FLORISTIC DIVERSITY AND ALTITUDINAL VARIATION OF TREE SPECIES IN LOWER KANCHENJUNGHA SINGHALILA RIDGE, EASTERN NEPAL

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CERTIFICATE

This is to certify that **Mr. Nar Bahadur Khatri Chhetri** has been carried out the dissertation work entitled **"Floristic Diversity and altitudinal variation of tree Species in Lower Kanchenjungha Singhalila Ridge, Eastern Nepal"** under my supervision. This work has not been previously submitted for any other degree to the best of my knowledge. I recommend this dissertation work to be accepted for the partial fulfillment of Master's Degrees in Botany from Tribhuvan University, Nepal (Plant Systematics and Phytogeography).

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LETTER OF APPROVAL

The dissertation submitted by **Mr. Nar Bahadur Khatri Chhetri** entitled **"Floristic Diversity and altitudinal variation of tree Species in Lower Kanchenjungha Singhalila Ridge, Eastern Nepal"** has been accepted for the partial fulfillment of the requirements for Masters of Science in Botany.

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November 2, 2009 **Nar Bahadur Khatri Chhetri**

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ACRONYMS

asl	-	Above Sea Level
BM	-	British Museum of Natural History
CDB	-	Central Department of Botany
CITES		Convention on International Trade in Endangerered Species of Wild Flora and Fauna
DNPWC	-	Department of National Park and Wildlife Conservation
Fl. & Fr.	-	Flowering and Fruiting
GPS	-	Global Positioning System
ICIMOD	-	International Centre for Integrated Mountain Development
IUCN	-	International Union for Conservation of Nature
IVI	-	Importance Value Index
KATH	-	National Herbarium and Plant Laboratories, Godavari.
LKSR		Lower Kanchenjungha Singhalila Ridge
LTZ	-	Lower Temperate Zone
MTZ	-	Middle Temperate Zone
RBGE	-	Royal Botanical Garden, Edinburgh
TUCH	-	Tribhuvan University Central Herbarium
UTZ	-	Upper Temperate Zone
VDC	-	Village Development Committee
WCMC	-	World Conservation Monitoring Centre

ABSTRACT

The present paper is based on the findings of floristic diversity inventory research work conducted in Lower Kanchenjungha Singhalila Ridge, in Nepal sides of Eastern Himalaya. Knowledge on floristic diversity of particular area can reflect the total resources, their use and conservation status which is very helpful for making necessary conservation strategies and policies. Eastern Himalaya is one of the globally important sites representing the important biodiversity hotspots of the South Asia. Analysis of vegetation helps to develop detailed picture of plant communities of particular geographical location.

Plants specimens were collected by two field visits viz. pre-monsoon and post-monsoon during the period of June-October, 2007. Total 50 square quadrats of 10mx10m sized were laid down following stratified-random sampling method for sampling trees. In each 10m×10m quadrats, the number of individual trees was counted and dbh [diameter at breast height-1.37m, dbh ≥ 10 cm] of each tree was measured. After preservation, identification and management of collected plants, herbarium specimens were prepared and deposited in National Herbarium and Plant Laboratories, Godavari, Lalitpur (KATH) and Tribhuvan University Central Herbarium, Kirtipur (TUCH).

Present study recorded 299 species among them seven species were identified only family level, 22 species only generic level rest of them to species level falling under 184 genera and 86 families. Dicots belong to 69 families, 150 genera and 229 species whereas Monocots include 15 families 32 genera and 39 species. Similarly, Gymnosperms represented two families, two genera and two species. Floristic analysis showed that Rosaceae was the largest family with 23 species followed by Ericaceae 17, and Lauraceae 9 species. The study furnished three new addition to the flora of Nepal viz. *Begonia flaviflora* H. Hara (Begoniaceae), *Carex cruciata* Wahlenberg var. *argocarpa* C. B. Clarke (Cyperaceae), and *Strobilanthes helicta* Anderson (Acanthaceae). This study also mentioned 11 threatened species of different categories and one endemic species *Heracleum lallii* (Umbelliferae). 30 tree species were recorded from the altitudinal range of 2100-3000m. *Eurya acuminata* and *Symplocos* species were dominant in lower elevation whereas *Lithocarpus pachyphylla* and *Rhododendron* species were dominant in upper elevation range. The diversity of tree species showed hump shape relation with elevation gradient.

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1. INTRODUCTION

1.1 Floristic Diversity

Flora refers to the brief taxonomic treatment of all plants occurring in a particular geographical location which generates a comprehensive account. A complete flora of a country is necessary to reflect the whole plant diversity of that country. Absence of flora severely hinders any scientific inquiry into plants (Shakya *et al.* 1997). Generally the flora are described within a classification system (Bentham and Hooker, Engler and Prantl, Cronquist, Takhtajan, etc.). There may or may not be keys for families, genera, species or even infraspecific levels.

Plants are regarded as the most important component of natural resources upon which people and animals are highly dependent. These are also very important in a sense that plant diversity is the store house for particular genetic informations (genetic material) which are stored within their body. Knowledge on floral diversity of a particular area can reflect the total resources, their use and conservation status which is very helpful for making conservation strategies and policies.

Nepal is a unique habitat for plant diversity because it is a boundary line between the Western Himalaya and Eastern Himalayan provinces. It covers transitional mountainous area between Indo-Gangetic plain in the south and the Tibetan plateau on the north (Rajbhandari, 2001). Due to great geographic diversity along with climatic variation, Nepal is endowed with the tropical to alpine vegetation (Chaudhary, 1998). Nepal is situated on the cross-roads of many floristic regions such as Sino-Japanese floristic region mainly in the East; Irano-Turanian floristic region, in the North-West; Eastern Asiatic floristic region, in the North; South-East Asian Malaysian floristic region in the South-East; Indo-Gangetic floristic region, in the South and Sudano-Zambian floristic region in the South-West.

Nepal's position in the central sector of the Himalaya is that of a transitional zone of interpretation between the two differing environment of the Eastern Himalaya and Western Himalaya (Shrestha and Joshi, 1996). Hara *et al.* (1978, 1982) and Williams (1979) enumerated 5036 species of flowering plants from Nepal. Press *et al.* (2000) provided 5716 species, 784 infraspecies of flowering plants from Nepal. 28 species of gymnosperms and 5856 species of angiosperms (Koba *et al*. 1994). It is estimated that the number of flowering plants of Nepal is more than 6500 species, of which 4% species are endemic to the country and 30% endemic to the Himalaya (WCMC, 1994, Shrestha, 2001).

1.1.1 Floristic Diversity in Eastern Himalaya

The Eastern Himalaya is recognized as a global centre of species diversity (WCMC, 1990; Wilson, 1992). The high floristic diversity of this area is due to the presence of diverse ecological habitats. It is also interesting phytogeographically due to the effect of Sino-Japanese and Sino-Himalayan elements. Species richness and endemism is very high in Eastern Himalaya due to the presence two biological niches viz.Indomalayan and Palaeartic realms (Yonzon, 1996). Nepal comprises only 0.1% of land area on a global but it has a share of 2.07% (about 6000 species) flowering plants thus plant diversity is unproportionally rich for Nepal (Sherestha and Joshi, 1995). Eastern Himalaya is one of the globally important site representing the important hotspots of the South Asia. Eastern Himalaya of Nepal site has been identified as one of the rich biodiversity hotspots in the world with high species diversity, richness and high level of endemism (Myers, 1998).

The flora of eastern Nepal include 3500 species of higher plants, 400 pteridophytes and 1000 bryophytes. Over half of these species do not grow to the west of 87^0 E, which permit a clear separation of the eastern flora and western flora (Dobremez and Shakya, 1975). Eastern Nepal harbors about 68 endemic flowering plant species of which about 50 were recorded from KCA only (Shrestha and Ghimire, 1996). The flora of eastern Nepal is comparatively rich with 2980 species of flowering plants of which more than 800 species are found to be endemic to the Himalaya (Shakya, 1983). This may happen due to its very humid condition as well as its relatively well preserved vegetation.

1.1.2 Floristic Diversity in Kanchenjungha Singhalila Ridge

The Kanchenjungha complex mostly covers the Taplejung district, the northeastern most part of the Nepal, bordered by Sikkim (India) in the east and Tibet (China) in the north. Taplejung has an area of 3646 sq. km., and altitude ranges from 777m-8598m (Mt. Kanchenjunga). The climate ranges from upper subtropical to alpine. Out of 6500 species of higher plants in Nepal flora, about two-thirds of the species are expected to occur in this area and the numbers of species are generally decreases from Central to West Nepal (Shrestha and Ghimire, 1997).

The east Himalayan element is dominant in the flora of Kanchenjungha. Of a total of 254 temperate species under consideration, 133 species are unquestionably East Himalayan in distribution, and many of them 55 pan-Himalayan species can presumed to be eastern in origin. Of the 133 species listed as East Himalayan, 86 species terminated their western range in Nepal. When traveling in East Nepal one cannot fail to notice the richness of the East Himalayan element present in the flora of the Arun-Tamur, and conversely one is impressed by the rapid disappearance of many eastern species as one moves west across the Arun-Koshi watershed (Stainton, 1972).

Taplejung and Kanchenjungha Conservation Area are home for 1284 species of plants and out of them 810 are flowering plants. This area is rich in species endemism possessing seven endemic flowering plants. However, very few plants were used as commercial means but the plant diversity of this area is threatened by anthropogenic interferences (Livestock grazing, tree cutting, forest fires and slash-and-burn, etc). Indiscriminate exploitation these species are threatened viz. *Michelia champaca, Taxus wallichiana, Boehmeria rugulosa, Swertia chirayita,* etc. The high altitude zones are rapidly being converted into semi-natural pasture land (Shrestha and Ghimire, 1996).

Kanchenjungha Conservation Area represents the alpine bioclimates and possesses several threatened and endangered plant species including *Taxus wallichiana, Neopicrorhiza scrophulariiflora, Dactylorhiza hatagirea,* etc. KCA along with its lowlands Panchthar, Ilam and Jhapa districts is floristically rich with over 2,900 species of flowering plants (Shakya, 1983; Shrestha and Ghimire, 1996) of which, several are found to be endemic to the Himalaya. Singhalila Ridge exhibits lush biodiversity particularly the species of *Rhododendron, Castanopsis, Abies, Symplocos, Quercus, Sorbus, Rubus, Begonia, Berberis*, etc. It ranges from temperate to alpine bioclimate and harbors different vegetation types with opulence of plant species richness.

The area is rich and pristine in its forests resources and treasured with innumerable non timber forest products (Chettri, 2000). Temperate zone of eastern Himalaya marks with the dominance of Laurels, *Rhododendron, Acer, Lyonia, Symplocos*, etc. (Mani, 1999). The high floristic diversity of this region is due to the presence of diverse ecological habitats which include: marshes, river gullies, and steep slopes with crevices, verdant valleys, and dry alpine grasslands. Tree trunks and branches of *Rhododendron*, *Lyonia* are covered with epiphytes (mosses, lichens, and orchids) and parasitic plants. Weeds threatening the natural vegetation of the region are *Lantana camara* in the subtropics, *Ageratina adenophora* in the temperate and *Aconogonum molle* in the sub alpine zone (Shrestha, 1994; Shrestha and Shengii, 1997).

1.1.3 Contribution to flora of Eastern Nepal

Botanical explorations in Eastern Nepal began when British naturalist J.D. Hooker first explored this area in 1848. Other explorers were Banerjii (1948-1953), Stainton (1955-1969), Hara (1960-1972), Dobremez (1971-1972), Kanai (1972) and Suzuki (1992). M.L Banerjii (1948) explored 417 plants specimens from east Nepal. Kanai (1966) studied the phytogeography of eastern Himalaya and out of 295 plants, 206 were recognized as identical between Himalaya and Japan. Hara (1966) enumerated the plants of eastern Nepal belonging to Angiosperms, Pteridophytes, Bryophytes, Lichens and Fungi

including some new species and compared the various taxa of spermatophytes from the eastern Nepal. Ohasi (1975) published Flora of Eastern Himalaya (third report), that gives comprehensive enumeration of plants collected in east Nepal including Angiosperms, Gymnosperm, Pteridophytes and Bryophytes, which also includes report on taxonomic studies of flowering plants from central Nepal. Shakya (1979) concluded that out of 3,383 species of vascular plants of east Nepal 24.6% was Himalayan endemic and 0.7% of plants were Indo-Turanian in nature. Siwakoti and Varma (1999) recorded 743 species of flowering plants belonging to 493 genera and 128 families (dicotyledons 546 species under 383 genera and 105 families of monocotyledons 197 species under 110 genera and 23 families) from eastern Tarai.

1.1.4 Floristic work in Ilam district and around study Area

Rai (1999) studied the flora of Maipokhari and adjoining Area of Ilam district and reported 263 plants species. Sharma (2000) stated that Ilam district is rich in medicinal plants resources and most of the resource is unexploited. Acceding to him, there were 125 medicinal plants in Ilam district and many are threatened. Basnet (2003) assessed floral diversity of Maipokhari, Ilam and documented 233 plant species from this area. Niroula (2004) conducted the Phytodiversity and soil study of Siwalik Hills of Ilam, and reported the 137 flowering plants. Magraw (2004) studied the analysis of plant communities in the fragmented rural landscape of northern Ilam district and reported 217 species.

Shrestha (2002) assessed floral diversity of Kanchenjungha conservation area at landscape level was for resource management strategy. Biodiversity hotspots and key stone species were identified on the basis of species richness, taxonomic uniqueness, endangered species, habitat value, and threat status and use pattern. Ghimire and Nepal (2006) prioritized *Saussurea tridactyla, Dactylorhiza hatagirea, Rheum australe, Swertia chirayita, Neopicrorhiza scrophulariflora, Aconitum bisma* and *Nardostachys grandiflora,* etc. species for conservation in Kanchenjugha Conservation Area.

1.2 Vegetation Ecology

Vegetation is an overall expression of various environmental factors which operates gradually or in a cyclic manner. Analysis of vegetation helps to develop detailed picture of plant communities of particular geographical location. More deliberatively vegetation refers to the expression of total plants cover in a particular area which may be made up of one or more plant communities or aggregation of plants usually forming a mosaic or complex (Fosberg, 1961). The structure of tree species diversity in hill forest varies greatly from place to place due to variation of altitude, orientation of slope, nature of soil and type and intensity of disturbance (Vetaas, 2002).

Change in vegetation type occur not only with respect to altitude latitude, slope and soil but also with respect to rainfall, pattern and human impact, Natural disturbance such as forest fire, soil erosion, landslide, volcanic activity and climatic change determine forest dynamics and tree diversity (Maskai *et al*. 1999). Disturbance may increase species richness in old growth forest (Sheill, 1999) and may maintained species diversity (Huston, 1979). Higher species richness is maintained in intermediate level of disturbance (Roberts and Glliams, 1995).

Frequent and low intensity of disturbance (for example grazing or extraction of firewood and fodder) strongly affects forest structure and the succession of tree species in the forest (Ramirez- Marcial *et al*. 2001). However such factors do not necessarily hamper genuine old growth forest (Philips *et al.* 1997). Whittakar (1972) distinguished three level of diversity: alpha diversity is the diversity within habitat or intracommunity diversity; Beta or between habitat diversity is defined as the change in species composition along the environmental gradients. Gamma diversity is the diversity on entire landscape and can be considered as composite of alpha and beta diversity.

Species density that varies with elevation has been known for over a century (Wallace, 1878; Pianka, 1966; Lomilino, 2001). A decreasing trend in species richness with increasing altitude was reported by several workers (Gentry, 1988; Patterson *et al*. 1998). However some others reported a hump shaped relationship between species richness and altitude (Janzen, 1973; Vetaas, 2002). The variation in species richness is created by many components of climate and environment (e.g. temperature, precipitation, etc) that vary along the elevation gradients and ultimately create the variation in species richness (Lomilino, 2001). The vegetation pattern of Nepal has been classified geographically, physiographically or ecologically by several workers. Stearn (1960) and Banerjii (1963) have been divided the vegetation pattern into three divisions on basis of three river system *viz.* Karnali, Gandaki and Koshi.

Especially in Arun and Tamur Valleys on the basis of vegetation composition and distribution 35 types of forests have been recognized in Nepal (Stainton, 1972; Stainton 1971; Dobremez and Shakya, 1975; Shrestha, 1989). They described the following forest types in East Nepal, Tropical Evergreen Forest of *Shorea robusta* in the outer foothills below 1000m, Subtropical evergreen and semi evergreen forest in areas of high rainfall on outer foothills (700-1800m), *Schima-Castanopsis* forest (700-2000m), *Eugenia tetragona-Ostodes paniculata* forest (1000-2000)m; in the far eastern frontier, *Pinus roxburghii* forest (1000-2150), *Castanopsis tribuloides – Castanopsis hystrix* forest (1600-2300m), *Quercus incana – Quercus lanuginosa* forest (1800-2650)m, *Quercus*

lamellosa forest (2100-2800m), *Quercus semecarpifolia* forest (2300-3000m), *Lithocarpus pachyphylla* forest (2600-3150m) only present in extreme east.

1.2.1 Work related with Vegetation Ecology

Adhikari *et al.* (1991) studied composition, diversity, and structural profile of high altitude forest (2150m- 2500m) in Kumaun Himalaya, India and found total tree density and basal area varying from 320 to 1600 trees/ha and 44 to 98 m^2/ha respectively. Gupta and Shukla (1991) studied the composition and dynamics of Sal plantations at two different sites in the Gorakhpur forest division (India) through the series of 5 years, 10 years, 20 years and 40 years old stands. The importance value index (IVI) of *Shorea robusta* showed slight change with increasing stand age while that of *Mallotus philippensis* increased with increasing stand age at both sites. Sigdel (1994) in Royal Chitwan National Park between Bharatpur and Tikauli conducted thee vegetation survey in *Shorea robusta* forest (250m altitude). He recorded 300 trees ha^{-1}; optimum diameter was 98.9 cm with community height up to 36m.

Manandhar (1996) carried out a work on high altitude forest in western Nepal along a distrubance gradient and categorized forest as undisturbed forest, moderately disturbed, and disturbed. Her findings reveal that density, basal area, alpha and beta diversity were found highest in the undisturbed forest. Pandey (2001) conducted the quantitative vegetation analysis as per aspect and altitude and regeneration behaviour of tree species in Garhwal Himalayan forest. Density and total basal area values ranged in between 885 – 1111 tree ha^{-1} and 56.42-126 m^2 ha^{-1} in site I and II respectively. Shannon-Weiner diversity index ranged between 1.8-2.33 for trees. The distribution pattern for most of the trees was contiguous. Dominance-Diversity (D-D) curves showed log normal distribution, irrespective of sites and growth forms. Density-Girth relationship was rotated sigmoid curves with plateau for site I and II. It was indicative of good regeneration.

Shrestha (1997) did the ecological study of natural (three sites) and degraded forests (one site) of Chitrepani in Siwalik region of Makawanpur. *Shorea robusta* had the highest density of 57.37 plants/ha at site I, 71.62 plant/ha site III of natural forest and 7.26 plants/ha in degraded forest. Aryal (1997) analyzed the vegetation of Royal bardia National Park. Four majore forest types were identified in the study area. The forest was mainly dominated by *Terminalia alata* and *Buchanania latifoia*.

On the basis of species dominance Zomer (1998) described the five forest types in Makalu-Barun National Park, Nepal along an elevation gradient (400m- 1000m), based

upon IVI values. It was expected that in steep topography, elevation exerted the strongest influence, both on community composition and individual species abundance. Karki (1999) worked on the ecological study of riverine forest in Kosi Tapu Wildlife Reserve She reported three forest types: mixed riverine forest, *Acacia catechu* forest and *Dalbergia sissoo* forest. She also found that species diversity index was highest in the mixed riverine forest.

Bhuju and Yonzon (2000) in their study of floristic composition, forest structure and regeneration of Churia forest in eastern Nepal reported *Shorea robusta* as the most dominant species. They reported that the forest has an average basal area of 37.28m^2/ha aand density of 756.5plant/ha. The basal area of dominant tree was in increasing tendency from lower to higher altitude.

Nepal (2001) conducted quantitative analysis of vegetation (trees and shrubs) along the altitudinal gradient on the north east slope and south west slope on Kaski district. He found variation in species composition in two different slopes of study area. Shrestha (2001) studied species diversity and distribution along altitudinal gradient in Landruk village of Annapurna region Nepal. He found prominent variation of vegetation along altitudinal gradient.

Bhattarai and Vetaas (2003) studied the variation of plant sspeces richness of different life forms along the subtropical elevation gradient in Dharan area of east Nepal. They recorded maximum species richness 267 above the altitude of 600m asl.

Kunwar and Sharma (2004) carried the quantitavive analysis of tree species in two community forest of Dolpa district, mid-west Nepal. Total stand density and basal area were found 2100 tree/ha and 152m2/ha in Juphal respectively.

Koirala (2004) conducted the comprehensive study of vegetation structre and composition of two forests at Tamafok (TF) and Madimulkharka (MM) village in Piluwa micro-watershed in Tinjure- Milke region of east Nepal. A total of 20 species were recorded with more species in the non-degraded (TF) forest than in the degraded (MM) forest. The total density of trees in the TF forest (756/ha) was higher than that at MM (346/ha). Similarly, tree basal area in the TF forest (69.8m^2/ha) was greater than at MM (56.9m^2/ha). Bhattarai *et al*. (2004) studied the relationship between plant species richness and biomass in arid subalpine grassland of central Himalaya, Nepal. They reported the hump-shaped relationship between plant species richness and biomass for herbaceous vegetation in temperate climates. The result indicates that a hump-shaped relationship is also found in arid Trans- Himalayan grasslands. Gautam and Watnable (2005) compared species composition, distribution and diversity of tree species in three

forest stands in the Bharse area, Gulmi district. They recorded the highest species richness in forest opened for cattle grazing. Tree species diversity and evenness were higher in the controlled cutting forest than in the forests with grazing or cutting. They concluded that controlled cutting is more effective than grazing or cutting in conserving the diversity of tree species.

Subedi (2006) studied the distribution pattern of plant species of Manang along whole Himalayan elevation gradient of Nepal. He recorded three hundred three species using primary and secondary data. The study showed the hump shaped distribution with optimum species at 3500m asl. Bhatta (2006) analyzed the vegetation of alpine pasture of Manang from two sites of south facing slope. The relationship of species richness with various environmental factors like altitude, moisture and pH was carried out and species richness showed linear relationship with altitude i.e. it declined significantly with increasing altitude.

1.2.2 Vegetation Ecology in Ilam district

Oli (1999) and his team studied the conservation status of Ilam district. They collected the information regarding forest and vegetation from the six VDCs of the Ilam Siwalik Hills. They sampled 5 plots and determined four vegetation types.

Niraula (2004) studied the different kinds of plants, soil and climate; and did the quantitative analysis of vegetation structure and composition at three VDCs of Siwalik Hills of Ilam. He found the highest tree diversity value (2.23) from the matured forest of Danabari and least value (2.02) from the regenerating forest of Chulachuli. Species evenness was found to be highest in degraded forest of Mahamai.

Magraw (2004) conducted survey of vascular plant species richness, abundance, and stand structure (dbh and stem density) in four common forest types in northern Ilam District, eastern Nepal: primary forests, deforested areas, large cardamom (*Amomum subulatum*) plantation, and conifer plantation. Nearly 400 species were encountered in 54170m^2 plots, from which 217 genera and 90 families were identified. The four types of forest types exhibited distinct habitat characteristics depending on the degree of management intensity. Typical of cash-crop systems, they had low species richness and were dominated by cultivated plant species.

1.3 Hypothesis

The general hypothesis of present study includes:

- ❖ The study area may be the habitat of archaic, rare and threatened plants.
- ❖ Variation of tree species may occur with altitudinal gradient.

1.4 Objectives

The general objective of the present study is to assess the overall vegetation and distribution patterns of plants species in Lower Kanchenjungha Singhalila Ridge, Ilam District, Eastern Nepal. Whereas, the specific objectives are as follows.

- ❖ To enumerate and describe flowering plant species with their accepted names and basionyms in Lower Kanchenjungha Singhalila Ridge, Ilam district
- ❖ To assess the community characters, variation of tree species diversity and tree species richness along altitudinal gradient in LKSR.

1.5 Rationale of the study

Ilam is very rich in floristic diversity. Forest products like timbers, fodders and also non timber forest products are high in this area. It also a naturally beautiful district of Nepal. Some exploration had been conducted from Maipokhari and its souroundings by Rai (1999) and Basnet (2003). But exploration has not conducted along the Nepal India Border side till now. A comprehensive floristic and ecological research has not been conducted in Lower Kanchenjungha Singhalila Ridge, Ilam district, so this research has been carried out with the aim of inventory of distribution and documentation of angiosperm in this area. There is no any work has done related to ecological research relating specie richness along altitudinal gradient so this study will be informative for future researcher in this area.

2. STUDY AREA

2.1 Location and Physiography

Ilam is a small hilly district, which is located in Eastern Development Region of Nepal with an area of 1703 sq. km. extending from 26^0 4'- 27^0 8' N latitude and 87^0 40'- 88^0 10' E longitude. The altitude of this district ranges from 250 meter to 3636 meter above from the sea level. Ilam is bordered by Panchthar in north, Jhapa in south and Morang in west and West Benghal of India in the east. Ilam is charming because it is unspoiled by modernity, pollution and urban bustle. Ilam is multicultural district. Out of its land area 44154 hector is cultivated land, 22803 hector is uncultivated, 3398 hector is pastureland and 95918 hector is covered by forest. The main rivers in this village are *Mai Khola, Deo Mai, Jogmai and Puwamai.*

The present study area Lower Kanchenjungha Singhalila Ridge covers the four eastern VDCs of Ilam district viz. Maimajuwa, Mabu, Jamuna and Jogmai. The most potential route for trekkers is Ilam to Sandakpur, which also help to develop ecotourism in those areas. Sandakpur is situated at an altitude of 3636m above from the sea level. So, the area is often snow covered. Its height and slope provide opportunities for skiing. Due to its height, the site offers some spectacular sunrise and sunset views. It also offers view of Mt. Everest, Mt. Kanchanjunga, Mt. Makalu and some of the world's highest mountains. It has an easy road access to it.Ilam to Chhintapu at an altitude of 3400 meter above the sea level; Chhintapu ranks the second highest peak in Ilam district.

This area is famous for various species of *Rhododendron*,where nearly 11 species are commonly found. It is also famous for herbal plants and various species of birds. It is close to Maipokhari, a trek from Maipokhari to Chhintapu via Deurali and Maipatal will take only Six hours walk. This area has great potential for the development of ecotourism. Hangetham of Jamuna VDC is popular as Important Bird Area. A total of three forest stands were selected at different altitudes (2100 m -3000 m) to examine the changes on the tree vegetation.

2.2 Climate

This region enjoys a temperate climate characterized by the monsoon, which deposits the vast majority of annual precipitation between June and October. The mountainsides are steep and landslides are not uncommon during the monsoon season. Because of the extreme topography, and because clouds and fog commonly block the sky throughout the year, direct sunlight is limited. The climate of this area is characterized by high rainfall, cool and humid atmosphere.

The mean maximum temperature in the year of 2007 is recorded as Monthly rainfall data of Kanyam tea state gauge is recorded which shows that mean rainfall in this area 19.8mm/Mon. Mansoon season starts a little earlier than other parts of country.

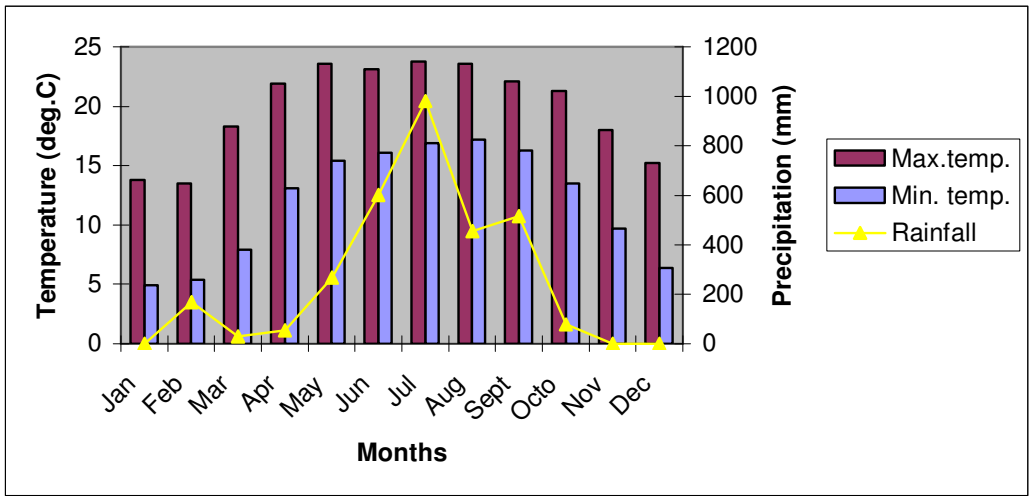


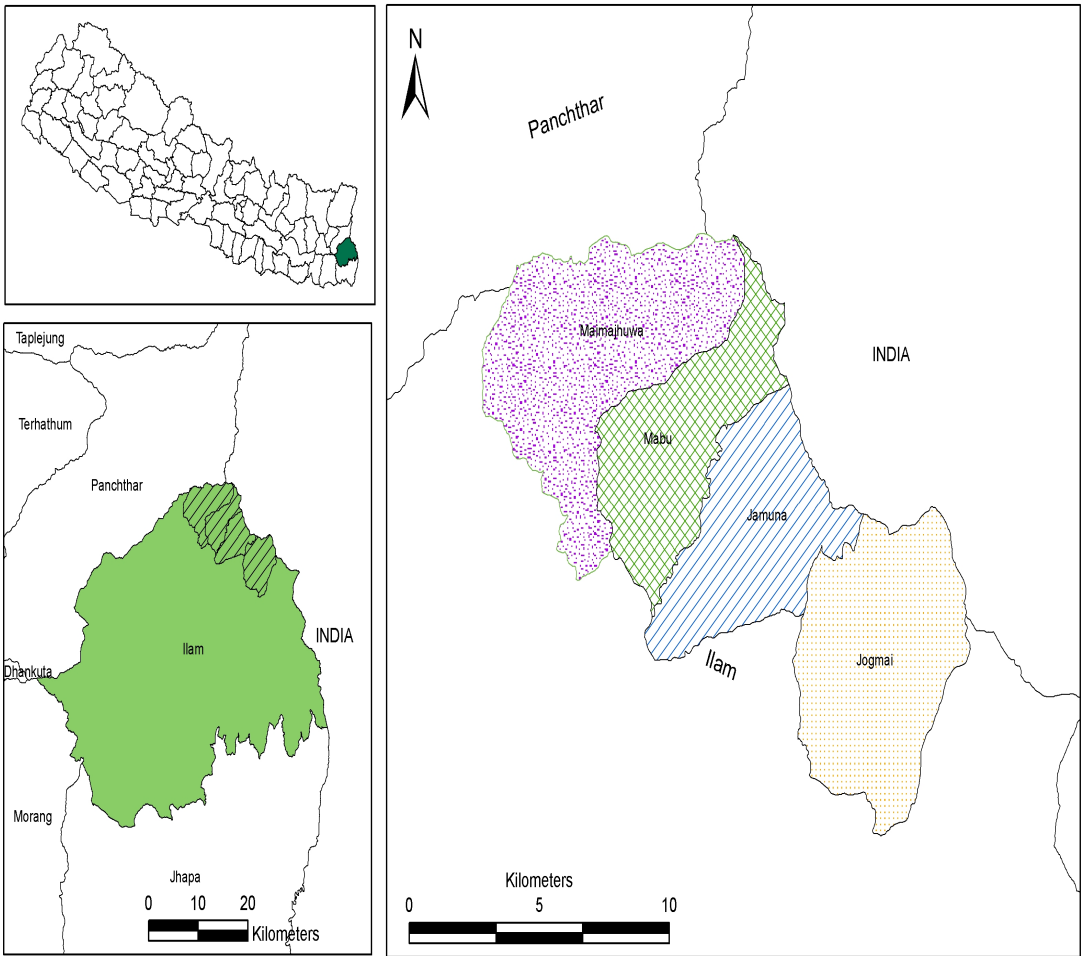
Figure 2.1 Average monthly temperature (°C) and rainfall of Kanyam Tea State weather station (26º52'N, 88º04'E, altitude 1678 m), Ilam (Source: *Department of Hydrology and Meteorology/GoN*, 2007).

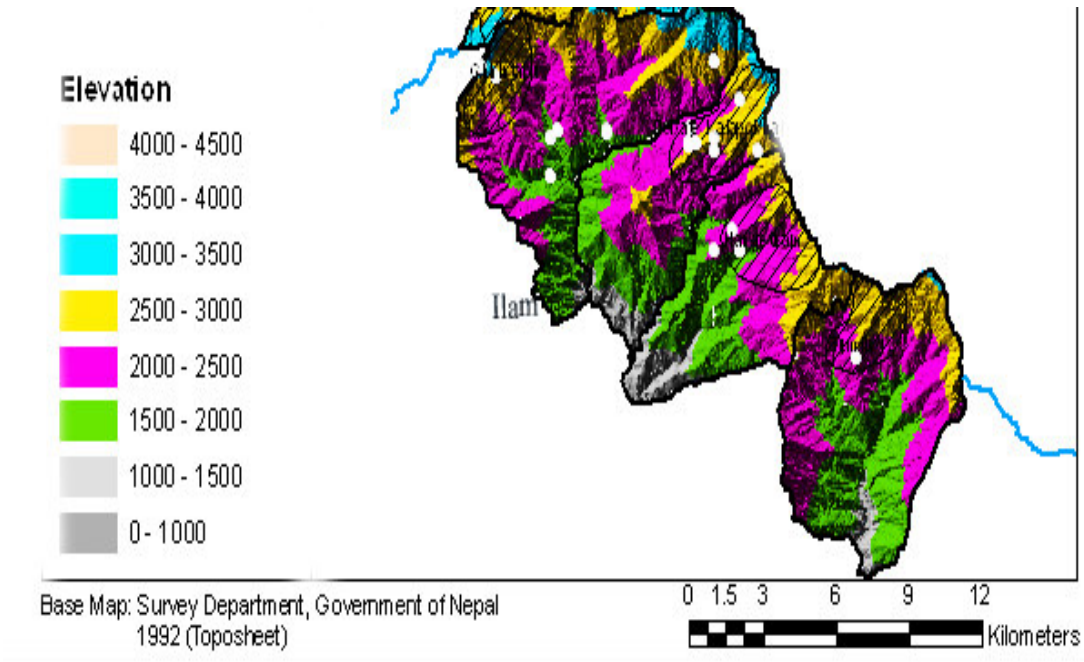
2.3 Vegetation

Natural vegetation in this region contains elements of three vegetation types these are characterized by a number of species in the Fagaceae and Lauraceae families (Stainton, 1972). The lowest elevation forest type is *Castanopsis tribuloides – Castanopsis hystrix*, which has been found up to 2300m. *Quercus lamellosa*, forest was found throughout the elevation range of study area. At highest elevation *Lithocarpus pachyphylla* forest was found. All of these forest types are found exclusively in eastern Nepal and form part of the Lower Temperate Zone, which spans the mountainsides roughly between the main forests types found in the study area are mentioned bellow.

Quercus semecarpifolia forest, *Castanopsis tribuloides- C. hystrix* forest, *Quercus lamellosa* forest, *Lithocarpus pachyphylla* forest, Lower temperate mixed broad-leaved forest, Upper temperate mixed broad leaved forest and pure *Rhododendron* forest.

MAP OF STUDY AREA





3. METHODOLOGY

3.1 Review of Literature and Herbarium

Relevant literature were reviewed throughout the research period. Taxonomic literature such as 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, Zobel *et al*. (1987), etc. were selected to review for preparation of this report.

The specimens which are previously collected from surrounding area and study area were examined in National Herbarium and Plant laboratories Godavari, Lalitpur (KATH). Tribhuvan University Central Herbarium (TUCH) and Royal Botanical Garden Edinburgh, U.K. (E).

3.2 Field visits

Two extensive field trips were made during research period. Field visit was from 12 June to 2 July, (2007) as pre-monsoon and next 16 September to 8 October as post-monsoon. Premonsoon collection was focused for collection of specimens in flowering stages and other collection was focused in fruiting stages.

3.3 Floristic Documentation

3.3.1 Collection and Preservation

Plants specimens were collected by two botanical expedition organized by ESON (Project Supported by CEPF-USA) from June-July and August-September 2007. The first visit was conducted from the upper border ridge while second field trip was to lower part which was near human settlements. Triplicate specimens of each species were collected as far as possible. The route of collection and area has been shown in the GIS map. The collected voucher specimens were properly tagged in the field during collection with appropriate field notes. The collected specimens were dried and mounted on herbarium sheets of (28x44cm). The specimens were poisoned using insecticide. Herbarium specimens were prepared and managed using techniques of Forman and Bridson (1989). All the preserved specimens related to floristic study and quantitative vegetation study were deposited at Central Department of Botany, Tribhuvan University (TUCH), Kirtipur, National Herbarium and Plant Laboratories (KATH). Godawari Lalitpur and Royal Botanical Garden Edinburgh (E).

3.3.2 Identification

The identification of collected plant specimens were done by using relevant literatures such as: Hooker, 1883-1897; Collett, 1925; Davis and Cullen, 1988; Grierson and Long, 1983-2001; Polunin and Stainton (1984), etc. Identification of some collected plant specimens were also done with the help of experts of TU Prof. Dr. K.K. Shrestha. The specimens were further confirmed by cross tallying with the specimens deposited at National Herbarium and Plant Laboratories (KATH), Godawari, Nepal and Royal Botanical Garden Edinburgh U.K. (E) and Tribhuvan University Central Herbarium, Kirtipur (TUCH).

3.3.3 Description

For the arrangement of families of described genera and species, the modified Engler system of Melchior (1964) has been followed as in the *"Flora of Bhutan"*. The species were cited using latest taxonomic literatures. The basionyms are also given whenever possible which must be accepted for synonyms. The local names were obtained from field note or from secondary literatures.

3.3.4 Herbarium Preparation and management

The dried plant specimens were mounted in (28x44cm) sheets. The process of herbarium preparation is based on the herbarium technique developed by Bridson (1989). The dried specimens were deposited at National Herbarium and Plant Laboratories (KATH), Godavari, Nepal and Royal Botanical Garden Edinburgh U.K. (E) and Tribhuvan University Central Herbarium, Kirtipur (TUCH).

3.4 Ecological assessment

The whole temperate forest of the study area was divided into three sub zones (Dahlen, 1993; Devlal, 2008) quantitative vegetation analysis of the plants communities along an altitudinal gradient were carried out in the year of 2007.

- Lower Temperate Zone: It ranges from the elevation 2100- 2400m.
- Middle Temperate Zone: It ranges from the elevation of 2400-2700m.
- Upper Temperate Zone: It ranges from the elevation of 2700-3000m.

3.4.1 Sampling Strategies

Vegetation analysis of the selected forest stands along an altitudinal gradient was carried out in the year of 2007 by using square quadrates following stratified-random sampling method (Kershaw, 1973).The quardrats of 10mx10m for trees, 5m×5m for shrub layer

(including saplings of tree) and 1m×1m for herbaceous layer (including seedling of woody species) were laid down for the estimation of quantitave data. Each quadrats of 10m×10 m were divided into four quarters; two of them lying diagonally were selected randomly to sample shrubs. Three 1 m × 1 m quadrat was located in adjacent to former. In each 10 m×10m quadrat, the number of individual trees DBH [diameter at breast height-1.37 m, dbh ≥ 10 cm] of each species was counted and DBH of each tree was measured. The height of each tree was estimated with the help of Clinometer. For shrubs/saplings (dbh < 10 cm, height > 1.37 m) and herbs/seedlings (height < 1.37 m) the number of individuals of each species was counted and cover was estimated. To determine canopy cover of species in shrub and herb layers, mid point value of each species was visually estimated following the method described by Zobel *et al*. (1987). Herbarium specimens were prepared for collected plants. For quick identification of plants specimens at field level some standard literatures were used (Polunin and Stainton 1984, Stainton 1988).

3.4.2 Numerical analysis

3.4.2.1 Community structure

Quantitative data were gathered with the help of field data sheet and quantitatively analysed for abundance, density and frequency according to the formulae given by Curtis and McIntosh (1950) and Mishra (1968). The relative values were summed up to represent importance value index (IVI) as Curtis (1959) reported. The diversity index (H') was computed by using Shannon-Wiener information Index (Shannon and Wiener, 1963). The concentration of dominance (CD) was computed by Simpson's Index (Simpson, 1949). Basal area for trees, and cover for shrub and herb layers were calculated.

Followings are the formulae used to calculate necessary attributes

Frequency (F)

Frequency is proportion of the total number of samples in which a species occurs with the total number of samples taken.

$$\text{Frequency (\%)} = \frac{\text{Number of Sampling units in which individual species occured}}{\text{Total number of sampling units Studied}} \times 100$$

Relative Frequency (RF)

The relative frequency of a species is the frequency of that species divided by the sum of frequencies of all species in the community. It can be calculated as:

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

Density (D)

Density is the total number of individuals of a species relative to the total area studied. It can be calculated by using the following formula (Zobel *et al*. 1987).

$$\text{Density (pl/ha}^{-1}) = \frac{\text{Total number of individual species in all quadrat}}{(\text{Total number of quadrat Studied}) \times (\text{Area of quadrat})} \times 10000$$

Relative Density (RD)

Relative density is the proportion of the total number of individuals of a species A' with the total number of individuals of all species within an area. It can be calculated by using the following formula.

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

Basal area (BA)

It is the simple measurement of diameter of the tree at breast height. Basal area (BA) of a tree was obtained by following formula:

$$\text{Basal area (m²)} = \frac{(dbh)^2}{4} \times \pi$$

Where dbh= diameter of the tree at breast height

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

$$\text{Basal Area (m}^2\text{/ha)} = \frac{\text{Total basal area of a species}}{\text{Total area of quadrats sampled}} \times 100$$

$$\text{Realative Basal Area (RBA)} = \frac{\text{Basal area of individual tree}}{\text{Total basal area of all trees}} \times 100$$

Importance value index (IVI) is the function of relative density, relative frequency and relative dominance (Trees and shrubs) or relative abundance (herbs). Thus IVI gives the quantitative basis for the classification of community structure of any study area.

Importance Value Index (for trees) = Relative frequency + Relative density + Relative basal area

3.4.2.2 Species diversity

The combined forms of species richness and species evenness is simply mean the Species diversity and the number of individuals per sampling units. Species richness while the distribution of individuals among the species called Species evenness. Evenness becomes maximum when all the species have same or nearly equal number of individuals. 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 Weiner's, 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).

Simpson's index of dominance (C) = $\sum_{i=1}^{s} (pi)^2$

Shannon -Wiener's index (H') = $-\sum_{i=1}^{s} (pi)(\ln pi)$

Where s = total number of species

Pi = proportion of all individuals in the sample that belongs to species i.

Beta (β) Diversity and Similarity Index

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

$\beta_w = s/\ \overline{\alpha} - 1$

Where s = Total number of species recorded in both sites.

$\overline{\alpha}$ = average of total number of species recorded in two sites.

The value of β 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. Following are the formula for calculating similarity index.

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

Where IS = index of similarity

A = Total number of species in one community

B = Total number of species in another community

C = the number of species which occur in both community

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

3.4.2.3 Size class distribution

For prediction of regeneration behavior of tree species size class distribution was developed. All the trees were divided into dbh classes of 10cm interval and density of tees in each diameter class was calculated. Size class distribution diagram was developed by plotting diameter class in x-axis and density in y-axis.

4. RESULTS

4.1 Floristic Composition

Present study recorded 299 species among them seven species were identified only family level, 22 species only generic level rest of them to species level falling under 184 genera and 86 families. Dicots belong to 69 families, 150 genera and 229 species whereas Monocots include 15 families 32 genera and 39 species. Similarly, Gymnosperms represented two families, two genera and two species. Floristic analysis showed that Rosaceae was the largest family with 23 species followed by Ericaceae 17, and Lauraceae 9 species.

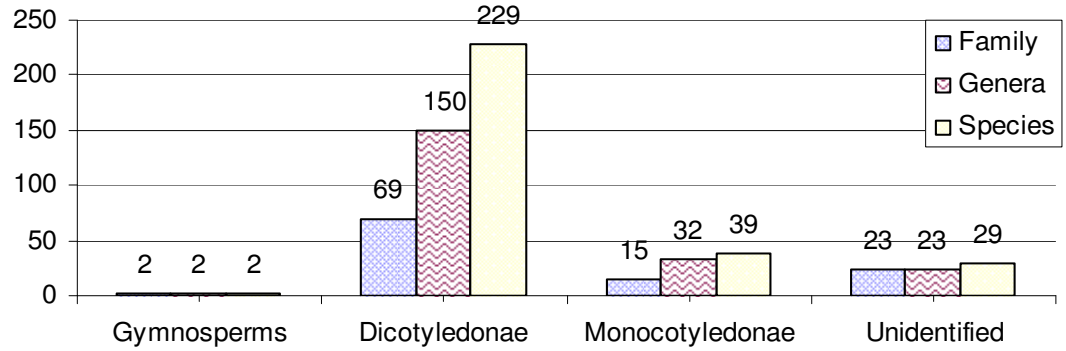


Figure 4.1: Distribution patterns of family, genera and species recorded from study area.

4.1.1 Dominating families and genera composition

Present study showed that Rosaceae is the largest family with 23 (8.24%) species and followed by Ericaceae 17 (6.09%), Lauraceae 9 (2.90%), Urticaceae, Labiateae, Scrophulariaceae, Asteraceae with 8 (2.87%) of species. Similarly Ranunculaceae, Orchidaceae, Convallariaceae, Urticaceae with 7 (2.51%) species and so on. Similarly the genera *Rhododendron* and *Rubus* are found to be largest genera with 8 species in each. *Begonia*, *Impatiens*, *Hypericum*, *Berberis*, *Sorbus* with 5 species in each and *Viburnum*, *Pilea* with 4 species in each and so on.

4.1.2 New Record of Species to Flora of Nepal, endemic and threatened plants

Present study has 4 additional records of species to flora of Nepal eleven threatened and one endemic plant species metioned (Table 4.1 & 4.2) newly recorded species are not published in available Nepali literature till now.

Call No.	Family	Species Name	Coll. date	Alt. (m)	Lat	Long	Locality
B 157	Begoniaceae	*Begonia flaviflora* H. Hara	06/07	2245	27.04	88.00	Jamuna 2,

							Hangetham, Ilam
C 240	Cyperaceae	*Carex cruciata* Wahlenberg var. *argocarpa* C. B. Clarke	09/12	3210	27 18	88.01	Bie-Chitre,
C 191	Acanthaceae	*Strobilanthes helicta* Anderson	09/05	2656	$27^0$407	87^0 59' 37	Dobate, Hangetham, Ilam

Table 4.1: New addition to flora of Neplal recorded from LKSR, eastern Nepal

Table 4.2: List of Endemic and threatened plant species recorded from LKSR

S.N.	Record	Family	Species Name with threatened category	Alt. (m)	Locality
1.	Threatened	Ranunculaceae	*Aconitum spicatum* (IUCN - CT)	3170	Chhintapu,Maimajuwa 7
2.	Threatened	Dioscoreaceae	*Dioscorea deltoidea* (IUCN - CT, CITES – II,)	2005	Hangetham, Jamuna-1
3.	Threatened	Magnoliaceae	*Magnolia campbelli* (IUCN – R, CITES II)	3220	Chhintapu,Maimajuwa 7
4.	Threatened	Magnoliaceae	*Magnolia globosa* (IUCN – R, CITES - II)	2040	Maimajuwa 7, Naule Gaun, Ilam
5.	Threatened	Magnoliaceae	*Michelia champaca* (IUCN – E, CITES II, GoN - III)	2050	Newa khola, Mai majhuwa
6.	Threatened	Magnoliaceae	*Michelia velutina* (CITES - II)	1870	Newa khola, Mai majhuwa, Ilam
7.	Threatened	Trilliaceae	*Paris polyphylla* subsp *marmorata* (IUCN - V)	2665	Dobate, Mabu-8
8.	Threatened	Trilliaceae	*Paris polyphylla* subsp *polyphylla* (IUCN - V)	3060	Mabu, Near Mai khola, Chauri chowk, Ilam
9.	Threatened	Podophyllaceae	*Podophyllum hexandrum* (IUCN - V)	3225	Mabu, Bikhe Bhanjyang, Ilam
10.	Threatened	Gentianaceae	*Swertia chirayita* (IUCN - V)	2042	Maimajuwa 7, Naule Gaun
11.	Threatened	Taxaceae	*Taxus wallichiana* (IUCN – V, CITES – II, GoN - II)	3220	Chhintapu,Maimajuwa 7
12.	Endemic	Umbelliferae	*Heracleum lallii*	1974	Sisne, Mai majhuwa

Source: IUCN. 1987/CITES. 1995

4.2 General Forest types

Based on the previous literatures of forest types in Eastern Himalaya and observation made during samplings, the forest types were categorized in under following four types

4.2.1 *Lithocarpus-Symplocos* mixed forest

This forest extends from the wet temperate forest of Asaam Himalaya to Nepal. It survives in wet environment hence so it is an eastern Himalayan species. This forest predominates between 2000-2900m. It appears mostly to be predominant at an altitude ranging from 2600-3000m; otherwise it exists in a form of sandwitch in between *Quercus lamellosa* and temperate mixed broad leaved forest, such as *Mangnolia-Acer-Rhododendron* forest. It attains an average height of 15-20m. 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 under story. Associated species are *Quercus lamellosa, Magnolia campbellii, Michelia dotlsopa,Ilex dipyrena, Acer campbellii*

4.2.2 *Quercus-Lyonia* mixed forest

This forest was ranging at the altitude of 2200-3000m. In north face it often seems unable to compete successfully with other east Himalayan types of forest. Sometimes there may be an overlap between *Q. semeicarpifolia* forest and upper temperate broad-leaved forest. Average height is 12-18m. This oak is found mostly in eastern Himalayas. It may be found west too but very scanty. It occupies the altitude of 2000-2500m forming continuous belt, coming in above *Castanopsis* forest. The under canopy was covered by *Lyonia ovalifolia*. Whereas associated species were *Magnolia campbellii, Acer campbellii*, *Lithocarpus pachyphylla*, *Castanopsis tribuloides,* etc but oak is very dominant in the upper canopy.

4.2.3 *Quercus-Lithocarpus* mixed forest

This type of forest was occurred between 2400-3300m, mostly on slopes that face north and west. In some places, *Rhododendron* forest may replace this forest. Mostly dominat species are *Quercus lamellosa, Q. glauca, Q. semecarpifolia,and codomonated* by *Lithocarpus pachyphylla, Acer campbellii, , Castanopsis tribuloides, Acer thomsonii,* etc.

4.2.4 *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. hodgsoni*i predominate, forming the tangled forest 15m tall. On the ridge and south facing slopes *R. arboreum* is common. At higher levels, *R. campanulatum, R. wallichi, 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. All of these

forest types are found exclusively in eastern Nepal and form part of the Lower Temperate Zone, which spans the mountainsides roughly between 2,000 and 2,500m.

4.3 Vegetation Composition and Diversity Indices

A total of 50 macro plots of 10x10m^2, 100 meso plots of 5x5m^2, and 150 micro plots of 1x1m^2 were laid down in three different altitudinal ranges. Altogether 30 tree species were recorded from three elevation ranges, 19 from lower elevation, 20 from middle elevation and 22 from upper elevation.

4.3.1 Community Structure in three Zones

The whole study side was site which includes temperate Zone was resolved in three sub zones on the basis of elevation ranges.

Lower temperate zone (2100-2400m)

In this range *Symplocos ramosissima*showed the highest frequency (63.64%) and relative frequency 14.29%. Similarly lowest frequency and relative frequency were 9.09% and 2.04% respectively. Similarly the density of individual tree species ranged from 263.64 plant/ha-9.09 plant/ha. The total density of all tree species was 1109.09 plant/ha. Similarly the dominance of the individual tree species ranged from 15.31 m^2/ha-0.07 m^2/ha. Similarly the important value index was found to be highest for *Eurya acuminate* (39.72) and followed by *Symplocos. ramosissima* (38.72), while the other species likes *Lindera*, *Rhus* showed least IVI (2.94). In this range canopy was dominated *Quercus lamellosa*, *Castanopsis hystrix*, *Lithocarpus pachyphylla* and *Persea odoratissima* but sub-canopy was well dominated by *Eurya acuminata* and *Symlocos* species. Altogether 19 tree species were recorded from this zone. Table 4.5 shows the quantitative vegetation analysis of lower temperate zone.

Middle temperate zone (2400-2700m)

Lithocarpus pachyphylla was the highest frequency was achieved as 60.71% and relative frequency 8.48%. Similarly the lowest frequency and relative frequency achieved as 3.57% and 1.09% respectively. Middle temperate forest is well dominated by *Lithocarpus pachyphylla* with its highest IVI value 94.60 and codominated by *Symplocos ramosissima* (47.33) and the species such as *Magnolia* and *Michelia* showed very scanty presence with least IVI values. In this site the density of individual tree species ranged from 289.29 plant/ha – 3.75 plant/ha. While total density of all trees were found to be 1203.57 plant/ha. Similarly the dominance of tree species ranged from 56.28m^2/ha -0.03m^2/ha. In this zone *Lithocarpus* (Bante) formed the very well canopy up to 25m. Similarly

Symplocos sp, *Lyonia ovalifolia*, *Rhododendron falconerii* made the sub canopy. Altogether 20 tree species were recorded from this site Table 4.6 shows quantitative vegetation analysis of middle temperate zones.

Upper temperate zone (2800-3000m)

Lithocarpus pachyphylla showed the highest frequency and relative frequency achieved as 63.64% and 16.28%. Similarly the lowest frequency and relative frequency as 9.09% and 2.33% respectively. *Lithocarpus pachyphylla* was well canopy dominating species in this range with maximum IVI 78.8 and codominated by *Rhododendron falconerii* with IVI value 40.14 and *Quercus lamellosa.* Other species like *Taxus wallichiana*, *Michelia* and *Magnolia* showed scanty in distribution. The density of individual tree species ranged from 245.45 plant/ha – 9.09 plants/ha, while total tree density for all tree species was found to be 1009.09 plant/ha. Similarly the dominance ranged from 68.48 m^2/ha-0.3 m^2/ha for individual tree species. In this site *Lithocarpus pachyphylla* was monodomianat canopy forming plant up to 30m. Altogether 22 tree species were recorded from this site Annex III (B) shows quantitative vegetation analysis of upper temperate zone.

4.3.2 Species Richness and Diversity Indices

The value for tree species richness was achieved highest for lower temperate zone (5.27) and lowest in middle temperate zone (3.29) while upper temperate zone showed (3.45) per 100m^2. Similarly the Simpson's index of Dominance (**C**) was highest for stand MTZ (0.15) followed by stand UTZ (0.13) and LTZ (0.12). Shanon-weiner's index (**H'**) was maximum for UTZ (3.68) followed by LTZ (3.50) and MTF (3.22). The Whittaker's beta diversity value shows maximum between LTZ and UTF (0.37) followed by LTZ and MTZ (0.28) and (0.24) between MTZ and UTZ.

Table 4.3: Species richness (S), Simpson's index of Dominance (C), Shanon-weiner's index (H'). and Beta diversity (Bw).

Diversity Indices	LTZ	MTZ	UTZ	Beta diversity (Bw)	MTZ	UTZ
Simpson's index of Dominance (C)	0.12	0.15	0.13	LTZ	0.28	0.37
Shanon-weiner's index (H')	3.50	3.22	3.68	MTZ		0.24
Species richness (S)/100m^2	5.27	3.29	3.45			

4.3.3 Similarity Index (%)

Similarity index between MTZ & site UTZ was highest 76.19% while it was least between site LTF& site UTF 63.41% and 71.79% in between LTZ and MTZ.

Table 4.4: Similarity index among three zones.

Index of Similarity (IS)	**MTZ**	**UTZ**
LTZ	71.79	63.41
MTZ		76.19

4.3.4 Size class distribution diagram

In each sites the tree species were classified into ten size classes with an interval of 10cm dbh. Then the density diameter curves were developed to assess the general population structure of tree in three study sites. As shown in the given figure 4.1

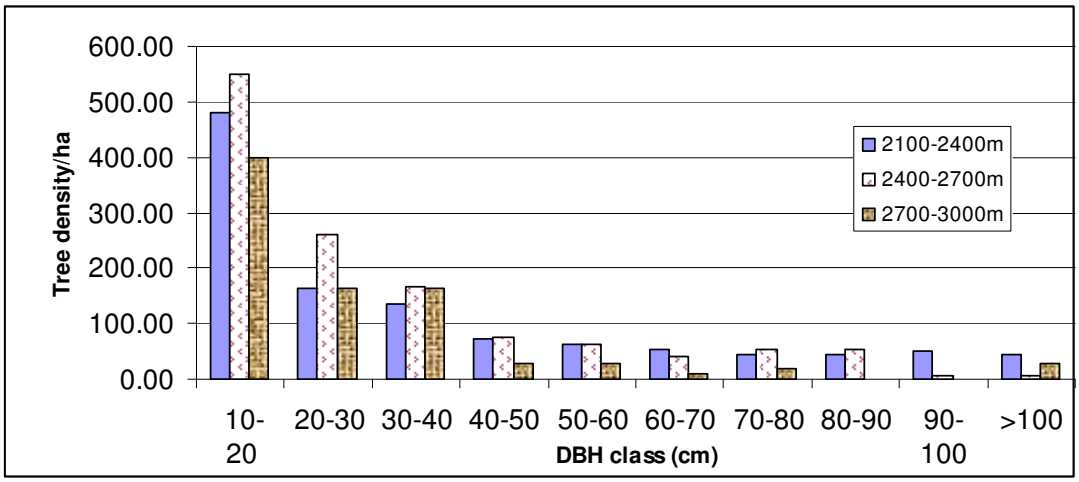


Figure 4.2: Density-Diameter distribution curves for tree species in three elevations

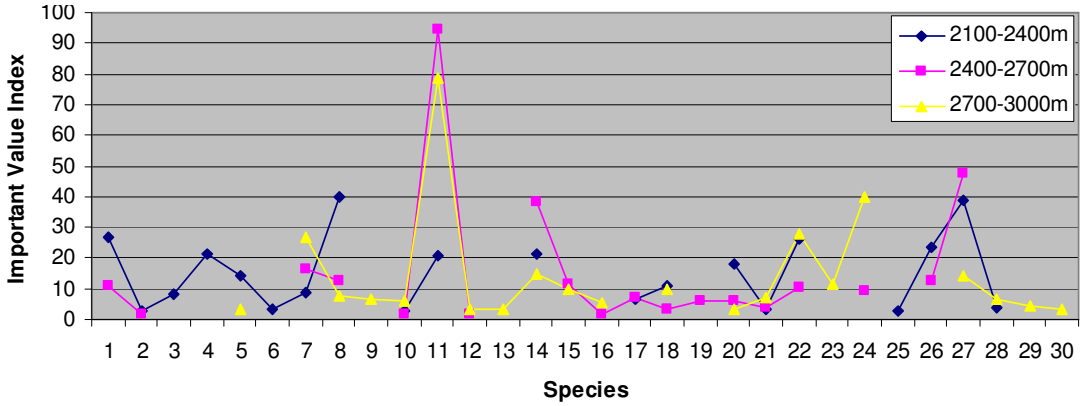


Figure 4.3: Dominance-Diversity curve for tree species in the study area

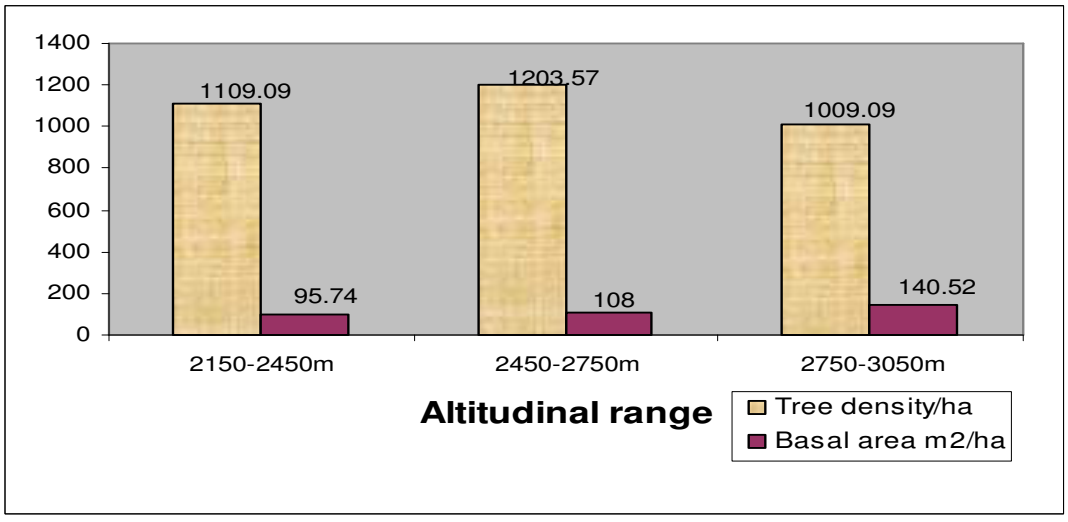


Figure 4.4: Altitudinal variation in tree density/ha and basal aream^2/ha.

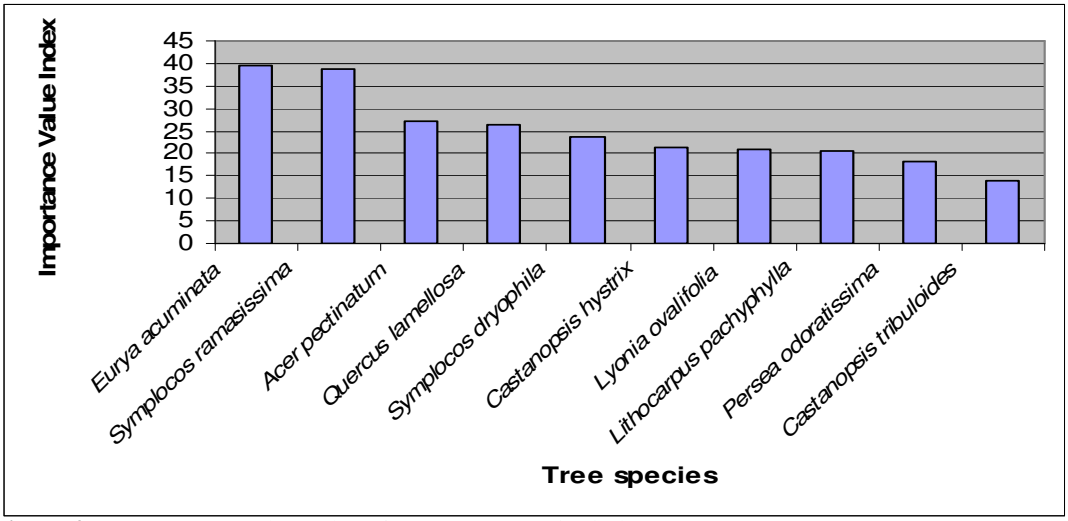


Figure 4.5: Importance Value Index of top ten tree species in lowere temperate zone

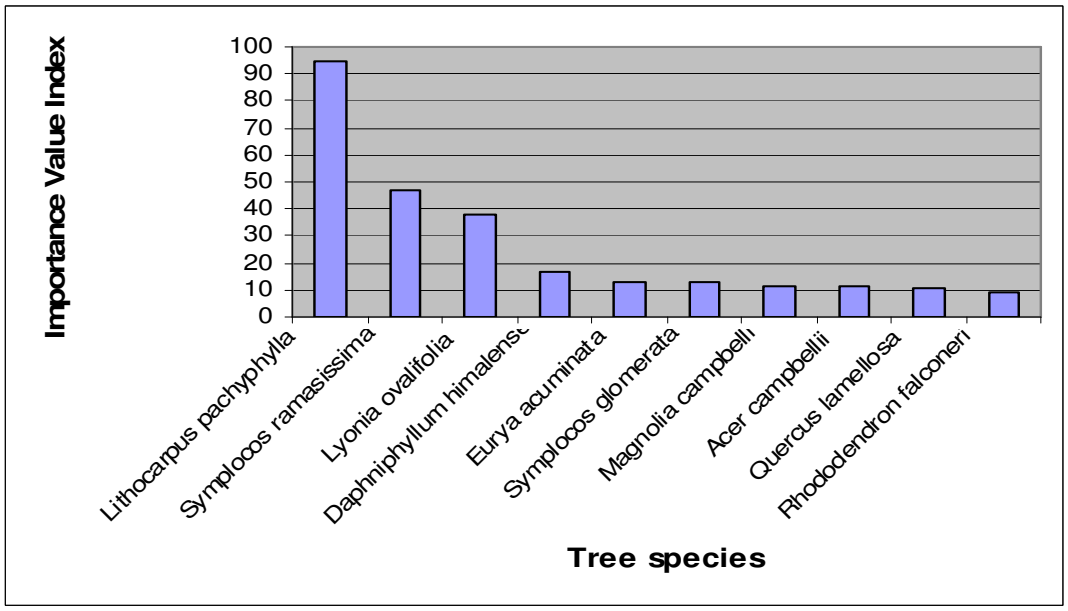


Figure 4.6: Importance Value Index of top ten tree species in middle temperate zone.

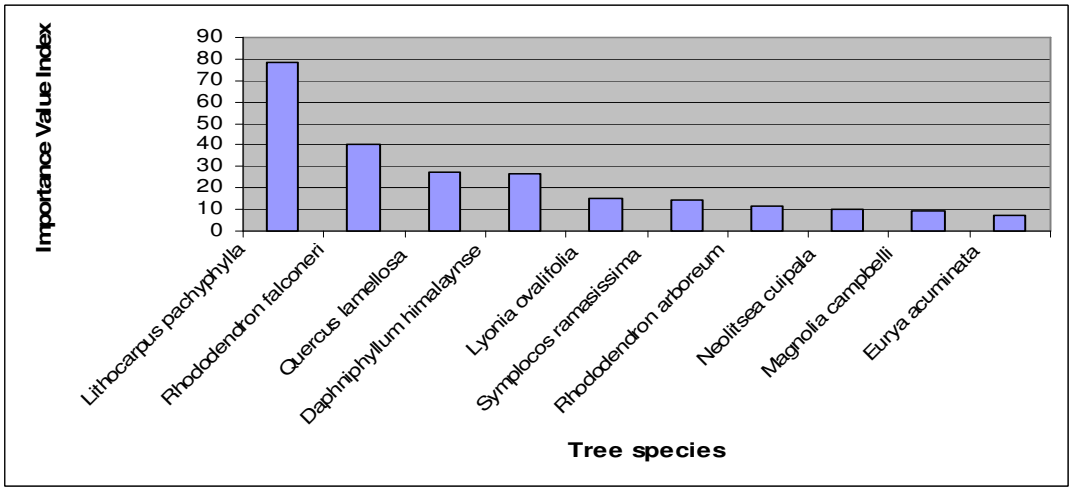


Figure 4.7: Importance Value Index of top ten tree species in upper temperate zone

Table 4.5: Frequency, RF, Density, RD, Basal area, RBA and Importance Value Index (IVI) of Tree species in lower temperate zone

Name of species	F%	RF%	D ha^{-1}	RD %	BAm^2ha^{-1}	RBA %	IVI
Acer pectinatum	27.27	6.12	54.55	4.92	15.31	15.99	27.03
Alangium alpinum	9.09	2.04	9.09	0.82	0.12	0.13	2.99
BHADRASE	9.09	2.04	9.09	0.82	5.16	5.39	8.25
Castanopsis hystrix	36.36	8.16	109.09	9.84	3.10	3.23	21.23
Castanopsis tribuloides	9.09	2.04	72.73	6.56	5.23	5.46	14.06
Cryptomeria japonica	9.09	2.04	9.09	0.82	0.14	0.15	3.01
Daphniphyllum himalaynse	9.09	2.04	9.09	0.82	5.41	5.65	8.51
Eurya acuminata	45.45	10.20	263.64	23.77	5.42	5.66	39.64
Lindera neesiana	9.09	2.04	9.09	0.82	0.07	0.07	2.94
Lithocarpus pachyphylla	27.27	6.12	45.45	4.10	9.88	10.32	20.55
Lyonia ovalifolia	36.36	8.16	100.00	9.02	3.71	3.88	21.06
Myrsine semiserata	18.18	4.08	18.18	1.64	1.00	1.05	6.77
Neolitsea cuipala	18.18	4.08	18.18	1.64	4.97	5.20	10.92
Persea odoratissima	27.27	6.12	54.55	4.92	6.80	7.11	18.15
Quercus glauca	9.09	2.04	9.09	0.82	0.45	0.47	3.33
Quercus lamellosa	27.27	6.12	45.45	4.10	15.37	16.06	26.28
Rhus succedanea	9.09	2.04	9.09	0.82	0.12	0.13	2.99
Symplocos dryophila	45.45	10.20	90.91	8.20	4.98	5.20	23.60
Symplocos ramasissima	63.64	14.29	172.73	15.57	8.49	8.86	38.72
Total	445.45	100.00	1109.09	100.00	95.74	100.00	300.00

Table 4.6: Frequency, RF, Density, RD, Basal area, RBA and Importance Value Index (IVI) of Tree species inmiddle temperate zone.

Species name	F%	RF%	D ha^{-1}	RD %	BAm^2ha^{-1}	RBA %	IVI
Acer campbellii	14.29	4.35	17.86	1.48	5.64	5.22	11.05
Alangium alpinum	3.57	1.09	3.57	0.30	0.03	0.03	1.41
Daphniphyllum himalense	14.29	4.35	139.29	11.57	0.41	0.38	16.30
Eurya acuminata	17.86	5.43	53.57	4.45	2.92	2.70	12.59
Lindera neesiana	3.57	1.09	3.57	0.30	0.06	0.06	1.44
Lithocarpus pachyphylla	60.71	18.48	289.29	24.04	56.28	52.09	94.60
Lindera neesiana (Siltimur)	3.57	1.09	3.57	0.30	0.07	0.07	1.45
Lyonia ovalifolia	42.86	13.04	210.71	17.51	8.15	7.55	38.10
Magnolia campbellii	17.86	5.43	17.86	1.48	5.17	4.79	11.70
Michelia dltlsopa	3.57	1.09	3.57	0.30	0.29	0.27	1.65
Myrsine semiserata	10.71	3.26	25.00	2.08	1.87	1.73	7.07
Neolitsea cuipala	3.57	1.09	3.57	0.30	2.27	2.10	3.49
Patpate	10.71	3.26	21.43	1.78	1.32	1.22	6.26
Persea odoratissima	14.29	4.35	14.29	1.19	0.56	0.51	6.05
Quercus glauca	7.14	2.17	7.14	0.59	0.99	0.92	3.68
Quercus lamellosa	14.29	4.35	35.71	2.97	3.22	2.98	10.29
Rhododendron falconeri	14.29	4.35	42.86	3.56	1.53	1.42	9.33
Symplocos glomerata	10.71	3.26	64.29	5.34	4.30	3.98	12.58
Symplocos ramosissima	53.57	16.30	232.14	19.29	12.69	11.74	47.33
Taxus wallichiana	7.14	2.17	14.29	1.19	0.28	0.26	3.62
Total	328.57	100.00	1203.57	100.00	108.06	100.00	300.00

Table 4.7 Frequency, RF, Density, RD, Basal area, RBA and Importance Value Index (IVI) of Tree species in upper temperate zone

Species name	F%	RF%	D ha^{-1}	RD %	BAm^2ha^{-1}	RBA %	IVI
Castanopsis tribuloides	9.09	2.33	9.09	0.90	0.10	0.07	3.30
Daphniphyllum himalaynse	9.09	2.33	245.45	24.32	0.20	0.14	26.79
Eurya acuminata	18.18	4.65	27.27	2.70	0.11	0.08	7.43
Ilex fragilis	18.18	4.65	18.18	1.80	0.38	0.27	6.72
Lindera neesiana (Siltimur)	9.09	2.33	9.09	0.90	3.81	2.71	5.94
Lithocarpus pachyphylla	63.64	16.28	136.36	13.51	68.48	48.73	78.53
Litsea sericea	9.09	2.33	9.09	0.90	0.14	0.10	3.33
Litsea cubela	9.09	2.33	9.09	0.90	0.14	0.10	3.33
Lyonia ovalifolia	9.09	2.33	18.18	1.80	15.23	10.84	14.97
Magnolia campbellii	18.18	4.65	27.27	2.70	3.26	2.32	9.67
Michelia velutina	9.09	2.33	18.18	1.80	1.56	1.11	5.23
Neolitsea cuipala	27.27	6.98	27.27	2.70	0.15	0.11	9.79
Persea odoratissima	9.09	2.33	9.09	0.90	0.14	0.10	3.33
Quercus glauca	18.18	4.65	18.18	1.80	0.54	0.39	6.84
Quercus lamellosa	9.09	2.33	9.09	0.90	34.27	24.39	27.61
Rhododendron arboreum	9.09	2.33	90.91	9.01	0.24	0.17	11.51
Rhododendron falconeri	54.55	13.95	190.91	18.92	10.22	7.27	40.14
Symplocos glomerata	18.18	4.65	27.27	2.70	0.03	0.02	7.38
Symplocos ramosissima	27.27	6.98	63.64	6.31	1.19	0.85	14.13
Taxus wallichiana	18.18	4.65	18.18	1.80	0.05	0.04	6.49
Viburnum cylindricum	9.09	2.33	18.18	1.80	0.18	0.13	4.26
Viburnum erubescens	9.09	2.33	9.09	0.90	0.09	0.06	3.29
Total	390.91	100.00	1009.09	100.00	140.52	100.00	300.00

Table 4.7 Plot Characters with dominant vegetation

S.N.	VDCs	Quadrats	Location			Dominant Vegetation Type
			Latitude	Longitude	Elevation (m)	
1	Mai Majhuwa	M1	27 05 04.5	87 55 39.1	2482	*Quercus-Lyonia* sp
2		M2	27 05 28.6	87 55 29.2	2265	*Lyonia-Acer* sp
3		M3	27 05 28.1	87 55 21.3	2792	*Lithocarpus-Lyonia* sp
4		M4	27 05 18.6	87 55 37.7	2480	*Quercus-Lyonia* sp
5		M5	27 05 0.2	87 55 31.1	2631	*Lithocarpus-Lyonia* sp
6		M6	27 05 10.1	87 55 12.6	2861	*Rhododendron-Castanopsis* sp
7		M7	27 05 8.7	87 55 3.3	3027	*Rosa-Piptanthus* sp
8		M8	27 05 22.7	87 54 47.3	3171	*Rhododendron* sp.
9	Mabu	Mb1	27 04 05.1	87 59 28.9	2665	*Rhododendron-Lyonia*
10		Mb2	27 04 19.8	89 00 2.7	2689	*Rhododendron-Lithocarpus* sp

11		Mb3	27 04 05.1	87 59 28.9	2665	*Rhododendron-Lithocarpus* sp
12		Mb4	27 04 13.4	87 59 42.6	2656	*Rhododendron* sp.
13		Mb5	27 04 17	87 59 52	2643	*Rhododendron* sp.
14		Mb6	27 04 18	87 59 54	2637	*Rhododendron-Lithocarpus*
15		Mb7	27 04 19.7	87 59 55.2	2637	*Rhododendron-Acer*
16		Mb8	27 04 19.8	88 00 2.7	2689	*Daphniphyllum-Lyonia*
17		J1	27 02 44.8	88 00 25.6	2334	*Lithocarpus-Castanopsis*
18		J2	27 02 44.8	88 00 27.7	2358	*Symplocos* sp.
19		J3	27 02 45.7	88 00 29.4	2377	*Symplocos* sp.
20		J4	27 02 45.3	88 00 30.3	2381	*Lithocarpus-Castanopsis* sp
21		J5	27 02 46	88 00 33.9	2400	*Castanopsis* sp.
22		J6	27 02 49.8	88 00 43	2457	*Lithocarpus* sp
23		J7	27 02 49.6	88 00.43.7	2450	*Quercus-Lyonia* sp
24		J8	27 02 51.3	88 00 46	2468	*Lyonia ovalifoilia*
25		J9	27 02 51.3	88 00 45.9	2476	*Lithocarpus-Querc* sp
26		J10	27 02 57.7	88 00 49	2490	*Lithocarpus pachyphylla* sp
27		J11	27 02 54.2	88 00 51.2	2529	*Lithocarpus pachyphylla* sp
28		J12	27 02 56.5	88 00 57.6	2555	*Lithocarpus-Lyonia* sp
29		J13	27 02 57.7	88 00 18	2582	*Lithocarpus-Lyonia* sp
30		J14	27 03 06.4	88 01 18	2683	*Rhododendron-Lithocarpus*
31		J15	27 02 38.3	88 00 47	2159	*Lithocarpus-Castanopsis* sp
32		J16	27 02 38.6	88 00 47.9	2209	*Lithocarpus-Quercus* sp
33		J17	27 02 44.7	88 01 28.3	2305	*Lithocarpus-Quercus*
34		J18	27 03 12.3	88 01 25.8	2760	*Lithocarpus pachyphylla* sp
35		J19	27 02 56.8	88 01 03.2	2616	*Lithocarpus-Quercus* sp
36		J20	27 02 54	88 00 48.4	2541	*Lithocarpus-Lyonia* sp
37		J21	27 00 39.2	88 01 18.5	2278	*Lithocarpus-Symplocos*
38		Jm1	27 00 19.5	88 01 24.8	2459	*Lithocarpus-Quercus* sp
39		Jm2	27 00 17.7	88 01 23.2	2474	*Lithocarpus- Symplocos* sp - *Magnolia* sp
40		Jm3	27 00 16.6	88 01 22.8	2459	*Lithocarpus- Symplocos* sp
41		Jm4	27 00 14.3	88 01 23	2451	*Lithocarpus- Symplocos* sp
42		Jm5	27 00 11.3	88 01 22.3	2463	*Lithocarpus- Symplocos* sp
43		Jm6	27 00 09.1	88 01 19.6	2442	*Lithocarpus- Symplocos* sp
44		Jm7	27 00 06.9	88 01 17.5	2435	*Rhododendron-Lithocarpus*
45		Jm8	27 00 42.8	88 03 04.8	2426	*Symplocos* sp
46		Jm9	27 00 45.8	88 03 06.7	2430	*Symplocos* sp
47		Jm10	27 00 47.4	88 03 07.6	2432	*Lithocarpus-Symplocos* sp
48		Jm11	27 00 43.7	88 03 09.8	2443	*Symplocos* sp
49		Jm12	27 00 55	88 03 10.2	2425	*Lithocarpus-Sumplocos* sp
50	Jog Mai	Jm13	27 00 50.3	88 03 18	2324	*Symplocos* sp

4.4 Systematic Treatment

A. GYMNOSPERMAE

Family 1.TAXACEAE

1. TAXUS L.

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

Tree 5-12m. Leaves 1.5-2.75x0.2-0.25cm, usually curved, acuminate margins slightly enrolled, dark green above, paler beneath. Male cones ovoid 8mm, long. Female flowers ovoid, 3-4 mm. Seeds ovoid, somewhat compressed, 7x5 mm, Fleshy aril red.

Habitat: *Lithocarpus-Rhododendron* forest. **Fl. & Fr.:** Mar. - May.

Representative collection: Ilam, Maimajuwa, Chintapu, 2650m, $27^0$05'28.6''N, $87^0$55'29.2''E, August 30, 2007, LKSR-Expedition team, **C 088** (TUCH).

Distibution: Himalaya (Nepal-Bhutan), North East India, North Myanmar. West China, Nepal (West-East: 2300-3400m).

Family 2. TAXODIACEAE

1. CRYPTOMERIA D. Don

1. Cryptomeria japonica; (L. f.) D. Don in *Trans. Linn. Soc. London* 18: 167, t. 13, f. 1(1841); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 307 (2000).

Cupressus japonica L.f., *Suppl. Pl.*:421 (1781).

Planted tree to 15m. Leaves inwardly-curved, 7-12mm, 4 angular, acuminate, shortly decurrent at base, Male cones 7-10x 3-4mm. Female cones 1.3-1.5cm; scale divided into 3-6 teeth, bract exerted, mostly adnate to scale but free at triangular apex. Seeds narrowly elliptic, 4x1.5mm.

Habitat: In *Pinus* forest. **Fl. & Fr.:** Mar. – Apr.

Representative collection: Ilam, Jamuna, Hangetham 2240m, 27.04N, 88.01E, June 7, 2007, LKSR-Expedition team, **B 232** (TUCH).

Distibution: Himalaya (Nepal-Sikkim), North East India, North. Myanmar, West China, Nepal (Central-East: 1300- 2600m).

Family 3. BETULACEAE

1. CORYLLUS L.

1. Coryllus ferox Wall*, Pl. Asiat. Rar.* **1(4):** 77, t, 87(1980); Press *et al.*, *Ann. Check. Fl. Pl. Nep*.: 76 (2000). *'Lekh Katus'* (लेखकटुस).

Tree 5-10m. Leaves ovate or elliptic, 7-12x3-5cm, finely acuminate, base rounded, margins finely serrate, sparsely pubescent above. Male catkins 3-5 (-7)cm. Female bud scales densely pubescent. Fruits in dense cluster; nuts broadly ovoid, branched spines on upper margin.

Habitat: *Rhododendron-Lyonia* forest. **Fl. & Fr.:** Nov.-Dec.

Representative collection: Ilam, Mabu, Kalapokhari, 2770m, 27.06N, 88.01E, June 6, 2007, LKSR-Expedition team, **B 134** (TUCH).

Distibution: Himalaya (Nepal-Bhutan), North East India, North Myanmar, West China, Nepal (Centre-East: 2600-3200m).

Family 4. FAGACEAE

1. CASTANOPSIS Spach.

1. Castanopsis hystrix Miq., *Ann. Mus.Bot. Lugduno-Batavum* **1**: 119 (1963); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 111 (2000). '*Patale Katus*' (पातले कटुस).

Tree 3-20m. Leaves ovate-lanceolate, 6-10x2-3cm, acute or more or less entire, finely reddish tomentose beneath. Spikes drooping to suberect female flowers less tomentose; cupule globose, 3-5cm including dense spines 7-10mm; nut 1 per cupule, ovoid.
Habitat: *Lithocarpus-Castanopsis* forest. **Fl. & Fr.:** Apr. – Jun.
Representative collection: Ilam, Jamun-2, Hangetham around, 2170m, 27.04N, 88.01E, June 7, 2007, LKSR-Expedition team, **B 171** (TUCH).
Distibution: Himalaya (Nepal to Arunachal Pradesh), North East India, Myanmar, South China, Nepal (Centre-East: 1000-2500m).

2. LITHOCARPUS Blume

1. Lithocarpus pachyphylla (Kurz) Rehder in *J. Arnold Arbor.* 1: 129 (1919); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 111(2000). 'Arkhaulo' (अरखौला)

Quercus pachyphylla Kurz. in J. *As. S. Beng* **25**: 197, t. 14, f. (1919).

Tree 10-20m. Leaves elliptic, 8-20x3-5cm, cordate-acuminate, glabrous; panicle branches 5-10 cm, clusters of male flowers surrounded by ovate spreading bracts, female flowers usually in 3s, acrons ovoid 2-2.5cm tall, turbinate, glabrous.
Habitat: *Castanopsis hystrix* forest. **Fl. & Fr.:** Jan. – May..
Representative collection: Ilam, Jamun-2, Hangetham around, 2170m, 27.04N, 88.01E, June 7, 2007, LKSR-Expedition team, **B 165** (TUCH).
Distibution: Hiamalaya (Nepal to Arunachal Pradesh) North East India, Myanmar Nepal (East: 2100-2800m).

3. QUERCUS L.

1. Quercus glauca Thunb. in *Fl. Jap*. 175 (1734); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 111 (2000). '*Phalat'* (फलाट).

Tree up to 12m. Leaves elliptic, 7-15x 3-5cm, acuminate, base cuneate, margins sharply toothed in upper half. Male spikes 4-6cm, flowers 3mm± globose. Cupules 1-1.5cm diameter covering acron with 6-7 overlaping annular lamellae, Acron ellipsoid.
Habitat: *Lithocapus-Castanopsis* forest**.** **Fl. & Fr.:** Mar. **-** Apr.
Representative collection: Ilam, Maimajuwa Newakhola, 2050m, $27^0$04'N-$87^0$58'E, August 28, 2007, LKSR-Expedition team, **C 052** (TUCH).
Distibution: Himalaya (Kashmir to Arunachal Pradesh), Myanmar, China, Indo-China, Nepal (West-East: 450-3100m).

2. Quercus lamellosa Smith. in *Res. Cyclop*. 29, n. 23 (1814); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 111(2000). '*Bajrant*' (बजराँठ).

Tree of 20m. Leaves ovate or oblong, 14-40x4-12cm, margins toothed almost; glaucous and glabrous beneath, veins 15-25 (-30) pairs; Cupules 4-7cm diameter, very woody, enclosing all but apex of acorn, 3-4cm tall with 8-10 lamellae; acorn turbinate or subglobose.
Habitat: *Quercus-Michelia* mixed forest. **Fl. & Fr.:** Apr. - Jun.
Representative collection: Ilam, Maimajuwa Ratopanikhola, 21840m, $27^0$04'N, $87^0$58'E, August 27, 2007, LKSR-Expedition team, **C 035** (TUCH).
Distibution: Himalaya (Nepal-Bhutan), North East India, Myanmar.Nepal (Central-East).

Family 5**. MORACEAE**

1. FICUS L.

1. Ficus hederacea Roxb. in *Fl. Ind. ed.* 18329 (Roxburgh) ed. 2, **3**: 538 (1832); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 198 (2000). '*Lahare peepal***'** (लहरे पिपल).

Climbing shrub. Leaves coriaceous 5-10x3-8cm, acute base broadly cuneate, entire, glabrous but slightly rough, lateral veins 3-5, pairs. Shoots creeping on ground, rooting at nodes. Figs subglobose 1-1.3cm, minutely roughened, glabrous on peduncles 6-10mm.
Habitat: In rocky mountain slope. **Fl. & Fr.:** Almost year.
Representative collection: Ilam, Jamun-Jawaubari, 2780m, 27.00N, 88.02E, June 18, 2007, LKSR-Expedition team, **B 189** (TUCH).
Distibution: Himalaya (Uttar Pradesh-Arunachal Pradesh), Myanmar, North India, South China, Indo-China; Nepal (West-East: 500-1400m).

Family 6. URTICACEAE

1. BOEHMERIA Jacquin

1. Boehmeria clidemioides Miq. in *Pl. Jungh.*: 34 (1851); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 319 (2000).

Small weak shrub, whitish pilose throughout; leaves smaller, 4-10x2-5cm, margins more strongly serrate. Flowers clusters more numerous and closely spaced, female flowers 0.5mm diameter, style persistent.
Habitat: In moist shady places. **Fl. & Fr.:** Jul.-Sep.
Representative collection: Ilam, Maimajuwa Thulogaun, 2650m, $27^0$05'28.6''N, $87^0$56'38''N, August 28, 2007, LKSR-Expedition team, **C 003** (TUCH).
Distibution: Himalaya (Nepal-Bhutan), North East India, North Myanmar. Indo-China. Malayasia.Nepal (Centre-East: 1900-2200m).

2. LECANTHUS Wedd.

1. Lecanthus peduncularis (Royle) Weddell in DC., *Prodr,* **16**(**2**):164 (1869); Press *et al.*, *Ann. Check. Fl. Pl. Nep.* 321 (2000).

Procris obtusa Royle*, III. B. Him. T*. 83, f. 3 (1836).

Small herb. Leafy shoots 20-50cm, sometimes smaller, as little as 3cm. Leaves ovate larger ones 5-12x3-6cm, acuminate, cuneate at base. Flower reddish green, 1-2.5 cm diameter, on peduncle up to 27cm long.
Habitat: *Lithocarpus Quercus* forest. **Fl. & Fr.:** Jul.-Sep.
Representative collection: Ilam, Jamun-2, Hangetham around, 2170m, 27.04N, 88.01E, June 7, 2007, LKSR-Expedition team, **B 174** (TUCH).
Distibution: Himalaya India, Myanmar, Taiwan, Indo-China, Africa, Nepal (West-East: 1200-3200m).

3. **PILEA** Lindl.

1. Pilea anisophylla Wedd. in *Monogr. Urtic.*: 245 (1856); Press *et al.*, *Ann. Check. Fl. Pl. Nep.* 321 (2000).

Dioecious herb with creeping stems and erect or scrambling leafy shoots up to 1m. Leaves ovate-lanceolate, asymmetric, larger ones 10-15x3-5cm, acuminate, base cordate, entire, smaller ones 2-3x 1-1.5cm, cordate, sessile or on short petioles. Panicles axillary. Achenes ovate, 1mm.
Habitat: In moist shady places. **Fl. & Fr.:** Jul.-Oct.
Representative collection: Ilam, Jamun-2, Hangetham around, 2170m, 27.04N, 88.01E, June 7, 2007, LKSR-Expedition team, **B 147** (TUCH).

Distibution: Himalaya (Nepal-Bhutan), North East India, West China, Taiwan, Nepal (Centre-East: 900-2000m).

2. Pilea bracteosa Wedd. in *Monogr. Urtic*.: 245 (1856) var. **bracteosa**; Press *et al.*, *Ann. Check. Fl. Pl. Nep.* 321(2000).

Glabrous herb 30-50cm. Leaves broadly ovate, 6-12x2-7cm, acuminate, base rounded margins and acumen sharply serrate. Panicles spreading, 6-10cm.
Habitat: In moist streamside **Fl. & Fr.:** May- Aug.
Representative collection: Ilam, Maimajuwa Ratopanikhola, 1840m, $27^0$04'02''N, $87^0$56'22''E, August 27, 2007, LKSR-Expedition team, **C 039** (TUCH).
Distibution: Himalaya (Nepal-Bhutan), North East India, Meghalaya, Myanmar, Nepal (Centre-East:1200-1500m).

3. Pilea scripta (Buch.-Ham. ex D. Don) Wedd., *Ann. Sci. Nat., ser*. **4(1):**187 (1854); Press *et al.*, *Ann. Check. Fl. Pl. Nep.* 322 (2000).

Urtica scripta Buch.-Ham. ex D. Don, *Prodr. F. Nep*. 59 (1825).

Tall glabrous herb. Stem ridged. Leaves opposite, long petiolate, elliptic, lanceolate, base acute, denticulate, apex acuminate, 3-19x1-6 cm, 3-nerved from base, glabrous. Inflorescence axillary panicles. Flowers reddish minute. Fruit a minute granulate achene.
Habitat: Along open rocky trial road. **Fl. & Fr**.: Aug. - Oct.
Representative collection: Ilam, Maimajuwa-Banduke, 2170m, 27.1N, 87.95 E, June 8, 2007, LKSR-Expedition team, **A 044** (TUCH).
Distribution: Himalaya (Uttar Pradesh-Nepal), Khasia, Burma and West China, Nepal (West-East: 1300-2500m).

4. POUZOLZIA Gaudich.

1. Pouzolzia hirta (Blume) Miq. in *Ann. Mus. Bot. Lugduno-Batavum* 4: 303, t. 10, f. 2 (1869); Press *et al.*, *Ann. Check. Fl. Pl. Nep.* 321 (2000).

Gonostegia hirta (Blume) Hassk in *Cat*. 164, n.4601 (1831).

Monoecious or dioecious prostrate herb up to 50cm. Leaves all opposite, ovate to lanceolate, 1.5-10x0.7-3cm, acuminate. Flower borne around nodes in globose clusters 1-1.5cm diameter. Male flowers globose, 5-merous, perianth ovoid, 2-4 broad wings in fruit.
Habitat: In moist shady places. **Fl. & Fr.:** Jun.-Aug.
Representative collection: Ilam, Maimajuwa-7 Upper hattiya, 1860m, 27.06N, 87.94E, June 8, 2007, LKSR-Expedition team, **A 004** (TUCH).
Distribution: Himalaya, India, Myanmar, Japan, Malaysia, Nepal (East-West: 500-2400m).

2. Pouzolzia zeylanica (L.) J. Benn. & R. Br. in *Pl. Jav. Rar*. 67 (1854); Press *et al.*, *Ann. Check. Fl. Pl. Nep.* 322 (2000).

Parietaria zeylanica Linn. in *Sp. Pl.* 1052 (1753).

Perennial herb up to 20-40cm. Leaves opposite, ovate to lanceolate, 3-6 x1.5-3cm, base rounded, entire, acute. Flower in loose axillary clusters. Male flower short, pedicellate. Female flower sessile. Achene ovate, 1.5 mm long, black, enveloped by ribbed calyx.
Habitat: Near moist cultivated land. **Fl. & Fr.:** Jul.-Aug.
Representative collection: Ilam, Maimajuwa-7 Upper hattiya, 1860m, 27.06N, 87.94E, June 8, 2007, LKSR-Expedition team, **A 003** (TUCH).
Distribution: Himalaya, India, Japan, Malayasia, Nepal (East-West: 200-2400m).

Family 7. **LORANTHACEAE**

1. SCURRULA L.

1. Scurrula elata (Edgew.) Danser in *Bull Jard. Bot. Buitenzorg, ser*. 3 **10** :350 (1929); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 190 (2000).

Loranthus elatus Edgew. in *Tr. Linn. S*. 20: 58 (1846).

Shrub up to 2m. Leaves broadly ovate, 7-11x4-6cm, thickly coriaceous, glabrous on both surfaces when mature.Racemes larger; flowers red at base, green at apex shortly brownish present in bud, bud becoming glabrous; fruit obovoid, only tapering, slightly at base.
Habitat: In pure *Quercus* forest. **Fl. & Fr.:** Apr.-Jun.
Representative collection: Ilam, Jamun-Jowbari, 26200m, 27.02N, 88.02E, June 18, 2007, LKSR-Expedition team, **B 178** (TUCH).
Distribution: Nepal (West-East: 1600-2700m). Himalaya (Himachal Pradesh- Bhutan), India, West China.

2. Scurrula parasitica L. in *Sp. Pl.*: 110 (1753); Press *et al.*, *Ann. Check. Fl. Pl. Nep.* 190 (2000). '*Aijeru'* (ऐजेरु).

Shrub 1-3m. Leaves ovate-elliptic, 5-12x2-6cm, acute or subacute, base rounded to cuneate, glabrous above and pale-tomentose beneath when mature. Racemes short; 5-10-flowered, brownish stellate, Fruit club shaped, 6-7mm, including narrowly tapering base.
Habitat: *Quercus-Lithocarpus* forest. **Fl. & Fr.:** May-Aug.
Representative collection: Ilam, Mabu-8, Dobate around, 2240m, $27^0$04'N, $87^0$59'E, September 1, 2007, LKSR-Expedition team, **C 110** (TUCH).
Distribution: Himalaya (Uttar Pradesh-Bhutan), India, Srilanks, Myanmar, Indo-Chian, Malaya, Nepal (West-East: 200-2200m).

Family 8. **POLYGONACEAE**

1. ACONOGONUM (Meisner) Reichenbach

1. Aconogoum companulatum (Hook. f.) H. Hara, Fl. E. Himalaya: 67 (1966) var. **campanulatum**; Press *et al.*, *Ann. Check. Fl. Pl. Nep.* 236 (2000).

Polygonum companulatum Hook.f., *Fl. Brit. India*. 5: 52 (1836).

Prostate or suberct herb up to 0.3-1m. Leaves elliptic ovate, 5-12x2-5cm, acuminate, base rounded, Flowers in sparsely branched panicles; Perianth companulate, pink, achenes strongly trigonous.
Habitat: In *Rhododendron-Magnolia* forest. **Fl. & Fr.:** Jun.-Sep.
Representative collection: Ilam, Mabu-8, Kalapokhari, 2770m, 27.05N, 88.01E, June 16, 2007, LKSR-Expedition team, **B 128** (TUCH).
Distribution: Himamalaya (Uttar Pradesh-Bhutan), North Myanmar, Nepal (Centre-East: 2100-4000m).

2. Aconogoum molle (D. Don) H. Hara, *Fl. E. Himalaya:* 68(1966); Press *et al.*, *Ann. Check. Fl. Pl. Nep.* 236 (2000). '*Thotne'* (ठोद्ने)

Polygonum molle D. Don, *Prodr. Fl. Nep.* 72(Feb. 1825).

Subshrub 1-2m. Leaves elliptic, 10-15×3-5cm, acuminate, base cuneate, rounded, appressed pubescent, densely beneath. Ocrea 2-4cm, membranous, lanceolate. Panicles richly branched, cream coloured, oblong-elliptic. 5mm. Achenes, enclosed in blackish, fleshy perianth.
Habitat: In moist bushy forest. **Fl. & Fr.:** May-Nov.
Representative collection: Ilam, Maimajuwa-7, Naulegaun, 2860m, $27^0$05'10''N, $87^0$55'12''E, August 28, 2007, LKSR-Expedition team, **C 049** (TUCH).
Distribution: Himalaya (Uttar Pradesh to Sikkim), Nepal (West-East: 1200-2400m).

2. BISTORTA (L.) Adanson

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

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

Annual erect branched herb. Leaves ovate, 6-10×3-5cm, base cordate margin entire, apex acuminate. Upper leaves sessile, amplexicaul, glabrous. Ocreae 1-4cm, brown, membranous, entire. Racemes 2-5cm, peduncles 3-8cm. Flowers numerous, 6mm, pink. Achenes 5-6, brown.
Habitat: In open pasture land. **Fl. & Fr.:** Jul.-Sep.
Representative collection: Ilam, Maimajuwa-7, Chintapu, 2860m, $27^0$00'39''N, $87^0$01'18''E, August 30, 2007, LKSR-Expedition team, **C 099** (TUCH).
Distribution: Himalaya, Afghanistan, Nepal (West-East: 2100-4800 m).

Family 9**. CARYOPHYLLACEAE**

1. ARENARIA L.

1. Arenaria orbiclauata Royle ex Edgew. & Hook. f. in *Fl. Brit. India* **1(2)**: 240 (1874); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 40 (2000).

Slender prostate or decumbent perennial herb; stem 7-25cm, minutely recurved; Leaves suborbicular or broadly ovate, 2-7x2-7mm, obtuse, acute. Flower axillary or few in terminal cymes; sepals ovate-lanceolate, petals oblanceolate, styles 3.
Habitat: Near cultivated land. **Fl. & Fr.:** Jun. - Jul.
Representative collection: Ilam, Charkhol-Maimajuwa. 2410m, 27.08N, 87.04E, June 7, 2007, LKSR-Expedition team, **A 017** (TUCH).
Distribution: Himalaya (Kashmir to Bhutan), China, Nepal (West-East: 900-4400m).

Famaly 10. AMARANTHACEAE

1. CYTHULA Blume.

1. Cythula capitata Moq. in *Prodr.* **13**: 329 (1852); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 8 (2000). '*Biblyate kuro'* (बिबल्याटेकुरो).

Subshrub 1-2m. Leaves elliptic, 5-15x2-7cm, acute, base rounded; Flowers clusters aggregated into short, subglobose or oblong heads, sterile and fertile perianth segments 3-4mm, up to 7mm in fruit, pseudostaminodes minute, and ciliate.
Habitat: In dry roadsides. **Fl. & Fr.:** Jul.-Sep.
Representative collection: Ilam, Mabu-8, 2650m, 27^0 04'N, $87^0$59'E, September 7, 2007, LKSR-Expedition team, **C 171** (TUCH).
Distribution: Himalaya, Indo-China, Nepal (Centre-East: 1300-2900m).

Family 11. MAGNOLIACEAE

1. MAGNOLIA L.

1. Magnolia campbellii Hook, f. & Thomson in *Fl. Ind*. (Hooker & Thomson): 77 (1855); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 192 (2000). '*Ghoge Champ***'** (घोगे चाँप).

Deciduous tree, 12-15m. Leaves unfolding after flowers, elliptic to obovate, 25-33x10-14cm, acute, base rounded, pubescent. Flowers erect 15cm across, enclosed at first by spathe-like bracts 4.5- 6cm, stamens and carpel publish. Fruiting receptacle cylindrical, carpel obovoid.
Habitat: In *Quercus-Rhododendron* forest. **Fl. & Fr.:** Mar.-May.

Representative collection: Ilam, Jamun-1, Hangetham Gairibas, 2720m, 27.04N, 88.03E, June 17 2007, LKSR-Expedition team, **B 176** (TUCH).
Distribution: Himalaya (Nepal to Arunachal Pradesh), North East India, North Myanmar. China, Nepal (Centre-East: 2250-2700m).

2. MICHELIA L.

1. Michelia doltsopa Buch.-Ham ex DC. in *Syst. Nat.* 1: 448 (1871); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 192 (2000). '*SetoChanp'* (सेतो चाँप).
Evergreen tree 8-25m, buds greyish-brown sericeous. Leaves elliptic or oblanceolate, acute. Flowers white, 10-15cm across, perianth parts 9-12. Stamens yellowish. Fruiting receptacle 7-12cm, carpel ovoid, acute.
Habitat: In cultivated public land. **Fl. & Fr.:** Feb.-Mar.
Representative collection: Ilam, Newakhola-Maimajuwa, 2050m, $27^0$04'N-$87^0$58'E, August 28, 2007, LKSR-Expedition team, **C 056** (TUCH).
Distribution: Himalaya (Nepal to Arunachal Pradesh), North East India, North Myanmar, China (Xizang, Yunnan), Nepal (East-Centre: 2100-2500m).

2. Michelia velutina DC in *Prodr.* 1: 79 (1824); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 192 (2000). '*Guaya Chanp'*(गुहे चाँप).

Similar to *M. dotlsopa* but leaves narrower, Flowers 5cm across, perianth parts oblanceolate, carpels densely pubescent at first, glabrous, rounded.
Habitat: Near cultivated land. **Fl. & Fr.:** Aug.-Sep.
Representative collection: Ilam, Maimajuwa-7, Naulegaun, 2040m, 27.06N, 87.94E, June 7, 2007, LKSR-Expedition team, **B 159** (TUCH).
Distribution: Himalaya (Nepal to Bhutan) North East India, North Myanmar, China (Xizang, Yunnan), Nepal (Centre-East: 300-2000m).

Family 12. **SCHISANDRACEAE**

1. SCHISANDRA Michaux

1. Schisandra grandiflora (Wall.) Hook. f. & Thomson in *Fl. Brit India* 1(1): 44 (1872); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 291 (2000). '*Singhatta Lahara*' (सिंगटा लहरा).

Kadsura grandiflora Wall. in *Tenr. Fl. Nap.* 10. t. 14 (1824).

Climber. Leaves lanceolate, elliptic. Male flowers pedicels 1-4cm, perianth parts white or pale pink, 7-8 in 3 series, broadly elliptic or obovate, Female flwoers: pedicels 1.5-6cm, perianth as in males; carpels ovoid red.
Habitat: In *Quercus-Lithocarpus* forest. **Fl. & Fr.:** May-Jun.
Representative collection: Ilam, Jamun-2, Hangetham around, 2240m, 27.04N, 88.01E, June 17, 2007, LKSR-Expedition team, **B 160** (TUCH).
Distribution: Himalaya (Himachal Pradesh to Bhutan), Nepal (West-East: 2100-3300m).

2. Schisandra neglecta A. C. Sm. in *Sergentia* **7:** 127, f. 17g (1947); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:291 (2000).

Similar to *S. grandiflora* but smaller leaves 5-15x2-7cm, acute, or shortly acuminate, base rounded or cuneate. Perianth parts yellowish, female flowers as male but carpel ellipsoid, 1-2x1mm, on column 1.5-1.8mm; fruiting column 4-122cm, bearing 10-30, oblong-ellipsoid.
Habitat: In moist stream. **Fl. & Fr.:** Jun.-Jul.
Representative collection: Ilam, Mabu, Near Maikhola, 2170m, 27.08N, 88.01E, June 15, 2007, LKSR-Expedition team, **B 102** (TUCH).
Distribution: Himalaya (Nepal to Bhutan), North East India, North Myanmar, Nepal (Centre -East: 1800-3000m).

Family 13**. LAURACEAE**

1. DODECADENIA Nees

1. Dodecadenia grandiflora Nees in Wall., *Pl. Asiat. Rar*. 2: 63 (1831); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 161 (2000).

Tree to 15m; shoots with ellipsoid terminal vegetative buds. Leaves coriaceous, elliptic-oblanceolate, 8-11x3-3cm, shortly acuminate, base cuneate, almost glabrous. Flower buds subsessile, globose, scales appressed silky; Perianth segments oblong, redish. Fruit 1.5x1cm.
Habitat: In *Lithocarpus-Qurcus* forest. **Fl. & Fr.:** Mar.-Apr.
Representative collection: Ilam, Mabu-8, Dobate around, 2680m, $27^0$04'N and $87^0$59'E, September 3, 2007, LKSR-Expedition team, **C 166** (TUCH).
Distribution: Himalaya (Uttar Pradesh-Nepal), China, Nepal (West-East: 2300-2900m).

2. **LINDERA** Thunberg

1. **Lindera neesiana** (Wall ex Nees) Kurz.in *Prelim. Rep. Forest Pegu*: 103 (1875); Press *et al.*, *Ann. Check. Fl. Pl. Nep*.: 161 (2000). '*Siltimur'* (सिल्टीमूर).

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

Deciduos shrub. Leaves membranous, strongly aromatic; Flowers umbels 3-6, racemose on short leavesless axillary shoots, perianth cup not enlarged; Fruit broadly ellipsoid.
Habitat: In *Quercus-Eurya* forest. **Fl. & Fr.:** Oct.-Feb.
Representative collection: Ilam, Jamun-2, Hangetham around, 2240m, 27.04N and 88.01E, June 17, 2007, LKSR-Expedition team, **B 159** (TUCH).
Distribution: Himamalya (Nepal-Bhutan), North East India, Myanmar, Nepal (Centre-East: 1800-2700m).

2. LITSEA Lamark

1. Litsea cubela (Lour.) Pers. in *Syn. Pl.* 2: 4 (1806); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 162 (2000). '*Lekh Siltimur'* (लेख सिल्टीमूर).

Laurus cubela Lour., Cochinch 1: 252 (1790).

Evergreen shrub or small tree to 6m, winter bud abscent. Leaves membranous, aromatic when crushed, lanceolate, 7-14x2-4cm, long acuminate, base cuneate. Umbel buds 4-5mm. borne on slender peduncle. Fruit subglobose 6-7mm, perianth rim 1.5mm, across, on thickned pedicel 3-5mm.
Habitat: In moist forest. **Fl. & Fr.:** Dec.-Feb.
Representative collection: Ilam, Mabu-8, Dobate around, 2680m, $27^0$04'N, $87^0$59'E, September 3, 2007, LKSR-Expedition team, **C 165** (TUCH).
Distribution: Himalaya (Nepal-Bhutan), North East India, Myanmar, Indo China, Nepal (Centre-East: 1000-2700m).

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

Small shrub; terminal buds sharply pointed, leaves membranous, elliptic.Petioles 9-12mm;umbel in bud borne on deflexed peduncles, flowers large, perianth segments 5mm in male 3mm in females. Fruits subglobose 6mm.
Habitat: In *Lyonia-Eurya* forest. **Fl. & Fr.:** Apr.-May.
Representative collection: Ilam, Mabu-Kalapokhari, 2770m, 27.06N and 88.01E, June 16, 2007, LKSR-Expedition team, **B 137** (TUCH).
Distribution: Himalaya (Nepal-Bhutan), North East China, Myanmar, Nepal (East: 2700m).

3. Litsea sericea (Wall. ex Nees) Hook. f., *Fl. Brit. India*. **5(13)** 156 (1886); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 162 (2000).

Tetranthera sericea Wall. ex Nees. in Wall., *Pl. Asiat. Rar. 2: 67 (1831)*

Deciduous shrub or small tree to 15m; Leaves thinly coriaceous, elliptic, Flowers umbels, bud ovoids, 3-4mm, umbell 1-2cm across, 5-10 flowered; perianth segments 3mm in male and 2mm in female flower; fruit ellipsoid.
Habitat: In *Lyonia-Eurya* forest. **Fl. & Fr.:** Apr.-May.
Representative collection: Ilam, Mabu-Kalapokhari, 2770m, 27.06N and 88.01E, June 16, 2007, LKSR-Expedition team, **B 130** (TUCH).
Distribution: Himalaya (Nepal to Bhutan), Myanamr, West-Cenral China, Nepal (Centre-East: 2500-3000m).

3. NEOLITSEA (Bentham) Mreeill

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

Teranthera cuipala Buch.-ham. ex D. Don, *Prodr Fl. Nep*. 65 (1825).

Evergreen tree to 20m. Leaves clustered at branch ends, pendulous, coriaceous, oblanceolate, gradually acuminate, base long attenuate. Umbel buds globose, in clusters on old shoots, flowering umbels 1.5-2.5cm diameter, perianth segments 3mm. Fruit ellipsoid 12-15x7-8mm.
Habitat: In *Quercus –Castanopsis-Michelia* forest. **Fl. & Fr.:** Feb.-Mar.
Representative collection: Ilam, Mabu-8, Dobate around, 2340m, $27^0$04'N, $87^0$59'E, September 3, 2007, LKSR-Expedition team, **C 223** (TUCH).
Distribution: Himalaya (Uttar Pradesh to Sikkim), North East India, North Myanmar.Nepal (Centre-East:1200-1400m).

4. PERSEA Miller

1. Persea odoratissima (Nees) Kosterm. in *J. Sci. Res. Indonesia* **1**: 116 (1952)*;* Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 163 (2000) '*Kaulo*' (काउलो).

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

Small tree up to 10m, Leaves elliptic or broadly elliptic 8-12 x3-5cm.petiole 1-2cm, shortly acuminate, base cuneate dry. Flowers in panicle, fruit ellipsoid, 1-1.5x0.5-1cm.
Habitat: In *Lithocarpus-Quercus* forest. **Fl. & Fr.:** Mar.-May.
Representative collection: Ilam, Jamun-2, Hangetham around, 2170m, 27.04N, 88.01E, September 9, 2007, LKSR-Expedition team, **C 227** (TUCH).
Distribution: Himalaya (Kashmir-Bhutan), North East India, Myanmar, Nepal (West-East: 1000-2000m),

Family 14**. RANUNCULACEAE**

1. ACONITUM L.

1. Aconitum orochryseum Stapf in *Kew Bull.* **1922:** 149 (1922); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 249 (2000).

Herb; Stems slender, 40-50 (-100) cm, finely pubescent. Leaves 3-9cm diameter, divided into segments 2-3c, broad, margins finger like teeth. Flowers 2-10in rather lax racemes, white tinged with yellow and blue; head 8mm spur bulbous, upwardly curved.
Habitat: In pure *Rhododendron* forest. **Fl. & Fr.:** Aug. - Sep.
Representative collection: Ilam, Mabu-8, Dobate around, 2680m, $27^0$04'N and $87^0$59'E, August 30, 2007, LKSR-Expedition team, **C 093** (TUCH).

Distribution: Himalaya (Nepal-Bhutan), Nepal (Center-East: 3600-4900m).

2. Aconitum spicatum (Bruchl) Stapf in *Ann. Roy. Bot. Gard.* (Calcuta) **10(2):** 165, t. 106 & 107 (1905); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 249(2000).

Aconitum ferox var. *spicata* Bruhl in *Ann. B. G. Cale*. 5:110 (1835).

Rhizomatous herb. Stem 1.5-2m, leaves 15cm diameter, lobes and teeth acute, finely pubescent. Sepals often white, tinged with purple; uppermost sepals helmet-shaped2.5-1.3cm, shortly (-3mm) beaked; upper lateral sepals orbicular, 1.5cm lower sepals elliptic, 13 X 3mm; petals hairy or sometimes glabrous, head S-shaped, 10-11mm, spur recurved; follicles 5, oblong, 10 x 4mm, hairy.
Habitat: In pure *Rhododendron* forest. **Fl. & Fr.:** Jul. - Sep.
Representative collection: Ilam, Maimajuwa-7, Chintapu around, 3150m, $27^0$22'N and $88^0$02'E, August 30, 2007, LKSR-Expedition team, **C 093** (TUCH).
Distribution: Himalaya (Nepal to Bhutan), South Tibet, Nepal (West-East: 1800-4200m).

2. ANEMONE L.

1. Anemone rivularis Buch.-Ham. ex DC., *Syst. Nat*. **1**: 211 (1817); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 251 (2000).

Herb; Leaves terrnate; leaflets broadly elliptic or rhombic, 4-7x3-5cm, acute, cuneate, often deeply trilobed, margins serrate. Sepals elliptic, 10-15x4-10mm; achenes broadly elliptic, 7x5mm, compressed, glabrous. Persistent 1mm. hooked.
Habitat: On open grassland. **Fl. & Fr.:** Apr.-Aug.
Representative collection: Ilam, Mabu-8, Maikhola around, 3060m, 27.08N, 88.01E, June 7, 2007, LKSR-Expedition team, **B 030** (TUCH).
Distribution: Nepal, India, Sri Lanka, Myanmar, China (West and North China (Xizang), Nepal (West-East: 1600-4000m).

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

Herb 60cm, Leaves simple, broadly ovate, 7-18x3-7cm, acute, base cordate, margins serrate. Umbelate cyme usually with 3 branches, one bearing a single flower, purplish, the others again ternately divided and involucrate. Achene ellipsoid, 1mm densely surrounded by hairs.
Habitat: Open rocky slope. **Fl. & Fr.:** Jul.-Sep.
Representative collection: Ilam, Maimajuwa-7, Kamiregaun, 1950m, 27.06N, 87.94E, June 15, 2007, LKSR-Expedition team, **B 083** (TUCH).
Distribution: Himalaya (Kashmir, Uttar Pradesh-Bhutan), North East India, Noth Maynmar, West China, Nepal (West-East: 1300-3300m).

3. CLEMATIS L.

1. Clematis connata DC in *Prodr*, **1**: 4 (1824). Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 252 (2000). '*Jungelahara*' (जुँगेलहरा).

Slender woody climber. Leaves pinnate; leaflets 5-7,distant, ovate, 4.5-13x3-8cm, acuminate, base rounded or cordate, margins serrately toothed or sometimes coarsely lobed. Panicles cymosely branched. Sepals ovate, acute, Achenes pubescent.
Habitat: Moist shady forest. **Fl. & Fr.:** Sep.-Nov.
Representative collection: Ilam, Jamun-1, Hangetham around, 2150m, 27^0 01'N, 88^0 01'E, Sept. 7, 2007, LKSR-Expedition team, **C 222** (TUCH).
Distribution: Himalaya (Kashmir, Uttar Pradesh-Sikkim), China (Xizang, West China), and Nepal (West-East: 2400-3300m).

4. ISOPYRUM L.

1. Isopyrum adiantifolium Hook. f. & Thomson in *Fl. Ind.* (Hook. & Thoms.): 42 (1855); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 255 (2000).

Stem 10-40cm. Leflets broadly obovate, 5-10mm long and broad, rounded and cuneate at apex, Sepals elliptic or obovate, 7-9x2-4mm. Follicles cylindrical 7-9x1-5mm.
Habitat: In *Rhododendron* forest. **Fl. & Fr.:** Apr. - Jul.
Representative collection: Ilam, Maimajuwa-7, Banduke around, 2830m, 27.14N and 87.95E, June 8, 2007, LKSR-Expedition team, **A 041** (TUCH).
Distribution: Himalaya (Nepal to Arunachal Pradesh), North Myanmar, Nepal (Centre-East: 2000-2600m).

5. THALLICTRUM L.

1. Thallictrum virgatum Hook. f. and Thomson, in *Fl. Ind.* (Hook. & Thoms.): 14 (1855); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 258 (2000).

Herb; Stem 30-50cm. Leaves ternate, subsessile, leaflets broadly obovate or suborbicular, deeply and obtusely toothed or lobed above, base rounded or cordate, glabrous, finely reticulates. Flowers erect in terminal panicles. Sepals narrowly elliptic 2 x 0.5mm, glabrous.
Habitat: On rocky steep slope. **Fl. & Fr.:** Jul.-Sep.
Representative collection: Ilam, Mabu-8, Bikhebhanjyang, 3224m, 27.09N, 88.00E, June 14, 2007, LKSR-Expedition team, **B 086** (TUCH).
Distribution: Himalaya (Nepal to Bhutan), West China, Nepal (West-East: 2400-4500m).

Family 15**. BERBERIDACEAE**

1. BERBERIS L**.**

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

Shrub 1-1.5m. Stem brownish strongly grooved, minutely pubescent; spines 3-fid. Leaves herbaceous, elliptic-obovate, 1.2x0.6-1cm, acute, base attenuate, entire or sometimes spinose-toothed. Flowers solitary or in fascicles of 2-3. Fruit ellipsoid. 10x7mm.
Habitat: In open dry pasture. **Fl. & Fr.:** May-Jun.
Representative collection: Ilam, Maimajuwa-7, Ahalbhjyang around, 3560m, 27.10N and 87.99E, June 14, 2007, LKSR-Expedition team, **B 071** (TUCH).
Distribution: Himalaya (Nepal to Sikkim) North East India, China, Nepal (Centre-East: 3400-4500).

2. Berberis aristata DC., *Syst. Nat*. **2**: 8 (1821); Press *et al.*, *Ann. Check. Fl. Pl. Nep.* 25 (2000). *'Barberry'* (Eng.)

Shrub 2m, deciduous. Stems spines 1-2 cm, Leaves obovate, 1.5-3×0.5-1.5cm, base attenuate, obtuse or acute, margin with spines. Racemes 4-5cm. Sepals outer one ovate and inner obovate. Petals obovate, 6-7×3-4mm with 3 distinct unbranched veins. Berries narrowly eliipsoid with style 1mm.
Habitat: In open pastureland. **Fl. & Fr.:** May-Jun.
Representative collection: Ilam, Jogmai-Kholagauna around, 2210m, 26.99N, 88.02E, June 8, 2007, LKSR-Expedition team, **B 171** (TUCH).
Distribution: Himalaya (Nepal to Bhutan), India, Nepal (West- Centre: 1800-3000m).

3. Berberis hookeri Lem. in *III.Hort*. **6**: 207 (1859); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 26 (2000).

Shrub up to 3m, groved stem, leaves elliptic, 3-7 x 1-3 cm, margin strongly spinose-dentate, flowers 3-8 in fascicles, berries, obovoid, reddish.
Habitat: In *Rhododendron* forest. **Fl. & Fr.:** Jun.-Jul.

Representative collection: Ilam, Mabu-BikheBhanjyang, 3220m, 27.09N, 88.00E, June 14, 2007, LKSR-Expedition team, **B 081** (TUCH).
Distribution: Himalaya (Nepal to Bhutan), North East India, Nepal (Centre-East: 2500-3500m).

4. Berberis insignis Hook.f. & Thomson in *Fl. Ind*. 226 (1855); Tebbs in *Enum. Fl. Pl. Nep*. **2**: 30 (1979); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 26 (2000). *'Chutro'* (चुत्रा).

Evergreen shrubs; 1.5-2m; Stem yellow or purplish, unarmed or a few weak spines 5-7mm. Leaves elliptic-lanceolate, 9-15x2-6cm, acuminate base cuneate, Flowers 5-merous in axillary fascicles; Sepals gradually increasing in size, outer broadly ovate,2x2mm, innermost elliptic, Petals obovate. Berries ellipsoid, 8x5mm, black.
Habitat: In rocky open shrubyland. **Fl. & Fr.:** May-Jun.
Representative collection: Ilam, Mabu-Kalapokahri, 2800m, 27.06N, 88.00E, June 14, 2007, LKSR-Expedition team, **B 144** (TUCH).
Distribution: Himalaya (Nepal to Bhutan), North-East India, Nepal (East: 2000-4000m).

2. MAHONIA Nutt., nom. Cons.

1. Mahonia napaulensis DC. in Syst. Nat. 2: 21 (1821); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 27 (2000). *'Jamanemandro'* (जमाने मान्द्रो).

Shrub 1-3m. Stem leafy near apex. Leaves coriaceous, suborbicular, 3-8x2-4cm, acute, base rounded or truncate, coarsely spinose-dentate, with 3-7 teeth on each side. Racemes 10-25cm in fascicles of 6-10, pedicels. Berries ellipsoid, blue black, 8-12x4-7mm, glacous.
Habitat: In open shrubyland. **Fl. & Fr.:** Apr.-Jun.
Representative collection: Ilam, Maimajuw-7, Naulegaun around, 2240m, 27.07N and 87.94E, June 7, 2007, LKSR-Expedition team, **B 007** (TUCH).
Distribution: Himalaya (Nepal-Bhutan), North East India, Nepal (West-East: 2000-2900m),

Family16. **PODOPHYLLACEAE**

1. PODOPHYLLUM L.

1. Podophyllum hexandrum Royle in *Ill. Bot. Himal. Mts.* **1(2)**: 64 (1834); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 27 (2000).

Herb. Stem in flower 15-25cm, later up to 45cm, glabrous. Leaves, brownish, orbicular-reniform in outline, 6-15x3.5-10cm, palmetly divided, elliptic. acute base cuneate, margins serrate, pubescent beneath. Flower solitary, pink. fruit ovoid, up to 6x3cm, reddish, borne on pedicel.
Habitat: Under moist rocky mountain. **Fl. & Fr.:** May-Jun.
Representative collection: Ilam, Mabu-BikheBhanjyang, 3220m, 27.09N, 88.00E, June 14, 2007, LKSR-Expedition team, **B 084** (TUCH).
Distribution: Himalaya (Kashmir-Arunachal Pradesh) West China, Nepal (West-East: 3000-4500m),

Family 17**. LARDIZABALACEAE**

1. HOLBOELLIA Wall.

1. Holboelia latifolia Wall.in *Tent. Fl. Napal.* **1**: 24, t. 16 (1824); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:160 (2000) '*Gulpha*' (गुल्फा).

Large climber. Leaves ovate-elliptic, 4.5-15x1.5-7cm, acute or acuminate to a fine tip, base rounded or cuneate, glabrous, margins entire; Racemes 3-12 flowered. Flower purplish. Fruiting carpels ellipsoid 6-10-3-4cm, red, ovoid, blackish.
Habitat: In *Quercus-Lithocarpus* forest. **Fl. & Fr.:** May-Jun.

Representative collection: Ilam, Mabu-8, Dobate around, 2680m, $27^0$04'N, $87^0$59'E, September 1, 2007, LKSR-Expedition team, **C 115** (TUCH).
Distribution: Himalaya (Uttar Pradesh-Arunachal Pradesh), North East India, Myanmar, West China, Nepal (West-East: 2000-4000m).

Family 18. **PIPERACEAE**

1. PEPEROMIA Ruiz and Paron

1. Peperomia tetraphylla (Forst.) Hooker & Arn. in *Bot. Beechey Voy*.: 97 (1832); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 234 (2000)

Peperomia tetraphyllum Forst. f., *Prodr*. 5 (1786).

Bushy succulent herb. Leaves opposite or in whorls of 4, fleshy, obovate, broadly elliptic or suborbicular, 7-12x6-10mm, rounded or broadly cuneate, 3-veined from base, veina pale when fresh, almost involute when dry, Drupe ellipsoid 1mm, tapering.
Habitat: In shady moist places. **Fl. & Fr.:** Feb.-Jul.
Representative collection: Ilam, Maimajuwa-7, Chibe, 1980m, $27^0$17'01''N, $87^0$58'14''E, August 29, 2007, LKSR-Expedition team, **C 077** (TUCH).
Distribution: Himalaya (Kashmir-Bhutan), India, Srilanka, China, Indo-China, Malayasia, America, and Nepal (West-East: 1000-2500m).

Family19. **ARISTOLOCHIACEA**

1. ARITOLOCHIA L.

1. Aristilochia griffithii Hook. f. & Thomson ex Duch. in *Prodr*. **15(1)**: 437 (1864); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 17 (2000).

Climber. Leaves ovate, 6-12x5-9cm, acute or shortly acuminate, base strongly cordate, entire, sparsely pubescent on both surface, 7-9 veined at base 4. Flowers solitary, axillary, pendent on pubescent. Fruit oblong; 12-18-1.5-2.5cm, 6-ribed, dehiscing into 6 longitudinal valves.
Habitat: *Quercus-Daphniphyllum* forest. **Fl. & Fr.:** Apr.-May.
Representative collection: Ilam, Mabu-8, Kalapokhari around, 2005m, $27^0$04'N, 87.59'E, September-3, 2007, LKSR-Expedition team, **C 141** (TUCH).
Distribution: Himalaya (Nepal-Arunachal Pradesh), Nepal (Central-East: 2000-2900m).

Family 20. **ACTINIDACEAE**

1. ACTINIDIA Lind.

1. Actinidia strigosa Hook.f. & Thomson ex Benth. in *J. Linn. Soc*., *Bot*. 5: 55 (1861); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 6 (2000). *'Thekiphal'* (ठेकीफल).

Scandent upto 6m. Stems glabrous or with a few soft simple hairs and sometimes with conspicuous lenticels. Leaves ovate-elliptic, 5-15x2-7cm, acuminate,base rounded or cuneate, margins finely serrate, usually with hair like teeth. Flowers solitary. Fruit oblong cylindrical.
Habitat: In *Quercus-Lithocarpus* forest. **Fl. & Fr.:** May-Jun.
Representative collection: Ilam, Mabu-8, Kalapokhari, 2170m, 27.06N, 88.01E, June 16, 2007, LKSR-Expedition team, **B 135** (TUCH).
Distribution: Himalaya (Nepal, Sikkim), Nepal (East: 2400-3000m).

Family 21. **THEACEAE**

1. EURYA Thunb.

1. Eurya acuminata DC. in *Mem. Soc. Phys. Geneve*. **1**: 418 (1822); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 308 (2000). *'Jhinyane'* (झिंगाने).

Tree up to 10m. Branches hairy. Leaves alternate, lanceolate or oblong-elliptic, serrulate, acuminate 6.5-8 x1.5-3 cm, softly hairy on midrib beneath; Flower fascicles or 3-5 together, shortly peduncle, bracteoles 2, flower white. Petals 5; Stamen 5-15; compressed.
Habitat: In *Rhodendron -Symplocos* forest. **Fl. & Fr.:** May-Jun.
Representative collection: Ilam, Jamun-2, Hangetham around, 2170m, 27.04N, 88.01E, June 17, 2007, LKSR-Expedition team, **B 172** (TUCH).
Distribution: Himalaya (Uttar Pradesh-Arunachal Pradesh), Srilankan, Malayasia, Nepal (West-East: 1300-2500 m).

Family 22. **HYPERICACEAE**

1. HYPERICUM L.

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

Bushy shrub of 1m. Leaves lanceolate or narrowly ovate, tapering to subacute or bluntly apiculate apex, base usually rounded, sometimes broad bud. Fruit elliptic lanceolate or ovate, broadest at or bellow middle, usually acute or acuminate.
Habitat: In near Arundinaria forest. **Fl. & Fr.:** Sep. - Oct.
Representative collection: Ilam, Mabu-8, Chatubari, 3390m, 27.10N, 88.00'E, June 14, 2007, LKSR-Expedition team, **B 073** (TUCH).
Distribution: Himalaya (Nepal-Bhutan), South India, Myanmar, Thailand, China, Nepal (Centre-East: 1500-3000m).

2. Hypericum japonicum Thunb. ex Murray, *Syst. Veg. ed.* 14: 702 (1979); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 145 (2000).

Suberect or difuse herb, 7-25cm, Leaves suberect broadly elliptic-oblong obtuse rounded, 3-veined seesile. Flowers 7-10mm across in terminal dichotomous often broad cymes. Sepals elliptic obovate, acute. Petals 3-4mm usually distinctly shorter than sepalous. Capsule ovoid.
Habitat: In open pastureland. **Fl. & Fr.:**Feb. **-** Aug.
Representative collection: Ilam, Maimajuwa-7, Upperhattiya, 1860m, 27.06N, 87.94E, June 6, 2007, LKSR-Expedition team, **A 002** (TUCH).
Distribution: Himalaya eastward to South East China and Japan, Australia, Hawai, Nepal (West-East: 150-2600m).

3. Hypericum petiolulatum Hook.f. & Thomson ex Dyer in *Fl. Br. Ind.* 1:25 (1874); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:145 (2000).

An erect slender herb. Leaves ovate or broadly elliptic with pellucid dots small and inconspicuous distinctly petiolate with petioles 1-4mm. Flowers 1-3 terminal and axillary on slender pedicels, Petals and stamens persistent.
Habitat: In moist rocky places. **Fl. & Fr.:** July-Sep.
Representative collection: Ilam, Maimajuwa-7, Chintapu, 3110m, $27^0$09'38''N, $87^0$57'10''E, August 30, 2007, LKSR-Expedition team, **A 002** (TUCH).
Distribution: Himalaya (Uttar Pradesh to Nepal); Nepal (West-East: 2200-2600m.

4. Hypericum uralum Buch.-Ham ex D.Don in *Bot. Mag.* 50: t. 2375 (1823); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 145 (2000).

Bushy shrub of 1-2m. Leaves lanceolate, acute or bluntlu pointed, base cuneate, seeile, cymes mostly 3-5 flowered. Flowers 2.5-3cm across. Sepals obovbate, petals asymmetrical obovate, capsule suborbicular.
Habitat: Near a rocky trial road. **Fl. & Fr.:** Jul.-Aug.
Representative collection: Ilam, Mabu-8, Dobate around, 2680m, $27^0$04'N, $87^0$59'E, September 1, 2007, LKSR-Expedition team, **C 127** (TUCH).
Distribution: Himalay (Kashmir-Bhutan), Myanmar, Thailand, South China, Nepal (West-East: 1200-3600m).

Family 23. **FUMARIACEAE**

1. CORYDALIS Venterat

1. Corydalis chaerophylla DC. in *Prodr.* **1**: 128 (1824); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:228 (2000).

Robust herb 0.5-1m with stout rootstock. Basal leaves broadly ovate 9-14x8-14cm on long petioles 15-25cm; Racemes terminal, forming branched panicles 10-20 flowers. Bracts lanceolate, 3-5mm, entire equalling pedicel. Petals yellow outer pair apiculate, capsule obovoid.
Habitat: In moist places. **Fl. & Fr.:** Jul-Oct.
Representative collection: Ilam, Dobate-Hangetham, 2330m, $27^0$02'44.8''N, $88^0$00'25.6''E, Sept. 5, 2007, LKSR-Expedition team, **C 195** (TUCH).
Distribution: Himalaya (Uttar Pradesh-Bhutan), Nepal (West-East: 1800-3400m).

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

Weak much-branched herb 10-15cm; ultimate oblong, 3-7x2-2.5cm, on petals 3-5cm; ulimate segments oblanceolate. Flower few to numerous in terminal racemes 2-5cm; Capsule narrowly obovoid seeds glossy but initially papillate.
Habitat: In open grassland. **Fl. & Fr.:** Jun.-Aug.
Representative collection: Ilam, Maimajuwa-Chintapu, 3170m, $27^0$05'22.7''N, $87^0$54'47.3''E, August 30, 2007, LKSR-Expedition team, **C 090** (TUCH).
Distribution: West Himalaya- Bhutan, Nepal (West to East: 3800-5000m).

2. DICENTRA Bernhardi

1. Dicentra macrocapnos Prain, *J. Asiat. Soc. Bengal* **65**:12(1896); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 231 (2000).

Glabrous climber to 2m. Leaves dichotomous, biternate with a terminal tendril. Leaflets ovate or ovate-elliptic, 0.8-3.5×0.5-2.5cm, acute or obtuse, base rounded, entire. Flowers 2-2.5cm long, yellow. Capsule cylindrical with papery valves.
Habitat: In moist places. **Fl. & Fr.:** Apr.-Aug.
Representative collection: Ilam, Maimajuwa-Chintapu, 3170m, $27^0$05'22.7''N, $87^0$54'47.3''E, August 30, 2007, LKSR-Expedition team, **C 081** (TUCH).
Distribution: Himalaya (Uttar Pradesh-Nepal), Nepal (Centre-East: 1200-2500m).

Family 24. **PAPEVERACEAE**

1.MECONOPSIS Viguier

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

Herb 1-2 m.Leaves elliptic, 30-50 X 8-20 cm, deeply pinnatifid, sometimes pinnatisect near base. Stem leaves smaller becoming sessile on upper part of stem. Flowering stem solitary, with short branches, flowers in cymes, Capsule ellipsoid.

Habitat: In moist rocky places. **Fl. & Fr.:** Jun.-Aug.

Representative collection: Ilam, Maimajue-Chintapu, 3170m, $27^0$05'22.7''N, $87^0$54'47.3''E, Sept. 5, 2007, LKSR-Expedition team, **C 091** (TUCH).

Distibution: Himalaya (Uttar Pradesh to Arunachal Pradesh) North East India, Nepal (West-East: 3000-4400m).

Family 25. **CRUCIFERAE**

1.CARDAMINE L.

1. Cardamine scutata subsp. **flexuosa** (With.) H. Hara, *J. Fac. Sci. Univ. Tokyo, Sect*. 3, *Bot*, sect. 3 **6**: 59 (1952); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 80 (2000).

Cardamine flexuosa Withering, *Bot. Arr. Br. Pl. ed*. 3.3 : 578 (1796).

Annual or biennial. Stem 10-35 cm flexuose. Basal leaves few scarcely forming a rosette; stem leaves 4-10 x2.5-5 cm; lateral leaflets 2-4 pairs. Ovate-elliptic, 3-7 x 2-5 mm, obtuse or subacute, entire or irregularly sinuate. Flowers few to numerous.

Habitat: In *Rhododendron* forest. **Fl. & Fr.:** Jan.-Jun.

Representative collection: Ilam, Maimajuwa-7, Banduke, 2835m, 27.1N, 87.95E, June 8, 2007, LKSR-Expedition team, **A 040** (TUCH).

Distibution: Temperate Himalaya, East Canada, Nepal (West-East: 1000-4000m).

Family 26**. CRASSULACEAE**

1. RHODIOLA L.

1. Rhodiola chrysanthemifolia (Raym.-Hamet) H. Ohba in *J. Fac. Sci. Univ. Tokyo, Sect*. 3, Bot. 12: 384 (1980); Press *et al.*, *Ann. Check. Fl. Pl. Nep.* 76 (2000).

Rhizomes 5-10mm, often creeping. Leaves clustered near stem apex, oblanceolate or obovate in outline, 2-8x0.5-2 cm base attenuate, pinnatifid. Inflorescence a densely corymbose cyme. Flowers bisexual usually 5-merous, carpel 5-7 mm, slightly outward.

Habitat: In *Rhododendron* forest. **Fl. & Fr.:** Jul.-Sep.

Representative collection: Ilam, Maimajuwa-7, Chintapu, 3475m, $27^0$18'22''N,$88^0$02'41.7E, August 30, 2007, LKSR-Expedition team, **C 096** (TUCH).

Distibution: China, Nepal (West-Central: 2500-3500m).

Family 27. **SAXIFRAGACEAE**

1. ASTILBE D.Don

1. Astilbe rivularis Buch. -Ham. ex D. Don, *Prodr. Fl. Nep.* 211 91825); Press *et al.*, *Ann. Check. Fl. Pl. Nep.* 286(2000). '*Budho okhati'* (बुडोओखती).

Perennial herb. Leaves up to 35cm long and broad, leaflets ovate or elliptic, 4-12×2-7cm, acuminate, base rounded or cordate, margin serrate, Peduncles pale brownish pubescent. Stamens 5, opposite sepals, c3mm. Ovary semi inferior. Capsule ovoid. Seeds ellipsoid.

Habitat: Along a motor-road. **Fl. & Fr.:**Jul.-Oct.

Representative collection: Ilam, Maimajuwa-7, Manedanda, 2180m, $27^0$04'33''N, $87^0$56'37''E, August 27, 2007, LKSR-Expedition team, **C 020** (TUCH).

Distibution: Himalaya (Kashmir-Bhutan), Thailand, North Indo-China, West China, Nepal (West-East: 2000-36000m).

Family 28**. HYDRANGEACEAE**

1. DICHROA Lour.

1. Dichroa febrifuga Lour. in *Fl. Cochinch.*: 301 (1790); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 147 (2000) '*Basak'* (बासक).

Shrub 1-3 mm. Leaves elliptic, oblanceolate 10-14 X 5-6 cm, acuminate base cuneate, margin serrate, petioles 1-3 cm. Calyx lobes 3-4mm, petals elliptic. Stamens 5-6 mm. Berries subglobose 6-8 mm diameter.
Habitat: In damp-moist forest. **Fl. & Fr.:** May-Nov.
Representative collection: Ilam, Jamun-2, Hangetham around, 2170m, 27.04N and 88.01E, June 17, 2007, LKSR-Expedition team, **B 146** (TUCH).
Distibution: Himalaya (Nepal to Bhutan), India, Myanmar, Central China, Nepal (Central-East: 900-2400m).

2. HYDRANGEA L.

1. Hydrangea heteromalla D. Don in Prodr Fl. Nepal.: 211(1825); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 147 (2000). *'Halonre'* (होलोड्रे).

Bushy tree 2-8 m. Leaves ovate 10-16x4-10 cm, margin uniformly serrate with acuminate teeth. Petioles 2-5 cm; Corymbs densely flowered, bracts linear-oblanceolate, fertile folwer, calyx 2 mm, stamens2-4 mm. Capsule ellipsoid 5x 2.5mm.
Habitat: In small streamside. **Fl. & Fr.:** Jun.- Aug.
Representative collection: Ilam, Maimajuwa-7, Sisne, 2170m, $27^0$04'36''N, $87^0$55'52''E, August 28, 2007, LKSR-Expedition team, **C 065** (TUCH).
Distibution: Himalaya (Uttar Pradesh to Arunachal Pradesh), North East India, North, China, China Nepal (West-East: 2400-3300m).

Family 29. **ROSACEAE**

1. AGRIMONIA L.

1. Agrimonia pilosa var. **nepalensis** (D.Don) Nakai, *Bot. Mag.*(Tokyo) 47: 247(1933); Press *et al.*, *Ann. Check. Fl. Pl. Nep.* 260 (2000).

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

Erect perennial herb, stem 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.
Habitat: In open grassland. **Fl. & Fr.:** May-Jul.
Representative collection: Ilam, Maimajuwa-7, Thulogaun, 2450m, $27^0$04'21''N, $87^0$57'29''E, August 27, 2007, LKSR-Expedition team, **C 002** (TUCH).
Distribution: Himalaya (Kashmir-Bhutan), North East India, Myanmar, China, Nepal (West-East: 1000-3000m).

2. FRAGARIA L.

1. Fragaria nubicola Lindl. ex Lacaita in *J. Linn. Soc. Bot.* 43:467(1916); Press *et al.* in *Ann. Checkk. Fl. Pl. Nep.*:263(2000). '*Bhui ainselu'* (भूइ ऐंसेलु).

Prostrate herb with stout rootstock. Leaflets obovate or elliptic, 2-5×1-3cm, obtuse, base cuneate, margins serrate, silky whitish pubescent beneath. Epicalyx segments elliptic-lanceolate, acuminate, entire. Achenes borne on succculent red globose receptacle.
Habitat: In moist steep slope. **FL. & Fr.:** Apr.-Jun.

Representative collection: Ilam, Jamun-2, Hangetham around, 2170m, 27.04N, 88.01E, June 17, 2007, LKSR-Expedition team, **B 168** (TUCH).
Distribution: Himalaya (Kashmir-Bhutan), North Burma, West China, Nepal (West-East: 1600-4000m).

3. NEILLIA D. Don

1. Neillia rubiflora D. Don in *Prodr. Fl. Nepal.*: 229(1825); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 264 (2000).

Small shrub; Leaves 3-10x2-5cm, more deeply 3-lobed, base usually deeply cordate; petioles up to 2cm; Inflorescence a narrow raceme or compact panicles, flowering shoots scaly, flowers campanulate; fruiting calyx cups stalked capitates glands at least at base.
Habitat: In open shrubyland. **FL. & Fr.:** May-Jul.
Representative collection: Ilam, Mabu-Kalapokhari around, 2770m, 27.06N and 88.01E, June 16, 2007, LKSR-Expedition team, **B 138**(TUCH).
Distribution: Himalaya (Nepal-Bhutan), North East India, West China.Nepal (Centre-East: 2100-3200m).

2. Neillia thryrsiflora D. Don, *Prodr. Fl. Nep*. 228 (1825); Press *et al.*, *Ann. Check. Fl. Pl. Nep.* 264 (2000).

About 2m tall shrub; Leaves alternate, stipulate, petiolate, 0.8-1.5 cm, simple 5-10x2-4 cm ovate or obovate, serrate, glabrous, acuminate; Inflorescence panicle. Flower pedicellate, bracteate, yellowish red. Stigma terminal capitate.
Habitat: Near motor road. **FL. & Fr.:** Jul.-Aug.
Representative collection: Ilam, Maimajuwa-7, Sisne, 1840m, $27^0$18'27''N, $88^0$02'00''E, August 28, 2007, LKSR-Expedition team, **C 067** (TUCH).
Distribution: North East India, Myanmar, China, Himalaya (Nepal-Bhutan), Nepal (Centre-East: 1600-2000m).

4. POTENTILLA L.

1. Potentilla lineata Trev. in *Ind. Sem. Vritislav*.: 1822 (1822); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 266 (2000).

Spreading perennial herb, stem 20-45cm, hairy. Leaves interruptedly pinnate 6-20cm; larger lateral leaflets 4-8 pairs, elliptic or narrowly obovate, 0.7-4x0.5-2cm, obtuse, base rounded or cuneate, Flowers in corymbose cymes, yellow. Achene ovoid 1-1.5mm, glabrous.
Habitat: Along a trial road. **FL. & Fr.:** Jun.-Aug.
Representative collection: Ilam, Maimajuwa-7, Tersegaun, 21200m, 27.07N, 87.94E, June 7, 2007, LKSR-Expedition team, **C 011** (TUCH).
Distribution: Himalaya (Kunawar-Sikkim), Nepal (West-East, 1600-4800m).

2. Potentilla kleiniana Wight, III Ind. Pl. t. 85 (1831). Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 266 (2000).

Rosetted herb with spreading prostrate stems up to 45cm. Leaves palmatley (3-)5-foliate; leaflets obovate, ±glabrous above, apressed pubescent beneath; petioles up to 7cm; stipules lanceolate 1-1.5cm. Flowers 2-5 in small terminal cymes. Achenes ellipsoid, 1mm, glabrous.
Habitat: Along a rocky trial road. **FL. & Fr.:** Mar.-Jul.
Representative collection: Ilam, Maimajuwa-7, Upper Hattiya, 1900m, 27.06N, 87.94E, June 7, 2007, LKSR-Expedition team, **A 006** (TUCH).
Distribution: North East India, Myanmar, China, Himalaya (Nepal-Bhutan), Nepal (Centre-East: 1600-2000m).

5. PYRACANTHA Roemer

1. Pyracantha crenulata (D.Don) M. Roemer, *Syn.* 3:220(1847); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 268 (2000). '*Ghagaru'* (घगारु).

Mespilus crenulata D.Don, *Prodr. Fl. Nep.* 238(1825).

Shrub 2-3m, branches bearing stout spines 0.5-1.5cm. Leaves oblong or obovate 1-4×0.5-1.7cm, obtuse, base cuneate or attenuate, margin slightly crenate-serrate, glabrous. Petioles 2-6mm. Cymes 5-10 flowered. Pomes globose, red.

Habitat: In open shrubyland. **FL. & Fr.:** Apr.-May.

Representative collection: Ilam, Jamun-2, Hangetham around, 2210m, 27.04N, 88.01E, September 9, 2007, LKSR-Expedition team, **C 228** (TUCH).

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

6. RUBUS L.

1. Rubus acuminatus Smith in *Rees. Cyclop.* 30: *Rubus* n. 43 (1819); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 268 (2000). '*Lahare Ainselu'* (लहरे ऐंसेलु).

Large climbing shrub with small recurved prickles. Leaves simple, lanceolate or elliptic, serrate; stipules subulate. Flowers in terminal, panicles or racemes, white. Fruit red enclosed by calyx.

Habitat: In the moist bushy places. **FL. & Fr.:** Jul.-Aug.

Representative collection: Ilam, Mabu-Kalapokhari around, 3030m, 27.08N, 88.01E, June 15, 2007, LKSR-Expedition team, **B 092** (TUCH).

Distribution: Himalaya (Uttar Pradesh to Bhutan), North East India, Indo-China, West China Nepal (West-East: 1000-2300m).

2. Rubus calycinoides Kuntze in *Meth. Sp. Rubus*: 67, 78 & 83 (1879); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 269 (2000).

Large scrambling shrub, stems brownish pubescent and with scattered short recurved prickles, eglandular. Leaves broadly ovate or suborbicular,10-20cm long and broad, base cordate, 3-5-lobed, pilose to subglabrous beneath. Flowers in axillary clusters, fruit red, druplets 40-50.

Habitat: Along a rocky trial road. **FL. & Fr.:** Jun.-Aug.

Representative collection: Ilam, Mabu-8, Dobate around, 2680m, $27^0$04'N, $87^0$00'E, September 3, 2007, LKSR-Expedition team, **C 149** (TUCH).

Distribution: Himalaya (Nepal-Bhutan), Nepal (East: 1300-2100m).

3. Rubus calycinus Wall. ex D.Don in *Prodr. Fl. Nepal.*:235(1825); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:269 (2000). '*Bin Aiselu'* (विङ् ऐंसेलु).

Herb with scattetred slender prickles. Leaves simple, cordate-orbicular to reniform, 3-6cm diameter, apex rounded, base deeply cordate, unlobed or shallowly lobed, margins denticulate, hirsute. Fruit red, globose, 1.5cm druplets 25-30.

Habitat: In *Daphne-Rhododendron* forest. **FL. & Fr.:** Apr.-May.

Representative collection: Ilam, Mabu-Kalapokhari around, 3030m, 27.08N, 88.01E, June 16, 2007, LKSR-Expedition team, **B 124** (TUCH).

Distribution: Himalaya (Uttar Pradesh to Bhutan), North East India, North Myanmar, Nepal (Centre-East: 2200-2800m).

4. Rubus lineatus Reinw. in *Bijdr. Fl. Ned. Ind.* 17: 1108 (1826); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 270 (2000).

Scrambling shrub to 3m. Leaves mostly pedately 5-foliate, sometimes 3- or 7-foliate; leaflets elliptic-oblanceolate, terminal 9-1.5x1.5-3(-4)cm, finely acuminate, base cuneate, margins sharply serrate. Flowers in short axillary clusters or cymes. Fruit red 1.5cm.
Habitat: In moist shady *Lithocarpus* forest. **FL. & Fr.:** Mar.-Jun.
Representative collection: Ilam, Mabu-8, Dobate, 2680m, $27^0$04'N, $87^0$59'E, September 1, 2007, LKSR-Expedition team, C **119** (TUCH).
Distribution: Himalaya (Nepal to Bhutan), North East India, Myanmar, Indo-Chna, West China, Malayasia, .Nepal (East: 2100-3000m).

5. **Rubus paniculatus** Sm. in *Rees. Cyclop.* **30**: *Rubus* n. 41(1819); Hook. f. in *Fl. Br. Ind.* **2**: 329(1878); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 270 (2000).
'Kalo Ainselu' (कालो ऐंसेलु).

Climbing shrub with scattered, small and recurved prickles. Leaves longer than broad, shallowing lobed, serrate, whitish tomentose beneath. Flowers in tomentose panicles, white, drupelets black.
Habitat: In dense footrest. **FL. & Fr.:** Apr.-Sep.
Representative collection: Ilam, Jamun-2, Hangetham around, 2240m, 27.04N and 88.01E, June 17, 2007, LKSR-Expedition team, **B 149** (TUCH).
Distribution: Himalaya (Kashmir-Bhutan), North East, India, Nepal (West-East: 2100-3000m).

6. **Rubus pentagonus** Wall. ex Focke in *Biblioth. Bot.* **17 (Ht.** 72): 145 (1911); Press *et al.*, *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 2-3in terminal fasciles, white, fruit red or yellow, druplets glsbrous.
Habitat: In dense *Eurya-Symplocos* forest. **FL. & Fr.:** Apr.-Jul.
Representative collection: Ilam, Jamun-2, Hangetham around, 2170m, 27.04N, 88.01E, June 17, 2007, LKSR-Expedition team, **B 167** (TUCH).
Distribution: Himalaya (Uttar Pradesh to Bhutan), Myanmar, West China, Nepal (West-East: 2100-3000m).

7. Rubus splendidissimus H. Hara, *J. Jap. Bot.* **40:** 327 (1965); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 270 (2000). *'Phurse Ainselu'* (फुसे ऐंसेलु).

Scrambling shrub with gland-tipped bristles 1.5-4mm. Leaves palmetly 3-foliate, obovate-elliptic, terminal 9-15x3.5-7cm, abruptly acuminate. Flowers in broad glandular-bristly corymbose, axillary and terminal panicles; bracts stipule-like but smaller. Fruit red, 1cm.
Habitat: In moist and dense *Quercus* forest**.** **FL. & Fr.:** May-Aug.
Representative collection: Ilam, Mabu-8, Dobate around, 2680m, $27^0$04'N, $87^0$59'E, September 3, 2007, LKSR-Expedition team, **C 150** (TUCH).
Distribution: Himalaya (Nepal-Bhutan, Nepal (Centre-East: 2400-3000m),)

8. Rubus treutleri Hook. f. in *Fl. Br. Ind.* **2(5):** 331(1878); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 270 (2000).

Scrambling or climbing shrub with long slnder shoots; branchlets with dense gland-tipped bristles and scattered slender prickles. Leaves suborbicular 6-14x6-14cm, 3-5-lobed, base cordate. Flowers 3-5 in short axillary racemes; bracts pectinate. Fruit 1.5-2cm.
Habitat: Along a trial road. **FL. & Fr.:** Jun.-Aug.
Representative collection: Ilam, Mabu-Kalapokhari around, 3030m, 27.08N, 88.01E, June 15, 2007, LKSR-Expedition team, **B 091** (TUCH).

Distribution: Himalaya (Uttar Pradesh to Bhutan), China (Xiang), Nepal (West-East: 3000-4400m).

7. SORBUS L.

1. Sorbus cuspidata (Spach) Held. in *Kungl. Sv. Vet. Akad. Hadl*. **35**: 89 (1901); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 271(2000).

Cartaegus cuspidata Spach, *Hist. Nat. Veg*. **2:** 106 (1834).

Tree of 6m. Leaves elliptic, occasionally obovate, 10-15x5-10cm, leaves regularly, never doubly, crenate-serrate, lateral veins 6-11 pairs; petals wooly within; styles 3-5. Fruit orange red or yellow, globose, 1.5cm diameter, 3-5 seeded; calyx lobes persistent.
Habitat: In dense *Lithocarpus- Castanopsis* mixed forest. **FL. & Fr.:** Apr.-May.
Representative collection: Ilam, Mabu-8, Dobate around, 2680m, $27^0$04'N, $87^0$59'E, September 3, 2007, LKSR-Expedition team, **C 164** (TUCH).
Distribution: Himalaya (Uttar Pradesh-Sikkim), Nepal (West-East: 2700-3700m).

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

Pyrus foliolosa Wall. in *Pl. Asiat. Rar*. **2**: 81, t. 189 (1831).

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.
Habitat: In open rocky slope. **FL. & Fr.:** May-Aug.
Representative collection: Ilam, Mabu-Kalapokhari around, 3030m, 27.08N, 88.01E, June 15, 2007, LKSR-Expedition team, **B 091** (TUCH).
Distribution: Himalaya (Nepal-Bhutan); Nepal (West-East: 2500-3400m).

3. Sorbus hedlundii C. K. Schneid. in *III. Handb. Laubholzk*. **1**: 685 (1906); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 271 (2000)

Tree of 6m Leaves elliptic, obovate, 10-15x5-10cm, leaf margins coarsely doubly serrate, often shallowly lobed; white tomentose beneath but brown tomentose on midrib and veins; Fruit orange red or yellow, globose, 1.5cm diameter, 3-5 seeded; calyx lobes persistent.
Habitat: In *Quercus-Lithocarpus* forest. **FL. & Fr.:** Jun.-Aug.
Representative collection: Ilam, Mabu-Bikhebhnjyang, 3120m, 27.08N, 88.01E, June 14, 2007, LKSR-Expedition team, **B 090** (TUCH).
Distribution: Himalaya (Nepal-Bhutan), Nepal (East: 2500-3300m).

4. Sorbus kurzii (Watt ex Prain) C. K. Schneid. In Bull. Herb. Boiss. In ser. 2 **6 :** 315 (1906); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 271 (2000).

Pyrus kruzii Watt ex Prain in J. As. S. Beng. **73**: 203 (1904).

Tree up to 10m; young. Leaves pinnate, 7-11cm, leaflets 4-5 pairs, elliptic or somewhat obovate, 2-3x0.7-1.5cm, apiculate, base obliquely rounded, distinctly petiolate, margins finely toothed. Corymbs narrow, 2-3cm diameter; petals white; styles 3-4; fruits red, 5-6mm.
Habitat: In steep rocky slope. **FL. & Fr.:** May.
Representative collection: Ilam, Mabu-Kalapokhari around, 3030m, 27.08N, 88.01E, June 15, 2007, LKSR-Expedition team, **B 091** (TUCH).
Distribution: Himalaya (Nepal, Sikkim), Nepal (East: 2300-3200m)

5. Sorbus rhamnoids (Dence.) Rehder in Pl. Wilson. 2: 278 (1915); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 271 (2000).

Micromeles rhamnoids Dence. 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.

Habitat: In *Rhododendron* forest. **FL. & Fr.:** May-Aug.

Representative collection: Ilam, Mabu-Kalapokhari around, 3030m, 27.08N, 88.01E, June 16, 2007, LKSR-Expedition team, **B 121** (TUCH).

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

8. SPIRAEA L.

1. Spiraea bella Sims in Bot. Mag. 59: t. 2426 (1823); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:272 (2000). '*Laharephul*' (लहरेफूल).

Rhizomatous shrub up to 2.5m, branched, leaves narrowly ovate, 3-6 x 0.5-1.5cm, base cuneate, margin serrate or doubly serrate, corymbs 3-7cm broad, terminal or lateral shoot, petals white or pink, follicles 3mm, glabrous or pubescent.

Habitat: In open rocky slope**.** **FL. & Fr.:** Jun.-Sep.

Representative collection: Ilam, maimajuwa-7, Tarunipani, 35400m, 27.1N, 87.99E, June 9, 2007, LKSR-Expedition team, **A 066** (TUCH).

Distribution: Himalaya (Kasmir-Sikkim), China, Nepal (West-East: 1900-4200m).

2. Spiraea micrantha Hook. f. in *Fl. Brit. Ind.* 2:325(1878); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 272(2000).

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

Habitat: In open shrubland. **FL. & Fr.:** Jun.-Sep.

Representative collection: Ilam, Maimajuwa-7, Tersegaun, 2120m, 27.07N, 87.94E, August 7, 2007, LKSR-Expedition team, **A 011** (TUCH).

Distribution: Himalaya (Nepal-Bhutan), North East India, Nepal (West-East: 1400-3000m)

Family30. **LEGUMINOSAE**

1. ASTRGALUS L.

1. Astragalus sikkimensis Benth ex Bunge in *Mem. Acd. Imp. Sci. Saint. Petersbourg. Ser.* 7 **11**: 23 (12868); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 167 (2000).

Shrub.Stem prostrate, slender up to 25cm. Leaves 3.5-6cm, leaflets 15-19 elliptic or narrowly obovate 4.5-9x2-5mm, obtuse. Racemes 8-14, flowered. Ovary densely pubescent on stalk 2mm. Pods ovoid 7-10x4-5mm, turgid blackish pubescent, unilocular 2-3 seeded.

Habitat: In open pastureland. **Fl. & Fr.:** Jun.-Jul.

Representative collection: Ilam, Maimajuwa-7, Chintapu, 3210m, $27^0$18'45''N, $88^0$01'22.4''E, August 30, 2007, LKSR-Expedition team, **C 101** (TUCH).

Distibution: Himalaya (Nepal-Bhutan), Nepal (East: 2700-3100m).

2. CORTALARIA L.

1. Cortalaria alata Buch.-Ham ex D.Don in *Prodr. Fl. Nepal.*: 241(1825); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:170 (2000).

Undershrub, stem 20-80cm. winged on both sides from decurrent stipules. Leaves elliptic or obovate, 3-7x1-4cm, acute base cuneate. Racemes 5-flowered borne on upper internodes. Calyx 12mm, Petals yellow, Pods oblong 3-4x14cm, glabrous, black when mature.

Habitat: Near cultivated field. **Fl. & Fr.:** Apr.- Sep.
Representative collection: Ilam, Maimajuwa-Hattiya, 1820m, $27^0$03'58''N, $87^0$56'04''1E, August 28, 2007, LKSR-Expedition team, **C 048** (TUCH).
Distibution: Himalya (Uttar Pradesh to Bhutan), India, South East China, Malaysia, Nepal (West-East: 450-2200m).

3. ERYTHRINA L.

1. Erythrina arborescence Roxb. in *Pl. Cormoandel* **3:** 14, t. 219 (1811); in *Enum. Fl. Pl. Nep.* **2**: 120(1979); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 174 (2000).

Tree 5-15m, branchlets with brown spines. Leaflets ovate 10-18x9-14cm, acute or shortly acuminate, cordate, sparsely or densely pubescent, beneath. Flowers red, appearing after leaf development racemes. Pods oblong ellipsoid 10-20x1.5-2.5cm, black seed 1.5-2x1-1.3cm.
Habitat: In small rocky trial road. **Fl. & Fr.:** Jul.-Aug.
Representative collection: Ilam, Maimajuwa-Kalopani, 2860m, $27^0$05'10''N, $87^0$55'12''E, August 28, 2007, LKSR-Expedition team, **C 048** (TUCH).
Distibution: Hiamalaya (Uttar Pradesh-Bhutan), North East India, Myanmar, China, Nepal (West-East: 1500-3000m).

4. PIPTANTHUS Sweet

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

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

Shrub up to 3m, young shoots pubescent. Leaflets ovate-elliptic, 5-8×1.5-2.5cm, acuminate, base cuneate, glabrous. Petioles 1-3cm. Stipules boat-shaped, 7-10mm, bifid at apex, deciduous leaving annual scars an stems. Seeds reniform, blackish.
Habitat: Near cultivated land. **Fl. & Fr.:** Apr.-May
Representative collection: Ilam, Maimajuwa-Kalopani, 3010m, 27.1N and 87.94'E, June 8, 2007, LKSR-Expedition team, **B 018** (TUCH).
Distribution: Himalaya (Himanchal Pradesh to Bhutan), Myanmar, West China, Nepal (West-East: 2000-3000m).

Family 31. OXALIDACEAE

1. Oxalis corniculata L. in *Sp. Pl.* : 435 (1753); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 228 (2000).

Herb. Stem prostate upto 30cm, rooting at nodes, with erect leafy branches, pilose; bulbes absent. Leaves alternate or clustered. Leaflets broadly obcordate 5-15x7-18mm, divided in upper half, petioles 1-4cm,Peduncles axillary, 3-8cm, 1-5-flowered.
Habitat: Near cultivated land. **Fl. & Fr.:**Feb.- Aug.
Representative collection: Ilam, Jamun-2, Hangetham around, 2240m, 27.04N, 88.01E, June 17, 2007, LKSR-Expedition team, **C 228** (TUCH).
Distribution: All over the World, Nepal (West-East: 300-2900m).

Family 32. GERANIACEAE

1. GERANIUM L.

1. Geranium nepalense Sweet in *Geraniaceae* **1:** t. 12 (1820); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 119 (2000).

Sprawling to decumbent. Basal leaves cordate, 1.5-4.5cm, across,deeply divided into 3-5 ovate to rhombic lobes. Peduncles 2-6cm, spikes-like panicles, or axiilary clusters or cymes, rarely solitary, actinomorphic, bisexual. Sepals 5, free.

Habitat: In moist damp places. **Fl. & Fr.:** Feb. - Jul.

Representative collection: Ilam, Maimajuwa Ratopanikhola, 2920m, 27.09N, 88.96E, August 27, 2007, LKSR-Expedition team, **B 150** (TUCH).

Distribution:, Himalaya, North East India, North Myanmar, Afganistan, Ino-China, West China, Nepal (West-Centre: 1500-4000m).

Family 33. **LINACEAE**

1. ANISADENIA Wall. ex Meisn.

1. Anisadenia saxatilis Wall. ex Meisn. in *Gen*. **2:** 96 (1838); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 189(2000).

Herb. Leafy shoot simple, erect 15-20cm. Leaves clustered at top of stems, elliptic, 4-8x1.5-3cm, acute base cuneate.Racemes 7-14cm, rachis pubescent. Flowers sessile or on simple or branched pedicel 1-4mm. Sepals lanceolate 4-5mm, Petals white or pink. Fruit oblong 2mm.

Habitat: In rocky trial roads **Fl. & Fr.:** Sep.-Jul.

Representative collection: Ilam, Dobate-Hangetham, 2660m, $27^0$04’07’’N, $87^0$59’37’’01E, September 5, 2007, LKSR-Expedition team, **C 192** (TUCH).

Distribution: Himalaya (Uttar Pradesh-Bhutan), North East India.Nepal (Centre-East: 1700-2700m).

Family 34. **DAPHNIPHYLLACEAE**

1. DAPHNIPHYLLUM Blume

1. Daphniphyllum himalense (Benth.) Muell. Arg. in *Prodr*. **16(2)**: 4 91864) var. **himalense**; Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 97 (2000). ‘*Chandane’* (चन्दने).

Goughia himalensis Benth. in *J. B. Kew. Misc*.6:9 (1857).

Shrub or small tree to 4m, scales of terminal buds obture; leaves thickly coriaceous.oblanceolate, 9-20x3-6cm, acute base attenuate, pale. Petioles 1.5-4cm. anthers narrow, 3x1mm, apicullate, female racemes recurved at apex. Pedicels shortly recurved.

Habitat: Mixed *Rhododendron* forest. **Fl. & Fr.:** May-Sep.

Representative collection: Ilam, Mabu-Kalapokhari, 3050m, 27.07N, $88^0$00’2.7’8.01E, June 16, 2007, LKSR-Expedition team, **B 110** (TUCH).

Distribution: Himalaya (Nepal-Bhutan), North East India, North Myanmar, China, Nepal (East: 2500-2800m).

Family 35. **RUTACEAE**

1. Boenninghausenia Reichenbach

1. Boenninghausenia albiflora (Hook.) Rchb. ex Meisn. in *Consp.*: 197 (1828); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 279 (2000).

Ruta albiflora Hook. f. in *Exot. Fl. B. t*. 79 (1823).

Shrub 50-60 cm; Leaflets elliptic-obovate, 5-13x3-13mm, pale green, Calyx 1-1.6mm, petals 5-8x3mm, white or pink, striped; Stamens slightly larger than petals, Gynophore long in fruit, capsule c. 4mm.

Habitat: In Open grassland. **Fl. & Fr.:** Oct.-Sep

Representative collection: Ilam, Maimajuwa-7, Chibe, 3170m, $27^0$05’22’’N, $87^0$54’47’’E, August 27, 2007, LKSR-Expedition team, **C 083** (TUCH).

Distribution: Himalaya (Kashmir-Bhutan), India, China, Taiwan, Nepal (West-East: 600-3300m).

2. SKIMMIA Thunberg

1. Skimmia laureola (DC.) Siebold & Zucc. ex Walp. in *Repert. Bot. Syst*. **5(3):** 405(1846); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 280 (2000).

Limonia laureola DC. in *Prodr.* **1**: 536 (1824).

Semi-proastate shrub 1m, Leaves elliptic-oblanceolate, 4-10x2.5cm, acute, base cuneate; Flowera in short racemes. Calyx c 1.5mm, petals greenish yellow, oblanceolate, 4.x1.5mm; Stamens c 3mm, Ovary ovoid c. 2mm, Fruit subglobose 2-8mm in diameter black.
Habitat: In *Daphniphyluum* forest. **Fl. & Fr.:** Apr. - May.
Representative collection: Ilam, Mabu-Kalapokhari, 2780m, 27.06N, 88.01E, June 16, 2007, LKSR-Expedition team, **B 140** (TUCH).
Distribution: Himalaya (Kasmir-Bhutan), Afganistan, Pakistan, Nepal (West: 2400-3000m).

3. ZANTHOXYLUM L.

1. Zanthoxylum acanthopodium DC., *Prodr.* 1:727 (1824); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 281 (2000). '*Bogya timur'* (वोगेटिमुर).

Shrub of 5m. Shoots, spiny Leaves 30cm, leaflets ovate or lanceolate upto 10×3cm, acuminate, base rounded, margin serrate. Inflorescence axillary in short dense clusters. Male flowers with 6-8 stamens. Female flowers with 2 ovoid carpels. Fruit reddish ovoid.
Habitat: In *Quercus-Lithocarpus* forest. **Fl. & Fr.:** Oct.-Feb.
Representative collection: Ilam, Mabu-8, Dobate around, 2680m, $27^0$04'N, $87^0$59'E, September 1, 2007, LKSR-Expedition team, **C 120** (TUCH).
Distribution: Himalaya (Uttar Pradesh to Bhutan), North East India (Meghalaya), East-China, Malaysia, Nepal (Centre-East: 1600-2800m).

2. Zanthoxylum oxyphyllum Edgew., in *Trans. Linn. Soc. London* 20:42 (1846); Press *et al.*, *Ann. Check. Fl. Pl. Nep*: 281 (2000). *'Ban timur'* (बन टिमुर).

Evergreen shrub of 7m. Stem hooked spiny. Leaves alternate, imparipinnate; leaflets 10-27, 3.5-10.5x1.5 - 3.5cm in ovate, acuminate, rounded. Flowers dark purple red, cymes, small, 0.4cm across. Fruit red when ripe, globose, coriaceous. Seed single, black shining.
Habitat: In *Quercus-Lithocarpus*. **Fl. & Fr.:** Jul.-Dec.
Representative collection: Ilam, Jamun-2, Hangetham, 2170m, 27.04N, 88.01E, June 17, 2007, LKSR-Expedition team, **B 169** (TUCH).
Distribution: Himalaya (Uttar Pradesh-Bhutan), North East India, Myanmar. Nepal (Centre-East: 2100-2800m).

Family 36. **POLYGALACEAE**

1. POLYGALA L.

1. Polygala arillata Buch.-Ham ex D.Don in *Prodr. Fl. Nepal*.: 199 (1825); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 235 (2000). **'***Marcha'* (मर्चा).

Erect shrub 3m. Leaves elliptic- ovate to oblong lanceolate, 3-18x1.5-3.5cm, acuminate; Flowers in terminal and axillary racemes, flowers yellow to dseep orange; Sepals ciliolate, cadaucous; boat shaped. Capsule winged.
Habitat: In moist places. **Fl. & Fr.:** Aug.-Nov.
Representative collection: Ilam, Mabu-8, Dobate around, 1990m, $27^0$11'27''N, $87^0$56'17''E, September 1, 2007, LKSR-Expedition team, **C 111** (TUCH).
Distribution: Himalaya(Nepal to Bhutan), Srilanka, Myanmar, China, Malaya Nepal (Centre-East: 1500-2700m).

Family 37. **ANACARDIACEAE**

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

1. Dobenea vulgaris Buch.-Ham. ex D.Don in *Prodr. Fl. Nepal*.: 249 (1825); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 9(2000). *'Sangle'*(साङ्गले).

Shrub 2-6m with long slender branches. Leaves elliptic-m lanceolate, 12-18x 3-5cm, acuminate, base rounded or cuneate, margin serrate, sparsely pubescent on veins beneath; flower yellowish. Fruit orbicular, 3mm.

Habitat: In small streamsite. **Fl. & Fr.:** Aug.-Sep.

Representative collection: Ilam, Jamun-2, Hangetham around, 3210m, $27^0$18'N, 88^0 01'E, September. 5, 2007, LKSR-Expedition team, **C 184** (TUCH).

Distribution: Himalaya (Nepal-Bhutan), North East India, Nepal (West-East, 1500-2300m).

2. RHUS L.

1. Rhus succedanea L., *Mant., Pl.* **2**:221(1771); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*:10(2000). '*Rani bhalayo'* (रानी भलायो).

Small tree upto 13m. Leaves 15-30cm, leaflets membranous, 2-6 pairs, ovate, oblong or lanceolate, 4.5-13×1.2-4.5cm, acuminate, base cuneate, margin entire. Panicles axillary. Calyx 1mm. Petals 2×0.5mm. Ovary ovoid. Drupe subglobose, 5-8mm

Habitat: Near the cultivated land **Fl. & Fr.:** Aug. - Nov.

Representative collection: Ilam, Jamun-2, Hangetham around, 3210m, $27^0$18'N, 88^0 01'E, September. 5, 2007, LKSR-Expedition team, **C 121** (TUCH).

Distribution: Himalaya (Kashmir-Bhutan), North East India, Myanmar, Nepal (West-East: 1300-2400m).

Family 38. **ACERACEAE**

1. ACER L.

1. Acer campbellii Hook. f. & Thomson ex Hiern in *Fl. Brit. India* **1**(**3**): 696(1875); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 5 (2000). *Kapasi'*(कपासी).

Tree up to 15m. Leaves 5- 7 lobed 8-14x10-18 cm; lobes, caudate-acuminate, margin finely and regularly serrulate, Petioles 4-8cm. Flowers greenish, in panicles. Sepals ovate, 2x3mm, Petals as long as sepals, fruits reddish, outer line forming a straight line.

Habitat: In rocky open mountainous slope. **Fl. & Fr.:** Apr.-Jun.

Representative collection: Ilam, Mabun-8, Caurichok around, 3080m, 27.09N, 88.01E, June 15, 2007, LKSR-Expedition team, **B 103** (TUCH).

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

2. Acer pectinatum Wall. ex Pax in *Bot. Jahrb.* **7**: 249 (1886); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 5 (2000). '*Lekh Kapasi'* (लेख कपासी).

Tree 8-16m; Leaves 3- 5lobed, basal lobes often smaller, 6-12cm long and broad; lobes 3-5cm long, acuminate, base rounded, margin finely and regularly serrulate. Flowers in loose racemes, reddish green, Sepals lanceolate, Petals shorter than sepals. Stamens not exertated.

Habitat: In rocky mountain slope. **Fl. & Fr.:** Apr.-May

Representative collection: Ilam, Mabu-8, Kalapokhari around, 2390m, 27.07N, 88.01E, June 06, 2007, LKSR-Expedition team, **B 117** (TUCH).

Distribution: Himalaya (Nepal-Bhutan), China, North Myanmar, Nepal (West-East: 2700-3800m).

Family 39**. SABIACEAE**

1. Meliosma simplicifolia (Roxb.) Walp. in *Repert. Bot. Syst***. 1(3):** 423 (1842) subsp. **simplicifolia**; Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 281(2000).

Millingtomia simplicifolia Roxb., *Pl. Corom*. **3:** 50 t. 254 (1820).

Tree of 6m. Leaves simple, 5-20x2-10cm, acute or acuminate, base cuneate or attenuate, entire or serrate. Panicles 10-20cm; Sepals ovate, 1.20x1mnm, Outer petal sub oebicular and inner petals bifid. Drupes subglobose, stone with prominent median keel.
Habitat: In *Rhododendron* forest. **Fl. & Fr.:** Oct.-Feb.
Representative collection: Ilam, Mabu-Kalapokhari, 2780m, 27.06N, 88.01E, June 16, 2007, LKSR-Expedition team, **B 132** (TUCH).
Distribution: Himalaya (Uttar Pradesh-Bhutan), North East India, West China, Myanmar, Thailand, Nepal (Centre-East: 200-2500m).

Family 40. **BALSAMINACEAE**

1. IMPATIENS L.

1. Impatiens graciliflora Hook. f. in *Rec. Bot. Surv. India*. 4: 15 & 21 (1905); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 22 (2000). *'Phosormindo/Mujuro'* (फोसोरमोन्दो् / मुजुरो).

Annual herb of 50cm. Leaves elliptic to lanceolate-elliptic, 6-12x3-4cm, inflorescence a many-flowered racemes, Flower pink; Lowers sepals ahallowly navicular, 5-7x2-3mm, spur slightly curved o S shaped, filiform. Capsule linear- cylindric, 15-8x2mm.
Habitat: Near cultivated land. **Fl. & Fr.:** Jun.-Oct.
Representative collection: Ilam, Maimajuwa-7, Upper Hattiya, 1920m, 27.06N, 87.94E, June 7, 2007, LKSR-Expedition team, **A 008** (TUCH).
Distribution: Himalaya (Nepal-Sikkim), Nepal (East: 1800m).

2. Impatiens puberula DC. in *Prodr*. **1**: 687 (1824); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 322 (2000).

Perennial herb to 50cm; stem finely pubescent; leaves; anceolate- elliptic to oblong-lanceolate, 3.5-15.5x1-5cm, pubescent above and beneath. Flowers solitary ependulate or on a short peg up to 6mm, bluish purple. Capsule cylindrical- fusiform. glabrous.
Habitat: In moist place. **Fl. & Fr.:** Jun.-Oct.
Representative collection: Ilam, Mabu-8, 2450m, 27^0 04'19''N, 87^0 59'E, September. 9, 2007, LKSR-Expedition team, **C 117** (TUCH).
Distribution: Himalaya (Nepal-Bhutan), Nepal (Centre-East: 1500-2700m).

3. Impatiens racemosa DC., *Prodr*. **1**: 688 (1824); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 23 (2000).

Annual herb 15-100cm. Leaves ovate to elliptic- lanceolate, 3.5-14-1.8-6cm. Inflorescence a 5- many flowered raceme, flowers bright yellow, often reddish- brown making on lip; Lower Capsule cylindric-clavate.
Habitat: In small riverbankside. **Fl. & Fr.:** May- Nov.
Representative collection: Ilam, Maimajuwa-7, Naulegaun, 2100m, $27^0$04' 19''N, $87^0$56' 34''E, August 27, 2007, LKSR-Expedition team, **C 015** (TUCH).
Distribution: Himalaya (Kashmir-Bhutan), North East India, China.Nepal (West-East: 1300-3900m).

4. Impatiens sulcata Wall. in *Fl. Ind.* (Roxburgh) ed. 2, **2**: 458 (1824); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 23 (2000).

Herb up to 1m. Leaves opposite, ovate elliptic, 3-10×1-4cm, base cuneate. Inflorescene racemes, flowers mauve spotted with yellow brown in throat. Capsule cylindric-clavate.
Habitat: In moist shady places. **Fl. & Fr.:** Jun.-Sep.

Representative collection: Ilam, Maimajuwa-7, Naulegaun, 2100m, $27^0$04' 19''N, $87^0$56' 34''E, August 27, 2007, LKSR-Expedition team, **C 017** (TUCH).
Distribution: Himalaya (Kashmir-Bhutan), Nepal (West-East: 1700-4100m).

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

Herb up to 1m. Leaves elliptic, lanceolate-elliptic, 4-15×1-5cm, glabrous. Inflorescence dropping, 2-7-flowered racemes. Flowers pale yellow lined with reddish purple in throat. Capsule linear-cylindrical.
Habitat: In moist places. **Fl. & Fr.:** Jun.-Sep.
Representative collection: Ilam, Mabu-8, Dobate, 2100m, $27^0$04' 05.1''N, $87^0$59' 28.9''E, August 27, 2007, LKSR-Expedition team, **C 015** (TUCH).
Distribution: Himalaya (Nepal-Bhutan), China, Nepal (West-East: 2700-3800m).

Family 41**. AQUIFOLIACEAE**

1. ILEX L.

1. Ilex dipyrena Wall., *Fl. Ind.* (Roxburgh) 1: 473 (1820); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 12 (2000). '*Lise'* (लिसे).

Evergreen tree to 10m, Leaves coriaceous, elliptic to ovate or broadly ovate, 5.5-10.5x2-3cm acute to shortly acuminate, base rounded. both margins entire to spinose; Flowers glabrescent. Fruit globose to elliptic 6-7.5mm in diameter.
Habitat: In Rhododendron mix forest. **Fl. & Fr.:** Apr.-May.
Representative collection: Ilam, Jamun-2, Jaowbari, 2450m, 27.01N, 88.02E, June 8, 2007, LKSR-Expedition team, **B 184** (TUCH).
Distribution: Himalaya (Punjab to Arunachal Pradesh) North East India, North Myanmar, North China, Nepal (West- East: 2500-3000m).

2. Ilex fragilis Hook. f., *Fl. Br. Ind*. **1(3)**: 602 (1875); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 12 (2000).

Deciduos tree 8m; Leaves membranous, ovate or elliptic-ovate, 6-12x2.5-5.5cm, acute to acuminate, base rounded or obtuse; Flowers glabresent, both sexes in axillary fascicles. Calyx glabrous lobes 5-8; Corolla white or green lobes 5-7. Stamens 5-8, Fruit red globose, 4-5mm.
Habitat: In *Quercus lamellosa* forest. **Fl. & Fr.:** May- Jun.
Representative collection: Ilam, Mabu-8, Dobate around, 2170m, $27^0$04'N, $87^0$59'E, June 7, 2007, LKSR-Expedition team, **B 171** (TUCH).
Distribution: Himalaya (Nepal to Bhutan) North East India, North Myanmar, West China, Nepal (Centre-East: 2200-3000m).

Family 42**. CELASTRACEAE**

1. EUONYMUS L.

1. Euonymus grandiflorus Wall. in Roxb. in *Fl. Ind.* (Roxburgh) ed. 2, **2**: 404 (1824); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 45(2000).

Shrub of 4m. Leaves coriaceous, obovate or elliptic, 4-9x2-4cm, acute to rounded, base cuneate, margins serrulate to almost entire. Cymes axillary; Flowers large, creamy yellow. Capsule yellow, Seed black.
Habitat: In *Quercus-Lithocarpus* forest. **Fl. & Fr.:** May- Jun.
Representative collection: Ilam, Dobate-Hangetham around, 2660m, $27^0$04'07.0''N, $87^0$59'37.6''E, Sept. 5, 2007, LKSR-Expedition team, **C 198** (TUCH).
Distribution: Himalaya (Uttar Pradesh to Bhutan), North East India, North Myanmar, West and Central China, .Nepal (Central: 1500-1800m).

Family 43. **BUXACEAE**

1. SARCOCOCCA Lindl.

1. Sarcococca hookeriana Baill.in *Monogr. Buxac.*: 53(1859); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 32 (2000).

Shrub 0.5-1.5m. Leaves narrowly elliptic-lanceolate, 5-9×1-2cm, acuminate or acute, base cuneate, pinnately veined, glabrous. Flowers strongly fragrant recemes. Bracts ovate c2.5cm. Perianth segments greenish, c2mm. Berries subglobose, c1cm.
Habitat: In moist places. **Fl. & Fr.:** Apr. - Jun.
Representative collection: Ilam, Mabut-8, 2450m, 27^0 04'21.2''N, $87^0$29'.2''E, Sept. 1, 2007, LKSR-Expedition team, **B 126** (TUCH).
Distribution: Himalaya (Nepal-Bhutan), North East India, West China, Nepal (West-East: 1800-3500m).

Family 44**. VITACEAE**

1. CISSUS L.

1. Cissus repens Lam.in *Encycl*. **1**: 31 (1789); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 327 (2000)

Weak trailing glabrous climber. Leaves ovate 7-14x4-8cm, margins distantly serrulate; Stipules rounded, Flowers greenish- white. Calyx entire, glabrous; petals glabrous. Style slender, Berry an obovoid.
Habitat: In *Quercus-Lithocarpus* forest. **Fl. & Fr.:** Jul- Aug.
Representative collection: Ilam, Jamun-2, Hangetham around, 2210m, $27^0$38.6N, $88^0$00' 47.9''E, Sept. 9, 2007, LKSR-Expedition team, **C 224** (TUCH).
Distribution: Himalaya (Nepal-Bhutan), India, Malayasia, Nepal (Centre: East, 300-1100m).

2. TERASTIGMA Palnch.

1. Tetrastigma serrulatum (Roxb.) Planch in *Monogr. Phan.* 5: 432 (1887); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 328 (2000). '*Charchare'* (चरचरे).

Cissus serrulata Roxb. in *Fl. Ind.* **1**: 432 (1820).

Evergreen climbing shrub. Leaves pedately 5-foliolate; petioles 2.5-5cm, lanceolate, elliptic or obovate, 2-10x 1-4cm. Flowers pale green in rounded, glabrous or pubescent lax, umbellately-brnached, cymes 3-7cm diameter. Berry globose black or purple.
Habitat: In Quercus –*Lithocarpus* forest. **Fl. & Fr.:** May-Oct.
Representative collection: Ilam, Jamun-2, Hangetham around, 2240m, 27.04N, 88.01E, June 7, 2007, LKSR-Expedition team, **B 158** (TUCH).
Distribution: Himalaya (Uttar Pradesh-Bhutan), Myanmar, Thailand, Indo-China, West China, Nepal (West-East: 500-2400m).

Family 45. **THYMELAEACEAE**

1. Daphne L.

1. Daphne bholua Buch ex D. Don in *Prodr. Fl. Nepal.*: 68 (1825) var. **bholua**; Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 322 (2000) '*Lokta/ Kagate'* (कागते).

Evergreen shrub 1-3m. Leaves clustered at branch at ends, elliptic- oblanceolate, 6-14x1.3-3cm, acuminate, base cuneate. Inflorescence terminal 5-15 flowered, flower shortly fragrant. Pink or purplish, 7-12mm. DSrupes ovoid, black 8x5mm.
Habitat: In open shrubyland. **Fl. & Fr.:** Feb.-May
Representative collection: Ilam, Mabu-Bikhebhanjyang, 3220m, 27.09N, 88.00E, June 14, 2007, LKSR-Expedition team, **B 085** (TUCH).

Distribution: Himalaya (Nepal-Arunachal Pradesh), North East India, West China, Nepal (Central-East: 2000-2900m),

2. EDGEWORTHIA Meisn.

1. Edgeworthia gardneri (Wall.) Meisn. In Denkschr. Bot. Ges. Regensb.3: 280, t. 6 (1841); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 309 (2000) '*Argayle*'(अरगेली).

Daphne gardneri Wall. in As Reseach. 13: 388, t.9 (1820).

Shrub 2-6m. Leaves elliptic- oblanceolate, 5-15x 1.5-4.5, acute, base cuneate or attenuate, petioles 0.5-1cm. Flowers numerous in peduncles heads 3-4.5 cm diameter, sweet scented; perianth tube 10-15mm, densely creamy white, silky, lobes yellow. Fruit ovoid, 5x3mm.
Habitat: Near cultivated land. **Fl. & Fr.:** Feb.-May.
Representative collection: Ilam, Maimajuwa-7, Manedanda, 2190m, $27^0$04'33''N, $87^0$56'37''E, August 27, 2007, LKSR-Expedition team, **C 028** (TUCH).
Distribution: Himalaya (Nepal-Bhutan), North East India, North Myanmar, Nepal (Centre-East: 2400-3500m).

Family 46. **VIOLACEAE**

1. VIOLA L.

1. Viola biflora L.in *Sp. Pl.* 936(1753); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 326 (2000).

Perennial herb with nodular rootstock upto 15cm herbs. Petiole c1cm. Leafblade broadly ovate, 10-16×12-20mm, pubescent especially on upper surface. Stipules ovate, leafy, entire. Peduncles with linear bracts 1-3mm. flower yellow. Capsule ovoid, glabrous.
Habitat: In open pasture land. **Fl. & Fr.:** Jun.-Sep.
Representative collection: Ilam, Maimajuwa-7, Lampokhari, 2920m, 27.09N, 87.96E, June 8, 2007, LKSR-Expedition team, **A 050** (TUCH).
Distribution: Europe, Siberia, North Korea, Japan, West and North America, Nepal (West-East: 2100-4500m).

Family 47**. BEGONIACEAE**

1. BEGONIA L.

1. Begonia dioca Buch.-Ham. ex D. Don, *Prodr. Fl. Nepal.*: 223 (1825); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 24 (2000). '*Magarkaje***'** (मगरकॉज).

Herb. Rootstock tuberous; stemless. Leaves ovate, symmetric 4-12x3-8cm, acuminate, base cordate to almost truncate, margin serrate, glabrous; petioles 5-16cm. Peduncles 2-5 flowers. Perianth white or pink; segments elliptic or obovate, Capsule obovoid 10x6mm. pubescent at first; wings subequal 4-5mm
Habitat: In moist and rocky places. **Fl. & Fr.:** Aug.-Sep.
Representative collection: Ilam, Maimajuwa-Ratopanikhola, 1830m, $27^0$04'02''N, $87^0$56'22''E, August 27, 2007, LKSR-Expedition team, **C 036** (TUCH).
Distribution: Nepal (West-East: 2000-2900m), Himalaya (Punjab-Sikkim), North India

2. Begonia flaviflora H. Hara, *J. Jap. Bot.* 45: 91. 1970.

Herb. Rhizome thick, softly brown tomentose. Leaves ovate. 10-25x7-20cm; Pedicels brown tomentose. Flowers yellow; Stamens numerous, forming a globose mass, 6mm diameter. Capsule becoming inverted 13x5mm. Wings, 2.5
Habitat: On shady moist-damp shaded places. **Fl. & Fr.:** Jul.-Sep.
Representative collection: Ilam, Jamun-2, Hangetham around, 2170m, 27.04N, 88.01E, June 17, 2007, LKSR-Expedition team, **B 163** (TUCH). New addition to flora of Nepal.

3. Begonia germipara Hook.f. in *III. Himal. Pl.*: t. 14 (1855); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 24(2000)

Herb. Rootstock tuberous. Leaves ovate, 5-8x3-6cm, acuminate, base usually asymmetrical, truncate or cordate, margin coarsely serrate or up to 5-lobed, usually glabrous. Flower peduncles, white or striped. Fruit body 7x10mm.
Habitat: On small rocky trail rod. **Fl. & Fr.:** Aug.- Oct.
Representative collection: Ilam, Jamun-2, Hangetham around, 2450m, $27^0$04'21.2''N, $87^0$59'29.2''E, Sept. 1, 2007, LKSR-Expedition team, **C 128** (TUCH).
Distribution: Himalaya (Nepal, Sikkim), Nepal (East: 2900m).

4. Begonia josephii A. DC. in *Ann. Sci. Nat.*, *ser.* 4, **11**: 126 (1859); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 24 (2000).

Herb. Rootstock tuberous. Leaves all basal, ovate or oblong ovate, 2-18cm, acuminate, base rounded, peltate, margin finely serrate, sometimes coarsely 3-5 lobed. Male flower white or pink, stamens few; Female flowers; Capsule ellipsoid, 9x6mm. wing 1-2mm.
Habitat: On rocky shady slope. **Fl. & Fr.:** Jun.-Sep.
Representative collection: Ilam, Jamun-2, Hangetham around, 2650m, $27^0$05'28.6''N, $87^0$55'29.2''E, August 30, 2007, LKSR-Expedition team, **C 086** (TUCH).
Distribution: Himalaya (Nepal to Bhutan), North East India, Nepal (Centre-East: 1600-2900m).

5. Begonia sikkimensis A. DC. in *Ann. Sci. Nat.*, *ser.* 4, **11**: 134 (1859); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 25 (2000).

Herb.Rootstock rhizomatous; stem 10-40cm. Leaves symmetrical, suborbicular in outline, 12-28cm diameter, peduncles 10-15cm; Perianth segments elliptic; 1-1.5cm, red; Stamens numerous, Styles 2, connate at base, Capsule 10x4mm, wing 1-2mm broad.
Habitat: On moist shady places. **Fl. & Fr.:** Aug.-Oct.
Representative collection: Ilam, Jamun-2, Hangetham around, 2650m, $27^0$04'07.0''N, $87^0$59'37.6''E, September. 5, 2007, LKSR-Expedition team, **C 200** (TUCH).
Distribution: Himalaya (Nepal, Sikkim), Nepal (Centre-East: 600-1600m).

Family 48**. CUCURBITACEAE**

1. BISWAREA Cogn.

1. Biswarea tonglensis (C.B.Clarke) Cogn. in *Monogr. Phan*, 3: 403 (1881); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 84 (2000).

Warea tonglensis C. B.Clarke in *J. Linn. S. B.* **15:** 129, f. 1-8 (1876).

Climber. Leaves ovate or suborbicular in outline, 12-22x12-20cm, moderately to deeply 3-7 lobed, lobes triangular, lanceolate or sublinear, acuminate; Petiole 6-9cm. Fruit oblong 10-12x4-4.5cm. seed 1-1.5x0.7-1cm.
Habitat: In moist shady places**.** **Fl. & Fr.:** Jul.-Sep.
Representative collection: Ilam, Mabu-Dobat, 2690m, $27^0$04'19.8''N, $88^0$00'2.7''E, Sept. 3, 2007, LKSR-Expedition team, **C 160** (TUCH).
Distribution: Nepal (Centre-East:1500-3200m), Himalaya (Nepal to Sikkim).

2. HERPETOSPERMUM Wall.

1. Herpetospermum pedunculosum (Ser.) Baill.in *Hist. Pl.* **8**:445(1886); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:85 (2000).

Bryonia pedunculosa Seringe in DC., *Prodr.* 3:306(1828).

Climber. Leaves ovate, 7-10×4-8cm, slightly to moderately 3-5 lobed, acuminate, base cordate, margin serrate, pubescent on both surfaces. Many flowered, 10-15cm, ebracteate. Fruit ellipsoid, stiffy hirsute, seeds oblong.

Habitat: In small riverbank. **Fl. & Fr.:** Aug.-Oct.

Representative collection: Ilam, Maimajuwa-RatopaniKhola, 2690m, $27^0$04'19.8''N, $88^0$00'2.7''E, August 27, 2007, LKSR-Expedition team, **C 045** (TUCH).

Distribution: Himalaya (Kullu to Bhutan), North East India, West and South China, Nepal (West-East: 1500-3600m).

3. TRICHOSANTHES L.

1. Trichosanthes ovigera Blume in *Bijdr. Fl. Ned. Ind*. **15**:934 (1826); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:86 (2000).

Climber. Leaves suborbicular in outline, 10-14x10-16cm, deeply 3-lobed, lobes lanmceolate, acuminate, petioles 3-6cm. Male peduncles 2-8cm, 4-10 flowered near apex. Pedicels 5-20mm, Anthers 3x1.55mm. Fruit ellipsoid, 8-10x2.5-4cm. seed brownish 6-8x7x5mm turgid.

Habitat: In Near cultivated land and small trial road. **Fl. & Fr.:** Aug.-Oct.

Representative collection: Ilam, jamuna-Jawobari, 2278m, 27.00N and 88.02E, June 18, 2007, LKSR-Expedition team, **B 190** (TUCH).

Distribution: Himalaya, Japan, Malayasia, Australia, Nepal (West-East: 200-17100m).

Family 49. MELASTOMATACEAE

1. OSBECKIA L.

1. Osbeckia stellata Buch.-Ham ex D. Don in *Bot. Reg*. **8**: t. 674 (1822); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:195 (2000).

Shrub of 1.5m. Leaves ovate, oblong or elliptic, 6.5-15x2-5cm, acute to acuminate, base cuneate, Inflorescence terminal and in upper leaf axils, paniculate, few to many flowered; Calyx 12-20mm. Petals 4, pinkish white to red- purple. Fruit 10-20mm, Capsule hairy at apex.

Habitat: In open grassland. **Fl. & Fr.:** Aug-Oct.

Representative collection: Ilam, Maimajuwa-7, Naulegaun, 1840m, $27^0$04'15''N and $87^0$57'29''E, August 27, 2007, LKSR-Expedition team, **C 016** (TUCH).

Distribution: Himalaya (Punjab-Arunachal Pradesh), Nepal (West to East: 1300-2600m).

2. OXYSPORA A.DC.

1. Oxyspora paniculata (D.Don) DC. in Prodr. 3: 123 (1828); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 195 (2000).

Arthrostemma paniculatum D.Don in *Mem. Wern. Nat. Hist.S.* **4**: 299 (1822).

Shrub upto 2.5m. Leaves ovate to ovate-elliptic, 11.5-29x5-14cm, shortly acuminate, base rounded, rarely subcordate, margin obscurely dentate. Upper surface glabrous, minutely tuberculate. Inflorescence drooping 20cm long with pink flower. Capsule ellipsoid 11x6mm

Habitat: In moist places. **Fl. & Fr.:** Aug-Oct.

Representative collection: Ilam, Maimajuwa-7, Newakhola 2190m, $27^0$14'22''N, $87^0$57'29''E, August 28, 2007, LKSR-Expedition team, **C 050** (TUCH).

Distribution: Himalaya (Nepal-Arunachal Pradesh), North East India, Indo-China, West China, Nepal (Centre-East: 1300-2000m).

Family 50. **ALANGIACEAE**

1. ALANGIUM Lam., nom. cons.

1. Alangium alpinum (C. B. Clarke) WW. Sm & Cave in *Rec. Bot. Surv. India* **6**: 96, t. 2 (1914); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 6 (2000).

M*a*rlea *begonlaeifolia* Roxb. Var. *alpine* C. B. Clarke in *Fl. Br. Ind*. **2**: 744 (1879).

Tree or shrub up to 12m. Leaves ovate, 8.5-20x 5.7-12.5cm, acuminate, base cordate, upper surface glabrous. Petioles 7-20mm. Cymes 1-4 flowered. Calyx 4.5mm. Petals creamy white or yellow. Fruit ellipsoid 1-1.5x 0.6-0.8cm, one seeded.
Habitat: *Quercus-Lithocarpus* forest. **Fl. & Fr.:** May- Jun.
Representative collection: Ilam, Mabu-8, Kalapokhari around, 2660m, 27^0 04'N, 87^0 59'E, September.3, 2007, LKSR-Expedition team, **C 140** (TUCH).
Distribution: Himalaya (Nepal-Bhutan); North East India, Myanmar. Nepal (Centre-East: 1900-2700m).

Family 51**. ARALIACEAE**

1. Gambelia ciliata C. B. Clarke in *Fl. Brit. Ind.* **2(6)**: 740 (1879); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 16 (2000). '*Kursimla'* (कुरसिम्ला).

Tree to 5m. Leaves palmate 1-5 folliolate; leaflets elliptic or ovate, 5-17x2.5-10cm, acuminate, base cordate, cuneate or rounded, margin entire. Panicles up to 20cm; umbels 10-17 flowered, up to 6cm. Petals greenish, ovate 3mm. Fruit 8mm diameter.
Habitat: In *Rhododendron-Lyonia* mixed forest. **Fl. & Fr.:** Jun.-Jul.
Representative collection: Ilam, Mabu-8, Kalapokhari around, 2930m, 27.07'N, 88.01'E, June 16, 2007, LKSR-Expedition team, **B 119** (TUCH).
Distribution: Himalaya (Nepal to Bhutan), China, Myanmar, Nepal (Centre-East: 2600-3300m).

2. MERRILIOPANAX L.

1. Merriliopanax alpina (Calrke) Shangi; Cannon in *Enum. Fl. Pl. Nep*. **2**: 1191(1978); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 16 (2000). *'Bhote Phutta'*(भोटे फुत्ता).

Brassaiopsis alpina C. B. Clarke in Fl. Br. Ind. **2(6):**736(1879).

Tree 3-5m. stem pale brownish tomentose at first. Leaves broadly ovate or sub-orbicular. 15-30cm, lobes upto 3, shallowly, abruptly acuminate, base cordate, margin serrulate, Panicles branches upto 25cm, umbels 1.5-2cm diameter, 7-15 flowered; 5-7mm. Fruit 5x3mm.
Habitat: In *Rhododendron-Lyonia* mixed forest. **Fl. & Fr.:** May- Sep.
Representative collection: Ilam, Mabu-8, Kalapokhari around, 2930m, 27.07'N, 88.01'E, June 16, 2007, LKSR-Expedition team, **B 108** (TUCH).
Distribution: Himalaya (Nepal-Sikkim), Nepal (East: 2100-2500m).

3. PANAX L.

1. Panax pseudo-ginseng Wall. in *Trans. Med. Soc. Cale*. **4**: 117 (1829); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 16 (2000).

Herb. Stem up to 75cm, erect, bearing a whorl of 3-6 palmate leaves; petioles 2.5-12cm; leaflets 3-6, ovate or lanceolate, acuminate, base rounded, or cuneate, Male umbels 1.5cm in diameter; Female umbels 3cm in diameter. Petals white 2mm. Fruits scarlet 4mm diameter.
Habitat: In Rhododendron-Lyonia mixed forest. **Fl. & Fr.:** May-Jun.
Representative collection: Ilam, Mabu-8, Dobate around, 3170m, 27^0 04'N, $87^0$59'E, September. 3, 2007, LKSR-Expedition team, **C 176** (TUCH).
Distribution: imalay (Nepal-Bhutan), North East India, Nepal (Centre and East: 2100-2500m).

Family 52. **UMBELLIFERAE**

1. HERACLEUM L.

1. Heracleum lallii N. Norman in *J. B*. 67:247(1929); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 313 (2000).

Perennial herb. Leaves pinnate, 3-paired, narrowly oblong, long petiolate. Umbels few, linear, inconspicuous. Outer petals spreading, broadly obcordate, provided with short lobules, base somewhat attenuate, not clawed.
Habitat: In near trial road. **Fl. & Fr.:** Uncertain
Representative collection: Ilam, Maimajuwa-7, Sisnekhola, 1970m, $27^0$04'17'N, $87^0$57'39''1E, August 28, 2007, LKSR-Expedition team, **C 064** (TUCH).
Distribution: Endemic to Nepal (West-Centre: 3000-4200m).

2. HYDROCOTYL L.

1. Hydrocotyl himalaica P. K.Mukh in *Indian Forester* 95: 470, t. 1 (1969); Press *et al.*, *Ann. Check. Fl. Pl. Nep*.: 313 (2000). '*Ghora Tophay'* (घोट तोपरे).

Herb. Stem brown pubescent. Leaves orbicular in outline with 5-7 broad, shallow, very rounded lobes (0.8-)1.5-3(-6)x 1.2-8cm, margins crenate-dentate, sparsely strigose pubescent on both surfaces; petioles 1-18cm. Umbels solitary in leaf axils. Fruit 1x1.5mm.
Habitat: Near cultivated land. **Fl. & Fr.:** Apr. - Sep.
Representative collection: Ilam, Thulogaun Maimajuwa, 1820m, $27^0$03'52''N, $87^0$56'38''E, August 27, 2007, LKSR-Expedition team, **C 006** (TUCH).
Distribution: Himalaya (Nepal-Bhutan), North East India, Nepal (West-East: 1500-2500m

2. Hydrocotyl nepalensis Hook. in *Exot Fl*. 1: t. 30 (1823); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 313 (2000). '*Ghora Tophay'* (घोट तोपरे)

Similar to *H. himalayaica* in habit, but differing in leaf shape, umbel form, most noticeably in fruit. Leaves angular in outline, lobes usually triangular, 2-9x2.8-11cm, strigose hairs rather longer than *H. himalaica.*Umbel often in clusters of 2-9(-12) at nodes; fruit, 0.3-0.5mm.
Habitat: In moist grassland. **Fl. & Fr.:** May-Jul.
Representative collection: Ilam, Jamun-2, Hangetham around, 2210m, 27.04N, 88.01E, Sept. 9, 2007, LKSR-Expedition team, **C 230** (TUCH).
Distribution: North East India China, Korea, Vietnam, Nepal (West-East: 1200-2700m),

2. SANICULA L.

1. Sanicula elata Buch.-Ham ex D. Don in *Prodr. Fl. Nepal*.: 183 ((1825); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 316 (2000).

Herb. Stem 12-100cm. Leaves deeply 3-5 x divided to base or almost so, lower ones 4-9 x 5-10(-13)cm, segement again deeply divided, acute or acuminate, margins serrate. Flowers greenish white sometimes pale. Fruit 2x1.5mm subterete.
Habitat: Near cultivated land. **Fl. & Fr.:** Apr.-Aug.
Representative collection: Ilam, Jogmai kholagaun, 2210m, 26.99N, 88.02E, June 18, 2007, LKSR-Expedition team, **B 194** (TUCH).
Distribution: Himalaya, China, Malayasia, Nepal (West-East: 1600-3500m).

3. OENANTHE L.

1. Oenanthe thomsonii C.B. Clarke in *Fl. Brit. Ind*. **2(6):** 697 (1879); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 314 (2000).

Weak diffuse herb with stem 20-80cm. Leaves 3-15(-30)cm long, finely 3-4x pinnately divaricately divided, ultimate segments linear. Umbels 3-5.5cm across. Calyx teeth 0.5-1mm. Petals white, 1-2.5mm long. Fruits ovoid, 2.5-3 x 2mm.

Habitat: Near cultivated land. **Fl. & Fr.:** Apr.-Aug.

Representative collection: Ilam, Jogmai kholagaun, 2210m, 26.99N and 88.02E, June 18, 2007, LKSR-Expedition team, **B 195** (TUCH).

Distribution: Himalaya (Nepal to Bhutan), Myanma, Nepal (Centre-East: 1600-2500m).

Family 53. **MONOTROPACEAE**

1. MONOTROPA L.

1. Monotropa hypopithys L., *Sp. Pl.* 387(1753); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*:198(2000).

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

Habitat: In shady moist places. **Fl. & Fr.:** July-Aug.

Representative collection: Ilam, Jamun-2, Hangetham around, 2170m, 27.04N, 88.01E, June 7, 2007, LKSR-Expedition team, **B 175** (TUCH).

Distribution: Europe, Himalayan (Kashmir to Bhutan), North East India (Meghalaya), Thailand, China, Siberia, Japan, North and Central America, Nepal (West-Centre: 2400-3700m).

Family 54. **ERICACEAE**

1. AGAPETIS D. Don ex G. Don

1. Agapetis incurvata var. Hokkeri (C.B. Clarke) Airy Shaw in *Kew Bull*. **13**: 486(1959); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:101 (2000).

Pentapterysium rugosum C.B. Clarke in *Fl. Br. Ind*. **3:** 450 (1882)

Epiphytic shrub up to 50 cm. Leaves glabrous, ovate-lanceolate, 6-9 x 2.5-3.5 cm. Corymb 2-8 flowered, pendulous, pinkish white. Calyx lobes ovate, 7mm.Corolla tubular, yellow, 2cm. Ovary reddish-green, winged.

Habitat: In shady Rhododendron forest. **Fl. & Fr.:** Jul.-Aug.

Representative collection: Ilam, Jamun-2, Hangetham around, 2170m, 27.04N, 88.02E, June 17, 2007, LKSR-Expedition team, **B 174** (TUCH).

Distribution: Himalaya (Nepal-Bhutan), Nepal (East: 2000-2900m).

2. Agapetis serpens (Wight) Sleumer in *Bot. Jahrb*. **70**: 105 (1939); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 101 (2000).

Pentapterygium serpens (Wight) Klotzsch. in *Linnaea* **24**: 47 (1850).

Pendulous epiphytic shrub, 0.5-1.5m. Leaves leathery, borne in one plane, ovate-lanceolate, 1-1.5x0.5-0.7cm, apex subsessile. Flowers solitary, axillary. Sepals lanceolate, 0.8-1cm, glandular-hairy. Corolla tubular. Berries globose, 10-12mm, sepals persistent.

Habitat: In *Alnus* forest associated with *Mahonia.* **Fl. & Fr.:** Feb.-May.

Representative collection: Ilam, Maimajuwqa-7, Tersegaun, 2770m, 27.07N and 87.94E, June 8, 2007, LKSR-Expedition team, **A 014** (TUCH).

Distribution: Himalaya (Nepal-Arunachal Pradesh), North East India, Nepal (East: 1200-3000m).

2. ENKIANTHUS Lour.

1. Enkianthus deflexusn (Griff.) Schneid. in *III Handb. Laubholzk*. 521 (1911); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 102(2000).

Rhodora deflexa Griff., *Itin. Not*. 148 & 187 (1848).

Shrub or small tree 3-6m. Leaves ovate-elliptic, 3-5x1.5-2.5cm, apex acute to acuminate, base acute.Inflorescence 8-12-flowered. Sepals triangular, 2-3mm. Corolla 8-12x6-10mm, greenish. Capsule globose, 5-7x4-6mm.

Habitat: In *Lithocarpus* forest. **Fl. & Fr.:** May-Jun.

Representative collection: Ilam, Mabu-Kalpokhari, 2970m, 27.04N, 88.01E, June 16, 2007, LKSR-Expedition team, **B 113** (TUCH).

Distribution: Himalaya (Nepal-Bhutan), North East India, North Myanmar Nepal (East: 2500-3300m).

3. GAULTHERIA L.

1. Gaultheria fragrantissima Wall. in *Asiat. Res*. **13**:397 (1820); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 102 (2000) '*Dhasingare'* (घसिंगे्र,).

A stout shrub, 1-2 m high. Leaves 4-11x1.5-4.5cm, alternate, shortly stalked, oblong-lanceolate or oblong-ovate, crenate-serrate, acute, glabrous, Flowers fragrant, numerous. Racemes 2-5 cm long, pubescent. Fruit globose, 0.5 cm in diameter.

Habitat: In open grassland. **Fl. & Fr.:** Feb-Jul.

Representative collection: Ilam, Maimajuwa-7, Hiwakhola, 2480m, $27^0$05'18.6''N, $87^0$55'37.7''E, August 28, 2007, LKSR-Expedition team, **C 051** (TUCH).

Distribution: Himalaya (Nepal-Arunachal Pradesh), North East India, North Myanmar, Nepal (West-East: 1200-2600m).

2. Gaultheria nummularioides D. Don, *Prodr. Fl. Nep*.: 150(1825); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 102 (2000).

Prostrate dwarf shrub with creeping bristly leafy shoots, 5-20cm long. Leaves ovate, acute, margin ciliate, lower surface bristly. Flowers in solitary (upper leaf axil). Capsule black when ripe.

Habitat: In open grassland. **Fl. & Fr.:** Jun-Oct.

Representative collection: Ilam, Maimajuwa-7, Hiwakhola, 1840m, $27^0$05'18.6''N, $87^0$55'37.7''E, August 27, 2007, LKSR-Expedition team, **C 027** (TUCH).

Distribution: Himalaya (Uttar Pradesh-Bhutan), China, North East India, North Myanmar, Nepal (West-East: 2100-4100m).

3. **Gaultheria semi-infera** (C. B. Clarke) Airy Shaw in Kew Bull. **1940**: 317 (1941); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 102 (2000).

Diplycosia semi-infera C. B. Clarke in *Fl. Br. Ind*. **3**: 459 (1825).

Shrubs up to 1.5 m. Leaves ovate-oblong, 4-9 x 1.5-3 cm, apex mucronate, margin serrulate. Racemes 10-18 flowered, capsule subglobose, 3-5 x 2-4 mm surrounded by enlarged, fleshy blue calyx with narrow erect teeth.

Habitat: In moist forest. **Fl. & Fr.:** May - Aug.

Representative collection: Ilam, Jamun-1, Hangetham around, 2470m, $27^0$02'57.3''N, 88^0'00'46''E , September. 6, 2007, LKSR-Expedition team, **C 206** (TUCH).

Distribution: Himalaya (Nepal to Bhutan), North Myanmar, West China, Nepal (East: 2100-3500m).

4. LYONIA Nutt.

1. Lyonia villosa (Hook. f.) Hand.-Mazz. in *Symb. Sin*. **7(4):**789 (1936); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 102(2000) *'Angeri'* (अंगेरी).

Xolisma villosa (Hook. f.) Rehder in *J. Arn. Arb*. 5: 53 (19240).

Similar to *L. ovalifolia* but leaves elliptic to ovate, 4-8x2-4cm, apex acute to rounded, base broadly cuneate to slightly cordate; racemes 2-7cm. Sepals 3-5mm. corolla urn-shaped 5.5-8x4-7mm; anthers witout spurs.
Habitat: In *Rhododendron* forest. **Fl. & Fr.:** Jun.-Aug.
Representative collection: Ilam, Mabu 8, Chatubari, 3390m, 27.10N, 88.00E, June 14, 2007, LKSR-Expedition team, **B 077** (TUCH).
Distribution: Himalaya (Uttar Pradesh-Bhutan), North East India, North Myanmar, West China, Nepal (West- East: 2700-3800m).

5. PIERIS D. Don.

1. Pieris formosa (Wall.) D. Don in *Edinburgh New Philos. J*. **17**: 159(1834); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 102 (2000). *'Balu'* (वलु).

Andromeda formosa Wall. in *As. Research.* 13: 395 (1820).

Small shrub of 1-4m. Leaves elliptic or oblanceolate, 5-12x1.5-3cm, coriaceous, apex acuminate, base cuneate, margins serrulate. Panicles 6-15cm. Sepals triangular, 3-5x1-2mm. Capsule ovoid to globose, seeds 3mm.
Habitat: In *Quercus-Rhododenron* forest. **Fl. & Fr.:** Feb.-Jun.
Representative collection: Ilam, Mabu, Caurichock. 3080m, 27.09N, 88.01E, June 15, 2007, LKSR-Expedition team, **B 106** (TUCH).
Distribution: Himalaya (Nepal-Bhutan), North East India, Myanmar. Nepal (Centre-East: 2000-3300m).

6. RHODODENDRON L.

1. **Rhododendron arboreum** Sm. in *Exot. Bot.* 1: 9, t. 6 (1805); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 102 (2000) '*Laligurans'* (लाली गुरास).

Tree up to 15 cm, Stem puberulous to tomentose. Leaves elliptic-oblanceolate, 7-17 x 2-5 cm, densely matted white tomentose below, petiole 0.5-1.5 cm. 10-20 flowrs in raceme, bright red, pedicel 0.5-1 cm. Stamen 10. Capsule slightly curved.
Habitat: In *Quercus-Lithocarpus* mixed forest. **Fl. & Fr.:** Mar.-Jun.
Representative collection: Ilam, Mabu-Dobate, 2670m, $27^0$04'05.1''N, $87^0$59'28''E, June 7, 2007, LKSR-Expedition team, **C 137** (TUCH).
Distribution: Himalaya (Kashmir-Arunachal Pradesh), China, North East India, Myanmar, Nepal (West-East, 1500-3000m).
* National flower of Nepal.

2. Rhododendron ciliatum Hook. f. in *Rhod. Sik. Him.*:n. 26, t. 24 (1851); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 103 (2000).

Shrub of 0.8-2m; branchlets densely spreading-bristly and scaly. Leaves elliptic, 4-7x2-3cm, acute or rounded mucronate, base rounded, sometimes narrowly, upper surface dark green. Racemes corymbose, 2-5-flowered. Capsules shortly ovoid-oblong, 1.5cm long.
Habitat: In *Quercus-Castanopsis* forest. **Fl. & Fr.:** Apr.-May.
Representative collection: Ilam, Jamun-2, Hangetham around, 2460m, $27^0$00''11.3N, $88^0$01'23.3''E, September 6, 2007, LKSR-Expedition team, **C 215** (TUCH).
Distribution: Himalaya (Nepal-Bhutan), China, Nepal (East: 3600-3900m).

3. Rhododendron cinnabarinum Hook. f. in *Rhod. Sik. Him.*:n. 8, t. 8 (1849); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 103 (2000).

Small tree up to 6 m with scaley branchlets. Leaves elliptic, 6-10 x 2-4 cm, densely scaley beneath, petiole 1-1.5 cm. 2-6 flowers in terminal raceme, orange or orange yellow, pedicel 0.5-1.5 cm. Stamens 10. capsule cylindric.

Habitat: In trial rocky roadside. **Fl. & Fr.:** Jun-Aug.

Representative collection: Ilam, Mabu-8, Chatubari, 3390m, 2701.N, 88.00E, June 14, 2007, LKSR-Expedition team, **B 078** (TUCH).

Distribution:, Himalaya (Nepal to Bhutan), North East India & China, Nepal (East: 3200-3800m)

4. Rhododendron falconeri Hook. f. in *Rhod. Sik. Him.*:n. 11, t.10 (1849); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 103 (2000). '*Chimal'* (चिमल).

Large shrub or trees 5-15m.Branchlets thinly brown tomentose. Leaves broadly elliptic-ovate, 15-35x7-17cm, rounded with small blunt mucro, base rounded, dark green and rugose above. Racemes dense subglobose, 12-16cm diameter. Capsule straight 3.5x1.2cm.

Habitat: In *Lyonia-Betula* mixed forest. **Fl. & Fr.:** Apr.-May.

Representative collection: Ilam, Manbu-Bikhebhanjyang, 3120m, 27.09N, 88.01E, June 14, 2007, LKSR-Expedition team, **B 089** (TUCH).

Distribution: Himalya (Nepal-Arunachal Pradesh) North East India, Nepal (East: 2700-3000m).

5. Rhododendron griffithianum Wight in *Icon. Pl. Ind.* or. **4**: t. 1203 (1850); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 103 (2000).

Shrub or small tree, 2-6m; bark grey, papery. Leaves oblong-elliptic, 9-20x3-7cm, bluntly acute or mucronate, base rounded. Racemes 3-5-flowered, flowers fragrant. Calyx saucer-shaped.Corolla broadly funnel-shaped, 6-8cm. Stamens 13-16; Ovary and style glandular. Capsule stout, 2.5-3.5x1.2-1.7cm.

Habitat: In *Quercus-Lithocarpus* forest. **Fl. & Fr.:** Apr.-May.

Representative collection: Ilam, Mabu-8, Dobate around, 2680m, $27^0$04'N, $87^0$59'E, September. 3, 2007, LKSR-Expedition team, **C 132** (TUCH).

Distribution: Himalaya (Nepal-Arunachal Pradesh), China, Nepal (East: 2100-2500m).

6. **Rhododendron lepidotum** Wall. ex G. Don, *Gen. Syst.* **3**: 845(1834); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 103 (2000).*'Sunpati*'(सुनपती).

Aromatic mat forming subshrub 15-60cm, branchlets scaly. Leaves obovate, oblanceolate or elliptic, 5-15×3-5mm, acute or rounded, base cuneate. Shortly petiolate. Flowers 1-2, terminal pink.

Habitat: In open shruby land. **Fl. & Fr.:** May- Jul.

Representative collection: Ilam, Mabu-8, Catubari, 3390m, 2701.N, 88.00E, June 14, 2007, LKSR-Expedition team, **B 074** (TUCH).

Distribution: Himalaya (Kashmir-Arunachal Pradesh), North Myanmar, West & South China, Nepal (West-East: 2100-4700m).

7. Rhododendron thomsonii Hook. f. in *Rhod. Sik. Him.*:n. 13, t. 12 (1851); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 102 (2000).

Small tree up to 6 m. Leaves elliptic or sub orbicular, 4-9 x 3-6 cm, glabrous beneath. Petiole 1.5-3 cm. 3-8 flowers in raceme, deep crimson, pedicel 1-2cm. Capsule curved.

Habitat: In *Quercus-Castanopsis* forest. **Fl. & Fr.:** Apr.-Sep.

Representative collection: Ilam, Jamun-2, Hangetham around, 2170m, 27.04N, 88.01E, June 7, 2007, LKSR-Expedition team, **B 162** (TUCH).

Distribution: Himalaya (Nepal-Arunachal pradesh), China, Nepal (East: 2900-3800m).

8. Rhododendron vaccniodes Hook. f. in *Rhod. Sik. Him.*: 3(1851); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:104 (2000).

Small bushy shrub 15-80cm. Leaves clustered towards branch-ends, ovate-spathulate, 13-20x5-8mm, rounded or retuse, base attenuate, margins revolute. Flowers tewrminal, solitary or 2-3 in a clusters. Capsule linear, curved 20-25x3-4mm.

Habitat: In *Quercus-Castanopsis* forest. **Fl. & Fr.:** Jun.-Jul.

Representative collection: Ilam, Jamun-2, Hangetham around, 2170m, 27.04N, 88.01E, Sept. 6, 2007, LKSR-Expedition team, **B 162** (TUCH).

Distribution: Hiamalaya (Nepal-Bhutan), North East India, North Myanmar, China, Nepal (East: 2100-3000m).

7. VACCINIUM L.

1. Vaccinium nummularia Hook. f. & Thomson ex C. B. Clarke in *Fl. Brit. India* 3(9): 451 (1882); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:104 (2000).

Epiphytic shrub up to 1 m with bristly hair on young shots. Leaves elliptic, 0.5-1.5 x 0.5-1.0 cm. 8-15 flowrs in raceme, pinkish white. Pedicel 0.4-0.8 cm, filaments hairy. Fruit 3 x 4 mm.

Habitat: In steep grass land. **Fl. & Fr.:** Apr- Jun.

Representative collection: Ilam, Mabu-8, Dobate around, 2340m, $27^0$04'N, $87^0$59'E, September. 3, 2007, LKSR-Expedition team, **C 138** (TUCH).

Distribution: Himalaya (Nepal-Arunachal Pradesh), North East India, North Myanmar, Nepal (Central-East: 2400-4000m).

Family 55. MYRSINACEAE

1. MAESA Forsskal

1. Maesa chisia Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.* 148(1825); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 202 (2000). '*Bilaune'* (बिलाउने).

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

Habitat: Near small streamside. **Fl. & Fr.:** Feb-May.

Representative collection: Ilam, Hangetham-Dobate, 2210m, $27^0$18'45''N, $88^0$01'22''E, June 17, 2007, LKSR-Expedition team, **C 183** (TUCH).

Distibution: Himalaya (Nepal to Bhutan), North East India, North Myanmar, Nepal (West-East: 1200-2600m).

2. MYRSINE L.

1. Myrsine semiserata Wall. in Fl. Ind. (Roxburgh) ed. 2, 2: 293 (1824); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 202 (2000). '*Phalame'*(फलामे).

Shrub of 3m. Leaves thinly coriaceous, narrowly elliptic-lanceolate, 5-12x1.5-5.5cm,acuminate,base cuneate, margins serrulate., apex, with pellucid gland or dots beneath, especially along margins. Flowers 5-15 in axillary fascicles. Drupe reddish globose 4mm.

Habitat: In *Quercus-Castanopsis* forest. **Fl. & Fr.:** Nov.-Apr.

Representative collection: Ilam, Jamun-2, Hangetham around, 2210m, $27^0$02'38''N, $88^0$00'48''E, September 9, 2007, LKSR-Expedition team, **C 229** (TUCH).

Distibution: Himalaya (Pakisthan-Arunachal Pradesh), North East India, North Myanmar, West and Centre China, Nepal (West-East: 1200-2700m)

Family 56. **PRIMULACEAE**

2. PRIMULA L.

1. Primula floribunda Wall. in *Tent. Fl. Nepal*. 43, t. 33 (1836); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 245 (2000).

Softly hairy plant. Leaves ovate to elliptic, coarsely and unequally toothed; leaf stalk winged. Golden-yellow flowers, in usually 2-6 superposed umbels each with 3-6 flowers, borne on a downy flowering stems 5-6cm. Flowers 1cm across; corolla tube long slender, hairy.
Habitat: In *Rhododendron* forest. **Fl. & Fr.:** Apr.-Jul.
Representative collection: Ilam, Jamun-2, Hangetham around, 3200m, 27.09N, 88.01E, June 14, 2007, LKSR-Expedition team, **B 087** (TUCH).
Distibution: Afganistan, Hiamalaya (Kashmir to Bhutan), Nepal (West: 1100m).

2. Primula glomerata Pax; *Pflanzenr*. (Engler) IV-237(ht.22):92(1905); Press *et al.*, *Ann. Check. Fl. Pl. Nep*.: 245(2000).

Semi-evergreen herb. Leaves smaller, narrowly spathulate, 5-10x 1.5-2cm, glabrous or minutely puberlous on margins above or rarely white farinose beneath, peduncle slender, 18-25cm, curved at apex with flower head, lanceolate, 8x2mm, blackish purple; flowers deep purple.
Habitat: In open pastureland. **l. & Fr.:** July-Sep.
Representative collection: Ilam, maimajuwa-Chintapu, 3250m, $27^0$22'10''N, $88^0$02'20''E, August 30, 2007, LKSR-Expedition team, **C 089** (TUCH).
Distibution: Hiamalaya (Nepal-Sikkim), China Nepal (West-East: 3100-5200m).

Family 57. **SYMPLOCACEAE** by D.G. Long

1.SYMOLOCOS Jacquin

1. Symplocos dryophila C. B. Clarke in *Fl. Brit. Ind*. 3(9): 578(1882); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 306 (2000) *'Kharane'* (खराने).

Tree or shrub 3-10m; branchlets stout, glabrous; terminal buds large. Leaves coriaceous, oblanceolate to elliptic, 10-21x3-3.5cm, abruptly acuminate, base cuneate, margin entire or serrulate towards apex. Flowers white or creamy, in simple racemes 4-10cm. Fruit ellipsoid, 1-seeded, smooth.
Habitat: In *Eurya-Rhododendron* forest. **Fl. & Fr.:** Apr.-Jul.
Representative collection: Ilam, Mabu-8, Dobate, 2690m, $27^0$04'19''N, $88^0$00'01E, September 3, 2007, LKSR-Expedition team, **C 156** (TUCH).
Distibution: Himalaya, Thailand, Indo-China**,** Myanmar, Nepal (East: 2000-2600m).

2. Symplocos lucida (Thunberg ex Murray) Siebold & Zucc. in *Fl. Jap.* **1**: 55 (1835); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:307 (2000). '*Kharane'* (खराने).

Evergreen shrub 4-10m, glabrous terminal buds conspicuous, 7-13mm. Leaves thick, elliptic lanceolate, 5-15x2-4.5cm, acuminate, base cuneate. Flowers white or creamy. Calyx lobes rounded 0.8-2mm. Corolla lobes 3-4mm. stamens many. Fruit ellipsoid 10x6mm, 2-seeded.
Habitat: In *Rhododendron* forest. **Fl. & Fr.:** Oct. - Nov.
Representative collection: Ilam, Mabu-8, Kalapokhari, 27.07N, 88.01E, June 16, 2007, LKSR-Expedition team, **B 115** (TUCH).
Distibution: Himalaya, Thailand, Indo-China**,** Myanmar, Indonesia, Japan, Nepal (West-East: 1500-3000m).

3. Symplocos ramosissima Wall ex G.Don in Gen. Syst. 4: 3 (1837); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 307(2000)

Shrub to 5m or small tree 6-10m. Leaves membranous or thinly coriaceous, elliptic lanceolate, 5-12x2-4.5cm, long acuminate, often cordate, base cuneate. Flowers creamy white, on short pedicels. Fruit ovoid-ellipsoid, 7-10x5mm, 1-seeded.

Habitat: In *Quercus-Castanopsis* forest. **Fl. & Fr.:** May-Jul.

Representative collection: Ilam, jogmai-1, Ramite, 27800m, $27^0$00'39''N, $88^0$01'18''E, September 11, 2007, LKSR-Expedition team, **C 232** (TUCH).

Distibution: Himalaya (Uttar Pradesh to Arunachal Pradesh), Myanmar, Indo-China, South West China, Nepal (West-East: 1400-2600m).

Family 58. **OLEACEAE**

1. LIGUSTRUM L.

1. Ligustrum confusum Decne.in *Nouv. Arch. Mus.Paris ser.* 2 **2**: 24 (1879); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 205 (2000). '*Goomgacha'* (गुम्गाचा).

Shrub or small tree. Leaves variable in shape and form, elliptic to elliptic-lanceolate to ovate20-60x11-25mm, apex acuminate. Flowers in ascending panicles. Corolla tube 3-5mm long. Fruit blue-purple, ovoid, 4 -5mm long.

Habitat: In *Rhododendron-Eurya* forest. **Fl. & Fr.:** Apr.-Jul.

Representative collection: Ilam, Jamuna-Jowbari, 2620m, 27.05N, 88.02E, June 18, 2007, LKSR-Expedition team, **B 177** (TUCH).

Distibution: Himalaya (Nepal-Bhutan), North East India, Myanmar, Indo-China, West China, Nepal (West to East: 800-2900m).

Family 59. **GENTIANACEAE**

1. CRAWFURDIA Wall.

1. Crawfurdia speciosa Wall. Tent in *Fl. Nap*. 64, t. 48 (1826); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:115 (2000).

Leaves membranous, glabrous, elliptic to ovate, 3-10x0.5-6cm, acuminate base attenuate or rounded, almost cordate, margins minutely denticulate. Fruit ellipsoid, 20-30x6-10mm; stipe elongated to 20-300mm.

Habitat: In open grassland. **Fl. & Fr.:** Sep.-Nov.

Representative collection: Ilam, Jogmai-Bichitre, 2660m, $27^0$04'07.0''N, $87^0$59'37.9''E, Sept. 12, 2007, LKSR-Expedition team, **C 239** (TUCH).

Distibution: Hiamalaya (Nepal-Bhutan), North East India, Myanmar. Nepal (East: 2500-2900m).

2. SWERTIA L.

1. Swertia bimaculata (Siebold & Zuccarini) C. B. Clarke in *J. Linn. Soc. Bot*. 14: 449 (1875); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 118 (2000). '*Chirata'* (चिराइता).

Ophelia biamculata Siebold & Zuccarini in *Abh. Akad. Wiss Munchen* **4(3)**: 159 (1846)

Annual or biennialherb to 70cm. Stem terete or quadrangular, slightly winged above. Leaves broadly elliptic or ovate, 2.5x12-1-1.5cm, acute or apiculate. Flowers in panicles made up of corymbos. Capsule ellipsoid, 10-15x4-6mm.

Habitat: In rocky moist trial road. **Fl. & Fr.:** Jul.-Oct.

Representative collection: Ilam, Dobate- Hangetham around, 2690m, $27^0$19.8N, $88^0$00'2''E, Sept. 5, 2007, LKSR-Expedition team, **C 188** (TUCH).

Distibution: Himalaya (Nepal-Bhutan), North East India, China, Japan, Nepal (East: 900-2700m),

2. Swertia chirayita (Roxb. ex Fleming) Karsten, *Deutche Fl.* 1025(1883); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:118 (2000). '*Chirata*' (चिराइता).

Gentiana chirayita Roxb. ex Fleming in *As. Res.* **11**:167(1812).

Annual herb 60cm. Leaves glabrous, ovate or elliptic, 2-6×0.5-2cm, sessile. Flowers 4-merous, in numerous small clusters on branches of panicles. Bracts present. Capsule ovoid, 4-9×2.5-3mm.
Habitat: In open grassland. **Fl. & Fr.:** Sep.-Mar.
Distribution: Himalaya (Kashmir-Bhutan), North-East India, Nepal (Centre-East: 1500-2500m).

3. Swertia paniculata Wall., *Pl. As. Rar*. 3:3, t. 205(1832); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 118(2000).

Erect annual herb. Leaves linear-lanccolate, 2-6×0.5-1cm. Flowers 5-merous. Bracts linear, acuminte. Flowers white with purple band. Capsule ellipsoid, 7-13×2-4mm.
Habitat: In moist open grassland. **Fl. & Fr.:** Jul. - Oct.
Representative collection: Ilam, Maimajuwa Chintapu, 2650m, $27^0$05'28.6''N, $87^0$55'29.6''E, August 30, 2007, LKSR-Expedition team, **C 103** (TUCH).
Distribution: Himalaya (Kashmir-Bhutan), North East India, Myanmar, China, Nepal (West-East: 1500-4000m).

4. Swertia nervosa (G. Don) C. B. Clarke in *Fl. Brit. India* **4(10):** 125 (1883); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 118 (2000).

Ophelia nervosa (G. Don) Griseb. in Gen. Sp. Gent. 317 (1838).

Annual to 60cm. Leaves elliptic to lanceolate, 3-5x 0.4-102cm, acute attenuate, almost petioled on basal leaves. Capsule ovoid, 5-7x3.5-4mm.
Habitat: In moist trial road. **Fl. & Fr.:** Aug.-Nov.
Representative collection: Ilam, Mabu-8, Dobate around, 2860m, $27^0$04'N, $87^0$59'E, Sept. 3, 2007, LKSR-Expedition team, **C 154** (TUCH).
Distibution: Himalaya (Himachal Pradesh-Bhutan), North East India, West China, Nepal (West-East: 700-3000m).

3. TRIPTEROSPERMUM Blume

1. Tripterospermum volubile (D. Don) H. Hara, *J. Jap. Bot*. 40:21(1965); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 119 (2000).

Gentaina vulubilis D.Don, *Prodr. Fl. Nep.* 126 (1825).

Twining, Stem terete. Leaves lanccolate to ovate, 2-8×0.5-2.5cm, acuminate, base rounded or cordate, margin denticulate. Fruit an ellipsoid red berry, 17-28×7-15mm.
Habitat: In *Rhododendron* forest. **Fl. & Fr.:** Jun-Nov.
Representative collection: Ilam, Maimajuwa Chintapu, 2650m, $27^0$05'28.6''N, $87^0$55'29.6''E, August 30, 2007, LKSR-Expedition team, **C 087** (TUCH).
Distribution: Himalaya (Nepal-Bhutan), China (Xizang), North Myanmar, Nepal (West-East: 2000-3200m).

Family 60. **ASCLEPIADACEAE**

1. ASCLEPIAS L.

1. Asclepias curassavica L. in *Sp. Pl.*: 215(1753); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 18 (2000).

Small to large herb, sometimes shrubby, 1m tall. Leaves lanceolate to obong-lanceolate, 5-15x0.6-4cm, apex acute, base cuneate, usually glabrouas. Flowers in umbels of 7-12, coroalla orange red. Seeds 6x3.5mm.
Habitat: *Quercus-Lithocarpus* forest. **Fl. & Fr.:** All years round.

Representative collection: Ilam, Jamuna-Jowbari, 2620m, 27.02'N, 88.02'E, June 16, 2007, LKSR-Expedition team, **B 180** (TUCH).
Distibution*:* Tropical America, Nepal (West-East: 700-1500m).

1. Ceropegia pubescens Wall., *Pl. Asiat. Rar.* **2(8)**: 81, t. 187 (1831); Press *et al* in *Ann. Check. Fl. Pl. Nep.*:18(2000).

Climbers, stem glabrous. Leaves ovate, 6.8-7.6×1.7-3cm, apex acuminate, base cordate to rounded, sparsely hispid on both sides. Inflorescence 4-5 flowered. Fruit c6×0.5cm. Seeds ovate-oblong with long coma.
Habitat: In the riverbank. **Fl. & Fr.:** Jul. - Sep.
Representative collection: Ilam, Maimajuwa-7, Sisnekhola around, 2650m, $27^0$04''04.4'N, $87^0$00'59.5''E, August 28, 2007, LKSR-Expedition team, **C 058** (TUCH).
Distribution: North East India, Myanmar, West China, Nepal (Centre-East: 900-2700m).

2. Ceropegia macrantha Weight in *Contr. Brit. Ind.*: 31 (1834); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 18 (2000).

Extensive climber; Stem sparsely to densely puberlous. Leaves ovate-lanceolate, 4 -18x 1.8-8cm. apex acuminate, base cuneate to subcordate. Flowers laegw 3-6cm long. Follicles 11x0.3cm. Seeds linear-oblong, 8x1mm.
Habitat: In shady shrub land. **Fl. & Fr.:** Jun.-Sep.
Representative collection: Ilam, Jamun-1, Hangetham around, 1980m, $27^0$17'01''N, $87^0$58'14.6''E June 7, 2007, LKSR-Expedition team, **C 207** (TUCH).
Distibution*:* Himalaya (Kashmir-Bhutan), North East India. Nepal (Centre-East: 150-500m).

3. **HOYA** R. Br.

1. Hoya linearis Wall ex D. Don in *Prodr. Fl. Nepal.*: 130 (1825); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 19 (2000).

Climber Slender long stemed, Leaves linear-lanceolate in outline, 1.5-5x0.2-0.5cm. Inflorescence a terminal sessile umbel of 4-12 white flowered. Calyx linear lanceolate. Corolla glabrous outside. Follicles slender and straight. Seeds ovate- oblong, 1.5x 0.5-1.3mm.
Habiatat: Found on rocky mountain. **Fl. & Fr.:** Jul. - Oct.
Representative collection: Ilam, Dobate- Hangetham around, 2330m, $27^0$02'44.8''N, $87^0$00'25'E, September. 5, 2007, LKSR-Expedition team, **C 194** (TUCH).
Distibution: Himalaya (Nepal-Arunacahal Pradesh), North-East India, West China, Nepal (East: 1600-1700m).

2. Hoya longifolia Wall. ex Wight in *Contr. Brit. Ind.*: 36 (1834); Press *et al.*, *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 1-3 cm, sparse pubescence below. Flowers in umbel, white. Follicles slender and straight.
Habiat: In open rocky slope. **Fl. & Fr.:** May- Oct.
Representative collection: Ilam, Maimajuwa-Banduke around, 2330m, 27.1N, 87.95E, June 8, 2007, LKSR-Expedition team, **A 046** (TUCH).
Distibution*:* Himalaya (Uttar Pradesh to Bhutan), North East India, Thailand, Nepal (Centre- East: 1400-2300m).

Family 61. **RUBIACEAE**

1. GALIUM L. Mill

1. Galium elegans Wall. ex Roxb. in *Fl. Ind.* (Roxburgh) **1**: 382 (1820) forma **elegans**; Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 201 (2000). '*Lute jhar*'(लुते झार).

Scrambling or trailing perennial herb. Stem weak, to 1m. Leaves in whorl of ±4 sessile, ovate-elliptc, 10-25x6-15mm, shortly and bluntly apiculate, base cuneate or shortly attenuate, 3 veined. Inflorescence a panicle, relatively few flowers creamy or white.
Habitat: In open pastureland. **Fl. & Fr.:** Jul.
Representative collection: Ilam, maimajuwa-7, Banduke, 2830m, 27.1, 88.95E, June 8, 2007, LKSR-Expedition team, **A 047** (TUCH).
Distibution: Himalaya (Kashmir-Bhutan), North East India, Notrh Myanmar, Thailand, West China, China, and Nepal (Centre-East: 1400-3000m).

2. Galium hirtiflorum Req. ex DC. in *Prodr.* **4:** 600 (1830); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 274 (2000).

Scrambling, herb. Leaves in whorls of 4, thin & membranous, linear-elliptic or linear-lanceolate, 8-20×0.5-2mm, apex obtuse, base attenuate, surface hirsute all over. Inflorescence terminal small panicles. Mericarps greyish covered by hooked hairs.
Habitat: In moist rocky trial road. **Fl. & Fr.:** Jun. - Oct.
Representative collection: Ilam, Jamun-2, Hangetham around, 1970m, $27^0$04'17''N, $87^0$57'39''E, August 28, 2007, LKSR-Expedition team, **C 054** (TUCH).
Distribution: Himalaya (Kashmir-Sikkim), Nepal (Centre-East: 1200-2200m)

2. LUCULIA Sweet

1. Luculia gratissima (Wall.) Sweet in *Brit. Fl. Gard*. **2**: t. 145 (1826); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 276 (2000). *'Ban Kangiyo'* (वन काँगीयो).

Cinchona gratisima Wall. in Roxb., *Fl. Ind*. 2:154 (1824).

Shrub.up to 3m, Leaves petioled, stipulate, elliptic lanceolate 5-16cm x 1.5-8cm. Inflorescence terminal many flowered corymb. Flowers 2cm across, pink or white. Capsule ovoid, 1-1.4cm long, pubescent.
Habitat: In open grassland. **Fl. & Fr.:** Jan.-Mar.
Representative collection: Ilam, Maimajuwa-7, Sisne, 1840m, $27^0$04'05''N, $87^0$57'29''E, August 28, 2007, LKSR-Expedition team, **C 066** (TUCH).
Distibution: Himalaya (Asam-Nepal), China, Nepal (Western-Eastern: 1000-2100m).

3. NEANOTIS

1. Neanotis gracilis (Hook.f.) W. H. Lewis in Ann. Missouri. Bot. Gard. 53: 38 (1966); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 277 (2000).

Anotis gracilis Hook. f. in *Fl. Br. Ind*. **3**: 71 (1880).

Diffuse very slender perennial herb. Leaves laceolate or ovate-lanceolate,1-1.5x0.5-1.5cm, acuminate or acute, base cuneate. Flower in terminal or lateral cymes. Calyx lobe ovate lanceolate. Corolla white.Anthers excreted from corolla tube.Style stigmatic
Habitat: Near cultivated field. **Fl. & Fr.:** May-Nov.
Representative collection: Ilam, Maimajuwa-7, Ratopanikhola, 1840m, $27^0$04'15''N, $87^0$57'29''E, August 27, 2007, LKSR-Expedition team, **C 043** (TUCH).
Distibution: Himalaya (Nepal-Bhutan), North East India. Nepal (Centre-East: 1500-2000m).

4. HYMENOPOGON Bennet

1. Hymenopogon paraciticus Wall. in *Fl. Ind.* (Roxb.) ed. 2, 2: 157 (1824); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 275 (2000).

Deciduous shrub 0.5-1.5cm; Stem arching, pubescent. Leaves elliptic oblanceolate or obovate, 1-2.5x0.5-1cm, apex shortly acuminate, base attenuate, margin entire. Corymbs 10-125 flowers. Calyx tubular. Corolla white, slender. Capsule ellipsoid, 12-20x6-8mm,

Habitat: In *Lithocarpus-Quercus* forest. **Fl. & Fr.:** Jun.-Aug.

Representative collection: Ilam, Maimajuwa-7, Naulegaun, 1840m, $27^0$04'15''N, $87^0$57'29''E, August 27, 2007, LKSR-Expedition team, **C 010** (TUCH).

Distibution: Himalaya (Uttar Pradesh-Bhutan), Myanmar, Indo-China, Nepal (West-East: 1600-2800m).

5. RUBIA L.

1. Rubia manjith Roxb. ex Fleming in *Asiat. Res*. **11**: 177 (1810); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 278 (2000). '*Manjit'* (मन्जीट).

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

Habitat: In rocky trial road. **Fl. & Fr.:** Jun.- Oct.

Representative collection: Ilam, Mabu-8, Dobate around, 2210m, $27^0$02'38''N, $80^0$00'59'E, September 3, 2007, LKSR-Expedition team, **C 142** (TUCH).

Distribution: Himalaya (Himachal Pradesh-Bhutan), North East India (Meghalaya), Nepal (Centre-East: 1200-2100m).

Family 62. **BORAGINACEAE**

1. HACKELIA Opiz

1. Hackelia uncinata (Benth. in Royle) C. E. C. Fisch. in *Kew Bull.;* **1932**: 298 (1932); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 30 (2000).

Cynoglossum uncinatum Royle ex Benth. in *Royle III. B. Him.* 305 (1836).

An erect herb up to 70 cm, 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 4 mm.

Habitat: In rocky grassland. **Fl. & Fr.:** Jun.- Jul.

Representative collection: Ilam, Mabu, Near Maikhola, 3060m, 27.08N and 88.01E, June 15, 2007, LKSR-Expedition team, **B 098** (TUCH).

Distibution: Himalaya (Kashmir-Bhutan), North East India, China, Nepal (West-East: 2700-4200).

Family 63. **LAMIACEAE** by R.A. Clement

1. AJUGA L.

1. Ajuga lobata D.Don in *Prodr. Fl. Nepal*.: 108 (1825); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 151 (2000).

Low creeping herb. Leaves broadly ovate to suborbicular, 1.5-3.5x1.2-3.5cm, apex usually obtuse, base cordate.Inflorescence verticillasters. Calyx 0.5-1cm, teeth.Corolla bluish purple.

Habitat: Underside of a rock. **Fl. & Fr.:** Apr.-Aug.

Representative collection: Ilam, Maimajuwa-7, Charkhol, 2410m, 27.08N, 87.94E, June 7, 2007, LKSR-Expedition team, **A 020** (TUCH).

Distibution: Hiamalaya (Nepal-Bhutan), India, Myanmar, China. Nepal (Centre-East: 1500-3100m).

2. CLINOPODIUM L.

1. Clinopodium umbrosum (M. Bieb.) C. Koch in *Linnea.* 21:673(1848); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 152 (2000).

Melissa umbrosa M. Bieb., *Fl. Taler.-Caw*. 2:63(1808).

Ascending herb about 30cm. Leaves ovate, 1.5-4.5×0.5-3cm, acute, base rounded to broadly cunneate, margin serrate, sparsely pilose. Petioles 3-12mm. Nutlets ellipsoid.
Habitat: In a trial road. **Fl. & Fr.:** May-Sep.
Representative collection: Ilam, Maimajuwa-7, Sisne, 2460m, $27^0$02'57''N, $88^0$00'46''E, August 28, 2007, LKSR-Expedition team, **C 068** (TUCH).
Distribution: Iran, Afghanistan, China, Pakistan, Himalaya (Kashmir to Bhutan), India, Burma, Ceylon, Tibet, China, Taiwan, Malaysia, Nepal (West-East: 180-3400m).

3. ELSHOLTZIA Willd.

1. Elsholtizia flava (Benth.) Benth., *Lab. Gen. Sp*. 161(1833); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 153 (2000).

Aphanochilus flavus Benth. in Wall, *Pl. As. Rar*. 1:28, t. 34(1830).

Aromatic small shrub about up to 1m. Leaves broadly ovate to ovate-oblong, 6-9×3-4cm, acuminate, base cuneate, rounded or subcordate, margins crenate-serrate, pubescent on main veins, lower surface with sessile glands. Nutlets ellipsoid.
Habitat: In *Quercus-Lithocarpus* forest. **Fl. & Fr.:** Sep.-Oct.
Representative collection: Ilam, Mabu-8, Dobate around, 2680m, $27^0$04'N, $87^0$59'E, September 1, 2007, LKSR-Expedition team, **C 113** (TUCH).
Distribution: Himalaya (Uttar Pradesh-Sikkim), North East India, China, Nepal (Centre-East: 1900-2700m).

4. PHLOMIS L.

1. Pholomis macrophylla Wall ex Benth in *Pl. Asiat. Rar.* **1(3):** 62 (1830); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 322 (2000).

Stout herb of 1-2m. Leaves ovate, 10-16x5-10.5cm, acuminate, base cordate to truncate, margin crenate-serrate, upper surface sparsely villous; Verticillaster in axil of upper leaves. Bracts linear lanceolate, pink or red. Nutlets ± oblong-ovoid, 4.5x2.5mm.
Habitat: In *Rhododendron Daphne* mixed forest. **Fl. & Fr.:** Jul.-Aug.
Representative collection: Ilam, Mabu-Kalapokhari, 3050m, 27.07N, 88.01E, June 16, 2007, LKSR-Expedition team, **B 107** (TUCH).
Distibution: Punjab, Himalaya (Uttar Pradesh-Bhutan), India, Nepal (Centre-East: 3100-4100m).

5. PRUNELLA L.

1. Prunella vulgaris L., *Sp. Pl.* 600 (1753); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 158 (2000).

Herb with creeping rhizome. Stem about 25cm, pilose. Leaves ovate to ovate-oblong, 1.5-4×0.5-2cm, acute, base rounded, margin entire to obscurely serrate, both surfaces pilose. Petiole 0.5-1.5cm. Flowers spike. Nutlets obovoid, scar small.
Habitat: In *Daphne-Lyonia* Forest. **Fl. & Fr.:** May-Aug.
Representative collection: Ilam, Mabu-Kalapokhari, 3050m, 27.07N and 88.01E, June 16, 2007, LKSR-Expedition team, **B 111** (TUCH).
Distribution: Europe and Temperate Asia, Nepal (West-East: 1200-3800m).

6. SCUTELLARIA R. V. ex L. in *Syst. ed.* 1(1735)

1. Scutellaria violacea Heyne ex Benth. in *Pl. Asiat. Rar.* **1(4)**: 66 (1830); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:159 (2000).

Decumbent herb. Stem upto 68cm.Leaves distributed along stem, ovate to ovate-ellptic, 2.1-6x1.7-3.6cm, acute or obtuse, base rounded to cordate. Verticillaster arranged in lax spike. Calyx 2.5-3 mm. Nutlets ± ellipsoidm, 1.4-0.9mm.

Habitat: In open pastureland. **Fl. & Fr.:** Jul.-Aug.

Representative collection: Ilam, Jamun-2, Hangetham around, 2470m, $27^0$02'57''N, $88^0$00'46E, September 6, 2007, LKSR-Expedition team, **C 214** (TUCH).

Distibution: Himalaya (Nepal to Bhutan), India, Srilanka, Nepal (East: 1400-1800m).

Family 64. **SOLANACEAE**

1. **CESTRUM** L**.**

1. Cestrum elegans (Brong ex Neumann) Schlechtendal in *Linnaea* **19**: 261 (1846); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 302 (2000).

Harbrothamnus elegans Brong ex Neumann in *Linnaea* **19**: 261 (1846).

Shrub 1.5-3.5m. Leaves elliptic or lanceolate-elliptic, 3-10x1.3-4.5cm, shortly acuminate. Inflorescence corymbose, appearing terminal, Flowers pink or pinkish purple; Berry reddish purple, obovoid, 10-12x6-8mm.

Habitat: Near cultivated land. **Fl. & Fr.:** Dec.- Mar.

Representative collection: Ilam, Jogmai-Kholagaun, 2210m, 26.99N, 88.01E, June 18, 2007, LKSR-Expedition team, **B 196** (TUCH).

Distibution: Himalaya (Nepal to Bhutan), North East India. Nepal (Centre-East: 450-1800m).

Family 65**. SCROPHULARIACEAE**

1. CALCEOLARIA L.

1. Calceolaria gracilis Kunth in *Nov. Gen. Sp. [Kunth*] **2:** 339 (1818); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 292 (2000).

Erect to decumbent herb up to 60 cm, sparsely short glandular, pilose. Leaves petiolate, 2-4 cm, broadly ovate, 3-10 x 2-7 cm. Terminal flowers with deep yellow. Corolla deep yellow. Capsule broadly conical or subglobose, 0.5-1 cm.

Habitat: In *Quercus-Rhododendron* forest. **Fl. & Fr.:** Apr.- Nov.

Representative collection: Ilam, Jamun-2, Hangetham around, 22400m, 27.04N, 88.01E, June 7, 2007, LKSR-Expedition team, **B 160** (TUCH).

Distibution: Nepal (West-East: 1500-2600m), Mexico, Naturalised in Nepal, India & Malayasia.

2. MIMULUS Adanson

1. Mimulus tenellus var**. nepalensis** (Benth) Tsoong ex Yang, Fl. Reipubl. Popularis Sin. 67(2): 171 (1979); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 295 (2000).

Dffusely branched perennial herb up to 25 cm. Leaves shortly petiolate, 0.1-0.5 cm, lamina ovate or ovate-oblong, 0.5-2.0 x 0.5-1.0 cm. Flowers solitary, axillary, and yellow.

Habitat: In moist places. **Fl. & Fr.:** Mar.-Sep.

Representative collection: Ilam, Maimajuwa-7,Ratekhola, 1840m, $27^0$04'02''N, $87^0$56'22''E, August 27, 2007, LKSR-Expedition team, **C 016** (TUCH).

Distibution: Himalaya (Nepal-Bhutan), North East India, West and Central China, Nepal (Centre-East: 1100-2300m).

3. PEDICULARIS L.

1. Pedicularis furfuracea Wall ex Benth. in *Scroph. Ind.*: 54 (1835); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 296 (2000).

Perennial herb up to 60 cm. Radical leaves small and withering. Cauline leaves alternate, pilose on upper surface, lamina ovate or ovate triangular, 2-7 x 1-5 cm, pinnatified, oblong-ovate, serrate. Flowers solitary, axillary, pale purplish to pink. Capsule lanceolate.
Habitat: Small stream side. **Fl. & Fr.:** Jun-Aug.
Representative collection: Ilam, Mabu, Near Maikhola, 2170m, 27.08N, 88.01E, June 15, 2007, LKSR-Expedition team, **B 100** (TUCH).
Distibution: Himalaya (Nepal-Bhutan) North East India, Nepal (Centre-East: 2800-2400m).

2. Pedicularis penneliana P.C. Tsoong in Acta Phytotax. Sin. 3: 307 (1955); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 298 (2000).

Herb. Stem slender branched, with small opposite and whorled stem-leaves, and with lax clusters of pink-purple flowers, or flowers axillary. Upper lip of corolla sickle-shaped, swollen in the middle and with a long almost straight beak. Flower 1-1.5cm.
Habitat: In open pastureland. **Fl. & Fr.:** Jun.-Sep.
Representative collection: Ilam, Maimajuwa-7, Chintapu, 3170m, $27^0$05’22’’N, $87^0$54’47’’E, August 30, 2007, LKSR-Expedition team, **C 094** (TUCH).
Distibution: Himalaya (Bashar-Bhutan), Myanmar, West China, Nepal (West-East: 2600-3800m).

4. SCROPHULARIA L.

1. Scrophularia urticifolia Wall. ex Benth in *Scroph. Ind.*: 18 (1835); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 299 (2000).

Stem 60-90cm. Leaves ovate 3.5-9.5x 2.5-6cm, acute. Inflorescence a terminal panicles, usually leafless above, with several pairs of cymes arising from axils of floral leaves below. Capsule ovoid to sub-globose.
Habitat: In moist trial roadside. **Fl. & Fr.:** May-Aug.
Representative collection: Ilam, Mabu, Kalapokhari, 2780m, 27.07N, 88.01E, June 16, 2007, LKSR-Expedition team, **B 125** (TUCH).
Distibution: Himalaya (Nepal-Bhutan), Nepal (West-East: 1800-2800m)

5. TORENIA L.

1. Torenia diffusa D. Don. in *Prodr. Fl. Nepal.*: 86 (1825); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 300 (2000).

Weak sprawling or creping branched annual. Stems 20-60cm, sharply quadrangular, sparsely short or almost glabrous. Flowers axillary usually solitary. Capsule 1cm, ellipsoid.
Habitat: In open grassland. **Fl. & Fr.:** May-Sep.
Representative collection: Ilam, Maimajuwa-7, Naulegaun, 1840m, $27^0$04’15’’N, $87^0$57’29’’E, August 27, 2007, LKSR-Expedition team, **C 013** (TUCH).
Distibution: Himalaya, Indo-China, South West China, Nepal (Centre: 1400-1500m).

6. VERONICA L.

1. Veronica deltigera Wall ex Benth.in *Scroph. Ind.*:45 (1835); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:300 (2000).

Perennial herb up to 30cm. Leaves opposite, sessile, lamina ovate, ovate-oblong or lanceolate-oblong, 1-4.5x0.5-2.5cm.Raceme terminal. Seeds ovoid, convex, 0.8-1mm, golden-yellow.
Habitat: Along a trial road. **Fl. & Fr.:** Jun.-Aug.

Representative collection: Ilam, Mabu, Bikhebhanjyang, 3270m, 27.09N, 88.01E, June 14, 2007, LKSR-Expedition team, **B 079** (TUCH).
Distibution: Himalaya (Nepal-Sikkim), Nepal (West-East: 2100-2400m).

2. Veronica szechuanensis subsp. **sikkimensis** (Hook. f.) Hong in Tsoong & Hong in *Fl. Reipubl. Popularis Sin*. **67(2):** 304 (1779); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 300 (2000

Perennial herb up to 25 cm, shortly pubescent or villosus. Leaves opposite, 3-4 pairs, petiole 0.2-0.5 cm, ovate 0.5-2.5 x 0.4-2.0 cm. Inflorescence umbel like. Flower pale blue. Capsule obcordate, 5 x 6.5 mm.
Habitat: In an open pasture land. **Fl. & Fr.:** May-Aug.
Representative collection: Ilam, Maimajuwa-7, Naulegaun, 3340m, 27.09'N, 87.98E, June 14, 2007, LKSR-Expedition team, **C 016** (TUCH).
Distibution: Himalaya (Uttar Pradesh to Bhutan), China, Nepal (West-East: 3600-4500m).

Family 66. **ACANTHACEAE** J.R.I. Wood

1. **STROBILANTHES** Blume

1. Strobilanthes helicta T.Anders. in *Journ. Linn. Soc. Bot.* 9: 479. 1867

Pteracanthus calycinus (Nees) Bremekamp; Wood in *Fl. Bhu.* **2**(3): 1272(2001).

Monocarpic under shrub of 0.5-1m. Stem usually erect. Leaves nearly equal, elliptic 5-12x 1-5cm, acuminate at both ends, serrate. Flowers usually solitary, 0.5-1cm apart in 1 sided.Calyx 1cm-2.5cm, glabrous. Corolla white or flushed pale purple. Capsule 1.8-2cm.
Habitat: On moist Lithocarpus-Rhododendron forest. **Fl. & Fr.:** Sept-Oct. in 12 years cycles.
Representative collection: Ilam, Jamun-2, Hangetham, Mabu-8, Dobate around, 2650m, 27^0 04'N, 87^0 59'E, Sept. 5, 2007, LKSR-Expedition team, **B 191** (TUCH).
New addition to flora of Nepal.

2. **THUNBERGIA** Retz., nom. Cons.

1. Thunbergia coccinea Wall. ex D. Don, *Prodr. Fl. Nep.*: 120(1825); Press *et al.*, *Ann. Check. Fl. Pl. Nep.* 5(2000).

Climber. Leaves petioled, elliptic, truncate or cordate, acuminate. Flowers in long drooping racemes, 2.5-3cm x 2.5cm, bract sub persistent, red.Flo0wers orange red. Capsule 4cm, glabrous, seeds flattened.
Habitat: On moist Lithocarpus-Rhododendron forest. **Fl. & Fr.:** Dec-Jan.
Distibution*:* Himalaya (Uttar Pradesh-Bhutan), North East India, Myanmar, West. China, Nepal (West-East: 300-2000m).

2. HYPOESTIS Sol. ex R. Br.

1. Hypoestis triflora (Forssk.) Roem. & Schult. in *Syst. Veg*. **1**: 141 (1817); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 2 (2000); Wood in *Fl. Bhu.* **2**(3): 1293(2001).

Justisia triflora Frossk., *Fl. Aegypt.- Arab*. 4 (1775).

Much branched decumbent or asending herb. Leaves ovate, 1-6x0.7-4cm, acute, broadly cuneate at base. Spirally pilose on both sides. Flowers in small axillary and terminal clusters, with 1-5 flowers. Capsule clavate, glabrous but with few hairs at tip 0.9-1cm.
Representative collection: Ilam, maimajuwa, Thlogaun, 1820m, $27.03^0$52'N $87^0$38'E, August27, 2007, LKSR-Expedition team, **C 009** (TUCH).
Habitat: In *Rhododenron* forest **Fl. & Fr.:** Sept.-Nov.
Distibution: Nepal (West to East: 1200-2600m), Himalaya (Nepal-Bhutan), West China

Family 67. **GESNERIACEAE**

1. AESCHYNANTHUS Jack

1. Aeschynanthus hookeri C.B. Clarke in Monogr. Phan. 5: 21 (1883); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 120 (2000).

Shrub laxly branched up to 1 m, slender, pendent. Leaves opposite, fleshy. Elliptic, 6-12 x 1.5-2.5 cm. Peduncle terminal with many flower, bright scrlet or orange scarlet, throat yello. Capsule long-linear. Fruit 30cm long. Seed 2mm.
Habitat: In *Rhododenron-Lyonia* forest. **Fl. & Fr.:** May - Oct.
Representative collection: Ilam, Jamun-Jowbari. 2780m, 27.00N, 88.02E, June 18, 2007, LKSR-Expedition team, **B 186** (TUCH).
Distibution: Himalaya (Nepal-Bhutan), North East India, Myanmar, Nepal (East: 1600-2700m).

2. Aeschynanthus parviflorus (D.Don) Spren. in *Syst. Veg. ed*. 16 4(1): 238 (1827); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 322 (2000).

Trichosporum parviflorum D.Don in *Edinb. Philos. J*. 7:85 (1822)

Shrub up to 1m, Stem spreading, laxly branched. Leaves opposite, fleshy, elliptic, 5-10x1.5-4.5cm, long-acuminate, base cuneate, margins entire. Flowers several, clustered at tip. Calyx light orange yellow. Fruit 10-20cm long.
Habitat: In *Alnus nepalensis* forest. **Fl. & Fr.:** Jul.-Aug.
Representative collection: Ilam, Jamun-2, Hangetham around, 2170m, 27.04N and 87.59E, September 5, 2007, LKSR-Expedition team, **C 187** (TUCH).
Distibution: Himalaya (Uttar Pradesh to Sikkim), China, Nepal (West-Centre: 1200-1600m).

2. CHIRITA D. Don

1. Chirita macrophylla Wall. in *Pl. Asiat. Rar*. **1(3):** 56, t. 72 (1830); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:120 (2000).

Perennial herb with small rhizome, aerial stem 7-25cm long. Leaves 1-2 radicle, ovate, 6-18x3.5-12cm, acute, base rounded or cordate. Inflorescence terminal 1-few flowered. Calyx deeply divided. Corolla minutely puberlous.Anthers bearded. Ovary and style puberlous.
Habitat: Lithophytic in rock. **Fl. & Fr.:** May-Aug.
Representative collection: Ilam, Ratokhola-maimajuwa, 1840m, $27^0$04’02’’N, $87^0$56’22’’01E, August 27, 2007, LKSR-Expedition team, **C 042** (TUCH).
Distibution:, Himalaya (Nepal to Arunachal Pradesh), Myanmar, Thailand, West China. Nepal (Centre-East: 1500-2400m).

3. DIDYMOCARPUS Wall.

1. Didymocarpus albicalyx C. B. Clarke in DC., *Monogr. Phan*. 5:78(1883); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 121 (2000). ‘Kumkum’ (कुमकुम).

Herbs about 13cm. Leaves broadly elliptic to ovate, opposite unequal, 3-6×1.5-4.5cm, apex acute to obtuse, base rounded, margin serrate, hairy. Petioles 1-3cm. Flowers many in cymes. Bracts ovate. Fruit a capsule.
Habitat: In moist places. **Fl. & Fr.:** Jun.-Sep.
Representative collection: Ilam, Maimajuwa-7, Uvichock, 2750m, 27.01N and 87.93E, June 7, 2007, LKSR-Expedition team, **A 018** (TUCH).
Distribution: Himalaya (Nepal-Bhutan), Nepal (East: 1200-1800m).

2. Didymocarpus aromaticus Wall. ex D.Don in *Prodr. Fl. Nepal*.: 123 (1825). Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 121 (2000). ‘*Kumkum’* (कुमकुम).

Herb of 10-30cm, Leaves distant and alternate on lower part of stem, broadly ovate to elliptic, 2-6.7x1.5-5.5cm, apex acute. Cymes 3.5-5.5cm long. Capsule sessile.
Habitat: In rocky moist places. **Fl. & Fr.:** Jun.-Sep.
Representative collection: Ilam, Maimajuwa-7, Chintapu, 2650m, $27^0$05'28N, $87^0$585'29''E, August 30, 2007, LKSR-Expedition team, **C 088** (TUCH).
Distribution: Himalaya (Uttar Pradesh to Sikkim), Nepal (West-East: 1600-3000m).

3. Didymocarpus villosus D. Don, *Prodr. Fl. Nepal.* 123(1825), Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 121 (2000).

Herb. Stem to 9 cm. Leaves crowded near stem apex, elliptic to rhombic, ovate, or obovate, 2.5-7.2 X 2-5 cm, herbaceous to papery, densely villous apex acute to rounded; lateral veins 3 or 4 on each side of midrib. Cymes 2-5-flowered. Capsule 1.4-2 cm.
Habitat: In moist stream rock. **Fl. & Fr.:** Jun.-Jul.
Representative collection: Ilam, Jamun-2, Hangetham around, 2340m, $27^0$02'44''4N and $88^0$00'25''E, Sept. 6, 2007, LKSR-Expedition team, **C 203** (TUCH).
Distribution: Himalaya (Nepal-Bhutan), Nepal (Centre-East, 900-2400m).

Family 68. **CAPRIFOLIACEAE**

1. LONICERA L.

1. Lonicera webbiana Wall ex DC. in *Prodr.* **4**: 336 (1830); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 39(2000).

Shrub of 4m. Leaves broadly lanceolate, 6-11x2-3.5cm, hairs especially at nodes, lanceolate, acuminate. Flowers zygomorphic. Fruit red, free. 6-9mm.
Habitat: In moist forest. **Fl. & Fr.:** Apr. **-** Jun.
Representative collection: Ilam, Dobate-Hangetham around, 2660m, $27^0$04'07.0''N and $87^0$59'37.6''E, Sept. 5, 2007, LKSR-Expedition team, **C 197** (TUCH).
Distribution: Afghanistan, Himalaya (Kashmir-Bhutan), Myanmar, China. Nepal (East: 2600-4300m).

2. SAMBUCUS L.

1. Sambucus adanta Wall. ex DC.in *Prodr.* 4: 322 (1830); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 284 (2000).

Shruby herb, 0.3-1.5m, Leaves (12-) 15-30cm, with 1-4 pairs of leaflets, upper 1-2 pairs conate with rachis. Corymbs ± umbelliform, broad. Berry globose, 4x3mm, black.
Habiat: in trial road. **Fl. & Fr.:** Jun.-Oct.
Representative collection: Ilam, Dobate-Hangetham around, 2670m, $27^0$04'05.1''N, $87^0$59'28.9''E, September. 3, 2007, LKSR-Expedition team, **C 197** (TUCH).
Distribution: Himalaya (Nepal-Bhutan). Nepal (West-East: 2000-3700m).

3. VIBURNUM L.

1. Viburnum cylindricum Buch.-Ham. ex Don in *Prodr. Fl. Nepal.*: 142 (1825); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 284 (2000).

Evergreen shrub, 2-6m. Leaves narrowly oblong-elliptic, 7.5-18x2.7-6.2cm, shortly acuminate, base cuneate,± entire to obscurely toothed. Flowers in umbelliform coryms. Drupe oblong to round, black, 4-5x3.5-4mm.
Habitat: Near rocky open shrubyland. **Fl. & Fr.:** Jul.-Aug.
Representative collection: Ilam, Maimajuwa-Manedanda, 2180m, $27^0$04'33.1''N, $87^0$56'37''E, September. 3, 2007, LKSR-Expedition team, **C 019** (TUCH).
Distribution: Himalaya (Uttar Pradesh-Arunachal Pradesh), India, Srilanka, Myanmar, Thailand, Indo-China, Malayasia, Nepal (West-East: 1200-2500m).

2. Viburnum erubescens Wall. ex DC. in *Prodr.* **4**: 329(1830); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 284 (2000); '**Asare** (असारे).

Deciduous shrub about 3m. Leaves elliptic to narrowly oblong-elliptic, 4-10×2-4.5cm, acute, base cuneate, serrulate. Flowers in corymbs. Drupe ellipsoid, purplish black, 6.5-9×5-6mm.

Habitat: Near cultivated land. **Fl. & Fr.:** Apr.-May.

Representative collection: Ilam, Maimajuwa-Tersegaun, 2180m, $27^0$04'33.1''N, $87^0$56'37''E, June 7, 2007, LKSR-Expedition team, B 005 (TUCH).

Distribution: Himalaya (Uttar Pradesh to Arunchal Pradesh), North East India, North Myanmar, West and Central China, Nepal (West-East: 1500-3000m).

3. Viburnum mullaha Buch.-Ham. ex D. Don, *Prodr. Fl. Nep.* 141(1825); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 284 (2000).

Deciduous tree about 3m. Leaves ovate, 4-7×2-3.5cm, long acuminate, base cuneate to truncate serrate, sparsely hairy on both surface. Flowers in umbelliform sessile or corymbs. Drupe globose, black, 7.5×7.5mm.

Habitat: Associated *Rhodendron* sp **Fl. & Fr.:** Jul.-Sep.

Representative collection: Ilam, Mabu-Bikhe Bhyanjyang., 3120m, 27.09N, 88.01E, June 14, 2007, LKSR-Expedition team, **B 088** (TUCH).

Distribution: Himalaya (Kashmir to Arunchal Pradesh), North East India, Indo-China, Nepal (West to East: 1800-2700m),

4. Viburnum nervosum D. Don in *Prodr. Fl. Nepal.*: 141 (1825); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 284(2000).

Deciduous shrub, 2-6m. Leaves ovate, 4.6-12.5x2.3-6.8cm, shortly acuminate, base cordate to truncate. Flowers in sessile corymbs. Calyx lobed. Corolla roatate. Drupe ellipsoid, purplish 7-9x4-5mm.

Habitat: In Rhodendron forest **Fl. & Fr.:** Apr.-May.

Representative collection: Ilam, Maikhola-Chauri- Chock, 3120m, 27.08N, 88.01E, June 15, 2007, LKSR-Expedition team, **B 101** (TUCH).

Distribution: Himalaya (Uttar Pradesh-Bhutan), North East India, North Myanmar, West China, Nepal (West-East: 2600-3500m),

Family 69. **VALERIANACEAE**

1. VALERIANA L.

1. Valeriana hardwickii Wall. in Roxb., *Fl. Ind.* **1**: 166(1826); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 323 (2000).

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.

Habitat: In moist shady forest. **Fl. & Fr.:** Jul.-Sep.

Representative collection: Ilam, Jamuna-2, Hangetham, 2340m, 27.04N, 88.01E, June 14, 2007, LKSR-Expedition team, **A 063** (TUCH).

Distibution: Himalaya (Kashmir to Bhutan), North East India, North Myanmar, West China, Nepal (West-East: 1200-4000m).

Family 70. **CAMPANULACEAE**

1. CAMPANULA L.

1. Campanula palida Wall. in *Asiat. Res.* **13**: 375 (1820); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 33 (2000).

Small hirsute herb.Leaves sessile, elliptic (8-) 12-37 (-50)x 2-16mm. Flowers 1-2 in apex. Calyx as long as corolla. Corolla campanulate. Capsule obovate to subglobose, 3-5x4-7mm.
Habitat: Open grass land. **Fl. & Fr.:** Jun.-Sep.
Representative collection: Ilam, Maimajuw-7, Chintapu, 3170m, 27^0 05'21.2''N, $87^0$54'47.3''E, August 30, 2007, LKSR-Expedition team, **C 092** (TUCH).
Distibution: Himalaya, Afganisthan, India, Myanmar, Indo-China. West China, Nepal (West-East: 1000-4500m).

2. CODONOPSIS Wall.

1. Codonopsis bhutanica Ludlow in *J. Roy. Hort. Soc. London* **97**: 127, t. 64 & f. 1 (1972); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 34 (2000).

Perennial erect herb with thick fleshy tap root. Leaves ovate, 0.7-2.3x0.5-2.3cm, base cordate to truncate. Flowers, deep reddish or pale-purple ring at mouth. Fruit 1.5-2cm, hemispherical with beak 0.5-0.8cm.
Habitat: In the side of trial road**.** **Fl. & Fr.:** Jul.-Aug.
Representative collection: Ilam, Maimajuw-Mabu, 2660m, 27^0 04'05.1''N, $87^0$59'28''E, September 1, 2007, LKSR-Expedition team, **C 107** (TUCH).
Distibution: Himalaya (Nepal-Bhutan), Nepal (Centre: 5600m).

2. Codonopsis viridis Wall. in. *Fl. Ind*. (Roxburgh) ed. 2, **2**: 103 (1824); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 34(2000).

A twining herb. Leaves ovate, 2.5-5.5 x 1.5-3.5 cm, pubescent-tomentose below, entire. Flowers cream to greenish yellow. Fruit 2 cm, hemispherical, with 0.7 mm beak.
Habitat: In open shrubby grassland. **Fl. & Fr.:** Aug.-Oct.
Representative collection: Ilam, Maimajuw-7, Manedanda, 3170m, 27^0 04'33'', $87^0$56'37''E, August 27, 2007, LKSR-Expedition team, **C 024** (TUCH).
Distibution: Nepal (West-East: 1200-3000m), Himalaya (Uttar Pradesh-Bhutan) North East India

3. **LOBELIA** L.

1. Lobelia nummularia Lam., *Encycl. Meth. B*. 3: 589 (1791-92); Press *et al.*in *Ann. Check. Fl. Pl. Nep.*: 36 (2000); Clement in *Fl. Bhu.* **2**(3): 1395(2001).

Pubescent herb. Stems creeping, up to 30cm long, rooting at nodes. Leaves ovate, 0.8-1.5 x 0.7-1.4cm, base truncate to cordate, margin serrulate; petiole2-7mm. Berry elliptic to globose. C 9 x 6-8mm, purple.
Habitat: In open pastureland. **Fl. & Fr.:** Aug.-Sep.
Representative collection: Ilam, Jogmai-Ramite, 2280m, 27^0 00'39.02''N, $88^0$01'18''E, August 30, 2007, LKSR-Expedition team, **C 235** (TUCH).
Distibution: Himalaya, North East India, Bhutan, Myanmar to East Chna. Nepal (West-East: 1000-2400m).

2. **Lobelia pyramidalis** Wall. in *Asiat. Res*. **13**: 376 (1820); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 35 (2000); Clement in *Fl. Bhu.* **2**(3): 1395(2001)

Herb up to 3 m, glabrous. Leaves sessile, linear-lanceolate to oblanceolate, 7.5-22 x 1.5-2 cm. Flowers many in a terminal branched raceme, white to pink. Capsule erect or deflexed, globose, 6x5.5 mm.
Habitat: In moist rockytrail road. **Fl. & Fr.:** Jun.-Aug.
Representative collection: Ilam, Jamuna-Hangetham, 2170m, 27^0 04'30.4''N, $87^0$58'36.1''E, September. 9, 2007, LKSR-Expedition team, **C 226** (TUCH).
Distibution: Himalaya (Uttar Pradesh-Arunachal Pradesh), North East India, North Myanmar, Nepal (West-Centre: 1100-2300m).

Family 71. **COMPOSITAE (Asteraceae)**

1. AINSLIAEA DC**.**

1. Ainsliaea aptera DC. in *Prodr*. **7(1)**: 14 (1838); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 49(2000).

Plant up to 1m sparsely araneous. Leaves blde ovate to, 4-9x 3-7cm, acute, cordate, more prominently dentate, subglsabrous above, sparsely pubescent beneath. Fully developed corollas white or purplish. Achenes 5.5mm.

Habitat: In open grassland. **Fl. & Fr.:** Sep.-Dec.

Representative collection: Ilam, Mabu-8, Dobate around, 2330m, $27^0$04'05.1''N and $87^0$59'28.9'E, September 3, 2007, LKSR-Expedition team, **C 136** (TUCH).

Distibution*:* Himalaya (Kashmir-Bhutan), Nepal (West-East: 1600-3500m).

2. ANAPHALIS DC.

1. Anaphalis contorta (D. Don) Hook. f. in *Fl. Br. Ind.* **3**: 284(1881); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 50 (2000). '*Bukiphul*' (बुकीफुल).

Anaphalis contorta var. *contorta* D. Don in *B. Reg*. 7: t. 605 (1821).

Herb of 10-15cm tall. Leaves sessile, linear, 1-nerveed, margin strongly curved, cottony beneath or on the both surfaces. Heads discoid, subglobose in dense terminal corymbs, flowers white.

Habitat: In open pastureland. **Fl. & Fr.:** Nov.-Dec.

Representative collection: Ilam, Newa-khjola-Maimajuwa around, 1870m, $27^0$04'08.1''N, $87^0$57'39'E, August 28, 2007, LKSR-Expedition team, **C 057** (TUCH).

Distibution: Himalaya(Kashmir-Bhutan), North East India, South West China, Nepal (West-East: 1700-4500m)**.**

3. ASTER L.

1. Aster tricephalus C. B. Clarke in *Comp. Ind.*: 48(1876); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 52 (2000).

Erect perennial herb up to 30-40cm. Leaves narrowly spathulate-oblanceolate, 3.5-6.5x0.5-2cm, upper ones often surrounding capitua, obtuse or acute. Capitula 1-3. involucres 2cm diameter. Achenes obovoid, 3.5x1mm, papus whitish.

Habitat: Near cultivated land **Fl. & Fr.:** Jul.-Oct

Representative collection: Ilam, Jogmai-Kholagaun, 2200m, 26.99N, 88.02E, June 18, 2007, LKSR-Expedition team, **B 191** (TUCH).

Distibution: Himalaya(Nepal, Sikkim, Bhutan), Nepal (Centre-East: 2900-4600m).

4. CIRSIUM Miller

1. Cirsium falconeri (Hook. f.) Petr. in *Feddes Repert. Spec. Nov. Regni Veg*. **9**: 198(1911); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 55 (2000).

Cricus falconeri Hook. f. in *Fl. Br. Ind.* 3: 363 (1881).

Herb up to 1.5 m. leaves densely setulose to smooth above, oblanceolate, 20-40 x 5-20 cm, 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.

Habitat: In open Pastureland. **Fl. & Fr.:** Jul.-Oct.

Representative collection: Ilam, Mabu-8, Dobate around, 2330m, $27^0$04'05.1''N, $87^0$59'28.9'E, September.3, 2007, LKSR-Expedition team, **C 136** (TUCH).

Distribution: Himalaya (Kashmir-Bhutan), Myanmar, China, Nepal (Central-East: 3000-4300m).

5. COSMOS Cavanilles

1. Cosmos bipinnatus Cav. in Ic. *Deser. Pl.* **1**:10. t. 14(1791); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 52(2000); Grierson & Springate in *Fl. Bhu.* **2**(3): 1617(2001).

Herb 0.5-1.5m, subglabrous to stiffly puberulous. Leaves bipinnate, 6-11x3-6cm, narrowly linear. Involucres 1.2cm across. Ray- flowers usually very narrowly elliptic below, linear above. Achene body 0.5-1cm beak rose or purplish pink.

Habitat: In small stream site. **Fl. & Fr.:** Jul.-Oct.

Representative collection: Ilam, Maimajuwa-7, Kholagaun, 1820m, $27^0$03'52'N and $87^0$56'38'E, August 27, 2007, LKSR-Expedition team, **C 004** (TUCH).

Distribution: native to Mexico.

6. SENECIO L.

1. Senecio alatus Wall. ex DC. in *Prodr.* **6**: 368 (1838); Kitamura; Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 66 (2000).

Rhizomatous herb up to 1.5m. Leaves subrosulate at base of flowering shoots, blades 7-30x4-13cm, acuminate, rounded or cordate at base. Inflorescence panicle. Female flowers usually 2. Bisexual flower usually 3. Achenes 2.5mm, glabrous or sometimes pubescent.

2. Senecio acuminatus Wall. ex DC., *Prodr. Fl. Nepal.*: 162 (18250); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 66 (2000).

Herb. Stem up to 130cm, ±glabrous. Leaves elliptic, 12-15x1.5-4cm, acuminate, cuneate or rounded at base, denticulate, ± glabrous on both surfaces; petioles 4-15mm. Female flowers 0-1 corolla tube 2.5mm; ligule 2.5-5.5x 0.2mm. Achene oblong, 2.5mm; papus 4.5mm. yellowish.

Habitat: Found under *Rhododendron* forest. **Fl. & Fr.:** Sep.-Jan.

Representative collection: Ilam, Maimajuwa-7, Dhapar, 2790m, $27^0$05'28.1''N and $87^0$55'21'E, August 30, 2007, LKSR-Expedition team, **C 105** (TUCH).

Distribution: Himalaya (Uttar Pradesh-Bhutan), Nepal (Centre-East: 2100-3700m).

3. **Senecio chrysanthemoides** DC., *Prodr.* **6**: 365 (1838); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 67 (2000).

An erect perennial herb. Lower leaves mostly with a large toothed terminal lobe and few smaller irregularly toothed lateral lobes, with numerous yellow flowers-heads in terminal branched flat-topped clusters, and with deeply lobed and toothed leaves. Flower-heads usually 1-2cm across.

Habitat: In moist open cultivated area. **Fl. & Fr.:** Aug-Sep.

Representative collection: Ilam, Jogmai-Kholagaun, 2200m, 26.99N, 88.02 E, June 18, 2007, LKSR-Expedition team, **B 198** (TUCH).

Distribution: Himalaya (Kashmir to Arunachal Pradesh), North East India, South China, Nepal (West-East: 1400-4000m).

4. Senecio scandens Buch.-Ham. ex D. Don in *Prodr. Fl. Nep.* 178(1825); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 67 (2000).

Herbaceous, perennial. Leaves ovate, 4-9×1-3.5cm, subentire, acuminate, truncate at base or attenuate, glabrous on both surfaces. Capitula radiate, in corymbs. Pappus white.

Habitat: In *Rhododendron* forest **Fl. & Fr.:** Apr.-Dec.

Representative collection: Ilam, Maimajuwa-7, Kholagaun, 2650m, $27^0$04'07'N, $87^0$59'37'E, September. 3, 2007, LKSR-Expedition team, **C 175** (TUCH).

Distribution: Himalaya (Uttar Pradesh to Arunchal Pradesh), North East India, North Myanmar, India, Sri-Lanka, Thailand, South China, Japan. Nepal (Centre-East: 2100-2800m).

Family 72. **DIOSCORECEAE**

1. DIOSCOREA L.

1. Dioscorea deltoidea Wall. ex Griseb., *Fl. Bras*. (Martius) 3(1): 43 (1842), Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 98 (2000).

Tubers much branched, surfaces rootlets many, flesh white. Leaves usually smaller, thinner-textured, distinctly hastate with basal lobes present at least when young, finally ovate, usually hispid on veins beneath. Male spikes: flowers clusters rather distant, absent from lower part of the filiform axis.
Habitat: In *Quercus-Castnopsis* forest. **Fl. & Fr.:** Apr. - May.
Representative collection: Ilam, Jamun-2, Hangetham around, 2000m, $27^0$11'27''N, $87^0$56'18''E, September 9, 2007, LKSR-Expedition team, **C223** (TUCH).
Distribution: Himalaya (Kashmir to Assam), Indo-China, West China, Nepal (West-East: 450-3100m).

Family 73. **TRILLIACEAE**

1. PARIS L.

1. Paris polyphylla subsp. **marmorata** (Stearn) H. Hara, *J. Fac. Sci. Univ. Tokyo, Sect.* 3. *Bot*. 10: 176, t. 2B-C, 6c (1969); Press *et al.*, *Ann. Check Fl. Pl. Nep.*: 186(2000). '*Satuwa'* (सतुवा).

Paris marmorata Stern in *Bull. Br. Mus. Nat. Hist. (Bot.)* **2:** 79, f. 11, t. 8 (1956).

Differs from *P. polyphylla* in being usually smaller (8-15), with fewer (4-6), smaller, variegated leaves with whitis markings along the veins, margins wavy, upper surface dark green. Flowers with 3-4 sepals.
Habitat: In a mois stream side. **Fl. & Fr.:** Apr.- May.
Representative collection: Ilam, Mabu-Kalapokhari, 2840m 27.07N and 88.00E, June 16, 2007, LKSR-Expedition team, **B 123** (TUCH).
Distribution: Himalaya (Nepal-Bhutan) West China, Nepal (Central-East: 2900-3100m),

2. Paris polyphylla Sm., *Cycl*. **26:** *Paris* n. 2 (1813)) subsp. **polyphylla;** Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:186 (2000). '*Satuwa'*(सतुवा).

Herb. Flowering stems 20-50cm. Leaves 5-12 narrowly oblanceolate to narrowly elliptic, finely acuminate, base cuneate, 6-12x1.5-4cm, glabrous.
Habitat: In moist streamside. **Fl. & Fr.:** Apr.- Jun.
Representative collection: Ilam, Mabu-Near Maikhola, 3060m 27.08N, 88.01E, June 15, 2007, LKSR-Expedition team, **B 123** (TUCH).
Distribution: Himalaya (Uttar Pradesh to Bhutan), North East India, China, Nepal (Central-East: 1800-3300m).

Family 74. **SMILACACEAE**

1. SMILAX L.

1. Smilax aspera L., *Sp. Pl.* 1028 (1753); Hara, *Enum. Fl. Pl. Nep.***1**: 78(1978Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 187 (2000). '*Kukurdainyi*'(ककुरडाइन्यी).

Climber; with zigzag and ridged stem, prickly. Leaves triangular to hastate with rounded spiny, base truncate to weakly cordate,5-10x2.5-5cm. inflorescence a zigzag raceme 4-9cm. Berries red, 0.5-7cm diameter, 3-seeded; seed 3.5mm diameter.
Habitat: In dense forest. **Fl. & Fr.:** Apr.- Aug.
Representative collection: Ilam, Jamun-2, Hangetham around, 2170m, 27.04N, 88.01E, June 17, 2007, LKSR-Expedition team, **B 173** (TUCH).
Distribution: Himalay, India, Srilanka, Nepal (West-East: 1200-2600m).

2. Smilax minutiflora A. DC., *Monogr. Phan*. 1: 109 (1878); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 188 (2000)

Shrubs, epiphytic. Stem terete. Leaves variable in shape, ones on old wood at least sometimes narrowly ovate, 15 x 10cm, and base cordate. Inflorescence of single umbels inserted in axils of lowers. Berry black, 0.8cm diameter, 2-3-seeded.
Habitat: In Lithocarpus-Rhododendron forest. **Fl. & Fr.:** Aug. - Feb.
Representative collection: Ilam, Jamun-2, Hangetham around, 2470m, $27^0$02'57''N, $88^0$00'46''E, September 6, 2007, LKSR-Expedition team, **C 212**(TUCH).
Distribution: Himalaya (Nepal-Bhutan), North East India, Myanmar, China Nepal (East: 2400-3500m).

Family 75. **CONVALLARIACEAE**

1. MAIANTHEMUM G.H. Weber

1. Maianthemum fuscum (Wall.) La Frankie in Taxon **35(3):** 588 (1986); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 186 (2000).

Stem 15-50cm, glabrous, or occasionally densely hairy in upper part. Scale leaves usually 2, whitish, membranous. Leaves 3-6, blades ovate, acuminate to caudate, margins narrowly membranous. Berry red, 1-seeded.
Habitat: In a rocky steep land. **Fl. & Fr.:** Apr- Jun.
Representative collection: Ilam, Mabu-8, Dobate around, 2680m, $27^0$04'N, $87^0$59'E, September 3, 2007, LKSR-Expedition team, **C 134** (TUCH).
Distribution: Himalaya (Nepal-Arunachal Pradesh), North East India, West China, Nepal (Centre and East, 2400-2600m).

2. OPHIOPOGON Ker Gawler

1. Ophiopogon parviflorus (Hook. f.) H. Hara, *J. Jap. Bot*. **40**: 21 (1965); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 186(2000).

Ophiopogon parviflorus D. Don var. *parviflora* Hook. f., *Fl. Brit. Ind*. 6; 269 (1892).

Rootstock thick. Leaves in dense tufts, sometimes swollen at base. Leaves linear, stiff, curved, rough with margins and some veins minutely serrate. Flowers usually bluish or violet, sometimes white. Seeds ellipsoid, bluish black.
Habitat: Along a trial road. **Fl. & Fr.:** Jul- Aug.
Representative collection: Ilam, Mabu-Kalapokhari around, 2770m, 27.06N, 88.01E, June 16, 2007, LKSR-Expedition team, **B 133** (TUCH).
Distribution: Himalaya (Nepal-Bhutan), North East India. Nepal (East-West: 2000-2800m).

3. POLYGONATUM Mill.

1. Polygonatum cathcartii Baker in *J. Linn. Soc., Bot.* **14:** 559 (1875); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:187 (2000).

Herb. Rhizome 1-1.5cm Leaves opposite or in 3s,lanceolate, acuminate, base rounded, 5.2-10.5x 2.1-3.5cm, upper narrower and more acuminate, glossy above, glacous beneath; Inflorescence borne on lower half of subtending leaf. Flowers greenish white to yellow.
Habitat: In a moist places. **Fl. & Fr.:** May-Aug.
Representative collection: Ilam, Mabu-Kalapokhari around, 2770m, 27.06N, 88.01E, June 16, 2007, LKSR-Expedition team, **B 142** (TUCH).
Distribution: Himalaya (Nepal to Bhutan). Nepal (East: 3200m).

2. Polygonatum punctatum Royle ex Kunth. in *Enum. Pl.* **5**: 142 (1850); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 187 (2000).

Rhizome 0.8-1.2cm diameter; roots thick. Leaves alternate, subopposite or in irregularly cartilaginous, gradually narrowed to base, 4.9-7.5x1.-1.8cm, coriaceous. Flowers white with pinkish or purplish flushing. Ovary ellipsoid to ovoid, berry 5.5mm.

Habitat: In moist steep grassland. **Fl. & Fr.:** Apr.-May.

Representative collection: Ilam, Maimajuwa-7, Chibe, 2470m, $27^0$02'57''N, $88^0$00'46''E, September 6, 2007, LKSR-Expedition team, **C 209** (TUCH).

Distribution: Himalaya (Nepal-Arunachal Pradesh), North East India. Nepal (Centre-East: 2000-2600m).

3. Polygonatum verticillatum (L.) All., *Fl. Pedemont* **1**:131(1785); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 77(2000).

Convallaria verticillata L., *Sp. Pl.* 315(1953).

Herb 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. Fruit c1cm, berry.

Habitat: In a open moist pastureland. **Fl. & Fr.:** Jun-Jul.

Representative collection: Ilam, Maimajuwa-7, Banduke, 2480m, 27.10N, 87.95E, June 8, 2007, LKSR-Expedition team, **C 106** (TUCH).

Distribution: Nepal (West to East, 2400-4700m), Europe, Asia Minor, Central.Asia, Himalaya, North East India (Manipur), West China.

Family 76. **ASPARAGACEAE**

1. ASPARAGUS L.

1. Asparagus filicinus Buch.-Ham. ex D. Don in *Prodr. Fl. Nep.* 49(1925) var. **filicinus**; Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 184 (2000). *'Van Kurilo'*(वन कुरीला).

Herb. Stem 20-150cm, herbaceous, without spines. Cladodes in whorls of 4-6, flat, curved, unequal in length within whorls, very narrow, 4-10×c1mm. Flowers borne single in axils of cladode whorls. Flowers white or greenish. Berry black, 6mm.

Habitat: In *Quercus- Castanopsis* forest. **Fl. & Fr.:** Apr.- Oct.

Representative collection: Ilam, Jamun-1, Hangetham, 2330m, $27^0$02'44.8''N, $87^0$00'25.6''E , Sept. 6, 2007, LKSR-Expedition team, **C 201** (TUCH).

Distribution: Himalaya (Kashmir to Arunchal Pradesh), North East India (Meghalaya, Nagaland), Myanmar, Thailand, Indo-China, China, Nepal (West-Centre: 2100-2900m).

2. Asparagus filicinus var**. lycopodineus** Baker; Noltie in *Fl. Bhu.* 3(1):61(1994);

Differs from var. filicinus in its broader cladodes (1.2-1.5), constantly 3 per whorl; larger flowers 4mm; larger ovary gradually tapered into longer style.

Habitat: Mixed broadleaved forest. **Fl. & Fr.:** May- Aug.

Representative collection: Ilam, Jamun-2, Hangetham, 22530m, $27^0$04'44.8''N and $87^0$00'25.6''E , Sept. 6, 2007, LKSR-Expedition team, **C 201** (TUCH).

Family 77**. ANTHERICACEAE**

1. CHLOROPHYTUM Ker Gawler

1. Chlorophytum nepalense (Lindl.) Baker, *J. Linn. Soc., Bot.* **15**: 330 91876); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 184 (2000).

Phalangium nepalense Lindl. in *Trans Hort. Soc. Lond.* 6:276 (1826).

Herb. Root without tubers. Leaves 6-11 per rosette, blade slightly wavy, 10-60x.5-2.5cm, linear. Inflorescence 10-50cm, simple or with up to 5 rather long. Flowers usually in groups. Tepals 0.8-1.5cm. Filaments 3-4.3mm; anthers 5-8mm. Ovary oblong, ovoid small. Capsule deeply emerginate. Seeds blackish, flattened, 3.5mm.

Habitat: Near cultivated land. **Fl. & Fr.:** Jul.-Nov.

Representative collection: Ilam, Jogmai-BiChitre, 2860m, $27^0$00'45.5''N, $88^0$03'09.8''E, June 7, 2007, LKSR-Expedition team, **C 243** (TUCH).

Distribution: Himalayas (Nepal to Arunachal Pradesh), North East India, Nepal (West to East: 1400-2500m).

Family 78. **AMARYLLIDACEAE**

1. ALLIUM L.

1. Allium wallichii Kunth, *Enum. Pl.* **4**: 443 (1843); Press *et al.* in *Ann. Check. Fl. Pl. Nep.*: 9(2000). **'***Banpyaj'* (बनप्याज).

Herb. Bulb cylindric, 1.5 cm, erect. Leaves 4-5, basal, flat, keeled beneath, 25-45× 0.7-1cm, bases sheathing. Umbel hemispheric, loose, many-flowered. Spathe deciduous. Fruit capsule.

Habitat: In open grassland. **Fl. & Fr.:** Jul.-Oct.

Representative collection: Ilam, Maimajuwa-7, Chintapu, 2860m, $27^0$05'10.1''N, $87^0$55'12.6''E, August 30, 2007, LKSR-Expedition team, **C 100** (TUCH).

Distribution: Himalaya (Nepal-Bhutan), West China. Nepal (West-East: 2400-4650m),

Family 79. **LILIACEAE**

1. DISPORUM Salisb. Ex D. Don

1. Disporum calcaratum D. Don in *Trans. Linn. Soc. London* **18**: 516 (1841); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 184 (2000).

Herb. Stem 50-150cm.Leaves lanceolate, slightly acuminate, base cuneate into short (0.2-0.5cm) petiole, 5-14x1.8-3.7cm, main veins 5-9, raised and papillose. Inflorescence of 4-9-flowered. Flowers greenish, cream or dull purple., Berry black, 3-seeded, 0.6-0.8cm diameter.

Habitat: In dense forest. **Fl. & Fr.:** Jul-Aug.

Representative collection: Ilam, Jamun-2, Hangetham around, 2170m, 27.04N, 88.01E, June 17, 2007, LKSR-Expedition team, **B 161**(TUCH).

Distribution: Himalya (Nepal to Bhutan), North East India, Myanmar, Nepal (Centre-East: 1500m).

2. LILIUM L.

1. Lilium nepalense D. Don in *Mem. Werner. Nat. Hist. Soc.* 3:412(182); Noltie in *Fl. Bhu.* **3**(1):102(1994); Hara, *Enum. Fl. Pl. Nep.* **1**: 74(1978); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:185 (2000).

Herb. Bulb oblong-ovate, c2.5cm. Rooting stems spreading horizontally, bearing secondary bulbs. Flower stem about 60cm. Leaves narrowly elliptic to oblong-lanceolate, subacute apex, 3-7×1-2.5cm. Inflorescence a single terminal flower. Fruit a capsule.

Habitat: In open pastureland. **Fl. & Fr.:** June-Jul.

Representative collection: Ilam, Maimajuwa-7, Chibe, 2480m, $27^0$05'04''N, $87^0$55'39''E, September 1, 2007, LKSR-Expedition team, **C 106** (TUCH).

Distribution: Nepal (West-East: 2300-3400m), Himalaya (Uttar Pradesh-Arunchal Pradesh).

3. TRICYRTIS Wall.

1. Tricyrtis maculata (D. Don) J. F. Macbr in *Contr. Gry Herb.* n.s. 3, **53**: 5 (1918); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:188 (2000).

Compsoa maculate D.Don*, Prodr. Fl. Nepal.:* 51 (1825).

Stem to 70cm, simple, shortly pilose. Leaves lanceolate to oblanceolate, lonng acuminate, margins ciliate, deeply cordate, 8-12x3.5-6cm. Inflorescence 3-to many-flowered, Flowers greenish white, spotted. Seeds flattened, sculptured.

Habitat: In open pasture land. **Fl. & Fr.:** Jul- Aug.

Representative collection: Ilam, Maimajuwa-7, Chibe, 2480m, $27^0$05'04''N, $87^0$55'39''E, September 1, 2007, LKSR-Expedition team, **C 076** (TUCH).

Distribution: Himalaya, North East India, Myanmar, Thailand, West China, Nepal (West-East: 1800-3000m).

Family 80. **ARACEAE**

1. ARISAEMA Mart.

1. Arisaema costatum (Wall.) Martius ex Schott in *Melet. Bot.*: 17(1832); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 13 (2000).

Arum costatum Wall., *Tent. Fl. Napal.*: 28, t. 19 (1824).

Herb. Spathe dark purple with longitudinal white stripes, 8-12cm long, the blade down-curved and with a tail like tip 1-4cm long. Spadix appendage very long, 15-40cm. Distiguished by its leaflets, leaflets elliptic to ovate 10-20cm long. Flowering stems greenish.

Habitat: In moist trail road. **Fl. & Fr.:** May-Jun.

Representative collection: Ilam, Dobate-Mabu, 2660m, $27^0$04'07.0''N, $87^0$59'37''E, Sept. 30, 2007, LKSR-Expedition team, **C 169** (TUCH).

Distribution: Nepal (Centre and East, 1900-2800m).

2. REMUSATIA Schott

1. Remusatia hookeriana Schott in *Oesterr. Bot. Wochenbl.* **7**: 133 (1857); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 15 (2000).

Perennial herb with cormose tuber. Leaf blade ovate, asymmetricallyt peltate, acuminate short, c6×5cm, yellowish green. Basally sheathing, petiole c9cm. Spathe narrowed to base, green outside apiculate, blade narrowly lanceolate.

Habitat: In open rockygrassland. **Fl. & Fr.:** May-Jun.

Representative collection: Ilam, Dobate-Hangetham, 2860m, $27^0$25'0.8''N, $88^0$02'55.3''E, Sept. 5, 2007, LKSR-Expedition team, **C 199** (TUCH).

Distribution: Himalaya (Himachal Pradesh to Sikkim), Nepal (West- East, 1500-2400m)

Family 81**. ZINGIBERACEAE**

1. CAUTLEYA Royle ex Hook. f.

1. Cautlea gracilis (Sm.) Dandy in J. Bot. 70: 328 (1932); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 329 (2000) '*Tembok*' (तोम्बोक).

Roscoeea gracilis Smith in Trans. in *Linn Soc. London* 13: 460 (1822).

Herb. Leafy shoot to 40cm. Leaves 4-6, lanceolate, long caudate, sessile, 6-20x2.5-3cm, usually dark purple beneath; bracts usually red. Calyx red, unilaterally split, 1-1.5cm. Corolla tube 1.5-2cm, petals oblong, rounded. Capsule red, globose, to 1cm diameter**.**

Habitat: In a rocky trial road. **Fl. & Fr:** May-Aug.

Representative collection: Ilam, Jamun-2, Hangetham around, 2470m, 27.04N, 88.01E, June 17, 2007, LKSR-Expedition team, **B 159** (TUCH).

Distribution: Himalaya (Kashmir-Bhutan), North East India, West China. Nepal (West-East: 1200-3100m).

2. ROSCOEA Sm.

1. Roscoea alpina Royle in III. Bot. Himal. Mts. **1(10)**: 361 t. 89 (1839); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 330 (2000).

Herb. Leafy shoots 10-30cm. Leaves 2-3. usually not fully developed at flowering linear to broadly elliptic, 2.5-15x1.5-3.5cm. Inflorescence 5-flowered, flowers opening singly.Calyx 2.5cm. Corolla tube long exserted; dorsal petal circular. Lateral staaminodes circular to elliptic. Lip obovate, bilobed,

Habitat: In open pastureland. **Fl. & Fr:** Jun.-Aug.

Representative collection: Ilam, Maimajuwa-upperhattiya, 2870m, $27^0$02'57''N, $88^0$00'46''E, September 6, 2007, LKSR-Expedition team, **C 217** (TUCH).

Distribution: Nepal (West-East, 2400-3100m), Himalaya (Kashmir to Bhutan), China.

Family 82. **COMMELINACEAE**

1. COMMELINA L.

1. Commelina paludosa Blume in *Enum. Pl. Javae* **1**:2 (1827); Hara, *Enum. Fl. Pl. Nep.* **1**: 82(1978).

Herb. Stem 1-1.5m, straggling, much branched. Upper stem leaves lanceolate, finely acuminate,base cuneate to extremely short, petiole-like base, 12-20x2.5-5cm. Flowers white or pale blue. Seed oblong in outline.

Habitat: Along a trial roadside. **Fl. & Fr:** May-Nov.

Representative collection: Ilam, Dobate-Hangetham, 2000m, $27^0$11'27''N, $87^0$56'18''E, September 6, 2007, LKSR-Expedition team, **C 186** (TUCH).

Distribution: Himalaya, India, Sri lanka, Indo-China, Taiwan, Malayasia. Nepal (West-East: 300-3500m).

2. CYANOTIS D. Don

1. Cynotis vaga (Lour.) Schult. & Schult. f. in *Syst. Veg*. **7(2)** 1153 (1830); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 48(2000).

Tradescantia vaga Lour., *Fl. Cchin.* 1: 193 (1790).

Bulbous perennial herb. Stem decumbent, much branched, 5-7cm. basal leaves in bulbous form. Leaves lanceolate or linear-lanceolate, tapering gradually.Cymes scropoid, terminal. Capsule 3-lobed.

Habitat: Near cultivated land. **Fl. & Fr.:** Aug.-Oct.

Representative collection: Ilam, Maimajuwa-7, Thulogaun, 1840m, $27^0$04'15''N, $87^0$57'29''E, August 27, 2007, LKSR-Expedition team, **C 008** (TUCH).

Distribution: Himalaya, North East India, West Africa, China, Myanmar, Nepal (West-East: 800-2700m).

3. DICTYOSPERMUM Wight.

1. Dictyospermum scaberrimum (Blume) H. Hara. in *comb. Nov. Faden*; Hara, *Enum. Fl. Pl. Nep.* **1**:82(1978); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 48 (2000).

Commelina scaberrima Blume in *Enum. Pl. Jav.* 1: 4 (1827).

Herb. Stem 50-80cm. Leaves 10x15-2-4cm, shortly scattered-hispid above, densely so on margins, glabrous beneath. Inflorescence an obconic, terminal thyrse, cmyme hairy. Capsule oblong-globose, retuse. Seed oblong elliptic in outline, 2.4-2.7x1.8-2.2mm.

Habitat: In a open pastureland. **Fl. & Fr:** Aug.-Oct.

Representative collection: Ilam, Maimajuwa-7, Naulegaun, 1840m, $27^0$04'15''N, $87^0$57'29''E, August 27, 2007, LKSR-Expedition team, **C 011** (TUCH).

Distribution: Himalaya (Nepal-Arunachal Pradesh), India, Sri lanka, Malayasia, Nepal (Centre-East: 1200-2100m).

4. STREPTOLIRION Edgew.

1. Streptolirion volubile Edgeworth. in *J. Proc. Linn. Soc. Bot*.; 254: 188 (1964); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 49 (2000).

Herb. Stem to 2m. Upper leaf blades 7-11.5x5.7-9cm, caudate apex to 2.5cm, margins densely ciliate. Peduncle subtended by tubular, membranous bract; panicle 2-5cm. Sepals pinkish or greenish-white, lanceolate. Capsule ellipsoid-trigonous, acuminate, reddish-brown.
Habitat: In a rocky steep land. **Fl. & Fr:** Jun.-Oct.
Representative collection: Ilam, Maimajuw-Chibe, 26450m, $27^0$04'07''N, $87^0$59'34''E, September 1, 2007, LKSR-Expedition team, **C 108** (TUCH).
Distribution: Himalaya (Uttar Pradesh-Assam), Myanmar, China, West Japan, Nepal (West-East: 1500-2400m).

Family 83. JUNCACEAE

1. JUNCUS L.

1. Juncus benghalensis Kunth in *Enum. Pl.* (Kunth) **3**: 360(1841); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:149 (2000).

Herb. Stoloniferous, stolons filiform. Flower stems slender, borne singly,7-16cm. Scale leaves one or more, whitish-brown. Stem leaves usually 2. Inflorescence 11 flowered; lowest bract developed into leaf like point to 2.5cm. Seeds 0.6mm, 2-tailed.
Habitat: In side of rocky stone. **Fl. & Fr.:** Jun.-Aug.
Representative collection: Ilam, Mabu-8, Dobate around, 2680m, $27^0$04'N, $87^0$59'E, September 3, 2007, LKSR-Expedition team, **C 146** (TUCH).
Distribution: Himalaya (Kashmir-Bhutan), West China Nepal (Centre-East: 2200-3500m).

Family 84. CYPERACEAE

1. CAREX L.

1. Carex filicina Nees in *Cotnr. Bot. India*: 123 (1834); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 88 (2000) '*Harkate'* (हरकटे).

Plant stout herb; rhizomes. Bases of leaf sheath cream or reddish-purple, persistent, not becoming fibrous. Leaves basal 1-3 on culm, blades about equaling culm. 2-13mm wide. Culm 26-114cm. Inflorescence 11-88cm, nodes 2-6. Urticles curved, narrowly ellipsoid-trigonous.
Habitat: In rocky trial steep slope. **Fl. & Fr.:** May-Feb.
Representative collection: Ilam, Maimajuwa-7, Upperhattiya, 1900m, 27.06N, 87.94E, june 7, 2007, LKSR-Expedition team, **A 009** (TUCH).
Distribution: Himalaya, East China, Taiwan, Malayasia, Nepal (West-East: 1200-4000m).

2. Carex cruciata Wahlenberg var. **argocarpa** C.B. Clarke.; Noltie, H. J. *Fl. Bhu.* **3**(I):378(1994).

Rhizomatous stout, woody, stems. Inflorescence 6-9mm wide, 20-50cm, narrowly cylindric, nodes 4-6; partial panicles inserted singly, narrowly pyramidal, branches and spike evenly spaced.Urticles appearing swollen at maturity.
Habitat: Along a trial road. **Fl. & Fr.:** Aug.-Jan.
Representative collection: Ilam, Bichitre-Jogmai-2, 3210m, $27^0$18'45''N, $88^0$01'22''E, September 12, 2007, LKSR-Expedition team, **240** (TUCH).
New record for Flora of Nepal

3. Carex inanis C.B. Clarke in Hook. f. in *Fl. Brit. India* **7**: 743 (1894)**;** Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 88 (2000).

Rhizomatous herb, stem densely tufted. Basal leaf sheaths splitting into rather weak fibrils. Leaves inserted into lower half of the culm. Culm 6-42cm. Inflorescence of 4-7 erect. Urticles knobbly, broadly ellipsoid- to narrowly obovoid-trigonous.

Habitat: Near a cultivated and pastureland. **Fl. & Fr.:** Jul.-Nov.

Representative collection: Ilam, Jogmai-Kholagaun, 2210m, 26.99N, 88.02E, June 18, 2007, LKSR-Expedition team, **B 192** (TUCH).

Distribution: Himalay (Kashmir-Shikkim), Nepal (West-East: 1800-4100m).

2. PYCREUS P. Beauv.

1. Pycreus flaviddus (Retzius) T. Koyama in *J. Jap. Bot*. **51**: 313 (1976); Hara, *Enum. Fl. Pl. Nep*. **1**:96 (1978).

Cyperus flavidus Retz., *Obs. Bot*. 5: 13 (1788).

Annaul tufted herb, 10-80cm. Leaves on lower $^{1/3}$ stem, blades channeled. Inflorescence sometimes a congested head, usually 1x compound. Spikelets linear lanceolate, acute. Glumes oblong, rounded to subacute. Nut narrowly ovate, conspicuously apiculate, 0.8x1.1mm, dark.

Habitat: In open pastureland. **Fl. & Fr.:** Jun.-Dec.

Representative collection: Ilam, Maimajuwa-7, Kalopani, 2440m, $27^0$00'43''N, $88^0$03'09''E, August 28, 2007, LKSR-Expedition team, **C 074** (TUCH).

Distribution: Europe, Africa and Asia, Nepal (West-East: 200-3800m).

Family 85. **GRAMINEAE (Poaceae)**

1. Eragrostis nigra Nees ex Stued in *Syn Pl. Glumac.* 1: 267 (1854); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 131 (2000).

Tufted herb. Culms 8-50cm. Leaf blades3.5-2.5x0.1-0.5cm, flat or enrolled, narrowly oblong. finely acuminate, with sparse, long spreading hairs above, glabrous beneath. Spikelets blackish gery, florets 5-7, glumes and lemmas deciduous, paleas falling after lemmas.

Habitat: In a open pasture land**.** **Fl. & Fr.:** May-Oct.

Representative collection: Ilam, Mabu-8, Dobate around, 2670m, $27^0$04'N and $87^0$59'E, September 3, 2007, LKSR-Expedition team, **C 147** (TUCH).

Distribution: Sri-Lanka, Myanmar- China, Nepal (West-East: 900-3000m).

2. ISACHNE R. Brown

1. Isachne albens Trin. in Sp. *Gram*. [Trinius]; 1, t. 85 (1828); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 135 (2000).

Perennial herb, 12-60cm, branched erect or decumbent. Leaf blades 4.5-25x0.5-2.4cm, oblong to narrowly lanceolate, acute, hispid, both surfaces and margins, veins. Inflorescence 8-30cm wide. Spikelets1.2-1.8mm. Lower glume 1.2-1.8mm, bluntly acuminate.

Habitat: In open grassland. **Fl. & Fr.:** Jul.-Feb.

Representative collection: Ilam, Maimajuwa-7, Naulegaun, 1980m, $27^0$04'17''N, $87^0$57'39''E, August 28, 2007, LKSR-Expedition team, **C 070** (TUCH).

Distribution: Himalaya (Uttar Pradesh-Sikkim), SriLanka, Myanmar, Thailand, Malaysia.Nepal (West-East: 1800-2300m).

Family 86. **ORCHIDACEAE**

1. ANTHOGONIUM Lindl.

1. Anthogonium gracile Wall. ex Lindl. in *Gen. Sp. Orchid. Pl.* (Lindley) **7**: 426 (1840); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 208 (2000).

Herb of 14-40cm tall, pseudobulbs; Leaves oblong-lanceolate to narrowly elliptic, acuminate, 7-30x0.4-3.2cm. Inflorescence laxly 5 to 10 flowered. Flowers 1-1.8cm long-dark pink to white, dark purple, anther bright yellow. Fruit narrowly ellipsoid, 1-2.4x0.3-0.5cm.

Habitat: In moist places. **Fl. & Fr.:** Jun.-Oct.

Representative collection: Ilam, Maimajua-Newakhola, 1820m, $27^0$04'15.8''N, $87^0$57'29.8''E, August 28, 2007, LKSR-Expedition team, **C 053** (TUCH).

Distribution: Himalaya (Nepal Sikkim), North East India, Myanmar, Bangladesh, Nepal (Centre-East: 1500-2000m).

2. BULBOPHYLLUM Thouars

1. Bulbophylum retusiusculum Rchb. f. in *Gard. Chron*. 1869: 1182(1829); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 210 (2000).

Epiphytic herb; Leaf 1, linear-oblong, subulate, obliquely retuse, base subsessile to shortly petiolate. Inflorescence basal, pseudobulb, umbellate, 6-12-flowered; Flowers 1.5-2.5cm long; violet spotted with darker purple, or yellow-orange Column stout.

Habitat: In *Quercus lamellosa* forest. **Fl. & Fr.:** Oct.-Dec.

Representative collection: Ilam, Mabu-8, Dobate around, 2680m, $27^0$04'N, $87^0$59'E around, September, 2007, LKSR-Expedition team, **C 135** (TUCH).

Distribution: Himalaya (Nepal to Bhutan), Nepal (Centre-East: 2100-3000m).

3. GOODYERA R. Br.

1. Goodyera foliosa (Lindl.) Benth. ex Hook. f. in *Fl. Brit. India* 6 (17): 113 (1890); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 217 (2000).

Georchis folisa Lindl. in *Gen. Sp. Orchid. Pl.*: 90(1840).

Herb up to 30cm. Leaves obliquely ovate to elliptic-ovate, acute to obtuse, petiolate; blade 2.5-8x1-4cm. Inflorescence densely several-flowered; Flower 0.9-1.4cm across greenish-white or pink-purple. Column short. Fruit 1-1.4x0.4-0.5cm.

Habitat: Along moist pastureland. **Fl. & Fr.:** Sep.-Nov.

Representative collection: Ilam, Mabu-8, Dobate around, 2680m, $27^0$04'N, $87^0$59'E around, September, 2007, LKSR-Expedition team, **C 143** (TUCH).

Distribution: Himalaya (Nepal-Bhutan), North East India, Myanmar, Japan, Nepal (East: 2100-2300m).

4. HABENARIA Willd**.**

1. Habenaria arietina Hook. f. in *Fl. Brit. India*. **6(17):** 138 (1890Press *et al.*, *Ann. Check. Fl. Pl. Nep.*:217 (2000).

Erect herb of 35-80cm; tuber fuisiform, Leaves 6 or 7, distichous, distantly lanceolate to ovate, acute to subacuminate. Inflorescence subdensely many-flowered; Flowers 3-5cm across, yellow, lip greenish-white; Sepals spur cylindric. Column broad. Pollinia clave.

Habitat: Along a trial road **Fl. & Fr.:** Jul.-Aug.

Representative collection: Ilam, Jamun-2, Hangetham around, 2460m, $27^0$02'57''N, $88^0$00'46''E, September 6, 2007, LKSR-Expedition team, **C 210** (TUCH).

Distribution: Himalaya (Himachal Pradesh- Bhutan), North East India, West. China, Nepal (West-East: 2000-2900m),

5. OREORCHIS Lindl.

1. Oreorchis micrantha Lindl. in *J. Proc. Linn. Soc. Bot.* 3: 27 (1859); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 222 (2000).

Herb 20-35cm, roots fleshy, with fibrous stadards. Leaves 2, from pseudobulb, long linear-acuminate, 20-28x0.4-0.7cm. Inflorescence dense to subdense; rachis. Flower pale yellow, 6mm long. Column extended into a foot. Fruit pendent.

Habitat: Along a trial road. **Fl. & Fr.:** Jun.-Jul.

Representative collection: Ilam, Jamun-2, Hangetham around, 2760m, 27.1N, 87.93E, June 17, 2007, LKSR-Expedition team, **A 019** (TUCH).

Distribution: Himalaya (Uttar Pradesh-Bhutan), North East India, West China, Nepal (Centre -East: 2600-3000m).

6. SATYRIUM Sw. nom. Cons

1. Satyrium nepalense D. Don in *Prodr. Fl. Nepal*.: 26 (1825); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 225 (2000).

Herb 15-70cm tall. Leaves 2 or 3, oblong to ovate-lanceolate, sub basal, fleshy bases clasping the stem stout. Inflorescence densely many-flowered. Flowers fragrant, 0.8-1.6cm across, pink or white. Column short, curved, enclosed within lip. Pollinia clavate.

Habitat: In open pastureland. **Fl. & Fr.:** Aug.-Oct.

Representative collection: Ilam, Maimajuwa-Chintapu, 3250m, $27^0$22’10’’N, $88^0$02’20’’E, August 30, 2007, LKSR-Expedition team, **C 097** (TUCH).

Distribution: Himalaya (Kashmir-Bhutan), India, Sri Lanka, Myanmar, China. Nepal (West-East: 600-46000m).

7. SPIRANTHES Rich. (nom. Cons.)

1. Spiranthes sinensis var. **amoena** (M. Bieb.); Hara, *J. Jap. Bot*. **44:** 59 (1969); Press *et al.*, *Ann. Check. Fl. Pl. Nep.*: 225 (2000).

Neotria amoena M. Bieb., Fl. Taur. Cauc. 3: 606 (1819).

Herb of 15-45cm. Leaves 3-5 in a basal rosette oblong-elliptic to linear-lanceolate, acute, glossy, dark green, 5-16x0.4-1cm. Inflorescence densely many-flowered. Flowers spreading Lip simple. Fruit ovoid, glandular, Pseudobulb 6x3.5mm.

Habitat: Near side of cultivated land. **Fl. & Fr.:** Mar.-Oct.

Representative collection: Ilam, Maimajuwa-7, Tersegaun, 2180m, $27^0$04’33’’N, $87^0$56’37’’E, August 27, 2007, LKSR-Expedition team, **C 025** (TUCH).

Distribution: Himalaya (Kashmir-Bhutan), Myanmar, China, Nepal (West-East: 100-4600m), Afganithan.

5. DISCUSSION

5.1 Floristic composition

Flora governs the key position among the natural resources of any geographical area. Study on floristic composition of any region gives the clear picture of floristic content, which in turn can be useful for developing strategy for conservation and management of biodiversity. Eastern Nepal is unique in species diversity as it as the supplementary zone for Eastern Himalaya. The Eastern Himalaya stands out as being one of the globally important sites representing the important hotspot of South Asia. Eastern Himalaya of Nepal has been identified as one of the rich biodiversity hotspot in the world with high species diversity and high level of endemism. Floristic composition has been carried out to enumerate and prepare the comprehensive description of the vascular plants from the Lower Kanchenjungha Singhalila Ridge Ilam district east, Nepal. The variation in altitudinal range and climatic conditions favours the diversity of flora.

Present study recorded 299 species among them seven species were identified only family level, 22 species only generic level rest of them to species level falling under 184 genera and 86 families. Dicots belong to 69 families, 150 genera and 229 species whereas Monocots include 15 families 32 genera and 39 species. Similarly, Gymnosperms represented two families, two genera and two species. Floristic analysis showed that Rosaceae was the largest family with 23 species followed by Ericaceae 17, and Lauraceae 9 species. The family Rosaceae was the largest family comprising of 23 species belonging to 8 genera where as Ericaceae was found to be the second largest family comprising of 17 species belonging to 7 genera. The other dominant families in the decreasing order are Lauraceae (5 genera and 9 spp.), Asteraceae (6 genera & 8 spp.), Labiatae (7 genera & 8 spp.), Scrophulariaceae (6 genera and 8 spp.), Urticaceae (4 genera and 8 spp.), etc.

The genera *Rhododendron* and *Rubus* both consisted of 8 species were found to be largest genera and *Begonia* with 6 species followed by *Sorbus, Hypericum*, and *Berberis* with 5 species in each. The floristic analysis showed that the dicotyledonae was dominant in comprision to the monocotyledoneae. The ratio of Monocotyledoneae to Dicotyledoneae was found to be 1: 5.95 for species, 1: 4.56 for genera and 1: 5 for families. Siwakoti and Varma (1999) recorded 743 species of flowering plants belonging to 493 genera and 128 families (dicotyledons 546 species under 383 genera and 105 families of monocotyledons 197 species under 110 genera and 23 families) from eastern Tarai in comparison with this present result governs the 42% of dicots and 20% of monocots reported by Siwakoti and Varma.

Rai (1999) studied the flora of Maipokhari and adjoining Area of Ilam district and reported Dicotyledons (55 families, 117 genera and 152 species), Monocotyledons (6 familes, 30 genera and 35 species) .Among Dicots Roasaceae and Ericaceae showed largest position with 15 and 13 species. In each comparision with this present study shows a little broad result Dicotyledons (70 families, 149 genera and 232 species), Monocotyledons (14 families, 33 genera and 39 species . similarly present study showed the same result with Rosaceae 21 species and Ericaceae 17 species. From this result we can predict that the study sitewas very rich in *Rubus* and *Rhododendron*.species.Highly dominant species were *Castanopsis hystrix, Alnus nepalensis, Lyonia ovalifolia, Lithocarpus pachyphylla, Symplocos ramosissimaa*, *Rhododenron arboreum* and *R. falconerii,* etc. in the natural forest.

Sharma (2000) stated that Ilam district is rich in medicinal plants resources and most of the resources are unexploited. According to him, there were 125 medicinal plants in Ilam district some of them were threatened. The most threatened medicinal plant species were *Bergenia* species*, Dioscorea deltoidea, Michelia champaca, Nardostachys grandiflora, Neopicrorhiza scrophulariflora, Rheum* species*, Valeriana wallichii, etc*

The study includes 11 threatened species as follows: *Taxus wallichiana* (IUCN – V, CITES – II, GoN - II), *Swertia chirayita* (IUCN - V), *Podophyllum hexandrum* (IUCN - V), *Paris polyphylla* subsp *polyphylla* (IUCN - V), *Paris polyphylla* subsp *marmorata* (IUCN - V), *Michelia velutina* (CITES - II), *Michelia champaca* (IUCN – E, CITES II, GoN - III), *Magnolia globosa* (IUCN – R, CITES - II), *Magnolia campbelli* (IUCN – R, CITES II), *Dioscorea deltoidea* (IUCN - CT, CITES – II,), *Aconitum spicatum* (IUCN - CT). Due to the anti-cancer properties of *Taxus*, it is highly exploited similarly the *Michelia* species are also exploited in natural forest due to the high timber value. Shrestha (2002) assessed floral diversity of Kanchenjungha conservation area at landscape level was for resource management strategy. Biodiversity hotspots and key stone species were identified on the basis of species richness, taxonomic uniqueness, endangered species, habitat value, and threat status and use pattern. *Bombax ceiba, Castanopsis hystrix, Lithocarpus pachyphylla, Michelia champaca, Quercus lamellosa*, etc were identified as key stone species of the KCA. Overgrazing, forest degradation and slash-and-burn agriculture were identified as major threats; similarly the study also reveals that Lower Kanchanjangha Singhalila Ridge Ilam is also very important habitat for above n\mentioned species.

Basnet (2003) assessed Floral diversity of Maipokhari, Ilam and documented 233 plant species from this area that comprises 28 Pteridphytes, 6 gymnosperms, 49 monocots and 150 dicot species. There were 6 species of *Rubus* and 4 species of *Rhododendron* in his

records. The present study also showed that similar result in comparison with above study.

Present study has furnished some new addition to the flora of Nepal. Out of the identified 273 species, three species viz. *Begonia flaviflora* H. Hara (Begoniaceae), *Carex cruciata* Wahlenberg var. *argocarpa* C. B. Clarke (Cyperaceae), and *Strobilanthes helicta* Anderson (Acanthaceae). Several species still remaining unidentified, which is due to insufficient literature, lack of represented herbarium specimens in KATH and TUCH, etc. This proves that through deep investigation of these areas will increase the chance of new records to the flora of Nepal. The diversity of dicots are nearly five times greater than monocots it is due to the flowering and fruiting.

The flora of eastern Nepal includes 3500 species of higher plants, 400 Pteridophytes and 1000 Bryophytes. Over half of these species do not grow to the west of 87^0 E, which permits a clear separation of the eastern Nepalese types from all other vegetation types of Nepal (Dobremez and Shakya, 1975).

The east Himalayan element is dominant in the flora of Kanchenjungha. Of a total of 254 temperate species under consideration, 133 species are unquestionably East Himalayan in distribution, and many of the 55 pan-Himalayan species can be presumed to be eastern in origin. Out of 133 species listen as East Himalayan, 86 species terminate their western range in Nepal. When travelling in East Nepal one cannot fail to notice the richness of the East Himalayan element present in the flora of the Arun-Tamur, and conversely one is impressed by the rapid disappearance of many eastern species as one moves west across the Arun-Koshi watershed (Stainton, 1972).

Out of 6500 species of higher plants in Nepal flora, about two-thirds of the species are expected to occur in this area and the numbers of species are generally decreased from Central to West Nepal.

The high floristic diversity of this region is due to the presence of diverse ecological habitats. Habitats include: marshes, river gullies, steep slopes with crevices, verdant valleys, and dry alpine grasslands. Tree trunks and branches of Rhododendron, *Lyonia* are covered with epiphytes (mosses, lichens, Orchids) and parasitic plants. Weeds threatening the natural vegetation of the region are *Lantana camara* in the subtropics, *Ageratina adenophora* in the temperate and *Aconogonum molle* in the sub alpine zone.

KCA exhibits all the vegetation and forest types of Nepal including upper sub-tropical hill sal forest in the south, *Schima-Castanopsis-Oak* forest in the middle hills, dense coniferous forest of *Abies*, *Tsuga* and *Juniperus* in the higher hills, bushes of

Rhododendron in the upper sub alpine and alpine grasslands. The area is photogeographically interesting to the presence of many Sino-Japanese and Sino-Himalayan elements.

5.2 Vegetation ecology

5.2.1 Forests

Forest is a complex ecological system in which trees are dominant life forms. Today forest is any land managed for the diverse purposes of forestry, whether or not covered with trees, shrubs, climbers or such other vegetation. Forest represents the largest most complex and most self generating of all ecosystems.

Stainton (1972) described primary forests in neighboring Sikkim, India, as a continuous belt from 1,850-2,900m elevation containing three forest types: (a) *Castanopsis tribuloides* and *Castanopsis hystrix* at lower elevations, (b) *Quercus lamellosa* in the middle, and (c) *Lithocarpus pachyphylla* at higher elevations. Thus, the primary forests in this region contain elements of three forest types described by Stainton (1972) and HMGN/MFSC and TISC/NARMSAP (2002) (the latter reference gives revised names for these forest types, listed in parentheses following Stainton's names). First, the *Castanopsis tribuloides-Castanopsis hystrix* (*Schima-Castanopsis*) forest type occurs up to 2,300 m. Second, the *Quercus lamellosa* (East Himalayan Oak-Laurel) forest type exists throughout the elevation range for this research. Finally, aspects of the *Lithocarpus pachyphylla* (*Lithocarpus*) forest type are present at the upper limits of our study. The understory in these forest types contains many species of epiphytes, climbing plants, ferns, orchids, and mosses (HMGN/MFSC and TISC/NARMSAP, 2002; Rai, 1999).

With in 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).

Large portions of the mountainsides are covered with terraced fields. The majority of farmers practice dry-farming of corn and potatoes. Other popular crops are wheat, millet, legumes, radish, and leafy vegetables. Many farmers earn a regular income by cultivating cash-crops, such as *Thysanolaena maxima* (broom-grass), *Amomum subulatum* (large cardamom), and recently *Camellia sinensis* (used to produce black tea) (NCDC, 2002).The three species widely planted in the study area are: *Cryptomeria japonica* (Japanese Cedar), *Pinus roxburghii* (Chir Pine), and *Pinus wallichiana,* (Blue Pine).

There are also several broad-leafed tree species that are commonly planted in state-owned lands, sometimes in combination with other species and sometimes as monocultures.

In many Community Forests removal of fodder and fuel-wood is a regular, sanctioned event, whereas in state-managed forests removal of forest resources is banned outright. Monitoring of the forests is difficult and oftentimes farmers obtain resources extralegally from Community Forests and state-managed forests. Illegal grazing by livestock occurs regularly in many state-owned forests, as does chopping of fuel-wood (HMGN/MFSC, 2002, Shrestha; Grosen, 2000). Village-level medicinal and aromatic plant traders collect valuable plant species from state-owned forests and trade them within Nepal or across the border in India (Chaudhary, 2000; Chhetri and Pokhrel, 2000; Edwards 1993).These activities have been ongoing for centuries, but were outlawed only within the last 50 years, as forest-sector policies took effect. For the purposes of this study, primary forests were those that had generated naturally and were dominated by tree species commonly associated with the *Castanopsis tribuloides-Castanopsis hystrix, Quercus lamellosa,* and *Lithocarpus pachyphylla* are majore vegetation types. The deforested stands, under continuous grazing pressure from cattle, goats, and buffalo, were dominated by herbaceous groundcover with some shrubs and occasionally trees. Some of these areas had been converted to cropland and then left fallow.

5.2.2 Structure of the Vegetation

Practices for removal of forest biomass in the form of grazing, lopping, surface burning and litter removal at a given time are a continuous disturbance affecting the stability of the ecosystem and retarding the succession processes in the area. These areas can be clearly demarcated on the basis of different phytosociological parameters of the vegetation. In the present study the tree density ranged from 1009.09 to 1203.57 individuals ha^{-1}, which is comparable to tropical forests. Higher anthropogenic disturbances in the buffer area have also led to the elimination of seedlings of most of the species. The total basal area across the sites ranged from 95.74 to 140.52m^2/ha1.The differences in basal area of tree layer among study sites may be due to difference in altitude, species composition, age of trees, and degree of disturbance and succession stages of the stands. The value obtained for basal area in the present study is comparable to the Indian tropical forests (Visalakshi, 1995). Importance value index of *Lithocarpus pachyphylla* as the present study area is located at altitude ranged from 2100m-3000m. The change in IVI of *Lithocarpus pachyphylla* among the study sites is due to the change in species composition, disturbance and altitude. Other studies elsewhere have reported a similar range of species richness (Brockway, 1998; Tripathi, 2001). Importance value index (IVI) of tree species indicated that *Lithocarpus pachyphylla* and *Eurya acuminata*

were the dominant species at all the study sites in the tree and sapling layers of tree serve followed by *Rhododendron, Lyonia, Acer* species, and, etc.

5.2.3 Size Class Distribution

In the study the size class distribution doesn't indicate different population structure, which may be related to differences in environment and disturbance regimes. 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 present work but the population structure of middle temperate zone shows somewhat continuous regeneration than others two range. The regeneration potential of trees in the study area was somewhat in continuous. The different shape of density-diameter show the extent of effect of disturbances on the density dbh classes (Gautam and Watanabe, 2005). In a montane rain forest in Mexico, Ramierz-Marcial *et al*. (2001) found that stem density decreases with distrubace intensity. Our study also found that the stem density declined with increasing disturbance such as graizing damages sapling through trampling and browsing (Glatzel, 1999). Dbh distribution of tree species among elevation is largely controlled by the density of over storey species and the pattern of regeneration can be described by the size distribution as reported by Singh *et al*. (1986). Middle elevation sites had a lower number of species than lower and higher elevation sites. Lower elevation is easily assessable by men than other so it is a little disturbed. Disturbed sites contained more species than undisturbed and moderately disturbed sites. Disturbances occurred either in the form of recurring soil erosion (natural) or anthropogenic disturbances such as grazing, lopping, surface burning and illegal cutting.

The distribution pattern of trees, shrubs, herbs, saplings and seedlings for all study sites is shown in appendix I. Odum (1971) stated that under natural conditions, a clumped distribution of plants is normal. A higher percentage of random and regular distribution reflects the greater magnitude of disturbance` such as grazing and lopping in natural forest stands. All the vegetation layers showed generally clumped type of distribution in the present study. The tree layer exhibited less clumped distribution at the disturbed sites than the undisturbed and moderately disturbed study sites. The distribution pattern of other vegetational layers did not show any distinct difference among the study sites.

5.2.4 Altitudinal Variation in tree diversity and species richness

The present study was conducted along an altitudinal gradient in a temperate forest of Lower Kanchenjungha Singhalila Ridge Ilam District. Species diversity (H') ranged from (3.68-3.22). Species diversity and concentration of dominance are generally inversely related. The values of species richness (S), species diversity (H') and CD are given in

Table 4. Species richness and diversity of tree species along an altitudinal gradient ranged between (5.27-3.29) and (3.68-3.22) respectively. Maximum diversity (3.68) reported for UTZ (2700-3000m) with the maximum number of species richness (22) whereas minimum diversity (3.22) recorded for MTZ (2400-2700m) with mediuum number of tree species (20). Concentration of dominance showed reverse trend as compared to species diversity.

In the present study the value of concentration of dominance ranged between 0.15 (MTZ, 2400-2700m) to 0.12 (LTZ, 2100-2400m). These values are generally comparable with the values reported for temperate forests (Singh & Singh, 1986). Lower diversity in the temperate forests could be due to the lower rate of evolution and diversification of community (Simpson, 1949) and severity in the environment (Conell and Oris, 1964). CD showed reverse trend as compared to species diversity. These findings supported the range reported by Risser and Rice (1971) for temperate forests. The data in Table 4 indicates that increasing diversity and reduced concentration of dominance is associated with increased stability (McNaughton, 1967). Pandey and Singh (1985) have also reported increasing species diversity in disturbed ecosystem of Kumaon Himalaya. It is a well known fact that the altitude represents a complex gradient along with many environmental variables change concomitantly. Rahbek (1997) explained the patterns in species richness decrease with altitude. Highly diverse compositional pattern of forests characteristic of central Himalaya, has been explored by (Singh and Singh, 1987). Besides the ecosystem functions the distribution and occurrence of species had been affected by human interventions (Singh and Singh, 1987). Among human influence, commercial exploitation, agricultural requirements, forest fire, and grazing pressure are the important source of disturbance (Singh and Singh, 1992).The result of present sturdy is pronounced that as well as the altitude is increase the tree diversity is also increase which is the result of above biotic disturbance and invasion by new species on these stands.

The highest number of tree species (22) was recorded from Stand UTZ due to relatively open habitat which provided congenial environment for the growth of different species. Figure 1 showed the total density of tree species ranged between 1009 trees/ha (UTZ) to 1203 trees/ha (MTF). The present values of density were higher as compared to those for submontane forest (Bhandari *et al*, 1997), suggesting that the present stands were much older than the submontane forests of Garhwal Himalaya. Study revealed that *Quercus leucotricophora* is the most dominant species of all stands. Oak (*Qurecus* spp) forests are most extensively distributed between the altitudes 1000 m to timberline and represent the climax stage, throughout the central Himalaya (Champion and Seth, 1968; Upreti *et al*; 1985).

In these forests, one or other species of oak exhibits clear-cut dominance over other associated tree layer (Singh and Singh, 1986). Three oak species (Q*urecus lamellosa, Quercus glauca* and *Quercus semecarpifolia*) were recorded in present forest stands but none of these attained a clear-cut dominance. The diversity index is generally higher for tropical forests and the reported range is 5.1 and 5.4 for young and old stands, respectively (Knight, 1975). Many researchers have reported the diversity value for Indian forests in the range of 0.8 to 4.1 (Parthasarthy *et al.,* 1992; Visalakshi, 1995). Thus, the diversity values of tree species obtained in the present study is well within the reported range of Indian tropical forests. However, these values are lower than the other tropical forests (Knight, 1975) which may perhaps be due to climatic differences and high degree of natural disturbances, which are critical factors in governing the temperate forest species diversity. It is well known fact that the altitude represents a complex gradient along with many environmental variables changes concomitantly. The result of the present study is pronounced that as well as the altitude is increase the tree diversity is also increase which is the result of above biotic disturbance and invention by new species on these lands.

6. CONCLUSION

The study has furnished some new addition to the flora of Nepal. Out of 270 secies *viz. Begonia flavifora* H. Hara (Begoniaceae), *Carex cruciata* Wahlenberg var. *argocarpa* C. B. Clarke (Cyperaceae), and *Strobilanthes helicta* Anderson (Acanthaceae). Present study has also mentioned the 11 threatened species of different categories and one endemic species *Heracleum lallii* (Umbelliferae).The high floristic diversity of this region is due to the presence of diverse ecological habitats which includes marshes, river gullies, and steep slopes. Weeds threatening the natural vegetation of the region are *Lantana camara* in the subtropics, *Ajeratina adenophora* in the temperate and *Aconogonum molle* in the upper Zone.

- Biological resources of the area are used by local people in much ways. The loss of biodiversity and degradation of forests in many places (especially near villages) can be attributed medicinal herb collection and unregulated grazing. Many resident species are expected to be endangered or threatened. The area is so l interested not only to the presence of rare and primitive plants such as *Magnolia*, *Michelia*, *Taxus* as well as occurrence of almost all of Nepal's *Rhododendron* species, *Rubus* species diversity and existence of many plants of value to the national economy (e.g. forest products, medicinal) but also of diverse ethnic groups.
- The important flora needs protection, because of their scientific interest and rarity. They are characteristics of particular vegetation types and specific role they play in the ecosystem. To prevent deforestation, alternative sources of fuel and timber should be introduced. Programs that provide conservation education, initiate the sustainable use of the forests, and propagate multipurpose indigenous trees should be initiated.
- Less economic tree species showed higher population and regeneration where important tree species such as *Taxus, Magnolia* and *Michelia* showed less dominated due to the 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
- The diversity of tree species showed hump shape relation with elevation gradient.
- It is recommended that biological inventories with comprehensive flora and fauna biological databases be prepared.
- Detailed ecological study of vegetation is needed for the development of conservation and management programs within the study area.

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PHOTO PLATE I

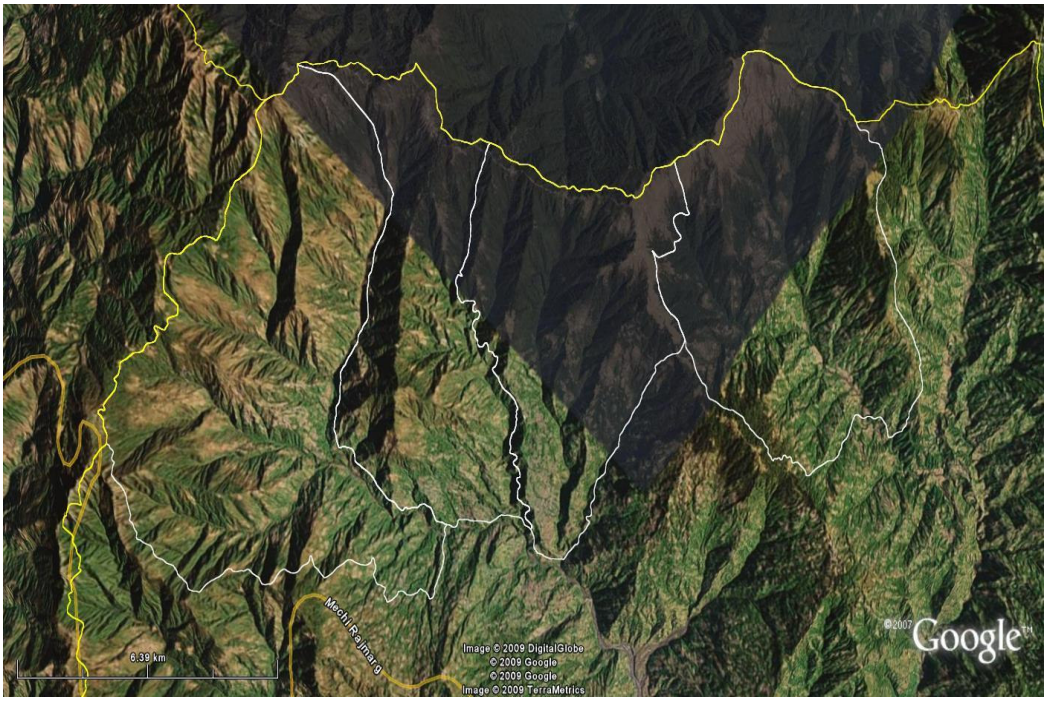

Photo 1: Landscape of the study area.

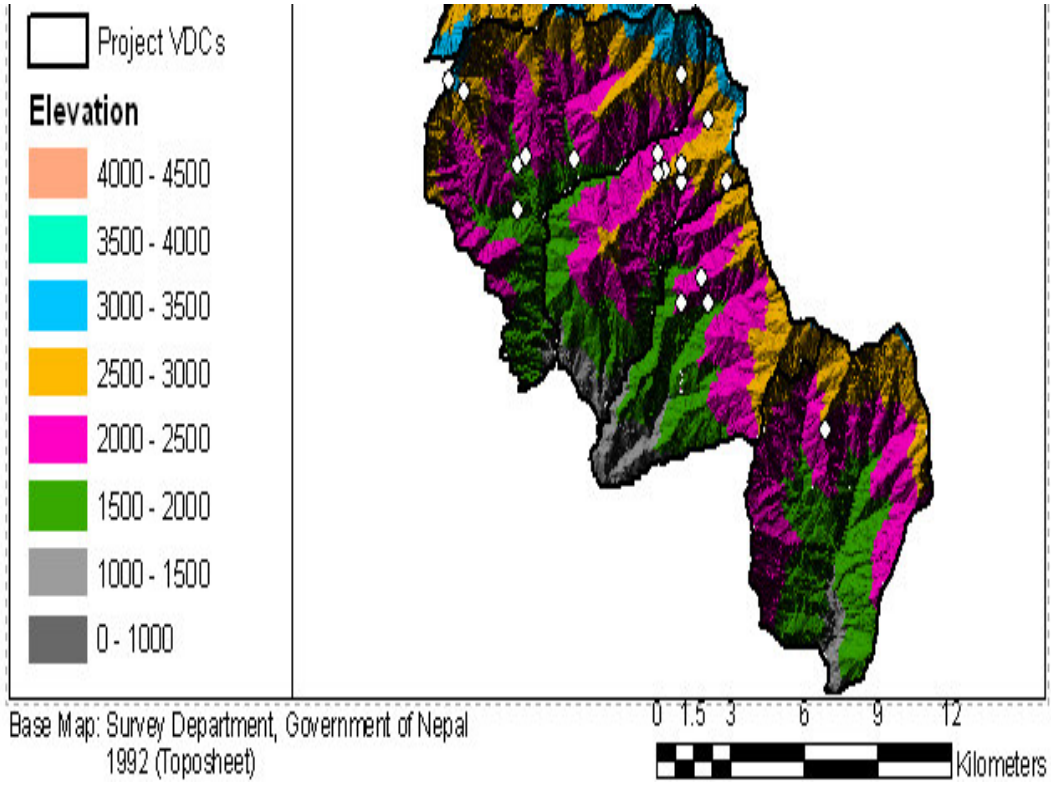

Photo 2: Distribution of new addition of species for flora of Nepal

PHOTO PLATE II (New records)

Photo 3. . *Begonia flaviflora* H. Hara
(Begoniaceae)

Photo 4: *Strobilanthes helicta* Anderson
(Acanthaceae)

Photo 5: *Carex cruciata* Wahlenberg
var.*argocarpa* C. B. Clarke
(Cyperaceae)

Annex 1

List of Families with Number of Genera and Species from LKSR, Eastern Nepal

A. Gymnosperms

SN	Family	Genera	Species
1.	Taxaceae	1	1
2.	Taxodiaceae	1	1`
Total	2	2	2

B. Angyosperms

I. Dicotyledoneae

SN	Family	Genera	Species
3.	Acanthaceae	3	3
4.	Aceraceae	1	2
5.	Actinidaceae	1	1
6.	Alangiaceae	1	1
7.	Amaranthaceae	1	1
8.	Anacardiaceae	2	2
9.	Aquifoliaceae	1	2
10.	Araliaceae	3	3
11.	Aristolochiaceae	1	1
12.	Asclepiadaceae	3	5
13.	Asteraceae	6	9
14.	Balsaminaceae	1	5
15.	Begoniaceae	1	6
16.	Berberidaceae	2	5
17.	Betulaceae	1	1
18.	Boraginaceae	1	1
19.	Buxaceae	1	1
20.	Campanulaceae	4	5
21.	Caprifoliaceae	3	6
22.	Caryophyll-aceae	1	1
23.	Celastra-ceae	1	1
24.	Crassula-ceae	1	1
25.	Cruciferae	1	1
26.	Cucurbita-ceae	3	3
27.	Daphniphyllaceae	1	1
28.	Ericaceae	7	17
29.	Fabaceae	4	4
30.	Fagaceae	2	3
31.	Fumariaceae	2	3
32.	Gentianaceae	3	5
33.	Geraniaceae	1	1
34.	Gesneriaceae	3	6
35.	Hydrangeaceae	2	2
36.	Hypericaceae	1	4
37.	Labiatae	7	8
38.	Lardizabalaceae	1	1
39.	Lauraceae	5	8
40.	Linaceae	1	1
41.	Loranthaceae	1	2
42.	Magnoliaceae	2	3
43.	Melastomataceae	2	2
44.	Monotropaceae	1	1
45.	Moraceae	1	1
46.	Myrsinaceae	2	2
47.	Oleaceae	1	1
48.	Oxalidiaceae	1	1
49.	Papaveraceae	1	1
50.	Piperaceae	1	1
51.	Podophylaceae	1	1
52.	Polygalaceae	1	1
53.	Polygonaceae	2	3
54.	Primulaceae	1	2
55.	Ranunculaceae	*5*	7
56.	Rosaceae	8	22
57.	Rubiaceae	5	6
58.	Rutaceae	3	4
59.	Sabiaceae	1	1
60.	Saxifragaceae	2	2
61.	Schisandraceae	1	2
62.	Scrophulariaceae	6	8
63.	Solanaceae	1	1
64.	Symplocaceae	1	3
65.	Theaceae	1	1
66.	Thymelaceae	2	2
67.	Umbelliferae	4	5
68.	Urticaceae	4	7
69.	Valarianaceae	1	1
70.	Violaceae	1	1
71.	Vitaceae	2	2
Total		150	229

II. Monocotyledoneae

SN	Family	Genera	Species
72.	Aliaceae	1	1
73.	Anthericaceae	1	1
74.	Araceae	2	2
75.	Asparagaceae	1	2
76.	Commelinaceae	4	4
77.	Convallariaceae	4	6
78.	Cyperaceae	2	4
79.	Dioscoreaceae	1	1
80.	Juncaceae	1	1
81.	Liliaceae	2	2
82.	Orchidaceae	7	7
83.	Poaceae	2	2
84.	Smilacaceae	1	2
85.	Trilliaceae	1	2
86.	Zingiberaceae	2	2
Total		32	39

Annex 2

Enumeration of flowering plants recorded from LKSR, Ilam

A. Gymnosperms

SN	RCN	Family	Plant name	Date(2007)	Alt. m	Lat. N	Long. E	Location
1.	*C 088*	Taxaceae	*Taxus wallichiana* Zucc.	08/30	2650	27 05 28.6	87 55 29.2	Maimajuwa-Chintapu
2.	B 232	Taxodiaceae	*Cryptomeria japonica* (L.F.) D. Don	06/07	2243	27.04	88.01	Jamuna 2, Hangetham

B. Angiosperms

I. Dicotyledoneae

SN	RCN	Family	Plant name	Date(2007)	Alt.	Lat.	Long.	Location
3.	*C 009*	Acanthaceae	*Hypoestes triflora* (Forssk.) Roem. & Schult.	08/27	1820	27 03 52	87 56 38	Thulogaun, Maimajhuwa
4.	*C 191*	Acanthaceae	*Strobilanthes helicta* T.Anders	09/05	2660	27 04 07.0	87 59 37.6	Dobate, Hangetham
5.	*C 189*	Acanthaceae	*Thunbergia coccinea* Wall. ex D.Don	09/05	2660	27 04 07.0	87 59 37.6	Dobate, Hangetham
6.	B 103	Aceraceae	*Acer campbelli* Hook. f. & Thomson ex Hiern in Hook. f.	06/15	3080	27.09	88.01	Mabu, Chauri Chowk
7.	B 117	Aceraceae	*Acer pectinatum* Wall. ex Pax	06/06	2940	27.07	88.01	Mabu, Kalapokhari
8.	*B 135*	Actinidaceae	*Actinidia srigosa* Hook. f. & Thomson ex Benth.	06/06	2770	27.06	88.01	Mabu, Kalapokhari
9.	*C 140*	Alangiaceae	*Alangium alpinum* (C.B. Clarke) W.W. Sm. & Cave	09/03	2670	27 04 05.1	87 59 28	Dobate, Mabu-8
10.	*C 171*	Amaranthaceae	*Cyathula capitata* Moq.	09/03	2660	27 04 07.0	87 59 37	Dobate, Mabu-8
11.	*C 184*	Anacardiaceae	*Dobinea vulgaris* Buch.-Ham ex D.Don	09/05	3210	27 18 45	88 01 22.4	Dobate, Hangetham
12.	*C 121*	Anacardiaceae	*Rhus succedanea* L.	09/01	2660	27 04 07.0	87 59 37.6	Mabu-8
13.	B 184	Aquifoliaceae	*Ilex dipyrena Wall.*	06/08	2450	27.01	88.02	Jamuna, Jowbari
14.	*C 155*	Aquifoliaceae	*Ilex fragilis* Hook. f.	09/03	2690	27 04 19.8	88 00 2.7	Dobate, Mabu-8
15.	B 119	Araliaceae	*Gambelia ciliate* C.B. Clarke	06/06	2940	27.07	88.01	Mabu, Kalapokhari
16.	B 108	Araliaceae	*Meriolliopanax alpinus Decne. & Planch.*	06/16	3050	27.07	88.01	Mabu, Kalapokhari
17.	C 176	Araliaceae	*Panax pseudo-gensing* Wall.	09/03	3170	27 16 50	88 01 50.3	Dobate, Mabu-8
18.	*C 141*	Aristolochiaceae	*Aristlochia griffithii* Hook. f. & Thomson ex Dutch	09/03	2000	27 11 27	87 56 18.6	Dobate, Mabu-8
19.	B 180	Asclepiadaceae	*Asclepias curssavica* L.	06/08	2620	27.02	88.02	Jamuna, Jowbari

20.	*C 207*	Asclepiadaceae	*Ceropegia macrantha* Wight	09/06	1980	27 17 01	87 58 14.6	Hangetham, Jamuna-1
21.	*C 058*	Asclepiadaceae	*Ceropegia pubescens* Wall	08/28	2260	27 04 07.0	87 59 37	Sisne, Mai majhuwa
22.	*C 194*	Asclepiadaceae	*Hoya linearis* Wall..	09/05	2330	27 02 44.8	88 00 25	Dobate, Hangetham
23.	A 046	Asclepiadaceae	*Hoya longifolia* Wall. ex Wight	06/08	2840	27.1	87.95	Banduke
24.	*C 136*	Asteraceae	*Ainsliaea aptera* DC.	09/03	2670	27 04 05.1	87 59 28	Dobate, Mabu-8
25.	C 057	Asteraceae	*Anaphalis contorta* (D.Don) Hook. f.	08/28	1870	27 04 08	87 57 39	Newa khola, Mai majhuwa
26.	B 191	Asteraceae	*Aster tricephalus* C.B.Clarke	06/08	2200	26.99	88.02	Jogmai, Kholagaun
27.	C 144	Asteraceae	*Cirsium falconeri* (Hook.f.) Petr.	09/03	2670	27 04 05.1	87 59 28.9	Dobate, Mabu-8
28.	*C 004*	Asteraceae	*Cosmos bipinnatus*	08/27	1820	27 03 52	87 56 38	Thulogaun, Maimajhuwa
29.	*C 105*	Asteraceae	*Senecio acuminatus* Wall. ex DC.	08/30	2790	27 05 28.1	87 55 21	Dhapar
30.	*B 198*	Asteraceae	*Senecio chrysanthemoides* DC.	06/08	2200	26.99	88.02	Jogmai, Kholagaun
31.	*C 175*	Asteraceae	*Senecio scandens*Buch.-Ham. ex D.Don	09/03	2660	27 04 07.0	87 59 37	Dobate, Mabu-8
32.	*C 157*	Asteraceae	*Senecio alatus Wall. ex DC.*	09/03	2690	27 04 19.8	88 00 2.7	Dobate, Mabu-8
33.	A 008	Balsaminaceae	*Impatiens graciliflora* Hook.f.	06/07	1900	27.06	87.94	Maimajuwa 7, Upper Hatiya
34.	*C 017*	Balsaminaceae	*Impatiens sulcata* Wall.	08/27	2100	27 04 19	87 56 34	Naule gaun, Mai majhuwa7
35.	*C 117*	Balsaminaceae	*Impatiens puberula* DC.	09/01	2450	27 04 21.2	87 59 29	Mabu-8
36.	*C 015*	Balsaminaceae	*Impatiens racemosa* DC.	08/27	2100	27 04 19	87 56 34	Naule gaun, Mai majhuwa7
37.	C 131	Balsaminaceae	*Impatiens urticifolia* Wall.	09/03	2670	27 04 05.1	87 59 28.9	Dobate, Mabu-8
38.	*C 036*	Begoniaceae	*Begonia dioca* Buch.-Ham. Ex D. Don.	08/27	1838	27 04 02	87 56 22	Rate khola, Mai majhuwa
39.	B 163	Begoniaceae	*Begonia flaviflora* H. Hara	06/07	2172	27.04	88.01	Jamuna 2, Hangetham
40.	*C 128*	Begoniaceae	*Begonia gemmipara* Hook.f.	09/01	2450	27 04 21.2	87 59 29.2	Patarashe, Mabu-8
41.	A 021	Begoniaceae	*Begonia grevillanum*	06/07	2410	27.08	87.94	Charkhol, Maimajuwa
42.	*C 086*	Begoniaceae	*Begonia josephii* A.DC.	08/30	2650	27 05 28.6	87 55 29.2	Chhintapu
43.	*C 200*	Begoniaceae	*Begonia sikkimensis* A.DC.	09/05	2660	27 04 07.0	87 59 37.6	Dobate, Hangetham
44.	B 071	Berberidaceae	*Berberis angulosa* Wall. ex.Hook f. & Thomson	06/14	3566	27.10	87.99	Maimajuwa, Ahal Bhanjyang
45.	B 195	Berberidaceae	*Berberis aristata* DC.	06/08	2200	26.99	88.02	Jogmai, Kholagaun
46.	B 081	Berberidaceae	*Berberis hookeri* Lem.	06/14	3220	27.09	88.00	Mabu, Bikhe

								Bhanjyang
47.	B 144	Berberidaceae	*Berberis insignis* Hook. f. & Thomson	06/06	2800	27.06	88.01	Mabu, Kalapokhari
48.	*B 007*	Berberidaceae	*Mahonia napaulensis*DC.	06/07	2244	27.07	87.94	Maimajuwa 7, Naule Gaun
49.	B 134	Betulaceae	*Corylus ferox* Wall.	06/06	2770	27.06	88.01	Mabu, Kalapokhari
50.	B 098	Boraginaceae	*Hackelia uncinata* (benth. In Royle) C.S.E. Fisch.	06/15	3050	27.08	88.01	Mabu, Near Mai khola, Chauri chowk
51.	C 126	Buxaceae	*Sarcococca hookeriana* Baill.	09/01	2450	27 04 21.2	87 59 29.2	Patarashe, Mabu-8
52.	*C 092*	Campanulaceae	*Campanula pallida* Wall.	08/30	3170	27 05 22.7	87 54 47.3	Chhintapu
53.	*C 107*	Campanulaceae	*Codonopsis bhutanica* Ludlow	09/01	2660	27 04 05.1	87 59 28	
54.	C 024	Campanulaceae	*Codonopsis viridis* Wall.	08/27	2190	27 04 33	87 56 37	Mane dada, Terse gaun, Mai majhuwa
55.	C 226	Campanulaceae	*Lobelia pyramidalis* Wall.	09/09	2173	27 04 30.4	87 58 36.1	Hangetham CF
56.	*C 235*	Campanulaceae	*Pratia nummularia* (Lam.) A.Braun & Asch.	09/11	2278	27 00 3902	88 01 18	Ramite, Jogmai-1
57.	*C 197*	Caprifoliaceae	*Lonicera webbiana* Wall. ex DC.	09/05	2656	27 04 07.0	87 59 37.6	Dobate, Hangetham
58.	*C 130*	Caprifoliaceae	*Sambucus adnata* Wall. ex DC.	09/03	2665	27 04 05.1	87 59 28.9	Dobate, Mabu-8
59.	*C 019*	Caprifoliaceae	*Viburnum coriaceum* Blume	08/27	2187	27 04 33	87 56 37	Mane dada, Terse gaun, Mai majhuwa
60.	B 005	Caprifolia-ceae	*Viburnum erubescens* Wall.ex.DC.	06/07	2042	27.06	87.94	Maimajuwa 7, Naule Gaun
61.	B 088	Caprifolia-ceae	*Viburnum mullaha* Buch.-Ham. ex D.Don l	06/14	3121	27.09	88.01	Mabu, Bikhe Bhanjyang
62.	B 101	Caprifolia-ceae	*Viburnum nervosum* D.Don	06/15	3059	27.08	88.01	Mabu, Near Mai khola, Chauri chowk
63.	A 017	Caryophyll-aceae	*Arenaria Fernald*	06/07	2411	27.08	87.94	Charkhol, Maimajuwa
64.	*C 198*	Celastra-ceae	*Eunymous grandiflorus*Wall. In Roxb.	09/05	3515	27 17 15	88 02 41.7	Dobate, Hangetham
65.	*C 096*	Crassula-ceae	*Rhodiola chrysansanthemefolia* subsp. *Sacra*(Raym.-Hamet) H. Ohba	08/30	3475	27 18 22	88 02 41.7	Chhintapu
66.	A 040	Cruciferae	*Cardamine* flexuosa With.= *Cardamine scutata* subsp. *flexuosa* (With.) H.Hara	06/08	2835	27.1	87.95	Banduke
67.	C 160	Cucurbita-ceae	Biswania tonglensis *(C.B.Clarke) Cogn.*	09/03	2689	27 04 19.8	88 00 2.7	Dobate, Mabu-8
68.	*C 045*	Cucurbita-ceae	*Herpetospermum peduculosum* (Ser.)	08/27	2689	27 04 19.8	88 00 2.7	Rate khola, Mai majhuwa

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69.	B 190	Cucurbita-ceae	*Trichosanthes himalensis* C.B.Clarke	06/08	2278	27.00	88.02	Jamuna, Jowbari
70.	B 110	Daphniphyllaceae	*Daphniphyllum himalense* (Benth.) Mull. Arg.	06/16	3053	27.07	88.01	Mabu, Kalapokhari
71.	B 174	Ericaceae	*Agapetes incurvata* var. *hookeri*(C.B.Clarke) Airy Shaw	06/07	2213	27.04	88.02	Jamuna 2, Hangetham
72.	A 014	Ericaceae	*Agapetes serpens* (Wight) Sleumer	06/08	2176	27.07	87.94	Maimajuwa 7, Terse Gaun
73.	B 113	Ericaceae	*Enkianthus deflexus* (Griff.) C.K.Schneid.	06/06	2969	27.07	88.01	Mabu, Kalapokhari
74.	*C 051*	Ericaceae	*Gaultheria fragrantisima* Wall.	08/28	2480	27 05 18.6	87 55 37.7	Newa khola, Mai majhuwa
75.	C 027	Ericaceae	*Gaultheria nummularioides*D.Don	08/27	1837	27 04 15.8	87 57 29	Mane dada, Terse gaun, Mai majhuwa
76.	C 206	Ericaceae	*Gaultheria semi-infera*(C.B.Clarke) Airy Shaw	09/06	2468	27 02 57.3	88 00 46	Hangetham, Jamuna-1
77.	B 077	*Ericaceae*	*Lyonia viliosa* (Hook.f.)Hand.-Mazz.	06/14	3395	27.10	88.00	Mabu 8, Chatu Bari
78.	B 106	Ericaceae	*Pieris formosa* (Wall.)D. Don	06/15	3084	27.09	88.01	Mabu, Chauri Chowk
79.	*C 137*	Ericaceae	*Rhododendron arboreum* Sm. var. *arboreum*	09/03	2665	27 04 05.1	87 59 28	Dobate, Mabu-8
80.	*C 215*	Ericaceae	*Rhododendron ciliatum* Hook.f.	09/06	2463	27 00 11.3	88 01 22.3	Hangetham, Jamuna-1
81.	B 078	Ericaceae	*Rhododendron cinnabarinum* Hook.f.	06/14	3395	27.10	88.00	Mabu 8, Chatu Bari
82.	B 089	Ericaceae	*Rhododendron falconeri* Hook.f.	06/14	3121	27.09	88.01	Mabu, Bikhe Bhanjyang
83.	*C 132*	Ericaceae	*Rhododendron griffithiana* Wight	09/03	2665	27 04 05.1	87 59 28	Dobate, Mabu-8
84.	B 074	Ericaceae	*Rhododendron lepidotum* Wall.ex G.Don	06/14	3395	27.10	88.00	Mabu 8, Chatu Bari
85.	B 162	Ericaceae	*Rhododendron thomsonii* Hook.f.	06/07	2172	27.04	88.01	Jamuna 2, Hangetham
86.	*C 204*	Ericaceae	*Rhododendron vaccinoides* Hook.f.	09/06	2334	27 02 44.8	88 00 25.6	Hangetham, Jamuna-1
87.	C 138	Ericaceae	*Vaccinium retosum* (Griff.)Hook.f. ex C.B. Clarke	09/03	2334	27 02 44.8	88 00 25.6	Dobate, Mabu-8
88.	*C 101*	Fabaceae	*Astragalus sikkimensis* Benth. ex Bunge	08/30	3210	27 18 45	88 01 22.4	Chhintapu
89.	C 048	Fabaceae	*Crotolaria alata* Buch.-Ham. ex D.Don	08/28	1820	27 03 58	87 56 04	Hatiya, Mai majhuwa
90.	*C 072*	Fabaceae	*Erythrina arborescens* Roxb.	08/28	2861	27 05 10.1	87 55 12.6	Kalo pani, Mai majhuwa
91.	B 018	Fabaceae	*Piptanthus nepalensis* (Hook.)D. Don	06/08	3014	27.1	87.94	Maimajuwa 8 , Bharlang
92.	B 171	Fagaceae	*Castanopsis hystrix*	06/07	2172	27.04	88.01	Jamuna 2,

			Miq.					Hangetham
93.	*B 165*	Fagaceae	*Lithocarpus pachyphylla*	06/07	2172	27.04	88.01	Jamuna 2, Hangetham
94.	*C 052*	Fagaceae	*Quercus glauca*	08/28	1837	27 04 15.8	87 57 29.1	Newa khola, Mai majhuwa
95.	*C 035*	Fagaceae	*Quercus lamellosa*	08/27	1838	27 04 02	87 56 22	Rate khola, Mai majhuwa
96.	C 195	Fumariaceae	*Corydalis chaerophylla* DC.	09/05	2334	27 02 44.8	88 00 25.6	Dobate, Hangetham
97.	C 090	Fumariaceae	*Corydalis stracheyi* Prain	08/30	3170	27 05 22.7	87 54 47.3	Chhintapu
98.	*C 081*	Fumariaceae	*Dicentra macrocapnos* Prain	08/30	3170	27 05 22.7	87 54 47.3	Chibe, Chhintapu CF
99.	C 239	Gentianaceae	*Crawfordia speciosa* Wall. = *Gentiana speciosa* (Wall.)C.Marquand	09/12	2656	27 04 07.0	87 59 37.6	Bie-Chitre, Jogmai-2
100	*C 188*	Gentianaceae	*Swertia bimaculata* (Siebold & Zucc.) C.B.Clarke	09/05	2689	27 04 19.8	88 00 2.	Dobate, Hangetham
101	*C 154*	Gentianaceae	*Swertia nervosa* (G.Don)C.B.Clarke	09/03	2861	27 05 10.1	87 55 12.6	Dobate, Mabu-8
102	*C 103*	Gentianaceae	*Swertia paniculata* Wall.	08/30	2650	27 05 28.6	87 55 29.2	Chhintapu
103	C 087	Gentianaceae	*Tripterospermum volubile* (G.Don) H.Hara *subsp volubile*	08/30	1974	27 04 17.5	87 57 39.7	Chhintapu
104	*B 150*	Geraniaceae	*Geranium nepalense*	06/08	2920	27.09	88.96	Rate khola Mai majhuwa
105	B 186	Gesneriaceae	*Aeschynanthes hookeri* C.B.Clarke	06/08	2278	27.00	88.02	Jamuna, Jowbari
106	*C 187*	Gesneriaceae	*Aeschynanthes parviflorus* (D.Dn)Spreng.	09/05	2656	27 04 07.0	87 59 37	Dobate, Hangetham
107	*C 042*	Gesneriaceae	*Chirita macrophylla* Wall.	08/27	1838	27 04 02	87 56 22	Rate khola, Mai majhuwa
108	*C 088*	Gesneriaceae	*Didymocarpous aromaticus*Wall.ex D.Don	08/30	2650	27 05 28.6	87 55 29.2	Chhintapu
109	A 018	Gesneriaceae	*Didymocarpus albicalyx* C.B.Clarke	06/07	2758	27.1	87.93	Uvikchok, Maimajuwa
110	*C 203*	Gesneriaceae	*Didymocarpus villosus* D.Don	09/06	2334	27 02 44.8	88 00 25.6	Hangetham, Jamuna-1
111	B 146	Hydrangeaceae	*Dichroa febrifuga* Lour.	06/07	2238	27.04	88.00	Jamuna 2, Hangetham
112	*C 065*	Hydrangeaceae	*Hydrangea heteromalla*D.Don	08/28	2185	27 04 36.5	87 55 52	Sisne, Mai majhuwa
113	B 073	Hypericaceae	*Hypericum choisianum* Wall.ex N.Robson	06/14	3395	27.10	88.00	Mabu 8, Chatu Bari
114	A 002	Hypericaceae	*Hypericum japonicum* Thunb.ex Murray	06/06	1861	27.06	87.94	Maimajuwa 7, Upper Hatiya
115	*C 095*	Hypericaceae	*Hypericum uralum* Buch.-Ham. ex D.Don	08/30	2115	27 09 38	87 57 10.5	Chhintapu

116	*C 127*	Hypericaceae	*Hypericum petiolulatum* Hook.f. & Thomson ex Dyer	09/01	3515	27 17 15	88 02 41.7	Patarashe, Mabu-8
117	A 020	Labiatae	*Ajuga lobata* D.Don	06/07	2411	27.08	87.94	Charkhol, Maimajuwa
118	*C 068*	Labiatae	*Clinopodium umbrosum* (M.Bieb.)K.Koch	08/28	2468	27 02 57.3	88 00 46	Sisne, Mai majhuwa
119	*C 113*	Labiatae	*Elsholtzia flava* (Benth.) Benth.	09/01	3930	27 23 20	88 02 22.5	Mabu-8
120	*C 213*	Labiatae	*Isodon scrophulariodes* (Benth.) Murata	09/06	2468	27 02 57.3	88 00 46	Jamuna-1
121	B 107	Labiatae	*Phlomis macrophylla* Wall.ex Benth.	06/16	3053	27.07	88.01	Mabu, Kalapokhari
122	B 111	Labiatae	*Prunella vulgaris* L.	06/16	3053	27.07	88.01	Mabu, Kalapokhari
123	*C 216*	Labiatae	*Scutellaria scandens* Buch.Ham. ex D.Don	09/06	2468	27 02 57.3	88 00 46	Hangetham, Jamuna-1
124	*C 214*	Labiatae	*Scutellaria violacea* Heyne ex Benth.	09/06	3855	27 24 33	88 02 26.1	Hangetham, Jamuna-1
125	*C 115*	Lardizabalaceae	*Holboellia latifolia var angustifolia* (Wall.)Hook.f .& Thomson	09/01	2450	27 04 21.2	87 59 29.2	Mabu-8
126	*C 166*	Lauraceae	*Dodecania grandiflora* Nees in Wall.	09/03	2656	27 04 07	87 59 37	Dobate, Mabu-8
127	*C 165*	Lauraceae	*Lindera cubeba* (Lour.)Pers.	09/03	2656	27 04 07.0	87 59 37	Dobate, Mabu-8
128	B 159	Lauraceae	*Lindera neesiana* (Wall.ex Nees) Kurz.	06/07	2243	27.04	88.01	Jamuna 2, Hangetham
129	B 137	Lauraceae	*Litsea kingii* Hook.f.	06/06	2772	27.06	88.01	Mabu, Kalapokhari
130	B 130	Lauraceae	*Litsea sericea* (Wall. ex Nees) Hook. f.	06/06	2778	27.07	88.01	Mabu, Kalapokhari
131	*C 174*	Lauraceae	*Neolitsea cuipala* (Buch.-Ham. ex D.Don) Kosterm.	09/03	2334	27 02 44.8	88 00 25.6	Dobate, Mabu-8
132	*C 233*	Lauraceae	*Neolitsea foliolosa*	09/11	1838	27 04 02	87 56 22	Ramite, Jogmai-1
133	*C 227*	Lauraceae	*Persia odorattissima* (Nees) Kosterm	09/09	2050	27.04	88.00	Hangetham CF
134	*C 192*	Linaceae	*Anisadenia saxatilis* Wall. ex. Meisn.	09/05	2656	27 04 07.0	87 59 37.6	Dobate, Hangetham
135	B 178	Loranthaceae	*Scurrula elata* (Edgew.)Danser	06/08	2621	27.02	88.02	Jamuna, Jowbari
136	*C 110*	Loranthaceae	*Scurulla parasitica* L.	09/01	2241	27 04 28.8	87 59 17	
137	B 176	Magnoliaceae	*Magnolia campbelli* Hook.f. & Thomson	06/07	2716	27.04	88.03	Jamuna, Gairibas
138	*C 056*	Magnoliaceae	*Michelia doltsopa* Buch.-Ham.ex DC.	08/28	2050	27 04 28.4	87 58 48	Newa khola, Mai majhuwa
139	*B 003*	Magnoliaceae	*Michelia velutiana* DC.	06/07	2042	27.06	87.94	Maimajuwa 7, Naule Gaun

140	*C 016*	Melastomataceae	*Osbekia stellata* Buch.-Ham.ex D.Don	08/27	1837	27 04 15.8	87 57 29.1	Naule gaun, Mai majhuwa7
141	C 050	Melastomataceae	*Oxyspora paniculata* (D.Don) DC.	08/28	2194	27 14 22	87 57 29.4	Newa khola, Mai majhuwa
142	B 175	Monotropaceae	*Monotropa hypopithys* L.	06/07	2213	27.04	88.02	Jamuna 2, Hangetham
143	B 189	Moraceae	*Ficus hederacea Blume* Roxb.	06/08	2278	27.00	88.02	Jamuna, Jowbari
144	*C 183*	Myrsinaceae	*Maesa chisia* Buch.-Ham. ex D.Don	09/05	3210	27 18 45	88 01 22.4	Dobate, Hangetham
145	*C 229*	Myrsinaceae	*Myrsine semiserrata* Wall.	09/09	2209	27 02 38.6	88 00 47.9	Hangetham CF
146	B 177	Oleaceae	*Ligustrum confusum* Decne.	06/08	2621	27.02	88.02	Jamuna, Jowbari
147	*C 228*	Oxalidiaceae	*Oxalis corniculata*	06/07	2243	27.04	88.01	Jamuna 2, Hangetham
148	*C 091*	Papaveraceae	*Meconopsis paniculata* Prain	08/30				Chhintapu
149	*C 077*	Piperaceae	*Peperomia tetraphylla* (G.Forst) Hook.& Arn.	08/29	1980	27 17 01	87 58 14.6	Chibe, Maimajhuwa
150	B 084	Podophylaceae	*Podophyllum hexandrum* Royle	06/14	3224	27.09	88.00	Mabu, Bikhe Bhanjyang
151	*C 111*	Polygalaceae	*Polygala arillata* Buch.-Ham. ex D. Don	09/01	1991	27 11 27	87 56 17.8	
152	B 128	Polygonaceae	*Aconogonon campanulatum* (Hook. f.) H. Hara	06/06	2778	27.07	88.01	Mabu, Kalapokhari
153	*C 049*	Polygonaceae	*Aconogonum molle* (D. Don) H. Hara	08/28	2861	27 05 10.1	87 55 12	Newa khola, Mai majhuwa
154	*C 099*	Polygonaceae	*Bistorta amplexicaulis* (D. Don) Greene	08/30	2278	27 00 3902	88 01 18	Chhintapu
155	B 087	Primulaceae	*Primula floribunda L.*	06/14	3203	27.09	88.01	Mabu, Bikhe Bhanjyang
156	*C 089*	Primulaceae	*Primula glomerata* Pax	08/30	3850	27 22 10	88 02 20.8	Chhintapu
157	*C 179*	Ranunculaceae	*Aconitum orochryseum* Stapf	*09/03*	2457	27 02 49.8	88 00 25	
158	*C 093*	Ranunculaceae	*Aconitum spicatum* (Bruhi.) Stapf	08/30				Chhintapu
159	B 083	Ranunculaceae	*Anemone rivularis* Buch.-Ham.ex DC.	06/15	3059	27.08	88.01	Mabu, Near Mai khola, Chauri chowk
160	*C 030*	Ranunculaceae	*Anemone vitifolia* Buch.-Ham.ex DC.	08/27				Kamire, Mai Majhuwa
161	*C 222*	Ranunculaceae	*Clematis connata* DC.	09/07	3450	27 17 01	88 01 55.5	Jamuna-1
162	A 041	Ranunculaceae	*Isopyrum adiantifolium* Hook.f. & Thomson	06/08	2835	27.1	87.95	Banduke
163	B 086	Ranunculaceae	*Thalictrum virgatum* Hook.f.&Thomson	06/14	3224	27.09	88.00	Mabu, Bikhe Bhanjyang
164	C 002	Rosaceae	*Agrimonia pilosa* var. *nepalensis* (D.Don) Nakai	08/27	2450	27 04 21.2	87 59 29	Thulogaun, Maimajhuwa

165	*B 168*	Rosaceae	*Fragaria nubicola*	06/07	2172	27.04	88.01	Jamuna 2, Hangetham
166	B 138	Rosaceae	*Neillia rubiflora* D.Don	06/06	2777	27.06	88.01	Mabu, Kalapokhari
167	C 067	Rosaceae	*Neillia thyrsiflora* D.Don	08/28	3385	27 18 27	88 02 00.9	Sisne, Mai majhuwa
168	A 054	Rosaceae	*Potentialla kleniana* Wight	06/09	3185	27.1	87.98	Maimajuwa, Dhupi
169	A 011	Rosaceae	*Potentialla lineata* Trev.	06/07	2124	27.07	87.94	Maimajuwa 7, Terse Gaun
170	*C 228*	Rosaceae	*Pyracantha cranulat*	09/09	2209	27 02 38.6	88 00 47	Hangetham CF
171	B 092	Rosaceae	*Rubus acuminatus* Sm.	06/15	3032	27.08	88.01	Mabu, Kalapokhari
172	*C 149*	Rosaceae	*Rubus calycinoides* Kuntze	09/03	2689	27 04 19.8	88 00 2.7	Dobate, Mabu-8
173	B 124	Rosaceae	*Rubus calycinus* Wall.ex D.Don	06/06	2845	27.07	88.00	Mabu, Kalapokhari
174	*C 119*	Rosaceae	*Rubus lineatus* Reinw.	09/01	2689	27 04 19.8	88 00 2	Mabu-8
175	B 149	Rosaceae	*Rubus paniculatus* Sm.	06/07	2238	27.04	88.00	Jamuna 2, Hangetham
176	B 167	Rosaceae	*Rubus pentagonus* Wall.ex Focke	06/07	2172	27.04	88.01	Jamuna 2, Hangetham
177	*C 150*	Rosaceae	*Rubus splendidissimus* H.Hara	09/03	2689	27 04 19.8	88 00 2.	Dobate, Mabu-8
178	B 143	Rosaceae	*Rubus treutleri* Hook.f.	06/06	2777	27.06	88.01	Mabu, Kalapokhari
179	*C 164*	Rosaceae	*Sorbus cuspidata* (Spach) Hedl.	09/03	2656	27 04 07.0	87 59 37.6	Dobate, Mabu-8
180	B 091	Rosaceae	*Sorbus foliolosa* (Wall.)Spach	06/15	3032	27.08	88.01	Mabu, Kalapokhari
181	B 090	Rosaceae	*Sorbus hedlundii* C.K.Schneid	06/14	3121	27.09	88.01	Mabu, Bikhe Bhanjyang
182	B 093	Rosaceae	*Sorbus kurzii* (Wall ex Prain)C.K.Schneid	06/15	3032	27.08	88.01	Mabu, Kalapokhari
183	B 121	Rosaceae	*Sorbus rhamnoides* (Decne.)Rehder	06/06	2911	27.07	88.01	Mabu, Kalapokhari
184	A 066	Rosaceae	*Spiraea bella* Sims	06/09	3548	27.1	87.99	Maimajuwa , Tarunipani
185	A 012	Rosaceae	*Spiraea micrantha* Hook.f. *cf*	06/07	2124	27.07	87.94	Maimajuwa 7, Terse Gaun
186	A 047	Rubiaceae	*Galium elegens* Wall.ex Roxb.	06/08	2837	27.1	87.95	Banduke
187	*C 054*	Rubiaceae	*Gallium hirtifolium* Req.ex DC.	08/28	1974	27 04 17.5	87 57 39	Newa khola, Mai majhuwa
188	*C 066*	Rubiaceae	*Luculia gratissima* (Wall.)Sweet	08/28	2665	27 04 05.1	87 59 28	Sisne, Mai majhuwa
189	*C 043*	Rubiaceae	*Neanotis gracilis* (Hook.f.)W.H.Lewis	08/27	1837	27 04 15.8	87 57 29.1	Rate khola, Mai majhuwa
190	*C 010*	Rubiaceae	*Neohymenopogon parasiticus*	08/27	1838	27 04 02	87 56 22	Thulogaun, Maimajhuwa
191	*C 142*	Rubiaceae	*Rubia cordifolia* auct.	09/03	2209	27 02 38.6	88 00 47.9	Dobate, Mabu-8

192	*C 083*	Rutaceae	*Boenninghaausenia albiflora* (Hook.) Rchb.ex Meisn.	08/30	3170	27 05 22.7	87 54 47.3	Chibe, Chhintapu CF
193	B 140	Rutaceae	*Skimmia laureola* (DC.) Siebold & Zucc. subsp. *laureola*	06/06	2777	27.06	88.01	Mabu, Kalapokhari
194	C 120	Rutaceae	*Zanthoxylum acanthopodium* DC.	09/01	3280	27 18 33	88 01 38.4	Mabu-8
195	B 169	Rutaceae	*Zanthoxylum oxyphyllum* Edgew.	06/07	2172	27.04	88.01	Jamuna 2, Hangetham
196	B 132	Sabiaceae	*Meloisoma simplicifolia* (Roxb.)Walp.	06/06	2778	27.07	88.01	Mabu, Kalapokhari
197	*C 020*	Saxifragaceae	*Astilbe rivularis* Buch.-Ham. ex D.Don	08/27	2187	27 04 33	87 56 37	Mane dada, Terse gaun,
198	*A 061*	Saxifragaceae	*Saxifraga kumaunensis* Engl	06/09	3338	27.1	87.98	Maimajuwa, Above Dhupi
199	B 160	Schisandraceae	*Schisandra neglecta* A.C.Sm.	06/07	2243	27.04	88.01	Jamuna 2, Hangetham
200	B 102	Schisandraceae	*Schisandra grandiflora* (Wall.) Hook. f. & Thomson	06/15	3059	27.08	88.01	Mabu, Near Mai khola
201	B 164	Scrophulariaceae	*Calceolaria gracilis*Kunth *C. tripartina*	06/07	2172	27.04	88.01	Jamuna 2, Hangetham
202	*C 034*	Scrophulariaceae	*Mimulus nepalensis* Benth.	08/27	1838	27 04 02	87 56 22	Rate khola, Mai majhuwa
203	B 100	Scrophulariaceae	*Pedicularis furfuracea* Wall.ex Benth.	06/15	3059	27.08	88.01	Mabu, Near Mai khola
204	*C 094*	Scrophulariaceae	*Pedicularis penneliana* P.C.Tsoong *c.f.*	08/30	3170	27 05 22.7	87 54 47.3	Chhintapu
205	B 125	Scrophulariaceae	*Scruphularia urticifolia*Wall.ex Benth	06/06	2778	27.07	88.01	Mabu, Kalapokhari
206	*C 013*	Scrophulariaceae	*Torenia diffusa* D.Don	08/27	2100	27 04 19	87 56 34	Naule gaun, Mai majhuwa7
207	B 079	Scrophulariaceae	*Veronica deltigera* Wall. ex Benth	06/14	3268	27.09	88.01	Mabu, Bikhe Bhanjyang
208	A 062	Scrophulariaceae	*Veronica umbelliformis* Pennel. *sikkimensis*(Hook.f.)Hng inTsoong & Hong	06/09	3338	27.1	87.98	Maimajuwa, Above Dhupi
209	B 196	Solanaceae	*Cestrum elegans* (Brgn. Ex Neumann)Schltdl.	06/08	2207	26.99	88.02	Jogmai, Kholagaun
210	B 115	Symplocaceae	*Symplocos lucida* (Thunb. Ex Murray) Siebold & Zucc.	06/06	2969	27.07	88.01	Mabu, Kalapokhari
211	C 232	Symplocaceae	*Symplocos ramosissima* Wall. ex G.Don	09/11	2278	27 00 3902	88 01 18	Ramite, Jogmai-1
212	*C 156*	Symplocaceae	*Symplocos dryophila* C.B.Clarke	09/03	2689	27 04 19.8	88 00 2.	Dobate, Mabu-8
213	B 172	Theaceae	*Eurya acuminata*DC	06/07	2172	27.04	88.01	Jamuna 2, Hangetham
214	B 085	Thymelaceae	*Daphne bholua* Buch.-	06/14	3224	27.09	88.00	Mabu, Bikhe

			Ham.ex D.Don					Bhanjyang
215	*C 028*	Thymelaceae	*Edgworthia gardneri* (Wall.)Meisn.	08/27	2187	27 04 33	87 56 37	Mane dada, Terse gaun, Mai majhuwa
216	*C 064*	Umbelliferae	*Heracleum lallii* C. Norman	08/28	1974	27 04 17.5	87 57 39	Sisne, Mai majhuwa
217	*C 230*	Umbelliferae	*Hydrocotyle nepalensis* Hook	09/09	2209	27 02 38.6	88 00 47	Hangetham CF
218	*C 006*	Umbelliferae	*Hydrocotyle himalaica* P.K.Mukh.	08/27	1817	27 03 52	87 56 38	Thulogaun, Maimajhuwa
219	B 193	Umbelliferae	*Oenanthe thomsonii* C.B.Clarke	06/08	2207	26.99	88.02	Jogmai, Kholagaun
220	B 194	Umbelliferae	*Sanicula elata* Buch.-Ham.ex D.Don	06/08	2207	26.99	88.02	Jogmai, Kholagaun
221	*C 003*	Urticaceae	*Boehmeria clidemioides* Miq.	08/27	1817	27 03 52	87 56 38	Thulogaun, Maimajhuwa
222	B 147	Urticaceae	*Lecanthes peduncularis* (Royle) Wedd. *cf*	06/07	2238	27.04	88.00	Jamuna 2, Hangetham
223	*C 039*	Urticaceae	*Pilea anisophylla* Wedd.	08/27	1838	27 04 02	87 56 22	Rate khola Mai majhuwa
224	*C 080*	Urticaceae	*Pilea bracteosa* Wedd.	08/30	2480	27 05 18.6	87 55 37.7	Chibe, Chhintapu CF
225	A 044	Urticaceae	*Pilea scripta* (Buch.-Ham.ex D.Don) Wedd.	06/08	2837	27.1	87.95	Banduke
226	A 004	Urticaceae	*Pouzolzia hirta* (Blume)Hassk	06/06	1861	27.06	87.94	Maimajuwa 7, Upper Hatiya
227	A 003	Urticaceae	*Pouzolzia zeylanica* (L.)Benn. &R.Br.	06/06	1861	27.06	87.94	Maimajuwa 7, Upper Hatiya
228	*A 063*	Valarianaceae	*Valariana hardwicki* WIall	06/04	2340	27.04	88.01	Jamuna 2, Hangetham
229	*A 050*	Violaceae	*Viola biflora* L.	06\08	2920	27.09	87.96	Lampokhari Maimajuwa
230	*C 224*	Vitaceae	*Cissus repens* Lam.	09/09	2209	27 02 38.6	88 00 47.9	Hangetham CF
231	*B 158*	Vitaceae	*Tetrastigma serrulatum* (Roxb.)Planch.	06/07	2243	27.04	88.01	Jamuna 2, Hangetham

II. Monocotyledoneae

SN	RCN	Family	Plant name	Date (2007)	Alt.	Lat.	Long.	Location
232.	*C 100*	Aliaceae	*Allium wallichii* Kunth	08/30	2861	27 05 10.1	87 55 12.6	Chhintapu
233.	*C 243*	Anthericaceae	*Chlorophytum nepalense (Lindl.)Baker*	09/12	2443	27 00 43.7	88 03 09.8	Bie-Chitre, Jogmai-2
234.	*C 169*	Araceae	*Araesima costatum* (Wall.)Mart. Ex Schott	09/03	2656	27 04 07.0	87 59 37	Dobate, Mabu-8
235.	*C 199*	Araceae	*Remusatia hookeriana* Schott	09/05	4050	27 25 08	88 02 55.3	Dobate, Hangetham
236.	*C 201*	Asparagaceae	*Asparagus filicinus* Buch.-Ham. ex D.Don	09/06	2334	27 02 44.8	88 00 25.6	Hangetham, Jamuna-1
237.	B 155	Asparagaceae	*Asparagus filicinus* Buch.-	06/07	2245	27.04	88.00	Jamuna 2, Hangetham

			Ham.exD.Don.var.*lyco podineus* Bake					
238.	*C 186*	Commelinaceae	*Commelina paludosa* Blume	09/05	2005	27 11 27	87 56 18.6	Dobate, Hangetham
239.	*C 008*	Commelinaceae	*Cyanotis fasiculata*	08/27				Thulogaun, Maimajhuwa
240.	*C 011*	Commelinaceae	*Rhopalephora scaberrima*	08/27	2100	27 04 19	87 56 34	Naule gaun, Mai majhuwa7
241.	*C 108*	Commelinaceae	*Streptolirion volubile* Edgew.	09/01	2656	27 04 07.0	87 59 37	
242.	B 161	Convallariaceae	*Disporum calcaratum* D.Don	06/07	2172	27.04	88.01	Jamuna 2, Hangetham
243.	*C 134*	Convallariaceae	*Maianthemum fuscum* (Wall.)LaFrankie	09/03	2665	27 04 05.1	87 59 28.9	Dobate, Mabu-8
244.	B 142	Convallariaceae	*Polygonatum cathcartii* Baker	06/06	2777	27.06	88.01	Mabu, Kalapokhari
245.	A 043	Convallariaceae	*Polygonatumleptophyll um* (D.Don)	06/08	2837	27.1	87.95	Banduke
246.	*C 209*	Convallariaceae	*Polygonatum punctatum*Royle ex Kunth	09/06	2468	27 02 57.3	88 00 46	Hangetham, Jamuna-1
247.	*C 076*	Convallariaceae	*Tricyrtis maculate* (D.Don) J.F.Macbr.	08/29	2185	27 04 36.5	87 55 52	Chibe, Maimajhuwa
248.	*C 240*	Cyperaceae	*Carex cruciata* Wahlenb *var. agrocarpa*	09/12	3210	27 18 45	88 01 22	Bie-Chitre, Jogmai-2
249.	A 009	Cyperaceae	*Carex filicina* Nees	06/07	1903	27.06	87.94	Maimajuwa 7, Upper Hatiya
250.	B 192	Cyperaceae	*Carex inanis* C.B. Clarke in Hook.f.	06/08	2207	26.99	88.02	Jogmai, Kholagaun
251.	*C 074*	Cyperaceae	*Pycreus flavidus* (Retz.) T. Koyama	08/28	2443	27 00 43.7	88 03 09.8	Kalo pani, Mai majhuwa
252.	*C 223*	Dioscoreaceae	*Dioscorea deltoidea* Wall. ex Griseb	09/09	2005	27 11 27	87 56 18.6	Hangetham CF
253.	*C 146*	Juncaceae	*Juncus benghalensis* Kunth	09/03	3530	27 19 29	88 03 09.0	Dobate, Mabu-8
254.	*C 106*	Liliaceae	*Lilium nepalense* D. Don	09/01	2482	27 05 04.5	87 55 39.1	Chibe
255.	B 133	Liliaceae	*Ophiopogon wallichianus* (Kunth)	06/06	2772	27.06	88.01	Mabu, Kalapokhari
256.	*C 053*	Orchidaceae	*Anthogonium gracile*Wall.ex Lindl.	08/28	1837	27 04 15.8	87 57 29.1	Newa khola, Mai majhuwa
257.	*C 135*	Orchidaceae	*Bulbophylum retusiusculum* Rchb.f.	09/03	2665	27 04 05.1	87 59 28.9	Dobate, Mabu-8
258.	*C 143*	Orchidaceae	*Goodyera foliosa* (Lindl.) Benth.ex Hook.f. in Hook.f.	09/03	2665	27 04 05.1	87 59 28.9	Dobate, Mabu-8
259.	*C 210*	Orchidaceae	*Habenaria arietina* Hook.f.	09/06	2468	27 02 57.3	88 00 46	Jamuna-1
260.	A 019	Orchidaceae	*Oreorchis micrantha* Lindl.	06/07	2758	27.1	87.93	Uvikchok, Maimajuwa
261.	*C 097*	Orchidaceae	*Sartyrium nepalense* D.Don	08/30	2861	27 05 10.1	87 55 12.6	Chhintapu

262.	*C 025*	Orchidaceae	*Spiranthes sinensis* var. *amoena* (M.Bieb.)H.Hara	08/27	2187	27 04 33	87 56 37	Mane dada, Terse gaun, Mai majhuwa
263.	*C 147*	Poaceae	*Eragrostis nigra* Nees ex Steud.	09/03	2665	27 04 05.1	87 59 28	Dobate, Mabu-8
264.	*C 070*	Poaceae	*Isachne albens* Trin.	08/28	1974	27 04 17.5	87 57 39	Sisne, Mai majhuwa
265.	B 173	Smilacaceae	*Smilax aspera* L.	06/07	2172	27.04	88.01	Jamuna 2, Hangetham
266.	*C 212*	Smilacaceae	*Smilax minutiflora* A.DC.	09/06	2468	27 02 57.3	88 00 46	Hangetham, Jamuna-1
267.	B 097	Trilliaceae	*Paris polyphylla* Sm. subsp *polyphylla*	06/15	3059	27.08	88.01	Mabu, Near Mai khola, Chauri chowk
268.	B 123	Trilliaceae	*Paris polyphylla* subsp *marmorata* (Stearn)H.Hara	06/06	2845	27.07	88.00	Mabu, Kalapokhari
269.	*C 217*	Zingiberaceae	*Cautleya gracilis* (Sm.) Dandy	09/06	2468	27 02 57.3	88 00 46	Jamuna-1
270.	A 037	Zingiberaceae	*Roscoea alpina* Royle	06/08	2827	27.1	87.94	Upper Maimajuwa

C. Unidentified Species

SN	RCN	Family	*Plant name*	Date	Alt.	Lat.	Long	Location
271	*C 123*	Acanthaceae	*Thunbergia species*	09/01	2450	27 04 21.2	87 59 29.2	Patarashe, Mabu-8
272	*C 242*	Asteraceae	*Aster species*	09/12	2443	27 00 43.7	88 03 09.8	Bie-Chitre, Jogmai-2
273	*C 172*	Asteraceae	*Gnaphalium species*	09/03	2656	27 04 07.0	87 59 37	Dobate, Mabu-8
274	*C 085*	Balsaminaceae	*Impatiens species*	08/30	2650	27 05 28.6	87 55 29.2	Chhintapu
275	B 179	Balsaminaceae	*Impatiens stenantha* Hook. f.	06/08	2621	27.02	88.02	Jamuna, Jowbari
276	*C 098*	Caryophyllaceae	*Stellaria species*	08/30	3820	27 20 28.	88 03 53	Chhintapu
277	*C 241*	Convallariaceae/ Liliaceae	*Disporum sp*	09/12	2443	27 00 43.7	88 03 09.8	Bie-Chitre, Jogmai-2
278	B 019	Daphniphyllacea e	*Daphniphyllum species*	06/08	3014	27.1	87.94	Maimajuwa 8 , Bharlang
279	B 021	Daphniphyllacea e	*Daphniphyllum species*	06/08	3014	27.10	87.94	Maimajuwa 8 , Bharlang
280	A 052	Ericaceae	*Rhododendron species*	06/09	3185	27.1	87.98	Maimajuwa, Dhupi
281	A 058	Fabaceae	*Astragalus species*	06/09	3338	27.1	87.98	Maimajuwa, Above Dhupi
282	B 185	Lauraceae	*Lindera species*	06/08	2450	27.01	88.02	Jamuna, Jowbari
283	*C 112*	Loranthaceae	*Taxillus cuneatus*	09/01	3450	27 17 01	88 01 55.5	Mabu-8
284	*C 219*	Monotrapaceae	*Monotropa species*	09/06	2390	27 12 51	87 57 51.6	Hangetham, Jamuna-1
285	B 175	Monotropaceae	*Monotrapastrum*	06/07	2213	27.04	88.02	Jamuna 2,

			humile (D.Don)H.Hara					Hangetham
286	B 116	Myrsinaceae	Myrsine species	06/06	2969	27.07	88.01	Mabu, Kalapokhari
287	*C 148*	Onagraceae	Epilobium species	09/03	1838	27 04 02	87 56 22	Dobate, Mabu-8
288	*C 032*	Orchidaceae	*Habenaria species*	08/27	2187	27 04 33	87 56 37	Kamire Mai Majhuwa
289	*C 005*	Orchidaceae	*Poneroorchis species*	08/27	1817	27 03 52	87 56 38	Thulogaun, Maimajhuwa
290	*C 145*	Papaveraceae	*Corydalis species*	09/03	2656	27 04 07.0	87 59 37	Dobate, Mabu-8
291	A 063	Plantaginaceae		06/09	3338	27.1	87.98	Maimajuwa, Above Dhupi
292	A 048	Pteridaceae	*Notholaena speciesR.Br.*	06/08	2920	27.09	87.96	Lampokhari
293	*C 082*	Ranunculaceae	*Thalictrum species*		2480	27 05 18.6	87 55 37.7	
294	A 056	Rosaceae	*Potentialla species*	06/09	3185	27.1	87.98	Maimajuwa, Dhupi
295	*C 007*	Rubiaceae	*Galium species*	08/27	1817	27 03 52	87 56 38	Thulogaun, Maimajhuwa
296	*C 001*	Scrophulariaceae	*Hemiphragma species*	08/27	1817	27 03 52	87 56 38	Thulogaun, Maimajhuwa
297	*C 227*	Symplocaceae	*Symploccus species*	09/09	2209	27 02 38.6	88 00 47.9	Hangetham CF
298	B 016	Urticaceae	*Girardinia species*	06/08	2904	27.10	87.94	Maimajuwa 8 , Bharlang
299	*C 109*	Verbenaceae (??)	*Gmelina arborea* Roxb. *??*	09/01	1974	27 04 17	87 57 39	