

1. INTRODUCTION

1.1 Background

Total number, variety, and variability of plants in a particular area is plant diversity, which is one of the major constituents of biological diversity. It is the natural resource used globally, remains poorly understood, inadequately documented and often wasted, but still retain immense potential for further developed of natural products (WCMC, 1992).

The knowledge of vegetation of any area is essential for the study of biodiversity and environment. Scientifically prepared flora of any part of the country can strongly support the different research and development activities of the entire nation. Generally speaking local floras are much more valuable than those of bigger areas because exploration can be carried out intensively for the former minimizing the possibilities of plants being left out and for studying biodiversity utilization and conservation strategies (Singh, 1997). Many developing countries have felt the increased need to assess and revise their floras for economic utilization of plant wealth and to conserve rare, endangered, and threatened plants.

Regarding the floral diversity, so far over 5600 species of flowering plants have been enumerated from Nepal (HMG, 2002). However, the estimated number of flowering plants in Nepal being 6,500 species (Hara *et al.*, 1978). Nepal has been ranked on 10th position in Asia and 27th in world for flowering plants diversity (WCMC, 1994).

Floral diversity (Species richness and endemism) in Eastern Himalayas is rich due to the effect of Indomalayan and Palaearctic realms (Yonjon 1996). Eastern Himalayas is one of the globally important sites including several globally significant eco-regions and centers of plant diversity. Eastern Himalayan harbors enormously diverse ecosystems, flora, fauna, and culture. Many floristic elements unique to Nepal are found in this region (CEPF, 2005).

The area is plagued with a multitude of serious ecological problems, including over use of resources, unregulated grazing wild fires etc. Human encroachment is particularly high in middle hills where prime forest area is being converted into cultivable land. Flora of the region includes elements from tropical Indochina, temperate East Asia, the palaeartic region, and Deccan Plateau (CEPF, 2005). Floral diversity of this region is attributed to the immigration of plants from different bordering countries, viz. Chinese and Malayan on the east and south, Oriental, European and African on the west and Tibetan and Siberian on the north (Roy and Behera, 2005).

The occurrence of many families and genera of archaic flowering plants such as *Tetracentron*, *Talauma hodgsoni*, *Magnolia*, *Michelia*, *Pandanus*, *Manglietia*, *Euptelea*, *Pycharrhona*, *Houttuynia*, *Myrica*, *Alnus*, *Betula*, *Schisandra*, *Haematocarps*, *Taxus*, etc. has led Takhtajan to consider this region (Eastern Himalayas), as the cradle of Angiosperms (Hajra and Verma, 1996). Eastern Himalayan region is one among the, 25 hotspots of the world and 150 important botanical sites identified for conservation action by the World Conservation-Monitoring Center. The humid conditions have resulted in speciation of several genera, thus adding to high endemism of the flora. In addition, Eastern Himalayan is an important Vavilovian center of diversity and origin of important cultivated crop species (IUCN, 1987).

1.2 Botanical explorations in East Nepal

In 1848, J. D. Hooker initiated the collection of plants from the eastern Nepal. Several institutions and individual botanists extensively explored the plant species of eastern Nepal after the Hooker's work. Botanical explorations have been carried out in the region between Arun valley and the Sikkim (Kangchenjungha complex). M. L. Banerji completed his Ph. D. degree on Flora of East Nepal and finally published his work in 1965 entitled *Contribution to the Flora of East Nepal* and recorded 417 species of flowering plants.

Hara (1966) compiled different collections from the eastern Nepal and published the *Flora of Eastern Himalaya*. Beer (1973) published a paper in Bulletin of Alpine Garden Society listing his own and friends' collection from the east Nepal. Tsuchida (1983) published a paper on *Vegetation and Succession in Grassland of East Nepal*. Lancarter (1995) described their expedition to East Nepal and collected 427 types of seed plants with their seeds from the Seduwa, Milke Danda and Jaljale Himal area to grow in the garden of University of British Columbia.

Shakya (1979) recorded that out of 3283 species of vascular plants of east Nepal, 24.6% was Himalayan endemic and 0.7% of plants were Irano-Turanian in nature. His finding concluded that the flora of upper subtropical, temperate and lower sub alpine zones (1500-3600m) was closely related to that of Sino-Japanese region; the flora below the subtropical belt (below 1500m) was close to south-east Asian Malaysian and Indian region; and upper sub alpine and alpine areas (above 3600m) were close to central Asiatic region. The floristic influence of Irano-Turanian region in temperate is feeble although getting stronger towards west. Over half of the species of east Nepal do not extend to the west, which permit a clear separation of eastern Nepalese types from all other vegetation types of the country (Dobremez and Shakya, 1975).

Plant diversity in Kangchenjungha Area

The Kangchenjungha landscape forms a part of a biodiversity hotspots of global importance (Sharma & Chettri, 2005). Floral diversity of Kangchenjungha conservation area at landscape level was assessed for resource management strategy (Shrestha, 2002). Biodiversity hotspots and key species were identified on the basis of species richness, taxonomic uniqueness, endangered species, habitat value, and threat status and use pattern. There are altogether 68 endemic and 42 threatened plants reported from the Eastern part of Nepal (Shrestha & Joshi, 1996). Out of 68 endemic species, 50 were recorded from Kangchenjungha conservation area (KCA). KCA with its lowland in Panchthar, Ilam, and Jhapa districts is very rich floristically. This area harbors over 2,900 species of flowering plants, more than 800 of which are found to be endemic to the Himalaya (Shrestha & Ghimire, 1996).

Carpenter *et al.* (1995) prepared a report on the flora and fauna of the Kangchenjungha region and included list of 13 species of *Rhododendron* and 39 species of trees recorded from there. Rai (1999) recorded 22 species of pteridophytes, six species of gymnosperms, 152 species of dicotyledons and 35 species of monocotyledons from the Maipokhari, Ilam. He also described the forest of Maipokhari and adjoining areas as being highly encroached by the local people mainly for firewood, grazing, fodder and collection for commercial purposes. Dominant trees recorded from the area were *Castanopsis hystrix*, *Alnus nepalensis*, *Sauraria napaulensis*, *Lyonia ovalifolia*, *Lithocarpus pachyphylla*, *Symplocos ramosissima*, etc.

The high plant diversity of this region is due to the presence of diverse ecological habitats. The areas marshes, river, gullies, steep slopes with crevices and dry alpine grasslands give rise to a

high diversity of plants species (Shrestha & Ghimire, 1996). Phytogeographically unique area contains many Sino-Japanese and Sino-Himalayan elements. The Kangchenjungha complex represents one of the country's richest pockets of biological diversity. Humid climatic conditions along with relatively well-preserved vegetation give rise to such diversity. Vegetation found in this part of Himalaya is *Lithocarpus pachyphylla* forest, deciduous forest of *Tetracentron sinense*, *Larix griffithiana* forest, *Castanopsis hystrix* forest, etc.

1.3 Vegetation Ecology

The country harbors 35 forest types and 75 different vegetation types, and over 100 ecosystems types (Dobremez, 1972; Stainton, 1972). Stainton (1972) published 'Forest of Nepal' concluding that the vegetation of Nepal is greatly influenced by different environmental factors like rainfall, aspect, slope, altitude, temperature, and exposure. Nepal adjoins six floristic regions: Sino-Japanese, Irano-Turano, Sudano-Zambian, Indian, East Asiatic, and Central Asiatic (Dobremez, 1972).

The vegetation of Nepal is found to be complex on account of its bio-climatic diversity. Most authors described vegetation type on the basis of various physiographic divisions. Many workers have described the vegetation of the Himalayas in terms of both vertical and horizontal divisions. Regarding the vertical vegetation zones many workers have followed altitudinal zonation, since the distribution of plants show distinct pattern along the altitudinal gradients (Dobremez, 1972; Stainton, 1972). Himalayan forests are the major reservoir of biodiversity and genetic resources. Varied vegetation in the Himalayas provides scope for quantification of vegetation status and other ecological studies (Pande, 2001). Forest areas are major sources of fuel wood, are decreasing at the rate of 1.8% per annum in Nepal (FAO, 2001). Finally, the vegetation has been described on the basis of dominance by a species or a group of species.

Community has its own composition, structure, and development. Unless we study the vegetation quantitatively, we can not understand its characters as species diversity, dominance etc. The quantitative value of each of frequency, density, abundance has its own importance in a community. Importance Value Index (IVI) of the species is calculated in order to have a really overall picture of ecological importance of a species with respect to the community (Ambasht, 1990). Three ways to describe the species diversity are: species richness, species evenness, and species dominance, suggested by WCMC (1992).

The distribution and diversity of plant species in forests depend on the size of forest or habitat area along with different factors. It is generally assumed that larger the size of the forest the more will be the number of species (Rosenzweig, 1995). But impact of forest area on diversity of species is still controversial. Hill and Curran (2001) studied species composition in fragmented forest and they proposed that large forests contain the greatest number of tree species; however, the proportion of rare tree species increase with forest area (Arrhenius, 1921).

Quantitative inventories of forest trees have been mainly concentrated on species rich forest (Johnston and Gillman, 1995) although species poor forests have also been recognized. Species poor or low diversity forests may be defined as forest in which 50-80% of the canopy trees are represented by only one tree species (Connell and Lowman, 1989). The simple choices are numbers, biomass, cover, productivity etc. But numbers are used in most cases as a measure of species important (Krebs, 1999).

Species diversity is mainly influenced by elevation. With in the increasing elevation, the decreasing trends of species have found (Lomoliono, 2001). But other studies showed a mid-altitude peak in species richness (Rahbeck, 1995; Liberman *et al.*, 1996). The elevation gradient in the species richness pattern is commonly explained by similar factors to the latitudinal gradient, such as climatic factors, productivity etc. Different factors influencing the species richness may differ between the different organisms and between life forms of plants. A comparison of various life forms may allow a finer resolution of precise causal factors than studies on total plant richness (Bhattarai and Vetaas, 2003).

Vetaas and Grytnes (2002) studied distribution of vascular plant species richness and endemic richness along the Himalayan elevation gradient in Nepal. They found that there was no positive statistically significant correlation between log-area and richness (total or endemic) and the proportion of endemic species increases steadily from low to high elevations. They found the peak in endemism at ca. 4000m that corresponds to the start of a rapid decrease in overall species richness. IVI, alpha and beta diversity and index of diversity were decreased with increase of altitude on North-East and South-East slopes in Ghandruk, Kaski (Nepal, 2001). The species richness of tree species showed a significant linear pattern along the elevation gradient (Mahato, 2006).

Disturbance has been considered to be force, which both increase and decrease diversity. In absence of any kinds of disturbance, community changes proceed towards climax stage where few species become dominant and species diversity becomes low due elimination of poor competitor by dominant species (Reice, 1994). Disturbance most likely interrupts the natural process of community change. Higher species diversity is maintained when there is intermediate level of disturbance (Roberts and Gilliam, 1995). There is variation in vegetation composition, distribution in high altitude Himalayan region due to altitude, and site factors (Ghimire, 2005).

The causes for the loss of species are numerous but the most important is the loss and fragmentation of natural habitats (Khera *et al.*, 2001). More species in non degraded forest were recorded than in degraded forest with high total stand density (Koirala, 2004). Species evenness and Shannon-Weinner index were minimum in least disturbed forest and maximum in highly disturbed forests (Kumar & Ram, 2005). So, a form of disturbance is needed to maintain high species diversity (Mahato, 2006).

1.4 Objectives

This study aims to enumerate and document the angiosperm and gymnosperm plant diversity in the study area, which will contribute to the flora of Panchthar District and to assess the forest community structure with special reference to the elevation gradients.

The specific objectives of the research are to:

-) Carry out collection, identification and systematic description of plant species from the study area
-) Analyze distribution of archaic, endemic, and threatened plants with respect to LKSR
-) Assess the species composition and richness of trees along different elevation ranges.

1.5 Rationale of the study

Eastern Himalayas have biologically diverse ecosystems, produce wide range of unique, and valuable plants. Several plant species are important for local people in their daily life, and used in several aspects like medicines, timber, fuels, fodders etc. It needs to have detailed information and knowledge about its resources and potentialities (Dobremez, 1971).

The present study area is lower Kangchenjungha-Singhalila Ridge (LKSR), Panchthar, which has unique vegetation types ranging form tropical to alpine. In Panchthar district, little research works have been done. It shows an immediate need of research in this field as still much is left to compile the flora of Nepal. The Nepalese herbaria viz. KATH and TUCH do not represent rich in the collection of plants from Panchthar, than that of other regions.

In spite of the biogeographically and botanical interest of this area, a complete flora (or at least a checklist giving a precise account of its extant plant taxa) is still lacking. A complete list of the plant taxa of this region or standard flora is therefore essential, but not sufficient to adequately evaluate its biodiversity. Ideally this complex, integrated parameter should encompass the variability at the genetic level, at the species level, at the community, and regional levels. Therefore, I have carried out some preliminary analysis of biodiversity components of the plant communities of this area.

2. STUDY AREA

2.1 Physiography

The study area encompasses the Nepal part of Kangchenjungha-Singhalila Complex, one of the five prioritized landscapes of the eastern Himalaya (CEPF, 2005). The Panchthar district is one of the mountainous districts of Mechi zone, which is somewhat elongated in shape. The total area of the district is 1,241 km² (124,590 ha). It is situated between the latitude 26⁰53'-27⁰21' N and longitude 87⁰30'-88⁰05' E. The elevation of the district varies from 610 m to 3675 m), but we were able to measure the highest altitude of 4360m at Timbu Pokhari area. The major area of the district is mid mountain (85.6%), followed by High Mountain (13.8%), and high Himalaya (0.6%) (District Profile, 2007/2008).

It has unique physiography due to Churia, Mahabharat and high Himalaya's ranges that are not running as regular parallel fashion. It is bounded by Taplejung district from the North, Ilam district from the south, Dhankuta, and Tehrathum district from the West, and West Bengal and Sikkim (India) from the East. The study area covers the northeastern parts of Panchthar district. Study was focused on Five VDCs (Sidin, Prangbung, Memeng, Changthappu and Falaicha). The VDCs are those bordering with India (Sikkim and West Bengal) i.e. Transboundary areas.

2.2 Climate

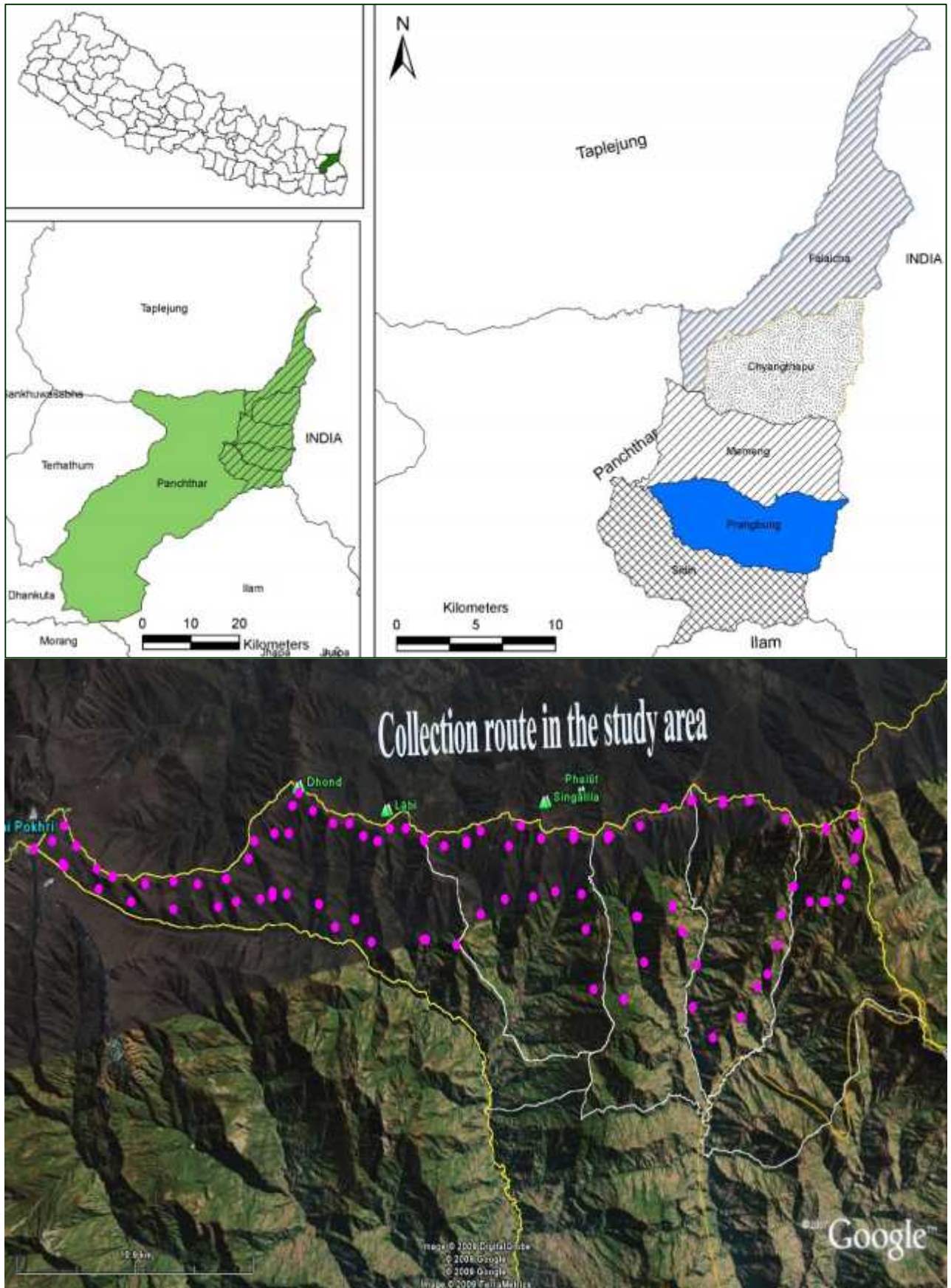
Physical factors of the mountain environment particularly latitude, altitude, rainfall, temperature, RH determine the distribution of plants. The monsoon starts early and lasts longer in the study area. The pre monsoon precipitation plays a significant role in initializing the growth and spread of plants, before they are subjected to the heavy downpour of monsoon rains (DFO, 2005).

The district has a great variation of topography, which is reflected in the diversity of weathers and climate. Temperature varies not only from east to west but also at the local level, and depends upon the surface exposed to sun, which is the great importance at higher elevation (DFO, 2005). The average maximum temperature of 26.4⁰C and minimum temperature of 15.6⁰C was recorded in the district with dry winter and wet summer. The monsoon starts from June and pronounced rainfalls occur during July/September. The district gets monsoon rain with average 2594.2ml per annum rainfall. The southeastern parts of the district get more rainfall compared to other parts (Deptment of Hydrology and Meterology, 2007).

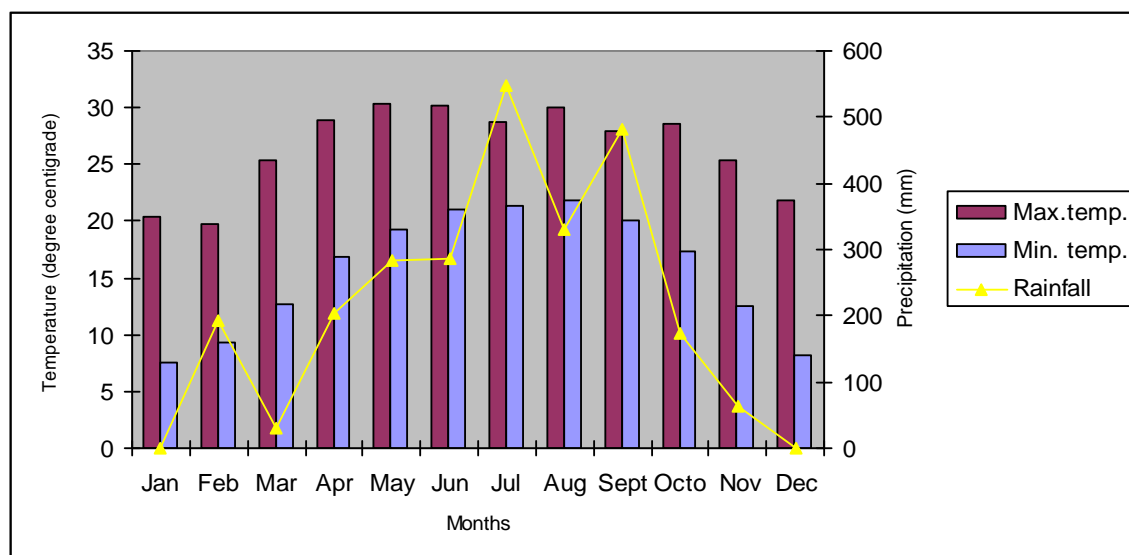
2.3 Geology and Soil

Geology of the district predominantly consists of Meta sedimentary rocks. North East (small portion) part of district is formed by glacier in the high Himalaya range. The area between 3000-3800 m is covered by soft sediments. The soil is the part of the complicated sedimentary formation, carbonates rocks and calcareous formations, which is considered to be more nutritious for plant growths and it is in this district where a diversity of plant species can be expected. (DFO, 2005).

MAP OF STUDY AREA



Source: Survey Department, Government of Nepal
1992 (Toposheet)



Vegetation

Vegetation is an overall expression of various environmental factors, which operate in a cyclic fashion. It is well known that the areas that are climatically similar will be characterized by similar plants form. Changes in vegetation type occur not only with respect to altitude, latitude, slope, and soils but also with respect to rainfalls pattern (Dobremez & Shakya, 1975).

On the basis of vegetation maps, Dobremez (1976) has provided an interpretation of the ecology of various parts of Nepal. Alpine and sub alpine zones along the Nepal Himalaya and the tropical zone along the terai show uniform patterns of vegetation distribution through out the Nepal. However, the intervening area lying between 1000 –3000 m (Sub tropical and temperate) exhibits great degree of diversity. There is pronounced difference in vegetation types between east, central and west Nepal.

The classification of forest types and vegetation of east Nepal has been attempted by many authors. Dobremez and Shakya (1975) identified 30 types of vegetations in eastern Nepal. The area is rich in terms of vegetation (flora), fauna, and habitat diversity (CEPF, 2005). Within a 610-4360m elevation range, over 15 types of forest have been described belonging to tropical to alpine zones of the district (Stainton, 1972). The vegetation of the area are much more connected with the flora of Assam-Burma-Malaya than with the Sino-Himalaya flora, though in so far as subtropical species are not easily separable from lower temperate ones those floras to a certain extent overlap each other (Stainton, 1972). The eastern Himalayan element is dominant in the study area. These elements become much reduced as one travels westward through Nepal. Dominant species from the study area are *Abies spectabilis*, *Acer cambelli*, *Acer caudatum*, *Betula utilis*, *Castanopsis hystrix*, *Corylus ferox*, *Edgeworthia gardneri*, *Gaultheria griffjthi*, *Ilex sikkimensis*, *Lindera neesiana*, *Lithocarpus pachyphylla*, *Magnolia campbellii*, *Michelia velutiana*, *M. doltsopa*, *Prunus rufa*, *Quercus lamellosa*, *Rhododendron cinnabarinum*, *R. dalhousie*, *R. falconeri*, *R. grande*, *R. hodgsoni*, *R. lindleyi*, *R. setosum*, *R. thomsonii*, *Salix sikkimensis*, *Skimmia arborescence*, *Sorbus foliolosa*, *S. microphylla*, etc.

3. MATERIALS AND METHODS

3.1 Literature and Herbarium Review

Literature review: Relevant literature was reviewed throughout the research period. Taxonomic literature such as Koba *et al.* (1994), Grierson & Long (1983-2001), Hara *et al.* (1978-1982), Noltie (1994, 2000), Pearce & Crib (2002), Press *et al.* (2000), various articles related to flora and ecological assessment, etc. were selected to review for preparation of this report.

Herbarium specimen review: Previous collection of specimens from the study area and its territories deposited at National Herbarium and Plant Laboratories, Godavari (KATH), and Tribhuvan University Central Herbarium (TUCH) were reviewed. For convenience, identification of specimens, deposited specimens of KATH and TUCH were reviewed in 1-2 June and 5-9 September, 2007 before the both field visits.

3.2 Field Visits

Plant collection expeditions were made in two seasons, and particularly focusing on monsoon season, because the flower blooms and plant sprouts well in this period. A total of 38 days were spent in field expeditions for plant species collection and vegetation sampling. Two extensive field trips were conducted during the research period. First pre-monsoon visit (4-18 June, 2007) was followed by second post-monsoon visit (16 September - 8 October, 2007).

3.3 Taxonomic Assessment

3.3.1 Collection and Herbarium Preparation

Plant specimens were collected by the expedition organized by ESON and financial supported by WWF Nepal/CEPF (USA). Plant collection, herbarium preparation and their preservation was based on the herbarium techniques of Forman and Bridson (1989).

3.3.2 Identification

Identification began from the spot (field) due to team member expertise and literatures. Further identification and verification was done in ESON's resource center with the help of taxonomic literatures (viz. Polunin & Stainton, 1984; Grierson & Long, 1983-2001 etc.). The specimens were tallied with the housed specimens of KATH and TUCH for further validations of the species name. For final confirmation of identified species, the specimens were compared with herbarium of RBGE, UK with the help of my research supervisor, M Watson, and HJ Noltie. Some of the doubtful and potentially new specimens were carefully diagnosed in RBGE, finally verified them. The collected herbarium specimens were deposited in national herbaria (KATH and TUCH) and international herbarium E (Royal Botanic Garden herbarium Edinburgh, UK).

3.3.3 Nomenclature and Description

For the nomenclature and author citation of species and genera, Hara *et al.* (1978, 1982), Koba *et al.* (1994) and Press *et al.* (2000) was followed. 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*." The basionyms were given whenever possible which must be accepted. The local names were obtained from field note or from secondary literatures.

3.4 Vegetation Analysis

A detailed analysis of vegetation (trees) was made by following quadrat sampling methods along the transect line. The line was made along the walking trail and the coverage of transect was 500m left from the center and 500 m right from the center of the road/trail. The process of sampling was based on Kershaw & Looney (1985) and Krebs (1999). In order to carry out the ecological assessment, the field level data related to micro weather, plant population and associated vegetation/species were noted. The Garmin Global Positioning System (GPS) was used for measuring altitude, Latitude, and Longitude. The study area is divided into three different sites on the basis of elevation gradients and dominant vegetation according to Stainton (1972).

1. Upper Temperate Forest (UTF): This site lies within the elevation range of 2400 - 2900 m. Three VDCs viz. Sidin, Prangbung, and Lower Memeng lies under this altitudinal range. Dominant species of this forest type are *Lithocarpus pachyphylla*, *Symplocos rasimossima*, *Quercus lamellosa*, *Daphniphyllum himalense*, *Acer campbelli*, *Lyonia ovalifolia*, *Rhododendron arboreum*, *R. falconeri*, etc.

2. Lower Subalpine Forest (LSF): This site lies within the elevation range of 2900 - 3400 m. Two VDCs viz. Upper Memeng and Chayanthapu lies under this altitudinal range. Dominant species of this forest type are *Acer caudatum*, *Sorbus foliolosa*, *Prunus cornuta*, *Rhododendron barbatum*, *R. grande*, *R. thomsonii*, *Viburnum nervosum*, etc.

3. Upper Subalpine Forest (USF): This site lies within the elevation range of 3400 - 3900 m. Only one VDC (Falaincha) lies under this altitudinal range. Dominant species of this forest type are *Rhododendron campanulatum*, *Abies spectabilis*, *Sorbus microphylla*, *Acer caudatum*, *Betula utilis*, etc.

Stratified systematic-random sampling method was used for vegetation sampling. Square quadrat of 10 m × 10 m was sampled for trees. Quadrats were located in different horizontal strata of forests. The horizontal distance between successive quadrats was about 200 m. 63 quadrats (25 quadrats in UTF, 20 in LSF and 18 in USF) were sampled in forest. In each quadrat, the numbers of individual trees were counted and diameter at breast height (dbh > 10 cm) of each species was measured by using DBH Tape.

3.5 Numerical Analysis

Community structure

The field data was used to calculate frequency, density, basal area, and importance value index following the method described by Zobel *et al.* (1987). The formulae used for the calculation of these attributes are given below:

$$\text{Frequency (\%)} = \frac{\text{Number of quadrats in which individual species occurred}}{\text{Total number of quadrats studied}} \times 100$$

$$\text{Density (trees ha}^{-1}\text{)} = \frac{\text{Total number of individuals of a species}}{\text{Total number of quadrats studied} \times \text{Area of a quadrat}} \times 10000$$

Basal area (BA) of a tree was calculated by following formula:

$$\text{Basal Area (m}^2\text{)} = \frac{d^2}{4}$$

$$\text{Basal Area (m}^2\text{ha}^{-1}\text{)} = \frac{\text{Total Basal Area of a species}}{\text{Total number of quadrats studied} \times \text{Area of a quadrat}} \times 10000$$

Basal area of a species in each sampling plot was obtained by the summation of BA of all individuals of a species.

$$\text{Relative Frequency (\%)} = \frac{\text{Frequency of Individual species}}{\text{Sum of the frequencies for all species}} \times 100$$

$$\text{Relative Density (\%)} = \frac{\text{Density of Individual species}}{\text{Total Density of all trees}} \times 100$$

$$\text{Relative Basal Area (\%)} = \frac{\text{Basal Area of Individual species}}{\text{Total Basal Area of all trees}} \times 100$$

Importance value index (IVI) gives the overall importance of each species in the community structure. It was calculated as the sum of relative values of density, frequency, and basal area. Relative values were obtained by the following relations:

$$\text{Importance Value Index (IVI)} = \text{Relative frequency} \Gamma \text{Relative density} \Gamma \text{Relative basal area}$$

Species diversity

Species diversity is the combination of species richness and species evenness. Species richness is the number of individuals per sampling unit. Species diversity can be expressed in single index number. Among the several indices most commonly used two indices are Simpson's index (Simpson, 1949) and Shannon-Wiener's index (Shannon and Weaver, 1949). Simpson's index (C) reflects the dominance because it is more sensitive to the most abundant species than the rare species. Following relations were used to calculate Simpson's and Shannon-Weiner indices following Barbour *et al.*, (1999).

$$\text{Simpson's index of dominance (C)} = \frac{1}{\sum_{i=1}^S (P_i)^2}$$

$$\text{Shannon -Wiener's index (H')} = -\sum_{i=1}^S (P_i)(\log P_i)$$

Where S = total number of species, P_i = proportion of all individuals in the sample that belongs to species i., and log = log₂ = log₁₀ × 3.3219

Beta () Diversity and Similarity Index

The calculation of Beta diversity helps to know the extent of species turn over between the sites. The Whittaker's diversity (w) was calculated using the following formula (Magurran 2004).

$$w = \frac{S}{r} - 1$$

Where, S = Total number of species recorded in both sites.

r = Average of total number of species recorded in two sites.

The value of diversity ranges from 0 (complete similarity) to 1 (complete dissimilarity) for two sites.

Degree of similarity between any two stands can be determined through the use of community coefficient (similarity index), which depends on the quantitative phytosociological characters of species common to both stands. Higher the index value more similar will be the stands to each other.

Similarity Index was calculated by using the formula (Magurran, 2004).

$$\text{Sorensen's Similarity Index (ISs)} = \frac{2C}{A+B} \times 100$$

Where IS = index of similarity, A = Total number of species in one community, B = Total number of species in another community, and C = the number of species which occur in both community.

The similarity index ranges from 0 - 100% to quantify the range from no similarity to complete similarity.

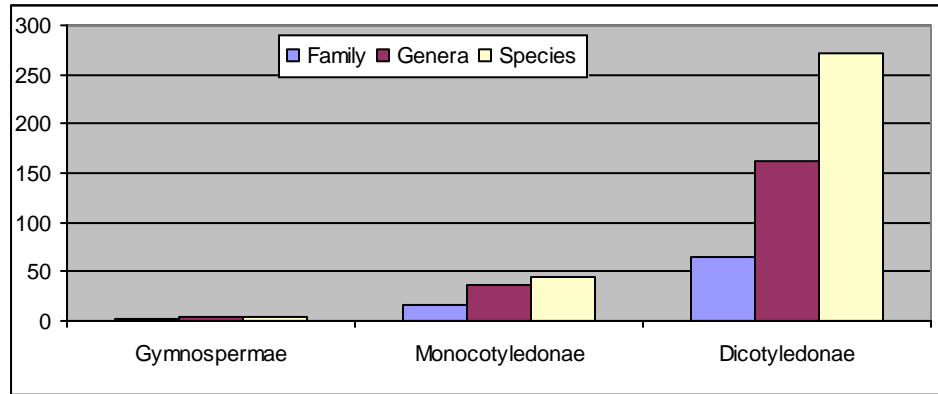
Size class distribution diagram

Size class distribution diagram is used for predicting regeneration behavior of trees. All the trees were divided into dbh classes of 10 cm interval and density of trees in each diameter class was calculated and then Size class distribution diagram was obtained by plotting diameter class on x-axis and density on y-axis (Barbour *et al.*, 1999).

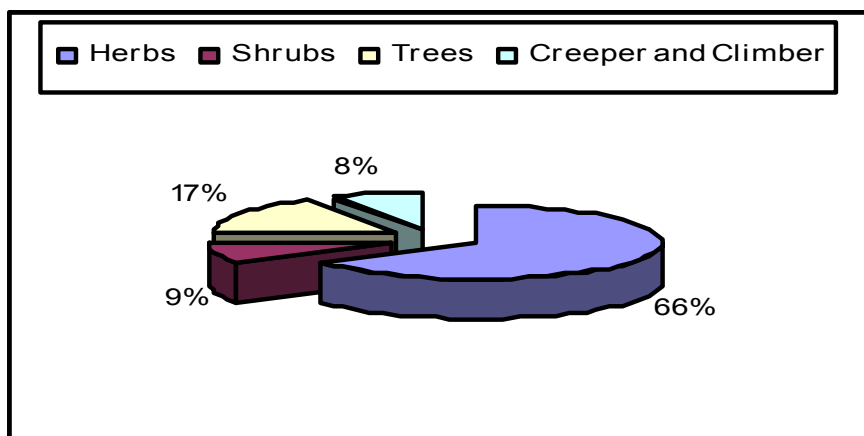
4. RESULTS

4.1 Plant Diversity

Altogether 320 species under 203 genera and 83 families were identified and described from the study area up to the species level. Among them, 271 species of Dicotyledonae belong to 163 genera and 64 families, 44 species of Monocotyledonae belong to 36 genera and 16 families, and five species of Gymnospermae belong to four genera and three families. Out of these, 211 were herbs, 30 were shrubs, 53 were trees, and 26 were creepers and climbers.



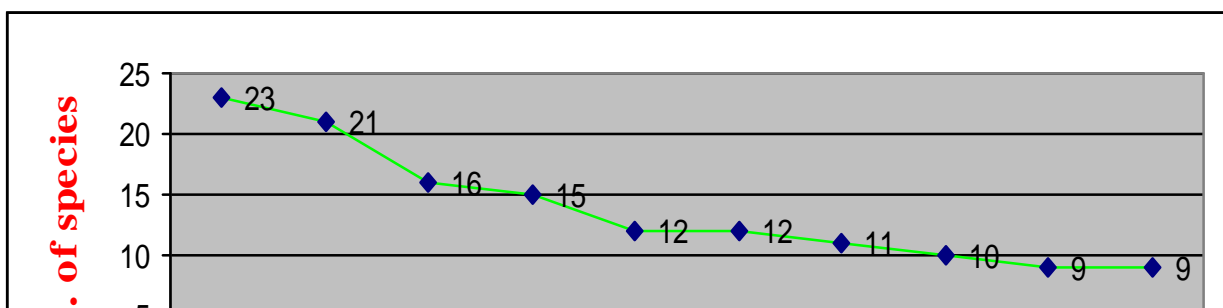
Graph 4.1 Distribution patterns of family, genera, and species



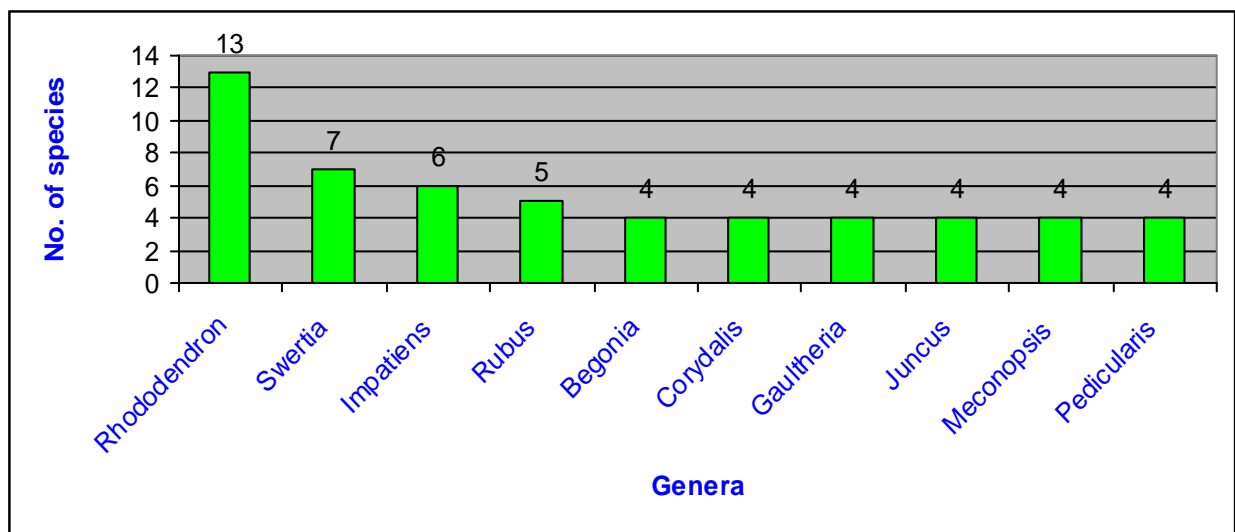
Graph 4.2 Distribution patterns of herbs, shrubs, trees, and creepers & climber

a. Family and Genera composition

Based on number of species, ten largest families were Ericaceae (23 species), Rosaceae (21 spp.), Ranunculaceae (16 spp.), Asteraceae (15 spp.), Gentianaceae (12 spp.), Scrophulariaceae (12 spp.), Poaceae (11 spp.), Fabaceae (10 spp.), Lamiaceae (9 spp.) and Polygonaceae (9 spp.) (Graph 4.3). Ten larger genera were *Rhododendron* (13 species), *Swertia* (7 spp.), *Impatiens* (6 spp.), *Rubus* (5 spp.), *Begonia* (4 spp.), *Corydalis* (4 spp.), *Gaultheria* (4 spp.), *Juncus* (4 spp.), *Meconopsis* (4 spp.) and *Pedicularis* (4 spp.) (Graph 4.4).



Graph 4.3 Top ten largest families with their species number



Graph 4.4 Top ten largest genera with their species number

b. New Addition to Flora of Nepal

Following species of the flowering plants (table 4.1) were reported from the Panchthar district as a new addition to the flora of Nepal. These species were not listed in available literatures mainly *Enumeration of Flowering Plants of Nepal* and *Annotated Checklist of Flowering plants of Nepal*.

c. Endemic and Threatened Species

Among the identified specimens, 10 species were identified as threatened, one species as endemic to Nepal (Table 4.1). Threatened species are based on IUCN, CITES and Government of Nepal (GoV) threat categories.

Table 4.1: New records to Flora of Nepal

SN	CN	Family	Species name	C. date	Altitude (m)	Latitude	Longitude	Locality
1	D 357	Begoniaceae	<i>Begonia panchtharensis</i> S. Rajbhandary & K.K. Shrestha, <i>sp. nov.</i> (in press)	10/02	2248	27 10 01	87 57 17.8	Prangbung

2	D 200	Fagaceae	<i>Castanopsis longispina</i> (King ex Hook.f.) C.C.Huang & Y.T.Chang	09/27	1900	27 16 04	87 57 29.9	Falaincha-6, Tintine
3	D 099	Gentianaceae	<i>Swertia wardii</i> Sm.	09/23	3910	27 23 35	88 02 16.6	Paharemeghu, Falaincha-9
4	D 130	Poaceae	<i>Calamogrostis lahulensis</i> G. Singh	09/24	4337	27 26 11	88 03 16	Timbu Falaincha-9
5	D 279	Rubiaceae	<i>Rubia hispidicaulis</i> Long	09/29	2450	27 04 21.2	87 59 29	Narelung CF, Memeng-3
6	D 257	Umbelliferae	<i>Acronema ioniostyles</i> Farille & Lachard	09/29	2702	27 13 21	87 57 25.2	Dabale Deurali

Table 4.2: Endemic and threatened plant Species from study area

SN	Record	Family	Species Name with threatened category	Alt. (m)	Locality
1.	Threatened	Asclepiadaceae	<i>Cerpegia hookerii</i> (CITES - II)	2481	Maklabu, Panchthar
2.	Threatened	Gentianaceae	<i>Swertia chirayita</i> (IUCN - V)	1900	Menjuwa, Panchthar
3.	Threatened	Magnoliaceae	<i>Magnolia campbelli</i> (IUCN - R, CITES II)	2005	Faleke-Betini, Falaincha-9, Panchthar
4.	Threatened	Pinaceae	<i>Abies spectabilis</i> (IUCN - V, GoN - II)	3185	Maimajuwa, Dhupi, Ilam
5.	Threatened	Polygonaceae	<i>Rheum nobile</i> (IUCN - R)	4335	Timbu pokhari, Falaincha-9, Panchthar
6.	Threatened	Ranunculaceae	<i>Aconitum spicatum</i> (IUCN - CT)	3850	Dund, Falaincha-9, Panchthar
7.	Threatened	Scrophulariaceae	<i>Neopicrorhiza scrophulariiflora</i> (IUCN - V, CITES - II, GoN - I)	4335	Timbu pokhari, Falaincha-9, Panchthar
8.	Threatened	Taxaceae	<i>Taxus wallichiana</i> (IUCN - V, CITES - II, GoN - II)	2702	Dabale Deurali, Panchthar
9.	Threatened	Trilliaceae	<i>Paris polyphylla</i> subsp <i>marmorata</i> (IUCN - V)	2685	Talkharka-Prangbung, Prangbung, Panchthar
10.	Threatened	Valerianaceae	<i>Nardostachys grandiflora</i> (IUCN - V, CITES - II)	3930	Paharemeghu, Falaincha-9, Panchthar
11.	Endemic	Umbelliferae	<i>Heracleum lallii</i> C. Norman	3640	Gairi-sukkhadhap Falaincha-9, Panchthar

d. Archaic species

A total of seven archaic plants (viz. *Magnolia campbelli* Hook. f., *Taxus wallichiana* Zucc., *Myrica esculenta* D. Don, and four species from family lauraceae) were recorded from the area.

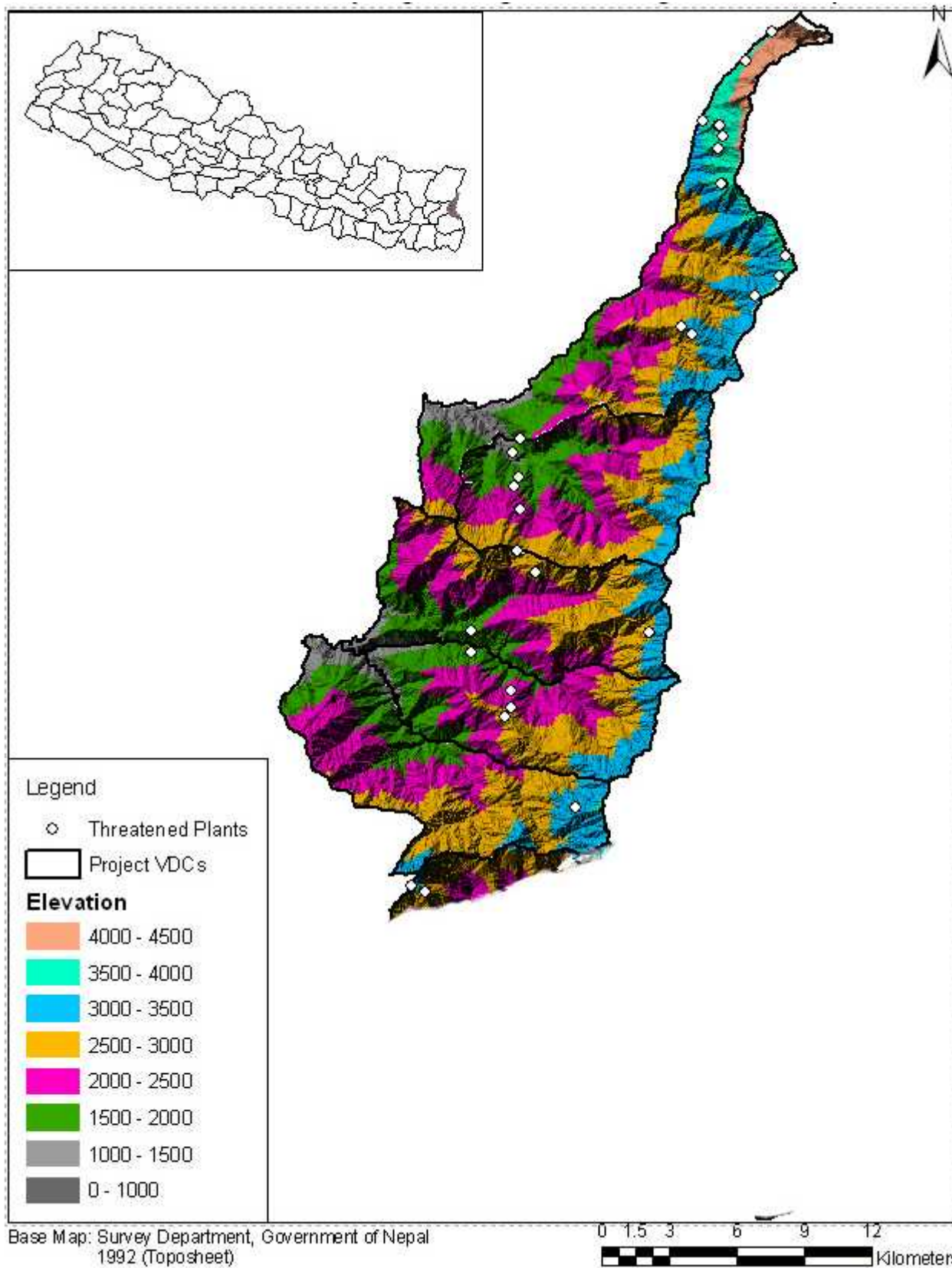
4.2 Forest types

The distribution of forest types depend on site specific physiography (Kunwar *et al.*, 2008). Different forest types were observed based on their dominant species and group of species and categorized into 11 types with the help of Stainton (1972).

i. *Castanopsis tribuloides* - *Castanopsis hystrix* Forest

Both of the above species are Eastern Himalayan elements, but where as *Castanopsis tribuloides* extends its range westwards through out Nepal. *C. hystrix* has not as yet been recorded west of Okhaldhunga, in the central midlands. This type of forest is ranged from

Map showing the distribution of threatened plants in the study area



Map showing the distribution of newly recorded plants in the study area



1800m to 2000m altitude. This forest is tall and dark with trees of 20-35m forming a close

canopy. The understory beneath is composed largely of species of *Symplocos* and of the family Lauraceae.

Associated species: *Quercus lamellosa*, *Lindera pulcherima*, *Neolitsea umbrosa*, *N. lanuginosa*, *Litsea elongata*, *Persea odoratissima*, *Symplocos* spp., *Ilex insignis*, *Eurya accuminata*, etc.

ii. *Quercus lamellosa* Forest

Quercus lamellosa occurs in the eastern Himalayas. In Nepal, this species found in east of Kaligandaki. It forms a more or less continuous belt, coming in above *Castanopsis* forest. The altitudes at which it occurs lie between 2000m-2600m. Usually it is confined to north or west faces. In its purest form *Q. lamellosa* forest is somewhat dark and gloomy.

Associated species: *Castanopsis tribuloides*, *Quercus glauca*, *Ilex sikkimensis*, *I. Dipyrena*, *Litsea elongata*, *Machilus duthiei*, *M. odoratissima*, *Symplocos ramosissima*, *S. theaefolia*, *Acer hookeri*, *Lyonia ovalifolia*, *Schefflera impressa*, *Daphniphyllum himalense*, *Prunus nepalensis*, etc.

iii. *Quercus semecarpifolia* Forest

In most part of the area, *Quercus semecarpifolia* remains quite common on south face. In north face it often seems unable to compete successfully with other east Himalayan types of forest. The altitude at which it occurs lie between 2200m to 3000m. Sometimes there may be an overlap between *Q. semecarpifolia* forest and upper temperate broad-leaved forest. So that the oak may be found growing with trees such as *Magnolia campbelli*, *Acer campbelli*, but in most typical form oak is very dominant in the upper canopy.

Associated species: *Abies spectabilis*, *Betula utilis*, *Laithocarpus pachyphylla*, etc.

iv. *Lithocarpus pachyphylla* Forest

Lithocarpus pachyphylla is an eastern Himalayan species. This forest predominates between 2400-2900m. This forest merges with *Q. lamellosa* forest in its lower part and *Rhododendron* forest in its upper parts. The upper canopy of this forest is composed almost exclusively of *Lithocarpus*, the tree attaining the height of 20-35m. The canopy is dense and the forest is dark. The species of *Symplocos* and of the family Lauraceae predominate in the understory.

Associated species: *Quercus lamellosa*, *Ilex dipyrena*, *I. Hookeri*, *Magnolia campbelli*, *Acer campbelli*, *Rhododendron grande*, *R. falconeri*, *Neolitsea umbrosa*, *Litsea kingie*, etc.

v. Lower Temperate Mixed Broad Leaved Forest

This type of forest is found in the wetter parts of the study area between 1600m-2400m, usually on north or west facing slope. The forest is to a large extent evergreen and in many places trees of the family Lauraceae are prominent. Because of the abundance of laurels, some authorities have described this forest as it occurs in Sikkim as laurel forest. Many of the species belonging to Lauraceae only occur in the understory; it would be as unreasonable to call such forest as laurel forest. So this is the mixed type of forest.

Lauraceae: *Machilus duthie*, *M. odoratissima*, *Neolitsea lanuginosa*, *Litsea oblonga*, etc.

Other species: *Acer oblongum*, *Schima wallichii*, *Lithocarpus pachyphylla*, *Quercus glauca*, *Castanopsis tribuloides*, *Acer thomsonii*, etc.

vi. Upper Temperate Mixed Broad Leaved Forest

This type of forest occurs in midlands between 2400-3300m, mostly on slopes that face north and west. This forest is predominantly broad and rather less predominantly deciduous. In some places, *Rhododendron* forest may replace this forest.

Dominant species: *Magnolia campbelli*, *Acer campbelli*, *A. pectinatum*, *Ilex dipyrena*, *Sorbus cuspidata*, *Corylus ferox*, *Betula utilis*, *Prunus cornuta*, *Symplocos ramosissima*, *Lindera pulcherima*, *Lyonia ovalifolia*, *Rhododendron* species, etc.

vii. *Rhododendron* Forest

Rhododendron in Nepal is most widespread and most numerous in species in area of heavy rain fall. This type of forest ranges from the 2300m to the alpine zone in a great sweep of almost pure *Rhododendron*. At lower level *R. grande*, *R. falconeri*, *R. hodgsonii* predominate, forming the tangled forest 15m tall. On the ridge and south facing slopes *R. arboreum* is common. At higher levels, *R. campanulatum*, *R. wallichii*, *R. thomsonii*, etc. form impenetrable shrubberies 4-6 m. tall. Above this, again somewhat smaller shrubberies of *R. lepidotum*, *R. anthopogon*, etc. lead into the alpine zone.

Associate species: *Abies spectabilis*, *Betula utilis*, *Lyonia ovalifolia*, *Daphniphyllum himalense*, *Acer* species etc.

viii. *Betula utilis* Forest

This is commonly called Birch forest, which is wide spread through out the Nepal and often dominates the forest at the tree line. Birch occurs only as individual trees scattered amongst the tangle of *Rhododendron* shrubs, and where it does form forest the under shrubs are almost exclusively ericaceous. This type of forest is ranged from 3000m to 3800m.

Associated species: *Rhododendron campanulatum*, *R. hodgsonii*, *R. arboreum*, *Abies spectabilis*, etc.

ix. *Abies spectabilis* Forest

Commonly called as fir forest, found through out the Himalayan. It ranges from 3000 m to the tree line. This fir forest normally has a dense understory of *Rhododendrons*, and when seen in the spring it is one of the most beautiful sights in Nepal. The upper canopy is composed almost exclusively of the fir, and the straight-stemmed trees attain a height of 35m.

Associated species: *Rhododendron barbatum*, *Betula utilis*, etc.

x. Moist Alpine Scrub

Moist alpine scrub occurs above the treeline in all the wetter parts of Nepal. *Rhododendron* species are very numerous as shrubberies with only a few species of *Rosa*, *Berberis*, *Cassiope*, etc.

Associate species: *Potentilla fruticosa*, *Polygonum vacciniifolium*, *Primula* species, *Rheum nobile*, *Saussurea* species, etc.

xi. Dry Alpine Scrub

Dry alpine scrub occurs between 3800m to 4500m in all the dry parts of Nepal. *Juniperus recurva* is the normal shrub predominates in this area.

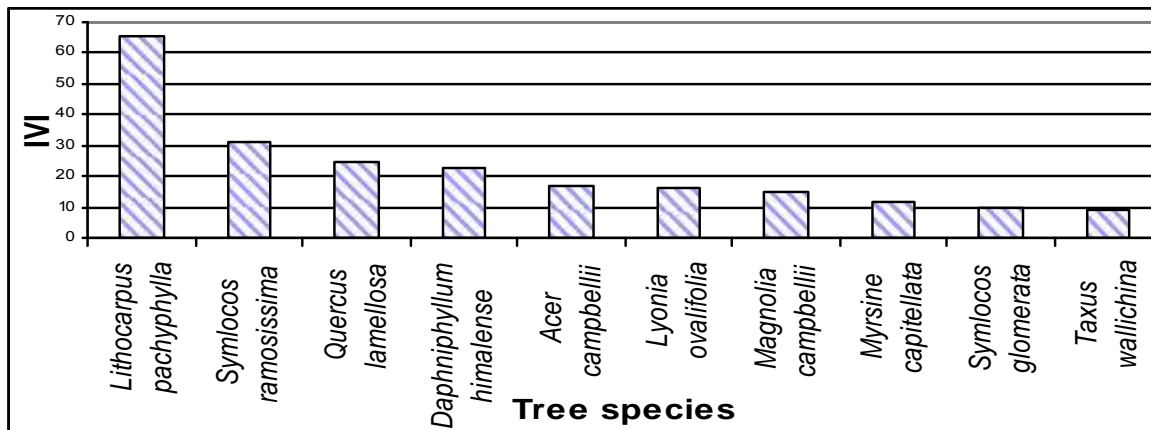
Associated species: *Rhododendron lepidotum*, *Rosa* species, *Spirea arcuata*, *potentilla* species, *Ephedra gerardiana*, etc.

4.3 Quantitative Study

Altogether 41 species of tree were recorded by sampling of 62 quadrats in 3 different sites. 30 species were recorded from UTF, 15 from LSF and 12 from USF.

Upper Temperate Forest (UTF) (2400-2900m)

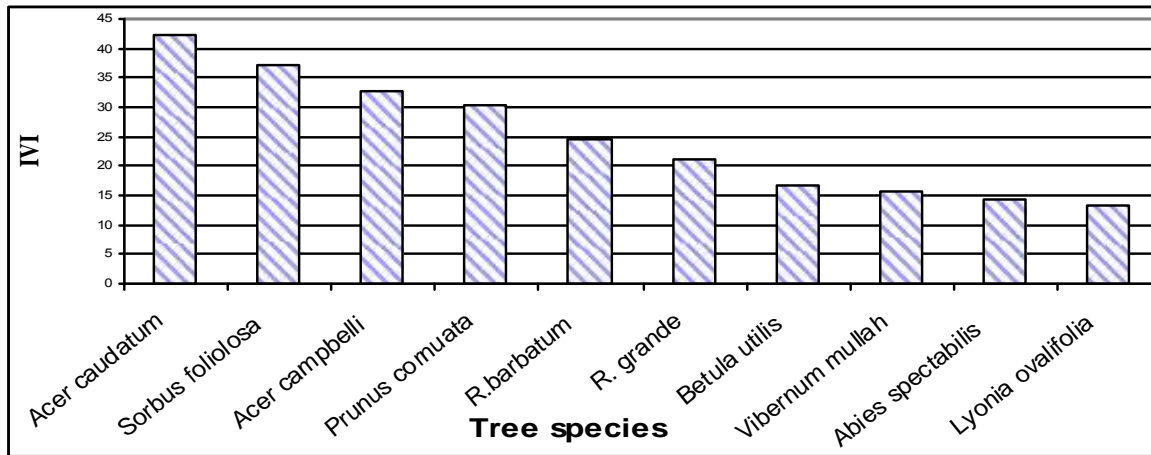
The density, frequency, basal area and their relative values and IVI are tabulated in Annex 2 (Table 2.1). Tree density was ranged from 3.3 to 213.3 trees ha⁻¹ and basal area from 0.1 to 48.8 m²ha⁻¹. The total density and basal area of all tree species were 1276.7 trees ha⁻¹ and 147.3 m²ha⁻¹ respectively. *Lithocarpus pachyphylla* was the dominant tree species with the highest importance value index (65.2) followed by *Symlocos ramosissima* (31.2). Canopy is formed by *Lithocarpus pachyphylla*, *Quercus lamellosa*, and *Acer cambelli*. The maximum canopy height was about 35m.



Graph 4.5 Importance Value Index of top ten trees in Upper Temperate Forest.

Lower Subalpine Forest (LSF) (2900-3400m)

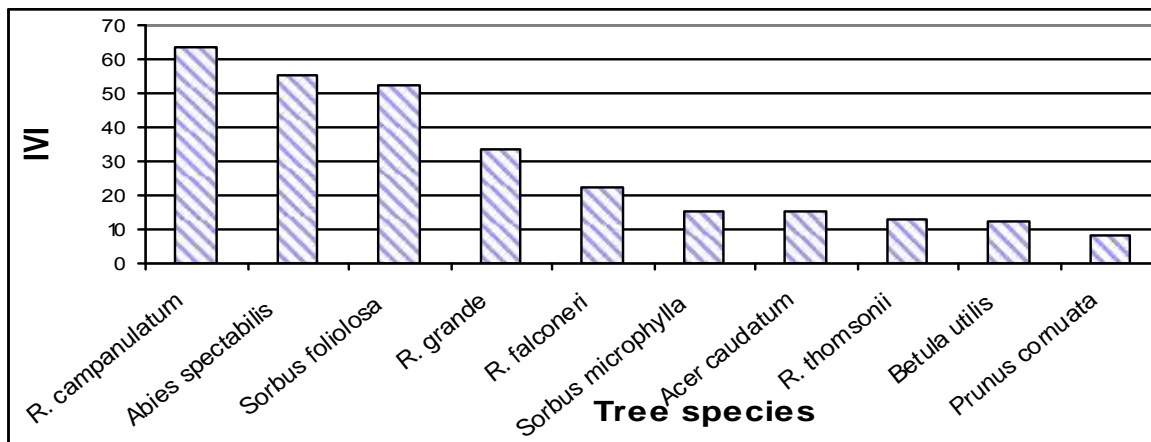
The density, frequency, basal area and their relative values and IVI are tabulated in Annex 2 (Table 2.2). Tree density was ranged from 7.7 to 123 trees ha⁻¹ and basal area from 0.2 to 4.1 m²ha⁻¹. The total density and basal area of all tree species were 753.846 trees ha⁻¹ and 24.620 m²ha⁻¹ respectively. *Acer caudatum* was the dominant tree species with the highest importance value index (42.3) followed by *Sorbus foliolosa* (37.3). Canopy is formed by *Acer caudatum*, *A. cambelli*, *Lyonia ovalifolia*, and *Abies spectabilis*. The maximum canopy height was about 30m.



Graph 4.6 Importance Value Index of top ten trees in Lower Subalpine Forest.

Upper Subalpine Forest (USF) (3400-3900m)

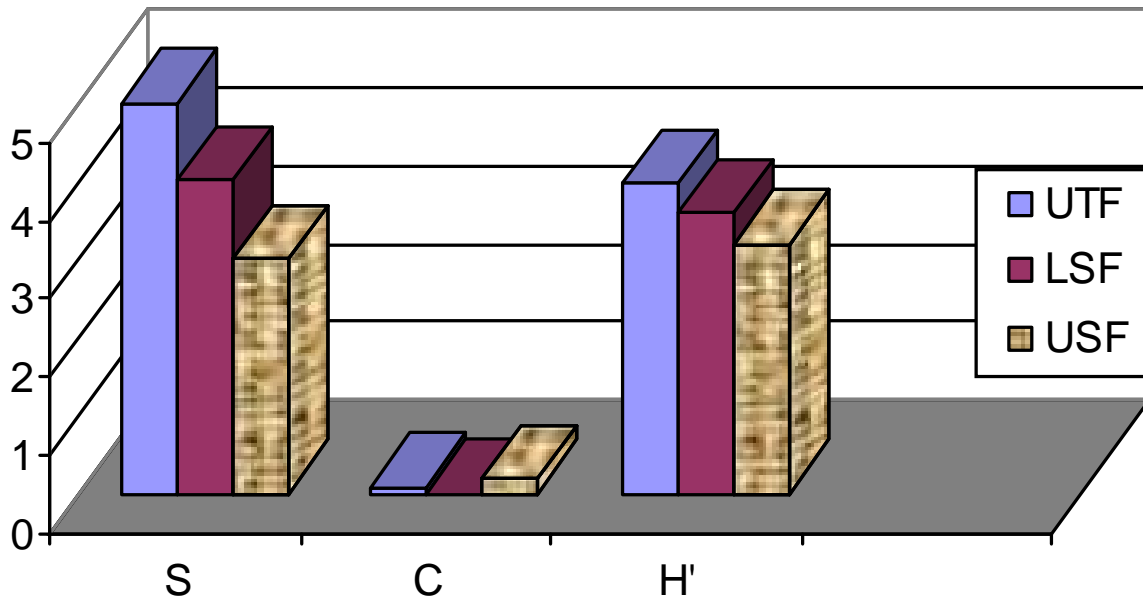
The density, frequency, basal area and their relative values and IVI are tabulated in Annex 2 (Table 2.3). Tree density was ranged from 15.8 to 494.8 trees ha⁻¹ and basal area from 0.034 to 20.8 m²ha⁻¹. The total density and basal area of all tree species were 1494.8 trees ha⁻¹ and 51 m²ha⁻¹ respectively. *Rhododendron campanulatum* was the dominant tree species with the highest importance value index (63.7) followed by *Abies spectabilis* (55.5). Canopy is formed by *Abies spectabilis* alone. None of the associated species reached to the canopy height. The maximum canopy height was about 15m.



Graph 4.7 Importance Value Index of top ten trees in Upper Subalpine Forest.

4.3.1 Species Richness and Diversity

Altogether 41 tree species in total were recorded from the study area. Tree species richness (- diversity) was higher in UTF (5) than in LSF (4) and USF (3) per 100m². Simpson's index of dominance (C) for trees was higher in USF (0.185) followed by LSF (0.093) and UTF (0.088). Shannon-Wiener's index (H') was higher in UTF (3.980) followed by LSF (3.598) and USF (3.196).



Graph 4.8: Species richness (S) per 100m², Simpson's Coefficient of Dominance (C), and Shannon-Weiner diversity index (H') in different forest type.

The Whittaker's diversity values between the sites reflect their spatial turnover (Table 4.3). Least value observed was 0.48 for LSF and USF, which show these sites contain similar species composition. The highest value observed is 0.86 for USF and UTF and reflects the dissimilarity in species composition. Higher beta diversity value between the sites indicates heterogeneity of the sites.

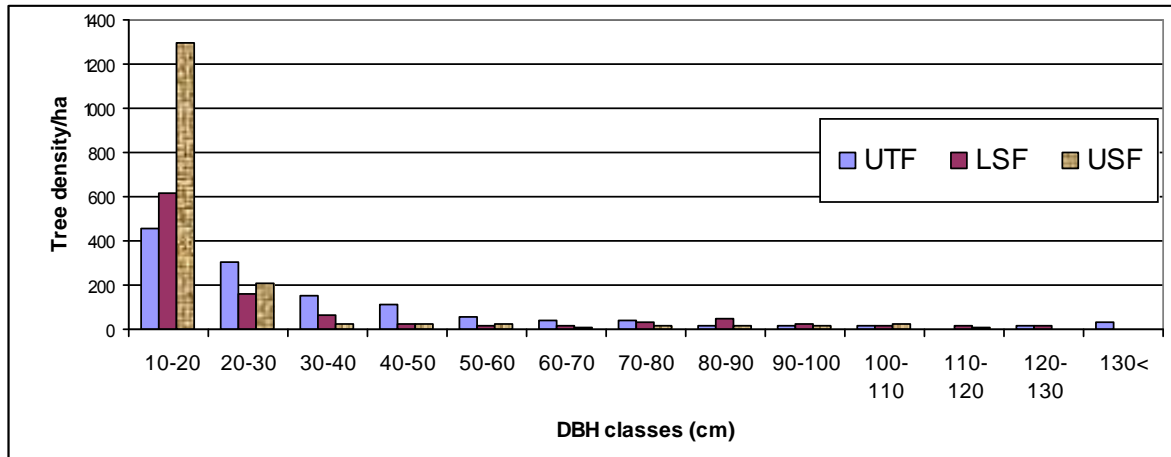
The highest and least values of similarity index are 51.85 and 14.29 for LSF & USF, and site USF & UTF respectively. Higher value of similarity index between sites indicates the similar composition of vegetation.

Table 4.3: Sorenson's similarity index and Whittaker's Beta diversity between the Upper Temperate Forest (UTF), Lower Subalpine Forest (LSF) and Upper Subalpine Forest (USF)

Forest type	LSF		USF	
	Beta diversity	Similarity Index	Beta diversity	Similarity Index
UTF	0.73	26.67	0.86	14.29
LSF			0.48	51.85

4.3.2 Size Class Distribution

The size class distributions indicate difference in population structure, which may be related to differences in environment and disturbance regimes. Almost inverse J-shaped graph was seen in all sites.



Graph 4.9 Size class distributions of tree species in three different sites.

4.4 Systematic Treatment (Description of plant species)

A. GYMNOSPERMAE

Family 1. TAXACAE

TAXUS L.

Taxus wallichiana Zucc., *Abh. Bayer. Akad. Wiss.* **3**: 803, t. 5 (1843); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 307 (2000). ‘Lauthsalla’

A tree to nearly 30m but usually not more than 10m with dark green foliage and thin dark reddish gray flaking bark. Leaves linear flattened, 2-3.5cm X 3-5mm, curved spiny tipped, leathery and dark glossy green. Fruit red, fleshy.

Habitat: on *Rhododendron-Acer* Forest.

Voucher specimen: Panchthar, Faleke (Falaincha), 3280m, Sep. 25, 2007, LKSR-Expedition, D 139 (TUCH).

Distribution: Nepal (West, Central, and East, 2300-3400m); Himalaya (Afghanistan to Bhutan), NE India, N Myanmar, Indo-China, W China, Malaysia.

Family 2. CUPRESSACEAE

JUNIPERUS L.

Juniperus recurva Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.*: 55 (1825) var. **recurva**; Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 86 (2000). ‘Dhupi’

Trees to 20m, more rarely a prostrate shrub c30cm. Leaves all needle like, appressed. Male cone oblong, 3-4mm x 2mm. Female cones globose 1.5mm, when ripe 7-10mm, black.

Habitat: in *Rhododendron* forest.

Voucher specimen: Panchthar, Dund (Falaincha), 3860m, Spe. 21, 2007, LKSR-Expedition, D 063 (TUCH).

Distribution: Nepal (Central and East, 3300-4600m); Himalaya (Kashmir to Bhutan), W China.

Family 3. PINACEAE

ABIES Juss.

Abies spectabilis (D. Don) Mirb. *Mem. Mus. Hist. Nat.* **13**: 17 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **1**: 25 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 233 (2000). ‘Thingre sallo’.

Evergreen pyramidal trees, branches whorls, branchlets opposite. Leaves sessile, linear, apex notched, borne on a disc like base. Cone erect. Male cone catkin like, terminal, smaller than female. Female cones sub terminal, 10-19cm X 4-9cm, dark purple. **Fr. & Fr.:** Apr.-Sep.

Habitat: on *Rhododendron-Betula* Forest.

Voucher specimen: Panchthar, Majortham (Falaincha), 3480m, Sep. 20, 2007, LKSR-Expedition, D 037 (TUCH).

Distribution: Nepal (West, Central, and East, 2400-4000m), Himalaya (Kashmir to Nepal) Pakistan.

PINUS L.

1. **Pinus roxburghii** Sarg., *Silva N. Amer.* **11**: 9 (1897); Hara *et al.* in *Enum. Fl. Pl. Nep.* **1**: 26 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 234 (2000). 'Khote Salla, Rani Salla'

A large tree to 40m. with very thick and deeply fissured rough bark. Leaves dark or bright green, needle like, borne in cluster of 3 on short shoots. Cone solitary or clustered. **Fl. & Fr.:** Apr.-Jun.

Habitat: on *Acer-Magnolia* forest (sparsely).

Voucher specimen: Panchthar, Dabalebhanjyang (Chyangthapu), 2500m, Sep. 29, 2007, LKSR-Expedition, D 270 (TUCH).

Distribution: Nepal (West, Central, and East, 1100-2100m); Himalaya (Afghanistan to Nepal).

2. **Pinus wallichiana** A. B. Jacks.; *Kew Bull.* **1938**: 850 (1938); Hara *et al.* in *Enum. Fl. Pl. Nep.* **1**: 26 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 234 (2000). 'Gobresalla'

A tall symmetrical pyramidal tree to 50m with smooth slate grey bark. Leaves 15-20cm. 5 needle in single sheath on short shoot. Cones long cylindrical pendulous in clusters of 2 or 3, 15-25cm long.

Habitat: on *Rhododendron-Betula* forest (sparsely).

Voucher specimen: Panchthar, Bikhepani (Prangbung), 3450m, Jun. 11, 2007, LKSR-Expedition, B 054 (TUCH).

Distribution: Nepal (West, Central, and East, 1800-4100m); Himalaya (Afghanistan to Nepal)

B. DICOTYLEDONAE

Family 1. MYRICACEAE

MYRICA L.

Myrica esculenta D. Don *Prodr. Fl. Nep.*: 56(1825). Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 213(1982). Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 201(2000). 'Kaafal'

Trees upto 15m. Leaves coriaceous, elliptic to oblanceolate, 7-14 x 2-3.5cm, glabrous. Male flowers in axillary raceme and female flowers in spike. Drupe ellipsoid, 8-10 x 6-9mm, brownish hirsute at first, later becoming covered with fleshy red tubercles. **Fl. & Fr.:** Feb.-May

Habitat: on *Shima-Castanopsis* Forest.

Voucher specimen: Panchthar, Tintine (Falaincha), 2660m, Sep. 27, 2007, LKSR-Expedition, D 212 (TUCH).

Distribution: Nepal (West, Central, and East, 1200-2300m); Himalaya (Kashmir to Bhutan), India, Myanmar, China, Malaysia.

Family 2. SALICACEAE

SALIX L.

1. **Salix lindeyilina** var. **microphylla** Andersson, *Kungl. Sv. Vet.-Akad. Handl.* **1850**: 500 (1851); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 218 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 282 (2000).

Prostrate rooting shrub. Leaves with deeply impressed midribs and revolute margins have been segregated, elliptic lanceolate, 3-8(-12) x 4 (-7)mm, serrulate, sparsely villosus. Catkins on leafy shoots, female catkin with crisom bracts. Capsule narrowly ovoid, dark brown. **Fl. & Fr**: Jun.-Aug.

Habitat: on *Rhododendron* forest.

Voucher specimen: Panchthar, Paharemeghu (Falaincha), 4050m, Sep. 23, 2007, LKSR-Expedition, D 117 (TUCH).

Distribution: Nepal (West, Centra, and East, 3400-4600m).

2. **Salix sikkimensis** Andersson, *Prodr.* **16(2)**: 269 (1868) ; Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 219 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 283 (2000).

Small shrub upto 4m. Leaves elliptic or oblanceolate, 2-7 x 1-3cm, entire. Catkins appearing with young leaves, pendulous. Capsules narrowly ovoid, 5mm, whitish pubescent. **Fl. & Fr**: May-Sep.

Habitat: along the walking trail on *Rhododendron-Sorbus* Forest.

Voucher specimen: Panchthar, Lampokhari (sidin), 3060m, Jun. 8, 2007, LKSR-Expedition, B 029 (TUCH).

Distribution: Nepal (East, 3800-4400m); Himalaya (Nepal to Bhutan), W China.

Family 3. **BETULACEAE**

1. **ALNUS** Miller

Alnus nepalensis D. Don, *Prodr. Fl. Nep.*: 58(1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 213(1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*:27(2000). 'Utis'

Deciduous tree. Leaves broadly elliptic, 9-15x4-9cm, acute, base rounded or cuneate, pubescent on veins. Petiole 0.8-2.5cm. Stipules oblong, auriculate. Male catkins in terminal panicles to 10 cm long. Female catkins short, cone like. Nut 1-seeds winged. **Fl. & Fr.**: Apr.-Sep.

Habitat: on stepy hill associated with *Schima wallichii*.

Voucher specimen: Panchthar, Prangbung (Prangbung), 1890m, Oct. 02, 2007, LKSR-Expedition, D 365 (TUCH).

Distribution: Nepal (West, Central and East, 500-2600m), Himalaya (Uttar Pradesh to Bhutan), NE India, Myanmar, India-China, W. China.

2. **BETULA** L.

Betula utilis D. Don, *Prodr. Fl. Nep.*: 58(1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **9**: 213 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 27(2000). 'Bhoj Patra'

Tree up to 15m; Bark white or pinkish, peeling in papery sheets; Branchlets warty glandular. Leaves ovate, 3-10 × 2-8cm, pubescent on veins and glandular beneath. Petioles 0.8-2cm. Stipules ovate-elliptic, deciduous. Male catkins solitary, axillary. Female spikes 2-4x1 - 1.5cm. Fruit winged achene.

Habitat: on *Rhododendron-Abies* Forest.

Voucher specimen: Panchthar, Faleke (Falaincha), 3280m, Sep. 26, 2007, LKSR-Expedition, D 140 (TUCH).

Distribution: Nepal (West, Central and East, 2700-4300m), Himalaya (Nepal to Bhutan), West China.

Family 4. **FAGACEAE**

1. **CASTANOPSIS** (D. Don) Spach

1. **Castanopsis hystrix** Miq. in *Ann. Mus. Bot. Lugduno-Batavum.* **1**: 119(1863); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 214 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 111(2000). 'Patale Katus'

A large trees with entire or toothed, lanceolate, finally pointed leaves, leaves 7.5-10cm long with fine reddish wooly hairs on beneath. Male spike stout, spreading or somewhat drooping. Female flowers in threes. Fruit 4-angled. **Fl. & Fr.:** Apr.-Sep.

Habitat: on *Schima-Castanopsis* forest.

Voucher specimen: Panchthar, Hiwakhola (Memeng), 2120m, Oct. 01, 2007, LKSR-Expedition, D 329, (TUCH).

Distribution: Nepal (Central and East, 1000-2500m); Himalaya (Nepal to Arunchal Pradesh), NE India, Myanmar, Indo-China, S China, Taiwan.

2. *Castanopsis longispina** (King ex Hook. f.) C.C.Huang & Y.T.Chang, *Guihaia* **21**: 1 (1992); Grierson and Long in *Fl. Bhu.* 1(1): 78 (1983). ‘*Kurkure Katus*’

Castanopsis tribuloides Smith var. *longispina* King ex Hook. f.

Small evergreen tree, 5-10m tall. Leaves usually obovate-oblong to ovate-lanceolate, 8.5-15cm x 3.5-8cm long, pubescent or glabrous beneath, margin entire, apex acuminate, nerves 10-12 pairs. Inflorescence rachis ca. 20cm. Involucre larger, 2.5cm in diameter, spines very long and stout, often 1.2cm. Nuts ellipsoid, 1-3, light brown. **Fl. & Fr.:** Apr.-Sep.

Habitat: on *Schima-Castanopsis* forest.

Voucher specimen: Panchthar, Tintine (Falaincha), 1900m, Sep. 27, 2007, LKSR-Expedition, D 200, (TUCH).

Distribution: East Nepal, Bhutan

* New record to “Flora of Nepal”

2. LITHOCARPUS Blume

1. *Lithocarpus grandifolius* (DC.) S. N. Biswas, *Bull. Bot. Surv. Ind.* **10**: 258(1969); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 111(2000). ‘*Arkhaul*’

Trees up to 20m. Leaves coriaceous, elliptic to oblanceolate or obovate, 8-35 x 4-10cm, base cuneate to rounded or cordate. Spikes 8-23cm, pubescent, cupule fused at base. Acorns ovoid or subglobose, lower third enclosed by cupule. **Fl. & Fr.:** Apr.-Jul.

Habitat: on *Rhododendron-Lyonia-Lithocarpus* forest.

Voucher specimen: Panchthar, Faleke (Falaincha), 3210m, Sep. 26, 2007, LKSR-Expedition, D 169, (TUCH).

Distribution: Nepal (West, Central and East, 1400-2000); Himalaya (Nepal to Bhutan), NE India (Meghalaya), Myanmar. S China.

2. *Lithocarpus pachyphylla* (Kurz) Rehder, *J. Arnold Arbor.* **1**: 129(1919); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 215 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 111(2000). ‘*bante*’

Quercus pachyphylla Kurz. in *J. As. S. Beng.* **2**: 197 (1875).

Trees up to 20m. Leaves elliptic, 8-20 x 3-5cm, caudate-acuminate, glabrous. Cupules fused together, enclosing half or more of acorn, scale thick. Acorn ovoid, 2-2.5cm, turbinate, glabrous. **Fl. & Fr.:** Jan.-Aug.

Habitat: on *Rhododendron-Lyonia-Lithocarpus* forest.

Voucher specimen: Panchthar, Faleke (Falaincha), 3210m, Sep. 26, 2007, LKSR-Expedition, D 173, (TUCH).

Distribution: Nepal (East, 2100-2800m); Himalaya (Nepal to Arunchal Pradesh), NE India (Manipur, Nagaland), Myanmar.

3. QUERCUS L.

1. **Quercus glauca** Thunb. in *Fl. Jap.*: 175(1784); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 216 (1982); Grierson and Long in *Fl. Bhu.* 1(1): 76(1983). 'Phalant'

Evergreen tree up to 20m. Leaves entire or serrate, shining and glabrous above and glaucous beneath, up to 16cm long. Male spike slender, hairy, bracts lanceolate. Nut 3/4, out of cup, small. **Fl. & Fr.**: Apr.-Sep.

Habitat: on *Rhododendron-Lyonia-Lithocarpus* forest.

Voucher specimen: Panchthar, Faleke (Falaincha), 3210m, Sep. 26, 2007, LKSR-Expedition, D 178, (TUCH).

Distribution: Nepal (West, Central and East, 450-3100m); Himalaya (Kashmir to Arunchal Pradesh), NE India (Meghalaya, Nagaland), Korea, Japan, Taiwan.

2. **Quercus lamellosa** Sm. in *Rees, Cyclop.* **29**: n. 23(1814); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 216 (1982); Grierson and Long in *Fl. Bhu.* **1**(1): 76(1983). 'Bajranth'

A tall evergreen tree upto 25m. leaves broadly oblong to lanceolate 7-30cm x 2-10cm, acuminate, cuspidately serrate. Flowers bisexual, solitary or crowded in short spikes. Nut 3/4, covered by cup, large. **Fl. & Fr.**: Apr.-Sep.

Habitat: on *Lyonia-Castanopsis* forest.

Voucher specimen: Panchthar, Hiwakhola (Prangbung), 2480m, Oct. 01, 2007, LKSR-Expedition, D 332 (TUCH).

Distribution: Nepal (Central and East); Himalaya (Nepal to Bhutan), NE India, S China, Myanmar .

3. **Quercus semecarpifolia** Sm., *Cycl.* **29**: n. 20(1814); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 216(1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 112(2000). 'Khasroo'

An evergreen or sometimes deciduous trees upto 20m. Leaves oblong or broadly elliptic, 4-10 x 2-3cm, margin revolute, entire or spinuous toothed, shortly stellate tomentose beneath. Acorn subglobose, 2-3cm, turbinate or mucronate. **Fl. & Fr.**: May-Aug.

Habitat: on *Lyonia-Castanopsis* forest.

Voucher specimen: Panchthar, Narelung (Memeng), 2390m, Sep. 29, 2007, LKSr-Expedition, D 277 (TUCH).

Distribution: Nepal (West, Central and East, 1700-3800m); Himalaya (Kashmir to Arunchal Pradesh), Afghanistan, Pakistan Myanmar, W & S China .

Family 5. MORACEAE

FICUS L.

Ficus pubigera (Wall. ex Miq.) Brandis, *Forest Fl. N. W. India*: 424(1874); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 211(1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 199(2000).

Pogonotrophe pubigera Wall. ex Miq. in Hook. , *J. Bot.* **7**: 76 (1867).

Climbing shrubs with pubescent shoots. Leaves ovate-elliptic, 12-20 x 4-8cm, gradually acuminate, base rounded. Figs larger, 3.5-4cm, brownish pubescent or tomentose, warted, sessile or on peduncles upto 3mm. **Fl. & Fr.**: Jun.-Aug.

Habitat: on *Schima-Castanopsis* forest.

Voucher specimen: Panchthar, Narelung (Memeng), 1900m, Sep. 29, 2007, LKSR-Expedition, D 281 (TUCH).

Distribution: Nepal (Central); Himalaya (Uttar Pradesh to Assam), NE India, Myanmar.

Family 6. URTICACEAE

1. BOEHMERIA Jacquin

1. **Boehmeria hamiltoniana** Wedd., *Monog. Urtic.*: 371 (1856); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 201 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 319 (2000). ‘Kamley’

Monoecious or dioecious sub shrub up to 2m. Leaves orbicular or sub orbicular, 7-20 x 5-16cm, margin coarsely crenate- serrate. Spikes usually slender and flexuous. **Fl. & Fr.**: Sep.-Nov.

Habitat: along walking trail near settle area.

Voucher specimen: Panchthar, Dabale Bhanjyang (Memeng), 2500m, Sep. 29, LKSR-Expedition, D 272 (TUCH).

Distribution: Nepal (Central and East, 1600-2400m); Himalaya (Nepal to Bhutan), Myanmar.

2. **Boehmeria macrophylla** D. Don, *Prodr. Fl. Nep.*: 60 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 201 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 319 (2000). ‘Kamle’

Monoecious or dioecious subshrub up to 3m. Leaves membranous, ovate to elliptic or sub orbicular, 7-25 x 4-15cm, stipules lanceolate. Male spike panicle, female spike solitary. Achene ellipsoid, 0.7mm, with hooked style. **Fl. & Fr.**: Apr.-Sep.

Habitat: along walking trail near settle area.

Voucher specimen: Panchthar, Maklabu (Chyangthapu), 1980m, Sep. 27, 2007, LKSR-Expedition, D 185 (TUCH).

Distribution: Nepal (Central and East, 500-1400m); Himalaya (Uttar Pradesh to Bhutan), NE India, Myanmar, Indo-China, W China.

3. **Boehmeria ternifolia** D. Don, *Prodr. Fl. Nep.*: 59 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 202 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 319 (2000).

Monoecious or dioecious sub shrub up to 3m. Leaves orbicular or suborbicular, 7-20 x 5-16cm, rounded and abruptly cuspidate at apex. Spikes usually slender and flexuous. **Fl. & Fr.**: Apr.-Sep.

Habitat: along walking trail near settle area

Voucher specimen: Panchthar, Maklabu (Chyangthapu), 1980m, Sep. 27, 2007, LKSR-Expedition, D 184 (TUCH).

Distribution: Nepal (West, Central, and East, 900-2300m); Himalaya (Punjab to Bhutan).

2. **DEBREGEASIA** Gaudich.

Debregeasia longifolia (Burm. f.) Wedd., *Prodr.* **16**(2): 235 (1868); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 202 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 319 (2000). ‘Tusare’

Large shrubs up to 8m. Leaves broadly ovate or sub orbicular, 14-27 x 7-20cm, base rounded or cordate, margin sinuate. Flowers and achenes 0.75mm long. **Fl. & Fr.**: May-Sep.

Habitat: along trail on *Rhododendron-Sorbus* forest.

Voucher specimen: Panchthar, Faleke (Falaincha), 3210m, Sep. 26, 2007, LKSR-Expedition, D 157 (TUCH).

Distribution: Nepal (West, Central, and East, 1000-2000); Himalaya (Uttar Pradesh to Arunachal Pradesh), India, Myanmar, Sri Lanka, Indo-China, W. China, Malaysia.

3. **PILEA** Lindl.

Pilea scripta (Buch.-Ham. ex D. Don) Wedd., *Ann. Sci. Nat.*, ser. 4 1: 187 (1854); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 205 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 322 (2000). ‘Seto Gaglet’
Urtica scripta Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.*: 59 (1825).

Monoecious or dioecious herbs up to 1m, stem succulent, glabrous, swollen above nodes. Leaves elliptic or lanceolate, 9-23 x 3-6cm, stipules lanceolate. Achenes ovate, 0.75cm. **Fl. & Fr.**: Jul.-Sep.

Habitat: along trail on *Quercus-Lithocarpus* forest.

Voucher specimen: Panchthar, Banduke (Sidin), 2840m, Jun. 08, 2007, LKSR-Expedition, A 044 (TUCH).

Distribution: Nepal (West, Central, and East, 1300-2500m); Himalaya (Uttar Pradesh to Bhutan), NE India (Meghalaya), Myanmar, W China.

4. URTICA L.

1. *Urtica dioica* L., *Sp. Pl.* 984(1753); Hara *et al.* in *Enum. Fl. Pl. Nep.* 3: 207 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 322(2000). '*Lekh sisnu / Sisnu*'

Plants monoecious, all parts bearing scattered white stinging hairs. Leaves ovate-lanceolate, 2-6×1-3cm; stipules lanceolate. Panicles 2-5cm long. Male flowers 2mm diameter, perianth segments orbicular. Female flowers 1.5mm diameter. Achenes ovoid or ellipsoid.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Prangbung (Prangbung), 1890m, Oct. 02, 2007, LKSR-Expedition, D 360 (TUCH).

Distribution: Nepal (West and Central, 3000-4500m), Europe, Himalaya, W. China.

Family 7. POLYGONACEAE

1. ACONOGONUM (Meisner) Reichenbach

Aconogonum campanulatum (Hook. f.) H. Hara, *Fl. E. Him.*: 67 (1966); Hara *et al.* in *Enum. Fl. Pl. Nep.* 3: 172 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 236 (2000).

Polygonum campanulatum Hook. f. in *Fl. Bri. Ind.* 5: 51 (1886).

Subshrubs up to 2m, glabrous or pubescent. Leaves ovate-elliptic, 10-20 x 2-8cm, pubescent beneath; ocreae 3-4cm, membranous. Flowers in branching racemose panicles. Achene trigonous. Fl. & Fr.: Jul.-Oct.

Habitat: along trail on *Schima-Castanopsis* Forest.

Voucher specimen: Panchthar, Betini (Falaincha), 1790m, Sep. 26, 2007, LKSR-Expedition, D 159 (TUCH).

Distribution: Nepal (Central and East, 2100-4000m); Himalaya (Uttar Pradesh to Bhutan), China.

2. BISTORTA (L.) Adanson

1. *Bistorta amplexicaulis* (D.Don) Greene, *Leafl.* 1: 21 (1904); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 237 (2000).

Polygonum amplexicaule D.Don, *Prodr. Fl. Nep.*: 70 (1825)

Erect herb with thick rhizomes of 30-75cm, branched. Leaves ovate, 6-10×3-5cm, base cordate margin entire, apex acuminate. Upper leaves sessile, amplexicaul, glabrous. Ocreae 1-5cm, brown. Racemes 2-5cm. Achenes 5-6, brown. **Fl. & Fr.:** May-Sep.

Habitat: on open grass land

Voucher specimen: Panchthar, Budhipani (Falaincha), 4050m, Sep. 22, 2007, LKSR-Expedition, D 084 (TUCH).

Distribution: Nepal (West, Central, and East, 2100-4800 m), Afghanistan, Himalaya.

2. *Bistorta vivipara* (L.) Gray, *Nat. Arr. Brit. Pl.* 2: 268(1821); Hara *et al.* in *Enum. Fl. Pl. Nep.* 3: 173(1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 237(2000).

Polygonum viviparum L., *Sp. Pl.*: 360 (1753)

An erect herb with thick, fibrous rhizomes of 8-30cm. Lower leaves ovate 1.5-11 x 0.5-2cm, pubescent beneath; ocreae 0.5-4cm, brown; upper leaves linear. Flowers in racemes, white or deep pink. Achene brown. **Fl. & Fr.:** May-Sep.

Habitat: on open grass land

Voucher specimen: Panchthar, Timbupokhari (Falaincha), 4340, Sep. 23, 2007, LKSR-Expedition, D 121 (TUCH).

Distribution: Nepal (West, Central and East, 3300-5000m); Himalaya, Europe, America.

3. FAGOPYRUM Miller

Fagopyrum dibotrys (D. Don) Hara, *Fl. E. Him.*: 69 (1966); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 174 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 238 (2000). ‘Tite Phapar’
Polygonum dibotrys D. Don, *Prodr. Fl. Nep.*: 73 (1825).

Annual herbs upto 2m. Lower leaves broadly deltoid, upto 13cm; ocreae 2-3.5cm. Flowers in spike like racemes. Achene ovoid, sharply trigonous. Fl. & Fr.: Jun.-Oct.

Habitat: along trail on *Rhododendron-Sorbus* forest.

Voucher specimen: Panchthar, Faleke (Falaincha), 3210m, Sep. 26, 2007, LKSR-Expedition, D 156 (TUCH).

Distribution: Nepal (West, Central and East, 1500-3400m), Himalaya, NE India, China.

4. KOENIGIA L.

Koenigia nepalensis D. Don, *Prodr. Fl. Nep.*: 74 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 174 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 238 (2000).

Annual herbs up to 40cm, stem with sparse, yellowish, pilose hairs forming a ring at base of ocreae. Leaves ovate, 0.5-2.5 x 0.3-1.0cm, sparsely oppressed pilose on both surface; ocreae 2-4mm. Flowers in terminal flat-topped corymbs, white or pink. Achene trigonous up to 2m. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail on *Rhododendron-Abies* forest.

Voucher specimen: Panchthar, Majortham (Falaincha), 3450m, Sep. 20, 2007, LKSR-Expedition, D 373 (TUCH).

Distribution: Nepal (West, Central and East, 2800-4900m); Himalaya (Kashmir to Bhutan), China.

5. PERSICARIA L.

1. **Persicaria chinensis** var. **brachiata** (Lam.) H. Hara, *Fl. E. Him.*: 71 (1966); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 234(2000). ‘Sanopate Thotne’
Polygonum brachiatum Lam., *III. 2*: t. 315, f. 4 (1797).

Small erect shrubs. Leaves simple, alternate, glabrous, oblong-ovate, entire. Inflorescence axillary and terminal cyme. Flower pinkish, peduncle hairy. Fruit fleshy. **Fl. & Fr.:** May-Nov.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Dabalebhnjyang (Memeng), 2120m, Sep. 29, 2007, LKSR-Expedition, D 268 (TUCH).

Distribution: Nepal (West, central and East, 2000-2700m)

2. **Persicaria pubescens** (Blume) Hara in *J. Jap. B.* **17**: 335 (1941); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 177 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 240 (2000).
Polygonum pubescens Blume, *Bijdr.* : 532 (1825/26)

Weak ascending perennial herbs up to 75cm. Leaves lanceolate, 3.5-10 x 0.7-2cm, pubescent or setulose on vein beneath; ocreae 10-15mm, cilia at mouth. Racemes very slender, up to 15cm, drooping, perianth gland-dotted. Achene trigonous. **Fl. & Fr.:** Apr.-Aug

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Chamling gaun (Chyangthapu), 2500m, Sep. 28, 2007, LKSR-Expedition, D 227 (TUCH).

Distribution: Nepal (West and East, 1000-2100m), Himalaya, India, China, Japan, Australia.

3. **Persicaria runcinata** (Buch.-Ham. ex D. Don) H. Gross, *B. Jahrb.* **49**: 277(1913); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 178(1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 240(2000). ‘Ratneuolo’

Polygonum runcinatum Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.*: 73 (1825).

Pubescent branched herb. Leaves simple, ovate 2.8 to 17cm long, runcinate-pinnatifid, glandular. Inflorescent terminal globose. Flower white or pink. Nut opaque. **Fl. & Fr.**: May-Oct.

Habitat: along trail near small streams.

Voucher specimen: Panchthar, Hiwakhola (Memeng), 1890m, Oct. 01, 2007, LKSR-Expedition, D 358 (TUCH).

Distribution: Nepal (Central and East, 1600-3800m); Himalaya (Kashmir to Bhutan), Meghalaya, W & C China, Malaysia.

6. RHEUM L.

Rheum nobile Hook. f. & Thomson, III. *Him. Pl.*: 19 (1855); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 179 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 240 (2000). ‘Kyanjo’

Herbs up to 1.5 m, stem densely covered in pale reflexed bracts. Leaves broadly ovate or orbicular, up to 30cm long and broad, sparsely pubescent beneath, petiole 15-20cm; ocreae as long. Raceme or panicles 15-20cm, concealed by bracts. **Fl. & Fr.**: Jun.-Aug.

Habitat: on open alpine meadow.

Voucher specimen: Panchthar, Timbupokhari (Falaincha), 4340, Sep. 23, 2007, LKSR-Expedition, D 132 (TUCH).

Distribution: Nepal (East, 3900-4300m); Himalaya (Nepal to Bhutan).

Family 8. CARYOPHYLLACEAE

1. ARENARIA L.

Arenaria depauperata (Edgew.) H. Hara, *J. Jap. Bot.* **51**: 129(1976); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 52(1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 39(2000).

Stellaria depauperata Edgew. ex Edgew. & Hook. f. in *Fl. Brit. Ind.* **1**: 234 (1874).

Slender sub erect herbs up to 10cm. Leaves linear-lanceolate, 5-10 x 1.5-2mm, glabrous. Flowers solitary or few, white. Anther blakish. **Fl. & Fr.**: Aug.-Sep.

Habitat: along trail on *Rhododendron-Sorbus* forest.

Voucher specimen: Panchthar, Faleke (Falaincha), 3280m, Sep. 26, 2007, LKSR-Expedition, D 138 (TUCH).

Distribution: Nepal (West and Central, 3500-4400m); Himalaya (Uttar Pradesh to Bhutan).

2. CERASTIUM L.

Cerastium glomeratum Thuill., *Fl. Paris* ed. **2**: 226(1799); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 53(1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 40(2000).

Annual herbs up to 30cm. Leaves ovate or oblanceolate, 0.5-2 x 0.3-0.8cm. Flowers in terminal cymes, white. Capsule 9-12mm, scarious, straw colour. **Fl. & Fr.**: May-Sep.

Habitat: on open pasture land.

Voucher specimen: Panchthar, Dund (Falaincha), 3910m, Sep. 21, 2007, LKSR-Expedition, D 061 (TUCH).

Distribution: Nepal (West and Central, 1500-3800m); Cosmopolitan.

3. STELLARIA L.

1. **Stellaria decumbens** Edgew., *Trans. Linn. Soc. London* **20**: 35(1846); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 257(1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 43(2000).

Densely tufted herbs stem pubescent up to 15cm. Leaves linear or ovate-lanceolate, 3-15 x 1-1.5mm. Flowers solitary or in cymes. Capsule as long as calyx. **Fl. & Fr.:** Jun.-Aug.

Habitat: on open alpine meadow.

Voucher specimen: Panchthar, Timbupokhari (Falaincha), 4340, Sep. 23, 2007, LKSR-Expedition, D 124 (TUCH).

Distribution: Nepal (West, Central and East, 3200-4000m); Himalaya (Kashmir to Bhutan)

2. **Stellaria monosperma** Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.*: 215(1825) var. **monosperma**; Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 58(1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 43(2000).

Scrambling herbs. Leaves elliptic or lanceolate, sessile or petiole of 1cm, margin smooth or minutely crisped. Cymes elongated, glandular pubescent. Capsule subglobose. **Fl. & Fr.:** Aug.-Oct.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Dabale-Deurali (Chyangthapu), 2680m, Sep. 29, 2007, LKSR-Expedition, D 252 (TUCH).

Distribution: Nepal (West and Central, 2600-3200m); Himalaya (Kashmir to Assam).

3. **Stellaria sikkimensis** Hook. f. ex Edgew. & Hook. f., *Fl. Br. Ind.* **1**(2): 230(1874); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 58(1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 44(2000).

Herbs with sparsely yellowish pilose through out. Leaves ovate-lanceolate, 0.8-2 x 0.3-0.8cm. Flowers in loose terminal cymes. Capsule ovoid, as long as sepals, 5-6cm.

Fl: Apr.-Jun.

Fr: Jun.-Jul.

LN:

Voucher specimen: Panchthar, Majortham (Falaincha), 3450m, Sep. 20, 2007, LKSR-Expedition, D 369 (TUCH).

Distribution: Nepal (East, 2000-3500m); Himalaya (Nepal to Bhutan).

4. **Stellaria subumbellata** Edgew. ex Edgew. & Hook. f., *Fl. Br. Ind.* **1**(2): 233 (1874); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 58 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 44 (2000).

Decumbent glabrous herbs up to 2cm. Leaves linear-lanceolate, 0.5-0.8 x 0.1-0.2cm. Cymes 2-4, terminal, umbellately arranged. Capsule ovoid, 4mm. **Fl. & Fr.:** Aug.-Oct.

Habitat: on *Rhododendron* forest along trail.

Voucher specimen: Panchthar, Budhipani (Falaincha), 4050m, Sep. 22, 2007, LKSR-Expedition, D 096 (TUCH).

Distribution: Nepal (Central, 4300m); Himalaya (Kashmir to Sikkim), W China .

Family 9. MAGNOLIACEAE

MAGNOLIA L.

Magnolia campbelli Hook. f. & Thomson, *Fl. Ind.* **1**: 77 (1855); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 25 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 192 (2000). '*Ghonge Champ*'

Deciduous trees of 12-20m tall. Leaves unfolding after flowers, elliptic or obovate, acute, stipule scar 5-7mm. Flowers enclosed at first by deciduous spathe like bracts, outer perianth parts yellowish, inner white, purple near base. **Fl. & Fr.:** May-Sep.

Habitat: on *Castanopsis-Quercus* forest.

Voucher specimen: Panchthar, Faleke-Beteni (Falaincha), 2010m, Sep. 26, 2007, LKSR-Expedition, D 174 (TUCH).

Distribution: Nepal (Central and East, 2250-2700m); Himalaya (Nepal to Arunchal Pradesh), NE India, N Myanmar, China (Xizang, Yunnan).

Family 10. SCHISANDRACEAE

SCHISANDRA Michaux

Schisandra grandiflora (Wall.) Hook. f. & Thomson, *Fl. Brit. Ind.* **1**(1): 44 (1872); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 26 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 291 (2000).

Kadsura grandiflora Wall., *Tent. Fl. Nep.* **10**: t. 14 (1824).

Woody climber. Leaves lanceolate, elliptic or oblanceolate, 8-16 x 2.5-6cm. Male flowers white or pale pink. Carpel ovoid. Fruit fleshy, obovoid, red. **Fl. & Fr.**: May-Aug.

Habitat: on *Lithocarpus-Lyonia* forest.

Voucher specimen: Panchthar, Lampokhari (sidin), 3060m, Jun. 8, 2007, LKSR-Expedition, B 032 (TUCH).

Distribution: Nepal (West, Central and East, 2100-3300m); Himalaya (Kashmir to Bhutan).

Family 11. LAURACEAE

1. LINDERA Thenberg.

Lindera neesiana (Wall. Ex Nees) Kurz, *Prelim. Rep. Forest Pegu*: 103 (1875); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 184 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 161(2000).

Benzoin neesianum Wall. ex Nees. in Wall., *Pl. As. Rar.* **2**: 63 (1831)

Evergreen small trees up to 7m. Leaves ovate, sub orbicular 6-12x3-6cm whitish sericeous beneath. Umbel solitary 3.8 sub sessile flowers fruit ellipsoid, 10x7mm. **Fl. & Fr.**: Apr.-Aug.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Chamling danda (Chyangthapu), 2010m, Sep. 28, 2007, LKSR-Expedition, D 238 (TUCH).

Distribution: Nepal (Central and East, 1800-2700m); Himalaya (Nepal to Bhutan), NE India.

2. LITSEA Lamark

Litsea kingii Hook f., *Fl. Bri. Ind.* **5**: 156 (1886); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 162 (2000).

Deciduous tree up to 12m with seriate shoot. Leaves membranous, elliptic 7-12x2-4cm, pale beneath, glossy above, petiole 1-1.5cm. Flowers in umbel, fruit sub globose, 6mm. **Fl. & Fr.**: Mar.-Sep.

Habitat: on *Castanopsis-Lithocarpus* forest.

Voucher specimen: Panchthar, Faleke-Beteni (Falaincha), 2660m, Sep. 26, 2007, LKSR-Expedition, D 155 (TUCH).

Distribution: Nepal (East, 2740m); Himalaya (Nepal to Bhutan), Meghalaya, Yunnan, N Myanmar

3. NEOLISTEA (Benth) Merril.

Neolitsea cuipala (Buch.-Ham. ex D. Don) Kosterm., *Bull. Bot. Surv. Ind.* **10**: 287 (1969); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 186 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 162 (2000).

Tetranthera cuipala Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.*: 65 (1825).

Evergreen tree up to 20m, terminal bud elongate. Leaves elliptic to oblanceolate, 15-24x4-6cm, pale beneath, petiole 1.5-2.5cm. Flowers in umbel. Fruit ellipsoid, 12-15x7-8mm. **Fl. & Fr.**: Feb.-Jul.

Habitat: near farming area along trail with *Castanopsis* spp.

Voucher specimen: Panchthar, Chamling danda (Chyangthapu), 2010m, Sep. 28, 2007, LKSR-Expedition, D 231 (TUCH).

Distribution: Nepal (Central and East, 1200-1400m); Himalaya (Uttar Pradesh to Sikkim),

4. PERSEA Miller

Persea odoratissima (Nees) Kosterm., *J. Sci. Res. Indone* **1**: 116 (1952); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 187 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 163 (2000).

Machilus odoratissima Nees in Wall., *Pl. As. Rar.* **2**: 70 (1831).

Small tree up to 10m. Leaves elliptic or broadly elliptic 8-12 x 3-5cm, petiole 1-2cm, Flowers in panicle. Fruit ellipsoid, 1-1.5x0.5-1cm. **Fl. & Fr.:** Mar.-Jul.

Habitat: on *Castanopsis-Lithocarpus* forest.

Voucher specimen: Panchthar, Faleke-Beteni (Falaincha), 2660m, Sep. 26, 2007, LKSR-Expedition, D 163 (TUCH).

Distribution: Nepal (West, Central and East, 1000-2000m); Himalaya (Kashmir to Bhutan), NE India, Myanmar, Indo-China, Malaysia.

Family 12. RANUNCULACEAE

1. ACONITUM L.

1. **Aconitum hookeri** Stapf, *Ann. Roy. Bot. Gard. (Calcutta)* **10**(2): 147 (1905); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 10 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 249 (2000).

Herbs up to 25cm. Leaves mostly basal, 1-3.5cm diameter, acutely toothed, pubescent petiole 2-8cm. Flowers 1-4, purplish. Follicles 5-8mm, hairy, dorsally pouched. **Fl. & Fr.:** Aug.-Oct.

Habitat: on open alpine meadow.

Voucher specimen: Panchthar, Timbupokhari (Falaincha), 4340, Sep. 23, 2007, LKSR-Expedition, D 127 (TUCH).

Distribution: Nepal (Central and East, 4300-4800m); Himalaya (Nepal, Sikkim, Arunchal Pradesh).

2. **Aconitum spicatum** (Brühl) Stapf, *Ann. Roy. Bot. Gard. (Calcutta)* **10**(2): 165 (1905); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 11 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 249 (2000).

Aconitum ferox var. *spicata* Brühl in *Ann. B. G. Calc.* **5**: 110 (1895). 'Bikh'

Herbs upto 2m. Leaves 15cm diameter, lobes and teeth acute, pubescent. Flowers purplish. Follicles 5, oblong, 10x5mm, hairy. **Fl. & Fr.:** Aug.-Oct.

Habitat: along trail on *Rhododendron-Abies* forest.

Voucher specimen: Panchthar, Dunda (Falaincha), 3850m, Sep. 22, 2007, LKSR-Expedition, D 072 (TUCH).

Distribution: Nepal (West, Central and East, 1800-4200m); Himalaya (Nepal to Bhutan), China .

2. ANEMONE L.

Anemone obtusiloba D. Don, *Prodr. Fl. Nep.*: 194 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 12 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 250 (2000).

Rhizomatous perennial herbs. Leaves simple, ovate, 1.5-5x1.5-4.5cm, densely villous with long pale hairs. Flowers solitary. Achene elliptic, 2.5x1.5cm, densely hairy, style hooked. **Fl. & Fr.:** Jun.-Sep.

Habitat:

Voucher specimen: Panchthar, Bikhepani (Prangbung), 3450m, Jun. 11, 2007, LKSR-Expedition, A 069 (TUCH).

Distribution: Nepal (West, Central and East, 2300-4200m); Himalaya (Kashmir to Bhutan), China (Xizang), Myanmar.

3. CALTHA L.

Caltha palustris L., *Sp. Pl.*: 588(1753); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 13 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 252 (2000).

Perennial herbs up to 80cm. Leaves reniform or deltoid, 5-15 x 4-14.5cm, dentate margins. Flowers 1 or few, yellow. Follicles oblong. **Fl. & Fr.:** Jul.-Oct.

Habitat: on open pasture land along trail.

Voucher specimen: Panchthar, Gorkhepani (Memeng), 3410m, Jun. 12, 2007, LKSR-Expedition, B 057 (TUCH).

Distribution: Nepal (West, Central and East, 2400-4200m); Himalaya (Kashmir to Bhutan).

4. CLEMATIS L.

1. **Clematis buchananiana** DC., *Syst. Nat.* **1**: 140 (1817); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 14 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 252 (2000).

Woody climber, brownish pubescent throughout. Leaves ternate, leaflets 3, broadly ovate, 6.5-12×4-10cm, margins coarsely serrate or 3-lobed. Panicles bearing a pair of coarsely toothed leafy bracts. Sepals greenish yellow, ovate, 2-3×0.5-0.7cm, filaments hairy. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail near streams.

Voucher specimen: Panchthar, Hiwakhola (Memeng), 1890m, Oct. 01, 2007, LKSR-Expedition, D 355 (TUCH).

Distribution: Nepal (Central and East, 1800-3300m), Himalaya (Nepal to Arunachal Pradesh), W China, N Myanmar, Indo-China.

2. **Clematis connata** DC., *Prodr.* **1**: 4 (1824); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 14 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 252 (2000).

Woody climber. Leaves pinnate; leaflets 5-7, ovate, 4--13 x 3-10cm, sparsely pubescent. Flowers in cymosely branched panicles; filaments hairy. Achene pubescent. **Fl. & Fr.:** Sep.-Dec.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Taalkharka (Prangbung), 2590m, Oct. 02, 2007, LKSR-Expedition, D 349 (TUCH).

Distribution: Nepal (West, Central and East, 2400-3300m); Himalaya (Kashmir to Sikkim), China.

3. **Clematis montana** Buch.-Ham. ex DC., *Syst. Nat.* **1**: 164 (1817); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 15 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 252 (2000).

Woody climber. Leaves ternate; Leaflets ovate, 2-7x1.5-3.5cm. Flower 2-3 in in axillary fascicles, white or pinkish. Achene ovate, 5x4mm. **Fl. & Fr.:** Jun.-Sep.

Habitat: on open pasture land along trail.

Voucher specimen: Panchthar, Bikhepani (Prangbung), 3450m, Jun. 11, 2007, LKSR-Expedition, B 053 (TUCH).

Distribution: Nepal (West, Central and East, 1600-4000m); Himalaya (Kashmir to Bhutan), NE India, W & C China, Taiwan.

5. DELPHINIUM L.

1. **Delphinium caeruleum** Jacquem. ex Cambess., *Voy. Inde* **4**: 7, t. 6 (1841-44); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 16 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 153 (2000).

Herbs up to 40cm. Leaves suborbicular, linear lanceolate, segments 5-20 x 2-3mm Flowers solitary or 2-3 in racemes; sepals oblong or ovate. **Fl. & Fr.:** Aug.-Nov.

Habitat: on open alpine meadow.

Voucher specimen: Panchthar, Timbupokhari (Falaincha), 4340, Sep. 23, 2007, LKSR-Expedition, D 125 (TUCH).

Distribution: Nepal (West and Central, 3000-5800m); Himalaya (Kunawar to Bhutan), China.

2. **Delphinium nepalense** Kitam. & Tamura, *Acta Phytotax. Geobot.* **15**(5): 129 (1954); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 17 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 254 (2000).

Herbs up to 30cm. Leaves suborbicular. Flowers few in short corymbose racemes, pedicels up to 7cm, blue or purplish. **Fl. & Fr.:** Aug.-Nov.

Habitat: on open alpine meadow.

Voucher specimen: Panchthar, Timbupokhari (Falaincha), 4340, Sep. 23, 2007, LKSR-Expedition, D 126 (TUCH).

Distribution: Nepal (West, Central and East, 4000-5500m); Himalaya (Nepal to Bhutan).

6. RANUNCULUS L.

1. **Ranunculus adoxifolius** Hand.-Mazz., *Acta Hort. Gothoburg.* **13**(4): 152 (1939); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 18 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 255 (2000).

Herbs up to 12cm. Basal leaves reniform; leaflets broadly ovate, dentate, silky pubescent. Flowers solitary, pedicel sparsely pubescent, yellow. Achene sub globose, glabrous. **Fl. & Fr.:** May-Aug.

Habitat: along trail on *Rhododendron-Abies* forest.

Voucher specimen: Panchthar, Pasibhanjyang (Prangbung), 3420m, Jun. 09, 2007, LKSR-Expedition, A 079 (TUCH).

Distribution: Nepal (Central and East, 3600-4300m); Himalaya (Nepal to Bhutan), China.

2. **Ranunculus brotherussi** Freyn, *Bull. Herb. Boiss.* **6**: 885 (1898); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 19 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 255 (2000).

Herbs up to 20cm. Basal leaves 1.5-3cm; leaflets linear lanceolate, 1-1.5mm broad, sparsely hirsute beneath. Flowers solitary yellow. Achene subglobose, pubescent. **Fl. & Fr.:** Apr.-Aug.

Habitat: along trail on *Rhododendron-Abies* forest.

Voucher specimen: Panchthar, Chandu (Prangbung), 3550m, Jun. 09, 2007, LKSR-Expedition, A 073 (TUCH).

Distribution: Nepal (West, Central, and East, 3000-5500m); Himalaya (Kashmir to Himalchal Pradesh), China (Xizang, W & C China).

3. **Ranunculus diffusus** DC., *Prodr.* **1**: 38 (1824); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 19 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 255 (2000).

Prostrate or decumbent perennial herbs. Leaves deeply divided into 3 obovate lobes, toothed margins. Flowers solitary, axillary, yellow. Achenes suborbicular, compressed. **Fl. & Fr.:** Apr.-Aug.

Habitat: along trail on *Rhododendron-Abies* forest.

Voucher specimen: Panchthar, Chandu (Prangbung), 3550m, Jun. 09, 2007, LKSR-Expedition, A 075 (TUCH).

Distribution: Nepal (West, Central and East, 1500-4000m); Himalaya (Uttar Pradesh to Arunchal Pradesh), Bhutan, NE India, N Myanmar, China.

4. **Ranunculus pulchellus** C. A. Mey., *Fl. Altaic.* **2**: 333 (1830); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 20 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 256 (2000).

Perennial herbs up to 30cm. Basal leaves elliptic or cordate, 2-3.5 x 0.5-1cm; stem leaves narrowly elliptic or deeply 3 lobed. Flowers solitary, yellow. Achene obovoid. **Fl. & Fr.:** Apr.-Aug.

Habitat: along trail on *Rhododendron-Abies* forest.

Voucher specimen: Panchthar, Chandu (Prangbung), 3550m, Jun. 09, 2007, LKSR-Expedition, A 072 (TUCH).

Distribution: Nepal (West, Central and East, 3600-4900m), C Asia, Altai, Himalaya, China.

8. THALICTRUM L.

1. **Thalictrum chelidonii** DC., *Prodr.* **1**: 11 (1824); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 21 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 257 (2000).

Perennial herbs, up to 2m. Leaves pinnate; leaflets ovate or suborbicular, 1.5-4 x 1.5-4cm, margin toothed lobed, minutely pubescent. Flowers in racemes or panicles, purplish. Achenes obliquely obovate, compressed. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail on *Rhododendron-Betula* forest.

Voucher specimen: Panchthar, Majortham (Falaincha), 3490m, Sep. 20, 2007, LKSR-Expedition, D 029 (TUCH).

Distribution: Nepal (West, Central, and East, 2300-3500m); Himalaya (Kashmir to Bhutan).

2. **Thalictrum virgatum** Hook. f. & Thomson, *Fl. Ind.* (Hooker & Thomson): 14 (1855); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 23 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 258 (2000).

Perennial herbs up to 0.5m. Leaves alternate, leaflets broadly ovate or sub orbicular, 1-3 x 1-3cm, deeply and obtusely toothed or lobed above. Flowers erect in terminal panicles. Achenes narrowly elliptic, glabrous, compressed. **Fl. & Fr.:** Apr.-Aug.

Habitat: along trail on *Lithocarpus-Lyonia* forest.

Voucher specimen: Panchthar, Banduke (Sidin), 2840m, Jun. 08, 2007, LKSR-Expedition, A 042 (TUCH).

Distribution: Nepal (West, Central, and East, 2400-4500m); Himalaya (Nepal to Bhutan), W China.

Family 13. **Berberidaceae**

1. **BERBERIS** L.

1. **Berberis angulosa** Wall. ex Hook f. & Thomson, *Fl. Ind.*: 227 (1855); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 29 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 25 (2000). 'Chutro'

Shrub up to 1.5m, stem brownish, strongly grooved, spine 3-fid, Leaves elliptic or obovate, 1-2 x 0.5-1cm. Flowers solitary or in fascicles of 2-3. Fruit ellipsoid. **Fl. & Fr.:** Jun.-Sep.

Habitat: on *Rosa-Berberis* shrubby forest.

Voucher specimen: Panchthar, Dhupi (Sidin), 3360m, Jun. 09, 2007, LKSR-Expedition, B 034 (TUCH).

Distribution: Nepal (Central and East, 3400-4500m); Himalaya (Nepal, Sikkim), NE India, China.

2. **Berberis hookeri** Lem., *III. Hort.* 6: -207 (1859); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 30 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 26 (2000). 'Chutro'

Shrub up to 3m, grooved stem. Leaves elliptic, 3-7 x 1-3cm, margin strongly spinose-dentate. Flowers 3-8 in fascicles. Berries obovoid, reddish in colors. **Fl. & Fr.:** Apr.-Jul.

Habitat: on *Rosa-Berberis* shrubby forest.

Voucher specimen: Panchthar, Lampokhari (Sidin), 3040m, Jun. 08, 2007, LKSR-Expedition, B 028 (TUCH).

Distribution: Nepal (Central and East, 2500-3500m); Himalaya (Nepal to Bhutan), NE India.

3. **Berberis tsarica** Ahrendt, *J. Bot. Mag.* 116: t. 7116 (1890); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 31 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 27 (2000). 'Chutro'

Shrub up to 1 m; stem angular, densely spiny, spines mostly 5-fid. Leaves oblanceolate, 8-14 x 3-5cm. Flowers solitary. Berries ellipsoid, red in colors. **Fl. & Fr.:** Apr.-Jul.

Habitat: on *Rosa-Berberis* shrubby forest.

Voucher specimen: Panchthar, Meghu-Faleke (Falaincha), 3360m, Sep. 25, 2007, LKSR-Expedition, D 137 (TUCH).

Distribution: Nepal (East, 3900-4300m); Himalaya (Nepal to Bhutan), China (Xizang).

2. **MAHONIA** Nutt.

Mahonia napaulensis DC., *Syst. Nat.* 2: 21 (1821); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 31 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 27 (2000). 'Jamane mandro'

Shurb, 1-3m. leaves pinnate, leaflets opposite, 6-13 pairs, coarsely spinose, dentate with 3-7 teeth on each side, glabrous. Inflorescence racemes, 10-25cm in fascicles of 6-10. Flowers pedicel 2-10mm. Berries ellipsoid, blue black. **Fl. & Fr.:** Apr.-Jul.

Habitat: on *Castanopsis-Quercus* forest.

Voucher specimen: Panchthar, Banduke (Sidin), 2240m, Jun. 07, 2007, LKSR-Expedition, B 007 (TUCH).

Distribution: Nepal (West, Central and East, 2000-2900m); Himalaya (Nepal to Bhutan), NE India .

Family 14. MENISPERMACEAE

STEPHANIA Loureiro

1. **Stephania elegans** Hook. f. & Thomson, *Fl. Ind.* (Hooker and Thomson): 195 (1855); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 28 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 197 (2000).

Slender twiner. Leaves deltoid, 5-10 x 2.5-10cm, entire, glabrous, petioles 2-4cm. Umbel usually axillary. Fruit reddish, obovoid. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail on *Lyonia-Lithocarpus* forest.

Voucher specimen: Panchthar, Narelung (Memeng), 2460m, Sep. 29, 2007, LKSR-Expedition, D 283 (TUCH).

Distribution: Nepal (Central and East, 1000-1700m), Himalaya (Uttar Pradesh to Assam).

2. **Stephania glabra** (Roxb.) Miers, *Ann. Mag. Nat. Hist.*, ser. 3 18: 14 (1866); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 28 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 197 (2000). 'Tamarko laharo'

Twinnings with tuberous rootstock, leaves broadly ovate or suborbicular, 5-15 x 3-15cm, glabrous, petioles 3-10cm long, flowers in axillary peduncles, umbels slender in male. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail on *Schima-Castanopsis* forest.

Voucher specimen: Panchthar, Betini (Falaincha), 1900m, Sep. 26, 2007, LKSR-Expedition, D 161 (TUCH).

Distribution: Nepal (Central and East, 1000-2500m); Himalaya (Himalchal Pradesh to Sikkim), India, Myanmar, Thailand.

Family 15. PIPERACEAE

PIPER L.

Piper mullesua Buch.-Ham. Ex D. Don, *Prodr. Fl. Nep.:* 20 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* 3: 20 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 234 (2000).

Climber, stems pubescent, Leaves elliptic to ovate, 7-15 x 2.5-7.5cm, glabrous, petioles 0.5-1.5cm. Flowers axillary. D rupe 2mm, densely clustered. **Fl. & Fr.:** Feb.-Jul.

Habitat: climbing on *Viburnum mullaha*.

Voucher specimen: Panchthar, Maklabu (Falaincha), 1890, Sep. 27, 2007, LKSR-Expedition, D 186 (TUCH).

Distribution: Nepal (West, Central and East, 400-2500m); Himalaya (Uttar Pradesh to Bhutan).

Family 16. THEACEAE

1. CAMELLIA L.

Camellia kissi Wall., *Asiat. Res.* 13: 429 (1820); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 63 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 308 (2000).

Shrub up to 5m. Leaves elliptic-ovate, 5.5-9.5 x 1.5-3.5cm, base cuneate, margin finely, serrate near apex. Flowers 1-2, subterminal or axillary. Capsule subglobose. **Fl. & Fr.:** Feb.-Oct.

Habitat: along trail near settle area.

Voucher specimen: Panchthar, Narelung (Memeng), 2390m, Sep. 29, 2007, LKSr-Expedition, D 282 (TUCH).

Distribution: Nepal (West, Central, and East, 900-2200m); Himalaya (Nepal to Arunchal Pradesh), NE India, Myanmar, Indo-China, W & S China.

2. EURYA Thunberg

Eurya accuminata DC., Mem. Soc. Phys. Geneve 1: 418 (1822); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 64 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 308(2000).

Shrub or trees up to 15m. Leaves elliptic to lanceolate, 6-12 x 1.5-4cm, serrate, sparsely pubescent, beneath. flowers yellow. Fruit 5mm diameter. **Fl. & Fr.:** Aug.-Nov.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Chamling danda (Chyangthapu), 1950m, Sep. 28, 2007, LKSR-Expedition, D 243 (TUCH).

Distribution: Nepal (West, central, and East, 1300-2500m); Himalaya (Uttar Pradesh to Arrunchal Pradesh), India, Sri Lanka, S & W China, Malaysia.

Family 17. HYPERICACEAE

Hypericum L.

1. **Hypericum choisianum** Wall. ex N. Robson, *Fl. W. Pakistan* 32: 6 (1973); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 61 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 145 (2000).

Bushy shrubs of 1-2m tall. Leaves lanceolate or narrowly ovate. Flowers in solitary or in three, 4-7cm in diameter. Fruit elliptic, lanceolate or ovate. **Fl. & Fr.:** Jun.-Oct.

Habitat: along trail on *Schima-Castanopsis* forest.

Voucher specimen: Panchthar, Faleke-Beteni (Falaincha), 2190m, Sep. 26, LKSR-Expedition, D 162 (TUCH).

Distribution: Nepal (West, Central, and East, 2400-3600m); Pakistan to China (Yunnan).

2. **Hypericum hookerianum** Wight & Arn., *Prodr. Fl. Ind. Orient.* 1: 99 (1834); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 61 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 145 (2000).

Bushy shrub up to 2 m. Leaves lanceolate or narrowly ovate, 3-7 x 1.5-3cm, superficial glands dots beneath. Flowers solitary or in 3-9 flowered cymes. Capsule ovoid, 1.5cm. **Fl. & Fr.:** Jun.-Sep.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Menjuwa (Falaincha), 2670m, Sep. 28, 2007, LKSR-Expedition, D 246 (TUCH).

Distribution: Nepal (Central and East, 1500-3000m); Himalaya (Nepal to Bhutan), S India, Myanmar, Thailand, China (Xizang).

3. **Hypericum petiolulatum** Hook. f. & Thomson ex Dyer in *Fl. Br. Ind.* 1: 255 (1874); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 61 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 145 (2000).

An erect slender herbs. Leaves ovate or broadly elliptic, with pellucid dots. Flowers 1-3, terminal and axillary on slender pedicels. Petals and stamens persistent. **Fl. & Fr.:** Aug.-Dec.

Habitat: along trail on *Abies-Betula* forest.

Voucher specimen: Panchthar, Majortham (Falaincha), 3450m, Sep. 20, 2007, LKSR-Expedition, D 023 (TUCH).

Distribution: Nepal (West, Central and East, 2200-2600m); Himalaya (Nepal to Bhutan), China (Yunnan), Sumatra, Borneo.

Family 18. FUMARIACEAE

1. CORYDALIS Venterat

1. *Corydalis cashmeriana* Royle, *III. Bot. Himal. Mts.* **1**(2): 69, t. 16, f. 1 (1834); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 32 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 228 (2000).

Herbs up to 15cm. Basal leaves few, soon withering biternate, leaflets obovate, stem leaves solitary, sometimes absent. 4-6 flowers in umbels, blue; petals 1-.5cm including spur, 0.4-0.6cm. Capsule ellipsoid, 0.8-0.3cm. **Fl. & Fr.**: Jun.-Oct.

Habitat: on open pasture land.

Voucher specimen: Panchthar, Near Budhipani (Falaincha), 3930m, Sep. 22, 2007, LKSR-Expedition, D 079 (TUCH).

Distribution: Nepal (West, Central and East, 2800-5500m); Himalaya (Kashmir to Bhutan), China.

2. *Corydalis chaerophylla* DC., *Prod.* **1**: 128 (1824); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 33 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 228 (2000).

Herbs up to 1.2 m. Basal leaves broadly ovate, 8-16 x 6-13cm; stem leaves similar but, small. Racemes terminal, forming 9 branched panicles with numerous flowers; petals yellow. Capsule obovoid, 8x3mm, spreading. **Fl. & Fr.**: Jun.-Sep.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Near Sukhkha Pokhari (Prangbung), 1990m, Sep. 29, 2007, LKSR-Expedition, D 263 (TUCH).

Distribution: Nepal (West, Central and East, 1800-3400m); Himalaya (Uttar Pradesh to Bhutan).

3. *Corydalis juncea* Wall., *Tent. Fl. Nep.* **2**: 54, t. 42, f. dextra (1826); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 34 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 229 (2000).

Erect herb 8-25cm. Basal leaf usually solitary, biternate or trifoliate, petiolate, Stem leaf usually solitary, linear, 0.5-1.5cm. Racemes 5-20 flowered. Bracts linear, entire. Upper petal 9-10mm, broad spur 3.5x2mm. Fruit capsule. **Fl. & Fr.**: Jun.-Sep.

Habitat: along trail on *Rhododendron-Betula* forest.

Voucher specimen: Panchthar, Dund (Falaincha), 3740m, Sep. 21, 2007, LKSR-Expedition, D 059 (TUCH).

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

4. *Corydalis stracheyi* Prain, *J. Asiat. Soc. Bengal* **65**(2): 37 (1896); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 37 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 230 (2000).

Branched herbs up to 20cm. Basal leaves few; stem leaves oblong, 3-7 x 1.5-2.5cm, petiole 3-5cm, segments oblanceolate, 2-5 x 0.5-1.5mm. Flowers few to numerous in terminal racemes. Capsule narrowly obovoid, 7-10 x 3mm. **Fl. & Fr.**: Jun.-Sep.

Habitat: along trail on *Rhododendron* forest.

Voucher specimen: Panchthar, Paharemeghu (Falaincha), 3910m, Sep. 22, 2007, LKSR-Expedition, D 090 (TUCH).

Distribution: Nepal (West, Central and East, 3800-5000m); Himalaya (W Himalaya to Bhutan) .

2. DICENTRA Bernhardi

Dicentra macrocapnos Prain, *J. Asiat. Soc. Bengal* **65**: 12 (1896); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 35 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 231 (2000). '*Jhumke bulaki*'

Glabrous climber to 2m. Leaves with a terminal tendril. Leaflets ovate or ovate-elliptic, 0.8-3.5 x 0.5-2.5cm. Flowers 2-2.5cm long, yellow. Capsule cylindrical with papery valves. **Fl. & Fr.**: Jun.-Sep.

Habitat: climbing on *Lindera* sp.

Voucher specimen: Panchthar, Chamling Danda (Chyangthapu), 2750m, Sep. 28, 2007, LKSR-Expedition, D 232 (TUCH).

Distribution: Nepal (Central and East, 1200-2500m), Himalaya (Uttar Pradesh to Nepal).

Family 19. PAPAVERACEAE

MECONOPSIS Viguir

1. **Meconopsis lyrata** (Cummins & Prain) Fedde ex Prain, *Kew Bull.* **1915**: 142 (1915); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 37 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 231 (2000).

Cathcartia lyrata Cumminiss & Prain, *J. As. S. Beng.* **64**: 325 (1896).

Herb up to 30cm. Basal leaves soon withering, ovate, 2-5 x 1-3cm, stem leaves 2-5, Flowers up to 5 terminals and in axils of upper leaves. Blue capsule cylindrical. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail on *Rhododendron-Sorbus* forest.

Voucher specimen: Panchthar, Gorkhepani (Memeng), 3370m, Jun. 12, 2007, LKSR-Expedition, B 070 (TUCH).

Distribution: Nepal (Central and East, 3000-4900m); Himalaya (Nepal to Sikkim), W China.

2. **Meconopsis nepaulensis** DC., *Prodr.* **1**: 121 (1824); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 37 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 231 (2000).

Monocarpic herbs up to 2-5m, with stiffly brownish villous throughout, basal leaves pinnatisect, segments oblong with large round teeth, flowering stem solitary, 2-6 flowers in lateral cymes, red or purple, capsule ellipsoid, 1.5-3 x 1cm. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail on *Rhododendron-Betula* forest.

Voucher specimen: Panchthar, Majortham (Falaincha), 3820m, Sep. 20, 2007, LKSR-Expedition, D 034 (TUCH).

Distribution: Nepal (West, Central, and East, 2700-5200m); Himalaya (Nepal to Bhutan), W China.

3. **Meconopsis paniculata** Prain, *J. Asiat. Soc. Bengal* **64**: 316 (1895); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 37 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 232(2000).

Monocarpic herbs up to 2.5 m, with softly yellowish villous throughout. Rosette leaves elliptic, 30-50 x 8-20cm, deeply pinnatifid, lobes ovate or oblong; stem leaves smaller, 2-6 flowers in lateral cymes, yellow. Capsule ellipsoid, 2.5-3 x 1.2-1.5cm. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail on *Rhododendron-Abies* forest.

Voucher specimen: Panchthar, Majortham (Falaincha), 3450m, Sep. 20, 2007, LKSR-Expedition, D 367 (TUCH).

Distribution: Nepal (West, Central and East, 3000-4400m); Himalaya (Uttar Pradesh to Arunchal Pradesh); NE India.

4. **Meconopsis simplicifolia** (D. Don.) Walp., *Repert. Bot. Syst.* 1(1): 110 (1842); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 37 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 232 (2000).

Polycarpic sometimes monocarpic herb up to 70cm, with brownish bristly throughout. Leaves all basal, oblanceolate, 4-10 x 1.5-3cm. Flowers solitary, purple or blue Capsule oblong, ellipsoid, 5-8 x 1-2cm, thinly bristly. **Fl. & Fr.:** May-Aug.

Habitat: on open alpine meadow.

Voucher specimen: Panchthar, Timbupokhari (Falaincha), 4340, Sep. 23, 2007, LKSR-Expedition, D 129 (TUCH).

Distribution: Nepal (Central and East, 3300-5300m); Himalaya (Nepal to Bhutan), China (Xizang).

Family 20. CRUCIFERAE

CARDAMINE L.

1. **Cardamine scutata** subsp. **flexuosa** (With.) H. Hara, *J. Fac. Sci. Uni. Tokyo* **6**: 59 (1952); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 41 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 80 (2000).

Annual herbs up to 40cm. Basal leaves forming a rosette; stem leaves 4-10, 2.5-5cm, leaflets 2-4 pairs, elliptical 3-8 x 2-5mm. Flowers white. Pods 2x0.1cm. **Fl. & Fr.**: Jan.-Aug.

Habitat: along trail on *Lithocarpus-Castanopsis* forest.

Voucher specimen: Panchthar, Banduke (Sidin), 2840m, Jun. 08, 2007, LKSR-Expedition, A 040 (TUCH).

Distribution: Nepal (West, Central, and East, 1000-4000m); Temperate Eurasia, E Canada .

2. **Cardamine macrophylla** subsp. **polyphylla** (D. Don) O. E. Schulz, *Bot. Jahrb.* **32**: 401 (1903) var. **polyphylla**; Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 40 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 80 (2000).

Cardamine polyphylla D. Don, *Prodr. Fl. Nep.*: 201 (1825).

Herbs up to 1.5m. Leaves 5-25cm; 2-7 pairs of leaflets, elliptic-lanceolate, 2-10x0.5-2.5cm. Flowers few to many in racemes, purplish. Pods 3-4.5 x 0.2-0.4cm. **Fl. & Fr.**: May-Sep.

Habitat: along trail on *Rhododendron-Prunus* forest.

Voucher specimen: Panchthar, Gorkhepani (Memeng), 3370m, Jun. 12, 2007, LKSR-Expedition, B 058 (TUCH).

Distribution: Nepal (Central and East, 2600-4500m); Himalaya (Nepal to Bhutan), N & NE India, China, Korea.

Family 21. CRASSULACEAE

1. RHODIOLA L.

Rhodiola himalensis (D. Don) S. H. Fu, *Acta Phyt. Sin. Addit.* **1**: 121 (1965); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 161 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 76 (2000).

Sedum himalense D. Don, *Prodr. Fl. Nep.*: 212 (1825).

Perennial herbs up to 80cm with elongate rhizome, succulent. Leaves alternate, oblanceolate or ovate, 5-20 x 2.5-5mm, whorl, simple. Flowers in loosely or densely cymose subumbellately arranged in loose corymbs, dark reddish purple. **Fl. & Fr.**: Jun.-Oct.

Habitat: along trail on open pasture land.

Voucher specimen: Panchthar, Dund (Falaincha), 4050m, Sep. 21, 2007, LKSR-Expedition, D 073 (TUCH).

Distribution: Nepal (West, Central and East, 3700-4600m); Himalaya (Nepal to Bhutan), S China.

2. SEDUM L.

1. **Sedum oreades** (Decne.) Raym.-Hamet, *Bull. Soc. Bot. France* **56**: 571 (1909); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 164 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 78 (2000).

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

Small herbs upto 15cm. Leaves oblong-lanceolate, 6-20x2-4mm, acute, Flowers cyme corymbiform, 1-several flowers, yellow. **Fl. & Fr.**: Jun.-Oct.

Habitat: along trail on open pasture land.

Voucher specimen: Panchthar, Paharemeghu (Falaincha), 3910m, Sep. 23, 2007, LKSR-Expedition, D 113 (TUCH).

Distribution: Nepal (West, Central, and East, 3200-5200m), Himalaya (Kashmir, Himanchal Pradesh to Bhutan), NE India, Myanmar, China (Xizang, Yunan).

2. **Sedum triactina** Berger; *Pflan. Ed.* **2**, 18a: 460 (1930); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 165 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 78 (2000).

Perennial herbs upto 25cm. Leaves opposite or in whorls of 3 oblanceolate or spatulate 10-20×3-8mm. Cymes loosely corymbs, Flowers yellow, carpel 3. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail on *Rhododendron-Betula* forest.

Voucher specimens: Panchthar, Majortham (Falaincha), 3740m, Sep. 20, 2007, LKSR-Expedition, D 035 (TUCH).

Distribution: Nepal (Central and East, 2700-3900m); Himalaya (Nepal to Bhutan), NE India.

Family 22. SAXIFRAGACEAE

1. ASTILBE D. Don

1. **Astilbe rivularis** Buch. -Ham. ex D. Don, *Prodr. Fl. Nep.*: 211 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 149 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 286(2000). '*Budho ausadi*'

Perennial herbs, stems sparsely brown villous. Leaves up to 35cm long and broad; leaflets ovate or elliptic, 4-12×2-7cm, margin serrate. Peduncles pale brownish pubescent. Calyx divided almost to base into lanceolate teeth. Petals absent. Ovary semi inferior. Capsule ovoid. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail on *Rhododendron-Prunus* forest.

Voucher specimen: Panchthar, Majortham (Falaincha), 3450m, Sep. 20, 2007, LKSR-Expedition, D 025 (TUCH).

Distribution: Nepal (West, Central, and East, 2000-3600m); Himalaya (Kashmir to Bhutan), Thailand, N Indo-China, W China.

2. BERGINIA Moench

Berginia purpurascens (Hook f. & Thomson) Engl., *Bot. Zeitung (Berlin)* **26**: 841 (1868); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 150 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 286 (2000).

Saxifraga purpurascens Hook. f. & Thoms. in *J. Linn. S. B.* **2**: 61 (1857).

Herbs up to 30cm, glandular pubescent. Leaves elliptic-ovate, 8-25 x 4-15cm, ciliate near base, 1-8 flowered branched cymes, bright pink. Capsule ellipsoid. **Fl. & Fr.:** May-Sep.

Habitat: on *Rhododendron* forest.

Voucher specimen: Panchthar, Near Budhipani (Falaincha), 3930m, Sep. 22, 2007, LKSR-Expedition, D 093 (TUCH).

Distribution: Nepal (Central and East, 3800-4700m); Himalaya (Nepal to Bhutan), Myanmar.

3. SAXIFRAGA L.

1. **Saxifraga brachypoda** D. Don, *Trans. Linn. Soc. London* **13**: 378 (1821); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 151 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 287 (2000).

Herbs up to 15cm, leafy through out. Leaves lanceolate, 0.5-1.5 x 0.2-0.3cm, margin sparsely spinulose ciliate, pale beneath. Flowers solitary, yellow. **Fl. & Fr.:** May-Sep.

Habitat: along trail on *Rhododendron-Betula* forest.

Voucher specimen: Panchthar, Dunda (Falaincha), 3850m, Sep. 22, 2007, LKSR-Expedition, D 082 (TUCH).

Distribution: Nepal (Central and East, 3300-5000m); Himalaya (Uttar Pradesh to Bhutan), Myanmar, NE India, W China.

2. *Saxifraga diversifolia* Wall. ex Ser., *Prodr.* 4: 44 (1830); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 152 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 287 (2000).

Robust herb up to 30cm. Basal leaves ovate stems leaves ovate oblong, 1-3 x 0.5-1.5cm. Inflorescence up to 30 flowers, corymbs, coarsely glandular, pubescent, and yellow. Fl. & Fr.: Sep.-Dec.

Habitat: along trail on open grass land.

Voucher specimen: Panchthar, Phalot-Chiwabhanjyang (Cyangthapu), 3580m, Sep. 18, 2007, LKSR-Expedition, D 003 (TUCH).

Distribution: Nepal (West, Central, and East, 2400-4800m); Himalaya (Kashmir to Bhutan), China.

3. *Saxifraga kingiana* Engl. & Irmsch., *Bot. Jahrb.* 48: 610 (1912); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 153 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 288(2000).

Herb up to 50cm, leafy throughout, sparsely brownish-lanate. Leaves ovate, 1.5-4 x 1-2cm, sparsely lanate on both surfaces. Flowers up to 15 in corymbose, pedicel with long brownish glandular hairs, yellowish orange spotted within. **Fl. & Fr.:** Aug.-Oct.

Habitat: along trail on *Rhododendron-Abies* forest.

Voucher specimen: Panchthar, Dunda (Falaincha), 3850m, Sep. 22, 2007, LKSR-Expedition, D 081 (TUCH).

Distribution: Nepal (Central, 3300-4200m); Himalaya (Nepal to Bhutan), China (Xizang).

Family 23. PARNASSIACEAE

PARNASSIA L.

Parnassia nubicola Wall. ex Royle, *III. Bot. Himal. Mts.* 1(7): 227, t. 50, f. 3 (1835); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 156 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 232 (2000).

An erect herbs up to 40cm. Radical leaves ovate, 4-10 x 1.5- 4.5cm; stem leaves similar but, small. Flowers solitary, creamy white. Capsule obovate-ellipsoid, 1-1.5cm. **Fl. & Fr.:** Jun.-Sep.

Habitat: along the rocky trail

Voucher specimen: Panchthar, Paharemeghu (Falaincha), 3910m, Sep. 23, 2007, LKSR-Expedition, D 106 (TUCH).

Distribution: Nepal (West, Central and East, 2900-4200m); Himalaya (Kashmir to Bhutan), Afghanistan, China (Xizang).

Family 24. HYDRANGEACEAE

1. HYDRANGEA L.

1. *Hydrangea anomala* D. Don, *Prodr. Fl. Nep.*: 211 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 157 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 147 (2000).

Climbing shrub, sparsely pubescent. Leaves ovate, 6-13x4-8cm, acuminate, base cuneate, margin serrate, pubescent along midrib above and with a few brown hairs in vein axils beneath. Petioles 2-4cm. Corymbs loose, spreading. **Fl. & Fr.:** Jun.-Oct.

Habitat: along trail near small river.

Voucher specimen: Panchthar, Hiwakhola (Prangbung), 1800m, Oct. 01, 2007, LKSR-Expedition, D 331 (TUCH).

Distribution: Nepal (West, Central and East, 1900-2700m), Himalaya (Uttar Pradesh to Bhutan), NE India, N Myanmar, W and C China, Taiwan.

2. **Hydrangea aspara** Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.*: 211 (18258); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 157 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 147 (2000).

An erect shrub up to 5m. Leaves broadly ovate, 12-25 x 6-16cm, pilose on both surface. Flowers in cymosely branched corymbs, purplish. Capsule campanulate, 3.5mm long. **Fl. & Fr.**: Jul.-Oct.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Chamling danda (Chyangthapu), 1970m, Sep. 28, 2007, LKSR-Expedition, D 229 (TUCH).

Distribution: Nepal (Central, 1600-2600m); Himalaya (Uttar Pradesh to Bhutan), NE India, China .

3. **Hydrangea heteromalla** D. Don, *Prodr. Fl. Nep.*: 211 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 157 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 147 (2000).

Small tree up to 10m. Leaves ovate elliptic, 10-18 x 4.5-11cm, pubenulose along main veins above, petiole 2-5cm. Corymbs with dense flowers, bracts linear oblanceolate, 1-2 x 0.1-0.4cm. Capsule ellipsoid, 5 x 2.5mm. **Fl. & Fr.**: Jun.-Sep.

Habitat: on *Lithocarpus-Acer* forest.

Voucher specimen: Panchthar, Chiwabhanjyang-Major (Falaincha), 3170m, Sep. 19, 2007, LKSR-Expedition, D 022 (TUCH).

Distribution: Nepal (West, Central, and East, 2400-3300m); Himalaya (Uttar Pradesh to Arunchal Pradesh), N. Indo-China, NE India.

Family 25. ROSACEAE

1. AGRIMONIA L.

Agrimonia pilosa var. **nepalensis** (D.Don) Nakai, *Bot. Mag.*(Tokyo) **47**: 247 (1933); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 133 (1979); 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. Racemes 20-50 flowered. **Fl. & Fr.**: May-Sep.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Tintine (Falaincha), 1700m, Sep. 27, 2007, LKSR-Expedition, D 199 (TUCH).

Distribution: Nepal (West, Central, and East, 1000-3000m), Himalaya (Kashmir to Bhutan), NE India, Myanmar, China (Xizang).

2. COTONEASTER L.

Cotoneaster microphyllus Wall. ex Lindl. in *B. Reg.* **13**: t.1114 (1827); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 135 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 262 (2000).

Low growing much branched shrub upto 20cm. Leaves elliptic or obovate, 5-10x2.5-5mm, coriaceous, base cuneate, margin inrolled, smooth. Petioles upto 3mm. Flower solitary. Calyx lobes c4mm, pubescent. Petals white, suborbicular. Fruit subglobose 7-10mm. **Fl. & Fr.**: Apr.-Sep.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Faleke-Betini (Falaincha), 1980m, Sep. 26, 2007, LKSR-Expedition, D 165 (TUCH).

Distribution: Nepal (West and East, 2000-5400m), China (Xizang).

3. FRAGARIA L.

Fragaria daltoniana J. Gay, *Ann. Sci. Nat.*, ser. 4 **8**: 204 (1857); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 137 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 263 (2000).

Prostrate herbs with stout root stock. Leaflet obovate, 0.8-2.5 x 0.7-2cm, with 4 broad teeth on sides, petiole 1-4cm, with pale brown or whitish hairs, 1-3 flowers in scapes, reddish. Fruit globose, pink, 2-2.5 x 1-1.5cm. **Fl. & Fr.**: May-Sep.

Habitat: along trail on *Rhododendron-Abies* forest.

Voucher specimen: Panchthar, Dund (Falaincha), 3740m, Sep. 21, 2007, LKSR-Expedition, D 060 (TUCH).

Distribution: Nepal (West, Central, and East, 2000-2800m); Himalaya (Uttar Pradesh to Sikkim).

4. **GEUM**. L.

Geum sikkimensis Prain, *J. Asiat. Soc. Bengal* **73**: 200, t. 7 (1904); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 137 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 264 (2000).

Rhizomatous herb, Radical leaves, 5-15cm, terrestrial leaflets broadly ovate or suborbicular, 3-5x3-5cm, lateral leaflets 5-10 pairs, elliptic, 1x1cm, 1-2 flowers on peduncles, white or pinkish, style persistence. Achene ellipsoid, 5-6mm. **Fl. & Fr.**: Jun.-Sep.

Habitat: along trail on open grass land.

Voucher specimen: Panchthar, Gorkhepani (Memeng), 3370m, Jun. 12, 2007, LKSR-Expedition, B 059 (TUCH).

Distribution: Nepal (Central and East, 3000-4200m); Himalaya (Nepal to Bhutan).

5. **NEILLIA** D. Don.

Neillia thyrsoflora D. Don, *Prodr. Fl. Nep.*: 228 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 138 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 264 (2000).

Shrub up to 30cm Leaves ovate, 5-12x 3-6cm, petiole 5-10mm, margin serrate. Flowers in large panicles. White follicle, 5mm, dehiscent along inner suture. **Fl. & Fr.**: Jun.-Sep.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Maklabu (Chyangthapu), 1980m, Sep. 27, 2007, LKSR-Expedition, D 192 (TUCH).

Distribution: Nepal (Central and East, 1600-2000m); Himalaya (Nepal to Bhutan), China, Sumatra.

6. **POTENTILLA** L.

1. **Potentilla fruticosa** var. **rigida** (Wall. ex Lehm.) Wolf, *Monogr. Potent. (Wolf)*: 57 (1908); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 139 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 265 (2000).

Potentilla rigida Wall. ex Lehm., *Pugill.* **3**: 3 (1831).

Shrub up to 1.5m. Leaves up to 3 or 5 foliate; leaflets elliptic, 1-2 x 0.5-1cm, margin entire, sparsely or densely silky pubescent on both surface. Flowers solitary, yellow. Achenes 1.5-2mm, ovoid, sparsely white pillose. **Fl. & Fr.**: Jun.-Sep.

Habitat: along trail on open grass land.

Voucher specimen: Panchthar, Paharemeghu (Falaincha), 3910m, Sep. 22, 2007, LKSR-Expedition, D 088 (TUCH).

Distribution: Nepal (West, Central, and East, 2700-4300m); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 139 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 265 (2000).

2. **Potentilla peduncularis** D. Don, *Prodr. Fl. Nep.*: 230 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 140 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 266 (2000).

Perennial rosette herb. Leaves mostly regular pinnate, oblong to oblanceolate, 5-20cm, lateral leaflets 9-21 pairs, oblong elliptic, 0.5-3 x 0.25-0.75cm, Flowers 2-5 corymbose, yellow. Achenes obovoid, 1.5-2mm, glabrous. **Fl. & Fr.:** Jun.-Sep.

Habitat: on open alpine meadow.

Voucher specimen: Panchthar, Timbupokhari (Falaincha), 4340, Sep. 23, 2007, LKSR-Expedition, D 128 (TUCH).

Distribution: Nepal (West, Central, and East, 3000-4700m), Himalaya, China.

7. PRUNUS L.

1. **Prunus cerasoides** D. Don, *Prodr. Fl. Nep.:* 239 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2:** 141 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 267 (2000).

Trees up to 15m. Leaves ovate or oblong elliptic, 5-12 x 3.5-4cm, glabrous, stipules linear lanceolate. 1-3 flowers in fascicle, pink. Drupe ellipsoid, 1-1.3 x 0.8cm. **Fl. & Fr.:** Sep.-Dec.

Habitat: on *Rhododendron-Betula* forest.

Voucher specimen: Panchthar, Majortham (Falaincha), 3490m, Sep. 20, 2007, LKSR-Expedition, D 026 (TUCH).

Distribution: Nepal (West, Central, and East, 1300-2400m); Himalaya (Punjab to Bhutan), NE India, Myanmar, W China.

2. **Prunus cornuta** (Wall. ex Royle) Steud., *Nomencl. Bot.* ed. 2, **2(12-13):** 403 (1841); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2:** 141 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 267(2000). '*Painyu*' **Nep.** *Cerasus cornata* Wall. ex Royle, *III. B. Him.* t. 38, f. **2** (1834): 207 (1835).

Trees up to 15m. Leaves elliptic, 5-15 x 3-6cm, serrate margin. Flowers in raceme, terminal on leafy lateral shoots fragrant, white. Drupe ellipsoid to sub globose, 7-8mm. **Fl. & Fr.:** Jun.-Sep.

Habitat: on *Rhododendron-Betula* forest.

Voucher specimen: Panchthar, Chiwabhanjyang-Major (Falaincha), 3820m, Sep. 19, 2007, LKSR-Expedition, D 021 (TUCH).

Distribution: Nepal (West and East, 2100-3500m); Himalaya (Afghanistan to Bhutan), China.

3. **Prunus rufa** var. **trichantha** (Koehne) H. Hara, *J. Jap. Bot.* **37:** 99 (1962); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2:** 142 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 268 (2000). *Prunus trichantha* Koehne in Sarg., *Pl. Wilson.* **1:** 254 (1912).

Shrub or tree up to 10m. Leaves ovate-elliptic, 3-10 x 2-3.5cm, margin serrate. Flowers solitary or in pairs, pink or white. Fruit ellipsoid, 1-2 x 0.5-1cm. **Fl. & Fr.:** Jun.-Sep.

Habitat: on *Rhododendron-Betula* forest.

Voucher specimen: Panchthar, Dund (Falaincha), 3740m, Sep. 21, 2007, LKSR-Expedition, D 068 (TUCH).

Distribution: Nepal (Central and East, 3200-3800m); Himalaya (Nepal, Sikkim).

8. PYRACANTHA Roemer

Pyracantha crenulata (D. Don) M. Roemer, *Syn.* **3:** 220(1847); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2:** 143 (1979); 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 1-4x0.5-1.7cm, obtuse, base cuneate or attenuate, margin slightly crenate-serrate, glabrous. Petioles 2-6mm.

Cymes 5-10 flowered. Pomes globose, red. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail near farming area.

Voucher specimen: Panchthar, Hiwakhola (Prangbung), 1780m, Oct. 01, 2007, LKSR-Expedition, D 322 (TUCH).

Distribution: Nepal (West, Central, and East, 1200-2500m), Himalaya, (Kashmir to Bhutan), Myanmar, China.

9. ROSA L.

Rosa sericea Lindl., *Monogr. Rosa*: 105, t. 12 (1820); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 143 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 268 (2000). ‘Jangali gulab’

Erect 1-4m, stem with prickles. Leaves 3-9cm; leaflet 7-17, oblong or narrowly ovate, serrate near apex. Flowers solitary, yellow or creamy white. Fruit subglobose, orange red. **Fl. & Fr.**: Jun.-Sep.

Habitat: on *Rhododendron-Prunus* forest.

Voucher specimen: Panchthar, Majortham (Falaincha), 3450m, Sep. 20, 2007, LKSR-Expedition, D 368 (TUCH).

Distribution: Nepal (West, Central, and East, 2200-4600m); Himalaya (Chamba to Bhutan), China.

10. RUBUS L.

1. **Rubus acuminatus** Sm., *Cyclop.* **30**: Rubus n. 43 (1819); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 144 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 268 (2000). ‘Lahare Ainselu’

Large climbing shrubs with recurved prickles. Leaves simple, lanceolate-elliptic, serrate. Flowers in terminal, panicles or racemes, white. Fruit red enclosed by calyx. **Fl. & Fr.**: Jun.-Sep.

Habitat: along trail, climbing on *Sorbus* sp.

Voucher specimen: Panchthar, Chamling Danda (Chyangthapu), 2750m, Sep. 28, 2007, LKSR-Expedition, D 276 (TUCH).

Distribution: Nepal (West, Central, and East, 1000-2300m); Himalaya (Uttar Pradesh to Bhutan), W China NE India, Indo-China.

2. **Rubus griffithi** Hook. f., *Fl. Brit. Ind.* **2**(5): 327 (1896); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 145 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 269 (2000). ‘Lahare Ainselu’

Climbing shrub, stem glabrous with recurved prickles. Leaves ovate, 6-13 x 3-5cm, gradually acuminate, reticulate beneath, petioles 1-1.5cm. Flowers in terminal panicle or raceme, white, fruit red, enclosed by calyx. 5-8 drupelets. **Fl. & Fr.**: Jun.-Sep.

Habitat: along trail near streams, climbing on *Viburnum*.

Voucher specimen: Panchthar, Hiwakhola (Prangbung), 1780m, Sep. Oct. 01, 2007, LKSR-Expedition, D 323 (TUCH).

Distribution: Nepal (East, 1400-2400m); Himalaya (Nepal, Sikkim).

3. **Rubus hypargyus** var. **niveus** (Wall. ex G. Don) H. Hara, *J. Jap. Bot.* **53**: 137 (1978); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 145 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 169 (2000).

Rubus niveus Wall. ex G Don, *Gen. Syst.* **2**: 330 (1832).

Scrambling shrub of 2-3 m with weak prickles. Leaves 3-foliolate; leaflets ovate, terminal, 3-9 x 2-6cm, white, tomentose beneath. Flowers solitary or 2-5 in short axillary racemes, pink or red. Fruit red or orange. Drupelets 30-60. **Fl. & Fr.**: Jun.-Sep.

Habitat: on *Lithocarpus-Lyonia* forest.

Voucher specimen: Panchthar, Lampokhari (Sidin), 3010m, Jun. 08, 2007, LKSR-Expedition, B 024 (TUCH).

Distribution: Nepal (West, Central, and East, 2200-3200m); Himalaya (Punjab to Bhutan), China.

4. **Rubus paniculatus** Sm., *Cyclop.* **30**: Rubus n. 41 (1819); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 146 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 270 (2000). ‘Kalo Ainselu’

Climbing shrubs with scattered, small recurved prickles. Leaves, shallowly lobed, serrate, whitish tomentose beneath. Flowers in tomentose panicles, white. Drupelets black. **Fl. & Fr.:** Jun.-Sep.

Habitat: on *Quercus-Castanopsis* forest.

Voucher specimen: Panchthar, Near Sukhkha Pokhari (Prangbung), 2390m, Sep. 29, 2007, LKSR-Expedition, D 265 (TUCH).

Distribution: Nepal (West, Central, and East, 2100-2900m); Himalaya (Kashmir to Bhutan), India.

5. **Rubus pentagonus** Wall. ex Focke, *Biblioth. Bot.* **17(Ht. 72)**: 145 (1911); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 146 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 270 (2000).

Scrambling shrub with prickles 3-5mm. Leaves palmately 3 foliate; lateral leaflets sessile, elliptic, terminal 5-10 x 2.5-4cm, caudate acuminate, petiole 2-4cm with prickles. Flowers solitary or 2-3 in terminal fascicles, white. Fruit red or yellow, drupelets glabrous. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail near small river.

Voucher specimen: Panchthar, Hiwakhola (Memeng), 1890m, Oct. 01, 2007, LKSR-Expedition, D 350 (TUCH).

Distribution: Nepal (West, Central, and East, 2100-3600m); Himalaya (Uttar Pradesh to Bhutan), N Myanmar, W China.

11. SORBUS L.

1. **Sorbus foliolosa** (Wall) Spach, *Hist. Nat. Veg.* (Spach) **2**: 96 (1834); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 148 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 271 (2000).

Pyrus foliolosa Wall., *Pl. As. Rar.* **2**: 61 (1971).

Trees up to 10m. Leaves 12-20cm, rachis winged and glandular, leaflets 2.5-4 x 0.5-1cm, mucronate, petioles narrowly winged. Flowers in corymbose, white or creamy. Fruit 7-8mm, white or flushed with pink. **Fl. & Fr.:** May-Sep.

Habitat: on *Rhododendron-Sorbus* forest.

Voucher specimen: Panchthar, Near Budhipani (Falaincha), 3930m, Sep. 22, 2007, LKSR-Expedition, D 075 (TUCH).

Distribution: Nepal (West, central, and East, 2500-3400m); Himalaya (Nepal to Bhutan).

2. **Sorbus microphylla** Wenz., *Linnaea* **38**: 76 (1873); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 148 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 271 (2000).

Shrubs. Leaves pinnate, 8-13cm; Leaflets 9-12 pairs, oblong-elliptic, 10-20x5-8mm, acute or mucronate, base obliquely rounded, sessile, margins serrate almost to base. Stipules subulate. Flowers in corymbs of 4-7cm across, rose pink. Fruit globose. **Fl. & Fr.:** Jun.-Sep.

Habitat: on *Rhododendron-Sorbus* forest.

Voucher specimen: Panchthar, Paharemeghu (Falaincha), 3910m, Sep. 22, 2007, LKSR-Expedition, D 094 (TUCH).

Distribution: Nepal (West, Central, and East, 3000-4500m), Himalaya (Himalchal Pradesh to Bhutan), NE India, S China.

3. **Sorbus rhamnoids** (Decne.) Rehder, *Pl. Wilson.* **2**: 278 (1915); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 148 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 271 (2000).

Micromales rhamnoids Decne. in *Nouv. Arch. Mus. Paris* **10**: 159 (1874).

Small tree up to 12m, often epiphytic. Leaves coriaceous, ovate-elliptic, 10-15 x 3-5cm, pubescent beneath, lateral veins 12-14 pairs, petioles 1-2cm. Flowers in corymbs, fragrant, creamy. fruit globose, 6mm diameter. **Fl. & Fr.:** May-Sep.

Habitat: on *Rhododendron-Lithocarpus* forest.

Voucher specimen: Panchthar, Chamling Danda (Chyangthapu), 2750m, Sep. 28, 2007, LKSR-Expedition, D 261 (TUCH).

Distribution: Nepal (East, 2700-3500m); Himalaya (Nepal, Sikkim), Myanmar.

12. SPIRAEA L.

Spiraea bella Sims, Bot. MAG. 59: t. 2426 (1823); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 149 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 272 (2000).

Rhizomatous shrub up to 2.5m, branched. Leaves narrowly ovate, 3-6 x 0.5-1.5cm, base cuniate, margin serrate or doubly serrate. Corymbs 3-7cm broad, terminal or lateral shoot, petals white or pink. Follicles 3mm, glabrous or pubescent. **Fl. & Fr.:** Jun.-Sep.

Habitat: on *Berberis-Rosa* shrubby area.

Voucher specimen: Panchthar, Banduke (Sidin), 3550m, Jun. 09, 2007, LKSR-Expedition, A 066 (TUCH).

Distribution: Nepal (West, Central, and East, 1900-4200m), Himalaya (Kashmir to Arunchal Pradesh), W China.

Family 26. FABACEAE (Leguminosae)

1. AESCHYNOMENE L.

Aeschynomene indica L., *Sp. Pl.*: 713(1753); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 104(1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 164(2000).

Shrubs up to 2m. Leaves 5-12cm, leaflets 20-40 pairs oblong, 3-10 x 1-2mm. Flowers in short axillary racemes, yellow or purplish. Pods linear, compressed. **Fl. & Fr.:** Aug.-Sep.

Habitat: along trail on *Rhododendron-Abies* forest.

Voucher specimen: Panchthar, Hiwakhola (Prangbung), 1800m, Oct. 01, 2007, LKSR-Expedition, D 336 (TUCH).

Distribution: Nepal (West, Central, and East, 200-1300m); Pantropical.

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2. ALBIZIA Duraz.

Albizia chinensis (Osbek) Merr., *Amer. J. Bot.* 3: 575 (1916); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 104 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 164 (2000).

Mimosa chinensis Osbek, *Dagb. Ostind, Resa*: 233 (1757).

Tree up to 35cm. Leaf rachis 15-20cm, pinnae 5-14 pairs, leaflets 18-35 pairs, oblong lanceolate 0.5-1.2 x 0.1-0.2cm, pubescent beneath, stipule ovate. 15-25 flowers in head. Pods thinly coriaceous, 10-18 x 2-4cm.

Fl. & Fr.: Apr.-Jul.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Bichgaun (Memeng), 1990m, Sep. 30m, 2007, LKSR-Expedition, D 303 (TUCH)

Distribution: Nepal (Central and East, 200-1500m); Himalaya, India, Sri Lanka, SE Asia, Malaysia.

3. ASTRAGALUS L.

Astragalus stipulatus D. Don ex Sims, *Bot. Mag.* 50: t. 2380 (1823) var. **stipulatus**; Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 107 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 167(2000).

Perennial herbs up to 2m. Leaves 20-40cm, leaflets oblong 1.5-4.5x1-2cm. Flowers numerous, orange red in raceme. Pods narrowly ovoid, curved & tapering to the apex. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail on *Castanopsis-Quercus* forest.

Voucher specimen: Panchthar, Narelung (Memeng), 2390m, Sep. 29, 2007, LKSr-Expedition, D 284 (TUCH).

Distribution: Nepal (Central and East, 2100-3400m); Sikkim, Bhutan.

4. CROTALARIA L.

1. **Crotolaria alata** Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.*: 241 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 113 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 170 (2000).

Under shrub up to 1m, pale pubescent. Leaves elliptic or obovate, 4-8 x 1.5-3.5cm, base cuneate, pale pubescent on both surfaces, stipules triangular. 5 flowers in racemes, yellow. Pods oblong, 3-4x1-1.5cm, black when matured. **Fl. & Fr.:** Apr.-Sep.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Bichgaun (Memeng), 2050m, Sep. 30, 2007, LKSR-Expedition, D 309 (TUCH).

Distribution: Nepal (West, Central, and East, 300-1400m); Himalaya (Uttar Pradesh to Bhutan), India, SE Asia, China, Malaysia.

2. **Crotolaria albida** Heyne ex Roth, *Nov. Gen. Pl.*: 333 (1821); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 113 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 170 (2000).

Perennial herbs up to 80cm with pale pubescent stem. Leaves oblanceolate, 3-6 x 0.5-1.5cm, base attenuate, sparsely pilose above & pale pubescent beneath. 5-15 flowers in racemes, yellow. Pods oblong, 1.5-2.5 x 0.5-1cm, glabrous. **Fl. & Fr.:** Jun.-Oct.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Tintine (Falaincha), 1570m, Sep. 27, 2007, LKSR-Expedition, D 197 (TUCH).

Distribution: Nepal (West, Central, and East, 450-2200m); Himalaya (Kashmir to Bhutan), India, China, Taiwan, Malaysia.

3. **Crotolaria cystisoides** Roxb. ex DC., *Prodr.* 2: 131 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 113 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 170 (2000).

Shrub up to 5m with densely appressed sericeous stem. Leaflets elliptic, 4-8 x 1.5-2.5cm, glabrous above, puberulous beneath. 10-30 flowers in racemes, usually leaf opposed, sometimes terminal, yellow. Pods oblong-elliptic, 2.5-3.5 x 1-1.5cm, finely pubescent. **Fl. & Fr.:** Aug.-Nov.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Bichgaun (Memeng), 1990m, Sep. 30m, 2007, LKSR-Expedition, D 307 (TUCH)

Distribution: Nepal (West, Central, and East, 1200-1900m); Himalaya (Nepal to Bhutan), NE India, Myanmar, W China .

5. DESMODIUM Desveaux

1. **Desmodium heterocarpon** (L.) DC., *Prodr.* 2: 337 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 118 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 172 (2000).

Hedysarum heterocarpon L., *Sp. Pl.*: 747 (1753).

Shrubs up to 2m. Leaves usually 3-foliolate, leaflets elliptic or obovate, 2-5 x 1-2cm, appressed greyish pubescent beneath. Petioles 1-2cm. Racemes elongate, axillary or terminal. Pods undulate along lower suture, sparsely pubescent with hooked hairs. **Fl. & Fr.:** Aug.-Nov.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Bichgaun (Memeng), 1990m, Sep. 30m, 2007, LKSR-Expedition, D 301 (TUCH)

Distribution: Nepal (West, Central, and East, 400-1700m), Himalaya (Uttar Pradesh to Bhutan), Sri Lanka, China, Japan, Pacific Islands, Malaysia, Australia .

2. *Desmodium microphyllum* (Thunb.) DC., *Prodr.* **2:** 337 (1825) var. **microphyllum**; Hara *et al.* in *Enum. Fl. Pl. Nep.* **2:** 118 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 172 (2000).

Hedysarum microphyllum Thunb., *Fl. Jap.:* 284 (1784).

Prostrate, sub shrub up to 1.5m. Leaves 3-foliolate, leaflets oblong or sub orbicular, 4-12 x 2-6mm. Flowers in racemes, purplish. Pods oblong, 5-15 x 2-3mm. **Fl. & Fr.:** Apr.-Oct.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Bichgaun (Memeng), 1990m, Sep. 30m, 2007, LKSR-Expedition, D 304 (TUCH)

Distribution: Nepal (West, Central, and East, 1800-2300m); Himalaya, Sri Lanka, India, SE Asia, China, Japan, Malaysia, Australia.

3. *Desmodium multiflorum* DC., *Ann. Sci. Nat., ser.* **14:** 101 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2:** 118 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 173 (2000).

Shrub up to 2m. Leaves 3-foliolate, elliptic or obovate, 3-8 x 1.5-4cm, appressed pubescent beneath; petiole 2-5cm Flowers in racemes, purplish. Pods pubescent. **Fl. & Fr.:** Jul.-Oct.

Habitat: along trail on settle area.

Voucher specimen: Panchthar, Betini (Falaincha), 2390m, Sep. 28, 2007, LKSR-Expedition, D 220 (TUCH).

Distribution: Nepal (West, Central, and East, 1800-2600m); Himalaya (Kashmir to Bhutan), SE Asia, NE India, China.

6. SMITHIA Aiton.

Smithia ciliata Royle, *III. Bot. Himal. Mts.* **2:** t. 35, f. 2 (1833-1840); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2:** 130 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 180 (2000).

Annual herbs, up to 1m, leaves 1-3cm, leaflets 3-8 pairs, 3-8x2-3mm, base obliquely rounded, finely ciliate, stipules membranous, flowers second in small racemes on short peduncles, white or pale blue, pods 4-6 segments. **Fl. & Fr.:** Aug.-Nov.

Habitat: along trail on settle area.

Voucher specimen: Panchthar, Bichgaun (Memeng), 1990m, Sep. 30m, 2007, LKSR-Expedition, D 305 (TUCH)

Distribution: Nepal (West, Central, and East, 1200-2800m); Himalaya (Himalchal Pradesh to Sikkim), NE India, SE Asia, China, Japan.

Family 27. EUPHORBIACEAE

PHYLLANTHUS L.

Phyllanthus parvifolius Buch.-Ham. ex D. Don, *Prdr. Fl. Nep.:* 63(1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3:** 198(1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 110(2000).

Shrub up to 2-5m with short leafy branches, leaves closely arranged, obovate elliptic, 0.5-1x0.3-0.4cm, base roundd, pale beneath, flowers solitary on short pedicel of 1-2mm, filament free, capsule subglobose, 3-4mm. **Fl. & Fr.:** Mar.-Sep.

Habitat: along trail near streams.

Voucher specimen: Panchthar, Hiwakhola (Prangbung), 1780m, Oct. 01, 2007, LKSR-Expedition, D 323 (TUCH).

Distribution: Nepal (Central and East, 1100-2000m); Himalaya (Uttar Pradesh to Bhutan), NE India .

Family 28. DAPHNIPHYLLACEAE

DAPHNIPHYLLUM Blume

Daphniphyllum himalense (Benth) Mull. Arg., *Prodr.* **16**(2): 4 (1864); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 200 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 97 (2000). 'Chandane'
Goughia himalensis Benth. in Hook., *J. B. Kew Misc.* **6**: 9 (1854).

Small tree up to 10m, scales of terminal buds obtuse, leaves thickly coriaceous, oblanceolate, 8-20x3-7cm, base attenuate, pale but densely & conspicuously papillate beneath, petiole 2-5cm, crimson. Flowers in crimson raceme, drupe black, ellipsoid, 14x9mm. **Fl. & Fr.**: May-Sep.

Habitat: along with *Lyonia*, *Rhododendron*, etc.

Voucher specimen: Panchthar, Faleke-Betini (Falaincha), 1950m, Sep. 26, 2007, LKSR-Expedition, D 172 (TUCH).

Distribution: Nepal (East, 2500-2800m); Himalaya (Nepal to Bhutan), NE India (Meghalaya), N Myanmar, China (Xizang).

Family 29. RUTACEAE

SKIMMIA Thunberg

Skimmia laureola (DC.) Siebold & Zucc. ex Walp., *Repert. Bot.* **43**: 491 (1916); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 83 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 280 (2000). 'Jainberiphul' Nep.
Limonia laureola DC., *Prodr.* **1**: 536 (1824).

Semi-prostrate shrub. Leaves elliptic-oblanceolate, 4-10 x 2-3cm, acute, base cuneate. Flowers in short racemes, greenish yellow. Fruit subglobose, 7-8mm diameter, black. **Fl. & Fr.**: Apr.-Sep.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Faleke-Betini (Falaincha), 2050m, Sep. 26, 2007, LKSR-Expedition, D 142 (TUCH).

Distribution: Nepal (West, 2400-3000m); Himalaya (Afghanistan to Bhutan).

Family 30. POLYGALACEAE

POLYGALA L.

Polygala persicarifolia DC., *Prodr.* **1**: 326 (1824); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 50 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 236 (2000).

Annual herbs. Leaves subsessile, elliptic to linear-lanceolate, 2.5-4.5 x 0.2-0.6, subobtuse to mucronate, sparsely scabrid-pubescent. Flowers in terminal and axillary raceme, rose-pink, purple or white. Capsule very narrowly winged, elliptic-oblong, 4.2-5 x 3-4.2mm. **Fl. & Fr.**: Aug.-Oct.

Habitat: along trail on *Rhododendron-Lyonia* forest

Voucher specimen: Panchthar, Bichgaun (Memeng), 1840m, Sep. 30, 2007, LKSR-Expedition, D 308 (TUCH).

Distribution: Nepal (West, Central, and East, 700-1900m); Himalaya (Punjab to Nepal), India.

Family 31. ANACARDIACEAE

1. DOBINEA Buch.-Ham. ex D. Don

Dobinea vulgaris Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.*: 249 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 100 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 9 (2000).

Shrubs of 2-5 m with long slender branch. Leaves elliptic-lanceolate, 12-18 x 3.5-5cm, serrate. Flowers in terminal panicle. Fruit orbicular, 3mm in diameter. **Fl. & Fr.**: Sep.-Oct.

Habitat: along trail on *Rhododendron-Sorbus* forest.

Voucher specimen: Panchthar, Faleke (Falaincha), 3210m, Sep. 26, 2007, LKSR-Expedition, D 154 (TUCH).

Distribution: Nepal (West, Central, and East, 1500-2300m); Himalaya (Nepal to Bhutan) .

2. RHUS L.

Rhus javonica L., *Sp. Pl.*: 265 (1753); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 101 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 10 (2000). 'Bhakiamilo'

Shrubs or small tree up to 10m. Leaves 20-50cm, leaflets 3-6 pairs, oblong-ovate 5-13 x 2.5-5.5cm. Flowers in terminal panicle. Drupe subglobose, 4-5mm, reddish. **Fl. & Fr.:** Jul.-Sep.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Faleke-Betini (Falaincha), 1950m, Sep. 26, 2007, LKSR-Expedition, D 171 (TUCH).

Distribution: Nepal (West, Central, and East, 1300-2400m); Himalaya (Kashmir to Bhutan), India, Sri Lanka, East to China, Korea, Japan.

Family 32. ACERACEAE

ACER L.

1. **Acer campbelli** Hook. f. & Thomson ex Hiern in Hook. F., *Fl. Br. Ind.* **1**(3): 696 (1875); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 97 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 5 (2000). 'Kapaasi'

Trees up to 25m. Leaves 5-7 lobed, 8-15 x 10-20cm, lobes caudate acuminate. Flowers in panicles with greenish color. Winged fruit, 2-2.5 x 0.75cm. **Fl. & Fr.:** Apr.-Jul.

Habitat: on *Rhododendron-Acer-Betula* forest.

Voucher specimen: Panchthar, Chiwabhanjyang-Major (Falaincha), 3530m, Sep. 19, 2007, LKSR-Expedition, D 009 (TUCH).

Distribution: Nepal (West, Central, and East, 2100-3600m); Himalaya (Nepal to Arunchal Pradesh), Myanmar .

2. **Acer caudatum** Wall., *Pl. Asiat. Rar.* **2**(5): 4(1830) pp :28, t. 132 (1831); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 98 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 5 (2000).

Tree about 12m. Leaves 5 lobed, 10-15cm long and broad, lobes 4-6cm caudate-acuminate. Flowers in dense panicles. Fruit a double samara, each with terminal wing. **Fl. & Fr.:** Apr.-Sep.

Habitat: on *Rhododendron-Acer-Betula* forest.

Voucher specimen: Panchthar, Chiwabhanjyang-Major (Falaincha), 3530m, Sep. 19, 2007, LKSR-Expedition, D 018 (TUCH).

Distribution: Nepal (Central and East, 3000-4000m), Himalaya (Uttar Pradesh to Bhutan), China.

Family 33. Balsaminaceae

1. IMPATIENS L.

1. **Impatiens discolor** DC., *Prodr.* **1**: 687 (1824); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 78 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 22 (2000). 'Patke jhar'

Perennial herbs upto 30cm. Leaves elliptic-lanceolate, 3.5-12.5 x 1.5-5cm. Pale pink or white flowers in raceme. Capsule narrowly clavate, 2-2.5cm. **Fl. & Fr.:** Jul.-Oct.

Habitat: along trail near streams.

Voucher specimen: Panchthar, Hiwakhola (Memeng), 2120m, Oct. 01, 2007, LKSR-Expedition, D 328, (TUCH).

Distribution: Nepal (West, Central, and East, 1900-2200m); Himalaya (Nepal to Bhutan).

2. **Impatiens falcifer** Hook. f., *Bot. Mag.* **129**: t. 7923 (1903); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 78 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 22 (2000).

Annual herbs up to 50cm. Leaves elliptic-oblongate, 3-12 x 0.8-3.8cm. White, purple spotted flowers in raceme. Capsule linear-cylindric, 3.5-4.5 x 0.1-0.2cm. **Fl. & Fr.:** Jul.-Nov.

Habitat: along trail on *Sorbus-Acer* forest.

Voucher specimen: Panchthar, Chiwabhanjyang (Falaincha), 3170m, Sep. 19, 2007, LKSR-Expedition, D 006 (TUCH).

Distribution: Nepal (Central and East, 2500-3400m); Himalaya (Nepal, Sikkim).

3. ***Impatiens puberula*** DC., *Prodr.* 1: 687 (1824); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 86 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 23 (2000).

Perennial herbs up to 65cm. Leaves oblong-lanceolate, 3.5-15.5 x 1.5-5.5cm. Bluish purple flower in solitary inflorescence. Capsule cylindrical fusiform, 1.5-3.0 x 0.3-0.5cm. **Fl. & Fr.:** Jun.-Oct.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Chamling danda (Chyangthapu), 2750m, Sep. 29, 2007, LKSR-Expedition, D 262 (TUCH).

Distribution: Nepal (Central and East, 1500-2700m); Himalaya (Nepal to Bhutan).

4. ***Impatiens racemosa*** DC., *Prodr.* 1: 688 (1824); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 79 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 23 (2000).

Annual herb up to 1m. Leaves ovate to elliptic-lanceolate, 3.5-12 x 1.5-5cm. Bright yellow flowers in raceme. Capsule cylindric-clavate, 14-17 x 2-3mm. **Fl. & Fr.:** May-Nov.

Habitat: along trail on *Rhododendron-Acer* forest.

Voucher specimen: Panchthar, Faleke-Betini (Falaincha), 3280m, Sep. 26, 2007, LKSR-Expedition, D 150 (TUCH).

Distribution: Nepal (West, Central, and East, 1300-3900m); Himalaya (Kashmir to Bhutan), NE India, china (Xizang).

5. ***Impatiens spirifer*** Hook. f. & Thomson, *J. Linn. Soc., Bot.* 4: 135 (1860); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 80 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 23 (2000).

Annual herb up to 60cm. Leaves ovate-lanceolate, 2-11.5 x 1.5-6cm. Flowers solitary or paired, pink with yellowish orange spur. Capsule subfusiform, 2-2.5 x 0.3-0.5cm. **Fl. & Fr.:** Jun.-Oct.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Chamling danda (Chyangthapu), 1950m, Sep. 28, 2007, LKSR-Expedition, D 234 (TUCH).

Distribution: Nepal (East), Sikkim, China (Xizang).

6. ***Impatiens urticifolia*** Wall. in Roxb., *Fl. Ind.* 2: 457 (1824); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 80 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 24 (2000).

Perennial herb upto 1m. Leaves elliptic, lanceolate-elliptic, 4-15x1-5cm, glabrous. Inflorescence dropping, 2-7-flowered racemes. Flowers pale yellow lined with reddish purple in throat. Peduncle 4-7cm. Capsule linear-cylindrical. **Fl. & Fr.:** Jun.-Oct.

Habitat: along trail near settle area.

Voucher specimen: Panchthar, Dabale-Deurali (Chyangthapu), 2640m, Sep. 29, 2007, LKSR-Expedition, D 259 (TUCH).

Distribution: Nepal (West, Central and East, 2700-3800m), Himalaya (Nepal to Bhutan), China.

Family 34. AQUIFOLIACEAE

ILEX L.

1. ***Ilex dipyrrena*** Wall., *Fl. Ind. (Roxburgh)* 1: 473 (1820); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 87 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 12 (2000). 'Lise/Liso'

Evergreen trees to 15m. Leaves coriaceous, elliptic to ovate, 5.5-11.5 x 2-4cm. Flowers glabrescent with greenish white. Fruit globose to elliptic, 5-8mm in diameter, red. **Fl. & Fr.:** Apr.-Sep.

Habitat: on *Acer-Rhododendron* forest.

Voucher specimen: Panchthar, Faleke (Falaincha), 3210m, Sep. 26, 2007, LKSR-Expedition, D 166, (TUCH).

Distribution: Nepal (West, Central and East, 2500-3500m); Himalaya (Punjab to Arunchal Pradesh), NE India, N Myanmar, W China.

2. **Ilex sikkimensis** Kurz., *J. Asiat. Soc. Bengal* **44**(II): 202 (1875); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 88 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 13 (2000). ‘Lise/Liso’

Evergreen trees to 15m. Leaves coriaceous, oblong-lanceolate, 8-14 x 3.5-6.5cm, midrib depressed above. Whitish green flowers with fragrant. Fruit 4-6mm in diameter. **Fl. & Fr.:** Apr.-Sep.

Habitat: on *Castanopsis-Lithocarpus* forest.

Voucher specimen: Panchthar, Faleke-Beteni (Falaincha), 2660m, Sep. 26, 2007, LKSR-Expedition, D 163 (TUCH).

Distribution: Nepal (East, 2200-3300m); Himalaya (Nepal to Bhutan), NE India, Myanmar.

Family 35. **BUXACEAE**

SARCOCOCCA Lindley

1. **Sarcococca hookeriana** Baill., *Monogr. Buxac.:* 53 (1859); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 200 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 32 (2000). ‘Chilekath’

Small shrubs 0.5-1.5m. Leaves narrowly elliptic-lanceolate, 5-9 × 1-2cm, Flowers strongly fragrant racemes. Berries subglobose, 1cm. **Fl. & Fr.:** Apr.-Sep.

Habitat: on *Rhododendron-Sorbus* forest.

Voucher specimen: Panchthar, Faleke (Falaincha), 3210m, Sep. 26, 2007, LKSR-Expedition, D 176 (TUCH).

Distribution: Nepal (West, Central, and East, 1800-3500m), Himalaya (Nepal to Bhutan), NE India, W China.

2. **Sarcococca wallichii** Stapf, *Kew Bull.* 1916: 37 (1916); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 200 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 33 (2000).

Similar to *S. hookeriana*, but shoots glabrous. Leaves ovate-lanceolate, 8-12 x 2.5-4cm. Fruit 1cm in diameter. **Fl. & Fr.:** Apr.-Sep.

Habitat: along trail on *Schima-Castanopsis* forest.

Voucher specimen: Panchthar, Hiwakhola (Prangbung), 1800m, Oct. 01, 2007, LKSR-Expedition, D 339 (TUCH).

Distribution: Nepal (Central and East, 2100-2900m); Himalaya (Nepal to Bhutan), N. Myanmar.

Family 36. **VITACEAE**

TETRASTIGMA Planch.

Tetrastigma serrulatum (Roxb.) Planch., *Monogr. Phan.* **5**: 432 (1887); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 95 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 328 (2000). ‘Charchare’
Cissus serrulatum Roxb., *Fl. Ind.* **1**: 432 (1820).

Evergreen climbing shrubs with red stem. Leaves pedately 5 foliate, stipules triangular; leaflets lanceolate, elliptic, or obovate, 3-9 x 1.3cm. Flowers pale green in umbellately branched cymes. Berry globose, black or purple when ripening. **Fl. & Fr.:** May-Oct.

Habitat: near farming area along trail climbing on *Ficus* sp.

Voucher specimen: Panchthar, Tintine (Falaincha), 1570m, Sep. 27, 2007, LKSR-Expedition, D 218 (TUCH).

Distribution: Nepal (West, Central, and East, 500-2400m); Himalaya (Uttar Pradesh to Bhutan), NE India, Myanmar, Thailand, Indo-China., W China.

Family 37. **TILIACEAE**

TRIUMFETTA L.

Triumfetta annua L., Mant. Pl. 1: 73 (1767); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 72 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 310 (2000).

An erect herbs up to 80cm. Leaves ovate, 3-11 x 2-7cm, sparsely pilose with mostly simple hairs. Cymes 1-1.5cm. Capsule 1.2-1.5cm, glabrous. **Fl. & Fr.:** Aug.-Oct.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Tintine (Falaincha), 1570m, Sep. 27, 2007, LKSR-Expedition, D 219 (TUCH).

Distribution: Nepal (West, Central, and East, 1000-1700m), Africa, India, Myanmar, Thailand.

Family 38. **MALVACEAE**

1. **SIDA L.**

Sida rhombifolia L., *Sp. Pl.*: 684 (1753); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 68 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 194 (2000).

Erect, perennial sub shrubs up to 1m. Leaves lanceolate or orbicular, 3-8 x 1.5-4.5cm, margin serrate. Flowers in axillary, solitary inflorescence, pedicel 1-3mm. Fruit glabrous. **Fl. & Fr.:** Jul.-Nov.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Bichgaun (Memeng), 1780m, Sep. 30, 2007, LKSR-Expedition, D 306 (TUCH).

Distribution: Nepal (Central and East, 100-500m); Pantropical.

2. **THESPESIA** Correa

Thespesia lampas (Cav.) Dalzell & Gibson, *Bombay Fl.*: 19 (1861); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 68 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 194 (2000). ‘*Ban Kapaas*’

Shrubs up to 3m, stellate-hairy through out. Leaves broadly ovate or deltoid, sometimes 3-lobed, 9-15 x 5-12cm. 1 (-3) flowered cymes. Fruit obovoid, 5-angled. **Fl. & Fr.:** Sep.-Feb.

Habitat: along trail near settle area.

Voucher specimen: Panchthar, Hiwakhola (Memeng), 2100m, Oct. 01, 2007, LKSR-Expedition, D 321 (TUCH).

Distribution: Nepal (West and Central, 200-1100), Africa, S & SE Asia.

3. **URENA L.**

Urena lobata L., *Sp. Pl.*: 692 (1753); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 68 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 194 (2000). ‘*Kurepaat*’

An erect annual or perennial herbs up to 2m. Leaves ovate to orbicular, 3-12 x 2.5-12cm. stipules filiform, 2-5mm. Mericarp 4-7mm with hooked bristles of 2mm. **Fl. & Fr.:** Aug.-Feb.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Bichgaun (Memeng), 1990m, Sep. 30m, 2007, LKSR-Expedition, D 294 (TUCH)

Distribution: Nepal (West, Central and East, 200-1300m), Pantropical.

Family 39. **THYMELAEACEAE**

DAPHNE L.

1. **Daphne bholua** D. Don, *Prodr. Fl. Nep.*: 68 (1825) var. **bholua**; Hara *et al.* in *Enum. Fl. Pl. Nep.* 3: 188 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 308 (2000). 'Lokta/Kagaje'

Shrubs up to 2.5m. Leaves clustered at branch ends, elliptic-oblongate, 4-14 x 1.5-3.5cm. 5-15 cluster of flowers in terminal, fragrant, pink or purplish. Drupe ovoid, black. **Fl. & Fr.**: Mar.-Jun.

Habitat: along trail near settle area.

Voucher specimen: Panchthar, Near Sukhkha Pokhari (Prangbung), 1990m, Sep. 29, 2007, LKSR-Expedition, D 258 (TUCH).

Distribution: Nepal (Central and East, 2000-2900m); Himalaya (Nepal to Arunchal Pradesh), China

2. **Daphne sureil** W. W Sm. & Cave, *Rec. Bot. Surv. Ind.* 6: 51 (1913); Hara *et al.* in *Enum. Fl. Pl. Nep.* 3: 188 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 309 (2000). 'Lokta/Kagaje'

Shrubs up to 2m. Leaves pale green, lanceolate, 5-20 x 1.5-4cm. Flower clusters subsessile or on peduncle, white or creamy. Drupe orange red. **Fl. & Fr.**: Sep.-Jan.

Habitat: along trail near settle area.

Voucher specimen: Panchthar, Tintine (Falaincha), 1900m, Sep. 27, 2007, LKSR-Expedition, D 196 (TUCH).

Distribution: Nepal (Central and East, 1200-2400m); Himalaya (Nepal to Bhutan).

Family 40. VIOLACEAE

1. VIOLA L.

1. **Viola biflora** L., *Sp. Pl.*: 936(1753); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 47 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 326 (2000).

Perennial herbs with nodular rootstock up to 15cm. Leaf blade broadly ovate, 10-16×12-20mm, pubescent especially on upper surface. Peduncles with linear bracts 1-3mm. Flowers yellow; lowermost petal reddish purple, spur saccate. Capsule ovoid, glabrous. **Fl. & Fr.**: Jun.-Aug.

Habitat: along trail on *Rhododendron-Acer* forest.

Voucher specimen: Panchthar, Lampokhari (Sidin), 2920m, Jun. 08, 2007, LKSR-Expedition, A 050 (TUCH).

Distribution: Nepal (West, Central, and East, 2100-4500m), Europe, Siberia, N. Korea, Japan.

Family 41. BEGONIACEAE

BEGONIA L.

1. **Begonia cathcartii** Hook. f., *III. Himal. Pl.*: t. 13 (1855); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 181 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 24 (2000). 'Magar-kachi'

Herbs up to 30cm. Leaves ovate, 6-12 x 3.5-6.5cm, base obliquely cordate. Flowers white, capsule 10 x 5mm with one large wing. **Fl. & Fr.**: May-Sep.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Chamling danda (Chyangthapu), 1950m, Sep. 28, 2007, LKSR-Expedition, D 237 (TUCH).

Distribution: Nepal (East, 1800-2800m), Sikkim, Bhutan.

2. **Begonia gemmipara** Hook. f. *III. Himal. Pl.*: t. 14 (1855); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 181 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 24 (2000). 'Magar-kachi'

Herbs up to 40cm. Leaves ovate, 5-10 x 3-6cm, margin coarsely serrate. Flowers pendulous, white or pink-striped. **Fl. & Fr.:** Aug.-Oct.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Chamling Danda (Chyangthapu), 2750m, Sep. 28, 2007, LKSR-Expedition, D 264 (TUCH).

Distribution: Nepal (East, 2900m), Sikkim.

3. **Begonia josephii** A. DC., *Ann. Sci. Nat.*, ser. 4 11: 126 (1859); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 181 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 24 (2000). ‘Magar-kachi’

Herbs with tuberous rootstock. Leaves usually all basal, oblong-ovate, 6-25 x 4-18. Male flowers pink or white. Capsule ellipsoid, 8 x 6mm with one triangular wing. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail on *Castanopsis-Lithocarpus* forest.

Voucher specimen: Panchthar, Narelung (Memeng), 2390m, Sep. 29, 2007, LKSR-Expedition, D 280 (TUCH).

Distribution: Nepal (Central and East, 1600-2900m), Bhutan, NE India (Press *et al.*, 2000)

4. **Begonia panchtharensis*** S. Rajbhandary & K.K. Shrestha, *sp. nov.* (in Press). ‘Magar-kachi’

Rhizomatous herb, 30-35cm. Rhizomes elongate, 2.5-6.5cm in diam. Leaves all basal, petiole 10-12cm, glabrous, green with red stripes; blades 14-18 x 10.5-14cm, 5- or 6-veined, lobes 5 or 6, apex.

Inflorescence 12-25cm. Male flowers tepals 4, pedicel 1-3.5cm, white to pinkish, outer 2 broadly ovate, 1.7-2.5 x 1.2-1.8cm, abaxially glabrous, inner 2 oblong, 14-18 x 7-10mm; stamens numerous. Female flowers and fruit not seen. **Fl. & Fr.:** Sep.-Oct.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Prangbung (Prangbung), 2250m, Oct. 02, 2007, LKSR-Expedition, D 357 (TUCH).

Distribution: East Nepal (Panchthar)

*New record to “Flora of world”

Family 42. MELASTOMATACEAE

1. OSBECKIA L

Osbeckia nepalensis Hook. f., *Exot. Fl.* 1(2): t. 31 (1822); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 170 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 195 (2000). ‘Angeri’

Shrub up to 2m. Leaves narrowly ovate-oblong to elliptic, 4-12 x 1.5-4cm. Inflorescence mainly terminal, paniculate, many flowered, pink. Capsule 8-10mm, hairy at apex. **Fl. & Fr.:** Jul.-Sep.

Habitat: on *Berberis-Rosa* shrubby area along trail.

Voucher specimen: Panchthar, Bichgaun (Memeng), 3210m, Sep. 30, 2007, LKSR-Expedition, D 312 (TUCH).

Distribution: Nepal (Central and East, 450-2300m); Himalaya (Nepal to Arunchal Pradesh), NE India, Thailand, Indo-China, Malaya.

2. OXYSPORA DC.

Oxyspora paniculata (D. Don) DC., *Prodr.* 3: 123 (1828); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 171 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 195 (2000).

Shrubs up to 3 m. Leaves ovate to ovate-elliptic, 11-28 x 5-12cm, petiole 2-6cm, with tuft of hairs at top. Inflorescence drooping. Capsule ellipsoid, 2-6mm. **Fl. & Fr.:** Aug.-Oct.

Habitat: along trail near settle area.

Voucher specimen: Panchthar, Menjuwa (Falaincha), 2190m, Sep. 28, 2007, LKSR-Expedition, D 248 (TUCH).

Distribution: Nepal (Central and East, 1300-2000); Himalaya (Nepal to Arunchal Pradesh), NE India, Thailand, Indo-China, Malaya.

Family 43. ALANGIACEAE

ALANGIUM Lam.

Alangium alpinum (C B Clarke) WW Sm. & Cave, *Rec. Bot. Surv. Ind.* **6**: 96, t. 2 (1914); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 194 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 7 (2000).

Markea begonifolia Roxb. var. *alpina* C B Clarke, in *Fl. Brit. Ind.* **2**: 744 (1879). 'Damaikath'

Trees up to 20cm. Leaves ovate, 8-20 x 5-12cm, petiole 7-25mm. Cymes 1-4 flowered, creamy white or yellow. Fruit ellipsoid, 1-2 x 0.5-1cm, one seeded. **Fl. & Fr.:** Jun.-Sep.

Habitat: on *Lithocarpus-Lyonia* forest.

Voucher specimen: Panchthar, Dabale-Deurali (Chyangthapu), 2640m, Sep. 29, 2007, LKSR-Expedition, D 260 (TUCH).

Distribution: Nepal (Central and East, 1900-2700m); Himalaya (Nepal to Bhutan) NE India.

Family 44. ARALIACEAE

1. HEDERA L.

Hedera nepalensis K. Koch, *Hort. Dendr.*: 284 (1853); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 191 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 16 (2000). 'Kathe laharo'

Climbing shrubs. Leaves coriaceous, ovate-lanceolate, 4-8 x 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. **Fl. & Fr.:** Aug.-Nov.

Habitat: climbing on *Symlocos* sp.

Voucher specimen: Panchthar, Narelung (Memeng), 1970m, Sep. 29, 2007, LKSR-Expedition, D 286 (TUCH).

Distribution: Nepal (West, Central, and East, 3000-4000m), Afghanistan, Himalaya (Kashmir to Bhutan), NE India, Myanmar, China.

2. PANAX L.

Panax pseudo-ginseng Wall., *Trans. Med. Soc. Cal.* **4**: 117 (1829) subsp. **pseudo-ginseng**; Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 192 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 16 (2000).

Rhizomatous herbs with simple unbranched stem up to 80cm. Leaves whorled, leaflets 3-6, ovate or lanceolate 3-14 x 1-4cm, margin serrate or deeply incised pinnatifid, sparsely hirsute along veins on both surface. Flowers in umbel. Fruit scarlet, 4.5mm diameter. **Fl. & Fr.:** May-Sep.

Habitat: along trail on *Rhododendron-Acer* forest.

Voucher specimen: Panchthar, Lampokhari (sidin), 3060m, Jun. 8, 2007, LKSR-Expedition, B 030 (TUCH).

Distribution: Nepal (Central and East, 2100-2500m), Apparently confined to Nepal.

3. PENTAPANAX Seem.

Pentapanax leschenaultii (DC) Seem., *J. Bot.* **2**: 296 (1864); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 192 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 17 (2000). 'Chinde'

Trees or shrubs up to 12 m. leaves 25-35cm, leaflets 5, ovate-elliptic, 7-15 x 2-7cm, serrate. Umbel 2-5cm across. Fruit 3-4mm in diameter. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail on steep hill with *Rhododendron-Sorbus* dominating forest.

Voucher specimen: Panchthar, Chiwabhanjyang-Major (Falaincha), 3280m, Sep. 19, 2007, LKSR-Expedition, D 008 (TUCH).

Distribution: Nepal (west, Central and East, 1600-3700m) ; Himalaya (Utter Pradesh to Bhutan); NE India, India (Madras), Myanmar, W China.

Family 45. **ERICACEAE**

1. **AGAPETIS** D. Don ex G. Don

1. **Agapetis incurvata** var. **hookeri** (C. B. Clarke) Airy Shaw, *Kew Bull.* **13**: 486 (1995); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 54 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 101 (2000).

Pentapterygium hookeri C.B. Clarke, in *Fl. Br. Ind.* **3**: 450 (1882).

Epiphytic shrub up to 50cm. Leaves glabrous, ovate-lanceolate, 6-9 x 2.5-3.5cm. Corymb 2-8 flowered, pendulous, pinkish white. **Fl. & Fr.:** Jun.-Sep.

Habitat: epiphytic habit on *Castanopsis* sp.

Voucher specimen: Panchthar, Chamling danda (Chyangthapu), 1950m, Sep. 28, 2007, LKSR-Expedition, D 236 (TUCH).

Distribution: Nepal (East, 2000-2900m); Himalaya (Nepal to Bhutan).

2. **Agapetis smithiana** Sleumer, *Bot. Jahrb.* **70**: 106 (1939); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 54 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 101 (2000).

Epiphytic shrubs. Leaves elliptic lanceolate 1.4-3.5cm X 0.8-1.8cm, apex rounded, marginal glands near base. Flowers in solitary or 2 or 4, corymbs, yellow. **Fl. & Fr.:** Feb.-Jan.

Habitat: Epiphytes on *Lyonia*.

Voucher specimen: Panchthar, Dabale Bhanjyang (Memeng), 2500m, Sep. 29, LKSR-Expedition, D 269 (TUCH).

Distribution: Nepal (East, 2000-2800m); Himalaya (Nepal to Bhutan).

2. **CASSIOPE** D. Don

Cassiope fastigiata (wall.) D. Don, *Edinburgh New Philos. J.* **17**: 157 (1834); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 55 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 101 (2000).

Basionym(s): *Andromeda fastigiata* Wall. in *As. Research.* **13**: 394 (1820).

An erect shrub up to 30cm. Leaves ovate-oblong, 3-5 x 1-2mm with white ciliate margin. Pedicels 2-5mm, white flowers. Capsule globose, 2-4 x 2-3mm. **Fl. & Fr.:** May-Sep.

Habitat: along trail on open area.

Voucher specimen: Panchthar, Paharemeghu (Falaincha), 4050m, Sep. 23, 2007, LKSR-Expedition, D 110 (TUCH).

Distribution: Nepal (West, Central and East, 2800-5000m); Himalaya (Kashmir to Bhutan).

3. **Gaultheria** L.

1. **Gaultheria nummularioides** D. Don, *Prodr. Fl. Nep.*: 150 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 55 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 102 (2000).

Prostrate dwarf shrubs with creeping bristly leafy shoots, 5-20cm long. Leaves ovate, margin ciliate, lower surface bristly. Flowers in solitary on leaf axil). Capsule black when ripe. **Fl. & Fr.:** Jun.-Oct.

Habitat: along trail near settle area.

Voucher specimen: Panchthar, Taalkharka (Prangbung), 2590m, Oct. 02, 2007, LKSR-Expedition, D 352 (TUCH).

Distribution: Nepal (West, Central, and East, 2100-4100m); Himalaya (Uttar Pradesh to Bhutan), China (Xizang), NE India, Myanmar.

2. **Gaultheria pyroloides** Hook. f. & Thomson ex Miq., *Ann. Mus. Bot. Lugduno-Batavum* **1**: 30 (1863); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 55 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 102 (2000).

Mat forming dwarf shrub and short erect glabrous leafy up to 15cm. Leaves elliptic-obovate, 0.5-3 x 1-2.5cm. 2-5 flowers in raceme. Capsule 0.5-1cm, blue when ripe. **Fl. & Fr.**: May-Aug.

Habitat: along trail on *Rhododendron* forest.

Voucher specimen: Panchthar, Bikhepani (Prangbung), 3450m, Jun. 11, 2007, LKSR-Expedition, B 050 (TUCH).

Distribution: Nepal (East, 3200-3800m); Himalaya (Nepal to Bhutan), NE India, N Myanmar.

3. **Gaultheria semi-infera** (C. B. Clarke) Airy Shaw, *Kew Bull.* **1940**: 317 (1941); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 55 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 102 (2000).

Diplycosia semi-infera C. B. Clarke in *Fl. Brit. Ind.* **3**: 459 (1852).

Shrubs up to 1.5 m. Leaves ovate-oblong, 4-9 x 1.5-3cm, apex mucronate, margin serrulate. Racemes 10-18 flowered, capsule subglobose, 3-5 x 2-4mm surrounded by enlarged, fleshy blue calyx with narrow erect teeth. **Fl. & Fr.**: May-Sep.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Taalkharka (Prangbung), 2590m, Oct. 02, 2007, LKSR-Expedition, D 354 (TUCH).

Distribution: Nepal (East, 2100-3500m); Himalayan (Nepal to Bhutan), N Myanmar, W China.

4. **Gaultheria trichophylla** Royle, *III Bot. Himal. Mts.* **1**(6): 200, 260 (1835); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 55 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 102 (2000).

Prostrate dwarf shrub with creeping leafless stem and short bristly leafy shoots up to 15cm. Leaves elliptic-oblong 0.4-1.2 x 0.2-0.4cm. Flowers solitary, axillary, white to pink. Capsule 0.5-1 x 0.5-0.8cm, deep blue when ripe. **Fl. & Fr.**: Aug.-Oct.

Habitat: along trail on *Rhododendron-Abies* forest.

Voucher specimen: Panchthar, Chiwabhanjyang-Major (Falaincha), 3530m, Sep. 19, 2007, LKSR-Expedition, D 021 (TUCH).

Distribution: Nepal (West, Central, and East, 2700-4500m); Himalaya (Kashmir to Bhutan), NE India, N Myanmar, W China.

4. LYONIA Nuttalla

Lyonia ovalifolia (Wall.) Drude, *Pflanzenfam.* **4**(1): 44 (1889); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 55 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 102 (2000). 'Angeri'

Andromeda ovalifolia Wall. in *As. Research.* **13**: 391, t. 11 (1820).

Small tree 20m. Leaves ovate, 4-8x1.5-4cm, apex acuminate, base rounded or cordate. Petioles c1cm. Racemes with 1-2 leaf-like bracts. Capsule globose 2.5-4x2-5mm, seeds c1mm. **Fl. & Fr.**: Apr.-Dec.

Habitat: on *Castanopsis-Lyonia* forest.

Voucher specimen: Panchthar, Faleke-Betini (Falaincha), 1950m, Sep. 26, 2007, LKSR-Expedition, D 164 (TUCH).

Distribution: Nepal (West, Central, and East, 1300-3300m), Himalaya (Punjab to Bhutan), NE India, Myanmar, China, Malay Peninsula.

5. RHODODENDRON L.

1. **Rhododendron anthopogon** D. Don, *Mem. Wern. Nat. Hist. Soc.* **3**: 409 (1821) var. **anthopogon**; Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 102 (2000). 'Sunpati'

Aromatic shrub up to 70cm with long stalked lacerate scale branches. Leaves ovate 1-3 x 0.5-1.5cm, densely scaly beneath. 5-10 flowers in subcapitate racemes, pinkish, white or pinkish yellow. Stamens 5-8. Capsules up to 5mm, enclosed in calyx. **Fl. & Fr.**: May-Sep.

Habitat: on *Rhododendron* forest.

Voucher specimen: Panchthar, Near Budhipani (Falaincha), 3930m, Sep. 22, 2007, LKSR-Expedition, D 086 (TUCH).

Distribution: Nepal (West, Central, and East, 3300-5100m); Himalaya (Punjab to Bhutan), China.

2. **Rhododendron arboreum** var. **album** Wall., *Pl. Asiatic Rar.* 2(6): 23, 123 (1831); Hara *et al.* in *Enum. Fl. Pl. Nep.* 3: 56 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 102 (2000). 'LaliGurans'

Trees up to 15cm, stem puberulous to tomentose. Leaves elliptic-oblongate, 7-17 x 2-5cm, densely matted white tomentose below, petiole 0.5-1.5cm. 10-20 flowers in raceme, bright red, pedicel 0.5-1cm. Stamen 10. Capsule slightly curved. **Fl. & Fr.:** Jun.-Sep.

Habitat: on *Rhododendron-Sorbus* forest.

Voucher specimen: Panchthar, Faleke (Falaincha), 3210m, Sep. 26, 2007, LKSR-Expedition, D 152 (TUCH).

Distribution: Nepal (Central and East, 2800-3600m); Himalaya (Nepal to Bhutan), NE India.

3. **Rhododendron barbatum** Wall. ex G. Don, *Gen. Syst.* 3: 844 (1834) var. **barbatum**; Hara *et al.* in *Enum. Fl. Pl. Nep.* 3: 57(1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 102 (2000).

Small tree up to 6m. Leaves elliptic-oblongate, 9-17 x 2.5-5cm, dendroid hairs and stalked, glands beneath, petiole 1-2cm with stiff spreading bristles. 10-20 flowered in raceme, crimson or blood red, pedicel 0.5-1.5cm. Capsule weakly curved, bristly. **Fl. & Fr.:** May-Sep.

Habitat: on *Rhododendron* forest.

Voucher specimen: Panchthar, Paharemeghu (Falaincha), 4000m, Sep. 23, 2007, LKSR-Expedition, D 120 (TUCH).

Distribution: Nepal (West, Central, and East, 2700-3600m); Himalaya (Uttar Pradesh to Bhutan).

4. **Rhododendron campanulatum** D.Don, *Mem. Wern. Nat. Hist. Soc.* 3: 410 (1821) var. **campanulatum**; Hara *et al.* in *Enum. Fl. Pl. Nep.* 3: 57 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 103 (2000). 'Nilo chimal'

Shrubs up to 5m, branchlets glabrous. Leaves thinly coriaceous, elliptic, 7-11x3-5cm, acute, base rounded, glabrous, with fine, pale brown to lower surface. Petioles glabrous c1.5cm. Flowers racemes, glabrous, creamy white. Capsule curved. **Fl. & Fr.:** May-Sep.

Habitat: on *Rhododendron-Abies* forest.

Voucher specimen: Panchthar, Dund (Falaincha), 3860m, Sep. 21, 2007, LKSR-Expedition, D 062 (TUCH).

Distribution: Nepal (West, Central, and East, 2800-4400m), Himalaya (Kashmir to Nepal), NE India.

5. **Rhododendron cinnabarinum** Hook. f., *Rhod. Sik. Him.*: n. 8 (1849); Hara *et al.* in *Enum. Fl. Pl. Nep.* 3: 57 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 103 (2000).

Small trees up to 6 m with scaly branchlets. Leaves elliptic, 6-10 x 2-4cm, densely scaly beneath, petiole 1-1.5cm. 2-6 flowers in terminal raceme, orange or orange yellow, pedicel 0.5-1.5cm. Stamens 10. Capsule cylindrical. **Fl. & Fr.:** Jun.-Aug.

Habitat: on *Rhododendron-Prunus* forest.

Voucher specimen: Panchthar, Tarsing (Sidin), 3420m, Jun. 09, 2007, LKSR-Expedition, B 037 (TUCH).

Distribution: Nepal (East, 3200-3800m); Himalaya (Nepal to Bhutan), NE India, China (Xizang).

6. **Rhododendron dalhousiae** Hook. f., *Rhod. Sik. Him.*: n. 1, t. 1&2 (1849); Hara *et al.* in *Enum. Fl. Pl. Nep.* 3: 57 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 103 (2000).

Small tree up to 4 m, branchlets scaly. Leaves elliptic oblanceolate or obovate, 10-17 x 3-7cm, densely reddish scaly beneath, petiole .5-1.5cm, bristly. 2-3 flowers in raceme, white or creamy, pedicel 0.5-2cm. capsule ribbed. **Fl. & Fr.:** May-Sep.

Habitat: on *Rhododendron* forest.

Voucher specimen: Panchthar, Budhipani (Falaincha), 4050m, Sep. 22, 2007, LKSR-Expedition, D 098 (TUCH).

Distribution: Nepal (Central and East, 1800-2500m); Himalaya (Nepal to Arunchal Pradesh).

7. **Rhododendron falconeri** Hook. f. in *Rhod. Sik. Him.:* n. 11, t.10 (1849); Hara et al. in *Enum. Fl. Pl. Nep.* 3:58 (1982); Press et al. in *Ann. Check. Fl. Pl. Nep.:* 103 (2000). 'Chimal'

Large shrub or trees up to 15m. Branchlets thinly brown tomentose. Leaves broadly elliptic-ovate, 15-35 x 7-17cm, dark green and rugose above. Racemes dense subglobose, 12-16cm diameter. Capsule straight 3.5 x 1.2cm. **Fl. & Fr.:** May-Sep.

Habitat: on *Lynia-Betula* forest.

Fl. & Fr.: Apr.-May.

Voucher specimen: Panchthar, Chiwabhanjyang-Major (Falaincha), 3530m, Sep. 19, 2007, LKSR-Expedition, D 010 (TUCH).

Distribution: Nepal (East, 2700-3000m), Himalaya (Nepal to Arunachal Pradesh) North East India.

8. **Rhododendron grande** Wight, *Calcutta J. Nat. Hist.* 8: 176 (1847); Hara et al. in *Enum. Fl. Pl. Nep.* 3: 58 (1982); Press et al. in *Ann. Check. Fl. Pl. Nep.:* 103 (2000).

Trees up to 15 m, bark rough. Leaves elliptic-oblanceolate, 15-26 x 6-10cm, silvery beneath, petiole 2-3.5cm. 15-25 flowers in dense raceme, pale yellow or white, pedicel 1.5-2.5cm. Stamen 16. capsule stout, weakly curved. **Fl. & Fr.:** May-Sep.

Habitat: on *Acer-Rhododendron* forest.

Voucher specimen: Panchthar, Chiwabhanjyang-Major (Falaincha), 3530m, Sep. 19, 2007, LKSR-Expedition, D 016 (TUCH).

Distribution: Nepal (East, 1700-2900m); Himalaya (Nepal to Bhutan), NE India, S China.

9. **Rhododendron hodgsonii** Hook. f., *Rhod. Sik. Him:* n. 16, t. 15 (1851); Press et al. in *Ann. Check. Fl. Pl. Nep.:* 103 (2000). 'Korlinga'

Trees up to 15 m. Leaves narrowly obovate, elliptic, 7-11cm broad, white to pale-brown tomentose beneath. Flowers in raceme, pinkish red to purple. Capsule narrow, curved. **Fl. & Fr.:** May-Sep.

Habitat: on *Rhododendron-Prunus* dominating forest.

Voucher specimen: Panchthar, Surketham (Prangbung), 3450m, Jun. 10, 2007, LKSR-Expedition, B 043 (TUCH).

Distribution: Nepal (East, 3000-3800m); Himalaya (Nepal to Arunchal Pradesh), China (Xizang).

10. **Rhododendron lepidotum** Wall. ex G. Don, *Gen. Syst.* 3: 845 (1834) var. **lepidotum**; Hara et al. in *Enum. Fl. Pl. Nep.* 3: 58 (1982); Press et al. in *Ann. Check. Fl. Pl. Nep.:* 103 (2000). 'Sunpati'

Aromatic mat forming subshrubs 15-60cm, branchlets scaly. Leaves oblanceolate, 5-15 x 3-5mm, acute or rounded, base cuneate. Shortly petiolate. Flowers 1-2, terminal pink. **Fl. & Fr.:** May-Sep.

Habitat: on *Rhododendron* dominating shrubby area.

Voucher specimen: Panchthar, Paharemeghu (Falaincha), 3910m, Sep. 22, 2007, LKSR-Expedition, D 102 (TUCH).

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

11. **Rhododendron lindleyi** T. Moore, *Gard. Chron.* 1864: 364 (1864); Hara et al. in *Enum. Fl. Pl. Nep.* 3: 58 (1982); Press et al. in *Ann. Check. Fl. Pl. Nep.:* 103 (2000). 'Chimal'

Small trees up to 4m, shoot scaly. Leaves elliptic, 10-16 x 2.5-6.5cm, pale beneath with red scale. 2-3 flowers in raceme, golden white, stamen 10. Capsule ribbed. **Fl. & Fr.:** Apr.-Jul.

Habitat: on *Lithocarpus-Lyonia* dominating forest.

Voucher specimen: Panchthar, Jamle (Sidin), 2870m, Jun. 08, 2007, LKSR-Expedition, B 013 (TUCH).

Distribution: Nepal (East, 2100-3300m); Himalaya (Nepal to Bhutan), NE India, Myanmar.

12. **Rhododendron setosum** D. Don, *Mem. Wern. Nat. Hist. Soc.* **3**: 408 (1821); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 59 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 104 (2000).

Strongly aromatic shrub up to 70cm. Leaves oblong-obovate, 0.5-1.5 x 0.3-0.6cm. 2-5 flowers in raceme, pale to deep purple, stamen 10. Capsule oblong-ovoid. **Fl. & Fr.:** Jun.-Sep.

Habitat: on *Rhododendron* forest.

Voucher specimen: Panchthar, Paharemeghu (Falaincha), 4190m, Sep. 23, 2007, LKSR-Expedition, D 115 (TUCH).

Distribution: Nepal (Central and East, 3700-5600m); Himalaya (Nepal to Bhutan), China (Xizang).

13. **Rhododendron thomsonii** Hook. f., *Rhod. Sik. Him.:* n. 13, t. 12 (1851); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 59 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 104 (2000).

Small trees up to 6 m. Leaves elliptic or sub orbicular, 4-9 x 3-6cm, glabrous beneath. Petiole 1.5-3cm. 3-8 flowers in raceme, deep crimson, pedicel 1-2cm. Capsule curved. **Fl. & Fr.:** Apr.-Sep.

Habitat: on *Rhododendron-Betula* forest.

Voucher specimen: Panchthar, Dund (Falaincha), 3740m, Sep. 21, 2007, LKSR-Expedition, D 069 (TUCH).

Distribution: Nepal (East, 2900-3800m); Himalaya (Nepal to Arunchal Pradesh), China (Xizang) .

VACCINIUM L.

1. **Vaccinium nummularia** Hook. f. & Thomson ex C. B. Clarke, *Fl. Br. Ind.* **3**(9): 451 (1882); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 59 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 104 (2000).

Epiphytic shrubs up to 1 m with bristly hair on young shoots. Leaves elliptic, 0.5-1.5 x 0.5-1.0cm. 8-15 flowers in raceme, pinkish white. Filaments hairy. Fruit 3 x 4mm. **Fl. & Fr.:** Apr.-Jun.

Habitat: epiphytes on *Acer*.

Voucher specimen: Panchthar, Lampokhari (Sidin), 3010m, Jun. 08, 2007, LKSR-Expedition, B 025 (TUCH).

Distribution: Nepal (Central and East, 2400-4000m); Himalaya (Nepal to Arunchal Pradesh), NE India, N Myanmar.

2. **Vaccinium retusum** (Griff.) Hook. f. ex CB Clarke in *Fl. Br. Ind.* **3**: 451 (1881); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 59 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 104(2000).

Thibaudia retusa Griff., *Notul.* **4**: 300 (1854).

Epiphytic shrubs up to 2m with pubescent shoots. Leaves obovate, 1.5-2.5cm X 0.7-1.0cm, shallowly retuse, entire. Flowers 10-20 in racemes, bract elliptic, whitish pink. **Fl. & Fr.:** Apr.-Jun.

Habitat: epiphytes on *Rhododendron*.

Voucher specimen: Panchthar, Goruwale (Sidin), 2810m, Jun. 07, 2007, LKSR-Expedition, A 031 (TUCH).

Distribution: Nepal (Central and East, 1400-3600m); Himalaya (Nepal to Arunchal Pradesh), NE India, N Myanmar.

Family 46. APIACEAE (Umbelliferae)

1. ACRONEMA Edgeworth

1. **Acronema ioniostyles*** Farille & Lachard, *Acta Bot. Gallica* **149**: 375 (2002); Grierson and Long in *Fl. Bhu.* **2**(2): 493 (1999).

Small herb 25-30cm high. Stems erect, slender and glabrous. Leaves compound with 3-5 leaflets, lobes ovate-linear, leaflets deeply lobed, 6-15 x 5-11mm, acute, margin serrate. Umbel 3-7 rayed, branched, lateral umbels developed along whole axis, laxly 4-5 flowered, green; bracteoles 3-5, linear, apex pointed. Petals ca. 2mm, purplish with pink, acuminate. Stylopodium brownish orange, flat, conical; style long, bifurcated with rolling tips. **Fl. & Fr.:** Aug.-Sep.

Habitat: along trail on *Rhododendron-Lithocarpus* dominating forest.

Voucher specimen: Panchthar, Dabale-Deurali (Chyangthapu), 2700m, Sep. 29, LKSR-Expedition, D 257 (TUCH).

Distribution: NW Himalaya (Uttaranchal), E. Nepal

* New record to "Flora of Nepal"

2. ANGELICA L.

Angelica harae Pimenov, *Feddes Repert. Spec. Nov. Regni. Veg.* **98**(7-8): 379 (1987); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 311 (2000).

An erect to scrambling herb to 1.5m. Leaves broadly ovate, 3 pinnate, leaflets ovate, 2.5-7.5 x 1.5-4cm, often lobed, upper puberulent and lower glabrous. 7-13 flowers in umbellules in umbel, white-purplish or dull yellow. Fruit ellipsoid. **Fl. & Fr.:** Jul.-Sep.

Habitat: along trail near settle area.

Voucher specimen: Panchthar, Maklabu (Chyangthapu), 1980m, Sep. 27, 2007, LKSR-Expedition, D 195 (TUCH).

Distribution: Nepal (East, 1300-3300m); Himalaya (Nepal to Bhutan).

3. HERACLEUM L.

1. **Heracleum lallii*** C. Norman in *J. B.* 67: 247 (1929); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 186 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 313 (2000).

A perennial pubescent herb up to 2 m. Basal leaves pinnate, 3 paired, leaflets ovate. Umbel few, linear, calyx teeth triangular. Fruit ellipsoid, compressed dorsally. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail on *Rhododendron-Abies* forest.

Voucher specimen: Panchthar, Gairi-Sukhkhadhap (Falaincha), 3640m, Sep. 21, 2007, LKSR-Expedition, D 049 (TUCH).

Distribution: Nepal (West and Central, 3000-4200m).

* Endemic to Nepal

2. **Heracleum sublineare** C. B. Clarke, in *Fl. Brit. Ind.* **2**(6): 713 (1879); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 313 (2000).

Perennial herbs up to 50cm, sparsely hairy to glabrous. Leaves ternate to pinnate with 5-leaflets, leaflets linear-lanceolate, 3-10 x 0.2-0.8cm, sparsely pubescent beneath. Umbel 3-4.5cm across. 5-11 flowers in each umbellules, white to pinkish. Fruit orbicular. **Fl. & Fr.:** Jul.-Oct.

Habitat: along trail on *Rhododendron-Prunus* forest.

Voucher specimen: Panchthar, Phalot-Chiwabhanjyang (Chyangthapu), 3490m, Sep. 18, 2007, LKSR-Expedition, D 004 (TUCH).

Distribution: Nepal (Central, 3600m); Himalaya (Nepal, Sikkim, Arunchal Pradesh).

4. HYDROCOTYLE L.

Hydrocotyle himalaica P. K. Mukh., *Indian Forester* 95: 470 t. 1 (1969); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 186 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 313 (2000). 'Ghodtapre'

Perennial herbs. Leaves petiolate, reniform-orbicular. Flowers in simple umbel, pedicel late, bracteates, greenish. Fruit laterally flattened mericarp, red brown to blackish. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail on *Rhododendron-Lithocarpus* forest.

Voucher specimen: Panchthar, Dabale-Deurali (Chyangthapu), 2700m, Sep. 29, LKSR-Expedition, D 256 (TUCH).

Distribution: Nepal (West, Central, and East, 1500-2500m); Himalaya (Nepal to Bhutan).

5. PLEUROSPERMUM Hoffmann

Pleurospermum apiolens C. B. Clarke, *Fl. Brit. Ind.* 2(6): 705 (1879); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 188 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 316 (2000).

An erect glabrous perennial herbs up to 40cm with aromatic stem when crushed. Leaves mostly basal, pinnate, 10-30 x 3-10cm; pinnae 4-5 pairs, ovate, 1.5-4 x 1.5-3.5cm. Umbel 4-9cm across in flowers, bract lanceolate, mericarp dorsally compressed, narrowly winged. **Fl. & Fr.:** Aug.-Sep.

Habitat: along trail on open grassland.

Voucher specimen: Panchthar, Paharemeghu (Falaincha), 3910m, Sep. 22, 2007, LKSR-Expedition, D 105 (TUCH).

Distribution: Nepal (West, central, and East, 3600-4500m); Himalaya (Nepal, Sikkim).

6. SELINUM L.

Selinum wallichianum (DC.) Raizada and Saxena, *Indian Forester* 92: 323(1966); 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. Umbels many rayed, bracts linear, bracteoles linear-lanceolate. Fruit elliptic to circular, 3-5x2-3mm. **Fl. & Fr.:** Jul.-Sep.

Habitat: along trail on *Rhododendron-Sorbus* forest.

Voucher specimen: Panchthar, Faleke-Betini (Falaincha), 3280m, Sep. 26, 2007, LKSR-Expedition, D 151 (TUCH).

Distribution: Nepal (West, Central, and East, 2700-4800m), Himalaya (Kashmir to Bhutan), China.

7. SINOCARUM H. Wolff.

1. **Sinocarum pulchellum** C. Norman ex M.F. Watson, *Edinb. J. Bot.* 53: 141 (1996); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 317 (2000).

An erect herbs up to 25cm. Leaves 1-4, ovate in outline, 3-10 x 2-6cm, 2-pinnate, leaflets ovate, 1-1.5 x 0.8-1.2cm, 3-lobes. Flowers 8-12 in umbellules, white. Fruit subglobose. **Fl. & Fr.:** Jul. & Aug.

Habitat: along trail on *Rhododendron-Betula* dominating forest.

Voucher specimen: Panchthar, Gairi-Sukhkhadhap (Falaincha), 3640m, Sep. 21, 2007, LKSR-Expedition, D 052 (TUCH).

Distribution: Nepal (East, 3650-4200m); Himalaya (Nepal, Bhutan).

2. **Sinocarum sikkimense** P.K. Mukh. & Constance, *Edinb. J. Bot.* 48: 43 (1991); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 317 (2000).

Herbs up to 40cm with stout stem. Leaves 2-3 pinnate or ternate, linear 0.3-1mm wide, acute, 3-lobes at apex, sheathing petiole broad base. Umbel 4-6cm across, 12-24 flowers in umbellules, white to purple. Fruit oblong-ovoid. **Fl. & Fr.:** Aug.-Sep.

Habitat: along trail on *Abies-Rhododendron* dominating forest.

Voucher specimen: Panchthar, Majortham (Falaincha), 3450m, Sep. 20, 2007, LKSR-Expedition, D 372 (TUCH).

Distribution: Nepal (Central and East, 3000-4000m); Himalaya (Nepal, Bhutan), China (Xizang).

Family 47. **PRIMULACEAE**

PRIMULA L.

1. **Primula glomerata** Pax, *Pflanzenr. (Engler)* **IV-237 (Ht. 22)**: 92 (1905); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 72 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 245 (2000).

Herbs up to 50cm. Leaves narrowly spatulate, 5-12 x 1.0-2.0cm. Peduncle slender, 18-30cm, curved at apex with flower heads held horizontally; bracts clustered below head, blackish purple-deep purple.

Capsule oblong to subglobose included with in calyx. **Fl. & Fr.**: Jul.-Sep.

Habitat: along trail on open grass land.

Voucher specimen: Panchthar, Near Budhipani (Falaincha), 3930m, Sep. 22, 2007, LKSR-Expedition, D 080 (TUCH).

Distribution: Nepal (West, Central and East, 3100-5200m); Himalaya (Nepal, Sikkim, and Bhutan), China (Xizang).

2. **Primula primulina** (Spreng.) H. Hara, *J. Jap. Bot.* **37**: 99 (1962); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 73 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 246 (2000).

Androsace primulina Spreng., *Syst. Veg.* **4(2)**: 57 (1827).

Herbs up to 30cm often forming extensive patch. Leaves forming a basal rosette surrounded by dead leaves, spatulate to oblanceolate, 0.8-1.8 x 0.3-0.5cm. Peduncle slender, 2-7cm with 2-5 sub sessile purplish flowers. Capsule ovoid, as long as calyx. **Fl. & Fr.**: Jul.-Sep.

Habitat: along trail on open grass land.

Voucher specimen: Panchthar, Budhipani (Falaincha), 4050m, Sep. 22, 2007, LKSR-Expedition, D 092 (TUCH).

Distribution: Nepal (West, Central and East, 3400-5500m); Himalaya (Uttar Pradesh to Bhutan), China (Xizang).

Family 48. **SYMPLOCACEAE**

SYMPLOCOS Jacquin

1. **Symplocos glomerata** King ex C. B. Clarke, *Fl. Brit. Ind.* **3(9)**: 577 (1882); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 78 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 306 (2000). 'Kholme'

Evergreen trees up to 10 m, glabrous. Leaves coriaceous, oblong-elliptic, 7-20 x 2-6cm. Flowers white or pale yellow, in axillary fascicles. Fruit cylindrical, 8-10 x 3-5mm. **Fl. & Fr.**: Mar.-Sep.

Habitat: on *Rhododendron-Prunus* forest.

Voucher specimen: Panchthar, Faleke (Falaincha), 3210m, Sep. 26, 2007, LKSR-Expedition, D 168, (TUCH).

Distribution: Nepal (East, 2000-2500m); Himalaya (Nepal to Bhutan), SW China, Myanmar.

2. **Symplocos lucida** (Thunb. ex Murray) Siebold & Zucc., *Fl. Jap.* 1: 55 (1835); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 307 (2000). 'Kharane'

Evergreen trees up to 10 m, terminal buds conspicuous. Leaves thick (yellow when dry), elliptic-lanceolate, 5-15 x 2-5cm. Flowers white or creamy. Fruit ellipsoid, 2 seeded. **Fl. & Fr.**: Apr.-Oct.

Habitat: on *Schima-Castanopsis* forest.

Voucher specimen: Panchthar, Hiwakhola (Prangbung), 1800m, Oct. 01, 2007, LKSR-Expedition, D 341 (TUCH).

Distribution: Nepal (West, Central, and East, 1500-3000m); Myanmar, Thailand, China, Malaysia.

Family 49. **GENTIANACEAE**

1. **CRAWFURDIA** Wall.

Crawfurdia speciosa Wall., *Tent. Fl. Nap.*: 64 (1826); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 93 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 359 (2000).

Twinning perennial, stem terrate, spirally twisted. Leaves membranous, glabrous, elliptic to ovate, 3-10 x 1-5cm. Flowers in axillary or terminal cymes, blue. Fruit ellipsoid. **Fl. & Fr.**: Sep.-Nov.

Habitat: along trail near farming area.

Voucher specimen: Panchthar, Menjuwa (Falaincha), 2190m, Sep. 28, 2007, LKSR-Expedition, D 247 (TUCH).

Distribution: Nepal (East, 2500-2900m); Himalaya (Nepal to Bhutan), NE India, N Myanmar.

2. GENTIANA L.

1. **Gentiana obconica** Ho, *Acta Phytotax. Sin* **23**: 45 (1985); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 115 (2000). 'Tite Jhar'

Decumbent stem to 10cm. Leaves ovate or elliptic, sometimes linear, 0.5-1.5 x 0.2-0.4cm. Flowers solitary, terminal, sessile, dark purple. Plicae triangular, stipe 1.5-3cm. **Fl. & Fr.**: Jul.-Oct.

Habitat: along trail on *Rhododendron-Abies* forest.

Voucher specimen: Panchthar, Phalot-Chiwabhanjyang (Cyangthapu), 3580m, Sep. 18, 2007, LKSR-Expedition, D 002 (TUCH).

Distribution: Nepal (East); Himalaya (Nepal to Bhutan), China (Xizang).

2. **Gentiana sikkimensis** C. B. Clarke, *Fl. Br. Ind.* **4**(10): 114 (1883); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 93 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 115 (2000).

Perennial herbs up to 15cm, stem ridged. Basal leaves in rosettes on non flowering shoots, ovate, 6-12 x 3-6mm; stem leaves ovate or spatulate, 0.5-0.3.0 x 0.5-1.0cm. Flowers in terminal clusters, dull blue, plicae shallowly triangular. Capsule ellipsoid. **Fl. & Fr.**: Aug.-Oct.

Habitat: along trail on *Rhododendron-Abies* forest.

Voucher specimen: Panchthar, Gairi (Falaincha), 3480m, Sep. 21, 2007, LKSR-Expedition, D 045 (TUCH).

Distribution: Nepal (East, 3100-3500m); Himalaya (Nepal to Bhutan), NE India, Myanmar.

3. LOMATOGONIUM A. Braun

Lomatogonium himalayense (Klotzsh) E. Aitken, *Edinburgh J. Bot.* **53**: 87 (1996); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 117 (2000).

An erect annual herb up to 30cm. Leaves ovate, 0.5-2.0 x 0.2-0.8cm, sessile. Flowers in terminal few flowers cymes, light blue, ovary linear, 0.8-1.3 x 0.1-0.2cm. **Fl. & Fr.**: Sep.-Oct.

Habitat: along trail on open alpine meadow.

Voucher specimen: Panchthar, Paharemeghu (Falaincha), 4050m, Sep. 23, 2007, LKSR-Expedition, D 117 (TUCH).

Distribution: Nepal (East, 3500-4400m); Himalaya (Nepal to Bhutan).

4. SWERTIA L.

1. **Swertia angustifolia** Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.*: 127 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 96 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 117 (2000). 'Chirayito'

Annual herbs. Stems quadrangular, winged. Leaves lanceolate to linear, 1.5-5x0.7x3cm, acute, base attenuate. Flowers 4-merous, in panicles. Bracts linear or lanceolate. Corolla elliptic or oblong, 5-8x2-4mm, with pocket-like flap, fimbriate. **Fl. & Fr.**: Sep.-Jan.

Habitat: along trail on *Rhododendron-Betula* forest.

Voucher specimen: Panchthar, Faleke-Gairi (Falaincha), 3580m, Sep. 20, 2007, LKSR-Expedition, D 042 (TUCH).

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

2. *Swertia bimaculata* (Sieb. & Zucc.) C. B. Clarke, *J. Linn. Soc., Bot.* **14**: 449 (1875); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 96 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 118 (2000).

Ophelia bimaculata Sieb. & Zucc., in *Abh. Akad. Wiss. Munchen* **4**(3): 159 (1846).

Annual or biennial herb up to 80cm. Leaves broadly elliptic or ovate, 2.5-12 x 1-4cm. Flowers in panicles made up of corymbs, white or greenish yellow. Capsule ellipsoid. **Fl & Fr.:** Jul.-Oct.

Habitat: near farming area along trail.

Voucher specimen: Panchthar, Tintine (Falaincha), 1900m, Sep. 27, 2007, LKSR-Expedition, D 210 (TUCH).

Distribution: Nepal (East, 900-2700m); Himalaya (Nepal to Bhutan), NE India (Assam, Nagaland), China, Japan.

3. *Swertia chirayita* (Roxb. ex Fleming) H. Karst., *Deutsche Fl.*: 1025(1883); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 96(1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*:118(2000). 'Chirayito'

Gentiana chirayita Roxb. ex Fleming in *As. Res.* **11**: 167(1812).

Annual about 60cm. Stem quadrangular, slightly winged. Leaves ovate or elliptic, 2-6×0.5-2cm, sessile. Flowers 4-merous, in numerous small clusters on branches of panicles with bracts, greenish yellow. Two glands in each lobe of corolla. Capsule ovoid, 4-9×2.5-3mm. **Fl. & Fr.:** Sep.-Nov.

Habitat: along trail near farming area.

Voucher specimen: Panchthar, Menjuwa (Falaincha), 1900m, Sep.28, 2007, LKSR-Expedition, D 244 (LKSR).

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

4. *Swertia cuneata* D. Don, *London Edinb. Philos. Mag. J. Sci.* **8**: 77(1836); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 96(1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 118(2000).

Perennial herbs up to 40cm. Basal leaves whorled, Spathulate or ovate 3-7 x 0.5-1.5cm; stem leaves spatulate or narrowly oblong, 2-4.5 x 0.5-1.5cm. Flowers in a lax panicle of cymes, blue or dull purple. Capsule narrowly ellipsoid. **Fl. & Fr.:** Aug.-Oct.

Habitat: along trail on open meadow.

Voucher specimen: Panchthar, Paharemeghu (Falaincha), 3910m, Sep. 232, 2007, LKSR-Expedition, D 111 (TUCH).

Distribution: Nepal (West, Central and East, 3900-5000m); Himalaya (Uttar Pradesh to Sikkim), NE India, China (Xizang).

5. *Swertia nervosa* (G. Don) C. B. Clarke, *Fl. Bri. Ind.* **4**(10): 125(1883); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 97(1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 118(2000).

Agathotes nervosa G. Don, *Gen. Syst.* **4**: 177 (1837)

Annual herbs up to 60cm. Leaves elliptic to lanceolate, 3-5 x 0.5-1.5cm. Flowers 4-merous in panicles made up of cymes, whitish with purple marking. Capsule ovoid. **Fl. & Fr.:** Aug.-Nov.

Habitat: along trail on Rhododendron forest.

Voucher specimen: Panchthar, Dund (Falaincha), 3820m, Sep. 21, 2007, LKSR-Expedition, D 058 (TUCH).

Distribution: Nepal (West, Central and East, 700-3000m); Himalaya (Himalchal Pradesh to Bhutan), NE India (Assam, Nagaland), W China.

6. *Swertia teres* (G. Don) J. Shah, *Pakistan J. Forest.* **38**(2): 81 (1988); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 119 (2000).

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

Annual or biennial herbs up to 75cm. Leaves ovate, 1.5-4 x 0.5-2.0cm, sessile. Flowers in panicles, white. Capsule ovoid. **Fl. & Fr.**: Aug.-Sep.

Habitat: along trail on *Rhododendron-Betula* forest.

Voucher specimen: Panchthar, Budhipani (Falaincha), 3820, sep. 22, 2007, LKSR-Expedition, D 085 (TUCH).

Distribution: Nepal (West, Central and East, 3000-5000m); Himalaya (Nepal to Bhutan), NE India, China (Xizang).

7. *Swertia wardii** Sm., *Notes Roy. Bot. Gard. Edinburgh* **8**: 122 (1913); Grierson and Long in *Fl. Bh.* **2**(2): 627(1999).

Perennial herb, 50-60cm. Stems unbranched. Leaves: Basal leaves lanceolate, 6-14 x 3-4.5cm, with broad petiole 6-12cm; Stem leaves narrowly elliptical or lanceolate, 9-17 x 2.5-4.5cm. Flowers 5-merous, in elongated panicle of cymes. Calyx tube 1-1.5mm. with short hairs in inner surface of base; lobes elliptical-lanceolate, Capsule ellipsoid, 16 – 20 x 5-7mm. **Fl. & Fr.**: Jul.-Sep.

Habitat: along trail on *Rhododendron* forest.

Voucher specimen: Panchthar, Paharemeghu (Falaincha), 3910m, Sep. 22, 2007, LKSR-Expedition, D 100 (TUCH).

Distribution: Bhutan, Sikkim, E. Nepal

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5. TRIPTEROSPERMUM Blume

Tripterospermum volubile (D. Don) H. Hara, *J. Jap. Bot.* **40**: 21 (1965); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 98 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 119 (2000).

Twining, stem terete, glabrous. Leaves lanceolate to ovate, 2-8x0.5-2.5cm, acuminate, base rounded or cordate, margin denticulate. Petiole 2-10mm. Calyx tube winged. Style bifid. Fruit an ellipsoid red berry, 17-28x7-15mm. **Fl. & Fr.**: Jun.-Oct.

Habitat: along trail on *Rhododendron-Acer* forest.

Voucher specimen: Panchthar, Faleke (Falaincha), 3390m, Sep. 26, 2007, LKSR-Expedition, D 143 (TUCH).

Distribution: Nepal (West, Central, and East, 2000-3200m), Himalaya (Nepal to Bhutan), China (Xizang), Myanmar.

Family 50. ASCLEPIADACEAE

1. CEROPEGIA L.

1. *Ceropegia hookeri* Hook. f., *F. Brit. Ind.* **4**(10): 73 (1883) var. **hookeri**; Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 88 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 18 (2000). ‘*Mirke Laharo*’

Twining climber from a tuberous base. Leaves membranous, lanceolate-ovate, 3-6 x 1-3cm. 1-7 flowers in peduncle of 2-5cm, whitish-green to dark purple, pedicel 3-7mm. **Fl. & Fr.**: Jul.-Sep.

Habitat: along trail near settle area.

Voucher specimen: Panchthar, Maklabu (Falaincha), 2480m, Sep. 27, 2007, LKSR-Expedition, D 182 (TUCH).

Distribution: Nepal (West, Central and East, 2300-3300m); Himalaya (Nepal, Sikkim), China.

2. *Ceropegia pubescens* Wall., *Pl. Asia. Rar.* **2**(8): 81, t. 187 (1831); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 85 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 18 (2000). ‘*Mirke Laharo*’

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. Fruit c6×0.5cm. Seeds ovate-oblong with long coma. **Fl. & Fr.:** Jul.-Sep.

Habitat: along trail near small river.

Voucher specimen: Panchthar, Hiwakhola (Memeng), 1890m, Oct. 01, 2007, LKSR-Expedition, D 340 (TUCH).

Distribution: Nepal (Central and East, 900-2700m), India, Sri-Lanka, Myanmar, E to W & S China.

2. HOYA R. Brown

Hoya longifolia Wall. ex Wight, *Contr. Brit. Ind.:* 36 (1834); Hara *et al.* in *Enum. Fl. Pl. Nep.* 3: 87 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 20 (2000)

Slender to stout stemmed, almost glabrous creeper with long flexuous pendent branches. Leaves narrowly oblanceolate to linear-oblanceolate, 6-16 x 1-3cm, sparse pubescence below. Flowers in umbel, white. Follicles slender and straight. **Fl. & Fr.:** May-Oct.

Habitat: along trail on *Rhododendron-Lithocarpus* forest.

Voucher specimen: Panchthar, Banduke (Sidin), 2840m, Jun. 08, 2007, LKSR-Expedition, A 046 (TUCH).

Distribution: Nepal (Central and East, 1400-2300m); Himalaya (Uttar Pradesh to Bhutan), NE India, Thailand.

Family 51. RUBIACEAE

1. GALIUM L.

1. **Galium hirtiflorum** Req. ex DC., *Prodr.* 4: 600 (1830); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 201 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 274 (2000). ‘Lute jhar’

Scrambling, herbs of 40cm; stem hirsute with thin hairs. Leaves in whorls of 4, thin & membranous, linear-elliptic or linear-lanceolate, 8-20 | 0.5-2mm, and surface hirsute all over. Inflorescence terminal and axillary. Corolla greenish white. Mericarps greyish covered by hooked hairs. **Fl. & Fr.:** Jul.-Sep.

Habitat: along trail on *Rhododendron-Lithocarpus* forest.

Voucher specimen: Panchthar, Banduke (Sidin), 2840m, Jun. 08, 2007, LKSR-Expedition, A 047 (TUCH).

Distribution: Nepal (CE, 1200-2200m), Himalaya (Kashmir to Sikkim).

2. **Galium paradoxum** Maxim., Bull. Acad. Imp. Sci. Saint-Petersbourg 19: 281 (1874); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 201 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 274 (2000).

Procumbent herbs up to 25cm. Leaves petiolate (0.5-1cm), orbicular-ovate or ovate-lanceolate, 1-3 x 0.5-2.0cm. Flowers solitary and axillary, creamy white. Fruit with dense hair. **Fl. & Fr.:** Jun.-Aug.

Habitat: along trail on *Rhododendron-Lithocarpus* forest.

Voucher specimen: Panchthar, Banduke (Sidin), 2840m, Jun. 08, 2007, LKSR-Expedition, A 047 (TUCH).

Distribution: Nepal (West and Central, 2500-3800m); Himalaya (Nepal, Sikkim), China, Korea.

2. HEDYOTIS L

Hedyotis scandens Roxb., *Fl. Ind. (Ruxburgh)* 1: 369 (1820); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 202 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 275 (2000). ‘Pinase lahara / boksi lahara’

Climbing shrub up to 3m. Leaves opposite or in whorl of 3, elliptic-lanceolate, 4-15 x 2-5cm. Flowers in terminal, trichotomously branched panicle, white, sweet scented. **Fl. & Fr.:** Sep.-Apr.

Habitat: along trail near settle area.

Voucher specimen: Panchthar, Betini (Falaincha), 2390m, Sep. 28, 2007, LKSR-Expedition, D 221 (TUCH).

Distribution: Nepal (Central and East, 400-1800m); Himalaya (Nepal to Bhutan), NE India.

3. LUCULIA Sweet.

Luculia gratissima (Wall.) Sweet, *Br. Fl. Gard.* **2:** t. 145 (1826); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2:** 204 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 276 (2000). 'Ban kangiyō'
Cinchona gratissima Wall. in Roxb., *Fl. Ind.* **2:** 154 (1824).

Shrubs. Leaves stipulate, elliptic lanceolate 5-16cm x 1.5-8cm. Inflorescence terminal many flowered corymbs. Flowers 2cm across, pink. Capsule 1-1.2cm long, pubescent. **Fl. & Fr.:** Apr.-Oct.

Habitat: along trail near settle area.

Voucher specimen: Panchthar, Betini (Falaincha), 1570m, Sep. 26, 2007, LKSR-Expedition, D 153 (TUCH).

Distribution: Nepal (West, Central, and East, 1000-2100m); Himalaya (Nepal to Assam), China.

4. RUBIA L.

1. **Rubia hispida** Long., *Edinburgh. J. Bot.* **53:** 109 (1996); Grierson and Long in *Fl. Bhu.* **2(2):** 825 (1999)

Climbing herb to 3 m, reddish-tinged throughout especially when dry. Stems quadrangular, weak with prickles and hispid hairs. Leaves in whorl of 4, weakly reddish-tinged, 5-11 x 3-7cm, hispid on both surface, petioles 3-10cm. Flowers 5-merous, 5-6mm across, red or orange in color, pedicel 3.5mm. Corolla tube 0.5-6mm, lobes sparsely hispid outside. Fruit black when ripe. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail on *Lithocarpus-Acer* forest.

Voucher specimen: Panchthar, Narelung (Memeng), 2450m, Sep. 29, 2007, LKSR-Expedition, D 279 (TUCH).

Distribution: Bhutan, Darjeeling, Sikkim, E Nepal

*New record to "Flora of Nepal"

2. **Rubia wallichiana** Decne., *Rech. Garance:* 61 (1837); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3:** 207 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 278 (2000).

Climbing herbs to 3m, stems with hooked prickles. Leaves lanceolate-ovate 3-7.5 x 1.5-4cm. Greenish yellow flowers in axillary and terminal panicle. Fruit black when ripe, bilobed-globose. **Fl. & Fr.:** Apr.-Sep.

Habitat: along trail on *Acer-Rhododendron* forest.

Voucher specimen: Panchthar, Faleke (Falaincha), 3210m, Sep. 26, 2007, LKSR-Expedition, D 148 (TUCH).

Distribution: Nepal (West, Central, and East, 1500-3200m); Himalaya (Punjab to Bhutan), India.

Family 52. CUSCUTACEAE

CUSCUTA L.

Cuscuta reflexa Roxb. var. **brachystigma** Engelm. in *Tr. Acad. Sci. St. Louis* **1:** 519 (1859); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3:** 106 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 73 (2000). 'Akaseveli'

Stem light brown, twining herbs, branched. Inflorescence a short lax racemes. Calyx lobes 5, ovate-obtuse, c4 | 2mm. Corolla creamy white. Capsule globose-conical. **Fl. & Fr.:** Feb.-Oct.

Habitat: parasites on *Luculia gratissima*.

Voucher specimen: Panchthar, Memeng (Memeng), 2860m, Sep. 30, 2007, LKSR-Expedition, D 297 (TUCH).

Distribution: Nepal (Central and East, 200-2200m).

Family 53. BORAGINACEAE

1. HACKELIA Opiz.

Hackelia uncinata (Royle ex Benth.) C.E. C. Fisch., *Kew Bull.* 1932: 298 (1932); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 100 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 30(2000).

Cynoglossum uncinatum Royle ex Benth. in Royle, *III. B. Him.*: 304 (1836).

An erect herb up to 70cm, weakly pilose to sub glabrous below. Radical leaves with long petiole; cauline leaves with short petiole, densely hairy on lamina. Flowers in terminal or lateral inflorescence, pale blue. Nutlets 4mm. **Fl. & Fr.**: Jun.-Sep.

Habitat: along trail on *Rhododendron* shrubby area.

Voucher specimen: Panchthar, Paharemeghu (Falaincha), 3910m, Sep. 22, 2007, LKSR-Expedition, D 095 (TUCH).

Distribution: Nepal (West, Central and East, 2700-4200m); Himalaya (Kashmir to Bhutan), NE India, China (Xizang, Yunnan).

2. MICROULA Benth.

Microula pustulosa (C. B. Clarke) Duthie, *Kew Bull.* 1912: 39 (1912); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 102 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 31 (2000).

Eritrichium pustulosa C. B. Clarke in *Fl. Brit. Ind.* **4**: 164 (1833)

Weak perennial herbs. Basal leaves few; cauline leaves shortly petiolate, upper almost sessile, lamina elliptic to obovate, 1-3 x 0.5-1cm. Flowers axillary and in a few flowered terminal inflorescence, dark blue. Nutlets pale brown, ovoid. **Fl. & Fr.**: May-Sep.

Habitat: along trail on *Lithocarpus-Rhododendron* forest.

Voucher specimen: Panchthar, Jamle (Sidin), 2870m, Jun. 08, 2007, LKSR-Expedition, B 011 (TUCH).

Distribution: Nepal (West and Central, 3800-4700m); Himalaya (Uttar Pradesh to Bhutan), W China .

Family 54. LAMIACEAE (Labiatae)

1. CLINOPODIUM L.

Clinopodium umbrosum (M. Bieb.) C. Koch, *Linnaea*. **21**: 673 (1848); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 150 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 152(2000).

Melissa umbrosa M. Beeb., *Fl. Taur.-Cauc.* **2**: 63 (1808)

Ascending herbs about 30cm, pubescent. Leaves ovate, 1.5-4.5 | 0.5-3cm, acute, base rounded to broadly cuneate, margin serrate, sparsely pilose. Petioles 3-12mm. Corolla pink, 7-8mm. Stamens 4, didynamous. Style bifid. Nutlets ellipsoid, pale brown. **Fl. & Fr.**: May-Sep.

Habitat: along trail near settle area.

Voucher specimen: Panchthar, Narelung (Memeng), 2010m, Sep. 29, 2007, LKSR-Expedition, D 274 (TUCH).

Distribution: Nepal (West, Central, and East, 180-3400m), Iran, Afghanistan, Pakistan, Himalaya (Kashmir to Bhutan), Burma, China, Taiwan, Malaysia.

2. COLQUHOUNIA Wall.

Colquhounia coccinea Wall., *Tr. Linn. S. London* **13**: 609 (1822) var. **coccinea**; Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 151 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 152(2000).

Small shrub about 2m, tomentose. Leaves ovate-elliptic, 2.5-9 | 1.5-4cm, margins serrulate or crenulated, both surface hairy, lower surface whitish. Petiole 1-3cm. Fruit nutlets. **Fl. & Fr.**: Sep.-Jan.

Habitat: along trail near settle area.

Voucher specimen: Panchthar, Maklabu (Falaincha), 2390m, Sep. 27, 2007, LKSR-Expedition, D 181 (TUCH).

Distribution: Nepal (West, Central and East, 1200-4200m), Himalaya (Uttar Pradesh to Bhutan), SW China.

3. DRACOCEPHALUM L.

Dracocephalum wallichii Sealy, *Bot. Mag.* **144**: sub t. 9657 (1944); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 152 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 152 (2000).

Herbs up to 60cm. Leaves usually radical, ovate, 3.5-8.5 x 2.5-5cm. Inflorescence spike, flower purple or dark blue-violet. Nutlets 4.5-2mm. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail on *Lithocarpus-Rhododendron* forest.

Voucher specimen: Panchthar, Paharemeghu (Falaincha), 3210m, Sep. 23, 2007, LKSR-Expedition, D 109 (TUCH).

Distribution: Nepal (West, Central, and East, 3000-5000m); Himalaya (Uttar Pradesh to Bhutan).

4. ELSHOLTZIA Willdenow

1. **Elsholtzia blanda** (Benth.) Benth., *Labiata. Gen. Spec.* **2**(3): 162 (1833); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 152 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 152 (2000).

Aphanochilus blandus Benth. in Wall., *Pl. As. Rar.* **1**: 29 (1830).

Herbs up to 1 m. Leaves linear to linear lanceolate, 4-13 x 1-3cm, margin serrate, petiole up to 2cm. Spikes slender, flowers white. Nutlets ellipsoid, 0.8-0.5mm. **Fl. & Fr.:** Sep.-Dec.

Habitat: along trail near settle area.

Voucher specimen: Panchthar, Maklabu (Falaincha), 2390m, Sep. 27, 2007, LKSR-Expedition, D 189 (TUCH).

Distribution: Nepal (West, Central, and East, 300-2000m); Himalaya (Nepal to Bhutan), NE India, Bangladesh, China (Yunnan), Indo-China, Malaysia.

2. **Elsholtzia fruticosa** (D. Don) Rehder, *Pl. Wilson.* **3**: 381 (1916) var. **fruticosa**; Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 153 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 153 (2000).

Perilla fruticosa 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, 5mm. Corolla creamy. Nutlets oblong. **Fl. & Fr.:** Aug.-Sep.

Habitat: along trail near farming area.

Voucher specimen: Panchthar, Faleke-Betini (Falaincha), 1950m, Sep. 26, 2007, LKSR-Expedition, D 175 (TUCH).

Distribution: Nepal (West, Central, and East, 1800-4200m), Punjab, Himalaya (Kashmir to Bhutan), India, Myanmar, China.

3. **Elsholtzia strobilifera** Benth., *Lab. Gen. Spec.* **2**(3): 163 (1833); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 153 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 153 (2000). 'Alainchijhar'

Small hairy herb, 10-35cm. Leaves ovate 1-3cm x 0.9-1.3cm, crenate or serrate, gland dotted beneath. Flowers in cylindrical spike, bracteate, purple. **Fl. & Fr.:** Sep.-Dec.

Habitat: along trail on *Rhododendron-Abies* forest.

Voucher specimen: Panchthar, Paharemeghu (Falaincha), 3210m, Sep. 23, 2007, LKSR-Expedition, D 91 (TUCH).

Distribution: Nepal (West, Central, and East, 1900-4800m); Himalaya (Kashmir to Bhutan), Myanmar, China.

5. **ISODON** (Bentham) Spach

Isodon lophanthoides H. Hara, *J. Jap. Bot.* **60**(8): 235 (1985) var. **lophanthoides**; Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 154 (2000).

Perennial herbs of 30-60cm with white tomentose stem. Leaves ovate, 1-5 | 0.5-2.5cm, base truncate to cuneate, margin crenate to crenate-serrate, hairy and numerous dark red sessile glands on lower surface. Flowers purple. Nutlets oblong-ellipsoid. **Fl. & Fr.:** Sep.-Nov.

Habitat: along trail on *Lithocarpus-Lyonia* dominating forest.

Voucher specimen: Panchthar, Narelung (Memeng), 2550m, Sep. 29, 2007, LKSR-Expedition, D 288 (TUCH).

Distribution: Nepal (West, Central, and East, 1300-2700), Himalaya (Kashmir to Bhutan), NE India, China.

6. **LEUCAS** R. Brown

1. **Leucas ciliata** Benth., *Pl. Asiat. Rar.* **1**(3): 61 (1830); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 156 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 155 (2000).

Annual herb. Leaves lanceolate, 4.5-12.5 x 2-3.5cm, margin serrate. Verticillasters usually only 3 on branches. Flowers white. Nutlets 2.5 x 1.5cm. **Fl. & Fr.:** Jun.-Oct.

Habitat: along trail near farming area.

Voucher specimen: Panchthar, Chamling danda (Chyangthapu), 2010m, Sep. 28, 2007, LKSR-Expedition, D 235 (TUCH).

Distribution: Nepal (Central and East, 1200-2300m); Himalaya (Nepal to Bhutan), India, Myanmar.

2. **Leucas mollissima** Wall. ex Benth., *Pl. Asiat. Rar.* **1**(3): 62 (1830) var. **mollissima**; Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 157 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 155 (2000).

Perennial herbs. Leaves ovate-oblong, 3.5-6 x 1.5-2.5cm. Verticillasters distant, in leaf axils. Flowers white. Nutlets 2 x 1.5mm. **Fl. & Fr.:** Sep.-Dec.

Habitat: along trail near settle area.

Voucher specimen: Panchthar, Bichgaun (Memeng), 1990m, Sep. 30m, 2007, LKSR-Expedition, D 315 (TUCH)

Distribution: Nepal (West, Central, and East, 500-2400m); Himalaya (Kashmir to Bhutan), India, Sri Lanka, China, Myanmar.

Family 55. **SCROPHULARTACEAE**

1. **CALCEOLARIA** L.

Calceolaria gracilis Kunth, *Nov. Gen. Sp. [Kunth]* **2**: 339 (1818); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 113 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 292 (2000).

Erect to decumbent herbs up to 60cm, sparsely short glandular, pilose. Leaves petiolate, 2-4cm, broadly ovate, 3-10 x 2-7cm. Terminal flowers with deep yellow capsule broadly conical or subglobose, 0.5-1cm. **Fl. & Fr.:** Apr.-Nov.

Habitat: along trail on *Acer-Rhododendron* forest.

Voucher specimen: Panchthar, Faleke (Falaincha), 3210m, Sep. 26, 2007, LKSR-Expedition, D 170, (TUCH).

Distribution: Nepal (East, 1500-2600m), Mexico, naturalized in Nepal, India and Malaysia.

2. **LINDENBERGIA** Lehmann

Lindenbergia grandiflora (Buch.-Ham. ex D. Don) Benth., *Scroph. Ind.*: 22 (1835); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 115 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 293 (2000).

Perennial herbs or small shrubs up to 2.5 m. Leaves elliptic-ovate, 5-12 x 2.5-7.5cm. Flowers in axillary raceme, golden yellow. Capsule ovoid, 0.3-0.5cm, hairy. **Fl. & Fr.**: Aug.-Apr.

Habitat: along trail near farming area.

Voucher specimen: Panchthar, Tintine (Falaincha), 1900m, Sep. 27, 2007, LKSR-Expedition, D 202 (TUCH).

Distribution: Nepal (West, Central, and East, 700-2400m); Himalaya (Uttar Pradesh to Bhutan), NE India, Myanmar, W China.

3. MAZUS Loureiro

Mazus surculosus D. Don, *Prodr. Fl. Nep.*: 87 (1825), Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 118 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 295 (2000).

Perennial, stoloniferous, decumbent up to 10cm, eglandular-pubescent below and glandular-pubescent above. Leaves all basal, 1-5 × 0.5-3cm, both surface hairy and with sessile glands. Inflorescence secund. Bracts linear. Flower white. Capsule ovoid to subglobose. **Fl. & Fr.**: Apr.-Sep.

Habitat: along trail on *Lithocarpus-Acer* forest.

Voucher specimen: Panchthar, Goruwale (Sidin), 2810m, Jun. 07, 2007, LKSR-Expedition, A 034 (TUCH).

Distribution: Nepal (West, Central, and East, 900-3000m), Himalaya (Kashmir to Bhutan) NE India, W China.

4. MIMULUS Adanson

Mimulus tenellus var. **nepalensis** (Benth.) Tsoong ex Yang, *Fl. Reipubl. Popularis Sin.* **67**(2): 171 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 295 (2000).

Diffusely branched perennial herbs up to 25cm, leaves ovate-oblong, 0.5-2.0 x 0.5-1.0cm. Flowers solitary, axillary, yellow. Capsule narrowly ellipsoid. **Fl. & Fr.**: Mar.-Sep.

Habitat: along trail near settle area.

Voucher specimen: Panchthar, Tintine (Falaincha), 1900m, Sep. 27, 2007, LKSR-Expedition, D 206 (TUCH).

Distribution: Nepal (Central and East, 1100-2300m); Himalaya (Nepal to Bhutan), China, Japan.

5. NEOPICRORHIZA Hong.

Neopicrorhiza scropulariiflora (Pennell) Hong, *Opera Bot.* **75**: 56 (1984); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 295 (2000). '*Kutki*'

Perennial rhizomatous herbs. Leaves basal, oblanceolate or narrowly spatulate, 2-6 x 1-2cm. Flowers in terminal spike, violate-purple. Capsule ovoid-acuminate, 1-1.5cm. **Fl. & Fr.**: May-Sep.

Habitat: on open alpine meadow.

Voucher specimen: Panchthar, Timbupokhari (Falaincha), 4340, Sep. 23, 2007, LKSR-Expedition, D 134 (TUCH).

Distribution: Nepal (West, Central, and East, 3500-4800m); Himalaya (Uttar Pradesh to Bhutan), N Myanmar, China (Xizang, Yunnan, Sichuan).

6. PEDICULARIS L

1. **Pedicularis furfuracea** Wall. ex Benth., *Scroph. Ind.*: 54 (1835); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 296 (2000).

Perennial herbs up to 60cm with fusiform roots. Radical leaves small and withering. Cauline leaves alternate, pilose on upper surface, lamina ovate triangular, 2-7 x 1-5cm, pinnatifid, oblong-ovate, serrate. Flowers solitary, pale purplish to pink. Capsule lanceolate. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail on *Rhododendron-Sorbus* forest.

Voucher specimen: Panchthar, Gairi (Falaincha), 3530m, Sep. 21, 2007, LKSR-Expedition, D 048 (TUCH).

Distribution: Nepal (Central and East, 2800-4100m); Himalaya (Nepal to Bhutan), NE India

2. ***Pedicularis gracilis*** Wall. ex Benth., *Scroph. Ind.*: 52 (1835); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 123 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 296 (2000).

Annual herbs up to 1m. Leaves opposite or in whorls of 4, petiole up to 1.5cm, lamina lanceolate-oblong 1.5-4 x 0.5-2cm, pinatifid, 4-8 pairs of oblong-linear. Inflorescence of a lax terminal raceme of 4-10 flowers, corolla pink or rose. Capsule ovate-oblong, 0.5-1 x 0.3-0.5. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail on *Rhododendron-Sorbus* forest.

Voucher specimen: Panchthar, Gairi-Sukkhkhadhap (Falaincha), 3640m, Sep. 21, 2007, LKSR-Expedition, D 051 (TUCH).

Distribution: Nepal (West, Central, and East, 2200-3800m); Himalaya (Kashmir to Bhutan), China.

3. ***Pedicularis megalantha*** D. Don, *Prodr. Fl. Nep.*: 94 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 124 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 297 (2000).

Perennial herbs up to 90cm. Leaves alternate, lamina ovate or ovate triangular, 2-7 x 1-5cm, pinnatifid. Flowers solitary axillary, pale purplish to pink. Capsule lanceolate. **Fl. & Fr.:** Jun.-Sep.

Habitat: along trail on open pasture.

Voucherspecimen: Panchthar, Dund (Falaincha), 3820m, Sep. 21, 2007, LKSR-Expedition, D 066 (TUCH)

Distribution: Nepal (Central and East, 2800-4300m); Himalaya (Nepal to Bhutan), China (Xizang).

4. ***Pedicularis siphonantha*** D. Don, *Prodr. Fl. Nep.*: 95 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 125 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 299 (2000).

Perennial herbs up to 35cm. Leaves alternate, mostly radical, petiole 1.5-4.5cm, lamina linear-oblong, 1-4 x 0.2-1.5cm, pinnatifid, 5-8 pairs, ovate. Inflorescence axillary. Flowers rose-purple or pink with white throat. Capsule lanceolate ellipsoid. **Fl. & Fr.:** May-Sep.

Habitat: along trail on open grass land.

Voucher specimen: Panchthar, Paharemeghu (Falaincha), 4050m, Sep. 23, 2007, LKSR-Expedition, D 122 (TUCH).

Distribution: Nepal (West, Central, and East, 3000-4400m); Himalaya (Nepal to Bhutan), W China.

7. TORENIA L.

Torenia violacea (Azaola ex Blanco) Pennell, *J. Arnold Arbor.* **24**: 255 (1943); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 127 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 300 (2000).

Mimulus violacea Azaola ex Blanco, *Fl. Phillip.* ed. **2**: 357 (1845).

An erect or prostrate annual herbs up to 45cm. Leaves ovate, 1-3 x 0.5-2cm. Flowers solitary and axillary, violet. Capsule narrowly lanceolate-ellipsoid, 0.5-1.0 x 0.2-0.3cm. **Fl. & Fr.:** Apr.-Nov.

Habitat: along train near farming and settle area.

Voucher specimen: Panchthar, Tintine (Falaincha), 1900m, Sep. 27, 2007, LKSR-Expedition, D 207 (TUCH).

Distribution: Nepal (West Central, and East, 400-1800m); Himalaya (Kashmir to Bhutan); China (Xizang), NE India, N Myanmar, Malaysia.

7. VERONICA L.

Veronica szechuanensis subsp. **sikkimensis** (Hook. f.) Hong in Tsoong & Hong, *Fl. Republ. Popularis Sin.* **67**(2): 304 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 301 (2000).

Perennial herbs up to 25cm, pubescent or villosus. Leaves opposite, 3-4 pairs, ovate 0.5-2.5 x 0.4-2.0cm. Inflorescence umbel like. Flower pale blue. Capsule obcordate. **Fl. & Fr.**: Jun.-Sep.

Habitat: along trail on *Rhododendron-Abies* forest.

Voucher specimen: Panchthar, Dhupi (Sidin), 3340m, Jun. 09, 2007, LKSR-Expedition, A 062 (TUCH).

Distribution: Nepal (West, Central, and East, 3600-4500m); Himalaya (Nepal to Bhutan), China.

Family 56. ACANTHACEAE

1. JUSTICIA L.

Justicia procumbens L. var. **simplex** (D. Don) Yamazaki in *Fl. E. Him.*: 30 2(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 c3-3.6x1.5-2cm Leaf margin entire, apex acute, base cuneate. Inflorescence axillary terminal spikes. Flower white tinged with pink spots. Fruit capsule. **Fl. & Fr.**: Mar.-Sep.

Habitat: along trail near settle area.

Voucher specimen: Panchthar, Memeng (Memeng), 2010m, Sep. 30, 2007, LKSR-Expedition, D 293 (TUCH).

Distribution: Nepal (West, Central, and East, 700-2500m), E Africa, Himalaya, India, Sri-Lanka, Myanmar, Thailand, Malaysia.

2. STROBILANTHES Blume

Strobilanthes capitata (Nees.) T. Anders., *J. Linn. Soc. Bot.* **9**: 475 (1867); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 3 (2000).

Shrubs. Leaves unequal, ovate 8-12cm x 4-6.5cm, dentate, dorsally slightly hairy except vein, ventrally hairy on vein area only. Peduncle smooth, flowers in simple pedunculate axillary heads. Calyx glandular hairy. Capsule, 1-1.5cm. **Fl. & Fr.**: Sep.-Feb.

Habitat: along trail near farming and settle area.

Voucher specimen: Panchthar, Narelung (Memeng), 2390m, Sep. 29, 2007, LKSR-Expedition, D 287 (TUCH).

Distribution: Nepal (Central and East, 200-2000m), Himalaya (Nepal to Bhutan), NE India Manipur, Meghalaya, Nagaland, W Bengal, China (Xizang), Myanmar.

3. THUNBERGIA Retz.

Thunbergia coccinea Wall. ex D. Don, *Prodr. Fl. Nep.*: 120 (1825); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 5 (2000). '*Kanaselahara*'

Climbers. Leaves petioled, elliptic, truncate or cordate, acuminate. Flowers in long drooping racemes, 2.5-3cm x 2.5cm, bract subpersistent, red. **Fl. & Fr.**: Dec.-Jan.

Habitat: along trail near settle area.

Voucher specimen: Panchthar, Tintine (Falaincha), 1900m, Sep. 27, 2007, LKSR-Expedition, D 208 (TUCH).

Distribution: Nepal (West, Central, and East, 300-2000m); Himalaya (Utter Pradesh to Bhutan), NE India, Myanmar, Indo-China, W. China.

Family 57. GESNERIACEAE

1. AESCHYNANTHUS Jack

Aeschynanthus hookeri CB Clarke, *Monogr. Phan.* **5**: 21 (1982); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 133 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 120(2000).

Shrub laxly branched up to 1m, slender, pendent. Leaves opposite, fleshy, elliptic, 6-12 x 1.5-2.5cm. Peduncle terminal with many flowers, bright scarlet or orange scarlet, throat yellow. Capsule long-linear. **Fl. & Fr.**: May-Oct.

Habitat: along trail near streams on steepy hill.

Voucher specimen: Panchthar, Hiwakhola (Prangbung), 2480m, Oct. 01, 2007, LKSR-Expedition, D 336 (TUCH).

Distribution: Nepal (East, 1600-2700m); Himalaya (Nepal to Arunchal Pradesh), NE India, N Myanmar, W China.

2. CORALLODISCUS Batalin

Corallodiscus lanuginosus (Wall. ex DC.) Burt, *G. Chron. Ser.* **3**, **122**: 212 (1947); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 134 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 120 (2000).

Didymocarpus lanuginosus Wall. ex DC., in *Prodr.* **9**: 268 (1845).

Herbs. Leaves broadly rhomboid, 3-7x2-4cm, apex obtuse, base cuneate, margin entire, hairy. Petiole 2-3cm long. Peduncles c3cm long. Corolla tube violet-blue. Fruit a capsule. **Fl. & Fr.**: May-Sep.

Habitat: along trail near settle and farming area.

Voucher specimen: Panchthar, Tintine (Falaincha), 1570m, Sep. 27, 2007, LKSR-Expedition, D 179 (TUCH).

Distribution: Nepal (West, Central, and East, 1000-3400m), Himalaya (Uttar Pradesh to Bhutan), NE India (Meghalaya).

Family 58. PLANTAGINACEAE

1. PLANTAGO L.

1. Plantago erosa Wall. in Roxb., *Fl. Ind.* **1**: 423 (1820); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 235(2000). 'Isabgol'

Herbs about 15cm. Leaves simple, elliptic, 3-6x1-3.5cm, subacute, attenuate base, subentire. Petioles 1-2cm. Inflorescence spike. Flowers subsessile. Bracts ovate, concave, acute. Corolla whitish green. Fruit a capsule. **Fl. & Fr.**: Mar.-Aug

Habitat: along trail near crop land.

Voucher specimen: Panchthar, Prangbung (Prangbung), 1890m, Oct. 02, 2007, LKSR-Expedition, D 363 (TUCH).

Distribution: Nepal (West, Central, and East, 900-4100m), India, Ceylon, Himalaya (Kumaun to Bhutan), Assam, Burma, S E Tibet, W China.

Family 59. CAPRIFOLIACEAE

1. LONICERA L.

1. Lonicera angustifolia Wall. ex DC., *Prodr.* **4**: 337 (1830); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 195 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 37 (2000).

Shrubs up to 4 m. Leaves oblong to lanceolate, 1.5-4 x 0.5-1.5cm, silvery beneath, leaving leaf scar. Flowers in 1-2.5cm, peduncle white, pale pink color. Fruit red, connate, 4-5mm. **Fl. & Fr.**: May-Sep.

Habitat: along trail on open area.

Voucher specimen: Panchthar, Gorkhepani (Memeng), 3370m, Jun. 12, 2007, LKSR-Expedition, B 062 (TUCH).

Distribution: Nepal (West, Central, and East, 2600-3800m); Himalaya (Kashmir to Bhutan), NE India, China (Xizang).

2. **Lonicera cyanocarpa** var. **prophyrantha** C. Marquand & Airy Shaw in C. Marquand, *J. Linn. Soc., Bot.* **48** (321): 187 (1929); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 195(1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 38 (2000).

Shrub up to 1 m. Leaves elliptic, 1.5-3.5 x 0.5-1.5cm, scabrous above, strigose beneath. Flowers creamy yellow. Fruit free, black with whitish bloom. **Fl. & Fr.**: Jun.-Sep.

Habitat: along trail on open pasture.

Voucher specimen: Panchthar, Paharemeghu (Falaincha), 3910m, Sep. 22, 2007, LKSR-Expedition, D 102 (TUCH).

Distribution: Nepal (East, 3600-4200); Himalaya (Nepal to Bhutan), China (Xizang).

Family 60. **SAMBUCACEAE**

VIBURNUM L.

1. **Viburnum mullaha** Buch.-Ham. ex D. Don var. **mullaha**, *Prodr. Fl. Nep.*: 141 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 199 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 284 (2000). 'Asare'

Deciduous shrub up to 5 m. Leaves ovate, 4.5-12 x 3.5-9.5cm, entire to crenulate-dentate. Flowers in umbelliform corymbs, whitish pink. Drupe oblong-ellipsoid, black. **Fl. & Fr.**: Jul.-Oct.

Habitat: on *Castanopsis-Quercus* forest.

Voucher specimen: Panchthar, Hiwakhola (Memeng), 2120m, Oct. 01, 2007, LKSR-Expedition, D 327, (TUCH).

Distribution: Nepal (West, Central, and East, 1800-2700m); Himalaya (Kashmir to Himalchal Pradesh), NE India, Indo-China.

2. **Viburnum nervosum** D. Don, *Prodr. Fl. Nep.*: 141(1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 199 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 284 (2000).

Shrubs up to 2.5 m. Leaves ovate, 4.5-13 x 2.5-6.5cm, venation prominent on lower surface. Flowers in sessile corymbs, white. Drupe ellipsoid, 7-9 x 4-5mm, purplish. **Fl. & Fr.**: Apr.-Sep.

Habitat: on *Rhododendron-Sorbus* forest.

Voucher specimen: Panchthar, Gairi (Falaincha), 3480m, Sep. 21, 2007, LKSR-Expedition, D 036 (TUCH).

Distribution: Nepal (West, Central, and East, 2600-3500m); Himalaya (Uttar Pradesh to Bhutan), NE India, N Myanmar, W China.

Family 61. **VALERIANACEAE**

1. NARDOSTACHYS DC

Nardostachys grandiflora DC., *Prodr.* 4: 624 (1830); Hara *et al.* in *Enum. Fl. Pl. Nep.* **2**: 209 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 323 (2000). 'Jatamansi'

Highly aromatic perennial herbs up to 40cm with rhizome surrounded by fibrous remains of leaf base.

Basal leaves linear or narrowly spathulate, 8-35 x 1-4.5cm, cauline leaves narrowly ovate to oblong, 2-5 x 0.5-1.5cm. Flowers in heads, pink to purple. Achene 5 x 2.5mm. **Fl. & Fr.**: Jun.-Sep.

Habitat: along trail on *Rhododendron* shrubby area.

Voucher specimen: Panchthar, Near Budhipani (Falaincha), 3930m, Sep. 22, 2007, LKSR-Expedition, D 087 (TUCH).

Distribution: Nepal (West, Central, and East, 3200-5000m); Himalaya (Uttar Pradesh to Bhutan).

2. VALERIANA L.

Valeriana hardwickii Wall. in Roxb., *Fl. Ind.* 1: 166 (1826); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 209 (1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 323 (2000). ‘*Nakali Jatamansi*’

An erect herb up to 1m. Rootstock slightly thickened, fibrous. Radical leaves soon disappearing; Cauline leaves pinnate, pinnules lanceolate. White flowers in axillary, stalked compound corymbs forming a long terminal panicle. Fruit oblong, lanceolate. **Fl. & Fr.**: Jun.-Sep.

Habitat: along trail near farming area.

Voucher specimen: Panchthar, Dabale Bhanjyang (Memeng), 2500m, Sep. 29, LKSR-Expedition, D 267 (TUCH).

Distribution: Nepal (West, Central, and East, 1200-4000m); Himalaya (Kashmir to Bhutan), NE India, N Myanmar, E to W China, Sumatra, Java.

Family 62. DIPSACACEAE

MORINA L.

Morina nepalensis D. Don, *Prodr. Fl. Nep.*: 161(1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* 2: 210(1979); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 99(2000).

Herbs, flowering stem up to 60cm. Basal and mid cauline leaves linear or linear lanceolate, 4-25 x 0.5-1.5cm; cauline leaves narrowly ovate, glabrous or with hairs on margin, margin always spiny. Flowers pink to rosy purple. Fruit oblong 4.5x2.5mm. **Fl. & Fr.**: May-Sep.

Habitat: along trail on *Rhododendron-Abies* forest.

Voucher specimen: Panchthar, Chiwabhanjyang-Major (Falaincha), 3530m, Sep. 19, 2007, LKSR-Expedition, D 015 (TUCH).

Distribution: Nepal (West, Central, and East, 3000-4500m); Himalaya (Nepal to Bhutan), NE India, N Myanmar, W China.

Family 63. CAMPANULACEAE

1. CODONOPSIS Wall.

1. **Codonopsis thalictrifolia** Wall., *Fl. Ind. (Roxburgh)* ed. 2, 2: 106 (1824); Hara *et al.* in *Enum. Fl. Pl. Nep.* 3: 58 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 34(2000).

An erect herbs up to 40cm. Leaves on lateral branching, sub opposite, ovate to reniform, 0.2-0.5 x 0.2-0.5cm. Flowers blue. Fruit 1.2-1.8cm, hemispherical with 0.5-1.0 beak. **Fl. & Fr.**: Aug.-Sep.

Habitat: along trail on *Rhododendron-Sorbus* forest.

Voucher specimen: Panchthar, Sukkhadhap-Dund (Falaincha), 3680m, Sep. 21, 2007, LKSR-Expedition, D 054 (TUCH).

Distribution: Nepal (Central and East, 3300-4800m); Himalaya (Nepal, Sikkim), China (Xizang).

2. **Codonopsis viridis** Wall., *Fl. Ind. (Roxburgh)* ed. 2, 2: 103 (1824); Hara *et al.* in *Enum. Fl. Pl. Nep.* 3: 51 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 34 (2000).

A twining herbs. Leaves ovate, 2.5-5.5 x 1.5-3.5cm, pubescent-tomentose below, entire. Flowers cream to greenish yellow. Fruit 2cm, hemispherical, with 0.7mm beak. **Fl. & Fr.**: Aug.-Sep.

Habitat: along trail near farming and settle area.

Voucher specimen: Panchthar, Chamlingdanda (Chyangthapu), 1790m, Sep. 28, 2007, LKSR-Expedition, D 230 (TUCH).

Distribution: Nepal (West, Central, and East, 1200-3000m); Himalaya (Uttar Pradesh to Bhutan), NE India.

2. CYANANTHUS Benth.

1. **Cyananthus hookeri** C. B. Clarke, *Fl. Br. Ind.* **3**(8): 435 (1881); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 51 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 34 (2000).

Annual herbs up to 30cm. Leaves ovate or semicircular, 0.5-1.0 x 0.3-0.5cm. Flowers solitary at apex, calyx not inflated with brown or white villous, corolla blue. **Fl. & Fr.**: Aug.-Oct.

Habitat: along trail on *Rhododendron* forest.

Voucher specimen: Panchthar, Phalot-Chiwabhanjyang (Cyangthapu), 3580m, Sep. 18, 2007, LKSR-Expedition, D 001 (TUCH).

Distribution: Nepal (West, Central, and East, 2600-4200m); Himalaya (Nepal to Bhutan), W China

2. **Cyananthus inflatus** Hook. f. & Thomson, *J. Linn. Soc., Bot.* **2**: 27 (1857); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 52 (1982) Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 35 (2000).

Annual herbs up to 50cm. Leaves broadly ovate-suborbicular, 4-12 x 3-12cm, pilose below. Flowers solitary at apex, calyx villous, corolla pale blue. Capsule ovate, 0.5-1.2cm. **Fl. & Fr.**: Aug.-Oct.

Habitat: along trail on *Rhododendron-Sorbus* forest.

Voucher specimen: Panchthar, Majortham (Falaincha), 3450m, Sep. 20, 2007, LKSR-Expedition, D 374 (TUCH).

Distribution: Nepal (Central and East, 2700-4500m); Himalaya (Nepal to Bhutan), NE India, Myanmar, W. China.

3. LOBELIA L.

1. **Lobelia pyramidalis** Wall., *Asiat. Res.* **13**: 376 (1820); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 52 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 35 (2000).

Herbs up to 3 m. Leaves sessile, oblanceolate, 7.5-22 x 1.5-2cm. Flowers many in a terminal branched raceme, white to pink. Capsule erect or deflexed, globose, 6 x 5.5mm. **Fl. & Fr.**: Mar.-Sep.

Habitat: along trail on *Rhododendron-Abies* forest.

Voucher specimen: Panchthar, Gairi (Falaincha), 3480m, Sep. 21, 2007, LKSR-Expedition, D 043 (TUCH).

Distribution: Nepal (West and Central, 1100-2300m); Himalaya (Uttar Pradesh to Sikkim), NE India, Myanmar, Indo-China .

2. **Lobelia seguinii** var. **doniana** (Skotts.) E. Wimm., *Pflanzenr. (Engler)* **IV-276b**: 651 (1953); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 53 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 35 (2000).

Lobelia doniana Skotts. in *Acta H. Gotob.* **4**: 19-24 (1928).

Sparsely hairy herbs up to 1.5 m. leaves sessile, lanceolate to linear, 7.5-16 x 1.5-4cm, margin serrulate, pubescent below. Flowers in terminal raceme, blue or violet. Capsule erect or deflexed, oblong-ellipsoid, 12 x 8mm. **Fl. & Fr.**: Aug.-Oct.

Habitat:

Voucher specimen: Panchthar, Dabale Bhanjyang (Memeng), 2500m, Sep. 29, LKSR-Expedition, D 271 (TUCH).

Distribution: Nepal (West, Central, and East, 1700-3200m); Himalaya (Uttar Pradesh to Sikkim), NE India, Myanmar, W China.

Family 64. ASTERACEAE (Compositae)

1. AGERATUM L.

Ageratum conyzoides L. *Sp. Pl.*: 839 (1753); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 9 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 49 (2000). ‘Gandhe jhar’

Plant rank smelling up to 1 m. with whitish pubescent stems. Leaf ovate, 3-8 x 1.5-5cm, crenate-serrate, sparsely pubescent on both surface, petiole up to 5cm. Involucre 3-5mm. Achene 1.5-2mm, pappus of 5 bristle-tipped scale slightly exceeding corolla. **Fl. & Fr.:** Through out year.

Habitat: along trail near crop land.

Voucher specimen: Panchthar, Prangbung (Prangbung), 1890m, Oct. 02, 2007, LKSR-Expedition, D 361 (TUCH).

Distribution: Nepal (West, Central, and East, 200-2000m); Pan tropical.

2. ANAPHALIS DC.

1. **Anaphalis contorta** (D. Don) Hook. f. in *Fl. Br. Ind.* **3**(8): 284 (1881) var. **contorta**; Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 10 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 50 (2000). ‘*Bukiphul*’
Antennaria contorta D. Don, in *B. Reg.* **7**: t. 605 (1821).

Herbs up to 15cm tall. Leaves linear, 1-nerveed, margin strongly curved, cottony beneath. Heads discoid, subglobose in dense terminal corymbs, flowers white. **Fl. & Fr.:** Feb.-Dec.

Habitat: along trail

Voucher specimen: Panchthar, Sukhkhadhap-Dund (Falaincha), 3680m, Sep. 21, 2007, LKSR-Expedition, D 055 (TUCH).

Distribution: Nepal (West, Central, and West, 1700-4500m); Himalaya (Kashmir to Bhutan), NE India, SW China.

2. **Anaphalis margaritacea** (L.) Benth., *Gen. Pl.* **2**: 303 (1873); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 10 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 50 (2000). ‘*Bukiphul*’
Gnaphalium margaritaceum L., *Sp. Pl.:* 850 (1735).

Herbs about 20-40cm. Stems grayish tomentose. Leaves narrowly elliptic or lanceolate, 2-9x0.4-2cm, acuminate, sessile, sometimes auriculate, not decurrent, and thinly tomentose. Capitula clusters in dense corymbs. Involucres many seriate, phyllaries white. Achenes papillose. **Fl. & Fr.:** Jul.-Dec.

Habitat: along trail near settle and farming area.

Voucher specimen: Panchthar, Betini (Falaincha), 1980m, Sep. 26, 2007, LKSR-Expedition, D 177 (TUCH).

Distribution: Nepal (Central and East, 1800-3100m), N America, N Pakistan, Himalaya (Kashmir to Bhutan), Indo-China, China, Japan.

3. ARTEMISIA L.

1. **Artemisia dubia** Wall. ex Besser, *Nouv. Mem. Soc. Imp. Naturalistes Moscou* **3**: 39 (1834); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 51 (2000). ‘*Titepati*’

Perennial herbs up to 1.5 m. Lower inflorescence leaves pinnatisect, 8x5cm, sparsely pubescent above. Capitula numerous in dense panicles. Involucres subglobose, 1.5-2mm diameter. Achene smooth, brown. **Fl. & Fr.:** Aug.-Nov.

Habitat: along trail near farming and settle area.

Voucher specimen: Panchthar, Memeng (Memeng), 2010m, Sep. 30, 2007, LKSR-Expedition, D 299 (TUCH).

Distribution: Nepal (West, Central, and East, 1200-3400m); Himalaya, China, Korea, Japan .

2. **Artemisia indica** Wild., *Sp. Pl.* ed. 4, **3**: 1846 (1804); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 13 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.:* 51(2000). ‘*Titepati*’

Perennial herbs up to 1.5 m. Lower inflorescence leaves bipinnatisect, 7-16 x 5-9cm, tomentose beneath. Capitula in broad or narrow panicle. Involucres campanulate, 1.2-2.5mm diameter. Achene oblong, 1-2mm. **Fl. & Fr.:** Aug.-Oct.

Habitat: along trail near settle and farming area.

Voucher specimen: Panchthar, Prangbung (Prangbung), 1890m, Oct. 02, 2007, LKSR-Expedition, D 364 (TUCH).

Distribution: Nepal (Central and East, 300-2400m); Himalaya, India, Myanmar, Thailand, S China.

4. **BIDENS** L.

Bidens pilosa var. **minor** (Blume) Sherff, *Bot. Gaz.* **80**: 387 (1925); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 15 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 52 (2000). ‘Kurro’

Bidens sundaica var. *minor* Blume, *Bijdr.*: 914 (1826).

Herbs up to 80cm. Leaves trifoliolate rarely pinnate up to 7 leaflets; leaflets ovate or elliptic, 2-8 x 0.5-3.5cm, serrate. Capitula radiate. Achene linear, 6-12 x 0.5-1.0mm, black, glabrous below; pappus awn 2-3.

Fl. & Fr.: Apr.-Dec.

Habitat: along trail near settle and farming area.

Voucher specimen: Panchthar, Prangbung (Prangbung), 1890m, Oct. 02, 2007, LKSR-Expedition, D 362 (TUCH).

Distribution: Nepal (West, Central and East, 700-2100m); Pantropical.

5. **CIRSIUM** Mill.

Cirsium falconeri (Hook. f.) Petr., *Feddes Repert. Spec. Nov. Regni Veg.* **9**: 198 (1911); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 20 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 55 (2000).

Cnicus falconeri Hook. f. in *Fl. Brit. Ind.* **3**: 363 (1881).

Herbs up to 1.5 m. leaves densely setulose to smooth above, oblanceolate, 20-40 x 5-20cm, with 7-12 pairs of segments, spinous at tip and margin. Capitula at branch ends, usually solitary. Flowers pale to dark purple. Achene ovoids, 6-7, dark brown. **Fl. & Fr.:** Jul.-Sep.

Habitat: along trail on *Rhododendron* forest.

Voucher specimen: Panchthar, Faleke (Falaincha), 3210m, Sep. 26, 2007, LKSR-Expedition, D 141 (TUCH).

Distribution: Nepal (Central and East, 3000-4300m); Himalaya (Kashmir to Bhutan), Myanmar, China (Xizang).

6. **CONYZA** Lessing

Conyza stricta Willd., *Sp. Pl.* **3**: 1922 (1803); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 56 (2000).

Annual weedy herbs of 30cm. Leaves linear-oblanceolate, simple, 3-lobed or pinnatisect 1-4cm x 0.5-1.5cm, attenuate at base, dentate, pubescent on both surfaces. Capitula numerous in dense terminal corymbs. Flowers yellowish. Achenes obovoid, pappus whitish. **Fl. & Fr.:** Through out year.

Habitat: along trail near settle and farming area.

Voucher specimen: Panchthar, Narelung (Memeng), 2550m, Sep. 29, 2007, LKSR-Expedition, D 316 (TUCH).

Distribution: Nepal (West, Central, and East, 600-2000m), Himalaya, India, W Asia, Africa.

7. **CREMANTHODIUM** Benth.

Cremanthodium reniforme (DC.) Benth., *Icon. Pl.* **12**: 37, t. 1141 (1873); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 23 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 57 (2000).

Ligularia reniformis DC., *Prodr.* **6**: 315 (1838).

Herbs up to 45cm. Basal leaves ovate to broadly reniform, 2-9 x 1.5-7cm; cauline leaves reniform or reduced to sheath. Capitulum solitary. Involucre 10-20mm diameter. Achene narrowly ovoid, 5mm, pappus white rarely brown. **Fl. & Fr.:** Jun.-Sep.

Habitat: on open alpine meadow.

Voucher specimen: Panchthar, Timbupokhari (Falaincha), 4340m, Sep. 23, 2007, LKSR-Expedition, D 108 (TUCH).

Distribution: Nepal (Central and East, 3000-4600m); Himalaya (Nepal to Bhutan).

8. GERBERA L.

Gerbera maxima (D. Don) Beauverd, *Bull. Soc. Bot. Geneve*, ser. 2, **2**: 44 (1910) var. **maxima**; Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 28 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 59(2000).

Chaptalia maxima D. Don, *Prodr. Fl. Nep.*: 166 (1825).

Perennial herbs with creeping root stock. Radical leaves ovate to oblong, 10-45 x 6-18cm, denticulate, whitish tomentose beneath, petiole 15-40cm. Capitulum discoid, flower creamy white. Achene narrowly elliptic. **Fl. & Fr.:** Sept.-Oct.

Habitat: along trail near settle and farming area.

Voucher specimen: Panchthar, Maklabu (Chyangthapu), 1980m, Sep. 27, 2007, LKSR-Expedition, D 193 (TUCH).

Distribution: Nepal (West, Central, and East, 1900-2900m); Himalaya (Uttar Pradesh to Bhutan).

9. INULA L.

Inula cappa (Buch.-Ham. ex D. Don) DC., *Prodr.* **5**: 469 (1836); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 29 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 61 (2000).

Conyza cappa Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.*: 176 (1825).

Aromatic shrubs with woolly or silky hairy plant up to 1m. Leaves leathery, oblong-lanceolate 3-7 x 1.5-3cm. Ray flowers 2 seriate, female, yellow. Disc flowers bisexual, tubular campanulate, 5-toothed at apex. Style branches. Achenes oblong. Pappus bristles. **Fl. & Fr.:** Jul.-Oct.

Habitat: along trail near settle and farming area.

Voucher specimen: Panchthar, Tintine (Falaincha), 1900m, Sep. 27, 2007, LKSR-Expedition, D 201 (TUCH).

Distribution: Nepal (West, Central, and East, 150-2500m); Himalaya (Kumanun to Bhutan), Assam to China, Thailand, Japan.

10. SAUSSUREA DC.

1. **Saussurea gossypiphora** D. Don, *Mem. Wern. Nat. Hist. Soc.* **3**: 414 (1821); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 39 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 65 (2000).

Monocarpic herbs up to 40cm. Leaves linear-oblongate, 7-15 x 0.5-3cm, sessile, denticulate to pinnatifid, woolly on both surface in lower half. Capitula numerous, densely crowded at a stem apex. Achene blackish, 4-5mm. **Fl. & Fr.:** Aug.-Sep.

Habitat: on open alpine meadow.

Voucher specimen: Panchthar, Timbupokhari (Falaincha), 4340, Sep. 23, 2007, LKSR-Expedition, D 133 (TUCH).

Distribution: Nepal (Central and East, 3500-5700m); Himalaya (Uttar Pradesh to Bhutan), China (Xizang, Yunnan).

2. **Saussurea taraxacifolia** Wall. ex DC., *Prodr.* **6**: 532 (1838); Hara *et al.* in *Enum. Fl. Pl. Nep.* **3**: 40 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 66 (2000).

Herbs up to 30cm. Leaves deeply pinnatisect, linear, 3-15 x 0.5-2.5cm, white araneous beneath. Capitulum solitary. Achene smooth ribbed. **Fl. & Fr.:** Jul.-Oct.

Habitat: along trail on *Rhododendron-Betula* forest.

Voucher specimen: Panchthar, Dund (Falaincha), 3860m, Sep. 21, 2007, LKSR-Expedition, D 065 (TUCH).

Distribution: Nepal (West, Central and East, 3400-5600m); Himalaya (Kashmir to Bhutan).

3. **Saussurea uniflora** Wall. ex Sch. Bip., *Linnaea* 19: 330 (1846); Hara *et al.* in *Enum. Fl. Pl. Nep.* 3: 40 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 66 (2000).

Herbs up to 70cm. Lower leaves oblanceolate to elliptic, 3-18 x 1.5-4cm, mid cauline leaves ovate, upper ones dark red or purplish. Capitula 1-10. Achene oblong, 5mm. **Fl. & Fr.**: Jul.-Nov.

Habitat: along trail on *Rhododendron-Abies* forest.

Voucher specimen: Panchthar, Sukkhadhap-Dund (Falaincha), 3680m, Sep. 21, 2007, LKSR-Expedition, D 056 (TUCH).

Distribution: Nepal (Central and East, 3700-4700m); Himalaya (Nepal to Bhutan), China (Xizang).

11. **SENECIO L**

Senecio wallichii Dc., *Prodr.* 6: 364 (1838); Hara *et al.* in *Enum. Fl. Pl. Nep.* 3: 43 (1982); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 68 (2000).

Herbs up to 50cm with leafless flowering stem. Leaves ovate-heart, 6-15 x 4-8cm, petiole long, wavy and toothed margin. Yellow flowers in head or spike like. **Fl. & Fr.**: Jun.-Sep.

Habitat: along trail on *Rhododendron-Sorbus* forest.

Voucher specimen: Panchthar, Majortham (Falaincha), 3450m, Sep. 20, 2007, LKSR-Expedition, D 027 (TUCH).

Distribution: Nepal (Central and East, 2400-3300m); Himalaya (Nepal to Bhutan), N Myanmar.

C. **MONOCOTYLEDONAE**

Family 1. **DIOSCOREACEAE**

DIOSCOREA L

1. **Dioscorea glabra** Roxb., *Fl. Ind.* ed. 1832 (Roxburgh) ed. 2, 3: 804 (1832); Hara *et al.* in *Enum. Fl. Pl. Nep.* 1: 67 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 98 (2000)

Tubers elongate, 50x4cm, fleshy, stem terete, prickly near base, bulbils not produced. Leaves opposite, oblong-elliptic to narrowly ovate, 6-12 x 3-7cm. Flowers in spike. Capsule spreading to erect. **Fl. & Fr.**: Aug.-Dec.

Habitat: along trail near crop land.

Voucher specimen: Panchthar, Falaincha (Betini), 1570m, Sep. 28, 2007, LKSR Expedition, D 213 (TUCH).

Distribution: Nepal (West, Central and East, 900-2200 m); Himalaya (Himalchal pradesh to Sikkim), India, Myanmar, Thailand, Malaysia.

2. **Dioscorea kamoonsensis** Kunth, *Enu. PL.* 5: 395(1850); Hara *et al.* in *Enum. Fl. Pl. Nep.* 1: 68(1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 98(2000)

Plant hairy, bulbils present. Leaf 5-foliolate, leaflets narrowly elliptic-oblanceolate, 7-14 x 2.5-4.5cm, white bristly above and beneath. Flowers in spike. Capsule reflexed, oblong, 2-2.5cm. **Fl. & Fr.**: Aug.-Nov.

Habitat: along trail near crop land

Voucher specimen: Panchthar, Betini (Falaincha), 1570m, Sep. 28, 2007, LKSR Expedition, D 214 (TUCH)

Representative collection: Ilam, Maimajuwa-7, Tersegaun, 2180m, August 27, 2007, LKSR-Eexpedition team, C 025 (TUCH).

Distribution: Nepal (West, Central and East, 1800-2200 m); Himalaya (Utter pradesh to Sikkim), India, Myanmar, Thailand, Indochina, S China.

Family 2. **SMILACACEAE**

1. SMILAX L.

1. **Smilax elegans** Wall. ex Kunth *Enum. PL. 5*: 163 (1850) subsp. **elegans**, Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 187 (2000).

Climbers, without prickles. Leaves lanceolate, glaucous beneath, subacute, 3-8 | 1.5-4cm, Inflorescence a single umbel. Male flowers smaller than female. Fruit a berry. **Fl. & Fr**: Apr.-Jul.

Habitat: along trail near farming area

Voucher specimen: Panchthar, Talkharka (Prangbung), 2590m, Oct. 02, 2007, LKSR Expedition, D 353 (TUCH)

Distribution: Nepal (Central and East, 1600-2450m), Himalaya (Nepal to Assam), NE India (Manipur), N. Myanmar.

2. **Smilax ferox** Wall. ex Kunth. *Enum. PL. 5*: 251 (1850); Hara *et al.* in *Enum. Fl. Pl. Nep. 1*: 78 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 188 (2000).

Climber, old stem with prickle. Leaves lanceolate to oblong, 5-10 x 2-4.5cm, glaucous beneath. Inflorescence single, 14-21 flowered umbel. Berries red. **Fl. & Fr**: Apr.-Nov.

Habitat: on moist area along trail

Voucher specimen: Panchthar, Hiwakhola (Prangbung), 2480m, Oct. 01, 2007, LKSR Expedition, D 334 (TUCH)

Distribution: Nepal (Central and East, 1100-2700m), Himalaya (Nepal to Assam).

3. **Smilax menispermoidea** A. DC., *Moonogr. Phan. 1*: 108 (1878); Hara *et al.* in *Enum. Fl. Pl. Nep. 1*: 159 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 188 (2000).

Climber, stem with out prickles. Leaves ovate, 5-14 x 3.5-8cm. Female umbel 4-9 flowered, male umbels 12-18 flowered. Berries black with glaucous bloom. **Fl. & Fr**: Apr.-Nov.

Habitat: on *Lithocarpus-Castanopsis* forest in steep hill

Voucher specimen: Panchthar, Faleke-Betini (Falaincha), 2680m, Sept. 26, 2007, LKSR Expedition, D 167 (TUCH)

Distribution: Nepal (West, Central and East, 1800-3400m), NW Himalaya to SW China, Malaysia, IndoChina.

Family 3. CONVALLARIACEAE

1. MAIANTHEMUM G.H. Weber

Maianthemum oleraceum (Baker) Hook. f. & Thoms. var. **acuminatum** F.T. Wang & T. Tang; Noltie in *Edin. J. Bot. 50*(2): 210 (1933); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 186 (2000).

Rhizomatous herbs up to 1.5 m, hairy above. Stem leaves lanceolate or elliptic, 11-25 x 4-10cm. White flowers in branched panicle. Berry pale mulberry colour. **Fl. & Fr**: May.-Sep.

Habitat: on *Castanopsis-Schima* forest

Voucher specimen: Panchthar, Goruwale (Sidin), 1820m, Jun. 07, 2007, LKSR Expedition, A 024 (TUCH)

Distribution: Nepal (East); Himalaya (Nepal to Bhutan), China (Xizang).

2. OPHIOPOGON Ker Gawler

Ophiopogon parviflorus (Hook. f.) H. Hara, *J. Jap. Bot. 40*: 21 (1965); Hara *et al.* in *Enum. Fl. Pl. Nep. 1*: 66 (1978) Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 186(2000).

Ophiopogon intermedius D. Don var. *parviflorus* Hook. f., *Fl. Br. Ind.* **6**: 269 (1892).

Perennial with thick rootstock, some roots with oblong-ovoid tubers. Leaves linear, 15-60 x 0.2-0.5cm, stiff, awned. Scapes flattened. 2-14 flowers in spike like raceme, bracts linear lanceolate exceeding flowers. **Fl. & Fr**: Jun.-Sep.

Habitat: along trail on steeply hill

Voucher specimen: Panchthar, Faleke-Betini (Falaincha), 3280m, Sept. 26, 2007, LKSR Expedition, D 149 (TUCH)

Distribution: Nepal (Central and East, 2000-28000m), Himalaya (Nepal to Bhutan), NE India.

3. POLYGONATUM Miller

1. **Polygonatum cirrhifolium** (Wall.) Royle, *III. Bot. Himal. Mts.* **1**(10): 380 (1839);; Hara *et al.* in *Enum. Fl. Pl. Nep.* **1**: 77 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 187(2000).

Convallaria cirrhifolia Wall. in *Asiat. Research.* **13**: 382, t. (1882).

Rhizome 0.5-2.5cm in diameter; stems up to 1.2 m, densely purple spotted. Leaves in whorl, linear-lanceolate, 4-10mm broad. 2-4 purplish flowers on peduncles. Ovary narrowly ellipsoids.

Fl. & Fr: May-Sep.

Habitat: on open grass land

Voucher specimen: Panchthar, Chandu (Prangbung), 3550m, Jun. 09, 2007, LKSR Expedition, A 074 (TUCH)

Distribution: Nepal (West, Central, and East, 1700-4600m), Himalaya (Punjab to Bhutan), Manipur (NE India), West China.

2. **Polygonatum singalilense** H. Hara, *J. Jap. Bot.* **40**: 102 (1965); Hara *et al.* in *Enum. Fl. Pl. Nep.* **1**: 77 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 187 (2000).

Rhizome up to 1cm diameter; beaded stem up to 0.5 m. Leaves opposite, lanceolate, 3.5-6.5 x 1-2cm, glaucous beneath. 2-yellowish flowers on peduncle. Ovary narrowly ovoid. **Fl. & Fr**: May-Oct.

Habitat: on *Rhododendron-Betula* forest

Voucher specimen: Panchthar, Dund (Falaincha), 3820m, Sept. 21, 2007, LKSR Expedition, D 063 (TUCH).

Distribution: Nepal (West, Central, and East, 3700-4400m), Himalaya (Nepal and Sikkim).

3. **Polygonatum verticillatum** (L.) All., *Fl. Pedemont* **1**:131 (1975); Press *et al.* in *Ann. Check. Fl. Pl. Nep.* **1**: 77 (2000).

Convallaria verticillata L., *Sp. Pl.*: 315 (1753).

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 Ovary ellipsoid,. Fruit berry. **Fl. & Fr**: Jun.-Oct.

Habitat: on *Rhododendron-Sorbus* forest

Voucher specimen: Panchthar, Faleke (Falaincha), 3880m, Sept. 26, 2007, LKSR Expedition, D 145 (TUCH).

Distribution: Nepal (West, Central and East, 2400-4700m), Europe, Asia Minor, C. Asia, Himalaya, NE India (Manipur), W China.

Family 4. TRILLIACEAE

PARIS L.

Paris polyphylla subsp. **marmorata** (Stearn) H. Hara, *J. Fac. Sci. Univ. Tokyo, sect. 3, Bot.* **10**: 176 (1969); Hara *et al.* in *Enum. Fl. Pl. Nep.* **1**: 76 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 186(2000). 'Satuwa' **Nep.**

Paris marmorata Stearn in *Bull. Br. Mus. Nat. Hist. (Bot.)* **2**:79, f. 11, t. 8 (1956).

Perennial herbs up to 20cm. Leaves 4-6, oblanceolate, 5.5-7.5 x 1-2cm, whitish marking along the veins, upper surface dark green, lower dark purplish. Flowers yellowish or greenish. Sepals 3-4. Anthers and connective not produced into apiculus. **Fl. & Fr:** Apr.-Aug.

Habitat: on *Lithocarpus-Lyonia* Forest

Voucher specimen: Panchthar, Talkharka (Prangbung), 2680m, Oct. 02, 2007, LKSR Expedition, D 345 (TUCH).

Distribution: Nepal (Central and East, 2900-3100m); Himalaya (Nepal to Bhutan), W. China.

Family 5. MELANTHAICEAE

TOFIELDIA Hudson

Tofieldia himalaica Baker, *J. Linn. Soc., Bot.* **17**: 489 (1879); Hara *et al.* in *Enum. Fl. Pl. Nep.* **1**: 80 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 188 (2000).

Leaves in basal tuft with curved apiculus, membranous margin, linear, 5-12 x 0.1-0.3cm, 3-5 veined. Scap up to 20cm. 4-22 flowered in raceme, white. Fruit 6x3.5mm, surrounded by persistent perianth. **Fl. & Fr:** May-Sep.

Habitat: along trail on open grass land

Voucher specimen: Panchthar, Bikhepani (Prangbung), 3450m, Jun. 11, 2007, LKSR Expedition, B 049 (TUCH).

Distribution: Nepal (Central and East, 3200-3500m); Himalaya (Nepal to Bhutan).

Family 6. LILIACEAE

FRITILLARIA L.

Fritillaria cirrhosa D. Don, *Prod. Fl. Nep.*: 51 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **1**: 72 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 185 (2000).

Bulb 1-2cm diameter with 2 thick whitish scales. Flowering stem up to 50cm. upper leaves 1 or 2 whorls of 3, linear, cirrhose, 5-8 x 0.3-0.5cm. flowers terminal solitary, olive brown. Capsule oblong, truncate. **Fl. & Fr:** May-Sep.

Habitat: along trail on open grass land

Voucher specimen: Panchthar, Aahale Bhanjyang (Sidin), 3560m, Jun. 09, 2007, LKSR Expedition, A 068 (TUCH).

Distribution: Nepal (West, Central and East, 3000-4600m); Himalaya (Nepal to Bhutan); China (Xizang); N. Myanmar.

Family 7. IRIDACEAE

IRIS L.

Iris clarkei Baker ex Hook. f. in Hook. f., *Fl. Brit. Ind.* **6**(18): 275 (1892); Hara *et al.* in *Enum. Fl. Pl. Nep.* **1**: 64 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 148 (2000).

Rhizomatous perennial herbs up to 1 m. leaves linear, 20-60 x 0.5-2cm, shining green on upper surface, grayish beneath. 2-flowers in spathes, white or greenish yellow. Capsule oblong-trigonal, 2.5-5.5cm. **Fl. & Fr:** Jun.-Sep.

Habitat: on open grass land

Voucher specimen: Panchthar, Chandu (Prangbung), 3550m, Jun. 09, 2007, LKSR Expedition, A 078 (TUCH).

Distribution: Nepal (Central and East, 3000-3500m); Himalaya (Nepal to Bhutan).

Family 8. ORCHIDACEAE

1. NEOTTIANTHE Schltr.

Neottianthe secundiflora (Hook. f.) Schltr., *Feddes Repert. Spec. Nov. Regni. Veg.* **16**: 291 (1919); Hara *et al.* in *Enum. Fl. Pl. Nep.* **1**: 49 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 221(2000).

Habenaria secundiflora Hook. f., *Fl. Br. Ind.* **6**(1): 165 (1890)

Terrestrial plant up to 35cm, tubers globose to ellipsoid, 8 x 7mm. stem erect to recurved. Leaves- 2 or 3, distant, linear to linear oblong, 3-12 x 0.5-1cm, sheathing at base. 7-many flowers in erect second. Flowers 0.5-1cm long, pink. Column long, 1-2 x 0.5-1.0mm. **Fl. & Fr**: Aug.-Oct.

Habitat: along trail on *Rhododendron-Sorbus* forest

Voucher specimen: Panchthar, Chiwabhanjyang-Major (Chyangthapu), 3530m, Sept. 19, 2007, LKSR Expedition, D 014 (TUCH).

Distribution: Nepal (West and Central, 2500-3200m); Himalaya (Utter Pradesh to Sikkim).

2. PLEIONE D. Don

Pleione hookeriana (Lindl.) J. Moore, *Orch.-Grow. Man.* Ed. **6**: 548 (1885); Hara *et al.* in *Enum. Fl. Pl. Nep.* **1**: 54 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 224 (2000).

Coelogyne hookeriana Lindl., *Fol. Orchid., Coelogyne*: 14(1854).

A small epiphytic on mostly tree trunks, pseudobulbs ovoid, scape 1-flowered, up to 7cm long. Flowers 3-5cm in diameter, white flushed with purplish tinge usually appearing before leaves. **Fl. & Fr**: May-Aug.

Habitat: on *Rhododendron* trees

Voucher specimen: Panchthar, Goruwale (Sidin), 1820m, Jun. 07, 2007, LKSR Expedition, A 023 (TUCH).

Distribution: Nepal (Central and East, 2300-3700m); Himalaya (Nepal to Bhutan), NE India, China (Xizang).

3. SATYRIUM Sw.

Satyrrium nepalense D. Don, *Prodr. Fl. Nep.*: 26 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* **1**: 56 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 225 (2000).

Plant terrestrial, tubers sessile, ovoid-cylindrical, and undivided; stem stout. Leaves basal, 2 or 3, oblong to ovate-lanceolate, 5-25 x 2-10cm, fleshy. Many flowers on terminal peduncle, pink to white, leaf like bracts, rachis 7-14cm; column short, curved. **Fl. & Fr**: Aug.-Oct.

Habitat: along trail on *Rhododendron-Sorbus* forest in steep hill.

Voucher specimen: Panchthar, Faleke (Falaincha), 3280m, Sept. 26, 2007, LKSR Expedition, D 146 (TUCH).

Distribution: Nepal (West, Central, and East, 600-4600m); Himalaya (Kashmir to Himalaya), India, N Myanmar, Sri Lanka, W China.

Family 9. ARACEAE

ARISAEMA Martius

Arisaema jacquemontii Blume, *Rumphia* **1**:95 (1836); Hara *et al.* in *Enum. Fl. Pl. Nep.* **1**: 90 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 14(2000). ‘*Sarpa ko makai*’ **Nep.**

Dioeciousherbs up to 60cm, corm 1-3cm diameter, pseudo-stem. Cataphylls whitish. Leaf 2, palmate, leaflets 5, leaflet oblanceolate to elliptic 5-13 | 1.5-5cm, Petiole 3-13cm. Peduncle exseeding leaves. Spathe pale green with narrow whitish stripes. **Fl. & Fr**: Jun.-Sep.

Habitat: on open grass land.

Voucher specimen: Panchthar, Paharemeghu (Falaincha), 3210m, Sept. 23, 2007, LKSR Expedition, D 119 (TUCH).

Distribution: Nepal (West, Central, and East, 2700-4000m), Afghanistan, Himalaya (Kashmir to Bhutan), NE India, China (Xizang).

Family 10. **PONTEDERIACEAE**

MONOCHORIA C. Presl

Monochoria vaginalis (Burm. f.) C. Presl., *Rel. Haenk.* **1**(2): 128 (1827); Hara *et al.* in *Enum. Fl. Pl. Nep.* **1**: 81 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 241 (2000).

Pontederia vaginalis Burm. f., *Fl. Ind.*: 80 (1768).

Annual herbs on marshy land. Leaves in basal rosette, blade lanceolate to ovate, 2-7 x 1-5cm, shallowly or deeply cordate. Inflorescence sub umbellate to racemose. Flowers pedicellate, blue. Capsule ellipsoid, 0.5-1 x 0.3-0.7cm. **Fl. & Fr:** Jun.-Nov.

Habitat: along trail in settle area on marshy land.

Voucher specimen: Panchthar, Chamling Gaun (Chyangthapu), 2650m, Sept. 28, 2007, LKSR Expedition, D 225 (TUCH).

Distribution: Nepal (West, Central, and East, 200-1800m), Himalaya (Nepal, Bhutan), India east to China and Japan, Malaysia.

Family 11. **ZINGIBERACEAE**

1. **CAUTLEYA** Royle ex Hook. f.

Cautleya spicata (Sm.) Baker in Hook. f., *Fl. Br. Ind.* **6**(17): 209 (1890); Hara *et al.* in *Enum. Fl. Pl. Nep.* **1**: 59 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 329 (2000).

Roscoea spicata Sm. in *Trans. Linn. Soc. Lond.* **13**: 461 (1822).

Leafy shoots to 1 m, robust habit. Leaves 4-6, lanceolate, 6-20 x 2-3cm, dark purple beneath; ligule entire. Bract red, petal spatulate. Capsule red, globose. **Fl. & Fr:** Jun.-Oct.

Habitat: along trail in settle area.

Voucher specimen: Panchthar, Chamlingdanda (Chyanthapu), 1950m, Sept. 28, 2007, LKSR Expedition, D 240 (TUCH).

Distribution: Nepal (Central and East, 1800-2800m); Himalaya (Himalchal Pradesh to Sikkim).

2. **ROSCOEIA** Sm.

Roscoea alpina Royle, *III. Bot. Himal. Mts.* **1**(10): 361, t. 89 (1839); Hara *et al.* in *Enum. Fl. Pl. Nep.* **1**: 61 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 330 (2000).

Leafy shoots up to 254cm. leaves 2-3, linear to broadly elliptic, 3-15 x 1-4cm; ligule semicircular. Inflorescence terminal to 5-flowered. Capsule elliptic. **Fl. & Fr:** Jun.-Sep.

Habitat: along trail on *Lyonia-Rhododendron* forest

Voucher specimen: Panchthar, Goruwale (Sidin), 2830m, Jun. 08, 2007, LKSR Expedition, A 037 (TUCH).

Distribution: Nepal (West, Central, and East, 2400-3100m); Himalaya (Kashmir to Bhutan), China (Xizang).

Family 12. **COMMELINACEAE**

CYANOTIS D. Don

Cyanotis vaga (Lour.) Schult & Schult. f., *Syst. Veg.* **7**(2): 1153 (1830); Hara *et al.* in *Enum. Fl. Pl. Nep.* **1**: 82 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 48 (2000).

Tradescantia vaga Lour., *Fl. Cochinch.* **1**: 19 (1790).

Stem decumbent, branched up to 50cm. Basal leaves bulbous form; stem leaves lanceolate or linear, 5-15 x 1.5-3cm. Cymose scorpioid, terminal or axillary, corolla pale blue. Capsule 3-lobed, truncate. **Fl. & Fr:** Jun.-Oct.

Habitat: along trail near crop land.

Voucher specimen: Panchthar, Memeng, 2670m, Sept. 30, 2007, LKSR Expedition, D 292(TUCH).

Distribution: Nepal (West, Central, and East, 800-2700m); W Africa, C Asia, NE India, Myanmar, China.

Family 13. **ERIOCAULACEAE**

ERIOCAULON L.

Ericaulon viride Korn., *Linnaea* **27**: 637 (1856); Hara *et al.* in *Enum. Fl. Pl. Nep.* **1**: 96 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 105 (2000).

Marshy herbs up to 35cm. leaves oblong, 2-5mm wide. Capitulum dark gray & white, hemispheric, 3-6mm diameter, bract oblanceolate. Female flowers 1.5-2mm; male flowers 1-2mm.

Fl. & Fr: Jul.-Nov.

Habitat: along trail on marshy area

Voucher specimen: Panchthar, Chamlinggaun (Changthapu), 1790m, Sept. 28, 2007, LKSR Expedition, D 222 (TUCH).

Distribution: Nepal (Central and East, 1600-2400m.); Himalaya (Nepal, Sikkim).

Family 14. **JUNCACEAE**

JUNCUS L.

1. **Juncus clarkei*** Buchenau *Bot. Jahrb. Syst.* **6**: 210, **12**: 413 (1885). Hooker in *Fl Bri. Ind.* **6**: 400-401 (1894). Noltie in *Fl. Bhu.* **3**(1): 260 (1994)

Herb of 30 cm. Stoloniferous, stem slender, subterete. Basal leaf 2; stem leaf 2, sheath 3 - 6 cm, often-reddish, up to 23 cm, 2 - 4.5 mm wide, margin narrowly membranous. Inflorescence 1-4 unequally peduncled cyme. Capsule pale straw-coloured at maturity, ovoid 4.5 - 6.5 mm. **Fl. & Fr** : Jul.-Oct.

Habitat: Wet, mostly on rocky mountain.

Voucher specimens: Panchthar, Chiwabhanjyang (Memeng), 3530 m, Sep. 19, 2007, LKSR Expedition, D 012 (TUCH)

Distribution: China, Bhutan Darjeeling, Sikkim, and East Nepal (1830 - 3760m).

* Not recorded in Press *et al.* (2000).

2. **Juncus grisebachii** Buchenau, *Abh. Natuwiss. Vereine Bremen* **3**: 295 (1978); Hara *et al.* in *Enum. Fl. Pl. Nep.* **1**: 84 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 149 (2000).

Stoloniferous herbs up to 70cm stem leaves up to 3, semi-sub cylindrical, 10-30 x 0.1-0.3cm. Inflorescence terminal, branched, 7-15 flowers in capitula pale straw color. Capsule broadly ellipsoid-trigonus. **Fl. & Fr:** Jul. – Nov.

Habitats: Wet cliffs and rocky hill in *Rhododendron* forest.

Voucher specimen: Panchthar, Chiwabhanjyang (Memeng), 3530 m, Sep. 19, 2007, LKSR Expedition, D 011 (TUCH).

Distribution: Nepal (Central and East, 2850-5200m), Himalaya (Uttar Pradesh to Bhutan) .

3. **Juncus khasiensis*** Buchenau *Bot. Jahrb. Syst.* **12**: 407 (1885). Hooker *Fl Bri. Ind.* **6**: 399-400 (1894). Noltie *Fl. Bhu.* **3**(1): 260 (1994).

Herb of 28cm. Stem erect, slender. Basal leaf 1 or 2; Stem leaf 1, pale yellow; blade Y- or X-shaped in cross-section, to 15 cm, 0.4 - 0.7 mm wide. Inflorescence with 1 - 5 unequally peduncled, 3 - 5 flowered, brownish white. Capsule narrowly ellipsoid, exceeding tepals, 5 - 6 mm, and golden brown at maturity. **Fl. & Fr:** Jul. - Oct.

Habitat: Wet cliffs and rocks in open or in *Rhododendron* forest.

Voucher specimen: Panchthar, Chiwabhanjyang - Major (Memeng) 3910m, Sep. 19, 2007, LKSR Expedition, D 013 (TUCH).

Distribution: Bhutan, Sikkim, and East Nepal.

* Not recorded in Press *et al.* (2000).

4. **Juncus triglumis** L., *Sp. Pl.*: 328 (1753); Hara *et al.* in *Enum. Fl. Pl. Nep.* 1: 85 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 150 (2000).

Rhizomatous herbs up to 25cm. stem leaves 2, linear, 5-10 x 0.1-0.2cm, sheath with membranous margin. 2-5 flowers in capitulum, brown. Capsule ellipsoid, trigonous, 4-6mm. **Fl. & Fr:** Jun.-Oct.

Habitat: on rocky mountain

Voucher specimen: Panchthar, Paharemeghu (Falaincha), 3910 m, Sep. 23, 2007, LKSR Expedition, D 103 (TUCH)

Distribution: Nepal (Central, 2800-4700m); Arctic-alpine W Hemisphere, Himalaya (Kashmir to Sikkim), China (Xizang), Japan.

Family 15. **CYPERACEAE**

1. **CAREX** L.

Carex atrata L., *Sp. Pl.*: 1387 (1753); Hara *et al.* in *Enum. Fl. Pl. Nep.* 1: 85 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 87 (2000).

Rhizomatous herbs up to 90cm. Leaves sub-basal, blade linear, 20-40 x 0.3-0.6cm. 2-6 drooping spikes. Utricles oblong-elliptic-trigonous, 2-4 x 1-2mm. **Fl. & Fr:** Mar.-Sep.

Habitat: along trail in settle area

Voucher specimen: Panchthar, Ghumne (Falaincha), 4200m, Sep. 24, 2007, LKSR Expedition, D 131 (TUCH).

Distribution: Nepal (West, Central, and East, 3500-4400m); Himalaya (Nepal, Sikim), Japan, C & SW China.

2. **CYPERUS** L.

Cyperus iria L., *Sp. Pl.*: 45 (1753); Hara *et al.* in *Enum. Fl. Pl. Nep.* 1: 107 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 91 (2000)

Annual rhizomatous herbs; stem tufted, trigonous. Leaves on lower half of stem, blades half to equaling stem, sheath bases reddish-brown; Inflorescence terminal, lower spikes spreading widely, overlapping but rachilla visible. **Fl. & Fr:** Mar.-Sep.

Habitat: Along trail in settle area.

Voucher specimen: Panchthar, Narelung (Memeng), 2160m, Sep. 30, 2007, LKSR Expedition, D 318 (TUCH)

Distribution: Nepal (West, Central, and East, 200-1800m), Tropical, Subtropical and Temperate regions of both hemispheres.

3. **ELEOCHARIS** R. Br.

Eleocharis congesta D. Don, *Prod. Fl. Nep.*: 41 (1825); Hara *et al.* in *Enum. Fl. Pl. Nep.* 1: 109 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 92 (2000).

Perennial tufted herbs up to 25cm; short rhizome. Spike oblong-lanceolate. Glume oblong-ovate, 3 x 2mm. nut trigonous, 1 x 0.6, whitish. **Fl. & Fr:** Mar.-Sep.

Habitat: Along trail in settle area

Voucher specimen: Panchthar, Chamling gaun (Memeng), 1790m, Sep. 28, 2007, LKSR Expedition, D 223 (TUCH)

Distribution: Nepal (West, Central, and East, 200-2300m); India, Indo-China, China.

4. KYLLINGA Rottb.

Kyllinga brevifolia Rottb., *Descr. Icon. Rar. Pl.*: 13, 71 (1773); Hara *et al. in Enum. Fl. Pl. Nep* 1: 115 (1978); Press *et al. in Ann. Check. Fl. Pl. Nep.*: 95 (2000).

Perennial rhizomatous creeping herbs up to 45cm. Leaves sub-basal, blade shorter than stem, 2-4mm broad. Inflorescence terminal, spikelets lanceolate, sessile. Nut narrowly oblong-obovate, 1-1.5 x 0.5-1mm, yellowish, smooth. **Fl. & Fr:** Mar.-Sep.

Habitat: along trail in settle area

Voucher specimen: Panchthar, Memeng, 2550m, Sep. 30, 2007, LKSR Expedition, D 300 (TUCH).

Distribution: Nepal (West, Central, and East, 100-2300m); Tropical and subtropical regions of both hemispheres.

5. MARISCUS Vahl. Nom. Cons.

Mariscus sumatransis (Retz.) T. Koyama in *Gard. Bull. Singa.* 30: 154 (1977), Hara *et al. in Enum. Fl. Pl. Nep.* 1: 116 (1978), Press *et al. in Ann. Check. Fl. Pl. Nep.*: 96 (2000).

Kyllinga sumatrensis Retz., *Obs. Bot.* 4: 13 (1786).

Rhizomes short, stem glabrous, erect, leaves usually longer than stem, Umbel simple, rays 5-12, straight, Bracts 5-10, leaf like, up to 18cm long, spikes solitary cylindrical, spikelets 1-2 flowered, linear, fruiting spikelets after falling consists of 2 sub equal glumes. **Fl. & Fr:** Aug.-Jan.

Habitat: along trail near farming area

Voucher specimen: Panchthar, Narelung (Memeng), 1750m, Sep. 30, 2007, LKSR Expedition, D 317 (TUCH)

Distribution: Nepal (WCE, Alt. 1000-2400m), Wide spread in tropical and subtropical regions of the old world, also extending northwards in E. Asia as far as C. Japan.

6. PYCREUS P. Beauv.

1. **Pycneus sanguinolentus** (Vahl) Nees ex C.B. Clarke in Hook. f., *Fl. Brit. Ind.* 6: 590 (1893); Press *et al. in Ann. Check. Fl. Pl. Nep.*: 96 (2000).

Cyperus sanguinolentus Vahl., *Cit.*: 351 (1806).

Perennial, slender, tufted herbs up to 30cm. Leaves sub-basal, blades shorter than stems, 2mm wide. Sheaths reddish brown. Inflorescence a dense head of many spikelets. Involucral bracts 2-3, Nut ellipsoid, apiculate, c1.5 | 1mm. **Fl. & Fr:** Mar.-Oct.

Habitat: along margin of crop land.

Voucher specimen: Panchthar, Chamling gaun (Chyangthapu), 2010m, Sep.28, 2007, LKSR Expedition, D 224 (TUCH).

Distribution: Nepal (Central and East, 800-2900m), Widely spread from C. Asia and India through China to the temperate far East, Malaysia, Oceania, Africa.

Family 16. GRAMINEAE (Poaceae)

1. AGROSTIS L.

Agrostis triaristata (Hook. f.) Bor., *Grass. Ind.*: 391 (1960); Hara *et al.* in *Enum. Fl. Pl. Nep.*1: 121 (1978), 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 15-40cm. Basal leaves short, filiform. Culm leaf blades linear lanceolate, 10-30 x 0.5-2.5cm. Inflorescence purplish, laxly pyramidal. Glumes equal or subequal, narrowly lanceolate, Lemma awned, broadly lanceolate. Palea 2mm, linear lanceolate, acute. **Fl. & Fr:** Jul.-Oct.

Habitat: along trail on *Rhododendron-Sorbus* Forest

Voucher specimen: Panchthar, Phalot-Chiwabhamjyang), 3490m, Sep. 18, 2007, LKSR Expedition, D 005 (TUCH)

Distribution: Nepal (East, 3600-3700m), Himalaya (Nepal, Sikkim).

2. **ARUNDINELLA** Raddi

Arundinella nepalensis Trin., *Gram. Panic.*: 62 (1826); Hara *et al.* in *Enum. Fl. Pl. Nep.*1: 122 (1978), Press *et al.* in *Ann. Check. Fl. Pl. Nep.*:124 (2000). 'Kharuki' **Nep.**

Tufted, rhizomatous perennial, culms to 1.5m. Leaf blade oblong, 15-35 x 0.5-2.5cm, sheaths glabrous, Inflorescence purplish; spikelets 3-6mm. Lower glume glabrous, veins hispid. Lemma narrowly lanceolate, acute, minutely hispid awn. **Fl. & Fr:** Sep.-Feb.

Habitat: along margin of farming area.

Voucher specimen: Panchthar, Narelung (Memeng), 2390m, Sep. 29, 2007, LKSR Expedition, D 289 (TUCH).

Distribution: Nepal (West, Central and East, 500-2500m); Himalaya (Nepal, Sikkim). India, SE Asia, China.

3. **BOTHRIOCHLOA** Kuntze

Bothriochloa bladhi* (Retz.) ST Blake, *Proc. Roy. Soc. Queensland* 80(6): 62-64 (1969) Noltie in *Fl. Bhu.* 3(2): 752 (2000).

Andropogon bladhi Retz., *Observ. Bot.* 2: 27 (1781).

Tufted perennial. Culms up to 80cm, unbranched. Leaf blades 10-20 x 0.4-0.8cm, scattered long hair; ligule truncate, ciliate. Inflorescence brown, sessile spikelets, 3-5mm. lower glume green, oblong, elliptic. Lemma narrowly lanceolate; awn 1-1.5cm. **Fl. & Fr:** Jun.-Oct.

Habitat: on trail in settle area

Voucher specimen: Panchthar, Memeng (Memeng), 2010m, Sep. 30, 2007, LKSR Expedition, D 290 (TUCH).

Distribution: Nepal (East, 2010m); Himalaya (Nepal to Bhutan)

* Not reported in Press *et al.* (2000).

4. **CALAMAGROSTIS** Adanson

^s**1. Calamagrostis lahulensis*** G. Singh, *Taxon* 33(1): 94 (1984); Noltie in *Fl. Bhu.* 3(2): 613 (2000).

Rhizomatous, slender, spreading herbs up to 60cm. Leaves mainly basal, blades linear, 8-13 | 0.5-3mm, inrolled, acute, minutely scabrid on veins. Sheath papery, narrow, scabrid on veins. Ligule 2-4.2mm blunt. Inflorescence dark purple, erect, 3.3-10 | 1-3.5cm, narrowly cylindrical, dense, branches short, erect. Spikelets 3.7 -5.7mm, hyaline tipped. Glumes 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 subbasal, 1.7-5mm, slender, exserted. Palea 2-3.2mm, linear, Anthers 1.4-2.3mm. **Fl. & Fr:** Jul.-Oct.

Habitat: on rocky steep hill

Voucher specimen: Panchthar, Timbu Pokhari (Falaincha), 4340m, Sep. 24, 2007, LKSR Expedition, D 130 (TUCH).

Distribution: Nepal (East, 4340m); Himalaya (Nepal to Bhutan)

*New record to "Flora of Nepal."

5. CYMBOPOGON Spreng.

Cymbopogon microtheca (Hook. f.) A. Camus, *Rev. Bot. Appl.* **1**: 284 (1921); Hara *et al.* in *Enum. Fl. Pl. Nep.***1**: 127 (1978), Press *et al.* in *Ann. Check. Fl. Pl. Nep.*:128 (2000).

Andropogon microtheca Hook. f., *Fl. Bri. Ind.* **7**: 208 (1896).

Herbs up to 145cm. Leaves mainly basal, blades 2-5 m broad, sparsely long hairy above; ligule sub acute, 3-3.5mm. Inflorescence denser, racemes, reddish brown; spikelets sessile, 3-4mm. Pedicel conspicuously widen upwards; lower glume oblong-triangular, 4-6 x 1mm. **Fl. & Fr:** Sep.-Jan

Habitat: along trail in settle area

Voucher specimen: Panchthar, Narelung (Memeng), 2550m, Sep. 30, 2007, LKSR Expedition, D 320 (TUCH).

Distribution: Nepal (East, 400-1200m); Himalaya (Nepal, Sikkim), India (Bihar).

6. DANTHONIA DC.

Danthonia cumminsii Hook. f., *Numer. List.*: 282 (1832); Hara *et al.* in *Enum. Fl. Pl. Nep.***1**: 127(1978), Press *et al.* in *Ann. Check. Fl. Pl. Nep.*:128 (2000).

Tufted perennial rhizomatous herbs up to 70cm. Leaf blade, 8-26cm, bristle like hairs beneath; sheath glabrous; ligule 0.5-0.8mm. Inflorescence racemose or panicle; spikelets 5-50, variable in size. Glumes purplish or greenish, sometimes hairy. **Fl. & Fr:** Jul.-Nov.

Habitat: on *Castanopsis-Quercus* forest in steep hill.

Voucher specimen: Panchthar, Faleke-Betini (Falaincha), 3210m, Sep. 26, 2007, LKSR Expedition, D 158 (TUCH).

Distribution: Nepal (West, Central and East, 2200-4100m); Himalaya (Swat to Bhutan), NE India (W Bengal).

7. DENDROCALAMUS Nees.

Dendrocalamus hamiltonii Nees. & Arn. Ex Munro, *Trans. Linn. Soc. Lond.* **26**: 151 (1868) var. **hamiltonii**; Hara *et al.* in *Enum. Fl. Pl. Nep.***1**: 128 (1978), Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 128(2000). 'Bans' **Nep.**

Rhizomes pachymorphs, Culms up to 25m, strongly pendulous above, branch fewer towards base; culm sheath persistent, often decaying, triangular. Leaf blade to 40cm, sheath with white hairs; ligule very long. Inflorescence very dense, spikelets soft, bell shaped, 6mm long.

Habitat: along trail near settle area.

Voucher specimens: Panchthar, Memeng (Memeng), 2010m, Sep. 30, 2007, LKSR Expedition, D 302 (TUCH).

Distribution: Nepal (East, 1000-2000); Himalaya (Nepal, Bhutan), NE India.

8. ISACHNE R. Br.

Isachne albens Trin., *Sp. Gram. (Trinius)*: 1, t. 85 (1828); Hara *et al.* in *Enum. Fl. Pl. Nep.***1**: 136 (1978); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 135 (2000).

Perennial robust herbs up to 130cm; branched. Leaf blade oblong to narrowly lanceolate, 3.5-25 x 0.5-2.5cm, hispid on both surface; ligules hairy. Inflorescence branched to 3 orders; spikelets 1-2mm. Lower glumes equaling spikelets, narrowly elliptic; lemma creamy. **Fl. & Fr:** Jul.-Feb.

Habitat: along trail in settle area

Voucher specimen: Panchthar, Tintine (Falaincha), 1900m, Sep. 27, 2007, LKSR Expedition, D 204 (TUCH).

Distribution: Nepal (Central and East, 1800-2300m); Africa; Himalaya (Utter Pradesh to Sikkim), India, Myanmar, Thailand, Indo-china, China, Malaysia.

9. **MISCANTHUS** Andersson.

Miscanthus nepalensis (Trin.) Hack., *Monogr. Phan.* **6**: 104 (1889); Hara *et al.* in *Enum. Fl. Pl. Nep.1*: 137 (1978), Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 136 (2000).

Eulalia nepalensis Trin. in *Mem. Aca. Sci. Petersb.* ser. **6, 2**: 333 (1832).

Tufted perennial herbs up to 150cm. Leaf blade 2-10mm broad; leaf sheath hairy at apex; ligule rounded, 1-3mm. Inflorescence golden brown; spikelets 1.5-3.5mm, callus hairy grey. Glume golden brown, oblong-lanceolate; lemma lanceolate. Grain 1-2mm, purplish brown. **Fl. & Fr:** Feb.-Dec.

Habitat: on moist stream.

Voucher specimen: Panchthar, Hiwakhola (Memeng), 2480m, Oct. 01, 2007, LKSR Expedition, D 335 (TUCH).

Distribution: Nepal (West, Central, and East, 1100-3000m).

10. **SACCIOLEPIS** Nash.

Sacciolepis indica (L.) Chase, *Proc. Biol. Soc. Wash.* **21**: 8 (1908); Hara *et al.* in *Enum. Fl. Pl. Nep.1*: 145(1978), Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 141 (2000).

Panicum indicum L., *Sp. Pl.*: 'in errata' (1753).

Tufted annual herbs up to 80cm. leaf blade oblong, 5-15 x 0.2-0.8cm, glabrous, hairy at junction with ligule. Ligule erose-truncate. Spikelets purplish, 2-3 x 1-1.5mm, lower glume ovate. Lemma 7-8 veined. Palea narrowly elliptic. **Fl. & Fr:** Jul.-Oct.

Habitat: on Lyonia-Rhododendron forest.

Voucher specimen: Panchthar, Narelung (Memeng), 2550m, Sep. 30, 2007, LKSR Expedition, D 319 (TUCH).

Distribution: Nepal (Central and Central, 200-2100m); Himalaya (Utter Pradesh, Nepal), south to tropical Asia, Polynesia, Australia.

11. **SETARIA** P. Beauv.

Setaria glauca (L.) P. Beauv., *Ess. Agrost.*: 51, 170, 178 (1812); Hara *et al.* in *Enum. Fl. Pl. Nep.1*: 145 (1978), Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 141 (2000). '*Banso*' **Nep.**

Panicum glaucum L., *Sp. Pl.*: 56(1753).

Tufted, rhizomatous annual herbs up to 75cm. Leaf blade oblong, 4-18 x 0.3-0.6cm, sheath flattened, keeled, glabrous; ligule a fringe of hairs. Panicle 2-11cm. spikelets singly, deciduous bristle golden or sometimes purplish. Glume ovate; lemma elliptic; palea crustaceous. **Fl. & Fr:** Mar.-Dec.

Habitat: around Cropland.

Voucher specimen: Panchthar, Memeng (Memeng), 2010m, Sep.30, 2007, LKSR Expedition, D 296 (TUCH).

Distribution: Nepal (West, Central. and East, 900-2300m); temperate regions of old world.

5. DISCUSSION

5.1 Floristic Composition

Geographical areas containing high species richness, high levels of endemism and/or harboring a high number of rare or threatened species, have been defined as biodiversity hotspots, and have been considered to set priorities for conservation planning (Reid, 1998). Eastern Himalayan is one from the four hotspots in the Hindu Kush-Himalayas region (Mittermeier *et al.*, 2004). Flora refers to plant occurring within a geographical region as well as publication of description of plants. Floristic composition of any area serves as a useful tool to develop strategy for conservation, sustainable management and utilization of biodiversity.

The floristic study of higher plants has been made to enumerate and document the herbs, shrubs, trees, and climbers of the LKSR, Panchthar district. The total enumerated plant species (320 species) comprises 84.68 % of Dicotyledones, 13.75 % of Monocotyledons, and 1.56 % of Gymnosperms.

Hara *et al.* (1978, 1979 and 1982) reported 4000 species of dicotyledones and 1150 species of monocotyledons from Nepal. The present study covers 6.9 % of dicotyledones and 4 % of monocotyledons of Nepalese plant. It shows that study area was dominated by dicotyledonae. The total number of flowering plants of Nepal is 5833 species belonging to 213 families and 1496 genera (Koba *et al.* 1994). Among recorded dicotyledon, Ericaceae comprises the largest number of species (23), which is followed by Rosaceae (21), Ranunculaceae (16), Asteraceae (15), and so on. While in monocotyledons, Graminae is the largest family with 11 species followed by Cyperaceae (6), Convallariaceae (6), so on. 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. Most of top ten families of present study lie within top ten largest families of Nepal according to Press *et al.* (2000). Largest families 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 alpine zone in Panchthar.

Distribution of *Rhododendron* shows higher in Eastern Nepal (Koirala, 2004), which was found truth after completion of my research. A total of 13 species of *Rhododendron* were recorded from the study area which takes the 1st position in terms of largest genera of collected species followed by *Swertia* (seven species) and *Impatiens* (six species), and so on.

In the present work, the largest number of herbaceous plants (66%) including both dicots and monocots were reported from open grasslands, and along walking trails. The reason for enormous occurrence of herbaceous plants in those above mentioned areas is because of the open environment, which usually supports the growth of plant species in comparison to the forested areas (Vetaas, 1997). Because of tall trees and shrubs canopy in forests, sufficient light, moisture and other nutrients are not available for ground vegetation. Therefore, herbaceous plants grow feebly in such situations. In open pastures, scarce of trees and shrubs canopy supports the growth of herbaceous plants. All the explored plant species are tabulated in annex.

The present study revealed six species new addition to the Flora of Nepal. The newly recorded taxa are: *Calamagrostis lahulensis* G. Singh (Gramineae), *Begonia panchtharensis* S. Rajbhandary & K.K. Shrestha, sp. nov. (in press, Begoniaceae), *Swertia wardii* Sm. (Gentianaceae), *Castanopsis longispina* (King ex Hook. f.) C. C. Huang & Y. T. Chang (Fagaceae), *Rubia hispidicaulis* Long (Rubiaceae), and *Acronema ioniostyles* Farille & Lachard (Umbelliferae), which were determined and approved at the Royal Botanic Garden, Edinburgh (E) by HJ Noltie, M Watson, KK Shrestha, B Adhikari and RC Paudel. These species are not recorded in Hara *et al.* (1978-82), Koba *et al.*, 1994, Press *et al.*, (2000), etc. Among the new records, *Begonia panchtharensis* was found as new to plant science which was confirmed by Ms. Sangeeta Rajbhandary (Ph.D scholar on genus *Begonia*). I feel that it was difficult to identify and describe grass species. But I also found one new species from the grass (*Calamagrostis lahulensis* G. Singh) whose further identification and verification was done by HJ Noltie (world expert grass) at RBGE (UK). M Watson (expert of family Umbelliferae) helps to confirm on species from Umbelliferae (*Acronema ioniostyles* Farille & Lachard) as a new record to Nepal.

The number of flowering plants enumerated in Nepal is 6067 belonging to 216 families and 1534 genera (Press *et al.* 2000). But after my study, this number gets raised with the value 6073 species due to that six species from the total collected species were found to be new to flora of Nepal.

Threatened, Endemic and Archaic species

IUCN (1994) prioritized 60 plant species for conservation with categorizing species in different red list categories (cited in Shrestha and Joshi, 1996) in Nepal. Nepal has been a signatory of the CITES of wild flora and fauna since 1975 and a number of plant species (15) are listed in CITES under various appendices (CITES, 1995). The report noted 246 endemic and 60 rare, endangered and threatened plants of Nepal (Shrestha & Joshi, 1996). Among 10 threatened species, nine species (15%) belong to IUCN threat category, five species (33%) belong to CITES category, and three from government protected species. These number of threatened species Species richness and number of threatened species is highest in Falaincha VDC (Timbu pokhari), Panchthar district. Shrestha (2001) prioritized Surumkhim of Taplejung district as most important site for habitat connectivity for conservation of biodiversity of the Kanchenjunga landscape. Surumkhim of Taplejung district is near to Timbu pokhari of Panthar district.

Out of 246 endemic plants from the Nepal (Shrestha & Joshi, 1996), the area harbours only one species (*Heracleum lallii* C. Norman). This number is less than one percentage of total endemic plants of Nepal. It is due to sharing common phytogeography between Nepal and India as it lies in the border line. Archaic plants like *Magnolia campbelli* Hook. f., *Taxus wallichiana* Zucc., *Myrica esculanta* D. Don (Takhtajan, 1981), four species from the lauraceae were recorded from the area. They are sparsely distributed in the study area. This may due to habitat destruction by various anthropogenic activities.

5.2 Forest types

Forest is one of the renewable resources providing services and products to people and environment which meets the basic needs of people and also a major resource of world for livelihood and cash income (Vaalverde & Silvertown, 1997).

According to Stainton (1972), forests of Nepal have been classified into 35 types under four major (tropical and sub tropical, temperate and alpine broad leaved, temperate and alpine conifer and

minor temperate and alpine association) heading. There were accounts of 20 forest types from Makalu Barun Landscape complex (Kunwar and Chaudhary, 2004) and 14 forest types from Kangchenjungha landscape complex (Shrestha, 2001). A total of 11 types of forest were recorded from the study area. This study area covers the 32% total forest type from the country. This number of forest type was found to be less than Shrestha (2001) and Kunwar & Chaudhary (2004), which may be due to the small size of study area in comparison to Kangchenjungha landscape complex and Makalu-Barun landscape complex. The present study area had natural forests, which are locally protected, as community forest. Grazing and collection of fallen branches for fuelwood were frequent in the vicinity of human settlements while felling for timber was less common. The forest of study area is very diverse type that ranges from *Castanopsis tribuloides* – *Castanopsis hystrix* (Temperate) dominated community to dry alpine scrub community (Alpine). With increasing elevation, the domination of *Lithocarpus*, *Quercus*, *Symplocos*, *Castanopsis*, *Eurya*, etc. is gradually declined, and appeared the *Rhododendron*, *Sorbus*, *Betula*, *Abies*, etc. as dominant ones.

5.3 Vegetation analysis

The vegetation of any area is outcome of various geological, physical, chemical and biological factors. These factors interact among themselves and determine the distribution pattern of various plant species. Different ecological factors have impact in the variation in species composition (Duwadee *et al.*, 2002).

Square plots are usually superior for correlating communities with local environmental variables; although various shape and size of plots have been selected for studies (Ferreira & Merona, 1997). In Nepal, most studies designed for study of diversity or species abundance (including the present) have employed square sample plots.

The present study was conducted along an altitudinal gradient in a temperate to sub alpine forest of Lower Kanchenjunga Singhalila Ridge (LKSR), Panchthar, Eastern Nepal. Altogether 41 tree species were recorded from the study area. The highest number of tree species (30) was recorded from UTF (2400-2900m) due to relatively open habitat, which provided congenial environment for the growth of different species that is followed by 15 from LSF (2900-3400m) and 12 from USF (3400-3900m).

Stand density differed slightly among study sites. Density is influenced by various factors, including elevation, soil type, dominant and associated species and human activities (Shrestha *et al.*, 1998). The total density of tree species is highest in USF (1494.737 trees ha⁻¹) followed by 1276.667 trees ha⁻¹ (UTF) and 753.846 trees ha⁻¹ (LSF) respectively. However, the range of total tree density was lower than the value (2090 to 2100 tree ha⁻¹) reported by Kunwar and Sharma (2004) and higher than the value (346 to 756 trees ha⁻¹) reported by Koirala (2004) in Tamafok and Malkharka Forest of Tinjure-Milke region. The factors like altitude, vegetation type, and anthropogenic activities influence the plant density. The highest number of stand density at USF was due to the presence of large number of individuals. Lowest density of species at LSF was due to human interference, here people may have grazed animals, lopped and cut trees freely. The total basal area of tree species is highest in UTF (147.345 m²ha⁻¹) followed by 50.951 m²ha⁻¹ (USF) and 24.620 m²ha⁻¹ (LSF) respectively. The forest having small basal area of individual ha⁻¹

showed the sparsely dispersed tree species with comparison with large basal area (Duwadee *et al.*, 2002). The higher the basal area is also due to the higher density in the present study.

The IVI provides a quantitative basis for the classification of community, which also shows very clear picture of forest. The IVI value of any species in community ranges between 0 – 300 and the sum of IVI of all species is 300. Along increasing elevation, IVI of *Acer caudatum*, *Rhododendron camanulatum*, *Abies spectabilis*, *Betula utilis* etc. was successively valued.

In the UTF, the highest IVI was recorded for *Lithocarpus pachyphylla* (65.21) followed by *Symplocos rasimossima* (31.151) indicating the ecological importance and most successful tree species in that particular environment. Similarly the lowest IVI (0.978) was recorded for *Sauraria napaulensis*. Study revealed that *Lithocarpus pachyphylla* is the most dominant species in UTF. This species is most extensively distributed between the altitudes 2400-2900m represents the climax stage, throughout the eastern Himalayas.

In the LSF, the highest IVI was recorded for *Acer caudatum* (42.298) followed by *Sorbus foliolosa* (31.151) indicating the ecological importance and most successful tree species in that particular environment. Similarly the lowest IVI (4.038) was recorded for *Eurya acuminata*. *Acer caudatum* and *Sorbus foliolosa* are most dominant species in LSF. These are distributed between the altitudes 2900-3400m represent the climax vegetation throughout the Eastern Himalayas.

In the USF, the highest IVI was recorded for *Rhododendron campanulatum* (63.74) followed by *Abies spectabilis* (55.54) indicating the ecological importance and most successful tree species in that particular environment. Similarly the lowest IVI (3.654) was recorded for *Acer campbellii*. *Rhododendron campanulatum* is most dominant species in USF. This species is distributed between the altitudes 3400-3900m represent the climax vegetation through out the Eastern Himalayas.

The IVI value for any species in these altitudinal ranges did not exceed 45% of total IVI, indicating considerable sharing of importance by number of species. This suggests an overall mixed type of forest. Bankoti *et al.* (1992) and Nepal (2001) also reported such type of mixed forest in Kumaun Hill and Annapurna Conservation Area respectively.

5.3.1 Size Class Distribution

The size class distributions indicate different population structure, which may be related to differences in environment and disturbance regimes. Seedling germination and establishment are related to the availability of space created through perturbation and to adaptation to particular light regimes (Ramkrishnan *et al.*, 1982). The reverse J-shaped size class distribution of trees in a community indicates sustainable regeneration (Vetaas, 2000). Although a clear inverse J-shaped graph is absent in all site, the population structure of trees in the UTF indicates somewhat continuous regeneration than others two sites. The regeneration potential of trees in the study area was somewhat in continuous. The combine effect of anthropogenic and natural disturbance, elevation gradient and inherent behavior has hampered the regeneration. The size-class distribution curve of tree in study sites resembled neither a reversed J-shaped nor a bell shaped. Since the lowest diameter class had the higher density, the regeneration potential was high, but regeneration had not been continuous in the past, which is similar result to Shrestha (2005). This effect of disturbance has been shown in similar in Himalayan (Rao *et al.*, 1990; Vetaas, 2000).

Within the few decades, these forests may change into a dense forest with close canopy if there are no any disturbances. The canopy closure occurs at an exponential rate and time required for full canopy closure depends on the type and magnitude of disturbance and on the species involved in regeneration; it may range from 8 to 40 years for temperate forest (Volverde and Silvertown, 1997).

5.3.2 Species Richness and Diversity Index

Species diversity is the combination of species richness and species evenness. Graph 4.6 shows plant species richness, concentration of dominance, and Shannon-Wiener diversity index for tree species in three altitudinally-based sites. The elevation represents a complex gradient along which many environmental variables change simultaneously (Austin *et al.*, 1996). Species richness along elevation gradients is controlled by a series of interacting biological, climatic and historical factors (Colwell & Lees, 2000). It is assumed that tree species are more influenced by climatic factors than herbaceous species. So, upper elevation range for trees is low. This might be due to the fact that trees are most susceptible to climatic factors than herbs (Bhattarai & Vetaas, 2003). Climatic factors, environmental stability, land use and area and habitat heterogeneity are the factors often discussed as determinants of variability in species richness (Spies & Turner, 1999).

Regarding the species richness, its value is highest for UTF (5 trees per 100m²), which is moderately disturbed and at the stage of regeneration. In this site canopy gap is wider. Canopy is also a significant factor, probably through its influence on the light intensity reaching the ground as suggested by several authors (Spurr and Barnes, 1973; Tilmen, 1985). Decline in the number of species with increasing elevation has often been considered a general pattern (Stevens, 1992). It could be due to harsh climatic conditions like, high radiation, low precipitation, low temperature, and high snowfall. This could also be due to ecophysiological constraints, such as reduced growing season and low ecosystem productivity in high elevation (Körner, 2000). Moisture is an environmental factor in determining the plant species richness and their composition in a community. Aspect regulates the quantity and duration of soil moisture, partly through temperature (Parker, 1991). The northern aspect in the UTF was found moister with more canopy cover than the southern aspect.

Due to human disturbances the density of plants were found less and there may be the chance of migration of seeds of new plants to grow and established in moderately disturbed forest so that newly germinating and regenerating plant can get the nutrients without struggle. The less species richness in USF (3 trees per 100m²) was due to the close canopy. This site is also relatively undisturbed forest, which was found dominated by few trees only.

The Shannon-Weiner index (H') for the natural communities is often found to fall within a range of 1 to 6. The maximum diversity of a sample is obtained when all species are equally abundant and as represented as H_{max} (Stilling, 1996). Index of diversity (Shannon-Wiener index) was found highest for UTF similar results reported by Zhang (1998) showed that species richness and diversity per site are higher in the area of relatively disturbed forest followed by LSF and USF due to the growth of middlestory because of the presence of relatively low disturbance and high altitude. Lowest value of species diversity at site USF was due to the presence of dense canopy and mature stands. Moreover, the diversity was negatively correlated with increasing elevation, which was concurred with the finding of Kunwar and Chaudhary (2004). In the present study,

relatively undisturbed forest site had lower value of diversity index. Shrestha (1999) also showed similar finding in *Castanopsis hystrix* forest of Arun river basin. Species diversity is generally lower in community characterized by environmental extremeness. According to the Gupta and Shukla (1991), species diversity increased as the ecosystem develops and decrease with the maturity.

Concentration of dominance (C) shows reverse trend as compared to species diversity. In the present study the value of concentration of dominance ranged between 0.088 (UTF) to 0.185 (USF). These values are generally comparable with the values reported for temperate forests (Singh & Singh, 1986). Lower the value of C shows that area is shared by many species.

The β diversity is calculated to ascertain the degree of species turnover among the different sites classified on the basis of altitude, which is given in table 4.3. Maximum turnover for tree species was recorded between UTF and USF. Highest value of beta diversity indicates the heterogeneity in community while those of least value shows homogeneity in community.

Low value of beta diversity in between LSF and USF was due to the commonality of species and low rate of species turnover. The value is an indication of lesser impact of altitudinal and vegetational differences on the significance turnover of species among the studied sites. Verma *et al.* (2001) put forth that not only macro-environment but also plant may change the microenvironment and soil fertility, which in turn affects the species turn over. Invariably, all the sites showed remarkable degree of dissimilarity in their vegetation composition and structure. This may be the reflection of the differences in altitude, local environment factors, and vegetation types.

Index of similarity (IS) is calculated regarding the number of common species present in studied sites. Similarity index among three studied sites are given in table 4.3. The IS values ranged between 14.29 and 51.85. The value was highest in between LSF and USF. This may be because of overlapping some common taxa. Invariably all the sites of the present investigation showed remarkable degree of dissimilarity in their composition and structure. The most frequent and common species have a greater role on similarity between two sites (Podani, 1978). So, variation in altitudinal range is the most important factor for determining the IS. It may also be due to the different topography and edaphic factors. Floristic similarity is the response of species to the micro and micro environment (Krebs, 1999).

6. CONCLUSION AND RECOMMENDATION

6.1 Conclusion

On the basis of recorded species, this can be concluded that the study area is rich in terms of plant resources along the Kangchenjungha-Singhalila ridge. The area provides habitats for plant species in the sense that documented species are threatened, endemic, and archaic floral species. The present study has been undertaken to explore the plant diversity and assess species composition of tree species along the elevation gradient.

Altogether 320 plants species belonging 271 species of Dicotyledonae, 44 species of Monocotyledonae, and five species of Gymnospermae were reported from the study area. Species richness in terms of species number was greatly contributed by herbaceous species. Six species viz. *Calamagrostis lahulensis*, *Begonia panchtharensis* (new to plant science), *Swertia wardii*, *Castanopsis longispina*, *Rubia hispidicaulis*, and *Acronema ioniostyles* were recorded as new species to flora of Nepal. There are also 10 species recorded as threatened species from the study area. Archaic plants (viz. *Magnolia campbellii*, *Taxus wallichiana*, *Myrica esculanta*, and four species from the family lauraceae.) also recorded from the study area. Most of the recorded plant species were fall in the eastern Himalayan elements. The effect of monsoon climate is stronger in eastern Nepal, and during the rainy season more than 80% of the annual precipitation falls between June to September which is the main reason for the richness of plant species (Numata, 1999).

The community structures of all sites were quite distinct in terms of the contribution of dominant species. The decrease in tree diversity from Upper Temperate Forest to Upper Sub alpine Forest is due to the increase in altitude and other environmental factors. The UTF of our study is at low altitude as compare of other two sites, so human interference is high that is subjected to deforestation and forest fragmentation to forest land clearing, extraction of forest resources such as timber and various Non Timber Forest Products as fuel wood, collection of medicinal plants, fodders etc. Change in the species composition of particular area is not under the direct control of few limited factors. It is the assemblage of multiple factors interacting in that area. All the biotic as well as abiotic factors play the role on determining the species assemblage.

Less economic tree species showed higher population and regeneration while important tree species such as *Taxus wallichiana*, *Magnolia campbellii*, etc. showed less dominated due to lopping and over exploitation of timber so the forest may convert into unnecessary bushy forest in near future. Higher densities of trees having less than 20cm DBH and basal area of tree species in our study suggest that forest in each sites are in stage of growing and in state of regeneration

Biodiversity inventories of any area are needed for conservation management. Proper management of plant diversity in study area requires systematic documentation of plant species present in area, their ecology, and status. Because of the presence of diverse topography and unique habitats, study area is ideal for base-line studies of forest ecosystem and change in vegetation dynamics. To promote in sustainable plant resource conservation in the area, long term and species specific inclusive participatory programs should be lunched in comprehensive and coordinated fashion.

6.2 Recommendation

The study area lies within the territory of Kangchenjungha Conservation Area. Altogether from the study area 320 species under 203 genera and 83 families were identified and described up to 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 Kangchenjungha region which will be fruitful for the sustainable development of the local peoples as well as of the whole nation.

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.

Rampant grazing and unsustainable collection of forest products (Fodder, fuelwood, timber, and non-timber forest products) were mostly responsible for exacerbating the biodiversity of the ridge. Detailed ecological study of vegetation is needed for the development of conservation and management programs within the study area. A need of integrated conservation efforts and investments from all stakeholders working on conservation of biodiversity is imperative.

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Annex-1

Team Members in LKSR-Expedition

1. First trip (June 4-18, 2007)

LKSR-Expedition A

Collection Number

A 031 to A 079

Prof. Dr. Krishna K Shrestha
 Ms. Sangeeta Rajbhandary
 Mr. Jeevan Pandey
 Mr. Nar B Khatri
 Mr. Kamal Humagain

LKSR-Expedition B

B 007 to B 070

Mr. Jeevan Pandey
 Mr. Ripu M Kunwar
 Mr. Bhaskar Adhikari
 Mr. Ram C Poudel

2. Second trip (September 16 to October 8, 2007)

Collection Number

LKSR-Expedition D

D 001 to D 374

Prof. Dr. Krishna K Shrestha
 Mr. Jeevan Pandey
 Mr. Ripu M Kunwar
 Mr. Nar B Khatri
 Mr. Kamal humagain
 Mr. Man K Dhamala

Itinerary- 1st Field Trip (June 4-18, 2007)

Date	Day	Place (Location)	Activities
2007/06/04	1 st	Kathmandu-Ilam	Traveling by bus from Kathmandu to Ilam.
2007/06/05	2 nd	Ilam Bazaar	Field preparation, trail fixing with the help of local, shopping for the field.
2007/06/06	3 rd	Ilam-Maimajhuwa (Ilam)	Traveling by vehicle, lodged at Maimajhuwa
2007/06/07	4 th	Maimajhuwa-Goruwale (Sididn)	Collection and management of specimens was started.
2007/06/08	5 th	Goruwale-Dhupi (Sidin)	Collection of specimens and ecological study started.
2007/06/09	6 th	Dhupi-Chandu (Prangbung)	Specimen collection and management was continued.
2007/06/10	7 th	Chandu-Pasibhanjyang (Prangbung)	Ecological sampling and plant collection
2007/06/11	8 th	Pasibhanjyang-Gorkhepani (Memeng)	Plant collection and their management
2007/06/12	9 th	Gorkhepani-Tinsimana (Memeng)	Specimen collection and ecological sampling
2007/06/13	10 th	Gorkhepani-Aahalebhanjyang (Sidin)	Due to heavy rainfall, research team came back
2007/06/14	11 th	Aahalebhanjyang-Kalapokhari (Ilam)	Walking on trail to back Ilam bazaar.
2007/06/15	12 th	Kalapokhari-Hangetham (Ilam)	Walking on trail
2007/06/16	13 th	Hangtham-Ilam bazaar	Walking on trail
2007/06/17	14 th	Ilam bazaar	Taking rest
2007/06/18	15 th	Ilam-Kathmandu	Traveling by bus from Ilam to Kathmandu

Annex-1.3 Itinerary- 2nd Field Trip (September 16 to October 8, 2007)

Date	Day	Place (Location)	Activities
2007/08/23 to 09/15	----	Kathmandu-Ilam	Field visit in Ilam
2007/09/16	1 st	Ilam bazaar-Manebhanjyang (India)	Traveling by vehicle for second field trip

2007/09/17	2 nd	Manebhanjyang-Phalot (Memeng)	Traveling by vehicle
2007/09/18	3 rd	Phalot-Chiwabhanjyang (Chyangthapu)	Collection and management of specimens was started.
2007/09/19	4 th	Chiwabhanjyang-Mejor (Chyangthapu)	Collection of specimens and ecological study started.
2007/09/20	5 th	Mejor-Gairi (Falaincha)	Collection and their management, ecological sampling
2007/09/21	6 th	Gairi-Dund (Falaincha)	Collection and their management, ecological sampling
2007/09/22	7 th	Dund-Paharemeghu (Falaincha)	Collection and their management, ecological sampling
2007/09/23	8 th	Paharemeghu-Ghumne (Falaincha)	Collection and their management, ecological sampling
2007/09/24	9 th	Ghumne-Timbupokhari-Paharemeghu	Plant specimens collection and their management
2007/09/25	10 th	Paharemeghu-Faleke (Falaincha)	Walking on trail
2007/09/26	11 th	Faleke-Betini (Falaincha)	Plant specimens collection and their management
2007/09/27	12 th	Betini-Chamling danda (Chyangthapu)	Plant specimen collection and their management, ecological sampling
2007/09/28	13 th	Chamling danda-Dabale (Memeng)	Specimen collection and management, ecological sampling
2007/09/29	14 th	Dabale-Memeng gaun (Memeng)	Specimen collection and management, ecological sampling
2007/09/30	15 th	Memeng gaun	Specimen collection and management, ecological sampling
2007/10/01	16 th	Memeng gaun-Taalkharka (Prangbung)	Specimen collection and management, ecological sampling
2007/10/02	17 th	Taalkharka-Prangbung bazaar (Prangbung)	Specimen collection and management, ecological sampling
2007/10/03	18 th	Prangbung bazaar	Specimen collection and management, ecological sampling
2007/10/04	19 th	Prangbung bazaar	Discussions with locals and taking rest
2007/10/05	20 th	Prangbung-Goruwale (Sidin)	Specimen collection and management, ecological sampling
2007/10/06	21 st	Goruwale-Maimajhuwa (Ilam)	Walking on trail
2007/10/07	22 nd	Maimajhuwa-Ilam-Birtamod (Jhapa)	Traveling by vehicle
2007/10/08	23 rd	Birtamod-Kathmandu	Traveling by vehicle and arrival in Kathmandu

Annex -2

Table 2.1: Frequency, RF, density, RD, Basal area, RBA and Importance Value Index (IVI) in Upper temperate Forest (UTF)

Name of species	F	R F	D ha ⁻¹	R D	BA m ² ha ⁻¹	R BA	IVI
<i>Lithocarpus pachyphylla</i>	73.33	15.38	213.33	16.71	48.79	33.11	65.21
<i>Symlocos ramosissima</i>	50.00	10.49	196.66	15.40	7.74	5.25	31.15
<i>Quercus lamellosa</i>	16.66	3.49	26.66	2.08	28.43	19.30	24.88
<i>Daphniphyllum himalense</i>	26.66	5.59	156.66	12.27	6.91	4.69	22.55
<i>Acer campbellii</i>	36.66	7.69	56.66	4.43	6.89	4.68	16.81
<i>Lyonia ovalifolia</i>	26.66	5.59	100.00	7.83	4.52	3.07	16.49
<i>Magnolia campbellii</i>	20.00	4.19	66.66	5.22	8.15	5.53	14.95
<i>Myrsine capitellata</i>	23.33	4.89	46.66	3.65	4.88	3.31	11.86
<i>Symlocos glomerata</i>	20.00	4.19	46.66	3.65	2.45	1.66	9.51
<i>Taxus wallichina</i>	13.33	2.79	63.33	4.96	1.63	1.10	8.86
<i>Eurya acuminata</i>	20.00	4.19	50.00	3.91	0.68	0.46	8.57
<i>Rhododendron arboreum</i>	16.66	3.49	26.66	2.08	3.80	2.58	8.16
<i>Viburnum mullaha</i>	20.00	4.19	33.33	2.61	0.54	0.36	7.17
<i>Persea odoratissima</i>	13.33	2.79	16.66	1.30	3.19	2.16	6.27
<i>Alangium alpinum</i>	16.66	3.49	26.66	2.08	0.71	0.48	6.07
<i>Ilex sikkimensis</i>	13.33	2.79	20.00	1.56	0.98	0.66	5.030
<i>Quercus glauca</i>	10.00	2.09	16.66	1.30	2.26	1.53	4.941
<i>Quercus semecarpifolia</i>	3.33	0.69	33.33	2.61	1.98	1.34	4.65
<i>Prunus cerasoides</i>	10.00	2.09	13.33	1.04	1.61	1.09	4.23
BELASE	3.33	0.69	3.33	0.26	4.42	3.00	3.96
<i>Pentopanax trifoliatus</i>	6.66	1.39	6.66	0.52	1.73	1.17	3.09
<i>Lindera</i> sp. (lekali timur)	6.66	1.39	16.66	1.30	0.43	0.29	2.99
KHANKPA	6.66	1.39	6.66	0.52	0.77	0.52	2.44
<i>Corylus</i> sp. (Pasa)	3.33	0.69	13.33	1.04	0.41	0.28	2.02
<i>Rhododendron. falconeri</i>	3.33	0.69	3.33	0.26	1.28	0.87	1.83
<i>Acer caudatum</i>	3.33	0.69	3.33	0.26	1.28	0.87	1.83
<i>Macaranga indica</i>	3.33	0.69	3.33	0.26	0.48	0.32	1.28
<i>Ficus infectoralis</i>	3.33	0.69	3.33	0.26	0.16	0.11	1.07
<i>Cinnamomum glanduliferum</i>	3.33	0.69	3.33	0.26	0.09	0.06	1.02
<i>Sauraria napaulensis</i>	3.33	0.69	3.33	0.26	0.02	0.01	0.97
Total	476.67	100.00	1276.67	100.00	147.34	100.00	300.00

Table 2.2: Frequency, RF, density, RD, Basal area, RBA and Importance Value Index (IVI) in Lower subalpine forest (LSF)

Name of species	F	RF	D ha ⁻¹	RD	BA m ² ha ⁻¹	R BA	IVI
<i>Acer caudatum</i>	46.15	13.33	123.07	16.32	3.11	12.63	42.29
<i>Sorbus foliolosa</i>	38.46	11.11	107.69	14.28	2.91	11.85	37.25
<i>Acer campbelli</i>	30.76	8.88	53.84	7.14	4.10	16.66	32.69
<i>Prunus cornuata</i>	38.46	11.11	76.92	10.20	2.22	9.05	30.36
<i>R. barbatum</i>	23.07	6.66	53.84	7.14	2.61	10.61	24.42
<i>R. grande</i>	23.07	6.66	69.23	9.18	1.27	5.19	21.04
<i>Betula utilis</i>	15.38	4.44	38.46	5.10	1.74	7.07	16.61
<i>Viburnum mullah</i>	23.07	6.66	46.15	6.12	0.67	2.75	15.54
<i>Abies spectabilis</i>	7.69	2.22	7.69	1.02	2.71	11.02	14.26
<i>Lyonia ovalifolia</i>	23.07	6.66	30.76	4.08	0.65	2.67	13.42
<i>R. fulconeri</i>	15.38	4.44	38.46	5.10	0.91	3.71	13.26
<i>Viburnum nervosa</i>	23.07	6.66	30.76	4.08	0.37	1.53	12.28
<i>R. thomsonii</i>	15.38	4.44	38.46	5.10	0.45	1.82	11.37
<i>Pentapanax leschanultii</i>	15.38	4.44	30.76	4.08	0.63	2.59	11.11
<i>Eurya accuminata</i>	7.69	2.22	7.69	1.02	0.19	0.79	4.03
Total	346.15	100.00	753.84	100.00	24.62	100.00	300.00

Table 2.3: Frequency, RF, density, RD, Basal area, RBA and Importance Value Index (IVI) in Upper subalpine forest (USF)

Name of species	F	RF	D ha ⁻¹	RD	BA m ² ha ⁻¹	RBA	IVI
<i>R. campanulatum</i>	47.36	18.00	494.73	33.09	6.44	12.64	63.74
<i>Abies spectabilis</i>	26.31	10.00	68.42	4.57	20.87	40.96	55.54
<i>Sorbus foliolosa</i>	63.15	24.00	263.15	17.60	5.53	10.86	52.46
<i>R. grande</i>	26.31	10.00	252.63	16.90	3.45	6.77	33.67
<i>R. falconeri</i>	21.05	8.00	121.05	8.09	3.11	6.10	22.20
<i>Sorbus microphylla</i>	15.78	6.00	89.47	5.98	1.77	3.48	15.46
<i>Acer caudatum</i>	10.52	4.00	47.36	3.16	4.13	8.11	15.28
<i>R. thomsonii</i>	21.05	8.00	52.63	3.52	0.68	1.35	12.87
<i>Betula utilis</i>	10.52	4.00	26.31	1.76	3.21	6.30	12.06
<i>Prunus cornuata</i>	10.52	4.00	36.84	2.46	0.95	1.87	8.33
<i>Viburnum nervosa</i>	5.26	2.00	26.31	1.76	0.47	0.93	4.69
<i>Acer campbellii</i>	5.26	2.00	15.78	1.05	0.30	0.59	3.65
Total	263.15	100.00	1494.73	100.00	50.95	100.00	300.00

Table 2.4: Density (trees/ha) of different DBH class in UTF, LSF, and USF.

DBH in cm	Upper temperate forest	Lower subalpine forest	Upper subalpine forest
10-20	453.3	615.4	1294.7
20-30	306.7	161.5	205.3
30-40	153.3	61.5	26.3
40-50	110.0	23.1	21.1
50-60	56.7	15.4	21.5
60-70	40.0	15.4	10.0
70-80	40.0	30.8	17.4
80-90	13.3	45.0	16.5
90-100	16.7	23.5	15.8
100-110	13.3	15.4	25.0
110-120	3.3	19.4	10.5
120-130	16.7	12.40	-
130<	30.0	-	-

Annex -3

Table 3.1 Plant species (Gymnosperms) of LKSR, Panchthar district

SN	CN	Family	Plant name	Date (2007)	Alt. (m.)	Lat.
1.	D 063	Cupressaceae	<i>Juniperus recurva</i> Buch.-Ham. ex D. Don	09/21	3855	27 24 23
2.	D 037	Pinaceae	<i>Abies spectabilis</i> (D. Don) Mirb	09/20	3475	27 18 22
3.	D 270	Pinaceae	<i>Pinus roxburghii</i> Sarg.	09/29	2500	27 12 58
4.	B 054	Pinaceae	<i>Pinus wallichiana</i> A. B. Jacks	06/11	3445	27 .17
5.	D 139	Taxaceae	<i>Taxus wallichiana</i> Zucc	09/25	3280	27 18 13

Table 3.2 Plant species (Dicots) of LKSR, Panchthar district

SN	CN	Family	Plant name	Date (2007)	Alt. (m.)
6.	D 208	Acanthaceae	<i>Thunbergia coccinea</i> Wall. ex D. Don	09/27	1900
7.	D 287	Acanthaceae	<i>Strobilanthus capitata</i> (Nees) T. Anders.	09/29	2390
8.	D 293	Acanthaceae	<i>Justicia procumbens</i> L. var. <i>simplex</i> (D. Don) T. Yamaz.	09/30	2005
9.	D 009	Aceraceae	<i>Acer campbelli</i> Hook. f. & Thomson ex Hiern in Hook. f.	09/19	3530
10.	D 018	Aceraceae	<i>Acer caudatum</i> Wall.	09/19	3530
11.	D 260	Alangiaceae	<i>Alangium alpinum</i> (C.B. Clarke) W.W. Sm. & Cave	09/29	2640
12.	D 154	Anacardiaceae	<i>Dobinea vulgaris</i> Buch.-Ham ex D. Don	09/26	3210
13.	D 171	Anacardiaceae	<i>Rhus javonoca</i> L.	09/26	1947
14.	D 160	Aquifoliaceae	<i>Ilex sikimensis</i> Kurz	09/26	2656
15.	D 166	Aquifoliaceae	<i>Ilex dipyrena</i> Wall	09/26	3210
16.	B 030	Araliaceae	<i>Panax pseudo-ginseng</i> Wall. subsp. <i>pseudo-ginseng</i>	06/08	3057
17.	D 008	Araliaceae	<i>Pantapanax leschanultii</i> (DC.) Seem	09/19	3280
18.	D 286	Araliaceae	<i>Hedera nepalensis</i> K. Koch	09/29	1974
19.	A 046	Asclepiadaceae	<i>Hoya longifolia</i> Wall. ex Wight	06/08	2837
20.	D 182	Asclepiadaceae	<i>Ceropegia hookerii</i> C.B. Clarke ex Hook.f. var. <i>hookeri</i>	09/27	2481
21.	D 340	Asclepiadaceae	<i>Ceropegia pubescens</i> Wall.	10/01	1890
22.	D 027	Asteraceae	<i>Senecio wallichii</i> DC.	09/20	3450
23.	D 055	Asteraceae	<i>Anaphalis contorta</i> (D. Don) Hook. f. var. <i>contorta</i>	09/21	3680
24.	D 056	Asteraceae	<i>Saussurea uniflora</i> Wall. ex Sch. Bip.	09/21	3680
25.	D 065	Asteraceae	<i>Saussurea taraxisifolia</i> Wall. ex DC.	09/21	3855
26.	D 108	Asteraceae	<i>Cremanthodium raniform</i> (DC) Benth.	09/23	4337
27.	D 133	Asteraceae	<i>Saussurea gossypiphora</i> D. Don	09/24	4337
28.	D 141	Asteraceae	<i>Cirsium falconeri</i> (Hook.f.) Petr.	09/26	3210
29.	D 177	Asteraceae	<i>Anaphalis margaritacea</i> (L.) Benth.	09/26	1980
30.	D 193	Asteraceae	<i>Gerbera maxima</i> (D. Don) Beauverd var. <i>maxima</i>	09/27	1980
31.	D 201	Asteraceae	<i>Inula cappa</i> (Buch.-Ham. ex D. Don) DC.	09/27	1900
32.	D 299	Asteraceae	<i>Artemisia dubia</i> Wall. ex Besser	09/30	2005
33.	D 316	Asteraceae	<i>Conyza stricta</i> Willd.	09/30	2550
34.	D 361	Asteraceae	<i>Ageratum conizoides</i> L.	10/02	1893
35.	D 362	Asteraceae	<i>Bidens pilosa</i> var. <i>minor</i> (Blume) Sherff	10/02	1893
36.	D 364	Asteraceae	<i>Artemisia vulgaris</i> auct	10/02	1893
37.	D 006	Balsaminaceae	<i>Impatiens falcifer</i> Hook.f.	09/19	3170
38.	D 150	Balsaminaceae	<i>Impatiens racemosa</i> DC.	09/26	3280
39.	D 234	Balsaminaceae	<i>Impatiens spirifer</i> Hook. f. & Thomson	09/28	1947
40.	D 259	Balsaminaceae	<i>Impatiens urticifolia</i> Wall.	09/29	2640
41.	D 262	Balsaminaceae	<i>Impatiens puberula</i> DC.	09/29	2750
42.	D 328	Balsaminaceae	<i>Impatiens discolor</i> DC.	10/01	2115
43.	D 237	Begoniaceae	<i>Begonia cathcartii</i> Hook. f.	09/28	1947
44.	D 264	Begoniaceae	<i>Begonia gemmipara</i> Hook.f.	09/29	2750
45.	D 280	Begoniaceae	<i>Begonia josephii</i> A. DC.	09/29	2390
46.	D 357	Begoniaceae	<i>Begonia panchtharensis</i> S. Rajbhandary & K.K. Shrestha, <i>sp. nov.</i> (in Press)	10/02	2248
47.	B 007	Berberidaceae	<i>Mahonia napaulensis</i> DC.	06/07	2244
48.	B 028	Berberidaceae	<i>Berberis hookeri</i> Lem.	06/08	3035
49.	B 034	Berberidaceae	<i>Berberis angulosa</i> Wall. ex Hook. f. & Thomson	06/09	3357
50.	D 137	Berberidaceae	<i>Berberis tsarica</i> Ahrendt	09/25	3355
51.	D 140	Betulaceae	<i>Betula utilis</i> D. Don.	09/26	3280
52.	D 365	Betulaceae	<i>Alnus nepalensis</i> D. Don.	10/02	1893
53.	B 011	Boraginaceae	<i>Microula pustulosa</i> (C.B. Clarke) Duthie	06/08	2870
54.	D 095	Boraginaceae	<i>Hackelia uncinata</i> (benth. In Royle) C.S.E. Fisch.	09/23	3910
55.	D 176	Buxaceae	<i>Sarcococca hookeriana</i> Baill.	09/26	3210
56.	D 339	Buxaceae	<i>Sarcococca wallichii</i> Stapf	10/01	1800
57.	D 001	Campanulaceae	<i>Cyananthus hookeri</i> C.B. Clarke	09/18	3580
58.	D 043	Campanulaceae	<i>Lobelia pyramidalis</i> Wall.	09/20	3475
59.	D 054	Campanulaceae	<i>Codonopsis thalictrifolia</i> Wall.	09/21	3680
60.	D 230	Campanulaceae	<i>Codonopsis viridis</i> Wall.	09/28	1791
61.	D 271	campanulaceae	<i>Lobelia seguinii</i> var. <i>doniana</i> (Skotts.) E. Wimm	09/29	2500
62.	D 374	Campanulaceae	<i>Cyananthes inflatus</i> Hook.f.	09/20	3450
63.	D 102	Caprifoliaceae	<i>Lonicera cyanocarpa</i> var. <i>porphyrantha</i> C. Marquand & Airy Shaw in C. Marquand	09/23	3910
64.	B 062	Caprifoliaceae	<i>Lonicera angustifolia</i> Wall. ex DC.	06/12	3374
65.	D 061	Caryophyllaceae	<i>Cerastium glomeratum</i> Thuill.	09/21	3910
66.	D 096	Caryophyllaceae	<i>Stellaria subumbellata</i> Edgew. ex Edgew. & Hook.f.	09/23	4050
67.	D 124	Caryophyllaceae	<i>Stellaria decumbens</i> Edgew. var. <i>decumbens</i>	09/24	4337

68.	D 138	Caryophyllaceae	<i>Arenaria depauperata</i> (Edgew.) H.Hara	09/25	3280
69.	D 252	Caryophyllaceae	<i>Stellaria monosperma</i> Buch.-Ham. ex D.Don	09/29	2684
70.	D 369	Caryophyllaceae	<i>Stellaria sikkimensis</i> Hook.f. ex Edgew. & Hook.f.	09/20	3450
71.	D 035	Crassulaceae	<i>Sedum triactina</i> Berger	09/20	3735
72.	D 073	Crassulaceae	<i>Rhodiola himalensis</i> (D.Don) S.H.Fu	09/21	4050
73.	D 113	Crassulaceae	<i>Sedum oreades</i> (Decne.) Raym.-Hamet	09/23	3910
74.	A 040	Cruciferae	<i>Cardamine scutata</i> subsp. <i>scutata</i> (With.) H. Hara	06/08	2835
75.	B 058	Cruciferae	<i>Cardamine macrophylla</i> subsp. <i>polyphylla</i> Willd.	06/12	3374
76.	D 297	Cuscutaceae	<i>Cuscuta reflexa</i> Roxb. var. <i>brachystigma</i> Engelm.	09/30	2861
77.	D 172	Daphniphyllaceae	<i>Daphniphyllum himalense</i> (Benth.) Mull. Arg.	09/26	1947
78.	D 015	Dipsacaceae	<i>Morina nepalensis</i> D. Don	09/19	3530
79.	A 031	Ericaceae	<i>Vaccinium retosum</i> (Griff.)Hook.f. ex C.B. Clarke	06/07	2812
80.	B 013	Ericaceae	<i>Rhododendron lindleyi</i> T.Moore	06/08	2870
81.	B 025	Ericaceae	<i>Vaccinium nummularia</i> Hook.f. & Thomson ex C.B. Clarke	06/08	3007
82.	B 037	Ericaceae	<i>Rhododendron cinnabarinum</i> Hook.f.	06/09	3418
83.	B 043	Ericaceae	<i>Rhododendron hodgsonii</i> Hook.f.	06/10	3454
84.	B 050	Ericaceae	<i>Gaultheria pyroloides</i> Hook.f. & Thomson ex Miq.	06/11	3445
85.	D 010	Ericaceae	<i>Rhododendron falconeri</i> Hook.f.	09/19	3530
86.	D 016	Ericaceae	<i>Rhododendron grande</i> Wight	09/19	3530
87.	D 021	Ericaceae	<i>Gaultheria trichophylla</i> Royle	09/19	3530
88.	D 062	Ericaceae	<i>Rhododendron campanulatum</i> D. Don	09/21	3855
89.	D 069	Ericaceae	<i>Rhododendron thomsonii</i> Hook.f.	09/22	3735
90.	D 086	Ericaceae	<i>Rhododendron anthopogon</i> D.Don	09/22	3930
91.	D 098	Ericaceae	<i>Rhododendron dalhousiae</i> Hook. f.	09/23	4050
92.	D 100	Ericaceae	<i>Rhododendron lepidotum</i> Wall.ex G.Don	09/23	3910
93.	D 110	Ericaceae	<i>Cassiope fastigiata</i> (Wall.)D.Don	09/23	4050
94.	D 115	Ericaceae	<i>Rhododendron setosum</i> D. Don	09/23	4190
95.	D 120	Ericaceae	<i>Rhododendron barbatum</i> Wall. ex G. Don var. <i>barbatum</i>	09/23	4000
96.	D 152	Ericaceae	<i>Rhododendron arboreum</i> Sm.	09/26	3210
97.	D 164	Ericaceae	<i>Lyonia ovalifolia</i> (Wall.) Drude	09/26	1947
98.	D 236	Ericaceae	<i>Agapetis incurvata</i> var. <i>hookeri</i> (CB Clarke) Airy Shaw	09/28	1947
99.	D 269	Ericaceae	<i>Agapetis smithiana</i> Sleumer	09/29	2500
100.	D 352	Ericaceae	<i>Gaultheria nummularioides</i> D.Don	10/02	2588
101.	D 354	Ericaceae	<i>Gaultheria semi-infera</i> (C.B.Clarke) Airy Shaw	10/02	2588
102.	D 324	Euphorbiaceae	<i>Phyllanthus parvifolius</i> Buch.-Ham. ex D.Don	10/01	1775
103.	D 197	Fabaceae	<i>Crotalaria albida</i> Heyne ex Roth	09/27	1570
104.	D 215	Fabaceae	<i>Aeschynomene indica</i> L.	09/28	1570
105.	D 220	Fabaceae	<i>Desmodium multiflorum</i> DC.	09/28	2390
106.	D 284	Fabaceae	<i>Astragalus stipulatus</i> D.Don ex Sims	09/29	2390
107.	D 301	Fabaceae	<i>Desmodium heterocarpon</i> (L.)DC.	09/30	1991
108.	D 303	Fabaceae	<i>Albizia chinensis</i> (Osbesk) Merr.	09/30	1991
109.	D 304	Fabaceae	<i>Desmodium microphyllum</i> (Thunb.)DC.	09/30	1991
110.	D 305	Fabaceae	<i>Smithia ciliata</i> Royle	09/30	1991
111.	D 307	Fabaceae	<i>Crotalaria cytisoides</i> Roxb. ex DC.	09/30	1991
112.	D 309	Fabaceae	<i>Crotalaria alata</i> Buch.-Ham. ex D.Don	09/30	2050
113.	D 169	Fagaceae	<i>Lithocarpus grandifolius</i> (DC.) S. N. Biswas	09/26	3210
114.	D 173	Fagaceae	<i>Lithocarpus pachyphylla</i> (Kurz) Rehder	09/26	3210
115.	D 178	Fagaceae	<i>Quercus glauca</i> Thunb.	09/26	3210
116.	D 200	Fagaceae	<i>Castanopsis longispina</i> (King ex Hook.f.) C.C.Huang & Y.T.Chang	09/27	1900
117.	D 277	Fagaceae	<i>Quercus semicarpifolia</i> Sm.	09/29	2390
118.	D 329	Fagaceae	<i>Castanopsis hystrix</i> Miq.	10/01	2115
119.	D 332	Fagaceae	<i>Quercus lamellosa</i> Roxb	10/01	2481
120.	D 059	Fumariaceae	<i>Corydalis juncea</i> Wall.	09/21	3735
121.	D 079	Fumariaceae	<i>Corydalis cashmeriana</i> Royle var. <i>cristata</i>	09/22	3930
122.	D 090	Fumariaceae	<i>Corydalis stracheyi</i> Prain	09/22	3910
123.	D 232	Fumariaceae	<i>Dicentra macrocapnos</i> Prain	09/28	2750
124.	D 263	Fumariaceae	<i>Corydalis chaerophylla</i> DC.	09/29	1991
125.	D 002	Gentianaceae	<i>Gentiana obconica</i> Ho	09/18	3580
126.	D 042	Gentianaceae	<i>Swertia aungustifolia</i> Buch.Ham.ex D.Don	09/20	3580
127.	D 045	Gentianaceae	<i>Gentiana sikkimensis</i> C.B. Clarke	09/21	3475
128.	D 058	Gentianaceae	<i>Swertia nervosa</i> (G. Don) CB clarke	09/21	3820
129.	D 085	Gentianaceae	<i>Swertia teres</i> (G. Don) J.Shah	09/22	3820
130.	D 099	Gentianaceae	<i>Swertia wardii</i> Marquand	09/23	3910
131.	D 111	Gentianaceae	<i>Swertia cuneata</i> D.Don	09/23	3910
132.	D 116	Gentianaceae	<i>Lomatogonium himalainse</i> (Klotzsh) E. Aitkin	09/23	4050
133.	D 143	Gentianaceae	<i>Tripterospermum volubile</i> (G.Don) H.Hara subsp. <i>volubile</i>	09/26	3385
134.	D 210	Gentianaceae	<i>Swertia bimaculata</i> (Siebold & Zucc.) C.B. Clarke	09/27	1900
135.	D 244	Gentianaceae	<i>Swertia chirayita</i> (Roxb.ex Fleming)H.Karst	09/28	1900
136.	D 247	Gentianaceae	<i>Crawfordia speciosa</i> Wall.	09/28	2194
137.	D 179	Gesneriaceae	<i>Corallodiscus lanuginosus</i> (Wall.ex DC.)Burt	09/26	1570
138.	D 336	Gesneriaceae	<i>Aeschynanthes indica</i> L.	10/01	1800
139.	D 022	Hydrangeaceae	<i>Hydrangea heteromalla</i> D.Don	09/19	3170
140.	D 229	Hydrangeaceae	<i>Hydrangea aspera</i> Buch.-Ham. ex D.Don var. <i>robusta</i>	09/28	1974
141.	D 331	Hydrangeaceae	<i>Hydrangea anomala</i> D.Don	10/01	1800

142.	D 023	Hypericaceae	<i>Hypericum petiolulatum</i> Hook.f. & Thomson ex Dyer	09/20	3450
143.	D 162	Hypericaceae	<i>Hypericum choisianum</i> Wall.ex N.Robson	09/26	2194
144.	D 246	Hypericaceae	<i>Hypericum hookerianum</i> Wight & Arn	09/28	2665
145.	D 091	Labiatae	<i>Elsholtzia strobilifera</i> (Benth.) Benth	09/22	3210
146.	D 109	Labiatae	<i>Dracocephalum wallichii</i> Sealy	09/23	3210
147.	D 175	Labiatae	<i>Elsholtzia fruticosa</i> (D.Don)Rehder	09/26	1947
148.	D 181	Labiatae	<i>Colquhonia coccinea</i> Wall. var. <i>coccinea</i>	09/27	2390
149.	D 189	Labiatae	<i>Elsholtzia blanda</i> (Benth.) Benth.	09/28	2390
150.	D 235	Labiatae	<i>Leucas ciliate</i> Benth.	09/28	2005
151.	D 274	Labiatae	<i>Clinopodium umbrosum</i> (M.Bieb.)K.Koch	09/29	2005
152.	D 288	Labiatae	<i>Isodon lophanthoides</i> (Buch.-Ham. ex D.Don) H. Hara	09/29	2550
153.	D 315	Labiatae	<i>Leucas mollissima</i> Wall. ex Benth.	09/30	1991
154.	D 155	Lauraceae	<i>Litsea kingii</i> Hook. f.	09/26	2656
155.	D 163	Lauraceae	<i>Persia odoratissima</i> (Nees) Kosterm.	09/26	2656
156.	D 231	Lauraceae	<i>Neolitsea cuipala</i> (Buch.-Ham. ex D. Don) Kosterm.	09/28	2005
157.	D 238	Lauraceae	<i>Lindera neesiana</i> (Wall. ex Nees) Kurz	09/28	2005
158.	D 174	Magnoliaceae	<i>Magnolia campbelli</i> Hook.f. & Thomson	09/26	2005
159.	D 294	Malvaceae	<i>Urena lobata</i> L.	09/30	1991
160.	D 306	Malvaceae	<i>Sida rhombifolia</i> L.	09/30	1775
161.	D 321	Malvaceae	<i>Thespesia lampas</i> (Cav.)Dalzell & Gibson	10/01	2100
162.	D 248	Melastomataceae	<i>Oxyspora paniculata</i> (D.Don)DC.	09/28	2194
163.	D 312	Melastomataceae	<i>Osbeckia nepalensis</i> Hook.	09/30	3210
164.	D 161	Menispermaceae	<i>Stephania glabra</i> (Roxb.)Miers	09/26	1900
165.	D 283	Menispermaceae	<i>Stephania elegans</i> Hok.f. & Thomson	09/29	2457
166.	D 281	Moraceae	<i>Ficus pubigera</i> (Wall.ex Miq.)Brandis	09/29	1900
167.	D 212	Myricaceae	<i>Myrica esculanta</i> Buch.-Ham. ex D.Don	09/27	2656
168.	B 070	Papaveraceae	<i>Meconopsis lyrata</i> (Cummins & Prain) Fedde ex Prain	06/12	3374
169.	D 034	Papaveraceae	<i>Meconopsis nepaulensis</i> DC.	09/20	3820
170.	D 129	Papaveraceae	<i>Meconopsis simplicifolia</i> (D.Don) Walp.	09/24	4337
171.	D 367	Papaveraceae	<i>Meconopsis paniculata</i> Prain	09/20	3450
172.	D 106	Parnassiaceae	<i>Parnassia nubicola</i> Wall.ex Royle	09/23	3910
173.	D 186	Piperaceae	<i>Piper mellesua</i> Buch.-Ham. ex D.Don	09/27	1893
174.	D 363	Plantaginaceae	<i>Plantago erosa</i> Wall.	10/02	1974
175.	D 308	Polygalaceae	<i>Polygalla persicarifolia</i> DC.	09/30	1837
176.	D 084	Polygonaceae	<i>Bistorta amplexicaulis</i> (D. Don) Greene	09/22	4050
177.	D 121	Polygonaceae	<i>Bistorta vivipara</i> (L.) Gray	09/23	4337
178.	D 132	Polygonaceae	<i>Rheum nobile</i> Hook. f. & Thomson	06/07	4337
179.	D 156	Polygonaceae	<i>Fagopyrum dibotrys</i> (D. Don) H. Hara	09/26	3210
180.	D 159	Polygonaceae	<i>Aconogonum campanulatum</i> (Hook. f.) H. Hara	09/26	1791
181.	D 227	Polygonaceae	<i>Persicaria pubescens</i> (Franch. & Sav.) H. Hara	09/28	2500
182.	D 268	Polygonaceae	<i>Persicaria chinensis</i> (Lam.) H. Hara	09/29	2115
183.	D 358	Polygonaceae	<i>Persicaria runcinata</i> (Buch.-Ham. ex D. Don) H. Gross	10/01	1890
184.	D 373	Polygonaceae	<i>Koenigia nepalensis</i> D. Don	09/20	3450
185.	D 080	Primulaceae	<i>Primula glomerata</i> Pax	09/22	3930
186.	D 092	Primulaceae	<i>Primula primulina</i> (Spreng.) H. Hara	09/22	4050
187.	A 042	Ranunculaceae	<i>Thalictrum virgatum</i> Hook. f. & Thomson	06/08	2837
188.	A 069	Ranunculaceae	<i>Anemone obtusiloba</i> D. Don	06/11	3445
189.	A 072	Ranunculaceae	<i>Ranunculus pulchellus</i> C.A.Mey	06/09	3550
190.	A 073	Ranunculaceae	<i>Ranunculus brotherusi</i> Freyn	06/09	3550
191.	A 075	Ranunculaceae	<i>Ranunculus diffusus</i> DC.	06/09	3550
192.	A 079	Ranunculaceae	<i>Ranunculus adoxifolius</i> Hand.-Mazz.	06/09	3420
193.	B 053	Ranunculaceae	<i>Clematis montana</i> Buch.-Ham.ex DC.	06/11	3445
194.	B 057	Ranunculaceae	<i>Caltha palustris</i> L.	06/12	3411
195.	D 029	Ranunculaceae	<i>Thalictrum chelidoni</i> DC.	09/20	3485
196.	D 072	Ranunculaceae	<i>Aconitum spicatum</i> (Bruhi.) Stapf	09/22	3850
197.	D 125	Ranunculaceae	<i>Delphinium caeruleum</i> Jacquem.ex Cambess.	09/22	4337
198.	D 126	Ranunculaceae	<i>Delphinium nepalense</i> Kitam. & Tamura	09/24	4337
199.	D 127	Ranunculaceae	<i>Aconitum hookeri</i> Stapf	09/24	4337
200.	D 349	Ranunculaceae	<i>Clematis connata</i> DC.	10/02	2588
201.	D 355	Ranunculaceae	<i>Clematis buchniana</i> DC.	10/01	1890
202.	A 066	Rosaceae	<i>Spiraea bella</i> Sims	06/09	3548
203.	B 024	Rosaceae	<i>Rubus hypargyryus</i> var. <i>niveus</i> (Wall. Ex. G.Don)H.Hara	06/08	3007
204.	B 026	Rosaceae	<i>Prunus cerasoides</i> D.Don	06/08	3035
205.	B 059	Rosaceae	<i>Geum sikkimense</i> Prain	06/12	3374
206.	D 019	Rosaceae	<i>Prunus cornuata</i> (Wall.ex Royle)	09/19	3820
207.	D 060	Rosaceae	<i>Fragaria daltoniana</i> Gay	09/21	3735
208.	D 068	Rosaceae	<i>Prunus rufa</i> var. <i>trichantha</i> (Koehne)H.Hara	09/22	3735
209.	D 075	Rosaceae	<i>Sorbus foliolosa</i> (Wall.)Spach	09/21	3930
210.	D 088	Rosaceae	<i>Potentilla fruticosa</i> var. <i>rigida</i> (Wall.ex Lehm.)Wolf	09/22	3910
211.	D 094	Rosaceae	<i>Sorbus microphylla</i> Wenz.	09/23	3910
212.	D 128	Rosaceae	<i>Potentilla peduncularis</i> D.Don	09/24	4337
213.	D 165	Rosaceae	<i>Cotoneaster microphyllus</i> Wall. ex Lindl.	09/26	1980
214.	D 192	Rosaceae	<i>Neillia thyrsiflora</i> D.Don	09/27	1980
215.	D 199	Rosaceae	<i>Agrimonia pilosa</i> var. <i>nepalensis</i> (D.Don) Nakai	09/27	2702
216.	D 261	Rosaceae	<i>Sorbus rhamnoides</i> (Decne.)Rehder	09/29	2750

217.	D 265	Rosaceae	<i>Rubus paniculatus</i> Sm.	09/29	2390
218.	D 276	Rosaceae	<i>Rubus acuminatus</i> Sm.	09/29	2750
219.	D 322	Rosaceae	<i>Pyracantha crenulata</i> (D.Don) M. Roem.	10/01	1775
220.	D 323	Rosaceae	<i>Rubus griffithii</i> Hook.f.	10/01	1780
221.	D 350	Rosaceae	<i>Rubus pentagonus</i> Wall.ex Focke	10/01	1890
222.	D 368	Rosaceae	<i>Rosa sericea</i> Lindl.	09/20	3450
223.	A 047	Rubiaceae	<i>Galium paradoxum</i> Maxim.	06/08	2837
224.	D 148	Rubiaceae	<i>Rubia wallichiana</i> Decne.	09/26	3210
225.	D 153	Rubiaceae	<i>Luculia gratissima</i> (Wall.)Sweet	09/26	1570
226.	D 221	Rubiaceae	<i>Hedyotis scandens</i> Roxb.	09/28	2390
227.	D 279	Rubiaceae	<i>Rubia hispidicaulis</i> Long	09/29	2450
228.	D 310	Rubiaceae	<i>Gallium hirtifolium</i> Req.ex DC.	09/30	1817
229.	D 142	Rutaceae	<i>Skimmia laureola</i> (DC.) Siebold & Zucc.	09/26	2050
230.	B 029	Salicaceae	<i>Salix sikkimensis</i> Anderson	06/08	3057
231.	D 117	Salicaceae	<i>Salix lindeylini</i> var. <i>microphylla</i> Anderson	09/23	4050
232.	D 036	Sambucaceae	<i>Viburnum nervosum</i> D.Don	09/20	3475
233.	D 327	Sambucaceae	<i>Viburnum mullaha</i> D. Don var. <i>mullaha</i>	10/01	2115
234.	D 003	Saxifragaceae	<i>Saxifraga diversifolia</i> Wall. ex Ser.	09/18	3580
235.	D 025	Saxifragaceae	<i>Astilbe rivularis</i> Buch.-Ham. ex D.Don	09/20	3450
236.	D 081	Saxifragaceae	<i>Saxifraga kingiana</i> Engl.&Irmsh.	09/22	3850
237.	D 082	Saxifragaceae	<i>Saxifraga brachypoda</i> D.Don	09/22	3850
238.	D 093	Saxifragaceae	<i>Bergenia purpurascens</i> (Hook.f. & Thomson)	09/22	3930
239.	B 032	Schisandraceae	<i>Schisandra grandiflora</i> (Wall.) Hook. f. & Thomson	06/08	3057
240.	A 034	Scrophulariaceae	<i>Mazus surculosus</i> D.Don	06/07	2812
241.	A 062	Scrophulariaceae	<i>Veronica szechuanensis</i> subsp. <i>Sikkimensis</i> (Hook. f.) Hong	06/09	3338
242.	D 048	Scrophulariaceae	<i>Pedicularis furfuracea</i> Wall.ex Benth.	09/21	3530
243.	D 051	Scrophulariaceae	<i>Pedicularis gracilis</i> Wall.ex Benth.	09/21	3640
244.	D 066	Scrophulariaceae	<i>Pedicularis megalantha</i> D.Don	09/21	3820
245.	D 122	Scrophulariaceae	<i>Pedicularis siphonantha</i> D. Don	09/24	4050
246.	D 134	Scrophulariaceae	<i>Neopicrorhiza scrophulariflora</i> (Pennell) Hong	09/25	4337
247.	D 170	Scrophulariaceae	<i>Calceolaria gracilis</i> Kunth	09/26	3210
248.	D 202	Scrophulariaceae	<i>Lindenbergia grandiflora</i> (Buch.-Ham. ex D.Don) Benth.	09/27	1900
249.	D 206	Scrophulariaceae	<i>Mimulus tenellus</i> var. <i>neplensis</i> (Benth) Tsoog ex Yang.	09/27	1900
250.	D 207	Scrophulariaceae	<i>Torenia violacea</i> (Azaola ex Blanco)Pennell	09/27	1900
251.	D 168	Symplocaceae	<i>Symplocos glomerata</i> King ex C.B.Clarke	09/26	3210
252.	D 341	Symplocaceae	<i>Symplocos lucida</i> (Thunb. Ex Murray) Siebold & Zucc.	10/01	1800
253.	D 243	Theaceae	<i>Eurya acuminata</i> DC.	09/28	1947
254.	D 282	Theaceae	<i>Camellia kissi</i> Wall.	09/29	2390
255.	D 196	Thymalaceae	<i>Daphne sureil</i> W.W.Sm.&Cave	09/27	1900
256.	D 258	Thymalaceae	<i>Daphne bholua</i> Buch.-Ham. ex D. Don	09/20	1991
257.	D 219	Tiliaceae	<i>Triumphetta annua</i> L.	09/28	1570
258.	D 004	Umbelliferae	<i>Heracleum sublineare</i> C.B.Clarke	09/18	3490
259.	D 049	Umbelliferae	<i>Heracleum lallii</i> C. Norman	09/21	3640
260.	D 052	Umbelliferae	<i>Sinocarum pulchellum</i> C.Norman ex M.F.Watson	09/21	3640
261.	D 105	Umbelliferae	<i>Pleurospermum apiolens</i> C.B.Clarke	09/23	3910
262.	D 151	Umbelliferae	<i>Selinum wallichianum</i> (DC.)Raizada & Saxena	09/26	3280
263.	D 195	Umbelliferae	<i>Angelica harae</i> Pimenov	09/27	1980
264.	D 256	Umbelliferae	<i>Hydrocotyle himalaica</i> P.K.Mukh.	09/29	2702
265.	D 257	Umbelliferae	<i>Acronema ioniostyles</i> Farille & Lachard	09/29	2702
266.	D 372	Umbelliferae	<i>Sinocarum sikkimense</i> (PK Mukh.) PK Mukh. & Constance	09/20	3450
267.	A 044	Urticaceae	<i>Pilea scripta</i> (Buch.-Ham.ex D.Don) Wedd	06/08	2837
268.	D 157	Urticaceae	<i>Debregeasia longifolia</i> Burm.f.	09/26	3210
269.	D 184	Urticaceae	<i>Boehmeria ternifolia</i> D.Don	09/27	1980
270.	D 185	Urticaceae	<i>Boehmeria macrophylla</i> D.Don	09/27	1980
271.	D 272	Urticaceae	<i>Bouhemaria hamiltoniana</i> Wedd.	09/29	2500
272.	D 360	Urticaceae	<i>Urtica dioica</i> L. var <i>atrachocaulis</i>	10/02	1893
273.	D 267	Valarianaceae	<i>Valariena hardwickii</i> Wall.	09/29	2500
274.	D 087	Valerianaceae	<i>Nardostachys grandiflora</i> DC.	09/22	3930
275.	A 050	Violaceae	<i>Viola biflora</i> L.	06/08	2920
276.	D 218	Vitaceae	<i>Tetrastigma serrulatum</i> (Roxb.) Planch.	09/28	1570

Table 3.3 Plant species (Monocots) of LKSR, Panchthar districts

SN	CN	Family	Plant name	Date	Alt.	Lat.
277.	D 119	Araceae	<i>Arisaema jacquemontii</i> Blume	09/23	3210	27 18 45
278.	D 292	Commelinaceae	<i>Cyanotis vaga</i> (Lour.) Schult. & Schult. f.	09/30	2248	27 10 01
279.	D 149	Convallariaceae	<i>Ophiopogon parviflorus</i> (Hook. f.) H. Hara	09/26	3280	27 18 33
280.	A 074	Convallariaceae	<i>Polygonatum cirrhifolium</i> (Wall.) Royle	06/09	3550	27.12
281.	D 063	Convallariaceae	<i>Polygonatum singalilense</i> H.Hara	09/21	3820	27 20 28
282.	D 145	Convallariaceae	<i>Polygonatum verticillatum</i> (L.)All.	09/26	3280	27 18 33
283.	A 024	Convallariaceae	<i>Maianthemum oleraceum</i> (Baker)Hook.f. & Thms. ex Hook. f.	06/07	1822	27.06
284.	D 131	Cyperaceae	<i>Carex atrata</i> L.	09/24	4200	27 16 04
285.	D 318	Cyperaceae	<i>Cyperus iria</i> L.	09/30	2157	27 02 38.3
286.	D 223	Cyperaceae	<i>Eleocharis congesta</i> D.Don	09/28	1791	27 15 08
287.	D 300	Cyperaceae	<i>Kyllinga brevifolia</i> Rottb.	09/30	2550	27 11 44
288.	D 317	Cyperaceae	<i>Mariscus sumatrensis</i> (Retz.) T. Koyama	09/30	2550	27 11 44
289.	D 224	Cyperaceae	<i>Pycnus saguinolentus</i> (Vahl)Nees ex C.B.Clarke in Hook.f.	09/28	2005	27 11 27
290.	D 213	Dioscoreaceae	<i>Dioscorea glabra</i> Roxb.	09/28	1570	27 15 44
291.	D 214	Dioscoreaceae	<i>Dioscorea kamoensis</i> Kunth	09/28	1570	27 15 44
292.	D 222	Eriocaulaceae	<i>Eriocaulon viride</i> Korn.	09/28	1791	27 15 08
293.	A 078	Iridaceae	<i>Iris clarkei</i> Baker ex Hook.f. in Hook.f.	06/09	3550	27.12
294.	D 012	Juncaceae	<i>Juncus clarkei</i> Buchenau	09/19	3530	27 19 29
295.	D 011	Juncaceae	<i>Juncus grisebachii</i> Buchenau	09/19	3530	27 19 29
296.	D 013	Juncaceae	<i>Juncus khasiensis</i> Buchenau	09/19	3910	27 23 35
297.	D 103	Juncaceae	<i>Juncus triglumis</i> L.	09/23	2187	27 04 33
298.	A 068	Liliaceae	<i>Fritillaria cirrhosa</i> D. Don	06/09	3564	27.1
299.	B 049	Melanthiaceae	<i>Tofieldia himalaica</i> Baker	06/11	3445	27.17
300.	D 014	Orchidaceae	<i>Neottianthe secundiflora</i> (Hook. F.) Schlr.	09/19	3530	27 19 29
301.	A 023	Orchidaceae	<i>Pleione hookeriana</i> (Lindl.) J.Moore	06/07	1822	27.06
302.	D 146	Orchidaceae	<i>Satyrium nepalense</i> D. Don	09/26	3280	27 18 33
303.	D 005	Poaceae	<i>Agrostis triaristata</i> (Hook. f.) Bor	09/18	3490	27 13 17
304.	D 289	Poaceae	<i>Arundinella nepalensis</i> Trinius	09/29	2390	27 12 51
305.	D 290	Poaceae	<i>Bothriochloa bladhii</i> (Retzius) ST Blake	09/30	2005	27 11 27
306.	D 130	Poaceae	<i>Calamogrostis lahulensis</i> G. Singh	09/24	4337	27 26 11
307.	D 320	Poaceae	<i>Cymbopogon microtheca</i> (Hook.f.) A.Camus	09/30	2550	27 11 44
308.	D 158	Poaceae	<i>Danthonia cumminsii</i> Hook.f.	09/26	3210	27 18 45
309.	D 302	Poaceae	<i>Dendrocalamos hamiltonii</i> Nees & Arn. ex Munro	09/30	2005	27 11 27
310.	D 204	Poaceae	<i>Isachne albens</i> Trin.	09/27	1900	27 16 04
311.	D 335	Poaceae	<i>Miscanthus nepalensis</i> (Trin.) Hack.	10/01	2481	27 09 34
312.	D 319	Poaceae	<i>Sacciolepis indica</i> (L.) Chase	09/30	2550	27 11 44
313.	D 296	Poaceae	<i>Setaria glauca</i> (L.) P. Beauv.	09/30	2005	27 11 27
314.	D 225	Pontederiaceae	<i>Monocoria veginalis</i> (Burm. f.) C. Presi	09/28	2650	27 05 28.6
315.	D 334	Smilacaceae	<i>Smilax ferox</i> Wall.ex Kunth	10/01	2481	27 09 34
316.	D 353	Smilacaceae	<i>Smilax elegans</i> Wall.ex Kunth subsp <i>elegans</i>	10/02	2588	27 09 45
317.	D 167	Smilacaceae	<i>Smilax menispermoidea</i> A.DC.	09/26	3210	27 18 45
318.	D 345	Trilliaceae	<i>Paris polyphylla</i> subsp <i>marmorata</i> (Stearn)H.Hara	10/02	2684	27 09 22
319.	D 240	Zingiberaceae	<i>Cautleya spicata</i> (Sm.) Baker in Hook.f.	09/28	1947	27 14 55
320.	A 037	Zingiberaceae	<i>Roscoea alpina</i> Royle	06/08	2827	27.1