulaceae	2	2
15	Bignoniaceae	1	1
16	Boraginaceae	2	3
17	Brassicaceae	3	3
18	Buxaceae	1	1
19	Campanulaceae	1	1
20	Cannabaceae	1	1
21	Caprifoliaceae	2	4
22	Caryophyllaceae	3	3 (sub sp., var. 1)
23	Chenopodiaceae	1	1
24	Commelinaceae	2	2
25	Compositae	17	21 (var. 1)
26	Convallariaceae	2	2
27	Convolvulaceae	1	1
28	Coriariaceae	1	1
29	Crassulaceae	1	2
30	Cucurbitaceae	1	1
31	Cuscutaceae	1	1 (var. 1)
32	Cyperaceae	5	8
33	Dipsacaceae	1	1
34	Elaeagnaceae	2	2
35	Ericaceae	2	3
36	Eurhorbiaceae	1	1
37	Fumariaceae	2	2
38	Gentianaceae	4	7
39	Geraniaceae	1	3
40	Gesneriaceae	3	3
41	Gramineae	15	16 (including 2 genera)
42	Hydrangeaceae	1	1
43	Hypoxidaceae	1	1
44	Iridaceae	1	1
45	Juglandaceae	1	1
46	Juncaceae	1	1
47	Labiatae	14	19
48	Lauraceae	1	1
49	Leguminosae	6	7
50	Liliaceae	2	2
51	Malvaceae	1	1
52	Monotropaceae	1	1
53	Morinaceae	1	1
54	Myrsinaceae	1	1
55	Oleaceae	1	1
56	Onagraceae	1	1
57	Orchideaceae	14	15
58	Orobanchaceae	1	1
59	Phytolaccaceae	1	1
60	Piperaceae	1	1
61	Plantaginaceae	1	1
62	Polygonaceae	8	9

63	Primulaceae	2	2
64	Ranunculaceae	5	8
65	Rosaceae	11	13
66	Rubiaceae	2	3 (var. 1)
67	Rutaceae	2	3
68	Salicaceae	1	1
69	Saxifragaceae	2	2
70	Scrophulariaceae	7	8 (var. 1)
71	Smilacaceae	1	1
72	Solanaceae	2	3
73	Thymelaeaceae	1	1
74	Toricelliaceae	1	1
75	Umbelliferae	4	4
76	Urticaceae	1	1
77	Valerianaceae	1	2
78	Verbenaceae	1	1
79	Violaceae	1	2
	Total	203	245 (var. 5 & 2 genera)

Appendix - V

List of plant species collected from different regional or altitudinal or both than recorded in *Hara et al*. (1978, 79 & 1982) & *Press et al*. (2000)

S.N.	Name of the Species	From Hara et al. and Press et al.		Altitude (m) of collection in Central Nepal
		Regional distribution	Altitudinal distribution	
1	*Acanthopanax cissifolius* (Griff. ex Seem.) Harms	WCE	3000-4000	2630
2	*Acer caudatum* Wall.	CE	3000-4000	2140
3	*Achyranthes bidentata* Blume	CE	1200-2100	2750
4	*Aconogonum molle* (D.Don) H. Hara	CE	1200-2400	2730
5	*Agrostis triaristata* (Hook.f.) Bor.	E	3600-3700	2720
6	*Alnus nepalensis* D.Don	WCE	500-2600	2700
7	*Anaphalis triplinervis* (Sims) C.B. Clarke	WCE	2900-4100	2788
8	*Barbarea intermedia* Boreau	WC	3000-3600	1960
9	*Berberis asiatica* Roxb. ex DC.	WCE	1200-2500	2790
10	*Bulbophyllum scabratum* Rchb.f.	E	2000	1640
11	*Callicarpa macrophylla* Vahl	WCE	300-1500	1630
12	*Campanula argyrotricha* Wall.ex A. DC.	WC	1500	2250
13	*Chlorophytum arundinaceum* Baker	CE	500-1200	1640
14	*Cimicifuga foetida* L.	WCE	3000-4000	2800
15	*Clematis buchananiana* DC.	CE	1800-3300	1640
16	*Clematis tongluensis* (Bruehl) Tamura	E	2600-3000	1640
17	*Commelina benghalensis* L.	WCE	900-1800	2250
18	*Conyza stricta* Willd.	WCE	600-2000	2250
19	*Coriaria napalensis* Wall.	WCE	1200-2400	2550
20	*Cotoneaster microphyllus* Wall.ex Lindl	WE	2000-5400	2620
21	*Cotula hemisphaerica* (Roxb.) Wall. rx C.B. Clarke	C	1400-1800	2950
22	*Cuscuta reflexa* Roxb.var. *brachystigma* Engelm	CE	200-2200	2700
23	*Cyathula prostrata* (L.) Blume	CE	900-1100	2630
24	*Datura metal* L.	WCE	300-1200	2750

25	*Dendrobium porphyrochilum* Lindl.	CE	2500	1640
26	*Didymocarpus albicalyx* C.B.Clarke	E	1200-1800	1640
27	*Dipsacus intermis* Wall.	WC	1500	2250
28	*Duchesnea indica* (Andrews) Focke	WCE	1000-2500	2600
29	*Elsholtzia flava* (Benth.) Benth.	CE	1900-2700	2710
30	*Elsholtzia stachyodes* (Link) Raizada & Saxena	WCE	1200-1800	1910
31	*Eulalia mollis* (Griseb.) Kuntze	WCE	2000-3700	1910
32	*Euphorbia sikkimense* Boiss	E	2400	2900
33	*Euphrasia himalayica* Wettst.	WCE	3200-4200	2550
34	*Festuca gigantea* (L.) Vill.	WC	2300-1200	2640
35	*Galinsoga quadriradiata* Ruiz & Pav.	C	1400-1700	2560
36	*Galium hirtifolium* Requine	CE	1200-2200	2800
37	*Gynura nepalensis* DC.	WCE	250-2000	2620
38	*Hedysarum sikkimense* Benth ex Baker	E	3500-4700	2880
39	*Heracleum obtusifolium* Wall. ex DC.	C	2400	2640
40	*Hydrangea anomala* D.Don	WCE	1900-2700	1630
41	*Hypoxis aurea* Lour.	WCE	1700-2900	1640
42	*Impatiens urticifoia* Wall	WCE	2700-3800	2600
43	*Incarvillea arguta* (Royle) Royle	WC	1800-3500	1640
44	*Juglans regia* L.	WCE	1200-2100	2560
45	*Juncus thomsonii* Buchenau	WCE	2700-5200	2600
46	*Kyllinga squamulata* Thonn.ex Vahl	C	2600	2630
47	*Leucos lanata* Benth.	WCE	700-1100	2770
48	*Lindelofia longiflora* (Benth.) Baill	W	3300-4600	2720
49	*Lindera nacusua* (D.Don) Merr.	WC	1300-1800	2600
50	*Listera pinetorum* Lindl.	C	3000-3800	2600
51	*Lomatogonium sikkimense* (Burkill) H.Sm.	CE	3000-5000	2670
52	*Malaxis cylindrostachya* (Lindl.) Kuntze	CE	2600-3500	2550

53	*Malva sylvestris* L.	C	2400	2630
54	*Morina nepalensis* D.Don	WCE	3000-4500	2780
55	*Murdania spirata* (L.) Bruckn.	CE	550-1800	2630
56	*Neottianthe cucullata* (L.) Schltr.	C	3000	2730
57	*Nervilia aragoana* Gaudichaud	C	800	2640
58	*Notholirion macrophyllum* (D.Don) Boiss.	WCE	2700-4400	1640
59	*Pedicularis oederi* Vahl in Hornemem.	WCE	3000-5500	2600
60	*Poa pratensis* L.	C	4100-4400	2788
61	*Polygonum tubulosum* Boiss	C	3000-3200	3800
62	*Potentilla saudersiana* Royle	CE	3100-4900	2620
63	*Ranunculus brotherusii* Freyn	WCE	3000-5000	2630
64	*Ranunculus scleretus* L.	WCE	800-1700	2600
65	*Rheum australe* D.Don	CE	3200-4200	2820
66	*Rhus succedanea* L.	WCE	1300-2400	2630
67	*Rubia manjith* Wall. ex G. Don	CE	1200-2100	2795
68	*Salvia campanulata* Wall. ex Benth.	CE	2400-3800	2140
69	*Salvia moorcroftiana* Wall. ex Benth.	W	2000-3000	2800
70	*Saxifraga mucronulata* Royle	WCE	3800-4800	2820
71	*Sedum oreades* (Decne.) Raym.Hamet	WCE	3200-5200	2600
72	*Solanum surattense* Brume. f.	WCE	300-900	2630
73	*Stachys sericea* Wall.ex Benth.	W	2400-3900	2800
74	*Stellaria vestita* Kurtz.	WCE	1600-2500	2770
75	*Stellera chamaejasme* L.	WC	2700-4200	1640
76	*Strobilanthes lachenensis* C.B.Clarke	E	1800-4300	1940
77	*Strobilanthes multidens* C.B.Clarke	CE	900-1700	2850
78	*Taraxacum eriopodum* DC.	WCE	3300-4600	2730
79	*Urtica dioca* L.	WC	3000-4500	2250
80	*Valeriana barbulata* Diels	E	4250	2780
81	*Vernonia cinerea* (L.) Less.	WCE	100-2300	2570
82	*Veronica anagallis-aquatica* L.	WC	2800-4700	1940

83	*Viburnum colebrookianum* Wall.ex DC.	E	300-900	2650
84	*Viola canescence* Wall.	WC	150-2400	2600

New Locality in Central Nepal (total 13 species reported)

Appendix - VI

List of plant species as new addition to the "Flora of Nepal."

S.N.	Name of the Species	Family	Locality	Attitude (m)
1	*Calamagrostis lahulensis* G. Singh	Gramineae	Upperside of Chame	2720
2	*Cyperus squarrosus* L.	Cyperaeeae	Above Talekhu	2790
3	*Oryzopsis aequiglumis* Duthie ex Hook.f.	Gramineae	Below Koto	2800
4	*Platanthera edgeworthii* R.K. Gupta	Orchidaceae	Above Chame	2600

Appendix - VII

Checklist of plant species recorded from the study area

S.N	Coll. No.	Name of Species	Family	Date of Collection	Locality of Collection	Distribution in Nepal		Collection altitude (m)
						Regional	Altitude(m)	
1	419	*Acanthopanax cissifolius* (Griff. ex Seem.) Harms	Araliaceae	13.10.2006	Bagarchhap	WCE	3000-4000	2630
2	180	*Acer caudatum* Wall.	Aceraceae	8.7.2006	Above Bagarchhap	CE	3000-4000	2140
3	404	*Achyranthes bidentata* Blume	Amaranthaeceae	13.10.2006	Near Danaque	CE	1200-2100	2750
4	294	*Aconogonum molle* (D.Don) H. Hara	Polygonaceae	11.10.2006	Above Chame	CE[E]	1200-2400	2730
5	162	*Agrimonia pilosa* var. *nepalensis* (D.Don) Nakai	Rosaceae	7.7.2006	Below Naya Bazar	WCE	1000-3000	2740
6	31	*Agrostis pilosula* Trin.	Gramineae	2.7.2006	Talekhu	WCE	2000-4600	2788
7	346	*Agrostis triaristata* (Hook. f.) Bor.	Gramineae	12.10.2006	Above Koto	E	3600-3700	2720
8	256	*Ajuga bracteosa* Wall. ex Benth.	Labiatae	6.9.2006	Danaque	WCE	1200-5100	2250
9	3	*Ajuga lupalina* Maxim.	Labiatae	1.7.2006	Below Humde	WC	2200-4500	3180
10	352	*Allium wallichii* Kunth	Allaiceae	12.10.2006	Above Koto	WCE	2400-4650	2720
11	408	*Alnus nepalensis* D.Don	Butulaceae	13.10.2006	Below Danaque	WCE	500-2600	2700
12	239	*Anaphalis busua* (Buch-Ham. ex D.Don) DC.	Compositae	6.9.2006	Danaque	WCE	1500-2900	2250

13	333	*Anaphalis margaritacea* (L.) Benth.	Compositae	11.10.2006	Chame	CE	1800-3100	2820
14	40	*Anaphalis triplinervis* (Sims) C.B. Clarke	Compositae	2.7.2006	Below Talekhu	WCE	2900-4100 [1800-3300]	2788
15	20	*Androsace strigillosa* Frinch	Primulaceae	2.7.2006	Talekhu	WC	2400-4700	2780
16	29	*Anemone vitifolia* Buch-Ham.ex DC.	Ranunculaceae	2.7.2006	Below Talekhu	WCE	1300-3300	2788
17	33	*Argyrolobium roseum* (Cambess.) Jaub. & Spoch	Leguminosae	2.7.2006	Below Talekhu	WC	1900-3200	2742
18	208	*Argyreia hookeri* C.B. Clarke	Convolvulaceae	9.7.2006	Above Tal	CE	800-2300	1640
19	30	*Arisaema jacquemontii* Blume	Araceae	2.7.2006	Below Talekhu	WCE	2700-4000	2788
20	95	*Arisaema tortuosum* (Wall.) Schott	Araceae	4.7.2006	Upperside of Chame	WCE	1300-2900	2720
21	453	*Arundinella nepalensis* Trin.	Gramineae	14.10.2006	Way from Dharapani to Tal	WCE	500-2500	1640
22	28	*Asparagus filicinus* Baum Buch.-Ham. ex D.Don	Asparagaceae	2.7.2006	Below Talekhu	WC	2100-2900	2788
23	52	*Aster albescens* (DC.) Hand.-Mazz	Compositae	3.7.2006	Bet^{n} Talekhu & Chame	WCE	1500-4200	2780
24	207	*Aster trinervius* Roxb. ex D.Don	Compositae	9.7.2006	Above Tal	WCE	1500-2600	1640
25	104	*Astilbe rivularis* Buch.-Ham.ex D.Don	Saxifrageceae	4.7.2006	Upperside of Chame	WCE	2000-3600	2720
26	178	*Barbarea intermedia* Boreau	Brassicaceae	8.7.2006	Dharapani	WC	3000-3600	1960
27	226	*Begonia picta* Sm.	Begoniaceae	9.7.2006	Tal area	WCE	600-2800	1640
28	19	*Berberis aristata* DC.	Berberidaceae	2.7.2006	Talekhu	WC	1800-3000	2780
29	285	*Berberis asiatica* Roxb. ex DC.	Berberidaceae	10.10.2006	Above Talekhu	WCE	1200-2500	2790
30	410	*Betula utilis* D.Don	Betulaceae	13.10.2006	Below Danaque	WCE	2700-4300	2700
31	428	*Bidens biternata* (Lour.) Merr. & Sherff	Compositae	13.10.2006	Above Dharapani	WC	1100-2000	2000
32	170	*Bistorta amplexicaulis* (D.Don)Greene	Polygonaceae	7.7.2006	Below Naya Bazar	WCE	2100-4800	2880
33	50	*Boenninghausenia albiflora* (Hook.) Rchb. ex Meissn	Rutaceae	3.7.2006	Bet^{n} Talekhu & Chame	WCE	600-3300	2770
34	365	*Brachypodium sylvaticum* (Huds.) P. Beauv.	Gramineae	13.10.2006	Above Thanchok	WCE	1800-3500	2630
35	191	*Bulbophyllum scabratum* Rchh.f.	Orchidaceae	9.7.2006	Above Tal	E	2000	1640
36	447	*Bupleurum falcatum* L.	Umbelliferae	14.10.2006	Way from	WC	1500-3800	1640

					Dharapani to Tal			
37	102	*Calamagrostis lahulensis* G.Singh	Gramineae	4.7.2006	Upperside of Chame	----	---	2720
38	220	*Callicarpa macrophylla* Vahl	Verbenaceae	9.7.2006	Near Tal	WCE	300-1500	1630
39	233	*Campanula argyrotricha* Wall., ex A. DC.	Campanulaceae	6.9.2006	Danaque	WC	1500	2250
40	139	*Cannabis sativa* L.	Cannabaceae	6.7.2006	Koto area	WCE	200-2700	2620
41	425	*Capillipedium assimile* (Steud.) A Camus	Gramineae	13.10.2006	Dharapani	WCE	600-2100	1940
42	316	*Capsella bursa-pastoris* (L.) Medicus	Brassicaceae	11.10.2006	Above Chame	WCE	1800-4500	3120
43	465	*Carex condensata* Nees	Cyperaceae	14.10.2006	Way from Dharapani to Tal	---	---	1640
44	354	*Carex filicina* Nees	Cyperaceae	12.10.2006	Above Koto	WCE	1200-4000	2670
45	27	*Carex inaequalis* Boott ex C.B. Clarke	Cyperaceae	2.7.2006	Below Talekhu	C	2600-3500	2788
46	146	*Carum carvi* L.	Umbelliferae	6.7.2006	Koto area	WC	2500-5100	2620
47	25	*Cephalanthera longifolia* (L.) Fritsch	Orchidaceae	2.7.2006	Talekhu	WC	1200-3200	2735
48	364	*Cerastium fontanum* subsp. *trivale* var. *angustifolium* (Franch.) H. Hara	Caryophyllaceae	13.10.2006	Above Thanchok	WCE	2200-5000	2630
49	212	*Ceropegia pubescens* Wall	Asclepiadaceae	9.7.2006	Near Tal	CE	900-2700	1640
50	140	*Chenopodium album* L.	Chenopodiaceae	6.7.2006	Koto area	WC	2000-4000	2620
51	225	*Chirita pumila* D.Don	Gesneriaceae	9.7.2006	Tal area	WCE	910-2300	1640
52	205	*Chlorophytum arundinaceum* Baker	Anthericaceae	9.7.2006	Above Tal	CE	500-1200	1640
53	301	*Cimicifuga foetida* L.	Ranunculaceae	11.10.2006	Above Chame	WCE	3000-4000	2800
54	451	*Clematis buchananina* DC.	Ranunculaceae	14.10.2006	Way from Dharapani to Tal	CE	1800-3300	1640
55	443	*Clematis tongluensis* (Bruehl) Tamura	Ranunculaceae	14.10.2006	Way from Dharapani to Tal	E	2600-3000	1640
56	267	*Clinopodium umbrosum* (M.Bieb.) C.Koch	Labiatae	10.10.2006	Near Bhratang	WCE	180-3400	2800
57	370	*Colquhounia coccinea* Wall.	Labiatae	13.10.2006	Thanchok	WCE	1200-1800	2640
58	230	*Commelina benghalensis* L.	Commelinaceae	6.9.2006	Danaque	WCE	900-1800	2250
59	234	*Conyza stricta* Willd.	Compositae	6.9.2006	Danaque	WCE	600-2000	2250
60	132	*Corallodiscus lonuginosus* (Wall. ex DC.) Burtt.	Gesneriaceae	6.7.2006	Koto area	WCE	1000-3400	2600

61	110	*Coriaria napalensis* Wall.	Coriariaceae	5.7.2006	Below Koto area	WCE	1200-2400	2550
62	187	*Corydalis juncea* Wall.	Fumariaceae	8.7.2006	Above Thanchok	CE	2500-5100 [2500-4000]	2630
63	272	*Cotoneaster frigidus* Wall.ex Lindl.	Rosaceae	10.10.2006	Near Bhratang	WC	2200-3400	2800
64	149	*Cotoneaster microphyllus* Wall. ex Lindl.	Rosaceae	7.7.2006	Below Naya Bazar	WE	2000-5400	2620
65	312	*Cotula hemisphaerica* (Roxb.) Wall. ex C.B. Clarke	Compositae	11.10.2006	Above Chame	C	1400-1800	2950
66	411	*Cuscuta reflexa* Roxb var. *brachystigma* Engelm.	Cuscutaceae	13.10.2006	Below Danaque	CE	200-2200	2700
67	387	*Cyathula prostrate* (L.) Blume	Amaranthaecae	13.10.2006	Below Thanchok	CE	900-1100	2630
68	284	*Cyperus squarrosus* L.	Cyperaceae	10.10.2006	Above Talekhu	---	---	2790
69	59	*Danthonia cumminsii* Hook. f.	Gramineae	3.7.2006	Bet^{n} Talekhu & Chame	WCE	2200-4100	2760
70	405	*Datura metal* L.	Solanaceae	13.10.2006	Near Danaque	WCE	300-1200	2750
71	206	*Dendrobium porphyrochilum* Lindl.	Orchidaceae	9.7.2006	Above Tal	CE	2500	1640
72	445	*Desmodium confertum* DC.	Leguminosae	14.10.2006	Way from Dharapani to Tal	CE	300-2000	1640
73	444	*Desmodium heterocarpon* (L.) DC.	Leguminosae	14.10.2006	Way from Dharapani to Tal	WCE	400-1700	1640
74	199	*Dicentra macrocapnos* Prain	Fumariaceae	9.7.2006	Above Tal	CE	1300-2500	1640
75	224	*Didymocarpus albicalyx* C.B.Clarke	Gesneriaceae	9.7.2006	Tal area	E	1200-1800	1640
76	384	*Digitaria cruciata* (Nees ex Steud.) A. Camus	Gramineae	13.10.2006	Below Thanchok	WCE	1300-3500	2630
77	245	*Dipsacus intermis* Wall.	Dipsacaceae	6.9.2006	Danaque	WC	1500	2250
78	385	*Drymaria cordata* (L.) Willd. ex Roem & Schult.	Caryophyllaceae	13.10.2006	Below Thanchok	WCE	2200-4300	2630
79	393	*Duchesnea indica*(Andrews) Focke	Rosaceae	13.10.2006	Temang	WCE	1000-2500	2600
80	260	*Elaeagnus parvifolia* Wall. ex Royle	Elaeagnaceae	6.9.2006	Danaque	WCE	300-3000	2250
81	122	*Elsholtzia ciliata* (Thunb.) Hyland.	Labiatae	5.7.2006	Below Koto	WCE	1500-3400	2570
82	291	*Elsholtzia flava* (Benth.) Benth.	Labiatae	11.10.2006	Above Chame	CE	1900-2700	2710
83	174	*Elsholtzia fructicosa* (D.Don) Rehder	Labiatae	7.7.2006	Below Naya Bazar	WCE	1800-4200	2640
84	472	*Elsholtzia stachyodes* (Link) Raizada & Saxena	Labiatae	14.10.2006	Way from Dharapani to Tal	WCE	1200-1800	1910

85	282	*Epilobium wallichianum* Hausskn.	Onagraceae	10.10.2006	Above Talekhu	WCE	1700-3000	2790
86	1	*Epipactis royleana* Lindl.	Orchidaceae	30.6.2006	Bet^{n} Humde & Manang	WC	1600-3500	3450
87	193	*Eria stricta* Cult. R.B.G.E ex Bhutan	Orchidaceae	9.7.2006	Above Tal	C	---	1645
88	37	*Erigeron multiradiatus* (Lindl. ex DC.) C.B. Clarke	Compositae	2.7.2006	Below Talekhu	WCE	2600-4400	2740
89	420	*Erioscirpus comosus* (Wall.) Palla	Cyperaceae	13.10.2006	Bagarchhap	---	---	2630
90	46	*Erysimum hieracifolium* L.	Brassicaceae	3.7.2006	Bet^{n} Talekhu & Chame	WCE	1600-3800	2770
91	466	*Eulalia mollis* (Griseb.) Kuntze	Gramineae	14.10.2006	Way from Dharapani to Tal	WCE	2000-3700	1910
92	10	*Euphorbia sikkimense* Boiss.	Euphorbiaceae	1.7.2006	Bhratang	E	2400	2900
93	119	*Euphrasia himalayica* Wettst	Scrophulariaceae	5.7.2006	Below Koto area	WCE	3200-4200	2550
94	182	*Fagopyrum tataricum* (L.) Gaertn	Polygonaceae	8.7.2006	Above Bagarchhap	WCE	1400-3900	2140
95	368	*Festuca gigantean* (L.) Vill.	Gramineae	13.10.2006	Thanchok	WC	2300-2600	2640
96	21	*Fragaria nubicola* Lindl. ex Lacaita	Rosaceae	2.7.2006	Talekhu	WCE	1600-4000	2783
97	125	*Galinsoga quadriradiata* Ruiz & Pav.	Compositae	5.7.2006	Below Koto	C	1400-1700	2560
98	85	*Galium aparine* L. var. *echinospermum* (Wallroth.) Cufodontis	Rubiaceae	4.7.2006	Upperside of Chame	W[WC]	900-3600	2720
99	348	*Galium hirtifolium* Requien	Rubiaceae	12.10.2006	Above Koto	CE	1200-2200	2800
100	94	*Gastrodia falconeri* D.L. Jones & M.A. Clements	Orchidaceae	4.7.2006	Upperside of Chame	---	---	2720
101	44	*Geranium pratense* L.	Geraniaceae	3.7.2006	Bet^{n} Talekhu & Chame	WC	2000-4000 [2200-3500]	2770
102	131	*Geranium procurrens* Yeo.	Geraniaceae	6.7.2006	Koto area	CE	2100-3500	2600
103	89	*Geranium wallichianum* D.Don ex Sweet	Geraniaceae	4.7.2006	Upperside of Chame	WC	2100-4200	2720
104	238	*Gnaphalium affine* D.Don	Compositae	6.9.2006	Danaque	WCE	600-3700	2250
105	32	*Goodyera repens* (L.) R.Br	Orchidaceae	2.7.2006	Below Talekhu	WCE	1000-4200	2735
106	145	*Gynura nepalensis* DC.	Compositae	6.7.2006	Koto area	WCE	250-2000	2620
107	242	*Halenia elliptica* D.Don	Gentianaceae	6.9.2006	Danaque	WCE	2000-4500	2250

108	213	*Hebenaria pectinata* D.Don	Orchidaceae	9.7.2006	Near Tal	WCE	900-3200	1650
109	279	*Hedera nepalensis* K. Koch	Araliaceae	10.10.2006	Above Talekhu	WCE	2000-3200	2780
110	68	*Hedysarum sikkimense* Benth. ex Baker	Leguminosae	3.7.2006	Bet^{n} Talekhu & Chame	E	3500-4700	2880
111	168	*Hemiphragma heterophyllum* Wall.	Scrophulariaceae	7.7.2006	Below Naya Bazar	WCE	1800-3500	2880
112	369	*Heracleum obtusifolium* Wall. ex DC.	Umbelliferae	13.10.2006	Thanchok	C	2400	2640
113	356	*Herminium lanceum* (Thunberg ex S.W.) Vuijk	Orchidaceae	13.10.2006	Below Koto	WCE	1500-3500	2570
114	396	*Herpetospermum pedunculosum* (Ser.) Baill	Cucurbitaceae	13.10.2006	Temang	WCE	1500-3600	2600
115	338	*Hippophae salicifolia* D.Don	Elaeagnaceae	12.10.2006	Below Chame	WC	2200-3500	2620
116	203	*Hydrangea anomala* D.Don	Hydrangeaceae	9.7.2006	Above Tal	WCE	1900-2700	1630
117	198	*Hypoxis aurea* Lour.	Hypoxidaceae	9.7.2006	Above Tal	WCE	1700-2900	1640
118	114	*Impatiens sulcata* Wall	Balsaminaceae	5.7.2006	Below Koto area	WCE	1700-4100	2600
119	113	*Impatiens urticifolia* Wall.	Balsaminaceae	5.7.2006	Below Koto area	WCE	2700-3800	2600
120	202	*Incarvillea arguta* (Royle) Royle	Bignoniaceae	9.7.2006	Above Tal	WC	1800-3500	1640
121	468	*Inula cappa* (Buch-Ham ex D.Don) DC.	Compositae	14.10.2006	Way from Dharapani to Tal	WCE	150-2500	1910
122	60	*Iris kemaonensis* D.Don	Iridaceae	3.7.2006	Bet^{n} Talekhu & Chame	WCE	2500-4300	2760
123	373	*Isodon lophanthoides* (Buch. Ham. ex D.Don) H. Hara	Labiatae	13.10.2006	Thanchok	WCE	1300-2700	2640
124	155	*Jasminum humile* L.	Oleaceae	7.7.2006	Below Naya Bazar	WC	1600-3400	2640
125	126	*Juglans regia* L.	Juglandaceae	5.7.2006	Below Koto	WCE	1200-2100	2560
126	117	*Juncus thomsoni* Buchenau	Juncaceae	5.7.2006	Below Koto area	WCE	2700-5200	2600
127	192	*Justicia procumbens* L. var. *simplex* (D.Don) T. Yamaz	Acanthaceae	9.7.2006	Above Tal	WCE	700-2500	1640
128	380	*Kyllinga squamulata* Thonn.ex Vahl	Cyperaceae	13.10.2006	Below Talekhu	C	2600	2630
129	47	*Leucos lanata* Benth.	Labiatae	3.7.2006	Bet^{n} Talekhu & Chame	WCE	700-1100	2770
130	124	*Leycesteria formosa* Wall.	Caprifoliaceae	5.7.2006	Below Koto	WCE	2000-3200	2550
131	164	*Ligularia amplexcaulis* DC. var. *nepalensis* S.W. Liu & T.N. Ho.	Compositae	7.7.2006	Below Naya Bazar	----	---	2800

132	14	*Lilium nepalense* D.Don	Liliaceae	1.7.2006	Betn Bhratang & Talekhu	WCE	2300-3400	2810
133	115	*Lindelofia anchusoides* Lehm.	Boraginaceae	5.7.2006	Below Koto area	---	---	2600
134	82	*Lindelofia longiflora* (Benth.) Baill	Boraginaceae	4.7.2006	Upperside of Chame	W	3300-4600	2720
135	398	*Lindera nacusua* (D.Don) Merr.	Lauraceae	13.10.2006	Temang	WC	1300-1800	2600
136	130	*Listera pinetorum* Lindl.	Orchidaceae	6.7.2006	Above Koto	C	3000-3800	2600
137	375	*Lomatogonium sikkimense* (Burkill) H.Sm.	Gentianaceae	13.10.2006	Below Thanchok	CE	3000-5000	2670
138	289	*Lyonia ovalifolia* (Wall.) Drude	Ericaceae	11.10.2006	Above Chame	WCE	1300-3300	2700
139	16	*Maharanga emodi* (Wall.) A.DC	Boraginaceae	1.7.2006	Bet^{n} Bhratang & Talekhu	WCE	2200-4500	2825
140	112	*Malaxis cylindrostachya* (Lindl.) Kuntze	Orchidaceae	5.7.2006	Below Koto	CE	2600-3500	2550
141	349	*Malaxis muscifera* (Lindl.)Kuntze	Orchidaceae	12.10.2006	Above Koto	WCE	2600-4100	2900
142	391	*Malva sylvestris* L.	Malvaceae	13.10.2006	Temang	C	2400	2630
143	80	*Mazus surculosus* D.Don	Scrophulariaceae	4.7.2006	Upper side of Chame	WE [WCE]	900-3000	2720
144	436	*Measa chisia* Buch. Ham. ex D.Don	Myrsinaceae	14.10.2006	Way from Dharapni to Tal	WCE	1200-2600	1640
145	265	*Micromeria biflora* (Buch. Ham. ex D.Don) Benth.	Labiatae	10.10.2006	Near Bhratang	WC	900-4000	2800
146	366	*Microstegium nudum* (Trin.) A. Camus	Gramineae	13.10.2006	Near Thanchok	WCE	1800-3200	2630
147	353	*Miscanthus nepalensis* (Trin) Hackel	Gramineae	12.10.2006	Above Koto	WCE	1100-3000	2670
148	66	*Monotropa hypopithys* L.	Monotropaceae	3.7.2006	Bet^{n} Talekhu & Chame	WC	2400-3700	2770
149	278	*Morina nepalensis* D.Don	Morinaceae	10.10.2006	Above Talekhu	WCE	3000-4500	2780
150	381	*Murdania spirata* (L.) Bruckn.	Commelinaceae	13.10.2006	Below Thanchok	CE	550-1800	2630
151	274	*Myriactis nepalensis* Less.	Compositae	10.10.2006	Near Bhratang	WCE	1400-3900	2800
152	295	*Neottianthe cucullata* (L.) Schltr.	Orchidaceae	11.10.2006	Above Chame	C	3000	2730
153	266	*Nepeta lamiopsis* Benth. ex Hook. f.	Labiatae	10.10.2006	Near Bharatang	WCE	3300-5300	2800
154	157	*Nervilia aragoana* Gaudichaud.	Orchidaceae	7.7.2006	Below Naya Bazar	C	800	2640

155	195	*Notholirion macrophyllum* (D.Don) Boiss.	Liliaceae	9.7.2006	Above Tal	WCE	2700-4400	1640
156	91	*Origanum vulgare* L.	Labiatae	4.7.2006	Upperside of Chame	WC	600-4000	2720
157	103	*Orobanche aegyptiaca* Pers.	Orobanchaceae	4.7.2006	Upperside of Chame	WC	150-3100	2720
158	357	*Oryzopsis aequiglumis* Duthie ex Hook. f.	Gramineae	13.10.2006	Below Koto	---	---	2570
159	5	*Oxyria digyna* (L.) Hill	Polygonaceae	1.7.2006	Way from Dhukur Pokhari to Pisang	WCE	2400-5000	3150
160	186	*Parochetus communis* Buch. Ham. Ex D.Don	Leguminosae	8.7.2006	Thanchok area	WCE	900-4000	2260
161	13	*Pedicularis longiflora* Rudolph var. *tubiformis* (Klotzsh) Tsoong	Scrophulariaceae	1.7.2006	Bet^{n} Bhratang & Talekhu	WCE	3300-5000 [2500-4100]	2800
162	341	*Pedicularis oederi* Vahl in Hornemem.	Scrophulariaceae	12.10.2006	Below Chame	WCE	3000-5500 [3600-5100]	2600
163	351	*Pennisetum* sp.	Gramineae	11.10.2006	Above Chame	---	---	3050
164	196	*Peperomia heyneana* Miq.	Piperaceae	9.7.2006	Above Tal	CE	900-2500	1630
165	181	*Persicaria nepalensis* (Meisn.) H.Gross	Polygonaceae	8.7.2006	Above Bagarchhap	WCE	1200-4100	2140
166	342	*Phytolacca acinosa* Roxb.	Phytolaccaceae	12.10.2006	Above Koto	WC	2200-3200	2670
167	74	*Piptanthus nepalensis* (Hook.) D.Don	Leguminosae	3.7.2006	Bet^{n} Talekhu & Chame	WCE	2000-3800	2760
168	123	*Plantago erosa* Wall.	Plantaginaceae	5.7.2006	Below Koto	WCE	900-4100	2550
169	105	*Plantanthera edgeworthii* (Hook.f.ex Collett) R.K. Gupta	Orchidaceae	4.7.2006	Above Chame	---	---	2720
170	252	*Plectranthus mollis* (Aiton) Spreng.	Labiatae	6.9.2006	Danaque	CE	900-1500	2250
171	29	*Poa pratensis* L.	Gramineae	2.7.2006	Talekhu	C	4100-4400	2788
172	464	*Pogostemon glaber* Benth.	Labiatae	14.9.2006	Above Tal	WC	300-1900	1640
173	111	*Polygonatum verticillatum* (L.) All.	Convallariaceae	5.7.2006	Below Koto	WCE	2400-4700	2550
174	286	*Polygonum aviculare* L.	Polygonaceae	10.10.2006	Near Chame	WC	2200-3800	2760
175	231	*Polygonum tubulosum* Boiss	Polygonaceae	8.10.2006	Way to Khangsar	C	3000-3200	3800
176	138	*Potentilla saundersiana* Royle	Rosaceae	6.7.2006	Koto area	CE	3100-4900	2620
177	321	*Primula sikkimensis* Hook .f.	Primulaceae	11.10.2006	Above Chame	WCE	2900-4800	3300
178	429	*Prinsepia utilis* Royle	Rosaceae	13.10.2006	Dharapani	WCE	1500-2900	1940

179	35	*Prunella vulgaris* L.	Labiatae	2.7.2006	Below Talekhu	WCE	1200-3800	2742
180	379	*Pycreus sanguinolentus* (Vahl) Nees ex C.B.Clarke	Cyperaceae	13.10.2006	Below Talekhu	CE	800-2900	2630
181	418	*Pycreus unioloides* (R.Br.) Urb.	Cyperaceae	13.10.2006	Bagarchhap	C	---	2630
182	257	*Pyracantha crenulata* (D.Don) M. Roemer	Rosaceae	6.9.2006	Danaque	WCE	1200-2500	2250
183	367	*Ranunculus brotherusii* Freyn	Ranunculaceae	13.10.2006	Near Thanchok	WCE	3000-5000	2630
184	395	*Ranunculus scleretus* L.	Ranunculaceae	13.10.2006	Temang	WCE	800-1700	2600
185	223	*Remusatia hookeriana* Schott	Araceae	9.7.2006	Tal	WCE	1500-2400	1640
186	330	*Rheum australe* D.Don	Polygonaceae	11.10.2006	Near Chame	CE	3200-4200	2820
187	320	*Rhododendron campanulatum* D.Don	Ericaceae	11.10.2006	Above Chame	WCE	2800-4400	3300
188	7	*Rhododendron lepidotum* Wall. ex. G.Don	Ericaceae	1.7.2006	Betn Dhukur Pokhari and Pisang	WCE	2100-4700	3025
189	414	*Rhus succedanea* L.	Anacardiaceae	13.10.2006	Below Danaque	WCE	1300-2400	2630
190	409	*Rosa brunonii* Lindl.	Rosaceae	13.10.2006	Below Danaque	WCE	1500-2400	2700
191	26	*Rosa macrophylla* Lindley	Rosaceae	2.7.2006	Below Talekhu	WCE	2100-3800	2735
192	326	*Rubia manjith* Wall. ex G. Don	Rubiaceae	11.10.2006	Chame	CE	1200-2100	2795
193	99	*Rubus biflorus* Buch. Ham. ex Sm.	Rosaceae	4.7.2006	Upper side of Chame	WCE	2100-3300	2720
194	83	*Rumex nepalensis* Spreng.	Polygonaceae	4.7.2006	Upperside of Chame	WCE	1200-4200	2720
195	458	*Saccharum* sp.	Gramineae	14.10.2006	Above Tal	---	---	1820
196	127	*Salix wallichiana* Anderson	Salicaceae	5.7.2006	Below Koto	WC[x]	1500-3500[x]	2550
197	183	*Salvia campanulata* wall. ex Benth.	Labiatae	8.7.2006	Above Bagarchhap	CE	2400-3800	2140
198	303	*Salvia moorcroftiana* Wall. ex Benth.	Labiatae	11.10.2006	Above Chame	W	2000-3000	2800
199	92	*Sarcococca hookeriana* Baill.	Buxaceae	4.7.2006	Upper side of Chame	WCE	1800-3500	2720
200	355	*Saussurea fastuosa* (Decne.) Sch. Bip	Compositae	12.10.2006	Above Koto	WC	2900-3800	2670
201	327	*Saxifrage mucroinulata* Royle	Saxifrageceae	12.10.2006	Chame	WCE	3800-4800	2820
202	376	*Scrophularia elatior* Benth.	Scrophulariaceae	13.10.2006	Below Thanchok	CE	1600-3800	2670

203	305	*Sedum multicaule* Wall. ex Lindl.	Crassulaceae	11.10.2006	Above Chame	WCE	1500-3200	2800
204	362	*Sedum oreades* (Decne.) Raym. Hamet	Crassulaceae	13.10.2006	Below Koto	WCE	3200-5200	2600
205	71	*Selinum wallichianum* (DC.) Raizade & Saxena	Umbelliferae	3.7.2006	Bet^{n} Talekhu & Chame	WCE	2700-4800	2890
206	259	*Senecio cappa* Buch.-Ham. ex D.Don	Compositae	6.9.2006	Danaque	CE	1300-2900	2250
207	275	*Senecio scandens* Buch.-Ham. ex D.Don	Compositae	10.10.2006	Near Bhratang	CE	2100-2800	2800
208	412	*Smilax elegans* Wall. ex Kunth	Smilacaceae	13.10.2006	Below Danaque	CE	1600-2450	2700
209	378	*Solanum nigrum* L.	Solanaceae	13.10.2006	Below Thanchok	WCE	900-2900	2630
210	377	*Solanum surattense* Brume.f.	Solanaceae	13.10.2006	Below Thanchok	WCE	300-900	2630
211	318	*Sorbus microphylla* Wenz.	Rosaceae	11.10.2006	Above Chame	WCE	3000-4500	3150
212	299	*Spiraea micrantha* Hook .f.	Rosaceae	11.10.2006	Above Chame	WCE	1400-3000	2800
213	268	*Stachys sericea* Wall. ex Benth.	Labiatae	10.10.2006	Near Bhratang	W	2400-3900	2800
214	45	*Stellaria vestita* Kurz.	Caryophyllaceae	3.7.2006	Bet^{n} Talekhu & Chame	WCE	1600-2500	2770
215	209	*Stellera chamaejasme* L.	Thymelaeaceae	9.7.2006	Above Tal	WC	2700-4200	1640
216	424	*Strobilanthes capitata* (Nees) T. Anderson	Acanthaceae	13.10.2006	Dharapani	CE	200-2000	1940
217	423	*Strobilanthes lachenensis* C.B. Clarke	Acanthaceae	13.10.2006	Dharapani	E	1800-4300	1940
218	400	*Strobilanthes multidens* C.B.Clarke	Acanthaceae	13.10.2006	Near Danaque	CE	900-1700	2850
219	241	*Swertia angustifolia* Buch. Ham. ex D.Don	Gentianaceae	6.9.2006	Danaque	WCE	600-2600	2250
220	232	*Swertia chirayita* (Roxb. ex Fleming) H. Karst	Gentianaceae	6.9.2006	Danaque	CE	1500-2500	2250
221	158	*Swertia macrosperma* (C.B. Clarke) C.B. Clarke	Gentianaceae	7.7.2006	Below Naya Bazar	CE	2000-3200	2640
222	461	*Swertia paniculata* Wall.	Gentianaceae	14.10.2006	Way From Dharapani To Tal	WCE [WC]	1500-4000 [1500-3000]	1640
223	43	*Taraxacum eriopodum* DC.	Compositae	3.7.2006	Bet^{n} Talekhu & Chame	WCE	3300-4600	2730
224	9	*Thalictrum cultratum* Wall.	Ranunculaceae	1.7.2006	Bet^{n} Pisang & Bhratang	WCE	2400-4200	2920
225	8	*Thalictrum foliolosum* DC.	Ranunculaceae	1.7.2006	Bet^{n} Pisang & Bhratang	WCE	1300-3400	3000
226	118	*Theropogon palliddus* (Kunth) Maxim.	Convallariaceae	5.7.2006	Below Koto	WCE	1800-2700	2600

227	188	*Toricellia tiliifolia* DC.	Toricelliaceae	8.7.2006	Above Dharapani	WC	1600-2500	1960
228	34	*Trigonella emodi* Benth.	Leguminosae	2.7.2006	Below Talekhu	WCE	1300-4900	2742
229	310	*Tripterospermum volubile* (D.Don) Hara	Gentianaceae	11.10.2006	Above Chame	WCE[x]	2000-3200 [x]	2900
230	56	*Typhonium diversifolium* Wall.ex Schott.	Araceae	3.7.2006	Bet^{n} Talekhu & Chame	WCE	2400-4300	2780
231	254	*Urtica dioca* L.	Urticaceae	6.9.2006	Danaque	WC	3000-4500	2250
232	54	*Valeriana barbulata* Diels.	Valerianaceae	3.7.2006	Bet^{n} Talekhu & Chame	E	4250	2780
233	137	*Valeriana jatamansi* Jones	Valerianaceae	6.7.2006	Koto area	WCE	1500-3300	2600
234	2	*Verbascum thapsus* L.	Scrophulariaceae	30.6.2006	Bet^{n} Humude & Manang	WCE	1800-4000	3485
235	358	*Vernonia cinerea* (L) Less.	Compositae	13.10.2006	Below Koto	WCE	100-2300	2570
236	201	*Veronica anagallis*-aquatica L.	Scrophulariaceae	9.7.2006	Above Tal	WC	2800-4700	1940
237	374	*Viburnum colebrookianum* Wall. ex DC.	Caprifoliaceae	13.10.2006	Below Thanchok	E	300-900	2650
238	437	*Viburnum erubescens* Wall. ex DC.	Caprifoliaceae	14.10.2006	Bet^{n} Dharapani to Tal	WCE	1500-3000	1640
239	296	*Viburnum mullaha* Buch.- Ham. ex D.Don	Caprifoliaceae	11.10.2006	Above Chame	WCE	2500-4000 [1800-2700]	2730
240	24	*Vincetoxicum hirundinaria* Medicus	Asclepiadaceae	2.7.2006	Below Talekhu	C	2300-3600	2735
241	360	*Viola canescens* Wall.	Violaceae	13.10.2006	Below Koto	WC	150-2400	2600
242	185	*Voila biflora* L.	Violaceae	8.7.2006	Above Bagarchhap	WCE	2100-4500	2140
243	307	*Youngia japonica* (L.) DC.	Compositae	11.10.2006	Above Chame	WCE	230-2900	2850
244	51	*Zanthoxylum acanthopodium* DC.	Rutaceae	3.7.2006	Bet^{n} Talekhu & Chame	CE	1600-2800	2770
245	210	*Zanthoxylum nepalense* Babu	Rutaceae	9.7.2006	Above Tal	CE	2700-3100	1640

[ ] - Different data in Hara et al. (1978, 1979 & 1982)

- New addition to the Central Nepal or altitude or both than reported in Hara et al. (1978, 1979 & 1982) & Press et al. 2000.

--- Not data reported in Hara et al. (1978, 1979 & 1982) & Press et al. 2000.

Appendix - VIII
List of unidentified specimens

S.N.	Representative Collection	Family	Habitat
1	Manang: Above Danaque, 2850m, 13.10.2006 (Fr.), K. Adhikari et al. 401.	Amaranthaceae	On sloppy & moist shady area
2	Manang: Way from Dharapani to Tal, 1640m, 14.10.2006 (Fr.), K. Adhikari et al. 452.	Amaranthaceae	On the rocky & moist shady area
3	Manang: Upperside of Chame, 2720m, 4.7.2006 (Fl.), K. Adhikari et al. 107.	Anacardiaceae	On moist, slopy and shady area
4	Manang: Above Chame, 2950m, 11.10.2006 (Fr.), K. Adhikari et al. 313.	Araliaceae	On moist sloppy & shady area
5	Manang: Above Tal, 1640m, 9.7.2006 (Fl. & Fr.), K. Adhikari et al. 194.	Asclepiadaceae	On moist shady area
6	Manang: Below Talekhu, 2800m, 2.7.2006 (Fl.), K. Adhikari et al. 41.	Brassicaceae	On moist rocky area
7	Manang: Below Chame, 2620m, 12.10.2006 (Fl.), K. Adhikari et al. 337.	Celastraceae	On dry place in pine forest
8	Manang: Upperside of Chame, 2720m, 4.7.2006 (Fl.), K. Adhikari et al. 88.	Compositae	On open dry area
9	Manang: Near Bhratang, 2800m, 10.10.2006 (Fl.), K. Adhikari et al. 269.	Compositae	On sandy dry area
10	Manang: Below Talekhu, 2788m, 2.7.2006 (Fl.), K. Adhikari et al. 42.	Compositae	On rocky open area
11	Manang: Below Thanchok, 2630m, 13.10.2006 (Fl.), K. Adhikari et al. 388.	Compositae	On dry sandy & road side
12	Manang: Above Talekhu, 2780m, 10.10.2006 (Fl.), K. Adhikari et al. 280.	Compositae	On sandy busy area
13	Manang: Side of Chame, 2700m, 10.10.2006 (Fl.), K. Adhikari et al. 288.	Compositae	On the moist area of pine forest
14	Manang: Near Bhratang, 2800m, 10.10.2006 (Fl.), K. Adhikari et al. 270.	Compositae	On the wall of rocky
15	Manang: Above Talekhu, 2780m, 10.10.2006 (Fl.), K. Adhikari et al. 276.	Compositae	on dry sandy & open area
16	Manang: Near Bhratang, 2800,, 10.10.2006 (Fl.), K. Adhikari et al. 273.	Compositae	On sliding sandy soil
17	Manang: Near Tal, 1630m, 9.7.2006 (Fr.), K. Adhikari et al. 215.	Gesneriaceae	On moist rocky & open area
18	Manang: Above Bagarchhap, 2140m, 8.7.2006 (Fl.), K. Adhikari et al. 176.	Gingiberaceae	On sloppy, sandy & moist area
19	Manang: Bet^{n} Talekhu & Chame, 2780m, 3.7.2006 (Fl.), K. Adhikari et al. 53.	Labiatae	On sandy soil
20	Manang: Above Chame, 2900m, 11.10.2006 (Fl.), K. Adhikari et al. 309.	Labiatae	On moist and shady area
21	Manang: Above Talekhu, 2780m, 10.10.2006 (Fl.), K. Adhikari et al. 277.	Labiatae	On the sandy dry area
22	Manang: Bet^{n} Pisang & Bhratang, 2800m, 1.7.2006 (Fl.), K. Adhikari et al. 12.	Leguminosae	On dry stony area
23	Manang: Dharapani, 1940m, 13.10.2006 (Fr.), K. Adhikari et al. 427.	Leguminosae	On the rocky open area
24	Manang: Danaque, 2250m, 6.9.2006 (Fl.), K. Adhikari et al. 258.	Leguminosae	On the moist open area
25	Manang: Above Bagarchhap, 2140m, 8.7.2006 (Fl.), K. Adhikari et al. 175.	Leguminosae	On the moist shady area
26	Manang: Below Naya Bazar, 2620m, 7.7.2006 (Fr.), K. Adhikari et al. 151.	Leguminosae	On slopy & sandy area
27	Manang: South west of Chame, 2820m, 11.10.2006 (Fr.), K. Adhikari et al. 332.	Leguminosae	On moist sandy area with rosa species
28	Manang: Way from Dharapani to Tal, 1820m, 14.10.2006 (Fr.), K. Adhikari et al. 467.	Leguminosae	On moist sandy & shady area

29	Manang: Below Naya Bazar, 2881m, 7.7.2006 (Fr.), K. Adhikari et al. 167.	Polygonaceae	On moist & shady area
30	Manang: Above Chame, 2710m, 11.10.2006 (Fr.), K. Adhikari et al. 292.	Ranunculaceae	On moist sloppy area
31	Manang: Above Chame, 2850m, 11.10.2006 (Fr.), K. Adhikari et al. 306.	Ranunculaceae	On moist slopy area
32	Manang: Talekhu, 2740m, 2.7.2006 (Fl.), K. Adhikari et al. 39.	Ranunculaceae	On sandy & shady area
33	Manang: Bet^{n} Talekhu & Chame, 2780m, 3.7.2006 (Fl.), K. Adhikari et al. 49.	Ranunculaceae	On sandy dry area
34	Manang: Near Tal, 1640m, 9.7.2006 (Fr.), K. Adhikari et al. 211.	Rosaceae	On dry busy area
35	Manang: Upperside of Chame, 2720m, 4.7.2006 (Fr.), K. Adhikari et al. 101.	Rosaceae	On open dry &sandy area
36	Manang: South west of Chame, 2720m, 4.7.2006 (Fr.), K. Adhikari et al. 323.	Rosaceae	On dry open rocky area
37	Manang: Near Bhratang, 2800m, 10.10.2006 (Fl. & Fr.), K. Adhikari et al. 264.	Rubiaceae	On sandy shady area
38	Manang: Danaque, 2250m, 6.9.2006 (Fl.), K. Adhikari et al. 249	Umbelliferae	On moist open area
39	Manang: Bet^{n} Talekhu & Chame,2780m, 3.7.2006 (Fl.), K. Adhikari et al. 48.	Valerianaceae	On shady sandy area
40	Manang: Upperside of Chame, 2720m, 4.7.2006 (Fl.), K. Adhikari et al. 96.	Valerianaceae	On sloppy, sandy & moist area

Appendix - IX
List of Members of Botanical Exploration

1. First trip June 27, 2006 to July 12, 2006 **Coll. No.**

Prof. Dr. Hari Datta Lekhak 1-227
Dr. Mohan Panthi
Kapil Adhikari
Deepak Mahat
Mingta Maya Gurung

2. Second trip Sept. 5, 2006 to Sept. 9, 2006 **Coll. No.**

Prof. Dr. Ram Prasad Chaudhary 228-262
Prof. Dr. Pramod Kumar Jha
Prof. Dr. Hari Datta Lekhak
Kapil Adhikari
Kuber Prasad Bhatt
Sandesh Bhattarai
Deepak Mahat
Mingta Maya Gurung

3. Third trip Oct. 6, 2006 to Oct. 19, 2006 **Coll. No.**

Kapil Adhikari 263-472
Kuber Prasad Bhatt
Sandesh Bhattarai
Deepak Mahat
Mingta Maya Gurung

Appendix - X
List of number of species in horizontal distribution pattern of the total identified plant species on the basis of *Hara et al*. (1978, 1979 & 1982) and *Press et al*. (2000)

S.N.	Horizontal Distribution	No. of Species
1	WCE	133
2	WC	37
3	W	3
4	C	14
5	WE	1
6	CE	37
7	E	9
Total		245

APPENDIX - XI

Type specimens of following Nepalese taxa recorded from Central Nepal (Shrestha et al. 2000) & also from present study area Manang (Central Nepal)

S.N.	Name of the Species	Family	Type Specimens	Type Specimens Deposited
1	*Salix wallichiana* Anderson	Salicaceae	Syntype	BM, K-W
2	*Betula utilis* D.Don	Betulaceae	Syntype	BM
3	*Alnus nepalensis* D.Don	Betulaceae	Holotype	BM!
4	*Aconogonum molle* (D.Don) H. Hara	Polygonaceae	⊗ Lectotype	BM
			Isotype	G,K,NY
5	*Bistorta amplexicaulis* (D.Don) Greene	Polygonaceae	⊗ Syntype	G-DC,K-W
6	*Persicaria nepalensis* (Meisn) H. Gross	Polygonaceae	⊗ Syntype	G-DC
7	*Rheum australe* D.Don	Polygonaceae	Lectotype	K-W
8	*Rumex nepalensis* Spreng.	Polygonaceae	Syntype	K
9	*Phytolacca acinosa* Roxb.	Phytolaccaceae	Syntype	K
10	*Lindera nacusua* (D.Don) Merr.	Lauraceae	⊗ Holotype	BM
			Isotype	LINN-SM!
11	*Anemone vitifolia* Buch.-Ham. ex DC.	Ranunculaceae	Holotype	BM
			Isotype	LINN-SM!
12	*Cimicifuga foetida* L.	Ranunculaceae	⊗ Lectotype	L-W
			Isotype	BM!
13	*Clematis buchananiana* DC.	Ranunculaceae	Holotype	BM!
14	*Thalictrum cultratum* Wall.	Ranunculaceae	Syntype	BM!
15	*Thalictrum foliolosum* DC.	Ranunculaceae	Holotype	BM!
			Isotype	LINN-SM!
16	*Berberis aristata* DC.	Berberidaceae	Syntype	?G-DC
17	*Corydalis juncea* Wall.	Fumariaceae	Syntype	BM,K
18	*Erysimum hieraciifolium* L.	Brasicaceae	⊗ Syntype	BM, K-W!
19	*Astilbe rivulularis* Buch.-Ham. ex D.Don	Saxifragaceae	Syntype	BM
20	*Hydrangea anomala* D.Don	Hydrangeaceae	Syntype	BM!

21	*Cotoneaster frigidus* Wall.	Rosaceae	Syntype	K-W!
22	*Cotoneaster microphyllus* Wall. ex Lindl.	Rosaceae	Syntype	K-W!
23	*Rosa brunonii* Lindl.	Rosaceae	Syntype	BM!, K
24	*Rosa macrophylla* Lindl.	Rosaceae	Syntype	BM!
25	*Rubus biflous* Buch.-Ham. ex Sm.	Rosaceae	Holotype	LINN-SM!
26	*Desmodium confertum* DC.	Leguminosae	Holotype	BM!
27	*Parochetus communis* Buch.-Ham. ex D.Don	Leguminosae	Holotype	BM!
28	*Geranium Procurrens* Yeo	Geraniaceae	Holotype	K
			Isotype	CGG
29	*Geranium wallichianum* D.Don	Geraniaceae	Syntype	BM
30	*Coriaria napalensis* wall	Coriariaceae	Syntype	K-W!
31	*Acer caudatum* Wall.	Aceraceae	Lectotype	BM
			Isotype	G,K-W!,PH
32	*Impatiens sulcata* Wall.	Balsaminaceae	Syntype	K-W
33	*Impatiens urticifolia* Wall.	Balsaminaceae	Syntype	K-W!
34	*Elaeagnus parvifolia* Wall.	Elaeagnaceae	Lectotype	K-W
35	*Viola canescens* Wall.	Violaceae	Syntype	K
36	*Viola biflora* L.	Violaceae	⊗ Holotype	KYO
37	*Begonia picta* Sm.	Begoniaceae	Syntype	LINN-SM
38	*Epilobium wallichianum* Hausskn	Onagraceae	⊗⊗ Lectotype	C
			Holotype	BM
39	*Toricellia tiliifolia* DC.	Toricelliaceae	Syntype	G-DC,K-W
40	*Heracleum obtusifolium* Wall. ex Dc.	Umbelliferae	Lectotype	G-DC
			Isotype	K-W
41	*Selinum wallichianum* (DC.) Raizada & Saxena	Umbelliferae	⊗⊗ Lectotype	G-DC,K-W
			Syntype	K
			Isotype	K-W
42	*Rhododendron campanulatum* D.Don	Ericaceae	Syntype	BM!
43	*Rhododendron lepidotum* Wall.	Ericaceae	Syntype	K-W!
44	*Maesa chisia* Buch. Ham.- ex D.Don	Myrsinaceae	Holotype	BM!
45	*Swertia angustifolia* Buch.-Ham. ex D. Don	Gentianaceae	Holotype	BM

			Isotype	LINN-SM!
46	*Swertia paniculata* Wall.	Gentianaceae	⊗Holotype	BM
			Isotype	E!
47	*Tripterospermum volubile* (D.Don) H. Hara	Gentianaceae	⊗Lectotype	BM!
48	*Ceropegia pubescens* Wall.	Asclepiadaceae	Syntype	BM!, K-W!
49	*Rubia manjith* Roxb. Ex Fleming	Rubiaceae	Syntype ?	K
50	*Ajuga bracteosa* Wall. ex Benth.	Labiatae	⊗Holotype	BM!
51	*Clinopodium umbrosum* (M.Bieb.)C.Koch	Labiatae	⊗Holotype	BM
52	*Elsholtzia stachyodes* (Link) Raizada & Saxena	Labiatae	⊗⊗Syntype	BM,K
			Holotype	BM!
53	*Hemiphragma heterophyllum* Wall.	Scrophulariaceae	Syntype	K
54	*Mazus surculosus* D.Don	Scrophulariaceae	Syntype	BM
55	*Justicia procumbens* var. *simplex* (D.Don)T. Yamaz	Acanthaceae	⊗⊗Syntype	BM
			Syntype	K-W!OXF!
56	*Strobilanthes capitata* (Nees) T. Anders	Acanthaceae	Syntype	K!,K-W!
57	*Chirita pumila* D.Don	Gesneriaceae	Lectotype	K-W
			Isotype	BM
58	*Leycesteria formosa* Wall. in Roxb.	Caprifoliaceae	Syntype	K/K-W
59	*Viburnum erubescens* Wall. ex DC.	Sambucaceae	Syntype	G-DC,K-W!
60	*Viburnum mullaha* Buch.-Ham. ex D.Don	Sambucaceae	Syntype	BM
61	*Dipsacus intermis* Wall. in Roxb.	Dispsacaceae	Syntype	K-W
62	*Morina nepalensis* D.Don	Morinaceae	⊗Syntype	BM,K,G-DC K,K-W!
63	*Anaphalis margaritacea* (L.) Benth.	Compositae	⊗Holotype	BM!
64	*Anaphalis triplinervis* (Sims) C.B. Clarke	Compositae	⊗Syntype	BM
65	*Anaphalis busua* (Buch.-Ham.ex D.Don) DC.	Compositae	⊗Holotype	BM
66	*Aster trinervius* Roxb. ex D.Don	Compositae	Holotype	BM!
67	*Gnaphalium affine* D.Don	Compositae	⊗Syntype	BM!G-DC, K-W!
68	*Gynura nepalensis* DC.	Compositae	Syntype	G-DC
69	*Inula cappa (Buch*.-Ham. ex. D.Don) DC.	Compositae	⊗Holotype	BM
70	*Senecio cappa* Buch.-Ham. ex D.Don	Compositae	Holotype	BM
71	*Taraxacum eriopodum* DC.	Compositae	⊗Syntype	BM

			Lectotype	G-DC
			Isotype	K-W!
72	*Smilax elegans*	Smilacaceae	Neotype	K-W
			Isotype	BM!
73	*Theropogan pallidus* (Kunth) Maxim.	Convallariaceae	⊗Syntype	BM!, K-W!
74	*Asparagus filicinus* Buch.-Ham ex D.Don	Asparagaceae	Holotype	BM!
			Isotype	LINN-SM!
75	*Hypoxis aurea* Lour.	Hypoxidaceae	⊗Syntype	BM
76	*Allium wallichii* Kunth.	Alliaceae	Syntype	BM!, E!
77	*Lilium nepalense* D.Don	Liliaceae	Lectotype	K-W!
			Isotype	BM!
78	*Notholirion macrophyllum* (D.Don) Boiss	Lilaceae	⊗Holotype	BM!
79	*Arisaema tortuosum* (Wall.) Schott	Araceae	⊗Syntype	K-W!
80	*Typhonium diversifolium* Wall. ex Schott	Araceae	Syntype	BM!, K-W!
81	*Carex filicina* Nees	Cyperaceae	⊗Syntype	BM, K-W!
82	*Cephalanthera longifolia* (L.) Fritsch	Orchidaceae	⊗Syntype	K-W!
83	*Hebenaria pectinata* D.Don	Orchidaceae	Syntype	BM, K-W!

⊗ Type specimen reported as a synonym (single synonym name).
⊗⊗ Type specimen reported as a synonyms (double synonym names).
! Those seen by author