FLORISTIC AND ETHNOBOTANICAL STUDIES OF SELECTED PLANTS OF DISTRICT SAHARANPUR, UTTAR PRADESH

THESIS SUBMITTED FOR THE DEGREE OF

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By

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SUPERVISOR'S CERTIFICATE

This is certified that the thesis entitled, **"FLORISTIC AND ETHNOBOTANICAL STUDIES OF SOME PLANTS OF DISTRICT SAHARANPUR, UTTAR PRADESH''** is an original piece of research work carried out by **Yogendra Kumar** for the award of **Doctor of Philosophy (Ph.D.)** degree in Botany under my guidance and supervision. I further certify that the work has not been submitted either partly or fully to any other University or Institution for the award of any degree.

(Dr. Kanchan Awasthi)
SUPERVISOR

In the Sweet Memory
of
My Beloved Father
Late Shri Chaturvedi Panchal

Dedicated to
My Loving Friend
and
Great Botanist
Late Dr. Bindhyachal Yadav

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Thanks are due to all others not mentioned by name but nevertheless, have been invaluable in their own good ways.

I am grateful to Shri Kashi Vishwanath Ji for giving me patience to complete this endeavor a success.

LIST OF ABBREVIATIONS

FBI	:	The Flora of British India, Vol. 1-7, Hooker, J.D. *et al.*, 1872-1897, Repr.1954-1961 (Kent).
FD	:	The Flora of Delhi. Maheshwari, J.K. 1963.
FF	:	Forest Flora of Chakrata, Dehradun and Saharanpur Forest Division, Uttar Pradesh. Kanjilal, U.N. 1928.
FFNC	:	The Forest Flora of North-West and Central India. Brandis, D. 1874.
FFP	:	A Forest Flora of the Punjab. Parker, R.N. 1956, Lahore.
FG	:	Flora Gorakhpurensis. Srivastava, T.N. 1976.
FH	:	Flora of Haryana. Jain *et al*. 2001.
FID	:	Flora of the Indian Desert. Bhandari, M.M. 1978, Repr.1990.
FPP	:	Flora of the Punjab Plains. Nair, N.C. 1980.
FUGP	:	Flora of the Upper Gangetic Plains, Adjacent Shiwalik and Sub- Himalayan Tract. Duthie, J.F. 1903-1922, Repr. 1995.
GBCIP	:	Grasses of Burma, Ceylon, India and Pakistan. Bor, N.L. 1960.
SPL	:	Species Plantarum. Linnaeus, C. 1753.
SFUGP	:	Supplement to Flora of the Upper Gangetic Plains. Raizada, M.B. 1976.

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CHAPTER-1
INTRODUCTION

The existence of millions of living organisms on the earth reveals variation in shape, size, color, habitat and habits. This variability among living organisms is termed as biodiversity. The term biodiversity was firstly coined by Walter G. Rosen in 1986. However, the most appropriate definition was given by Delong (1996). According to him, ‘‘the variability among living organisms from all sources including *inter alia* (among other things) terrestrial, aquatic ecosystem and the ecological complexes of which they are part, including diversity within and among species and ecosystems”. It is a measure of variety in totality. Biodiversity can be categorized into genetic, species, ecosystem diversity. The variations at the gene level of living organisms is genetic diversity, while the variations at their species level is species diversity, and the differences in ecosystem of living organisms is termed as ecosystem diversity.

In order to study ecosystems of a particular region it is deemed necessary to have fundamental knowledge about floristic richness and vegetation patterns of that region. Natural resources survey like floristic study plays a significant role in the economic development of the people through judicious utilization of developing country like India. Floristic studies are taxonomic analysis of a flora or of a major segment of a flora, of a given area. Floristic studies help us to assess the plant wealth and its potentiality of any given area as well as to understand basic aspects of biology such as isolation, speciation, endemism and evolution. Flora of any area is not fixed up. It changes with due course of time. Various ecological factors especially biotic one change the floristic components. The total number of species may be changed; dominant species may be replaced with other species; the floristic composition, i.e. family: genus: species ratio may be changed.

The knowledge about plant taxonomy existed since the ancient time *i.e.* Vedic era. Theophrastus, Pliny and Dioscorides are amongst the people who initiated a more systematic and scientific approach to taxonomical studies. Later, in the 15^{th} and 16^{th} century, Brunfels, Fuchs and Bock and many others helped in building a scientific repository of taxonomical knowledge. The progress in taxonomy was gradual and assisted by all those interested in various aspects of economic importance of plants.

Theophrastus was a very remarkable botanist and is regarded as the “*Father of*

Botany". Botanical science in its broadest aspects flourished in Greece under the leadership of Theophrastus. His work published in 'Historia Plantarum'. A significant contribution to taxonomy was made at this time by Caspar Bauhin. Bauhin's 'Prodromus Theatri Botanici' (1620) and 'Pinax Theatri Botanici' (1623) are important references in which he listed all the species of plants. John Ray (1703) gave description of about more than 18000 plants.

In India, history of botanical science dates back to the Vedic period (approx 1500 B.C. to 500 B.C.). In the literature of that period, several technical terms are available which were used for the description of plants and plant parts. Details on classification, morphology and anatomy of important economic plants are also available. Plants were studied in relation to medicine, agriculture and horticulture. The early treatise on botany like 'Ayurveda', 'Charka-Samhita' and 'Sushruta-Samhita' were, therefore primarily utilitarian. Dhanvantari, Nagarjun, Agnivesh Jatukarna, Bhela Harita etc. had detailed knowledge of the characteristics of medicinal plants.

The Portuguese were the first to arrive in India and thus initiated the modern study of Indian plants. The Dutch succeeded the Portuguese in India and developed an interest in the plants of this country. Hendrik van Rheede tot Draakenstein (1660-1699) made large collections of plants and published their descriptions in Hortus Malabaricus. John Gerard Koenig (1728-1785), a pupil of Linnaeus, came to India in 1768. He joined the Tranquebar Mission in South India as a Surgeon and naturalist.

The Royal Botanic Garden came into existence in 1787 due to the munificence of East India Company in general and to the interest of Col. Robert Kyd (1746-1793) in particular. The Garden became a centre of taxonomic and phytogeographic research and an agency of plant material of economic importance between India and farthest corners of the world. Robert Kyd became its first superintendent. Kyd was succeeded by William Roxburgh (1751-1815), the Linnaeus of India. Two of his monumental work include Flora Indica and Plantae Coromandelianus. The pioneer work of J.D. Hooker (1872-1897) "Flora of British India" became an important step in taxonomical studies of India. C. B. Clarke began a series of botanical publications on his vast collection of plants. He was also one of the important collaborators of Hooker's Flora of British India.

George King established the Botanical Survey of India in 1890. Regional offices were established at Pune with T. Cooke as Director for western India, at Saharanpur with

J.F. Duthie as Director for northern India and at Madras with M.A. Lawson as Director for southern India. The botanists attached to the Forest Research Institute at Dehradun were mainly concerned with the flora of our forests. Their work also extended to the Upper Gangetic Plain and other parts of North India. Here the remarkable contributors included N.L. Bor, J.N. Parker, C.E. Parkinson and M.B. Raizada.

In 1952, E.K. Janaki Ammal was appointed as Officer on Special Duty to reorganise the Botanical Survey of India. The Central Botanical Laboratory was the first Unit to be set up, with Janaki Ammal as the Director. Four Regional Circles at Shillong (Eastern), Dehradun (Northern), Pune (Western) and Coimbatore (Southern) were also simultaneously started for the study of plant resources in the respective regions. Botanical Survey of India during the last 30 years of its reorganization, contributed in publication include reprinting of the regional floras of Bombay (T. Cooke), Madras (J.S. Gamble), Bihar and Orissa (H.H. Haines) as well as publishing a Check List of Indian Plants, Aquatic Angiosperms, Illustrations of West Himalayan Flowering Plants, Flora of Rajasthan, Dictionary of Flowering Plants in India, High Altitude Flowering Plants, Flora of Bashahar Himalayas, Orchids of India, Flora of Punjab Plains etc.

The Indian subcontinent has a rich biological and ethnic diversity. Although it is total land areas is 2.4% of whole world, it has been found that 8% of the total global bio-diversity of the estimated wealth, 15000 species of flowering plants are occurred in the country. Economic utility of only 9000 plants species are known and about 5000 species are endemic to this land (Jain and Sastry, 1980).

The term ethnobotany was first coined by Harshberger (1895), it reveals the entire studies concerning the plants, which describes the interaction of local people with the environment. This interaction has been classified by Jain (1995), the father of Indian ethnobotany into two categories-the abstract and the concrete. The abstract includes sacred plants, worship and folklore while the concrete mainly deals with material use and act of domestication, conservation or destruction of plants. It can be concluded that ethnobotany has a direct role in inexpensive food, new sources of medicinal herbs and more importantly in the foods and medicines which are easily acceptable to the primitive people (Jain 1987b).

Ethnobotany is a multidisciplinary science defined as the interaction between plants and people. It deals with the study of relationship of the tribal and rural people and

the plants of their interest, especially medicinal plants. The relationship between plants and human cultures is not limited to the use of plants for food, clothing and shelter but also includes their use for religious ceremonies and health care. This discipline became established as a genuine academic and research activity during the later half of the twentieth century. In recent years, the interest in ethnobotany has increased dramatically.

Though the knowledge of ethnobotany has existed in India since ancient times, still lot of work has to be done in this field. Ethnobotany is the holistic approach which involves the dynamic aspects of interaction of indigenous people with plants (Schutles 1962, Ford 1980). The main focus of this approach is to include studies about the plants which are used, managed and perceived in human societies and also includes studies of plants which are used for food, fibers, dyes, tannins and also medicinal and other useful plants, harmful plants, material use, the act of domestication, conservation and improvement or destruction of plants (Ford 1978, Jain 1987b, 1995). Wambebe (1990) stated that approximately 80 percent of the world's population depends upon traditional medicine either wholly or partially for its primary health care needs.

In the present study the district Saharanpur of the state Uttar Pradesh, was selected for study to achieve following objectives-

1. *Extensive exploration of district Saharanpur in various seasons.*
2. *Collection of information regarding floristic diversity of angiosperms of the area.*
3. *Documentation of ethnobotanical significance of plants of the area.*

Geographically, district Saharanpur is located in the North-West edge of Uttar Pradesh. It lies between 29° 34' and 30° 34' North latitude and 77° 7' and 87° 12' East longitude. The area of district is 3860 sq. km. The district shares its border with three states i.e. Haryana, Himachal Pradesh and Uttarakhand. Therefore, climatic variations in adjoining regions has great impact on the vegetation of Saharanpur district. Further, due to northern part of Saharanpur being hilly and rest of the adjoining district of Uttar Pradesh being plain, the rainfall in the Saharanpur district is comparatively more than the other adjoining districts.

The climate of the district is characterized by general dryness, a bracing cold season and a hot summer. The cold season from around the middle of November to

February is followed by the hot season lasting till the end of June. The monsoon season starts from July to mid of September. Winds are generally light with some increase in force driving the later summer and monsoon season. Winds blow predominantly from north-west from November to April. By April, south-eastern winds also appear and in the next four months winds are mostly from the south-east, winds from the north-west blowing on some days in the afternoons. In the cold season passing western disturbances affect the weather over the district causing a few thunder-storms, some of which are accompanied by hail. Dust-storms and thunder storms occur during the hot season.

The floristic diversity of this region shows great affinities with the vegetation of adjoining regions. The wild flora of Saharanpur district contain vast variety of useful plants which have been a valuable source of basic needs of people of this district such as food, fodder, shelter, fiber, fuel and medicine etc. In the present study an attempt has been made to describe those plants of the district area which are important from floristic diversity and ethnobotanical significance point of view.

CHAPTER -2
REVIEW OF LITERATURE

In order to achieve the objectives of present investigation, it is important to study the previous works done by different researchers from time to time on this aspect all over India. In the following account, review of some earlier work and historical background is being presented.

Botanical exploration in India:

In India, the earliest mention of the usage of medicinal plants is available in vedic literature e.g. Rigveda, which was written between 4500 and 1600 B.C. Charak Samhita also provides detailed description of medicinal use of plants. The early treatise on botany like 'Ayurveda', 'Charka-Samhita' and 'Sushruta-Samhita' were, therefore primarily utilitarian. Charak Samhita provides detailed description of medicinal use of plants. Dhanvantari, Nagarjun, Agnivesh Jatukarna, Bhela Harita etc. had detailed knowledge of the characteristics of medicinal plants.

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The pioneer work of J.D. Hooker (1872-1897) "Flora of British India" became an important step in taxonomical studies of India. C. B. Clarke began a series of botanical publications on his vast collection of plants. He was also one of the important collaborators of Hooker's Flora of British India. George King established the Botanical Survey of India in 1890. Regional offices were established at Pune with T. Cooke as Director for western India, at Saharanpur with J.F. Duthie as Director for northern India and at Madras with M.A. Lawson as Director for southern India.

As far as the earlier work on Indian medicinal plants is concerned, the contribution of Dey's 'Indigenous Drugs of India'(1896) and Kirtikar and Basu's

'Indian Medicinal Plants' (1933) is remarkable. They scientifically described healing properties of various medicinal plants.

The 'Forest Flora of Chakrata, Dehradun and Saharanpur' published by Kanjilal (1901) and later revised by B.L.Gupta (1928) gives detailed information about medicinal plants and their uses. The 'Flora of the Upper Gangetic Plains, Adjacent Shiwalik and Sub- Himalayan Tract' by Duthie (1902-1929) and the 'Flora of Delhi' by J.K.Maheshwari (1963) provides an elaborate description of large number of plants collected from North India. Kashyap (1936) compiled the Flora of Lahore District.

Ethnobotany has made great impact on anthropologists, botanists and medical practitioners in India during the last two decades and related studies have been carried out from time to time in tribal rich areas of various states. The Council of Scientific and Industrial Research (CSIR) has published valuable literature on medicinal plants in the 'The Wealth of India'(Anonymous 1956-1981). Gupta (1971) reported medicinal and aromatic plants of Bhandal ranges, Churoh forest division Chamba district, Himachal Pradesh. Uniyal and Chauhan (1971) documented the uses of medicinal plants of Uhal valley in the Kangra forest division in Himachal Pradesh. S.K. Jain (1981) published his extensive work on medicinal plants in 'Glimpses of Indian Ethnobotany'.

Goel *et al.* (1984) documented the contribution of ethnobotany of Santhal Paragana. Jain (1986) presented an overview of ethnobotany and indication of the significant research during last thirty year in this field and also explained how ethnobotany is an inter-disciplinary science. Singh (1993) described about the medicinal plants of Ayurvedic importance from Mandi district of Himachal Pradesh. Singh and Ali (1996) studied about the folk medicinal plants used for family planning.

Hajra *et al.*(1996) documented 'Flora of Arunachal Pradesh and Sikkim'. Debryial *et al.* (1997) described about the medicinal plant resources of Chakkinal watershed in north western Himalaya. Singh and Karthikeyan (2000) documented the flora of Maharastra state, West Bengal (1996), Flora of Andaman and Nicobar islands (1999). Rao and Pullaiah (1997-2001) surveyed the flowering plants of Eastern Ghats. Radha *et al.* (2002) surveyed the floristic diversity of Tansa Valley. Bhalla (2002) presented an overview of collection and marketing of the importance medicinal and aromatic plants in the tribal areas of Himachal Pradesh.

Aggarwal *et al* (2004) documented the ethnobotanical uses of some willd plants of lower foot hills of Himachal Pradesh. Katewa *et al* (2004) studied the floristic diversity of ethno-medicinal plants occurring in the tribal area of Rajasthan. Mishra *et al.* (2005) conducted a survey of species diversity of Bhitarkanika Mangove ecosystem in Orissa. Bhatt and Purohit (2009) studied the floristic diversity along an elevational gradient in Peepalkoti-Joshimath area of Garhwal Himalaya and reported a total 149 genera belonging to 74 families.

Phondani *et al* (2010) reported ethnoveterinary uses of medicinal plants in Alaknanda catchment of Uttarakhand. Rajdeep *et al.* (2011), studied the floristic diversity in ecologically restored lime stone mines and natural forests of Mussoorie and Doon valley. Bahuguna *et al.*(2011) reported a total of 133 plant species belonging to 65 families from the submerged area of Srinagar hydroelectric power project, Garhwal Himalaya. Gupta (2011) described about the ethnobotanical studies on Gaddi tribe of Bharmour area of Himachal Pradesh. Kumar and Choyal (2013) recorded the ethno-medicinal uses of some plants of lower foot-hills of Himachal Pradesh for the treatment of oral health problems and other mouth disorder.

Sharma *et al* (2014) highlighted the studies on traditional knowledge of ethno-medicinal plants in Jawalamukhi, Himachal Pradesh, India. Sharma *et al.* (2014) surveyed the floristic diversity and distribution pattern of Plant communities along altitudinal gradient in Sangla Valley, Northwest Himalaya. Yadav and Khare (2014) described about the traditional uses of medicinal plants among the tribals of Shivpuri district (M.P). Mishra and Pareek (2015) studied the floristic wealth of Kota district in Rajasthan and described their medicinal properties. During the survey, a total of 133 species and intraspecific taxa of plants representing 99 genera belonging to 46 families were recorded.

Singh, Anup (2016) Studies ethnobotanical study of medicinal plants in Bhiwani district of Haryana, India. Rana *et al.*(2017) conducted a survey on Sikkim region and studied the impact of ethno-botanical knowledge in conservation of biodiversity. Rathore *et al* (2017) described the medicinal plants of Mewar region of Rajasthan with their medicinal properties for the treatment of various diseases. Nagarajan *et al.* (2017) studied the floristic diversity of medicinal plants in IIT- Madras campus, Chennai. Acharya Balkrishan *et al.* (2018) reported medicinally important 53 new plant species from Morni

Hills, Panchkula, Haryana. Tariq *et al.* (2018) described the ethnobotanical importance of herbal plant species of Kalvarayan hills, Tamil Nadu.

Singh *et al*. (2019) studied the ethno-medicinal use of plant of Tehri Garhwal in Uttarakhand. Samant and Tewari (2019) conducted a survey of floristic diversity and indigenous uses of wild edible plants of Shikari Devi Wildlife Sanctuary in Himachal Pradesh. Dwivedi *et al.* (2019) reported some important medicinal plants with their medicinal uses from Uttarakhand. Kumar *et al*. (2019) documented the ethno-botanical significance of Solanum species from Nilgiri Biosphere Reserve, Tamil Nadu.

Botanical exploration in Uttar Pradesh:

The 'Forest Flora of Chakrata, Dehradun and Saharanpur' published by Kanjilal (1901). Srivastava (1976) described plants of Gorakhpur (U.P.) in the „Flora Gorakhpurensis". Bajpayee *et al.* (1996) described about ethno-botanical studies on food stuff of the tribals of Tarai-Regions in Uttar Pradesh. Khanna *et al.* (1996 a) highlighted the medicinal uses of plants from Jalaun district, Uttar Pradesh. Khanna *et al* (1996b) described the medicinal plants uses from the rural folklore of Rai Bareli district, Uttar Pradesh.

Floristic survey of district Muzaffarnagar was carried out by Kumar (1998), he described 885 plant species belonging to 523 genera and 124 families of angiosperms. Shukla (2009) described the plant diversity across Terai landscape in north-eastern Uttar Pradesh. Mishra and Pal (2010) surveyed the tree wealth of Eastern Uttar Pradesh. Chaudhary *et al.*(2012) studied the sedges and grasses of Gautam Budhnagar (Noida) Uttar Pradesh.

Kumar and Saxena (2012) described about the sedges and grasses of district Saharanpur (U.P.) and documented 110 species of Cyperaceae and Gramineae (Poaceae). Verma and Pal (2014) described the exploration of ethno-botanical use of majar plant species by the local tribal communities of Bundelkhand region of Uttar pradesh. Verma and Singh (2015) described the ethno-botanical notes on some wild plants used by the tribals of Chitrakoot district (U.P).

CHAPTER-3

AREA OF STUDY

Saharanpur is the northernmost of the districts of state Uttar Pradesh, bordering the states of Haryana, Uttarakhand and Himachal Pradesh. The district is geographically located in the North-West part of the newly created Saharanpur Division. It lies between 29^{o} 34' and 30^{o} 34' North latitude and 77^{o} 7' and 87^{o} 12' East longitude. The area of district is 3860 sq. km., of which forest area is about 67014 hectares. The region forms the northern most part of Ganga-Yamuna Doab. In the North of the district lies district Dehradun of Uttarakhand state and districts Yamuna Nagar and Karnal of Haryana state in the west, district Muzaffarnagar and Shamli of Saharanpur Division in the south and district Haridwar of Uttarakhand state in the east.

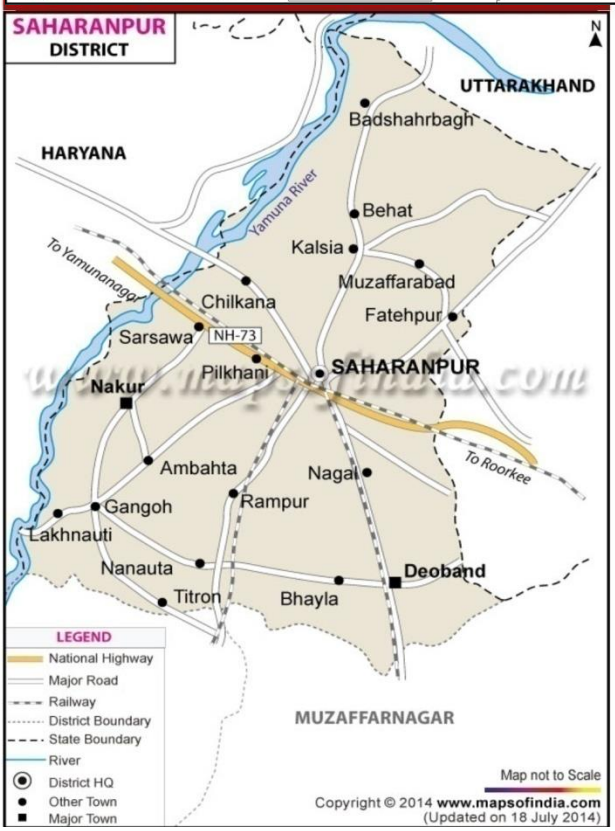
Physiography:

The district is characterized with the Shiwalik, Bhabar, Tarai, Khadar and the plain. Hilly tract of the Shiwalik, range along the northern border is stretching from west to east directions, which have a breadth of 10-16 kilometres. The whole range is forested. Lying immediately below the Shiwaliks is the Bhabar tract intersected by numerous torrents that drain rainy water into the Yamuna river and its numerous tributaries. This once forested, sub-mountainous belt stands, almost denuded with the great extension of village. The maximum area of the district consists of plain. On the basis of geology, topography, climate and natural vegetation the district is divided into the following sub regions-

Yamuna Khadar

Yamuna Khadar extends to the western part of the district in the north-south direction. It has mostly flat surface with monotonous topography. The region is demarcated on the basis of the extent of Yamuna floodwaters. The general slope of the region is towards south. Yamuna is the main river which flows on the western limit of the district in south direction. Budhi Yamuna and Kothanala are the other rivulets in the region. As far as soil texture is concerned, the region is mainly composed of Alluvial soil.

STUDY AREA MAP:



Saharanpur Plain

The region covers the major part of the district. It is a level plain with gentle slope from north to south direction. Monotony of the physiography is broken by the streams flowing in this belt. In the northern part of the streams beds are wide but narrow down towards south. Hindon is the main river which flows in this region. There are other streams which have no significance. The region is composed of alluvial soil.

Deoband Plain

The region extends to the eastern part of the district in North-South direction. Kali river with its tributaries drains this tract. A few patches of sand dunes or bhur are noticed south of Deoband town. The plain is flat and fertile with plenty of irrigational facilities. The transport network is also very well developed. Other characteristics are similar to Saharanpur plain.

Saharanpur Bhabar

The region is situated south of the Shiwalik ranges are parallel to them in east-west direction. The rivulets coming down from the Shiwalik suddenly disappear in this belt. These streams deposit unasserted sediments and town tans and talus. These torrents accelerate soil erosion and render the land upfit for agricultural purposes by depositing coarser materials. The streams are notable for changing their courses. They do not have any defined banks. The soil of the region are mostly coarse loamy to sandy.

Saharanpur Shiwalik

The region is also known as 'Ghar Region' spread in east-west direction in the northern part of the district. The region is composed of upper Shiwalik and lower Shiwalik of Pleistocene and Miocene periods. The region is drained by many rivulets.

From administrative point of view, the district is divided into *5 Tehsils* namely Behat, Nakur, Saharanpur (Sadar), Deoband and Rampur Maniharan. Area wise Behat is the largest Tehsil while Saharanpur Sadar is the smallet one. The district Saharanpur composed of *11 Development Blocks* viz. Baliakheri, Deoband, Gangoh, Muzaffarabad, Nagal, Nakur, Nanauta, Punwarka, Rampur Maniharan, Sadhauli Qadeem and Sarsawa. These blocks are further divided into villages. There are *1243 villages* in the district.

Map of Study site- District Saharanpur (Uttar Pradesh)

Drainage:

The Yamuna is the important river of the district which flows upto 92 kilometers in the western border. It enters the district at a place called Khar in the extreme north of pargana Faizabad. Here, It forms the western boundary of the district upto pargana Gangoh where from it enters the district Shamli. The other important rivers of the district are Hindon, Katha, Krishna, Dhamola and Panvdhoi which dries up mostly in summer.

Climate:

The climate of the district is characterized by general dryness, a bracing cold season and a hot summer. The cold season from around the middle of November to February is followed by the hot season lasting till the end of June. The monsoon season starts from July to mid of September. Winds are generally light with some increase in force driving the later summer and monsoon season. Winds blow predominantly from north-west from November to April. By April, south-eastern winds also appear and in the next four months winds are mostly from the south-east, winds from the north-west blowing on some days in the afternoons. In the cold season passing western disturbances

affect the weather over the district causing a few thunder-storms, some of which are accompanied by hail. Dust-storms and thunder storms occur during the hot season.

May and June are the hottest months with maximum temperature around 39º C and the daily minimum around 25º C. The heat in summer is intense and the maximum temperature on individual days goes up to 45º C and over. January is generally the coldest month with mean daily maximum at 20.1º C and the mean daily minimum at 6.6º C. During the cold season in association with passing western disturbances, cold wave affects the district, the minimum temperature occasionally dropping to about a degree or two below the freezing point. Frosts occur on such occasions.

The northern part of the district is a hilly tract and most of the forests are there. Because of this, the rainfall in the Saharanpur district is comparatively more than the other districts of the Saharanpur Division.

Natural Resources:

Forests cover practically the whole of the hilly range of the Shiwalik. Apart from the government forests there are no large areas of jungle or waste. This is generally covered with trees and coarse grass which is in itself of considerable economic value and also useful for grazing. In the Khadar occasional patches of Dhak and other species are to be seen. Deoband, an ancient place lying in the Southern part of the district is said to have been the residence of the Pandavas during their exile and was then known as Devi-ban meaning the sacred forest dedicated to some deity. With the increase of population the forest mostly lying the tarai area have been gradually cleared and reclaimed for agricultural purpose. In 1996-1997, the forest covered an area of 61233 hectares out of total reported area of 390508 hectares which is about 16 percent. Out of this 33229 hectares is under reserve forest in the Shiwalik range of forest division.

Most of these forests are covered with coarse grass while in the khaddar tracts, there are scattered patches of dhak and other species. Poplar and most tropical trees comprise the moist Shiwalik sal forests and low lying moist Savannah forests. The moist Shiwalik sal forests are confined to a small area in the district in the Nahan sandstone region. The other trees which are found in these forests are Sida, Ghoghar, Pandal, Bakli, Kandla, Bel, Rohni, Chamroro, Chilla, Dhudhi, Sandam, Kathber, Dhawan and Marorphali. The common species growing in the low lying moist Savannah forests are

Sissoo, Ber, Kharik, Maindal, Chilla, Kaddum and Kathber, sandam, kusum, amla, amaltas, harsingar, dhawai, tendu, sakina, rohini, lisora and bhatta. The Bamboo forests are mainly found along the river banks and on the slopes of the Shiwalik hills. Other trees found in abundance in the forest are Shisam, tun, Sal, Semal , Garhal, Atna, Gurhana, Shahtut,, Papri, Khair and Kaket. These are useful in building houses, match box, plywood, packing, gum, catechu and sport goods.

Coarse grass found in hilly area is used in making bun (Rope). Small scale industry of woodwork in the district of Saharanpur is of world fame because of wood which is easily available here. Eucalyptus trees are grown in private areas here and market is also available for its commercial use near the district Yamunanagar of Haryana state. The trees mostly found in the forest are the Sal, haldu, Bel, Sissoo, Ber, Chir, Bakli, sain, Bahera, Gular, Amla, Dhauri, Amaltas, Khair, Rohini, Dhak, Bargad and Bamboo. The industries connected with forest product are timber and wood cutting for furniture, fuel, building ropes, strings and thatching material. There is great demand of soft wood species like Kanju, Baurang and Jhingan for the plywood industry at Jwalapur. Khair trees yield catechu which is exported to Dehradun, Delhi, Meerut, Bareilly and Kanpur. Baib grass is mostly used for making paper at Saharanpur Paper Mill. Other minor forest products are gum, honey, medicinal herbs and plants.

CHAPTER-4

METHODOLOGY

The present study comprises extensive survey of the study area to analyze floral diversity of angiosperms and their ethno-botanical information. The study area was extensively surveyed in different seasons during the last four years. Best efforts were made to cover all the sites to collect maximum number of plant specimens in flowering and fruiting stages. The ethno-botanical data was collected by conducting interviews with Vaidyas, Ojhas, Hakims, experienced tribal people and local inhabitants.

A. Collection:

For the collection of plants, all efforts were made to collect the wild species of herbs, shrubs and trees. Special attention was paid to the areas with rich floristics. Every collected specimen was placed in folds of newspapers. The record of all the specimens, so far collected was maintained in a field note book. It included field number, botanical name, local name, date of collection, locality of collection, habit, habitat, flower colour and ethno-botanical importance. Photographs of plants were also taken in various seasons by digital camera during field work for future use.

B. Preservation:

The collected specimens were preserved by using various chemicals such as Formalin, FAA, mercuric chloride and alcohol. The formalin was sprayed on the specimens placed on newspapers in order to protect them from infection by various fungi and insects. Thereafter, the specimens were sealed airtight with the help of cellophane in polythene bags for 20-24 hours. It was done to eradicate the already existing infection by insects and fungi. After this, the polythene bags were opened and specimens were taken out, placed in new fresh blotting papers for about 36 hours. The specimens were then placed one above the other with fresh blotting sheets. These blotting sheets were then kept under pressure. The preserved specimens were mounted with glue on standard sized (42cm×29cm) herbarium sheets.

C. Labeling:

Specimens were labeled on the right lower corner of the herbarium sheet with a label showing field number, botanical name and local name of plant, family, place and date of collection, brief description and uses etc. The prepared herbarium sheets were then placed in a suitable place like steel or wooden cabinets with pigeon holes.

D. Identification:

The plants have been observed during field visits and were identified on the spot. Unidentified plants were further identified at home or college laboratory by using various flora, books and laboratory tools. The plants were identified with the help of available floras and monographs such as Flora of British India (Hooker,1872-1897), Flora of the Upper Gangetic Plains, Adjacent Shiwalik and Sub- Himalayan Tract (Duthie,1903-1929), Forest Flora of Chakrata, Dehradun and Saharanpur Forest Division (Gupta,1928), Flora of Delhi (Maheshwari,1963), Forest Flora of Plains of Uttar Pradesh (Kanjilal,1966), Grasses of Upper Gangetic Plain (Som Deva and Naithani,1974), Herbaceous Flora of Dehradun(C.R. Babu, 1997), Flora Gorakhpurensis (Srivastava,1976), Supplement to Flora of Upper Gangetic Plain (Raizada,1976), Flora of District Garhwal North West Himalaya (R. D. Gaur,1999) . Other floras were also consulted for identification of plants.

Ethnobotanical Studies:

During this field work, ethno-botanical observations were collected from the rural people dominated areas and other vegetation areas of district Saharanpur, Uttar Pradesh. The information about the utilization of plants as fodder, food, medicines and for other purposes by the rural people of the district was recorded. The methods of field exploration as suggested by Jain and Goel (1995) was followed for observations during the course of study.

For collecting information from rural people about medicinal use of plants, two kinds of interviews were organized- first of individuals and secondly of groups of individuals. Persons were selected at random on the way or gathering information from individuals from the study area. In group interviews, more than one individual were selected and their interviews were taken at different sites wherever necessary. The gathered information was documented and was then segregated for different medicinal plants on the basis of plant part used and the disease cured.

In addition to the the information collected from rural people and local inhabitants, several books such as *Applied Ethnobotany; People, wild plant use and conservation* by A. B. Cunningham (2001), *Ethnobotany; Principals and Applications* by C. M. Cotton (1966), *A Hand Book of Field and herbarium Method* by S. K. Jain & R. R. Rao (1977) were consulted.

CHAPTER – 5

OBSERVATION

During the floristic and ethnobotanical investigation of district Saharanpur, 303 plant species belonging to 208 genera and 74 families of angiosperms have been enumerated. Out of these, 250 species pertaining to 169 genera and 62 families of dicotyledons whereas 53 species under 39 genera and 12 families of monocotyledons have been identified. These species are being described along with key to families, genera and species. For taxonomic identification and description of plants, Bentham and Hooker's (1862-1883) system of classification has been followed.

DICHOTOMOUS KEY TO THE FAMILIES

CLASS I- DICOTYLEDONAE

Embryo with two cotyledons, Leaves usually with reticulate venation, Flowers tetra or penta-merous.

SUB CLASS – 1 POLYPETALAE - Petals free

SERIES - 1***THALAMIFLORAE*** - Torus small, not expanded.

1. Stamens numerous
    2. Carples usually many, free.
        3. Plants terrestrial.
            4. Shrubs or trees, leaves simple,carpels aggregated. **Annonaceae**
        3. Plantsaquatic **Nymphaeaceae**
    2. Carpels two or more,united.
        4. Placentation parietal.
            5. Flowers actinomorphic.
                6. Ovary not sessile, leaf compound.
                    7. Shrubsortrees. **Capparaceae**
                    7. Herbs. **Cleomaceae**
                6. Ovary sessile, leaf simple.
                    8. Herbs, plants with milky sap, leaf spiny. . **Papaveraceae**
                    8. Shrubs, plants without sap. **Flacourtiaceae**
        4. Placentation free-central, leaf fleshy. **Portulacaceae**

4. Placentation axile, sometimes basal.
9. Stamens monadelphous or polyadelphous or free.
10. Anther one celled.
11. Mostly herbs or shrubs, leafsimple, stamens monadelphous, **Malvaceae**
11. Trees, leaf digitately compound, stamens polyadelphous. **Bombacaceae**
10. Anther two celled. **Sterculiaceae**
9. Stamens free, many, anthers two celled. **Tiliaceae**

1. Stamens few, not more than ten.
12. Carpels free, flowers unisexual,
12. Carpels united, flowers bisexual, herbs.
13. Flowers zygomorphic.
14. Sepals 5, petaloid, stamens 8, placentation axile. **Polygalaceae**
14. Sepals-5, stamens-5, placentation parietal. **Violaceae**
13. Flowers actinomorphic.
15. Palcentation periatal.
16. Petals cruciform, stamen 6, tetradynamous. **Brassicaceae**
16. Petals not cruciform, stamen if 6, tetradynamous. **Capparaceae**
15. Placentation free-central.
17. Sepals 2, petals 4-5, leaf fleshy, ovary superior or half inferior.
17. Sepals 5, petals 5, leaf not fleshy, ovary superior. **Caryophyllaceae**
15. Placentation axile,may be basal.
18. Leaves opposite, calyx imbricate.
18. Leaves alternate, calyx valvate.

Sterculiaceae

SERIES-2 *DISCIFLORAE*- Torus expanded into fleshy disk.

1. Placentation parietal, fruit 3-valved capsule, seeds winged. **Moringaceae**

1. Placentation axile, fruit not as above.
   2. Flowers zygomorphic.
      3. Flowers spurred, anthers syngenesious, leaves simple. **Balsaminaceae**
      3. Flowers not spurred, anthers free, leaves compound. **Sapindaceae**
   2. Flowers actinomorphic.
      4. Plants usually herbs.
         5. Leaves compound.
            6. Fruit capsule. **Oxalidaceae**
      4. Plants usually climbers.
         5. Leaves simple or compound, inflorescence leaf- opposed, tendril present. **Vitaceae**
         5. Leaves simple, inflorescence not as above,tendril present.
            6. Fruit indehiscent drupe, seeds exarillate. **Rhamnaceae**
            6. Fruit dehiscent capsule, seeds arillate. **Celastraceae**
   4. Herbs, shrubs or trees, plants armed.
      7. Leaf gland dotted, aromatic. **Rutaceae**
      7. Leaf not gland dotted.
         8. Stamens monadelphous. **Meliaceae**
         8. Stamensfree.
            9. Plants usually with resinous stem, fruit one seeded. **Anacardiaceae**
            9. Plants not as above.
               10.Leaf simple.
                  11.Plant armed with prickles, flowers in axillary fascicles, one ovule ineachlocule. **Rhamnaceae**
                  11. Plants unarmed, flowers in cymose, two ovules in each locule. **Celastraceae**
               10. Leaves compound.
                  12. Leaves bifoliate, plants armed. **Balanitaceae**
                  12. Leaves more than two foliate, plants armed.
                     13. Plants resinous with glanddotted leves. **Burseraceae**
                     13. Plants not resinous, leaf not glanddotted.
                        14. Trees, one ovule in each locule.
                           15. Flowers regular, style2-5, ovary lobed, fruit winged, one seeded. **Simaroubaceae**

15.Flowers irregular, style one, ovary not lobed,
fruit 2-3 lobed drupe. **Sapindaceae**

14. Herbs or undershrubs, 2 ovules in each locule.
Zygophyllaceae

SERIES-3 *CALYCIFLORAE*- Sepals united.

1. Leaves mostly compound, rarely simple.
2. Stipules adnate, carpels many, free, fruit an achene. **Rosaceae**
2. Stipules if present, not as above, carpel one, fruit legume or pod.
3. Flowers zygomorphic, papilionaceous. **Fabaceae**
3. Flowers zygomorphic, not papilionaceous. **Caesalpiniaceae**
3. Flowers actinomorphic. **Mimosaceae**

1. Leaves simple, succulent, propagated by leaf marigins. **Crassulaceae**

1. Leaves simple, fruit capsule, achene, berry or schizocarpic.
4. Plants wth tendril, flower unisexual, ovary inferior. **Cucurbitaceae**
4. Plants without tendril.
5. Flowers unisexual, ovary inferior. **Trapaceae**
5. Flowers bisexual, ovary superior. **Passifloraceae**
6. Stamens usually indefinite.
7. Leaves absent or much reduced, succulent plants. **Cactaceae**
7. Leaves well developed, plants not succulent.
8. Calyx free fromovary.
9. Petals present, episepalous, leaves not fleshy,
placentation axile. .... **Lythraceae**
9. Petals absent, if present not episepalous, leaves
fleshy, basal placentation. **Aizoaceae**
8. Calyx attached to the ovary.
10. Leaves opposite, glanduler, punctuate
with intra- marginal nerves. **Myrtaceae**
10. Leaves alternate, not asabove.
11. Ovary single celled, flower greenish white.
Alangiaceae
11. Ovary more than one celled. flower bright red,
fruit berry with leathery rind. **Punicaceae**

12. Flowers white, fruit drupe, ovary with 4 locules.

Lecythidaceae

6. Stamens usually definite, ovary inferior or half inferior.

13. Leaves aromatic, flowers in umbel,
fruit with 2 mericarp. **Apiaceae**

13. Leaves not aromatic, flowers in racemes,
spikes or cymes.

14. Trees, shrubs or woody climber.

Combretaceae

14. Herbs, fruit capsules. **Onagraceae**

6. Stamens usually definite, ovary superior.

15. Soft wood tree with latex, leaves with
hollow petiole, petals united. **Caricaceae**

15. Herbs or under shrubs, without latex,
petals free.

16. Petals absent, leaves fleshy, seeds reniform.

17. Fruit 3-5 valved capsule. **Molluginaceae**

17. Fruit transversely dehiscing,
petiole with basal pouch. **Aizoaceae**

16. Petals present, leaves not fleshy,
seeds not reniform. **Lythracaae**

SUB CLASS-2 GAMOPETALAE - Petals united.

1.Ovary inferior of half inferior.

2. Leaves alternate, stamens 8 or more, Inflorescence head,
calyx absent or modified into pappus, anther united, ovary one celled.

Asteraceae

2. Leaf opposite, stamens 4-5, Inflorscence varied, calyx usually
present, anthers free, ovary with more than one cell, leafopposite,
stipules inter or intra petioler. **Rubiaceae**

1. Ovary superior.

3. Plants leafless, non-green, stem or root parasite.

4. Stem parasites. **Cuscutaceae**

4. Root parasites.

5. Placentation parietal. **Orobanchaceae**

5. Placentation axile. **Scrophulariaceae**

6. Carpels more than two.

7. Flower bisexual, stamens inserted on corolla.

8. Tree, shrubs, woody twiners, plants with milky juice, corolla 4-8 lobed, ovary 2-8 celled. **Sapotaceae**

8. Herbs or under shrubs, styles 5, ovary one celled. **Plumbaginaceae**

6. Carpels two.

9. Plants with milky latex.

10. Pollens not agglutinated in wax-like mass, style one. **Apocynaceae**

10. Pollens agglutinated into wax like mass, style 2.

11. Filaments united, anthers with horny wings. **Asclepiadaceae**

11. Filaments free, anther without horny wings. **Periplocaceae**

9. Plants without milky latex.

12. Flowers actinomorphic.

13. Inflorescence dichasial or monochasial cyme.

14. Fruit capsule, many ovules ineach locule. **Hydrophyliceae**

14. Fruit drupe or nutlets, ovulesdefinite.

15. Herbs, style 1, gynobasic. **Boraginaceae**

15.Tree or shrub, style 2. **Ehretiaceae**

13. Inflorescence not as above.

16. Leaves usually alternate.

17. Plants not twining, ovary 2 celled, many ovules in each locule, swollen placenta. **Solanaceae**

17. Mainly twinners, ovary 2celled, two ovules in each locule. **Convolvulaceae**

16. Leaves opposite or atleast lower ones opposite.

18. Stamens 2. **Oleaceae**

18. Stamens 4-5.

19. Usually herbs.

20. Ovary 2 celled, placentation axile. **Scrophulariaceae**

20. Ovary 2 celled, placentation parietal,
stemens alternate with petals. **Gentinaceae**

20. Ovary one celled, placentation free central,
stamens opposite to petals. **Primulaceae**

19. Trees or shrubs, ovary one celled. **Salvadoraceae**

12. Flowers zygomorphic.

21. Leaves usually compound, fruit elongated.
Bignoniaceae

21. Leaf usually simple, fruit not as above.

22. Flowers with clear bracts and
bracteoles, stem with swollen joints.
Acanthaceae

22. Flowers without bracts and bracteoles,
stem without swollen joints.

23. Flowers with extra floral glands at
the base, fruits with spines.
Pedaliaceae

23. Placentation parietal, fruit hooked.
Martyniaceae

23. Flowers without extra floral glands,
fruits notspiny.

24. Many ovules in each locule.
Scrophulariaceae

24. Ovules 1or 2 in each locule.

25. Inflorescence verticellaster,
gynobasic style, plants aromatic.
Lamiaceae

24. Ovary not lobed, style terminal.
Verbenaceae

SUB CLASS-3 MONOCHLAMYDEAE- Petals absent, perianth sepaloid or petaloid.

1. Ovary superior.

2. Flowers bisexual.

3. Perianth present.

4. Plants not parasitic, anthers without valvular dehiscence.

5. Leaves with ochreate stipules. **Polygonaceae**

5. Leaves exstipulate.

6. Herbs, undershrubs, woody stragglers or twinners.

7. Perianth petaloid.

8. Not twinners, perianth tubular, flowers in cymes or umbels, stamens involute in bud. **Nyctaginaceae**

8. Herbaceous twiners, flowers in spikes, racemes or panicles, perianth and stamens not as above. **Basellaceae**

7. Perianth not petaloid, if petaloid, bracts and bractioles scarious.

9. Bracteoles absent or herbaceous. **Chenopodiaceae**

9. Bracts and bracteoles scarious. **Amaranthaceae**

2. Flowers unisexual orpolygamous.

10. Trees or shrubs.

11. Ovary 3- celled. **Euphorbiaceae**

11. Ovary1-celled.

12. Calyx absent, flowers in catkin or spikes.

13. Leaves scale like, stamen 1, ovary 1 celled, ovules 2, basal, fruits 1 seeded. **Casuarinaceae**

12. Calyx present, inflorescence various cymose, spike or hypanthodium.

14. Plants with milky juice, anther inflexed in bud, leaf not oblique at base, fruit multiple. **Moraceae**

14. Plants with water sap, anthers erect in bud, leaves oblique at base, fruit samara. **Ulmaceae**

10. Herbs, terrestrial, stamens definite.

15. Ovary 3 celled. **Euphorbiaceae**

15. Ovary1 celled.

16. Leaf exstipulate, bracts and bracteoles scarious, fruitutricle. **Amaranthaceae**

16. Leaves stipulate, anthers erect in bud. **Cannabinaceae**

1. Ovary inferior.

17. Parasites, shrubs or trees, flowers actinomorphic, fruit drupe or berry.

18. Root parasite, tree, flower unisexual, disc epigynous or perigynous.

Santalaceae

18. Stem parasite, shrubs, flowers bisexual or unisexual, disc absent.

Loranthaceae

17. Plants not parasite, perennial climbers, flowers zygomorphic, fruit capsule.

Aristolochiaceae

CLASS II-MONOCOTYLEDONAE

Embryo with one cotyledon, Leaves usually with parallel venation, Flowers tri-merous.

1. Leaves fan shaped or pinnate, usually very long or very broad, forming a terminal crown, long petiolated. **Arecaceae**

1. Leaf not as above.

2. Perianth none, at least in male flowers.

3. Perianth absent, flowers in the axil of bracts (glumes or scales), arranged spikelets.

4. Stem (culm) mostly solid, usually triangular, nodes absent, leaves aligulate, fruit achene. **Cyperaceae**

4. Stem usually hollow, cylindrical or flat, nodes present, leaves ligulate, fruit a caryopsis. **Poaceae**

3. Perianth represented by scales, if absent then no spikelet, flowers not subtended by bracts.

5.Plants not submerged or floating.

6. Plants monoecious, male and female flowers on the same axis in spike, leaves not spinulose.

7. Plants not of wet lands, inflorescence subtended by spathaceous bracts, plants tuberous. **Araceae**

7. Plants of wet lands, inflorescence not subtended by spathaceous bracts, plants rhizomatous. **Typhaceae**

6. Plants dioecious, leaves spinulose. **Pandanaceae**

5. Plants are submerged or floating.

8. Plants floating.

9. Fronds thalloid. **Lamnaceae**

9. Plants stoloniferous, leaves obovate. **Araceae**

2. Perianth present, usually in 2 series, inner one petaloid, scales absent.

10. Ovary superior.

11. Plants aquatic.

12. Perianth composed of calyx and corolla, inflorescence subtendedby spathe like bract. **Pontederiaceae**

11. Plants terrestrial.

12. Plants climbing or twining. **Liliaceae**

12. Flowers in terminal, solitary head, leaves radical. **Eriocaulaceae**

1. Plants not grass like, perianth petaloid.

2. Plants usually xerophytic, leaf mostly fibrous and thick, in a dense tuft at the stem apex, flowers in panicle. **Agavaceae**

12. Plants grass like.

14. Outer and inner segments of perianth alike, petaloid. **Liliaceae**

14. Outer segment of perianth (calyx like) different from inner one. **Commelinaceae**

11. Plants aquatic, inflorescence in close whorls, fruitanachene. **Alismataceae**

10. Ovary inferior.

15. Flowers regular (rarely irregular) and stamen 3 or more, no petaloid.

16. Aquatic submerged herbs. **Hydrocharitaceae**

16. Terrestrials.

17. Twining, leaves simple or compound, reticulate venation, flower unisexual.

Dioscoreaceae

17. Plants not twining, parallel venation, if reticulate, leaf much lobbed, flowers bisexual.

18. Stem false, convolute leaf sheath, inflorescence usuallydrooping. **Musaceae**

18. Stem not as above, inflorescence umbellate. **Amaryllidaceae**

15. Flowers strongly zygomorphic, fertile stamens1-2.

19. Stamens 6, but only one fertile. **Zingiberace**

FLORISTIC AND ETHNOBOTANICAL DESCRIPTION OF PLANTS

Ranunculaceae

Ranunculus L.

***Ranunculus sceleratus*L.**, *SPL.551; FBI. 1: 19; FUGP. 1: 21; FPP.2;FD.50.*

A glabrous, erect, annual herb, up to 30-70 cm tall. Stem hollow, erect, branched, fistular. Leaves long, petiolate, deeply segmented. Stipules membranous. Inflorescence panicle. Flowers numerous, small, yellow. Sepals reflexed, petaloid. Petals yellow, oblong. Fruit obliquely obovate achenes.

Common Name:- Shim, Jaldhania

Flowering and Fruiting:- January –March

Ethnobotanical Uses:

- Leaf juice is applied for the treatment of eczema and ringworm.
- Stem juice is used in asthma, pneumonia andrheumatism.
- Seeds are used in treatment of stomach pain and kidney problems.

Menispermaceae

Tinospora Miers.

***Tinospora cordifolia* (Willd.) Miers.**, *FBI. 1: 97; FUGP. 1: 27; FFP. 9; FF. 51; FD.53; FH. 23; FPP. 6.*

A perennial, climbing shrub with branchedstem, grey bark, corky. Petiolate leaves, 6-10 cm in diameter, glabrous, deeply cordate at base. Inflorescence raceme. Flowers small, greenish-yellow. Staminate flowers in fascicles. Sepals 6, ovate, biseriate, outer smaller, inner larger. Petals wedge-shaped. Stamens 6, free, antipetalous. Pistilate flowers solitary. Sepals and petal similar to staminate flower. Ovary on a fleshy receptacle, style short. Fruit ovoid, red, sessile drupes **(Plate-1).**

Common Name:- Giloy, guduchi

Flowering and Fruiting:- August-December

Ethnobotanical Uses:

- Leaf decoction is given in the treatment of gout.
- Fruit is used to treat jaundice and rheumatism.
- Dried stem used in polyurea and skin diseases.
- Stem juice used in general debility, fever and urinary problems.

Nymphaeaceae

Nelumbo Adans.

***Nelumbo nucifera* Gaertn.**, *FPP. 7; FH. 24; FD.54; FUGP. 1:35; SPL.511.*

An aquatic, perennial herb having milky juice. Roots submerged, branched with creeping rhizome. Leaves orbicular, having waxy coatings, margin entire, petiole hollow. Flowers solitary, pinkcolored, fragrant, peduncled. Tepals caducuous. Anthers dithecous, yellow in color, filaments long. Carpels golden in color. Fruit has seeds coated with wax.

Common Name:- Kamal

Flowering and Fruiting:- July –November

Ethnobotanical Uses:

- Leaf stalk is used as a source of fibres.
- Petiole and flowers areused as vegetable.

Papaveraceae

Argemone L.

Petals bright yellow, stigma lobes contracted. *A. mexicana*

Petals creamy-yellow, stigma lobes spreading. *A. ochroleuca*

***Argemone mexicana*L.**, *SPL.508;FUGP. 1: 37; FBI. 1:117; FD.55; FPP. 7; FID.30; FH.24.*

An annual, prickly, erect herb, about 70-130cm high. Stem with yellow latex. Leaves elongated, 5-10 cm long, alternate, divided, upper one sessile, lower one petioled, prickly. Flowers small, prickly peduncled, solitary, bright yellow in color. Sepals 3, prickly outside. Petals 4-6, imbricate, yellow. Stamens numerous. Ovary covered with soft spines, stigma persistent, 5-lobed, red. Fruit capsule oblong, spiny, dehiscence through valves. Seeds many, brownish-black.

Common Name:- Peeli Kateli

Flowering and Fruiting:- November- June

Ethnobotanical Uses:

- Seeds are used as antidote against snake bite.
- Latex is used to treat eye infection and jaundice.
- Seed oil is used to to treat cutaneous infections.

Argemone ochroleuca Sweet; *FH. 24; FD.55; FP. 7.*

An annual, prickly herb upto 60 cm high. Leaves rosette at base, upper one sessile, prickly. Flowers solitary, sessile, petals creamish yellow, stigma lobes spreading. Fruit a spiny, ovate-lanceolate capsule. Seeds black in color.

Common Name:- Satyanashi

Flowering and Fruiting:- March- September

Ethnobotanical Uses:

- Seed oil is used in treatment of various skin diseases.
- Seeds are used as antidote against snake bite.

Fumariaceae

Fumaria L.

***Fumaria indica* (Haussk.) Sabnis**; *FPP. 9; FD.56; FH. 24; FBI. 1: 128; FUGP. 1: 37.*

An annual, scattering, herb. Leaves highly segmented, mucronate. Inflorescence raceme. Flowers small, numerous, short stalked, bracteate, bracts papery. Sepals membranous, white. Petals white, unequal sized, fused to form corolla tube, inner petals fused to form keel. Fruit small, indehiscent, single seeded, brown colored capsule.

Common Name:- Pit Papra

Flowering and Fruiting:- November- March

Ethnobotanical Uses:

- The decoction is used as a blood purifier.
- It is also used against fever and as anthelmentic.

Brassicaceae

Pods triangular, globose, obcordate.

Fruit with1-2 seeds. *Lepidium*

Fruit with many seeds. *Capsella*

Fruit linear or oblong.

Seeds uniseriate.

Herbs, seeds not winged.

Flowers white, stigma capitate. *Cardamine*

Seeds biseriate.

Stigma capitate, fruit oblong. *Eruca*

Capsella Medic.

***Capsella bursa-pastoris* (L.) Medik.**, *FBI. 1: 159; FUGP. 1: 46; FH. 25; SPL.2:647.*

An erect, annual, procumbent herb about 30-40 cm tall. Stem highly branched, covered with stellate hairs. Leaves dimorphic, radical one pinnatifid, cauline leaves minute, sessile. Inflorescence corymbose raceme. Flower small, white. Sepals green, elongated. Petals 4, lanceolate. Fruit triangular pod. Seeds numerous, brown.

Flowering and Fruiting:- January - March

Ethnobotanical Uses:

- Used to prevent haemorhage from urino-genital tract.
- Also act as diuretic.
- Used for dysentery, diarrhoea and eye problems.

Cardamine L.

***Cardamin escutata* Thunb.**, *FH. 25; SPL.655; FBI. 1: 138, 1872; FUGP. 1: 40.*

An erect, decumbent, annual herb, about 10- 30 cm high. Stem extremely branched. Leaves petiolated, basal leaves ovate, toothed, lobed, upper leaves narrow, lobed. Inflorescence raceme. Flowers small, pale white in color. Calyx oblong. Corolla with 4 petals, erect. Stamens 6. Fruit an erect, obtuse pod.

Flowering and Fruiting:- December- March

Ethnobotanical Uses:

- Leaves and immature flowers are used as salad.

Eruca (L.) Cav.

***Eruca vesicaria* (L.) Cav.**; *FUGP. 1: 45; FBI. 1: 158; FD.62; FPP. 13.*

An erect, branched herb. Leaves pinnatifid, toothed, terminal leaflet oblanceolate. Inflorescence raceme. Flowers ebracteate, whitish yellow. Sepals 4, acute. Petals long, wedge shaped. Stamens 9-10. Fruit siliqua, with triangular beak. Seeds brownish.

Common Name:- Tara-mira

Flowering and Fruiting:- December- March

Ethnobotanical Uses:

- Young plant is used as salad and vegetable.

- The oil with pungent smell is used in pickles.

Lepidium L.

Flowers very small, white, fruit a pod. *L.didymus*

Flowers small, pink, fruit siliqua. *L.sativum*

***Lepidium didymus* L.**; *FH., 25; FD.57; FID.32; FUGP.1:46.*

Annual, decumbent, leafy, branched. Stem glabrous, angled. Leaves 2-4 cm, alternate, cauline, petiolated, pinnately compound, basal leaves form rosette. Flowers small sized, yellowish-green in raceme, opposite to leaf. Sepals 4, ovate, concave. Petals white, shorter than sepals. Stamens 6, only 2 having anthers, anthers globose, didymous. Fruit a pod with black seeds **(Plate-21).**

Common Name:- Jungli Halo

Flowering and Fruiting:- January -June

Ethnobotanical Uses:

- The plant extract is used to treat bone disorders and for rheumatism.

***Lepidium sativum* L.**, *SPL.644; FBI. 1: 159; FH. 27; FUGP. 1: 47; FD.62; FPP. 14.*

An, erect, glabrous, unbranched, annual herb, upto 1m tall. Stem erect, glabrous. Leaves radical, petiolate, elongated, segmeted, cauline one sessile, entire. Inflorescence raceme. Flowers small, white or pinkish, ebracteate, pedicellate. Sepals pubescent, short. Petals 4. Fruit, siliqua, ovate, winged, deeply notched, 2seeded.

Common Name:- Halo

Flowering and Fruiting:- January -April

Ethnobotanical Uses:

- Used for the treatment of asthma and bleeding piles.
- Leaves are used as salad.
- Roots are used in the treatment of syphilis.

Capparidaceae

Capparis L.

Erect shrub, branches leafless, flowers reddish-orange. *C.decidua*

Climbing shrub, branches leafy,flowers white. *C. sepiaria*

***Capparis decidua* (Forsk.) Edgew.**, *FPP. 17; FD.65; FBI. 1: 174; FUGP.1: 51; FFP. 19.*

A perennial, barbed shrub with corky bark. Stem highly branched, coated with waxy bloom, thorns straight, paired, short. Leaves absent. Inflorescence corymbose raceme. Flowers numerous, borne at lateral position, red in color. Calyx unequal in size, inner saccate. Petals ovate, fused, larger than sepals. Stamens 18-20, filaments long, red. Gynophores elongated, slender, as long as the stamens. Fruit globose berry.

Common Name:- Kair

Flowering and Fruiting:- January- September

Ethnobotanical Uses:

- Root paste is used in scorpion bite.
- Fruits are used to prepare pickle.
- Flowers and buds are used in treatment of gastric problems.
- Root bark is used for the treatment of gout, dropsy and rheumatism.

***Capparis sepiaria* L.**, *FBI. 1: 177; FUGP. 1: 52; FFP. 20; FF. 60; FD.65; FPP. 17; FH.28.*

A diffuse, spreading, highly branched, perennial shrub. Stem branches tough, zig-zag with short, paired thorns. Leaves lanceolate, leathery, petiole elongated, pubescent, adaxial surface smooth, abaxial downy, stipules paired, modified into spines. Inflorescence terminal umbel. Flowers small sized, numerous, white. Stamens many. Gynophore long. Fruit single seeded red berry.

Common Name:- Kanthari

Flowering and Fruiting:- May- August

Ethnobotanical Uses:

- Leaf decoction is used for cough.
- Root bark is used as antiseptic and to cure boils.
- Leaf paste is applied for scabies and swellings.

***Cleome* L.**

Leaves compound, gynophores present. *C. gynandra*

Leaves simple, gynophores absent. *C. viscosa*

***Cleome gynandra* L.**, *SPL.671;FPP. 18; FH. 28; FD.64; FBI. 1: 171; FUGP. 1:49.*

A branched, erect, annual herb, 70-150 cm high. Stem branches pubescent, glandular. Leaves pinnately compound, pentafoliate, sessile, ovate, acute, entire. Inflorescence corymbose raceme. Flowers stalked, bisexual, bracteate, white, sticky. Sepals 4, lanceolate, glandular. Petals 4, clawed. Stamens 6, filaments long, purple. Fruit capsule with black seeds.

Common Name:- Jakhiya

Flowering and Fruiting:- June-August

Ethnobotanical Uses:

- Seed decoction is used for typhoid and epilepcy.
- Leaves are used to cure headache and rheumatism.
- Leaf paste can be applied to prevent pus formation in boils.

***Cleome viscosa* L.**, *FBI. 1: 170; FUGP. 1: 48; FD.63; FPP. 19; FH. 28.*

Annual, erect, highly branched, pubescent herb about 1m tall. Leaves penta-foliate, sessile, variable in shape and size, ovate, apex obtuse, pubescent, petiole elongated. Inflorescence raceme. Flower stalked, yellow, axillary, bracteate. Sepals 4, glandular, pubescent. Petals (2+2), clawed, yellow. Stamens 12-24, filaments elongated. Fruit glandular capsule with small hairs. Seeds black, small sized, numerous **(Plate-21).**

Common Name:- Hulhul

Flowering and Fruiting:- July-October

Ethnobotanical Uses:

- Seeds in the form of poultice is applied on painful joints.
- Seeds are used as carminative and anthelmintic.
- Plant is also used as vegetable.

Caryophyllaceae

Leaves stipulate, sepals fused. *Silene*

Leaves ex-stipulate, sepals free.

Style free from base.

Petals bilobed. *Stellaria*

Style connate at base.

Leaves in whorls, seeds winged. *Spergula*

Leaves opposite, seeds not winged. *Spergularia*

***Silene* L.**

***Silene conoidea* L.**; *SPL.418; FBI. 1: 218; FUGP. 1: 62; FH.34.*

Annual, erect, medium-sized herb about 40 cm tall. Stem dichotomously branched, shielded with glandular hairs. Radical leaves broad at base, narrow at top, cauline leaves sessile, lanceolate. Inflorescence panicle. Flowers pink, ebracteate. Sepals glandular, pubescent, ovoid, 5- toothed. Petals 4-5, pink, short, obovate. Stamens (5+5), 5 epipetalous, 5 free. Styles 3, ovary stalked. Fruit capsule with many seeds.

Common Name:- Takla

Flowering and Fruiting:- December- March

Ethnobotanical Uses:

- Plant juice is used in ophthalmia.
- It is also used as a fumigant.

***Spergula* L.**

***Spergula arvensis* L.**, *SPL. 440; FBI. 1: 243; FUGP. 1: 63; FD.69; FPP. 23.*

An, erect, pubescent, diffuse, annual herb, up to 50 cm long. Leaves sessile, fleshy, spreading, deciduous. Inflorescence dichasial cyme. Flowers pedicellate, white. Sepals 5, free, ovate, green. Petals 5, white, longer than sepals, obtuse. Stamens 10, filament elongated, anthers yellow. Carpel 3-5, style short, stigma pentafid. Fruit a multi-seeded, 5- valved, winged capsule with black seeds.

Common Name:- Muchmuchia

Flowering and Fruiting:- January- April

Ethnobotanical Uses:

- Seeds are used in the treatment of pulmonary tuberculosis.
- Plant is commonly used as green manure and fodder.
- Seeds yield a fatty oil.

Spergularia (Pers.) Presl.

***Spergularia rubra* (L.) J. Presl.**; *FPP. 24; FH. 34; FBI. 1: 244; FUGP. 1: 64.*

A small sized, pubescent, glandular, annual herb. Leaves elongated, fleshy, stipules lanceolate. Inflorescence cymose. Flowers pinkish white. Sepals 5, polysepalous. Petals 5, whitish pink, obovate. Stamens 10, anthers yellow. Style 3. Fruit capsule with many, non-winged, brown seeds.

Flowering and Fruiting:- February - May

Ethnobotanical Uses:

- Plant is used in urinary caliculi.
- It is diuretic and used for cystitis.

Stellaria L.

***Stellaria media* (L.) Vill.**, *FBI. 1: 230; FUGP. 1: 62; FD.68; FPP. 24; FH. 34.*

A prostrate, diffuse, annual herb about 15- 60 cm tall. Stem highly branched, decumbent, green in color. Lower leaves petiolate, upper one sessile, cordate, pubescent. Inflorescence dichasial cyme. Flowers stalked, glandular, white. Sepals 5, lanceolate, acute. Petals 5, white. Stamens 10, filaments white, antisepalous, anthers yellow. Ovary smooth, ellipsoid, style 3. Fruit a toothed capsule with 10-20 brown seeds.

Common Name:- Godal, Chick weed

Flowering and Fruiting:- December - March

Ethnobotanical Uses:

- Paste of the plant applied to cuts and wounds.
- It also helps to treat constipation.
- Paste of plant mixed with plaster of paris is applied on broken bones for healing.

Portulacaceae

Portulaca L.

Plant without nodes. *P.oleracea*

Plant with nodes. *P. pilosa*

***Portulaca oleracea* L.**, *SPL. 445; FBI. , 1: 246; FUGP. 1: 66; FD. 71; FPP. 25.*

Annual, succulent, glabrous herb, swollen at nodes. Leaves alternate, subsessile, obovate, caducous, stipular hairs. Inflorescence dichotomously cyme. Calyx fleshy, unequal,

persistent, united below. Corolla yellow, obovate. Stamens 8-12. Ovary ovoid. Fruit capsule. Seeds minute, reniform **(Plate-1).**

Common Name :- Luni

Flowering and Fruiting :- August –November

Ethnobotanical Uses :

- Leaves are used in the treatment of kidney, bladder and spleen disorders.
- It is also used to treat mouth ulcer.

***Portulaca pilosa* L.**, *SPL. 639; FPP. 26; FH. 35.FBI. 1: 247.*

An annual, succulent, glabrous herb with branched, reddish stem. Leaves alternate, simple, oblong, acute or obtuse, white ring of stipules present. Inflorescence terminal head. Flowers 2-6, brick red colored. Sepals free. Petals ovate, obtuse. Stamens 15-20, filaments white. Ovary unilocular, ovules many. Fruit capsule with many reniform Seeds **(Plate-21).**

Common Name:- Ragchasi

Flowering and Fruiting:- July- September

Ethnobotanical Uses:

- It is used in treatment of renal troubles.
- Plant is also used in inflammation and ulcers.

Tamaricaceae

Tamarix L.

Tree, flowers bisexual, inflorescence interrupted spike. *T. aphylla*

Shrub,flowers unisexual, inflorescence continuous spike. *T. dioica*

***Tamarix aphylla* (L.) H. Karst.**; *FD.72; FPP.26; FH. 35; FBI. 1: 249; FUGP.1: 68; FFP. 26.*

An evergreen, branched, perennial tree, upto 14-16 m high. Main trunk erect and branches pendulous. Leaves reduced with ensheathing leaf base, punctuate gland dotted. Inflorescence interrupted spike. Flower bisexual, sessile, pink colored, bracteate. Sepals 5, acute, polysepalous. Petals 5, deciduous. Stamens 5, inserted alternatively on lobed disc. Fruit a sessile capsule.

Common Name:- Farash

Flowering and Fruiting:- November- April

Ethnobotanical Uses:

- Bark contains good amount of tannin.
- It is used to treat eczema and other skin disorders.

***Tamarix dioica* Roxb. ex Roth**; *FBI. 1: 249; FUGP. 1: 68; FFP. 26; FF. 66; FD.72; FPP. 27; FH. 35.*

A medium-sized, branched tree. Branches spreading, drooping. Leaves sheathing, small sized, greyish-green, acuminate. Inflorescence compact spike. Flowers pentamerous, unisexual, bracteate, rose colored. Sepals 5, ovate. Petals 5, poypetalous, Staminate flower with stamens 5, filaments longer than corolla, inserted in notches of 5- lobed disk, anthers dithecous. Pistillate flower with styles 3, exerted. Fruit capsule.

Common Name:- Jhau

Flowering and Fruiting : July – November

Ethnobotanical Uses:

- Decoction is used for the treatment of enlarged spleen.
- It is useful for dying and tanning due to good amount of tannin.

Malvaceae

Ripe carpels separating from the axis.
Styles as many as the carpels.
Carpels1-seeded.
Stigmas linear.
Bracteoles 3. *Malva*
Stigma capitate.
Bracteoles 3. *Malvastrum*
Bracteoles absent. *Sida*
Carpels 2- or more seeded. *Abutilon*
Styles twice as many as the carpels. *Urena*
Ripe carpels forming a capsular fruit..
Spathaceous calyx deciduous. *Abelmoschus*
Spathaceous calyx persistent. *Hibiscus*

Abelmoschus Medic.

***Abelmoschus moschatus* Medic.**, *FPP.29; SPL. 697; FBI. 1: 342; FUGP. 1: 87.*

Annual, under shrub about 2-3 m tall. Leaves dimorphic, lower one entire, upper one lobed, ovoid, hairy, stipulate, petiole long. Flowers axillary, solitary, involucral bracts present, bracteolate, epicalyx (6-10), lanceolate. Sepals elongated, velvety. Petals showy, bright yellow. Fruit a pubescent capsule with musky black seeds.

Common Name:- Muskdana

Flowering and Fruiting:- May-October

Ethnobotanical Uses:

- Seeds are commonly used as flavouring agent.
- Shoots and young leaves used in making soups.

Abutilon L.

Carpels more than 10. *A. indicum*

Carpels less than 10. *A. ramosum*

***Abutilon indicum* (L.) Sweet**; *FBI. 1: 326; FUGP. 1: 78; FFP. 36; FD.75; FPP. 31; FH.37.*

A perennial, branched, erect, pubescent shrub, up to 1.5 m tall. Stem branches hairy, woody when mature. Leaves ovate, acuminate, toothed, velvety pubescence, stipules deflexed. Flowers solitary, axillary, yellow, pedicellate. Sepals 5, free, shallow lobed, acute, green. Petals yellow, polypetalous, spreading. Stamen fused to form staminal tube, hairy at base. Carpels 15-20. Fruit a schizocarp with 28-40 mericarps, black in color. Seeds brownish black, reniform **(Plate-26).**

Common Name:- Kanghi

Flowering and Fruiting:- July –November

Ethnobotanical Uses:

- Leaf juice used to cure kidney stones.
- Leaves are used in treatment of bleeding piles.
- Root are useful in treating dental problems.
- Decoction is used as a solution to wash the eyes.

***Abutilon ramosum* (Cav.) Guill.**; *FBI. 1: 328; FUGP.1: 79; FFP. 38; FD.76.*

A small sized, highly branched, erect, pubescent, perennial shrub. Stem branches covered with soft hairs. Leaves broadly ovate-cordate at base, apex acuminate, pubescent, petiole tomentose, stipules long. Inflorescence cymose. Flowers axillary, terminal, pedicellate, small sized, yellow. Sepals 5, cup shaped, divided up to middle, lobes ovate. Petals 5, polypetalous, yellow. Staminal tube hairy, stamens numerous. Carpel 8-10, sticky with spreading awns. Fruit capsule with truncate apex. Seeds many.

Flowering and Fruiting:- October –February

Ethnobotanical Uses:

- Root powder is used to cure stomach disorders.

Hibiscus L.

***Hibiscus vitifolius* L.**, *SPL.695; FBI. 1: 338; FUGP. 1: 85; FPP. 36; FH. 38.*

An erect, highly branched, perennial herb up to 1-2 m high. Stem branches slender. Leaves subcordate at base, apex acute, crenate-serrate, lobes 3-7, ovate with small, setaceous stipule. Flowers axillary, solitary, yellow, drooping. Epicalyx 7-12, linear, bracteoles 5-8, setaceous, free. Sepals 5, campanulate, lanceolate, hairy, persistent. Petals 5, yellow, purple at centre, longer than the calyx. Fruit 5-winged, pubescent capsule. Seed 2-4, brown in color.

Common Name:- Jungli Bhindi

Flowering and Fruiting:- July – December

Ethnobotanical Uses:

- Stem yields fibre, that can be used for preparation of ropes and strings.

Malva L.

***Malva parviflora* L.**, *FBI. 1: 321; FUGP. 1: 74; FD.76; FPP. 37; FH. 39.*

A small, prostrate, spreading, annual herb. Stem with stellate hairs. Leaves petiolate, petiole long, cordate, 5-7 nerved at base, lobed, sparsely hairy, stipulate. Flowers axillary, clustered, bisexual, bracteate, bracteolate, involucral bracts caducous, hairy. Sepals 5, polysepalous, glabrous, lobes ovate. Petals clawed, polypetalous, yellow. Stamens fused to form staminal column. Carpels 10, glabrous, reticulated on back. Fruits lightly winged with brownish- black seeds.

Common Name:- Golio

Flowering and Fruiting:- January -April

Ethnobotanical Uses:

- Leaf decoction is used as nerve tonic.
- Seeds are used to cure cough and ulcers.

Malvastrum Gray

***Malvastrum coromandelianum* (L.) Garcke.**; *FD.77; FPP.37; FH. 39;SPL.687; FBI. 1: 321; FUGP 1: 75; FFP. 35; FF.73.*

Annual, highly branched, erect, herb up to 1 m tall with pubescent hairs. Leaves petiolate, stipulate, pubescent, ovate-elliptic, serrate. Flowers solitary, axillary, bracteate, involucral bracts 3, bracteolate. Calyx with 5 sepals, free, ovate, ciliate. Corolla with 5 petals, polypetalous, slightly lobed, hairy at base, yellow. Staminal tube glabrous, 3-4 mm long. Carpels 10-12, reniform, with 3 projections, style persistent, stigma capitate. Fruit a schizocarp with 1-12 mericarps, covered with persistent calyx. Seeds black, reniform **(Plate-1).**

Common Name:- Bariara

Flowering and Fruiting:- August- December

Ethnobotanical Uses:

- Roots are used in the treatment of dysentery and intestinal hemorrhage.
- Stem is utilized for making brooms.

Sida L.

Herbs, leaves cordate at base.

Inflorescence corymbose, carpel 5, awn small. *S. cordata*

Inflorescence fasciculate, carpel 10, awn long. *S. cordifolia*

Shrubs, leaves not cordate at base.

Leaves lanceolate, calyx glabrous. *S. acuta*

Leaves not lanceolate, calyx pubescent.

Leaves rhomboid, peduncle longer than petiole. *S. rhombifolia*

Leaves elliptic or obovate, peduncle shorter than petiole. *S. ovata*

***Sida acuta* (Burm. f.) Bross.**; *FUGP. 1: 76; FPP.38; FH. 40; FBI. 1: 323; FID. 71; FFP. 33.*

A highly branched, pubescent, wody, undershrub up to 1-2 m tall. Leaves alternate, petiolate, smooth, margin dentate, stipules paired, pubescent. Flower solitary, axillary, pedicel as long as petioles. Calyx penta-lobed, membranous, triangular, pubescent. Corolla pale-yellow, ciliate. Stamens forming a column, anthers monoadelphous, yellow. Fruit schizocarp with 5-6 mericarps.

Common Name:- Bal

Flowering and Fruiting:- August –December

Ethnobotanical Uses:

- Boiled leaves are used against elephantiasis.
- Roots are used for nervous and urinary disorders.
- Plant fibre is used as a substitute of jute fibre.

***Sida cordata* (Burm. f.) Boiss.**; *FH. 40; FFP. 33; FID.72;FUGP. 1: 75; FFP. 33; FD.74; FPP.40. FBI. 1: 322.*

Annual, erect, trailing herb about 25-50 cm high. Stem branched, covered with stellate hairs. Leaves simple, alternate, petiole shorter than leaf blade, cordate at base, abaxial side with long hairs, stipulate. Inflorescence racemose. Flower pedicellate, hypogynous. Sepals 5, long, lobed, persistent. Petals broad, yellow. Staminal tube pubescent. Carpels 5, superior ovary. Fruit globose schizocarp with brownish-black seeds **(Plate-26).**

Common Name:- Baharbuta, Adia bel

Flowering and Fruiting:-February– September

Ethnobotanical Uses:

- Fruit decoction is used in sexual debility.
- Decoction of root is given in leucorrhoea and gonorrhea.
- Leaves crushed and applied on cuts.

***Sida cordifolia* L.**, *SPL.684; FBI. 1: 324; FUGP. 1: 77; FID. 72: FFP. 34; FD.75;FPP.39; FH. 40.*

A small sized, perennial, undershrub. Stem branched at base, covered with stellate hairs. Leaves alternate, petiolate, cordate, irregular crenate margins, pubescent on both surfaces, stipules deciduous. Inflorescence racemose. Flower axillary, small, yellow, sessile. Calyx campanulate, segmented, segments triangular. Corolla yellow, obliquely obovate. Staminal tube hirsute. Carpels 5, awns longer than calyx, enclosed with stiff

hairs. Fruit a schizocarp, composed of 8-10mericarp. Seeds brownish- black.

Common Name:- Kharenti

Flowering and Fruiting:- September- November

Ethnobotanical Uses:

- Roots infusion is given in nervous and urinary disorders.
- Root powder is given with milk in leucorrhoea and frequent micturition.

***Sida ovata* Forsk.**; *FPP.39; FH. 40; FBI. 1: 323; FUGP. 1: 77; FFP. 34; FD.75.*

An erect, perennial herb up to 1m tall. Stem highly branched at base. Leaves oblong-ovate, obtuse, hairy on both surfaces, petiole shorter than the blade, stipulate. Flowers solitary, axillary, short stalked. Calyx penta-lobed, angular, cup shaped. Corolla oblique, yellowish-white. Staminal tube pubescent. Carpels 7-8, wrinkled, shortly awned. Fruit a globose schizocarp, incompletely covered by calyx. Seeds brown in color.

Common Name:- Bal

Flowering and Fruiting:- Almost throughout the year

Ethnobotanical Uses:

- Root decoction is given in sexual debility.
- Powdered seeds mixed with jaggery are given in lumbago.

***Sida rhombifolia* L.**, *SPL. 684; FBI. 1: 323; FUGP. 1: 76; FFP. 33; FF. 75; FD.74; FPP.39; FH. 40.*

Annual, erect, pubescent, branched shrub up to 1.3 m tall. Leaves variable in shape, lower rhomboid, margin serrate, upper one entire towards the base. Stipules longer than the petiole, linear, caducous. Flower axillary, solitary, clustered at ends of branches. Calyx with 5 sepals, angular, penta-lobed, campanulate. Corolla with 5 petals, pale orange, longer than calyx. Staminal column stellate, pubescence. Carpels 8-10, beaked. Fruit schizocarp with 8-10 mericarp. Seeds brownish-black.

Common Name:- Sahadevi

Flowering and Fruiting:- August- October

Ethnobotanical Uses:

- Decoction of roots is given in fever, swelling and burning micturition.
- Plant is used for the treatment of skin troubles.
- It is used in rheumatism and tuberculosis.

Urena L.

***Urena lobata* L.**; *SPL. 692; FBI. 1: 329; FUGP. 1: 80; FFP. 37; FF. 77; FD.77; FPP.40; FH. 40.*

An erect, small pubescent, branched, undershrub. Stem branches covered with stellate hairs. Leaves petiolate, ovate, broader at base, apex acute, dentate margin. Flower axillary, bracteolate, bracteoles linear, pink. Calyx with 5 sepals, lobed. Corolla with 5 petals, reflexed, pink. Stamens monoadelphous. Carpels 5, single ovuled, style 10. Fruit a globose capsule with hairy seeds **(Plate-1).**

Common Name:- Bachita

Flowering and Fruiting:- July - October

Ethnobotanical Uses:

- Stem yields a fibre used for making ropes, cordage and carpets.
- The decoction of stem and roots used for flatulence.

Bombacaceae

Bombax L.

***Bombax ceiba* L.**, *SPL. 311; FH. 40; FD.83; FBI. 1: 349; FUGP. 1: 92; FFP. 40.*

A large, deciduous tree upto 60 m tall. Stem branched horizontally, main trunk prickled when old, prickles conical. Leaves compound, alternate, long petioled, stipulate. Flowers solitary, bisexual, large, fleshy, bright red colored. Flower blooms when plant is leafless. Calyx cup-shaped, pubescent inside. Corolla with 5 petals, oblong, red. Stamens many, filaments pink, pentadelphous, brown colored. Fruit a 5-valved capsule. Seeds numerous, enclosed within silky hairs **(Plate-26).**

Common Name:- Semal, Simbhal

Flowering and Fruiting:- February -May

Ethnobotanical Uses:

- Flowers are used as gulkand and applied to prevent miscarriage.
- The wood is used in manufacturing of match boxes and pencils.
- Seed fibre is used for making pillows for new born baby.
- Root is used for treatment of gonorrhoea and dysentery.

Tiliaceae

Herbs or undershrubs.

Fruit unarmed, elongated, 2-5 valvate.	*Corchorus*
Fruits armed with spines, 3-6 valvate.	*Triumfetta*

***Corchorus* L.**

Fruit elongated, cylindrical.	
Capsule tri-radiate,winged.	*C. aestuans*
Capsule slender, non-winged	
Capsule with trifid beak.	*C. tridens*
Capsule beak not lobed.	*C. trilocularis*
Fruit globose or sub-globose.	*C.capsularis*

***Corchorus aestuans* L.**; *FID. 77; FD. 89; FH. 44; FBI. 1: 398; FUGP. 1: 114.*

A sub-erect, annual herb, about 50 cm high. Stem reddish, branched, pubescent with long, straight, spreading and short, contracted, curled hairs. Leaves alternate, ovate-oblong, pubescent, membranous, stipulate, petiole long. Inflorescence cyme. Flower bracteate, bisexual, actinomorphic, pedicellate. Calyx with 5 sepals, linear, dorsally keeled. Corolla with yellow petals, clawed. Stamens numerous, anthers yellow. Ovary superior, hairy. Fruit a 6-winged, beaked capsule with many, dark brown seeds.

Common Name:- Kaga-roti

Flowering and Fruiting:- August -December

Ethnobotanical Uses:

- Seeds are used for treatment of gonorrhea and sexual debility.
- Infusion made of crushed fruits is given during fever, pneumonia and stomatitis,
- Stem is used as a source of good quality fibre.

***Corchorus capsularis* L.**, *SPL.529; FBI. 1: 397; FPP.43; FUGP. 1: 113; FD.89.*

A glabrous, erect, annual herb about 80-120 cm tall. Stem greenish-purple, branched. Leaves simple, alternate, lanceolate, round at base, tip acute, margins dentate. Inflorescence cymose. Flowers 1-2, leaf opposed, bracteate, bisexual. Calyx purple, oblong. Corolla obovate, yellow. Stamens 20-25, anthers yellow. Fruit globose capsule, short beaked with glabrous seeds.

Common Name:- Kharenti, Narcha

Flowering and Fruiting: September - November

Ethnobotanical Uses:

- Leaves infusion is used in fever, cystitis and gonorrhea.
- Fruit decoction is given in stomach trouble.
- It is a source of jute used for make jute ropes, carpets, gunny bags.
- Short fibres are used for paper manufacturing.

***Corchorus tridens* L.**, *FID., 80; FUGP. 1: 114; FD.89; FBI. 1: 398; FPP. 44.*

A sub-erect, glabrous, annual herb about 30-40 cm tall. Stem branched at base. Leaves alternate, oblong, lanceolate, margins serrate. Inflorescence cymose. Flowers subsessile, yellow, 1-4 in a cluster. Calyx long. Corolla clawed, obovate. Stamens 10, anthers yellow. Fruit slightly curved, smooth capsule with trifid beak. Seeds many, black in color.

Common Name:- Kag-nasha

Flowering and Fruiting:- August- December

Ethnobotanical Uses:

- Stem is used as a source of fibre.

***Corchorus trilocularis* L.**;*FH. 44; FBI. 1: 397; FID., 80;FUGP. 1: 113; FPP.44.*

A pubescent, suberect, annual herb about 1m high. Stem highly branched at base. Leaves alternate, lanceolate, serrate margins, adaxial surface dotted, abaxial pubescent with setaceous stipules. Inflorescence cyme. Flowers pedicellate, yellow, 1-3. Calyx oblong, pubescent. Corolla smooth with minutely pubescent margins. Stamens numerous, filaments smooth. Fruit slightly curved, short beaked capsule. Seeds black.

Common Name:- Karak

Flowering and Fruiting:- September-November

Ethnobotanical Uses:

- Fibers obtained from stem are used for making ropes.

Triumfetta L.

***Triumfetta rhomboidea* Jacq.**; *FD.89; FBI. 1: 395; FH. 45; FUGP. 1: 111; FF. 92; FPP. 46; SPL. 389.*

A perennial, branched, erect, shrub about 1.5 m tall. Stem highly branched at base,

smooth. Leaves alternate, variable, lower leaves 3-5 lobed, broad-ovate, petiolate, pubescent, margins glandular. Inflorescence cymose. Flowers yellow. Calyx oblong, apiculate. Corolla oblong, margins ciliate. Fruit ovoid, spiny capsule.

Common Name:- Jhinjhira

Flowering and Fruiting:- August – November

Ethnobotanical Uses:

- Leaves and flowers are used for the treatment of leprosy.
- Leaves and roots are used to treat diarrhea and ulcers respectively.
- Fruit infusion is used to facilitate easy parturition.

Linaceae

Linum L.

***Linum usitatissimum* L.**; *SPL. 277; FD.90; FBI. 1: 410; FUGP. 1: 115; FPP.47.*

An erect, annual herb about 60 cm tall. Stem branched, smooth. Leaves alternate, linear-lanceolate. Inflorescence panicle. Flower bluish white, pentamerous. Sepals 5, ovate with ciliate margins. Petals obovate, blue. Fruit round capsule with dark brown, shining seeds.

Common Name:- Alsi

Flowering and Fruiting:- December -March

Ethnobotanical Uses:

- It is a common source of fibre.
- Seeds are used as laxative. Also used to treat bronchitis and cough.
- Flowers are used as a tonic for heart and brain.
- The oil obtained from seeds is used in paints industry.

Zygophyllaceae

Tribulus L.

***Tribulus terrestris* L.**; *FBI. 1: 423; FPP.49; FD.91; FH. 5; FUGP. 1: 119.*

An ascending, suberect, perennial, pubescent herb upto 80-90 cm high. Stem branched, covered with white hairs. Leaves opposite, imparipinnately compound, mucronate. Flowers solitary, axillary, pentamerous, hypogynous. Calyx with 5 sepals, polysepalous. Corolla with 5 petals, free. Stamens 10, filaments free. Fruit an armed, schizocarpic, spiny cocci, each cocci bear divaricate spines.

Common Name:- Gokhru

Flowering and Fruiting:- July- December

Ethnobotanical Uses:

- Fruit decoction is used for the treatment of impotency.
- Raw leaves are used to treat stone problems.
- Mixture of fruits and root is used to treat leucorrhoea and urinary problems.

Oxalidaceae

Oxalis L.

Leaflet margins round. *O. corniculata*

Leaflet margins triangular. *O. latifolia*

***Oxalis corniculata* L.**; *FUGP. 1: 122; SPL.435; FPP. 50; FBI. 1: 435; FID. 92.*

A suberect, perennial herb with fibrous roots at nodes. Stem subterranean, branched. Leaves trifoliate, petiole long, leaflets obovate, broad, ciliate at margins, stipules attached to petiole. Inflorescence solitary umbel. Flower axillary, bracteate, bisexual. Calyx with 5 sepals, free, obtuse. Corolla with 5 petals, yellow, round at apex. Stamens 10, diplostamenous. Fruit oblong, angular, penta-ridged capsule with many, deep brown seeds **(Plate-2).**

Common Name:- Khatti- Booti

Flowering and Fruiting:- Almost throughout year.

Ethnobotanical Uses:

- The leaves are good source of vitamin C.
- The leaves are chewed raw due to its sore taste.
- Juice of its leaves act as antidote against Datura poisoning.
- Leaf juice is used to treat piles, anemia and skin problems.

***Oxalis latifolia* Kunth.**; *FD.93; FH. 52.*

Annual, suberect, hairy herb without stem. Leaves trifoliate, cuneate at base, triangular leaflet margins, tapering ends. Inflorescence umbel. Flower axillary, bluish purple. Calyx with 5 sepals, lanceolate. Corolla with 5 petals, funnel-shaped **(Plate-2).**

Common Name:-Nili Khatti Booti

Flowering and Fruiting:- November-May

Ethnobotanical Uses:

- Plant used as green manure due to presence of phosphoric acid, nitrogen and potash.

Rutaceae

Tree armed, leaves trifoliate. *Aegle*

Shrub, unarmed, leaves pinnately compound. *Murraya*

***Aegle* Correa**

***Aegle marmelos* (L.) Correa.**; *FBI. 1: 516; FFP. 60; FF. 103; FUGP. 1: 134; FPP.51; FD.95; FH.52.*

A medium-sized, deciduous, glabrous tree up to 10-15 m tall. Stem branched, branches ascending, armed with straight, sharp spines. Leaves alternate, tri-foliate, smooth, pale green, petiole elongated, gland dotted, lateral leaflets sessile, terminal stalked, fragrant. Inflorescence panicle. Flower pedicellate, small, greenish-white, fragrant. Sepals 5, hairy. Stamens numerous, filaments free. Fruit globose drupe, green when young later on turns yellow with hard fruit wall. Pulp aromatic, orange-colored, tasty. Seeds creamish, sticky, numerous **(Plate-2).**

Common Name:- Bel, Bel-Patthar

Flowering and Fruiting:- February -May

Ethnobotanical Uses:

- Its leaves are used for worship of Lord Shiva.
- Root paste is applied as an antidote against scorpion bite.
- Juice of ripe fruit is used for the treatment of gastro-intestinal problems.
- Leaf juice is used to treat jaundice, asthma, fever and diabetes.

***Murraya* L.**

***Murraya koenigii* (L.) Spreng.**; *FBI. 1: 503; FUGP. 1: 129; FF. 101; FFP. 66;FH.53; FD.97; FH. 53.*

A perennial, fragrant, deciduous, branched shrub about 4-6 m high. Stem branches pubescent, bark grey colored. Leaves pinnately compound, leaflets shortly stalked, ovate-lanceolate, base oblique, acuminate. Inflorescence sub-umbel. Flower small sized, white, fragrant, hypogynous. Calyx with 5 sepals, segmented, triangular, free. Corolla with glandular petals, longer than calyx. Stamens 8-10, free. Carpels 5, superior ovary, placentation axile, style short, stigma capitate. Fruit ovoid, shiny, pinkish berries. Seeds

mucilage coated **(Plate-2).**

Common Name:- Kari-patta, Mithi Neem

Flowering and Fruiting:- March-September

Ethnobotanical Uses:

- Leaves are used as flavouring agent.
- Root juice is applied for kidney related troubles.
- Leaves infusion is used for the treatment of diarrhea, dysentery and fever.
- Leaves, roots and bark are used for making tonics.

Meliaceae

Fruit is a drupe.

Leaves imparipinnate, flowers pale-white. *Azadirachta*

Leaves bi-tripinnate, flowers white-purple. *Melia*

Fruit is a capsule. *Toona*

Azadirachta A. Juss.

***Azadirachta indica* A. Juss.**; *FPP. 56; FH. 57; FF. 107; FFP. 69; FF. 107; FD.99; SPL.385; FBI. 1: 544; FUGP. 1:141.*

A perennial, evergreen, large sized tree. Stem branched, trunk straight, bark brownish and bitter. Leaves pinnately compound, imparipinnate, leaflets serrate, short stalked, bitter. Inflorescence panicle. Flowers many, axillary, bisexual, white, fragrant. Sepals free, obtuse, pentafid. Petals 5, oblanceolate. Stamens 10, fused to form staminal tube, anthers sessile. Gynoecium with 3 carpels, tricarpellary, syncarpous, superior ovary, single ovule per locule, stigma tridentate. Fruit ovoid-oblong, single seeded drupe, yellow when ripe **(Plate-3).**

Common Name:- Neem

Flowering and Fruiting:- March- July

Ethnobotanical Uses:

- Leaves are used in the manufacture of tooth paste and soaps.
- Young twigs are used as tooth brush, called ‘Datoon’ to clean teeth.
- Root decoction is given to treat jaundice and malaria.
- Leaves are boiled and their extract is used to treat various skin diseases.
- Bark paste is applied on wounds for quick healing.

Melia L.

***Melia azedarach* L.**; *SPL.384; FBI. 1: 544; FF. 108; FPP. 56; FD.99; FH. 58; FUGP. 1: 141; FFP. 70.*

A perennial, medium-sized, evergreen tree, about 12 m tall. Stem straight, branched with reddish-brown bark. Leaves bipinnate, pinnae lanceolate with dentate margins. Inflorescence panicle. Flower white-purple, axillary, bisexual, actinomorphic. Calyx lobed, oblong-lanceolate. Corolla linear, minutely pubescent. Stamens 10-12, fused to form staminal tube, purple, in color. Carpels 5, syncarpous, superior ovary, placentation axile. Fruit globose, wrinkled drupe **(Plate-3).**

Common Name:- Bakain, Deg

Flowering and Fruiting:- March-July

Ethnobotanical Uses:

- Leaves are used as green manure.
- Fruits are used to treat leprosy.
- Leaf decoction is used as a blood purifier.
- Fresh leaves paste can be applied on wounds.

Toona Roem.

***Toona ciliata* Roem.,** *FD.100; FH. 58; FPP. 56; FUGP. 1: 143; FFP. 71; FF. 109; FBI. 1: 568.*

A deciduous, branched tree up to 30 m tall. Stem straight, branched high above the ground, bark greyish. Leaves paripinnate, pinnae stalked, entire, undulate, oblique at base. Inflorescence drooping panicle. Flower small, bisexual, white, sweet scented. Calyx penta-lobed, obtuse. Corolla with 5 petals, oblong, ciliate. Stamens 5, inserted on the 5 fleshy disc lobes. Carpel 5, ovary superior, stigma peltate, penta-lobed. Fruit oblong, penta-valved capsule with numerous, winged seeds **(Plate-3).**

Common Name:- Toon

Flowering and Fruiting:- March-August

Ethnobotanical Uses:

- Bark is given to infants for treatment of dysentery.
- Wood is scenty and widely used in the manufacture of furniture.

Rhamnaceae

Ziziphus Mill.

Large trees with fruits exceeding 1-2 cm in diameter.	*Z. jujuba*
Small bushes with 1-1.5 cm long fruit.	*Z. nummularia*
Climbing shrubs with small-sized long fruits.	*Z. oenoplia*

***Ziziphus jujuba* Lamk.**; *FBI. 1: 632; FUGP. 1: 152; FF. 123; FD.101; FPP. 59.*

An armed, medium sized, evergreen tree upto 12 m high. Stem branches spreading, prickles solitary, straight or curved. Leaves simple, alternate, variable in shape and size, ovate to elliptic, rounded at both ends, abaxial side tomentose, adaxial dark green. Inflorescence cymose. Flower greenish- yellow, subsessile, bisexual. Calyx glabrous. Corolla with 5 petals, clawed, disk 10-lobed. Carpels 2, bicarpellary, bicelled ovary, style 2, connate to middle. Fruit globose drupe, yellowish-orange when ripe.

Common Name:- Ber

Flowering and Fruiting:- October –March

Ethnobotanical Uses:

- Fruits are used to protect liver and prevent ulcer formation.
- Fruits are useful in nausea, vomiting and stomach pain during pregnancy.
- Bark is used in ulcers and wounds.
- Leaves paste is helpful to prevent hairfall.
- Seeds are used to treat dry cough and skin problems.

***Ziziphus nummularia* (Burm. f.) Wt. & Arn.**; *FBI. 1: 633; FFP. 84; FD.102; FP59; FH. 60; FUGP. 1:153.*

A prickly, straggling shrub about 2-5 m high. Stem branches geniculate near the base, zig-zag, tomentose, bark greyish. Leaves alternate, ovate, rounded at base, shortly stalked, a pair of stipule modified into thorns. Inflorescence cyme. Flowers minute, sessile, axillary. Sepals ovate lanceolate, velvety. Petals obovate, convolute margins. Ovary 2-celled, styles 2, united above the middle. Fruit drupe, red or brown when ripe, shining and globose.

Common Name:- Jhad Beri

Flowering and Fruiting:- March-December

Ethnobotanical Uses:

- Root decoction is recommended in fever.
- Root bark is used for treatment of gout and rheumatism.
- Leaves are used as good fodder.
- The powder of the stem bark is used in diarrhoea.

***Ziziphus oenoplia* (L.) Mill.**, *FBI. 1: 634; FUGP. 1: 154; FD.102; FPP. 60; FH. 60; FFP. 85; FF. 124; SPL.194.*

A perennial, straggling, scandent shrub. Stem branches rusty tomentose, stipule modified into thorns, paired, one straight, other recurved. Leaves alternate, simple, obliquely lanceolate, shortly acuminate, adaxial surface smooth, abaxially pubescent. Inflorescence dichotomous cyme. Flower pubescent, axillary, pale-yellow. Fruit small-sized drupe, shining, globose or obovoid.

Common Name:- Bamolan

Flowering and Fruiting:- March-November

Ethnobotanical Uses:

- Fruit juice is used as a tonic for stomach.
- Roots are used in hyperacidity and ascariasis.

Sapindaceae

Climbing herb, flowers with petals. *Cardiospermum*

Erect shrub, flowers devoid of petals. *Dodonaea*

Cardiospermum L.

***Cardiospermum halicacabum* L.**, *SPL.366; FBI. 1: 670; FUGP. 1:166; FD.103; FPP. 61; FH. 61.*

An annual, tendrilar, climber with a perennial rootstock. Stem branched, slender. Leaves alternate, pinnately compound, bipinnate, deltoid, smooth, margin serrate. Inflorescence dichasial cyme. Flowers small, white, 2 circinate tendrils at apex of peduncle. Sepals rounded, outer 2 pubescent at margin, inner one membranous. Fruit trigonous capsule. Seeds black, enclosed within white aril.

Common Name:- Kapal- Phori

Flowering and Fruiting:- August- November

Ethnobotanical Uses:

- The herb is used in hair oils to prevent dandruff.
- Juice of the plant is useful in ear pain.
- Roots are laxative, and used for rheumatism and nervous disorders.

Dodonaea L.

***Dodonaea viscosa* (L.) Jacq.**; *FBI. 1: 697; FUGP. 1: 170; FFP. 105; FF. 147;FD.103; FPP. 61; FH. 61; SPL.118.*

A perennial, evergreen shrub about 1-4 m tall. Stem highly branched, young parts glandular. Leaves alternate, subsessile, smooth, filled with yellow sap. Inflorescence cymose. Flower small, greenish-yellow, bisexual. Sepals 5, oblong, apetalous. Fruit smooth, winged, yellowish-brown capsule. Seeds 1-2, black in color.

Common Name:- Vilayti-Mehndi

Flowering and Fruiting:- September- March

Ethnobotanical Uses:

- Leaves are antibacterial and used in treatment of burn, wounds and swellings.
- Bark decoction used as anti-inflammatory drug.

Anacardiaceae

Mangifera L.

***Mangifera indica* L.**; *SPL.200; FBI. 2: 13; FUGP.1: 176; FFP.112; FF. 157; FD.105; FPP. 62; FH. 62.*

A wide spreading, large sized, perennial, evergreen tall tree about 30 m high. Leaves simple, alternate, entire, coriaceous, clustered at ends of branches, petiole swollen at base. Inflorescence terminal panicle. Flower subsessile, bracteate, pale-yellow, fragrant, polygamous. Sepals 4-5, oblong-concave. Petals 4-5, ridged with dark yellow lines, penta-lobed. Fertile stamen 1, staminode 2-4, anthers purple. Ovary superior. Fruit ovoid drupe, laterally compressed, green in color, yellow on ripening **(Plate-3).**

Common Name:- Aam

Flowering and Fruiting:- March-August

Ethnobotanical Uses:

- Unripe fruits are used to prepare pickles.
- Fruits edible in various forms like juice, jams and jellies.
- Roasted seed is recommended to pregnant women in diarrhoea.

- The plant leaves are used in rituals such as home warming ceremony.
- Leaf paste is applied in scorpion bite.

Moringaceae

Moringa Adans.

***Moringa oleifera* Lam.**, *FD.106; FH. 62; FBI.2: 45; FUGP.1: 179.*

A medium sized, perennial tree about 10 m tall. Stem greyish-white, longitudinal wrinkles, barked, branches tomentose when young. Leaves alternate, pinnately compound, pinnae 4-6 paired, pale beneath, nerves obscure, glandular, pubescent. Inflorescence panicle. Flowers pedicellate, pale-white, honey-scented, bracteate. Sepals 5, lanceolate. Petals spathulate, unequal. Stamens 5, villous at base. Ovary pubescent, ovules numerous. Fruit pendulous triangular pod, ribbed. Seeds trigonous, winged **(Plate-21).**

Common Name:- Sahjan

Flowering and Fruiting:- March-July

Ethnobotanical Uses:

- Young fruits (pods) are edible as vegetable.
- Root decoction is given to treat asthma and bronchitis.
- Leaves juice along with honey is dropped into eyes in conjunctivitis.
- Yong fruits are used for making pickles.

Papilionaceae

Stamens monoadelphous.

Tree, leaves not gland dotted. *Dalbergia*

Herbs or undershrubs, leaves gland dotted. *Crotolaria*

Stamens diadelphous.

Unarmed herbs or shrubs.

Leaves simple.

Fruit 2-3 seeded, hairs medifixed, anthers apiculate. *Indigofera*

Fruit many seeded, hairs not medifixed, anthers not apiculate. *Tephrosia*

Leaves compound.

Leaflets dentate.

Seeds compressed, spotted with grey dots. *Lens*

Seeds niether compressed nor spotted.

Climbers with tendrils.

Only rachis tip is modified into tendril. *Vicia*

Rachis tip and upper leaflet modified into tendril. *Lathyrus*

Climbers devoid of tendrils.

Fruit1-2seeded. *Rhynchosia*

Fruit with more than 2 seeds.

Pod flat and pubescent. *Lablab*

Pod falcate, wrinkled, smooth.

Fruit spirally twisted. *Medicago*

Fruit not twisted.

Pod short, round or oblong. *Melilotus*

Leaflets entire or lobed, not dentate.

Trees.

Flower more than1cm, purplish white, fruits woody. *Pongamia*

Flowers more than 2 cm, orangish red, fruits non-woody. *Butea*

Shrubs or herbs.

Leaves trifoliate, imparipinnate.

Flower in globose head, leaflets not gland dotted. *Trifolium*

Leaves non-trifoliate.

leaves imparipinnate, leaflets5-8 pairs. *Clitoria*

Leaves paripinnate, leaflets16-20 pairs. *Sesbania*

***Butea* Roxb.**

***Butea monosperma* (Lam.) Taub.**; *FD.130; FPP. 80; FH. 66; FBI. 2: 194;FUGP. 1:221; FFP. 160; FF. 191.*

A medium-sized, erect, branched, deciduous tree about 10-20 m high. Branches irregular, young parts pubescent, latex red. Stipules small, deciduous. Leaves alternate, trifoliate, lateral leaflets larger than terminal one, broadly obovate, adaxial surface smooth, abaxial pubescence. Inflorescence terminal raceme. Flower bright orange-red. Calyx with 5 sepals, broadly campanulate, brown-velvety outside. Corolla with 5 petals, standard clawed, wings falcate, keel curved united, bright orange, silvery tomentose outside. Stamens diadelphous (9+1). Fruit pendulous pod with single seed.

Common Name:- Dhak, Palash,Tesu, Kesu

Flowering and Fruiting:-March-May

Ethnobotanical Uses:

- Fresh leaves juice is applied in burning urination.
- Leaf paste is applied externally for treatment of rheumatic pain.
- Flowers provide a dye known as 'tesu', used for dyeing the clothes.
- Bark decoction is useful in diarrhoea and dysentery.

Clitoria *L.*

***Clitoria ternatea* L.**; *SPL.753; FBI. 2: 208; FUGP. 1: 212; FD.131; FPP. 81.*

A perennial, twinning herb with trailing branches. Stem round, hairy. Leaves pinnately compound, leaflets 5-7, ovate, adaxial surface glabrous, abaxial one pubescent. Flowers solitary, axillary, bracteate, bracteolate. Calyx with 4-5 sepals, fused to form tube, lower most sepal veined, largest, persistent. Corolla bright blue in color, centre yellowish–white, sparsely pubescent. Fruit hairy pod, dehiscence through valves. Seeds 6-10, black **(Plate-4).**

Common Name:- Aprajita

Flowering and Fruiting:- May- October

Ethnobotanical Uses:

- Roasted seeds are used as a tonic for nursing mothers.
- Root paste is a good medicine against snake bite.
- Flowers yield a blue dye.
- Root powder is utiliized to prevent miscarriage.

Crotalaria L.

Leaves trifoliate, pods with 1or 2seeds. *C. medicaginea*

Leaves simple, pods with single seed. *C. burhia*

***Crotalaria medicaginea* Lam.,** *FBI. 2: 81; FUGP. 1: 190; FD.112; FPP. 82.*

A highly branched, erect herb with woody root base, upto 60 cm high. Stem erect, covered with thin hairs. Leaves small, petiolate, trifoliate, oblanceolate, smooth, stipules long, filliform, linear, deciduous. Inflorescence raceme. Flower yellow, bracteate, bracts linear. Calyx gamosepalous, companulate, pubescent. Corolla twice of calyx , yellow, standard hairy on backside, alae (2) oblong, keel (2) twisted, pubescent. Fruit an

obliquely sub globose, pubescent, 2-seeded pod.

Common Name:- Gugriya

Flowering and Fruiting:- July- December

Ethnobotanical Uses:

- Plant is used as fodder for cattles.

***Crotalaria burhia* Benth.**, *FPP.83; FH. 68; FBI. 1: 75; FUGP. 1: 189; FPP. 83.*

A branched, rigid, greyish-white, perennial, hairy, undershrub. Leaves large sized at lower side, upper one minute, sub-sessile, stipulate. Inflorescence raceme. Flowers yellow, pedicellate, bracteate, bracteolate, bracteoles 2 at each pedicel. Calyx gamosepalous, greenish yellow. Corolla yellow with red colored lines, standard ovate, clawed, wings oblong, 2 alae fused at base, free at top, distinctly beaked. Stamens 10, monoadelphous but heteromorphic. Style long, curved, swollen at base, stigma oblique. Fruit a beaked, brown ovoid pod.

Common Name:- Sanni

Flowering and Fruiting:- October- March

Ethnobotanical Uses:

- Plant is used for preparation of ropes and cordage.
- It is commonly utilized as a medicinal plant for its cooling effect.
- It provides fodder for cattles.

Dalbergia L.

***Dalbergia sissoo* DC.**; *FBI. 2: 231; FUGP. 1: 243; FF. 199; FFP. 167; FD.135; FPP. 84; FH. 68.*

A perennial, deciduous, tree about 25 m tall. Stem branched, bark corky, rough, greyish-yellow colored. Leaves trifoliate, imparipinnate, leaflets 3-5, alternate, acuminate. Inflorescence panicle. Flowers axillary, pale yellow, bracteate, bracts hairy, caducous. Calyx fused, dentate, shorter than the tube. Corolla double of calyx, yellow, standard clawed. Stamens 9, monoadelphous, yellow, dithecous anthers. Ovary hairy. Fruit thin, strip-shaped, 1-4 seeded pod **(Plate-4).**

Common Name:- Shisham, Sisso

Flowering and Fruiting:- February- June

Ethnobotanical Uses:

- Fresh leaves and dried bark is used in bleeding piles.
- Leaf decoction is given in gonorrhea.
- Wood is useful in leprosy, boils, and eruptions.

Lablab L.

***Lablab purpureus* (L.) Sw.**, *SPL.725; FUGP. 1: 210; FD.131; FH. 80; FPP. 90.*

A perennial climber, about 2-8 m long. Stem herbaceous, greenish-purple in color, finely hairy. Leaves petiolate, petiole flattened, stipulate, trifoliate, leaflet alternate, broadly ovate. Inflorescence raceme. Flowers axillary, pedicellate, bracteate, bracteolate, white-pink in color. Calyx gamosepalous, campanulate, toothed. Corolla with 5 petals, purplish pink, standard round, wings 2, 2 alae fused to form elongated keel. Stamens 9, monoadelphous. Fruit a flat, pubescent, 3-5 seeded pod.

Common Name:- Sem

Flowering and Fruiting:- September -February

Ethnobotanical Uses:

- Fruit contains good amount of protein and is commonly used as a vegetable.
- It is good source of fodder for cattles.

Indigofera L.

Leaves simple, entire.	
Fruit globose with 1 seed.	*I. linifolia*
Fruit cylindrical with 1or 2 seeds.	*I.cordifolia*
Leaves pinnately compound.	
Fruit with10-12 seeds.	*I. tinctoria*

***Indigofera cordifolia* Heyne ex Roth**.; *FBI. 2: 93; FUGP. 1: 230; FD.117.*

A diffuse, small, annual herb. Stem branched, upto 30 cm long, covered with white, long hairs. Leaves simple, sub-sessile, broadly ovate, cordate at base, stipulate, pubescent on both surfaces. Inflorescence axillary, sessile head. Flower 4-8, red in color. Calyx tubular, dentate. Corolla bright red, spathulate. Fruit cylindrical, oblong, pubescent, curved pod. Seeds pale brown.

Common Name:- Bekar, Bekaryio

Flowering and Fruiting:- June-November

Ethnobotanical Uses:

- Plant provides good fodder for cattles and goats.

***Indigofera linifolia* (L. f.)Retz.**; *FUGP. 1: 229; FD.117; FPP. 88; FH.70.*

A sub-erect, annual, silvery pubescent herb, up to 50 cm high. Stem branched at base. Leaves simple, nearly sessile, mucronate, stipules scarious. Inflorescence axillary raceme. Flower bright red, sub-sessile. Calyx campanulate, teeth setaceous, longer than tube. Corolla bright red, 2-3 times of calyx. Fruit minute, globose, silvery-white pod. Seed single, dark brown.

Common Name:- Torki

Flowering and Fruiting:- May-September

Ethnobotanical Uses:

- Root paste is applied on swellings.
- Plant decoction is given in fever.
- It is also used as a vermifuge.

***Indigofera tinctoria* L.**; *SPL.751;FBI. 2: 99;FUGP.1: 235;FFP.128; FF.172; FD.118; FPP. 89; FH.70.*

An erect, annual, bushy undershrub, about 1-1.5 m tall. Stem highly branched, branches angular, rough, covered with white pubescence. Leaves long, stalked, pinnately compound, leaflets bluish-green, opposite, shortly stalked, ovate-oblong, stipules minute, subulate. Inflorescence raceme. Flowers pink, numerous, bracteate. Calyx shallow, silvery-pubescent, teeth as long as the tube, lobes lanceolate, acuminate. Corolla exserted, standard greenish-yellow, wings pink. Fruit glabrous, pointed, straight or slightly curved, brown pod. Seeds 10-12 **(Plate-22).**

Common Name:- Neel

Flowering and Fruiting:- September- December

Ethnobotanical Uses:

- Plant is mainly grown for indigo and green manure.
- Leaf juice is useful in epilepsy and nervous disorders.
- Roots used in urinary complaints and jaundice.
- Root decoction is given in snake bite.

Lathyrus L.

Rachis ends in single tendril, flowers dull yellow. *L.aphaca*

Rachis ends in 3 tendrils, flowers purplish-pink. *L. sativus*

***Lathyrus aphaca* L.**; *SPL.729; FBI. 2: 179; FUGP. 1: 239; FD.127; FPP. 90; FH.70; FID. 121,1978.*

Annual, trailing, branched herb, about 25 cm high. Stem slender, angled, smooth. Stipules paired, leaf-like, triangular, foliaceous. Leaves abortive, rachis stiff, modified into unbranched tendrils. Inflorescence raceme. Flower axillary, bracteate, yellow in color. Calyx fused at base, toothed, lanceolate, exceeding the tube. Corolla cream colored. Fruit a smooth, beaked, linear, compressed pod with 4-6, brown seeds.

Common Name:- Jangli Matar

Flowering and Fruiting:- December - March

Ethnobotanical Uses:

- Seeds powder is given to cure cough and diarrhoea.
- The plant is useful as fodder.

***Lathyrus sativus* L.**; *SPL.730; FBI. 2: 180; FUGP. 1: 240; FD.128; FPP. 91.*

A diffuse, highly branched, glabrous, annual herb about 40 cm high. Stem winged, smooth. Leaves petiolate, petiole long and winged, stipulate, leaflets 2, acuminate, lanceolate leaflets ending in to tri-fid tendrils. Flower solitary, bisexual, zygomorphic. Calyx lanceolate, toothed, teeth slightly longer than tube. Corolla purple, standard broad, long. Fruit winged, compressed pod with 1-2, brown seeds.

Common Name:- Khesri dal

Flowering and Fruiting:- January - March

Ethnobotanical Uses:

- Seeds contain Selenium, therefore limited consumption is recommended.
- Seeds provide a material for preparation of plywood adhesives.
- Plant is mainly grown for fodder.

Lens Mill.

***Lens culinaris* Medik.**; *FD.127; FPP. 91; FH. 72; FBI. 2: 179; FUGP. 1: 237.*

An erect, small, softly pubescent herb. Leaflets 4-6 pairs, sessile, lanceolate, mucronate.

Inflorescence raceme. Flowers pale purplish, in 2-4 fid racemes. Calyx lobes linear, silky, twice the tube. Corolla pale purple. Fruit smooth, compressed, rhomboid-oblong pod. Seeds 2, grey in color.

Common Name:- Masoor

Flowering and Fruiting:- November – February

Ethnobotanical Uses:

- Young pods are used as vegetable.
- Soup made of seeds used as medicine for constipation and gastric troubles.
- It is a source of commercial starch used in textile and printing industries.
- Leaves and stalks used as a fodder.

***Medicago* L.**

Erect annual herb. *M. sativa*

Procumbent or spreading annual herb.

Fruit is smooth, linear pod.

Pod single seeded. *M. monantha*

Pod with many seeds. *M. polymorpha*

***Medicago monantha* C.A.**; *SPL. 777; FBI. 2:87; FUGP. 1:209; FD. 115.*

A prostrate, slender, diffused, annual, pubescent, herb. Leaves trifoliate, leaflets obovate, deltoid base, stipules long and pointed. Inflorescence axillary raceme. Flowers sessile. Calyx shorter, teeth setaceous. Corolla yellow, exerted. Fruit transversely wrinkled, falcate pod with 10-20, sickle-shaped seeds.

Common Name:-Maina

Flowering and Fruiting:- January – April

Ethnobotanical Uses:

- Plant is used as a green manure.
- It possess analgesic properties.

***Medicago polymorpha* L.**; *SPL.779; FPP. 92; FH. 72; FBI. 2: 90; FUGP. 1: 194.*

Annual, glabrous, branched herb about 40 cm tall. Stem branches prostrate, Leaves stipulate, trifoliate, leaflets lanceolate, dentate. Inflorescence umbel. Flower bisexual, bracteate, yellow. Calyx gamosepalous, toothed, teeth lanceolate, equal to the tube.

Corolla twice of the calyx, yellow. Stamens 9. Fruit sub-globose pod with 2-4 spirals and two rows of spines at margin.

Common Name:- Ghundhi

Flowering and Fruiting:- January-April

Ethnobotanical Uses:

- It is mainly used as green fodder.
- Sometimes eaten as a leafy vegetable.
- Also used as green manure and to prevent land erosion.

***Medicago sativa* L.**; *SPL.778; FBI. 2: 90; FUGP. 1: 194; FD.114; FPP. 93.*

An erect, branched, perennial, deep green, pubescent herb about 1m high. Stem highly branched near the base. Leaves tri-foliate, leaflets oblanceolate, dentate margin, acute apex. Inflorescence raceme. Flowers purple colored. Fruit a double spiraled, smooth pod with 10-20 seeds.

Common Name:- Lahsun ghas

Flowering and Fruiting:- May- October

Ethnobotanical Uses:

- The plant leaves are consumed as vegetable.
- The tea made of leaves is used to strengthen digestive system.
- Sprouts of seed are useful in diabetes.
- It is also used as a fodder.

***Melilotus* Adans.**

Flowers white. *M. albus*

Flowers yellow. *M. indicus*

***Melilotus albus* Medik.**; *FBI. 2: 89; FUGP. 1: 192; FD.115; FPP. 93; FH.72.*

Annual, erect, glabrous herb up to 1m tall. Shoot striate- angular, stout. Leaves petiolate, tri-foliate, leaflets oblanceolate, smooth on both sides. Inflorescence raceme. Flowers white, pendulous with elongated pedicels. Calyx toothed, teeth lanceolate, shorter than tube. Corolla white. Fruit a long, smooth, compressed pod. Seeds 1-2, dull brown colored.

Common Name:- Safed Methi

Flowering and Fruiting:- January- March

Ethnobotanical Uses:

- Seeds yield a fatty oil, which is used in paints and varnishes.
- Plant is used as protein rich fodder.

***Melilotus indicus* L.**; *FUGP. 1: 191; FD.116; FPP.93; FH. 72; FBI. 2: 89.*

An anual, erect, branched herb about 30-40 cm high. Stem slender, pale in color. Leaves petiolate, tri-foliate, leaflets oblanceolate, dentate, pubescent on both surfaces, stipulate. Inflorescence raceme. Flowers bisexual, bracteate, small sized. Calyx gamosepalous, triangular, long teeth. Corolla long, pale-yellow, standard covering the wings and keel. Fruit smooth, compressed, ellipsoid, single seeded pod **(Plate-4).**

Common Name:- Senji, Metha

Flowering and Fruiting:- December- March

Ethnobotanical Uses:

- Seeds are used as medicine for diarrhoea in infants.
- Also used as a fodder for cattles.

***Pongamia* Vent.**

***Pongamia pinnata* (L.) Pierre.**; *FD.135; SPL.741; FBI. 2: 240; FUGP. 1: 246; FFP. 165; FF. 202; FPP. 99; FH. 68.*

A moderate sized, perennial, deciduous tree up to 20 m high. Stem branched with grey bark. Leaves pinnately compound, imparipinnate, stipulate, bright green colored, rachis pulvinate. Inflorescence raceme. Flowers pedicellate, axillary, bracteate, bracteolate, violet in color. Calyx campanulate, penta-lobed, deep red. Corolla long, clawed, keel obtuse, violet in color. Stamens 10, monoadelphous. Ovary superior, hairy. Fruit thick, decurved pod with 1-2 seeds **(Plate-27).**

Common Name:- Karanj

Flowering and Fruiting:- March-August

Ethnobotanical Uses:

- Bark powder is used in treatment of diabetes.
- Plant decoction is used to cure‘Beri-beri’.
- Seed oil is antiseptic and useful in cure of skin diseases.
- Plant leaves are used as fodder.

***Sesbania* L.**

Branches and rachis not prickly.

Flowers yellow. *S. sesban*

Branches and rachis prickly. *S. bispinosa*

***Sesbania bispinosa* (Jacq.) W. Wight.**; *FD.119; FPP.95; FH. 74; FBI. 2: 115; FUGP. 1: 224; FFP. 128.*

Annual, glabrous, branched shrub about 3 m tall. Stem branches and leaf rachis prickled at lower side. Leaves stipulate, pinnately compound, leaflets 20-50, paired, lanceolate, with short stalk. Inflorescence drooping raceme. Flower axillary, bracteate, yellow. Calyx fused to form tube, toothed, membranous. Corolla long, yellow, spotted with red dots on back of standard. Fruit long, sickle-shaped, constricted pod with 20-30 brown color seeds.

Common Name:- Dhadhen

Flowering and Fruiting:- September- November

Ethnobotanical Uses:

- Seeds are mixed with flour and applied to ringworm.
- Plant is useful in the reclamation of saline and alkaline soil.
- Stem is used as a source of good fuel.
- Plant is utilized as fodder, green manure and source of fibre.

***Sesbania sesban* (L.) Merr.**; *FD.120; FPP. 96; FH. 76; SPL.714; FBI. 114; FUGP.1: 223; FFP. 125.*

Annual, erect, soft wooded, branched, shrub upto 3-5 m high. Stem branches and rachis without prickles, glabrous, slender. Leaves paripinnate, leaflets 20-40, membranous with short stalk. Inflorescence hanging raceme. Calyx fused, toothed, campanulate. Corolla yellow with red- brown dots. Fruit a twisted pod with 15-20seeds **(Plate-4).**

Common Name:- Dhaincha

Flowering and Fruiting:- August- December

Ethnobotanical Uses:

- Seeds are used in treatment of diarrhoea and enlargement of the spleen.
- Whole plant is utilized as an important green manure.

- Young leaves and branches are used as fodder.

Tephrosia Pers.

Leaves simple. *T. strigosa*

Leaves pinnately compound. *T. purpurea*

***Tephrosia purpurea* (L.) Pers.**; *FBI. 2: 112; FUGP. 1: 225; FD.121; FPP. 100;FH.76; SPL.752.*

A perennial, highly branched, pubescent herb with woody root base, about 40-60 cm tall. Leaves imparipinnate, leaflet short petioled, oblanceolate, apex acuminate, glabrous adaxial, abaxial pubescent,stipules hairy. Flowers reddish-purple, bracteolate flowers in acropetal manner. Calyx fused, toothed. Corolla deep purple, smooth. Style smooth, stigma hairy. Fruit hairy, recurved pod. Seeds 5-8, dark brown.

Common Name:- Sharpunkhada

Flowering and Fruiting:- July-December

Ethnobotanical Uses:

- Root decoction is used to cure bleeding piles, diarrhoea and dyspepsia.
- Root and seeds have insecticidal properties.
- Seed oil is applied on eczema and other skin disorders.
- Decoction made of pods is given in bronchitis and boils.

***Tephrosia strigosa* (Dalz.) Santapau & Maheshw.**; *FD.121; FPP. 100; FH. 76; FBI.2: 111; FUGP.1: 225; FID.131.*

A highly branched, slender, annual herb, 20-30 cm tall. Stem pubescent, filiform. Leaves petiolate, stipulate, unifoliate, subsessile, smooth above, hairy below. Flowers axillary, light bluish pink. Calyx lobed, toothed, campanulate. Corolla light purple, clawed, standard pubescent outside. Style short, smooth. Fruit a linear, pubescent pod.

Common Name:- Jhino

Flowering and Fruiting:- July- October

Ethnobotanical Uses:

- The plant is mainly used as green manure.
- Decoction of plant root is used for dental problems.

Rhynchosia Lour.

***Rhynchosia minima* (L.) DC.**; *FUGP. 1: 204; FD.133; FPP. 95; FH. 74; SPL.726.*

A highly branched, climbing, annual herb. Stem slender, covered with minute hairs. Leaves petiolate, stipulate, trifoliate, leaflets, rhomboid-ovate, acute, golden brown dots visible at abaxial surface. Lateral as well as terminal leaflets same sized. Inflorescence raceme. Flowers axillary, bracteate, yellow. Calyx fused, toothed, hairy. Corolla long, yellow, exserted. Fruit compressed, glabrescent pod with 2 seeds.

Common Name:- Kalta

Flowering and Fruiting:- July –October

Ethnobotanical Uses:

- Plant is used as fodder for cattle and horses.
- Leaves are used as an abortifacient.

Vicia L.

***Vicia sativa* L.**; *SPL.736; FBI. 2: 178; FUGP. 1:259; FD.127; FPP.103; FH.78.*

A dwarf, straggling, annual, glabrous herb. Stem suberect, angular. Leaves paripinnate, leaflets 6-8 paired, linear- lanceolate, upper one modified into branched tendrils, stipules toothed. Inflorescence raceme. Flowers 1-2, axillary, reddish-blue. Calyx long, toothed, pubescent, lanceolate. Corolla reddish-blue, twice of calyx. Fruit an oblong pod with 6-7 seeds **(Plate-22).**

Common Name:- Matari

Flowering and Fruiting:- January- March

Ethnobotanical Uses:

- Seeds are used in treatment of diarrhoea.
- Whole plant is used as a fodder and green manure.

Caesalpiniaceae

Leaves simple, deeply bilobed. *Bauhinia*

Leaves pinnately compound.

Leaves unipinnate.

Petals 5, stamens 5-10.

Filaments of 3 abaxial stamens sigmoidal. *Cassia*

Filaments of all stamens straight or simply incurved.

Pod indehiscent or inertly dehiscent.	*Senna*
Leaves bipinnate.	
Trees, non-spiny.	*Delonix*
Shrubs, armed with spines.	
Fruit monoliform.	*Parkinsonia*

Bauhinia L.

Corolla creamy-yellow, calyx equally segmented.	*B.purpurea*
Corolla rose colored, calyx spathaceous.	*B.variegata*

***Bauhinia purpurea* L.**; *SPL.675; FBI. 2: 284; FUGP. 1: 276; FFP. 179; FF. 211;FD. 138; FPP. 70; FH. 80.*

A medium sized, deciduous tree, 7-8 m tall with greyish black bark. Leaves petiolate, ovate-cordate, 2-lobed, cleft up to half, lobes round, stipulate. Flowers axillary, terminal, pedicellate, bracteolate, bracteole persistent. Calyx fused, tubular, limbs lobed, red. Corolla white to creamy-yellow, clawed, oblanceolate. Stamen 10 (3 fertile, 7 staminode). Stigma capitate, ovary superior, placentation parietal. Fruit pendulous, oblong pod covered with soft hairs, seeds 12-15 **(Plate-23).**

Common Name:- Kachnar

Flowering and Fruiting:- October- January

Ethnobotanical Uses:

- Bark is used in the treatment of diarrhoea.
- Leaves are used as fodder.
- Wood is used to prepare agricultural implements.

***Bauhinia variegata* L.**; *SPL. 375; FBI. 2: 284; FUGP. 1: 277; FFP. 180; FF. 212; FD.137; FPP.70; FH.81.*

A moderate sized, deciduous tree upto 12 m tall. Stem bark smooth, dark brown. Leaves broader than long, deeply cordate, lobes obtuse reaching up to 1/3. Inflorescence raceme. Flowers few, fragrant, shortly pedicelled, bracteate. Sepals greyish, tomentose, spathulate, hairy outside. Petals long, clawed, whitish pink, large, scenty, lip variegated with red or purple veins. Fertile stamens 5, staminode absent. Ovary long-stalked, pubescent, style long, stigma capitate. Fruit a dehiscent pod, with 10-15 black seeds.

Common Name:- Kachnar

Flowering and Fruiting:- March- October

Ethnobotanical Uses:

- Flowers are utilized for the treatment of diarrhoea, dysentery and piles.
- Roots decoction is applied to prevent obesity.
- Bark is used for dyeing, tanning and to extract fibre.

Cassia L.

***Cassia fistula* L.**; *SPL.377; FBI. 2: 261; FUGP. 1: 268; FFP. 175; FF. 205; FD.142; FPP. 72; FH. 81.*

A medium sized, glabrous, deciduous, perennial tree about 10-20m tall with greyish bark. Leaves paripinnate, leaflets paired, entire, ovate, acuminate, stipulate. Inflorescence raceme. Flowers axillary, pedicellate, bracteate, bright yellow. Calyx oblong, lobed. Corolla obovate, clawed, Stamens trimorphic, (3+3+4), shortest 3 sterile.Ovary pubescent. Fruit indehiscent, glabrous, long, deep brown colored pod. Seeds upto100, albuminous **(Plate-23).**

Common Name:- Amaltas

Flowering and Fruiting:- March- September

Ethnobotanical Uses:

- The paste made from rind of pod is applied into vagina for easy delivery.
- Wood is used in making furniture.
- Paste of leaves is applied to cure ringworm, eczema, rheumatism and swelling.
- The bark is used in dyeing and tanning.
- Leaves and pods are used as bug repellent.

Senna L.

Herbs or small undershrubs.

Single gland at base of leaf rachis. *S. occidentalis*

Two glands at the base of leaf rachis. *S. tora*

***Senna occidentalis* L.**; *SPL.377; FBI. 2: 262; FUGP. 1: 269; FFP. 175; FF. 206; FD. 141; FPP. 73; FH. 82.*

A diffuse, branched, annual herb about 2 m tall. Stem subglabrous. Leaves long,

petiolate, with one ovoid gland at base of petiole, stipule lanceolate, paripinnate, pinnae membranous, acute apex, glaucous, shortly stalked. Inflorescence racemose. Flowers axillary, short peduncled, bracteate, caducous. Calyx white, tinged with pink. Corolla yellow, veined. Stamens 10 (3+4+3), upper 3 reduced to staminode. Fruit glabrous, compressed, transversely septate pod. Seeds 20-30, hard, greenish brown **(Plate-5).**

Common Name:- Chakwad

Flowering and Fruiting:- June- December

Ethnobotanical Uses:

- Seeds are used for treatment of cough and whooping cough.
- Roasted seeds mixed with coffee are given for strength.
- Stem, leaf and seed decoction is used as a purgative.
- Leaf paste is used in curing eczema and other skin diseases.

***Senna tora* L.**; *SPL. 376; FBI. 2: 263; FUGP. 1: 270; FF. 206; FD.141; FPP.73.*

An erect, branched, annual, under-shrub about 1 m tall. Leaves imparipinnate, stipulate, grooved rachis, leaflets 3-5, paired, obovate, obliquely round at base, gland dotted at lowest pinnae. Inflorescence racemose. Flowers sessile, axillary, paired. Calyx segmented, yellow. Corolla bright yellow. Stamens (7+3), 3 staminode, 7 fertile one. Fruit tetragonous, membranous, obliquely septate, pod with 30-34seeds.

Common Name:- Chakunda

Flowering and Fruiting:- August –November

Ethnobotanical Uses:

- Pods are used in treatment of dysentery.
- Leaf paste is applied to cure eczema and various other skin problems.
- Equal amount of leaves and seeds is given for jaundice.
- It is also used in constipation, cough and cardiac disorders.

Parkinsonia L.

***Parkinsonia aculeata* L.**; *SPL.375.; FBI. 2: 260; FUGPP.1: 280; FFP. 173; FD.138; FPP.74; FH.82.*

A perennial, branched, deciduous shrub about 5 m tall. Stem green, woody, spiny with smooth branches. Leaves bipinnate, present in their axillary axis, leaflets minute, oblanceolate, paired, caducous. Inflorescence raceme. Flower pedicellate, pedicel

slender. Calyx segmented. Corolla bright yellow, upper most clawed. Stamens 10. Fruit dry, dehiscent pod having 3-8 seeds.

Common Name:- Vilayti Kikar

Flowering and Fruiting:- December- April

Ethnobotanical Uses:

- Plant is mainly used as fiber and fodder.
- It is a good source of fuel.

Delonix Raf.

***Delonix regia* (Hook.) Raf.**;*FD.143; FBI. 2:260; FUGP.1:303.*

A highly branched, perennial, large sized tree. Leaves pinnately compound, pinnae 20-30, paired, sessile. Inflorescence raceme. Flower pedicellate, bracteate, zygomorphic, bright red color. Filaments woolly at base. Ovary pubescent. Fruit a flat compressed, smooth pod **(Plate-5).**

Common Name:- Gul-Mohar

Flowering and Fruiting:- April- September

Ethnobotanical Uses:

- Plant is mainly grown for ornamental purpose.
- The seeds are carminative, and also used to purify the blood.
- Decoction of bark is useful in fever anddiarrhoea.

Mimosaceae

Tree, armed with spines or thorns.

Fruit dehiscent, splitting into squarish segments. *Mimosa*

Fruit dehiscent, not splitting into segments.

Fruit spirally twisted. *Pithecellobium*

Fruit not twisted or curved.

Stamens 10, anthers gland tipped. *Prosopis*

Stamens numerous, anthers not gland tipped. *Acacia*

Tree, unarmed.

Leaflets acute at apex, pod yellowish-cream. *Albizzia*

Leaflets round at apex, pod brownish black. *Leucaena*

***Acacia* Mill.**

Inflorescence globose head.

Head bright yellow.

Medium sized tree, fruit monoliform. *A. nilotica*

Bushy shrub, fruit not monoliform.

Fruit cylindric pod. *A. farnesiana*

Heads creamish-yellow.

Seeds non-arilled. *A. leucophloea*

Inflorescence spike.

Stipular spines 3, leaflets 8-14 pairs. *A. senegal*

***Acacia leucophloea* (Roxb.) Willd.**; *SPL.4: 1083, 1806;FBI. 2: 294; FUGP. 1: 290; FFP. 192; FD.149; FPP. 65; FH. 84.*

A moderate-sized, deciduous, highly branched armed tree, spines 2-4 cm long, paired, white, around the petiole. Leaves petiolate, alternate, bipinnate, main rachis hairy, cup shaped gland in between each leaflet, leaflet paired, obtuse. Inflorescence capitate heads on terminal panicle. Flowers numerous, creamish yellow, fragrant. Calyx 1.2 mm long. Corolla pale yellow. Stamens many. Fruit a thin, sessile, curved, pubescent pod with10-20, oblong, dark brown seeds.

Common Name:- Safed Kikar

Flowering and Fruiting:- August- February

Ethnobotanical Uses:

- Young twigs are used as tooth brushes.
- Flowers mixed with honey are given in diabetes.
- Young pods are used as vegetable.
- Bark decoction is used to wash ulcers.

***Acacia farnesiana* (Linn.) Willd.**; *FBI. 2 : 292; FF. 215; FUGP. 1: 313; FFP., 189; FH., 84; FD.148; FPP. 64.*

A branched, erect shrub, branches zig-zag, marked with grey dots, stipular spines white, straight. Leaves bipinnate, pinnae 4-8 pairs, rachis downy. Leaflets 10-20 pairs, rigid, linear-oblong, coriaceous. Inflorescence capitate head. Flowers bright yellow, fragrant. Fruit long, cylindrical pod with bi-seriate seeds. **(Plate-22).**

Common Name:- Vilayati Kikar

Flowering and Fruiting:- September- March

Ethnobotanical Uses:

- Plant yields good quality gum.

***Acacia nilotica* L.**;*FPP. 65; FH. 85; FBI. 2: 293; FUGP. 1: 288; FFP. 190; FF.216; FD.148.*

A medium sized, highly branched, evergreen, perennial tree with spines. Stem slender, greyish- brown bark with fissures, stipular spines long, straight, paired, white, erect, sharp. Leaves bipinnate, petiolate, pinnae 4-10 paired, leaflets paired, subsessile, obtuse, smooth. Inflorescence capitate globose head. Flowers numerous, axillary, bracteolate, yellow. Calyx campanulate, toothed. Corolla lobed, triangular, double of calyx. Fruit compressed, flat, indehiscent pod with 8-12 glabrous, brown seeds.

Common Name:- Desi Kikar, Babool

Flowering and Fruiting:- October- May

Ethnobotanical Uses:

- Young twigs are used as 'Datoon' to clean teeth.
- Powdered gum is useful in fever, diabetes, dysentery and pyorrhea.
- Paste of leaves is applied on boils and wounds.
- It is a good source of arabic gum, fuel and inferior qualiity timber.

***Acacia senegal* (L.) Willd.**; *FUGP. 1:317; FID. 148; FD.Fl. Delhi 150; FFP.192; FPP. 66; SPL.521.*

A perennial, branched, prickly tree, about 3-6 m tall. Stem branches greyish, smooth, hairy when young. Leaves petiolate, bipinnate, paired, having glands at base, in between lowest and upper most pair, leaflets 8-14 paired, smooth, obtuse. Stipules modified into 3 prickles, 2 lateral straight, middle one curved. Inflorescence spike. Flowers axillary, scenty. Calyx obtuse, campanulate, lobed, lanceolate. Filaments white, anthers yellow. Fruit a flat, coiled pod with 5-6 seeds.

Common Name:- Kumbatio

Flowering and Fruiting:- July-December

Ethnobotanical Uses:

- Root and stem bark decoction is given in diabetes and urinary disorders.

- Powdered gum is employed in checking hemorrhage.
- Seeds are consumed as vegetable and gum is used for commercial purposes.

Albizzia **Durazz.**

Flower stalked, fruit straw-coloured. *A.lebbeck*

Flowers sessile, fruit reddish-brown. *A.procera*

***Albizzia lebbeck* L.**; *FBI. 2: 298; FUGP. 1: 295; FFP. 187; FF. 221; FD.151; FPP. 66; FH. 85; SPL. 516.*

A deciduous, unarmed, large sized, perennial tree, about 25 m tall. Leaves pinnately compound, bipinnate, rachis glandular, stipules small, cauducous, leaflets paired, opposite, adaxial glabrous, abaxial hairy. Inflorescence umbellate. Flowers fragrant, small, white. Calyx toothed, teeth triangular. Corolla gamopetalous, penta-lobed, double of calyx. Stamens exerted, epipetalous. Fruit flattened, dry, long, 7-12 seeded pod with ovate, pale-brown seeds **(Plate-27).**

Common Name:- Siris

Flowering and Fruiting:- March-November

Ethnobotanical Uses:

- Paste of flowers are applied on boils and swelling.
- Stem bark paste is applied against poisonous insect bites.
- Twigs and pods are tied on the house entrances as good omen.

***Albizzia procera* Roxb.**; *FBI. 2: 299; FUGP. 1: 296; FF. 222; FD.151*.

A deciduous, perennial, tall tree up to 25 m high. Bark yellowish brown. Leaves alternate, bipinnate, pinnae 2-6 pairs, glabrous, pulvinate, with a large gland at the base. Leaflets paired, gland dotted at last pair, dark-green, adaxial smooth, abaxial pubescent. Inflorescence globose head. Flowers pale-yellow, bracteate, bracts linear, caducous. Calyx funnel-shaped, glabrous, teeth triangular, distinct. Corolla segmented, lanceolate, pubescent outside. Fruit a thin, flat, long, shiny, reddish- brown pod. Seeds 6-12, pale-brown in color.

Common Name:- Siras

Flowering and Fruiting:- July-December

Ethnobotanical Uses:

- Bark decoction is useful in rheumatism and haemorrhage.
- The plant wood is used for making furniture.

Leucaena Benth.

***Leucaena leucocephala* Lam.**; *FD.146; FPP. 67; FBI. 2: 290; FUGP. 1: 286; FFP. 199; FH. 85; SPL.519.*

An evergreen, perennial shrub about 2-3 m high. Stem corky, greyish-brown, lenticelled, fissured. Leaves large, alternate, bi-pinnate, leaflets 10-16 pairs, acute, membranous, rachis terminating like a weak spine. Inflorescence spike. Flower axillary, clustered in 3, white. Sepals campanulate, lobed. Petals 5, spathulate, yellowish white. Stamens 10, exserted, anthers pilose. Fruit a long, flat, papery, straight, tapering pod with 15-25 seeds **(Plate-5).**

Common Name:- Safed babool

Flowering and Fruiting:- July-December

Ethnobotanical Uses:

- Young pods and leaves are consumed as vegetables.
- Leaves are used for treatment of diarrhoea.
- It is a good source of fodder.
- The wood provides raw material for paper industry.

Mimosa L.

Shrub, erect or straggling, Fruit prickly. *M. hamata*

Spreading herbs or undershrubs. *M.pudica*

***Mimosa hamata* Willd.**; *SPL.4: 1033, 1806;FBI. 2: 291; FUGP. 1: 287;FFP.198; FID.150; FD.147; FPP.67; FH. 85.*

A highly branched, diffuse, armed, perennial shrub with straw colored, straight prickles. Leaves bipinnate, stipulate, leaflets 6-10 pair, long, ovate, smooth, obliquely round at base. Inflorescence capitate head. Flower solitary, pink, tetramerous, bracteolate. Calyx toothed. Corolla pink, lobed. Stamens 8. Ovary hairy, stalked. Fruit stalked, falcate pod with single seed.

Common Name:- Jhinjhni

Flowering and Fruiting:- July-October

Ethnobotanical Uses:

- It is used as green manure.
- Seeds are used for tonic.
- Also used as a hedge plant.

***Mimosa pudica* L.**; *SPL.518; FBI. 2: 291; FUGP. 1: 286; FF. 214; FD.147.*

A prickly, diffuse, branched, wide spreading, evergreen undershrub about 70-80 cm high. Leaves highly sensitive for touch, bi-pinnate, pinnae 1-2 paired, leaflets sessile, lanceolate, smooth above, bristly below. Rachis covered with ascending prickles. Inflorescence axillary capitate head. Flowers small, pink. Stamens 4, filaments pink. Fruit a flat, membranous, long pod with pale brown seeds.

Common Name:- Lajwanti,Chhui-Mui

Flowering and Fruiting:- August -November

Ethnobotanical Uses:

- Plant powder is used as good medicine for asthma.
- Plant paste is applied on fistula and piles.
- Root decoction used in urinary disorders.
- Leaves juice is helpful in treatment of glandular swellings.

Pithecellobium Mart.

***Pithecellobium dulce* Roxb.**; *FBI. 2: 302; FFP. 201 ; FD.152; FPP.68; FH. 87.*

A large sized, branched, evergreen, perennial tree about 20m tall. Stem branched, bark greyish-white, stipule small, modified into thorns. Leaves pinnately compound, pinnae 2. leaflets 2, paired, obovate. Base of each leaflet pair is gland dotted. Inflorescence head. Flowers white colored. Fruit spirally coiled, reddish-brown in color, with 6-10 brown, flat seeds **(Plate-22).**

Common Name:- Jangal Jalebi

Flowering and Fruiting:- May-September

Ethnobotanical Uses:

- Leaf paste is applied for promoting hair growth.
- Pods and leaves used as fodder.
- Pulp of pods mixed with sugar is eaten for treatment of jaundice.

***Prosopis* L.**

Decidous tree, prickles small, fruit cylindrical. *P.cineraria*

Evergreen tree, fruit compressed. *P. juliflora*

***Prosopis juliflora* (Sw.) DC.**; *FUGP. 1: 285; FFP. 201; FD.145; FPP. 68; FID.151, 1977; FH. 87.*

A medium sized, evergreen, highly branched tree about 10-14 m tall. Stem branches drooping, thorns randomly arranged, bark brownish. Leaves bi-pinnate, pinnae 2-4, gland dotted, leaflets paired, opposite, dark green, stipules modified in to spines. Inflorescence pendulous spike. Flowers axillary, yellow colored. Sepals 5, toothed. Petals 5, lobed, ligulate. Stamens exerted, 10. Fruit hanging, curved, compressed pod, green when young, yellow and pulpy on maturity.

Common Name:- Kabuli Kikar

Flowering and Fruiting:- April- October

Ethnobotanical Uses:

- Decoction of bark is useful in diabetes and rheumatism.
- Pods are eaten because of sweetness.
- Leaves are use as fodder for cattles.

***Prosopis cineraria* L.**; *FPP. 69; FH. 87; SPL.517; FBI. 2: 288; FUGP. 1: 284; FFP. 200; FD.145.*

A branched, small, deciduous tree, upto 5 m tall, armed with curved, pointed prickles, bark grey, lenticelled. Leaves bipinnate, pinnae 1-2, paired, leaflets 7-12 paired, dark green, obliquely round, coriaceous. Inflorescence spike. Flowers axillary, sessile, cream colored. Calyx cup-shaped, penta-lobed, slightly toothed. Corolla oblong, yellow colored. Stamens 10. Fruit pendulous, straight, glabrous, 10-15 seeded pods with dull brown, oblong seeds.

Common Name:- Chaonka, Khejri

Flowering and Fruiting:- September- March

Ethnobotanical Uses:

- Leaf juice is useful in cataract.
- Decoction of leaves is given in asthma and diarrhoea.
- Dried pods are eaten in diarrhoea.

- Wood is used as fuel.

Combretaceae

Terminalia Linn.

***Terminalia arjuna* (Roxb. *ex* DC.) Wt. & Arn.**; *FUGP.1:336; FF. 254;FBI.2:447; FPP.,107; FD.156; FPP.107; FH.90.*

A moderate sized, branched, evergreen tree. Branches horizontally spreading, bark smooth, grey. Leaves sub-opposite, oblong or elliptic, long, unequal at the base, serrate. Inflorescence axillary spike. Flowers small, sessile, greenish-yellow, bracteolate. Corolla campanulate, acute, dentate. Ovary glabrous with hairy disk. Fruit a woody, winged drupe **(Plate-27).**

Common Name:- Arjun

Flowering &Fruiting:- March- August

Ethnobotanical Uses:

- The bark is considered to be a tonic for heart.
- Decoction of leaves is useful in diabetes.
- Fruit is also helpful in high blood pressure control.
- Twigs are used as tooth brush in dental disorders.
- Wood is used for agricultural implements.

Myrtaceae

Calyx and corolla fused to form an operculum.	*Eucalyptus*
Calyx and corolla not fused.	*Syzygium*

Eucalyptus L.' Herit

Operculum long, conical.	*E.tereticornis*
Operculum short, pointed.	*E.camaldulensis*

***Eucalyptus camaldulensis* Dehnh.**; *FD.159; FPP. 108; FFP. 251; FF. 260.*

A tall evergreen, perennial tree. Bark greyish white. Young leaves opposite, linear, lanceolate, dull green, older one alternate, grey-green with acuminate apex. Inflorescence axillary umbel. Flowers bisexual, 7-10 flowered, peduncle angular. Operculum short, hemispheric or pointed. Stamens numerous, fertile. Fruit a hemispherical, cylindrical

capsule with numerous seeds **(Plate-27).**

Common Name:- Safeda

Flowering and Fruiting:- December- July

Ethnobotanical Uses:

- Leaves are used to cure congestions of the throat.
- Plant yield red gum which is used in treatment of diarrhoea.

***Eucalyptus tereticornis* Sm.**; *FFP. 251; FF. 259; FD.159; FPP. 108; FH.90.*

A tall, evergreen, perennial tree, about 25 m tall. Trunk straight, unbranched. Bark shining, whitish, thin, smooth. Leaves alternate, linear-lanceolate, slightly twisted, gland-dotted, fragrant. Inflorescence umbel. Flowers 4-8 clustered, white in color. Opeculum double, inner transparent, outer hemispheric, conical with acuminate apex. Stamens numerous. Fruit a globose capsule with numerous seeds **(Plate-24).**

Flowering and Fruiting:- February -June

Ethnobotanical Uses:

- Wood is utilized for construction, sleepers and flooring.

Syzygium Gaertn.

***Syzygium cumini* L.**; *FD.160; FPP. 109; FH. 90; SPL. 471; FBI. 2: 499; FUGP.1: 314; FFP. 243; FF. 257.*

A medium-sized, evergreen, tall tree. Stem branches terete, grey bark. Leaves long, oblong-ovate, acuminate apex, coriaceous, adaxial smooth, shining, abaxial surface pale, gland dotted. Inflorescence trichotomous lateral panicle. Flowers many, sessile, greenish-white in color. Calyx campanulate, compresed into pseudo-stalk, limb at first 4-lobed, afterwards truncate. Corolla with 4 petals, orbicular, united into calyptra. Fruit ovoid, juicy, single seeded purple, sweet berry **(Plate-5).**

Common Name:- Jamun

Flowering and Fruiting:- March–August

Ethnobotanical Uses:

- Seeds are regarded as wonderful medicine for treatment of diabetes.
- The plant bark yields a brown dye.
- Wood is light, durable and suitable for furniture making.
- Bark and crushed seed decoction is useful in diabetes.

Lythraceae

Lawsonia Linn.

***Lawsonia inermis* L.**; *SPL.340; FPP.11; FD.162; FBI. 2:573; FUGP. 1:352.*

An erect, deciduous, profusely branched, spreading, shrub with greyish-brown bark. Leaves sub-sessile, entire, acute apex, elliptic, coriaceous. Inflorescence corymbosely branched panicle. Flowers white with pungent fragrance. Fruit a globose capsule with brown and angular seeds **(Plate-6).**

Common Name:- Mehandi

Flowering and Fruiting:- June - November

Ethnobotanical Uses:

- Paste of leaves is applied over skin to cure burns.
- Leaves are source of red-orange dye and used for dyeing the hairs and hands.
- The paste of leaves is also applied to check burning sensation.
- Gargle with decoction of its leaves is good medicine for gum disease.

Puicaceae

*Punica*L.

***Punica granatum* L.**; *SPL. 472.; FBI. 2:581; FUGP. 1.354; FF.253.*

An evergreen, branched shrub or small tree. Bark dark grey. Leaves simple, oblong, obovate or oblanceolate. Inflorescence cyme. Flowers bright red or vermilion-red, terminal, solitary or in cluster of 3 floweres. Sepals green, petals bright orange. Fruits reddish-brown, globose balausta with angled seeds having aril filled with an acidic or sweet juice **(Plate-6).**

Common Name:- Anaar

Flowering and Fruiting:- April-September

Ethnobotanical Uses:

- Seeds are given as medicine in morning sickness, diarrhoea and vomiting.
- Fruit rind is chewed in stomatitis and diarrhoea.
- Bark decoction is given to pregnant women to prevent miscarriage.

Caricaceae

*Carica*L .

***Carica* papayaL.**; *SPL.1036;FBI.2.599; FUGP.1.383.*

An evergreen, rapidly growing soft tree, about 5-10 m tall with weak, hollow stem, succulent trunk and milky sap. Leaves large, palmately lobed, peliole long, hollow. Flowers creamy-yellow, male flowers small, funnel shaped in long drooping panicles, female flowers large sized, in short clusters. Petals fleshy, united at base. Stamens 10. Ovary superior, globose, crowned with fan-shaped sessile stigmas. Fruit large sized, green when young, orange-yellow when ripe, with numerous black, mucilaginous seeds **(Plate-6).**

Common Name:- Papita

Flowering and Fruiting:- Throughout year

Ethnobotanical Uses:

- Unripe fruits used as a vegetable.
- Milky juice of unripe fruits used as a cosmetic to remove freckles.
- Fruit pulp used in making face creams and shampoos.
- Ripe fruits are used for good digestion.

Cucurbitaceae

Anther-cells sigmoid.

Flowers yellow.

Tendrils bi or trifid, male flower solitary. *Citrullus*

Tendril simple, male flower clustered in raceme.

Berries not beaked, not spiny. *Cucumis*

Berries beaked and spiny. *Momordica*

Flowers white.

Corolla campanulate, divided upto half. *Coccinia*

Corolla non-campanulate, divided near base. *Trichosanthes*

Citrullus Forsk.

Perennial, tendrils simple, berries not edible. *C. colocynthis*

Annual, tendrils bifid, berries edible. *C. lanatus*

***Citrullus colocynthis* (L.) Schrad.**; *FBI. 2: 620; FID., 161; FUGP.1: 344; FPP.114; FH. 94; FD.170; SPL.1011.*

A trailing, perennial herb. Stem branched, angular, slender, tendrils simple. Leaves

petiolate, deeply tri-lobed, sinuate, abaxial pale-green, adaxial ashy. Flowers solitary, pedicellate, bracteate, yellow. Calyx broadly campanulate, pubescent. Corolla obovate, greenish outside, yellow inside. Stamens 3, filaments villous at base. Fruit globose, green berry with yellow patches, bitter in taste. Seeds compressed, obovate, pale-brown.

Common Name:- Tumba

Flowering and Fruiting:- May - September

Ethnobotanical Uses:

- Fruits are purgative.
- Oil from the seeds is used against snake bite.
- Root is given in cough, bronchitis, jaundice and rheumatism.

***Citrullus lanatus* Thunb.**; *FPP. 114; FH. 94;FBI. 2:621;FUGP. 1:344; FD.171.*

A trailing, hispid, annual herb about 4-5 m long. Stem branched, angular with stout, hairy and bifid tendrils. Leaves triangularly ovate, middle one largest, lateral one rounded, prominently nerved on abaxial side. Flowers axillary, solitary. Calyx campanulate, lanceolate. Corolla greenish outside, yellowish inside, villous. Pistillate flowers with long peduncle, ovary oblong. Fruit globose, green berry, mottled with dark green bands. Seeds numerous, black colored.

Common Name:- Mitira

Flowering and Fruiting:- August - October

Ethnobotanical Uses:

- Fruit juice or fruit pulp act as cooling and energy giving beverage.
- Seeds are used as tonic, provides nutrition and good for digestion.

Coccinia Wt. & Arn.

***Coccinia grandis* (L.) Voigt.**; *FPP.115; FH. 94; FBI. 2: 621; FD.171; SPL.1012; FUGP. 1:376.*

A perennial climber, with tuberous roots. Stem glabrous, grooved, angular, tendrils slender, striate, simple. Leaves alternate, variable in shape and size, adaxial surface pale yellow, glandular, abaxial surface green, penta-lobed, petiole thick and long. Staminate flowers solitary, pedicellate. Calyx tube campanulate, dentate. Corolla white, pubescence glandular, ribbed outside. Staminode 5, obtuse, glandular, villous. Pistillate flowers with ribbed ovary, style long, glabrous, stigma bi-lobed. Fruit fusiform, green when young,

bright orange on maturity. Seeds oblong, compressed, yellow in color **(Plate-6).**

Common Name:- Kanduri

Flowering and Fruiting:- Throughout the year

Ethnobotanical Uses:

- Root paste is applied in snake bite.
- Flowers are useful in jaundice and itching.
- Decoction of stem and leaves helps in treatment of bronchitis.

***Cucumis* L.**

Plants Annual,

Berries hairy. *C. melo*

Berries smooth. *C. sativus*

Cucumis melo* L.var. *agrestris; *FUGP.1: 340; FD.169; FBI. 2: 620; FPP. 117.*

Annual, smooth, monoecious climber, about 1.5 m in length. Stem weak, herbaceous, angular. Leaves alternate, petiolate, lobed, reniform, pubescent on both surfaces. Flowers solitary, small sized, densely pubescent. Calyx subulate. Corolla obovate. Fruit ovoid or spherical berries stripted with numerous seeds **(Plate-24).**

Common Name:- Kachra

Flowering and Fruiting:- May – October

Ethnobotanical Uses:

- Fruit pulp is useful in chronic eczema.
- Seeds powder is used to get relief in kidney stone problem.

***Cucumis sativus* L.**; *SPL.1012; FBI. 2: 620; FUGP. 1: 343; FD.170.*

A creeping, annual herb. Stem angular, scabrous. Leaves alternate, petiolated, triangular, dentate margin, cordate at base. Flowers monoecious, yellow. Staminate flower clustered, axillary. Pistillate flowers solitary. Calyx campanulate. Corolla oblong-lanceolate. Fruit glabrous, trigonous, yellowish-green berry. Seeds many, ovate, greenish white.

Common Name:- Kheera

Flowering and Fruiting:- May- August

Ethnobotanical Uses:

- Fruit is used as salad.

- Fruits are eaten in burning micturition and calculi.
- Seeds act as diuretic, tonic and refrigerant.

Momordica Linn.

Dioecious, fruits covered with soft spines. *M.dioica*

Monoecious, fruits covered with tubercles. *M. balsamina*

***Momordica dioica* Roxb. ex Willd.**; *SPL.4: 605, 1805; FBI. 3: 709; FUGP. 1: 339; FD.169; FPP. 119; FH. 95.*

A perennial, highly branched climber, up to 5 m long. Root tuberous, stem slender, tendrils unbranched. Leaves alternate, petiolate, glandular, cordate at base, acute apex. Flower solitary, large, dioecious, yellow. Staminate flowers pedicellate, bracteate, bract prominent. Pistillate flowers with small sized, yellow. Calyx lobed, linear-lanceolate. Corolla obtuse. Fruit ovoid, shortly beaked, spiny berry. Seeds compressed, numerous, ovoid.

Common Name:- Jungli Karela

Flowering and Fruiting:- July - November

Ethnobotanical Uses:

- Roasted roots are used in treatment of piles and urinary troubles.
- Root paste is applied on scorpion sting.
- Leaf juice is used as good medicine for ear ache.

***Momordica balsamina* L.**; *FBI. 2:617; FUGP. 1:370; FPP., 118; FID. 117.*

Annual, highly branched, climber. Stem branches smooth, slender, tendrils smooth. Leaves alternate, palmately lobed, pubescent at abaxial surface, irregularly dentate. Flowers dioeceous. Staminate flowers basal, bracteate. Pistillate flowers ebracteate, bract if present, at base only. Fruit sub-globose, greenish yellow berry. Seeds compressed, yellowish-red in color.

Common Name:- Desi Karela

Flowering and Fruiting:- May - November

Ethnobotanical Uses:

- Fruits are consumed as vegetable.
- Leaf juice is given in snake bite.

- Fruit pulp is applied on burns.

***Trichosanthes* L.**

Male flowers solitary, fruits oblong, red.	*T. dioica*
Male flowers in raceme.	
Male racemes ebracteate, fruits ovoid, purple red.	*T.cucumerina*
Male racemes with minute bracts, fruits elongated.	*T.anguina*

***Trichosanthes anguina* L.**; *SPL.1008; FBI. 2.610.*

A herbaceous, climbing or trailing herb with perennial root stock. Leaves 5 to7 lobed, petiolate, palmately lobed. Inflorescence raceme with minute bracts. Flowers unisexual, white colored, opening at night. Petals are curled, non-companulate. Fruits elongated, fusiform, variable in shape and size, upto 200 cm long, bright orange colored when ripe.

Common Name:- Chichinda

Flowering and Fruiting:- July-September

Ethnobotanical Uses:

- Fruits are edible and consumed as vegetable.

***Trichosanthes cucumerina* L.**; *SPL. 1008; FBI. 2.609; FUGP. 1.364.*

A climbing or spreading , scabrous, stout herb. Tendrils divided. Leaves petiolate, usually 5-lobed or angled, margins denticulate. Flowers white, with fimriate petals. Male peduncles paired. Female flowers solitary. Fruits conical, yellow, pointed.

Common Name:- Jangli Parwal

Flowering and Fruiting:- July-September

Ethnobotanical Uses:

- Fruits are edible and consumed as vegetable.

***Trichosanthes dioica* Roxb.**; *FBI.2: 609; FUGP. 1: 334; FPP. 120;FD.166.*

Annual climber, with slender, branched stem, woolly, tendrils bifid. Leaves alternate, petiolate, cordate at base, acute at apex, dentate margin, rough on both surfaces. Flower solitary, dioecious. Staminate flowers with free anthers. Pistillate flowers with narrow, lobed calyx. Corolla oblong. Fruits spherical, oblong berries, orange-red when mature, pointed at both ends with numerous, compressed seeds.

Common Name:- Parwal

Flowering and Fruiting:- March – October

Ethnobotanical Uses:

- Fruits are edible and consumed as vegetable.
- Roots are useful in treatment of bronchitis.

Cactaceae

Opuntia Mill.

Stem joints undulate, prickles subulate, curved. *O. dillenii*

Stem joints not undulate, prickles slender, straight. *O. elatior*

***Opuntia dilleni* (Ker Gawl.) Haw.**; *FBI. 2: 657;FUGP. 1: 352; FFP. 259; FPP.121; FF. 268; FD.172; FH. 99.*

An armed, jointed, branched, perennial shrub about 2 m high. Phylloclade spiny, flattened. Flower solitary, yellow, tinged with red color, perianth spreading, numerous. Stamens free, many. Fruit pear-shaped, purple colored, truncate berry with many seeds.

Common Name:-Nagphani

Flowering and Fruiting:- March-November

Ethnobotanical Uses:

- Pulp is used in opthalmia.
- Fruits are edible and also act as expectorant and spasmodic.
- Fruits are baked and given to treat whooping cough.
- It is believed that plant combat supher dioxide pollution.

***Opuntia elatior* Mill.**; *FH. 98; FD.173; FPP. 121; FBI. 2: 657.*

A jointed, succulent, woody, perennial shrub about 1.5 m tall. Phylloclade branched, pale-green, erect, punctuate with divaricate, spiny areoles. Spines purplish-black. Inflorescence solitary. Flower with campanulate perianth, yellow, outer tepals red. Stamens purple, inserted, carpel shorter than filaments. Fruit red colored berry marked with areoles and bristles.

Common Name:- Hathjor

Flowering and Fruiting:- April - August

Ethnobotanical Uses:

- Fruits are used as vegetable.
- Baked fruit used in whooping cough.
- The syrup made of fruit act as expectorant.

Trapaceae

Trapa L.

***Trapa natans* L. var. *bispinosa* (Roxb.)**; *FD.164; FPP. 113; FH. 98; FBI. 2: 590; FUGP. 1: 329.*

An aquatic, annual, submerged floating herb. Submerged leaves opposite, dissected. Floating leaves in rosette and crowded at top of stem, rhomboidal, trilobed, villous at base, adaxial surface shining and dark green, abaxial pubescence, purple in color, Petioles spongy, stipule present. Flower axillary, solitary and white. Fruit dark brown, angled drupe with beak at apex and spiny horn on both side.

Common Name:- Singhara

Flowering and Fruiting:- July – November

Ethnobotanical Uses:

- Fruit edible row or boiled or roasted.
- Paste of fruit is applied to treat sciatica and back ache.

Apiaceae

Leaves simple, inflorescence simple umbel.	*Centella*
Leaves pinnately compound, inflorescence compound umbel.	
Fruit much compressed laterally, winged.	*Anethum*
Fruit less compressed laterally, but not winged.	*Trachyspermum*

Anethum L.

***Anethum graveolens* L.**; *SPL. 263; FPP. 125; FH. 100; FD.177; FUGP. 1: 363.*

An erect, glabrous, aromatic, annual herb about 90-120 cm high. Stem branched. Leaves tripinnate, highly segmented. Inflorescence umbel. Flower small, yellow, fragrant. Fruit a laterally compressed, brown, winged schizocarp with compressed seeds **(Plate-28).**

Common Name:- Sowa

Flowering and Fruiting:- December– April

Ethnobotanical Uses:

- Strongly fragrant leaves are used as flavouring agent.
- Seeds are given to women in order to increase breast milk.
- Leaf paste is applied to boils and wounds.

Centella L.

***Centella asiatica* L.**; *FD.176; FPP. 126; SPL. 234; FBI. 2: 669; FUGP. 1: 358.*

A perennial, creeping herb of moist and shady places. Adventitious roots arising from nodes. Leaves alternate, fan-shaped, stipules attached to petiole. Inflorescence clustered umbel. Flower bracteate, 3-6 flowers per cluster, small. Sepals absent. Petals 5, minute, ovate, acute. Stamens 5, carpel curved, slightly compressed. Fruit a reticulate, oblong, indehiscent, schizocarp with 2, dull brown seeds.

Common Name:- Brahmi

Flowering and Fruiting:- April – October

Ethnobotanical Uses:

- Powdered leaves with cow's milk is given to improve memory.
- Leaf decoction is given in the treatment of leprosy.
- Leaves are used to overcome fatigue, stress and mental confusion.

Trachyspermum L.

***Trachyspermum ammi* (L.) Sprague.**; *FD.177; FPP. 127; FH. 101; SPL.252; FBI.2: 682; FUGP. 1: 361.*

Annual, erect, branched, pubescent herb about 1 m tall. Leaves pinnately compound, bipinnate to tripinnate, aromatic. Inflorescence compound umbel. Flower white, bracteolate. Carpels compressed at dorsal side, ridged. Fruit ovoid, compressed, greyish-brown, single seeded cremocarp.

Common Name:- Ajwain

Flowering and Fruiting:- April- July

Ethnobotanical Uses:

- Fruit is used as spice with peculiar flavour.
- Fruits are useful in flatulence, indigestion, colic and bronchitis.
- Roots are used as carminative, diuretic and febrifuge.

Rubiaceae

Inflorescence globose head, orangish yellow. *Neolamarckia*

Inflorescence capitate head, greenish yellow. *Mitragyna*

Neolamarckia (Roxb.)

***Neolamarckia cadamba* (Roxb.) Bosser**; *FH. 103; FBI. 3:23, 1880.*

A medium sized tree with large leaves. Leaves simple, entire, acute. Inflorescence head. Flower in a globose, terminal, solitary head, orange-yellow in color. Calyx attached to ovary. Corolla fused. Fruit a fleshy, dehiscent capsule.

Common Name:- Kadam

Flowering and Fruiting:- May – July

Ethnobotanical Uses:

- Leaves are used to reduce pain.
- This plant is cocsidered as sacred also.

Mitragyna Korths.

***Mitragyna parvifolia* (Roxb.) Korth.**; *FH.,104;FUGP.1:408;FF.286;FD.181;FFP. 276; FID.190; FPP., 130.*

A large, deciduous, sweet scented tree. Stem branched, downy, bark greyish-green. Leaves orbicular to obovate, stipulate. Inflorescence capitate head, solitary, terminal. Flower small, greenish-yellow. Calyx fused, penta-lobed. Corolla recurved with valvate aestivaton. Stamens inserted. Fruit dehiscent capsule.

Common Name:-Kadam

Flowering and Fruiting: June – October

Ethnobotanical Uses:

- Bark is used for relief in muscular pain.
- Root and bark useful in colic and fever.
- Leaves are source of fodder.
- The wood is light and is used as timber or fuel.

Asteraceae

Plants with milky sap.

Heads sessile, blue. Pappus absent or scaly. *Cichorium*

Heads peduncled, pappus bristled.

Achene not narrowed at ends.

Achene compressed. *Sonchus*

Achene columnar. *Launea*

Plants devoid of milky sap.

Fruit non-spiny. *Carthamus*

Fruit spiny.

Straggling, leaves armed with spines.

Involucres hard, 2-beaked. *Xanthium*

Involucres not hard, not beaked.

Herb not densely woolly, bracts herbaceous. *Blumea*

Densely woolly herb, bracts scarious.

Heads in leafy spikes.

Flowers bright golden colored. *Gnaphalium*

Flowers pale, bright blue or pink.

Pappus reduced to 2-3 minute teeth. *Eclipta*

Pappus not reduced.

Leaves alternate.

Capitulum homogamous.

Phyllotaxy opposite, pappus scales 5.

Capitulum heterogamous.

Plants unarmed. *Parthenium*

Plants armed with spines.

Heads 1-flowered, collected into globose ball. *Echinops*

Heads many flowered, separate.

Capitulum non-radiate.

Involucral bracts enclosing the flowers or achenes. *Eclipta*

Involucral bracts not enclosing the flowers or achenes. *Tridax*

Flowers whitish.

Flower homogamous. *Ageratum*

***Ageratum* L.**

***Ageratum conyzoides* L.**; *SPL.839; FF. 303; FPP. 133; FD.190; FH. 109; FBI. 3:243; FUGP. 1: 405.*

A pubescent, annual, branched herb about 65 cm high. Leaves broadly ovate, sub-cordate

at base, cuneate, crenate with ciliate margins, pubescent. Inflorescence head, corymbose, homogamous. Florets whitish-blue, pappus 5, scaly, corolla tubular. Involucral bracts linear, subglabrous, acute. Fruit pentangular, glandular, black colored achene **(Plate-7).**

Common Name:- Nilam, Neela Phool

Flowering and Fruiting:- January – June

Ethnobotanical Uses:

- Leaves decoction is used in treatment of dysentery, rheumatism and fever.
- Leaf extract is used as an antidote against snake bite.
- Leaves are also used to prevent loss of hairs.

***Blumea* DC.**

***Blumea axillaris* (Lam.) DC.**; *FUGP.1: 413; FD.195; FPP. 135; FH. 110.*

An erect, highly branched, woolly, glandular herb about 30-75 cm tall. Leaves alternate, petiolate, obovate, lanceolate, dentate. Inflorescence head with numerous, terminal, arranged as a spikelet. Flowers yellow, bisexual. Involucral bracts dimorphic, outer few, short, inner one many, longer. Fruit tetrangular, pubescent achene.

Flowering and Fruiting:- January– May

Ethnobotanical Uses:

- Leaf extract is useful in treatment of leucorrhoea .

***Carthamus* L.**

***Carthamus oxycantha* Bieb.**; *FD.200; FBI. 3: 386; FH. 110; FPP. 136.*

An annual, spiny, branched herb upto 1.5 m tall. Leaves, alternate, spinulose-dentate, rigid, oblong- lanceolate, semi-amplexicaul. Inflorescence head, homogamous, solitary, spiny. Florets yellow, pappus absent, anthers bristled, pubescent at base. Involucral bracts longer than head, greenish at upper side, spiny on lower side, yellow, multi-seriate. Fruit obovoid, tetrangular achene.

Common Name:- Kusum

Flowering and Fruiting:- March - August

Ethnobotanical Uses:

- Fruit yields an oil ‘Poli oil and Roghum oil’.
- Poli oil is used in hair oil while roghum oil is used as a grease for ropes.
- Roghum oil is also used in treatment of itches and ulcers.

Cichorium L.

***Cichorium intybus* L.**; *SPL.813; FBI. 3: 391; FUGP. 1: 451; FD.188.*

A prostrate, biennial herb up to 100 cm tall. Stem branched, grooved, filled with milky sap. Leaves opposite, oblanceolate, semi- amplexicaul, young leaves undivided, basal leaves pinnately divided. Inflorescence head, homogamous. Flower axillary, sessile, bright blue. Involucral bracts greenish when young later on turns brownish and dry. Pappus scaly, short, persistent. Fruit smooth achene, brown in color.

Common Name:- Kasni

Flowering and Fruiting:- August – March

Ethnobotanical Uses:

- Roots are used as diuretic, stomachic in powder form.
- Dried powder is used for adulteration in coffee.
- Root is used for treatment of gall bladder and liver disorders.

Echinops L.

***Echinops echinatus* Roxb.**; *FUGP. 1: 437; FPP. 139; FBI. 3: 358; FF. 303.*

A highly branched, diffuse shrub upto 30-90 cm tall. Leaves alternate, sessile, long, deeply pinnatifid, lobes ending in to pale spines, adaxial smooth, abaxial pubescent. Inflorescence capitulum. Flower hermaphrodite, bluish. Involucral bracts oblanceolate, fused to form long tube. Pappus short, cylindric, yellow. Corolla tubular, white, acute. Fruit densely villous achene.

Common Name:- Untkatela

Flowering and Fruiting:- January – April

Ethnobotanical Uses:

- Roots in powdered form are applied to destroy lice.
- It is also used as a diuretic.
- Paste of root is applied in snake bite.
- Decoction of root act as a tonic in impotency and sexual debility.

Eclipta L.

***Eclipta prostrata* L.**; *FBI. 3: 304; FD.197; SPL.902; FUGP. 1:427.*

A small, decumbent, annual herb about 30 cm tall. Root arising from nodes. Stem erect,

branched, with white hairs. Leaves alternate, variable, sessile, 1-5 cm long, elliptic with serrate margins. Inflorescence capitulum, head solitary, heterogamous, axillary. Involucral bracts obtuse, hairy. Ray florets ligulate, white, disc florets tubular, corolla 4-dentate. Pappus absent or reduced. Fruit winged achene, brown in color **(Plate-24).**

Common Name:- Bhringaraj

Flowering and Fruiting:- Throughout the year

Ethnobotanical Uses:

- Plant juice is applied in fever, jaundice, anemia and diabetes.
- Whole plant is used to treat skin problems and urinary tract infections.
- Leaf paste mixed with coconut oil is used to prevent hair loss.

Gnaphalium L.

Pappus hairy, connate base. *G. pensylvanicum*

Pappus without hairs. *G. polycaulon*

***Gnaphalium pensylvanicum* Willd.**, *FH. 116; SPL.854; FBI. 3: 289; FUGP. 1:421. FPP. 141.*

A pubescent, annual herb about 40 cm high. Stem branched at base, ascending. Leaves alternate 12 cm long, narrow at base, abaxial surface white, woolly pubescence. Inflorescence capitulum head, heterogamous. Involucral bracts linear. Pappus connate at base forming a ring. Fruit papillose achene.

Flowering and Fruiting:- January – June

Ethnobotanical Uses:

- Leaves are consumed as vegetable.

***Gnaphalium polycaulon* Pers.**; *FH.117; SPL.852; FD.194; FBI. 3:289;FUGP. 1:421; FPP. 141; FID.,201.*

A highly branched, soft, erect, annual herb about 20 cm tall. Stem branched at base. Leaves dimorphic, upper one sessile, lower leaves shortly stalked. Inflorescence capitulum, yellow, heterogamous. Ray florets numerous, Pappus hairs free at base. Disk florets with tubular corolla, 5-toothed. Fruit a papillose, ovoid achene.

Common Name:- Buchbucha

Flowering and Fruiting:- November – April

Ethnobotanical Uses:

- Leaf paste is used for healing of fractures.

Launaea Cass.

***Launaea procumbens* Roxb.**; *FH. 118; FBI. 3: 416, 1881;FUGP. 1: 450; FD.189; FPP. 144.*

A glabrous, highly branched, suberect, annual herb about 30-60 cm tall. Stem branches naked and smooth. Leaves radical, sessile, pinnatifid, irregularly lobed. Inflorescence capitulum, head terminal, yellow. Flower bisexual. Involucral bracts narrow, outer one short, inner oblong, white. Pappus hairs subequal, white, soft. Fruit achene with dorsal and ventral thick ribs.

Common Name:- Gobhi ghas

Flowering and Fruiting:- October – March

Ethnobotanical Uses:

- It is used in preparation of curries.
- Leaf paste is applied on boils and swellings.
- Leaves are used in fever and cancer.

Parthenium L.

***Parthenium hysterophorus* L.**; *SPL. 988; SFUGP. 127; FH. 118.*

A fast growing, perennial, highly branched, erect, herb up to 1m tall. Leaves alternate, elliptic, palmately lobed, dark green, oblong-lanceolate, pubescent. Inflorescence capitulum, head sessile, terminal, white. Pappus absent, corolla persistent, white. Fruit triquetrous achene with minute, black seeds **(Plate-7).**

Common Name:- Gajar ghas

Flowering and Fruiting:- August – December

Ethnobotanical Uses:

- Decoction of roots is used as tonic.
- Root decoction is also used in treatment of dysentery and skin diseases.
- Whole plant is used as fuel.

Sonchus L.

Involucral bracts non-glandular.

Cauline leaves with obtuse, contracted auricles, margin spinous. *S. asper*

Cauline leaves with acute, spreading auricles, margin dentate. *S. oleraceus*

Involucral bracts glandular. *S. brachyotus*

***Sonchus asper* (L.) Hill**; *FBI. 3: 414; FUGP. 1: 448; FID. 211; FH. 119; FD.190; FPP. 146; SPL.794.*

An erect, sparsely glandular, annual herb about 70-80 cm tall. Stem branched, filled with pale sap. Leaves sessile, cauline, entire, pinnatifid, semi-amplexicaul, auricles adpressed, margin spinous-dentate. Inflorescence capitulum, head arranged as irregular umbel. Flowers yellow. Involucral bracts nearly glabrous, non glandular. Fruit compressed, elliptic, 3-ribbed, achene **(Plate-7).**

Common Name:- Dudhi

Flowering and Fruiting:- November – March

Ethnobotanical Uses:

- Young shoots are eaten row as salad.
- Root paste is a good medicine for jaundice.
- Paste of herb is used for treating wounds and boils.

***Sonchus oleraceus* L.**; *SPL.794; FUGP.1: 448; FID., 211; FBI. 3: 414; FPP. 147; FH. 119; FD.190.*

An erect, glaucous, annual herb about 30-60 cm high. Stem branches unequal in length, glandular-hispid. Leaves cauline, sessile, oblong-obovate, pinnatifid, semi-amplexicaul, auricles spreading, acute, minutely dentate. Inflorescence capitulum irregular umbellate cyme, glandular. Flowers yellow, pappus numerous,white. Involucral bracts smooth, non-glandular. Fruit much compressed, obovoid achene **(Plate-7).**

Common Name:-Peeli Dudhi

Flowering and Fruiting:- December – March

Ethnobotanical Uses:

- Roots and leaves are used for digestive problems.
- An ointment is prepared from the decoction for wounds and ulcers.
- Plant used as a fodder for sheeps, goats and cattles.

***Sonchus brachyotus* DC.**; *FPP. 147; FH. 119; SPL.793; FBI. 3: 414; FUGP. 1:449;*

FD.190.

An erect, perennial herb about 40-100 cm tall. Stem angular, branched, hollow, covered with glandular pubescence. Leaves rosette, radical leaves spinous-toothed, cauline amplexicaul, with appressed auricles. Inflorescence head. Involucral bracts coated with glandular hairs. Fruit wrinkled achene.

Common Name:- Dodak

Flowering and Fruiting:- June – September

Ethnobotanical Uses:

- It is used in treatment of skin disorders and kidney stones.
- Plant roots are used in cough and bronchitis.

***Sphaeranthus* L.**

***Sphaeranthus indicus* L.**; *SPL.927; FBI. 3: 275; FUGP. 1: 419; FPP. 147.*

An erect, aromatic, highly branched, annual herb. Stem branches ascending, glandular, tomentose. Leaves alternate, sessile, clasping base decurrent into wings, oblong-obovate, pubescent on both surfaces. Inflorescence compound capitula, heterogamous. Involucral bracts linear-lanceolate, ciliate. Ray florets 6-8, tubular, pistillate. Disc floret hermaphrodite. Fruit stalked, smooth achene.

Common Name:- Gorakmundi

Flowering and Fruiting:- November –March

Ethnobotanical Uses:

- Leaf juice is used in tumors and piles.
- It is also used as a vermifuge.
- Plant juice is used for treatment of gastric disorders.

***Tridax* L.**

***Tridax procumbens* L.**, *SPL. 900; FH. 121; FBI. 3: 311; FUGP. 1: 433; FPP.147; FD.199.*

A weak, straggling, annual herb about 40-50 cm tall. Stem hairy. Leaves entire, petiolate, ovate-lanceolate, dentate margin, pubescence glandular on both surfaces. Inflorescence capitulum head solitary, cream colored, heavily pubescent. Involucral bracts dimorphic, outer pubescent, acuminate, inner one membranous, minutely hairy. Ray-florets yellow, ligulate, 3- partite, pistillate. Disc-florets bisexual, corolla tubular, hairy. Fruit oblong,

densely pubescent achene **(Plate-8).**

Common Name:- Sadahari

Flowering and Fruiting:- Throughout the year

Ethnobotanical Uses:

- It is used to treat dental problems.
- Leaf juice is used to get relief from ear ache.
- Leaves are used for treatment of dysentery.

***Xanthium* L.**

***Xanthium strumarium* L.**; *SPL.987; FBI. 3: 303; FID. 214; FUGP. 1: 426; FPP.149; FH. 121; FD.196.*

An erect, gregarious, annual herb about 1-1.5 m tall. Stem branched, pubescence bristly. Leaves alternate, petiolate, broader, lobed, dentate margins. Inflorescence capitulum. Involucral bracts curved, densely pubescent, hooked prickles, pappus absent. Fruit oblong, compressed achene **(Plate-8).**

Common Name:- Bharunt

Flowering and Fruiting:- August – December

Ethnobotanical Uses:

- Fruits are used in constipation, leprosy and rheumatoid arthritis.
- Seeds are eaten raw to get relief from head ache.
- Roots are useful in treatment of tumor.

Plumbaginaceae

***Plumbago* L.**

***Plumbago zeylanica* L.**; *SPL.151; FBI. 3: 480; FUGP. 1: 457; FFP. 300; FF.309; FD.203; FPP. 150; FH.123.*

A perennial, evergreen undershrub, about 1-2 m tall. Stem branched, spreading, glabrous, woody, glandular when young. Leaves alternate, simple, shortly stalked, entire, ovate, glaucous adaxially. Inflorescence spiked raceme. Flower white, hypogynous, bracteolate, bracteoles shorter than sepals. Calyx fused, tubular, glandular pubescence. Corolla with 5 petals, gamopetalous, white. Stamens 5, exserted. Fruit oblong capsule with accrescent calyx. Seeds many, oblong, brown colored **(Plate-8).**

Common Name:- Chitrak

Flowering and Fruiting:- September – April

Ethnobotanical Uses:

- Infusion of root is useful in influenza.
- Roots are given for stimulation of digestive process.
- Root extract is used as an astringent and for treatment of skin problems.

Primulaceae

Anagallis L.

***Anagallis arvensis* L.**; *SPL.148; FBI. 3: 506; FUGP. 1: 461; FD.203; FPP. 151; FH.*

A procumbent, annual herb about 50 cm tall. Stem branches quadrangular, winged. Leaves opposite, simple, sessile, entire, ovate, acute, gland dotted. Peduncle 1-3 cm long. Sepals 5, segmented, segment narrow, linear-lanceolate. Petals blue, aestivation rotate. Stamens 5, free, inserted. Fruit a globose capsule. Seeds numerous, triangular, dark brown in color **(Plate-8).**

Common Name:- Krishna neel

Flowering and Fruiting:- December – April

Ethnobotanical Uses:

- It is used to expel leeches from nostrils of cattle.
- Plant paste is applied on wounds, tumors and swellings.
- The plant extract is also used in treatment of leprosy and hydrophobia.

Sapotaceae

Madhuca Gmel.

***Maduca indica* Gmel.**; *FBI.3.544; FUGP. 2.11*

A large or medium-sized, deciduous tree. Bark dull black. Leaves clustered at the ends of branches, elliptic, obovate or broadly lanceolate, prominently nerved beneath. Flowers cream-coloured, peculiarly musty, sweet-scented, drooping, rusty-tomentose, in dense fasicles at the ends of leafless branches.

Common Name:- *Mahua*

Flowering and Fruiting:- March-May

Ethnobotanical Uses:

- Flowers are employed in coughs, bronchitis and general debility.
- Dried petals are used to prepare wine by fermentation.

- Seeds oil is applied on skin diseases and rheumatism.
- Leaves paste is applied on burns and scalds.

Ebenaceae

Diospyros L.

***Diospyros montana* Roxb.**; *FUGP. 1: 471; FFP. 308; FF. 317; FD.206; FPP.152; FH. 125.*

A perennial, deciduous, large sized shrub, about 10 m tall. Stem branched, armed with hard spines, bark dull brown, cracked. Leaves alternate, simple, ovate-lanceolate, cordate at base, pubescent at both surfaces. Inflorescence cymose. Flowers green, axillary, arranged in triads. Staminate flower pale-white. Calyx tetra lobed, elliptic. Corolla pubescent. Stamens 16, connate at base, paired. Pistillate flower solitary, pedicellate, greenish white in color. Calyx thin, persistent. Corolla white, obtuse. Fruit globose, minutely pubescent. Seeds arillate.

Common Name:- Tendu

Flowering and Fruiting:- December – June

Ethnobotanical Uses:

- Leaves are used to wrap the bidies.
- Flowers are useful in urinary, skin and blood related diseases.
- It is fairly useful as fuel and also for furniture.
- Unripe fruit juice is applied on wounds for quick healing.

Salvadoraceae

Salvadora Linn.

Inflorescence shorter than leaves, flowers sessile. *S.oleoides*

Inflorescence longer than leaves, flowers pedicellate. *S. persica*

***Salvadora oleoides* Decne.**; *FUGP. 2:29; FD.210; FID.215.*

A branched, small, evergreen tree. Stem branches divergent, bark grey. Leaves opposite, linear-lanceolate, whitish green, glabrous. Inflorescence spike. Flower sessile, greenish white. Calyx cup shaped, tetra-lobed, persistent. Corolla obovate-oblong, lobed. Stamens 4, epipetalous, alternating with corolla lobes. Fruit berry with acrescent calyx.

Common Name :- Jaal

Flowering and Fruiting:- March – June

Ethnobotanical Uses:

- Young twigs are used as tooth brushes.
- Fruits are very delicious and edible.
- Leaves are used as purgative and as a remedy for cough.

***Salvadora persica* L.**, *SPL.122; FBI. 3: 619; FUGP. 1: 481; FFP. 323; FD.209; FPP. 155; FH.127.*

A highly branched, evergreen, perennial, small tree about 2-6 m tall. Stem branches arises symmetrically at an angle of 45 with main axis. Leaves opposite deccusate, elliptic-lanceolate, mucronate at apex, pale green. Inflorescence drooping panicle. Flower greenish yellow, pedicellate, bracts beneath the pedicel, caducous. Calyx glabrous, lobed. Corolla deeply cleft, persistent. Stamens 4. Fruit globose drupe, dark red when mature. Seeds smooth, brown.

Common Name:- Meswak

Flowering and Fruiting:- February– July

Ethnobotanical Uses:

- Leaves are consumed as vegetable.
- Leaves juice is given in piles, asthma, coughs and indigestion.
- Fruits are edible and used in fermentation of drinks.
- Fruits are utilized in calculi, flatulence and constipation.
- Seeds are purgative, diuretic and tonic.

Apocynaceae

Phyllotaxy whorled.

Tree, flowers yellowish-green. *Alstonia*

Shrubs, flowers whitish-red or rosy. *Nerium*

Phyllotaxy not whorled.

Erect herb, leaves opposite. *Catharanthus*

Twinner, leaves alternate. *Tylophora*

Alstonia R.Br.

***Alstonia scholaris* (L.) R. Br.**; *FBI. 3:642; FUGP. 2:34; FD. 215.*

An erect, evergreen, medium-sized tree with dense canopy, whitish-grey bark. Leaves

whorled, bright, green, obovate, crowded. Inflorescence umbellate cyme. Flowers greenish-yellow, fragrant, compactly arranged. Fruit long, pendulous follicle **(Plate-9).**

Common Name:-Sapt-Parni

Flowering& Fruiting:- November –March

Ethnobotanical Uses:

- Bark is used as blood purifier.
- Decoction of bark is useful in fever to reduce body temperature.

Catharanthus **Don**

Catharanthus pusillus **(Murray) G. Don.**; *FD. 211; FPP. 157; FID. 216; FH.129; FBI. 3: 640; FUGP. 2:34.*

An erect, annual, glabrous herb with milky latex, having quadrangular stem and angular branches. Leaves opposite, sessile to sub-sessile, simple, lanceolate, membranous. Inflorescence terminal. Flowers solitary or paired. Calyx filliform. Corolla obovate, puberulous. Fruits triate with black seeds.

Common Name:- Teanklo

Flowering and Fruiting:- July-November

Ethnobotanical Uses:

- Dried plant boiled in oil and applied in rheumatism.
- Plant is poisonous for grazing animals.

Nerium **Linn**.

Nerium oleander **L.**; *SPL.1:209; FD.215; FPP.157; FH. 130; FBI. 3 : 655; FF.338; FUGP. 2: 40; FFP. 332.*

An evergreen, large shrub, having milky juice, glabrous with silvery-grey bark. Leaves with short petiole, rosetted in three, linear-lanceolate, dark green with prominent midrib. Inflorescence terminal cyme. Flowers red to white or rose-coloured, fragrant. Calyx subulate. Corolla bell-shaped. Stamens near to mouth of the tube, anthers sagittate. Fruit follicles,dehiscing longitudinally with light brown hairy seeds **(Plate-9).**

Common Name:- Kaner

Flowering and Fruiting:- April – October

Ethnobotanical Uses:

- It is planted along roadsides as ornamental.

- Also believed to minimize the pollution.

Tylophora R. Br.

***Tylophora indica* (Burm. f.) Merr.**; *FD. 220; FBI. 3: 44.*

A profusely branched climber with a length of about 15 meter. Stem densely tomentose. Leaves ovate, oblong, acuminate, rounded at base, hairy. Inflorescence umbellate cyme. Flowers pale-green, pedicellate, pubescent. Sepals lanceolate, hirsute. Petals ovate, yellowish-green. Pollinia horizontal, minute. Fruit follicle in pairs, lanceolate, tapering at both ends. Seeds compressed with 2.5 cm long coma.

Common Name:- Anantmool

Flowering and Fruiting:- August-January

Ethnobotanical Uses:

- Leaves are used for the treatment of asthma, cough, bronchitis and dysentery.

Asclepiadaceae

Plants erect, herbs or shrubs.

Leaves ovate, flower more than 2.5 mm, corolla purple. *Calotropis*

Leaves lanceolate, flower less than 2.5 mm, corolla yellow. *Leptadenia*

Plants climbers or twinners. *Pergularia*

Calotropis R. Br.

Corona lobes shorter than staminal tube, appendages pubescent. *C. gigantea*

Corona lobes equal or longer than staminal tube, appendages smooth. *C. procera*

***Calotropis gigantea* (L.) Dryand. R. Br.**; *FUGP.2: 48; FID. 218; FFP., 314;FPP. 218; FH.132.*

A decumbent, medium-sized shrub with latex. Young parts and leaves pubescent. Leaves opposite decussate, amplexicaul, petiole short, thick, ovate to obovate. Inflorescence terminal, axillary, umbellate to sub-corymbose cymes. Flower creamy white, fleshy, bracteate. Calyx acute. Corolla tube deltoid, gynostegium 2.3 cm long, pollinia attached to caudicles, corona lobes adnate to staminal tube. Ovaries smooth, ovules many, style long and thick. Fruit paired boat-shaped follicle with flat silky seeds **(Plate-9).**

Common Name:- Safed Aak, Madar

Flowering and Fruiting:- October – June

Ethnobotanical Uses:

- Milky juice is applied or ring worm, eczema and swelling.
- Fresh root twigs are used as tooth brush in tooth ache.
- Leaves of the plant are used in treatment of paralysis.
- Root bark is used in elephantiasis and worms.

***Calotropis procera* (Ait.) Dryand. R. Br.**; *FBI. 4 : 18; FF. 345; FUGP.2: 48;FFP. 342; FD. 218; FPP.161.*

An erect, highly branched shrub with milkylatex. Leaves opposite decussate, subsessile, ovate to obovate, acute, sub-amplexicaul. Inflorescence terminal, umbellate to corymbose cymes. Flowers purple, long peduncle. Calyx lobes acute. Corolla spreading, incised 2/3 way down, corona compressed, subacute with white spur. Fruit paired, ellipsoid, follicles. Seeds with glossy, silky-white coma **(Plate-10).**

Common Name:- Madar, Aak

Flowering and Fruiting:-Throughout the year

Ethnobotanical Uses :

Almost all plant parts are used for various purposes.

Flowers are used for worshipping Lord Shiva.

Leaves used in dysentery.

Stem fibres are used to prepare rope and cords.

Root and latex are used for treatment of asthma.

Leptadenia R.Br.

***Leptadenia pyrotechnica* (Forsk.) Decne.**; *FID.273; FD.221; FH.134; FBI.4:64, FUGP.2:63.*

A profusely branched, almost leafless, erect, shrub. Leaves with short drooping petiole, lanceolate, leathery, acute. Inflorescence lateral umbellate cymes. Flowers pale-yellow, pubescent. Calyx deltoid. Corolla funnel shaped, corona staminal, annular. Fruit with slender beak.

Common Name:- Khimparo

Flowering and fruiting:- August- April

Ethnobotanical Uses :

- Tuberous roots consumed as avegetable.
- Plant used as fodder for cattles.
- Stem used to make ropes, baskets and also suitable for paper manufacture.

Pergularia Linn.

***Pergularia daemia* (Forsk.) Chiov.**; *FD.218; FPP. 163; FH. 134; FID. 225; FBI.4:20; FUGP. 2:52.*

A perennial, twining, foul smelling shrub with milky sap. Leaves thick, margin entire, cordate, velvety pubescent. Inflorescence axillary, umbellate cyme later on become raceme. Flowers greenish-yellow, pedicel long. Calyx villous. Corolla broad, ciliate margined. Stamens with inflexed anthers, corona double, pollinia waxy, stigma flat. Fruit lanceolate, pointed, curved follicles with soft spines.

Common Name:- Aaksand

Flowering and Fruiting:- August-November

Ethnobotanical Uses:

- Paste of root is applied on snake bite.
- Leaves juice is used in bleeding piles, asthma and coughs.
- Plant extract is used for menstrual problems and to facilitate parturition.

Gentianaceae

Centaurium Hill.

***Centaurium pulchellum* (Sw.) Druce**; *FPP. 166; FH. 135; FD.223; FBI. 4: 101; FUGP. 1: 520.*

A decumbent, glabrous, leafy, annual herb about 5-20 cm tall. Leaves opposite decussate, sessile, lanceolate, oblong, ascending. Inflorescence dichotomous cyme. Flowers pinkish, sessile, bracteates. Sepals 5, tubular, toothed. Petals 5, fused to form short tube, penta-lobed. Stamens 5, spirally twisted. Fruit oblong capsule. Seeds numerous, minute, black in color.

Flowering and Fruiting:- May – October

Ethnobotanical Uses:

- It used in treatment of high blood pressure, fever and kidney stones.
- Also useful in digestive system disorders.

Boraginaceae

Trees with drupe.

Calyx persistent. *Cordia*

Herbs or undershrubs with nutlets.

Herbs not hispid,stigma entire. *Heliotropium*

Hispid herb, stigma bipartite.

Inflorescence raceme, flowers yellow. *Arnebia*

Arnebia Forsk.

***Arnebia hispidissima* (Lehm.) A. DC.**; *FBI. 4: 176; FUGP. 1: 541; FD.227; FPP. 172; FH. 136.*

A diffuse, annual, hispid herb. The tap roots red. Stem woody at base, branches densely covered with white pubescence. Leaves linear-lanceolate, densely hispid on both surfaces. Inflorescence raceme. Flowers yellow, bracteate. Calyx unequally segmented, lanceolate. acute. Corolla yellow, hairy outside, lobes oblong, obtuse. Fruit minute, ovoid, acute nutlets.

Common Name:- Rathanjot

Flowering and Fruiting:- September - March

Ethnobotanical Uses:

- The tap roots yield red colour, used for coloring hairs.

Cordia L.

***Cordia dichotoma* G.Forst.**; *FD.227; FPP. 173; FH. 138; FFP. 355; SPL.190; FBI. 4: 136; FUGP. 1: 528.*

A moderate-sized, deciduous, perennial tree. Stem with grey and rough bark.Leaves alternate, broadly ovate, obtuse, rounded at base, glabrous adaxially, pubescent abaxially. Inflorescence terminal cyme. Flower axillary, white, small, bisexual. Calyx campanulate, glabrous outside, silky inside, irregularly 5 toothed, accrescent. Corolla gamopetalous, penta-lobed, lobes equal to the tube. Stamens exserted, filaments hairy below. Fruit ovoid, apiculate, cream-coloured drupe with persistent calyx.

Common Name:- Lisoda

Flowering and Fruiting:- March-July

Ethnobotanical Uses:

- Fruits are edible and pickled.
- Bark is employed for cough and chest diseases.
- Wood is used for constructions of boats.
- Leaves juice and honey is given in foot and mouth disease of cattles.

Heliotropium L.

Herbs pubescent.

Leaves linear, lanceolate. *H. strigosum*

Leaves broadly obovate or elliptic. *H. ellipticum*

Herbs glabrous. *H. curassavicum*

***Heliotropium curassavicum* L.**; *SPL.130; FPP. 170; FH. 139.*

A perennial, diffuse herb with woody base, up to 45 cm high. Leaves sub- opposite, fleshy, linear-lanceolate. Inflorescence cyme. Flowers white, ebracteate. Calyx persistent, 5-lobed, ovate-lanceolate. Corolla campanulate, lobes obtuse. Stamens 5. Ovary 4-lobed, style absent, stigma conical. Fruit 4- nutlets.

Flowering and Fruiting:- August – December

Ethnobotanical Uses:

- Decoction of leaves is useful in fever.
- Powdered roots applied to boils, wounds and skin infections.

***Heliotropium strigosum* Willd.**; *FBI. 4: 151; FUGP. 1: 537; FD. 226; FPP.170.*

A profusely branched, procumbent, deep rooted perennial herb about 30 cm tall. Stem branches covered with white hairs. Leaves alternate, sessile, linear, entire, acute. Inflorescence terminal spike. Flower small, white, bracteates, bracts leafy. Calyx with 5 sepals, lobed, enlarged in fruit, accrescent. Corolla-tube cylindric, twice of calyx. Stigma narrowly conical. Fruit globose, 4 nutlets, hairy.

Common Name:- Safed bhangra

Flowering and Fruiting:- March –November

Ethnobotanical Uses:

- Plant juice is applied to sore eyes.
- Leaf juice is useful in boils, wounds and ulcers.

***Heliotropium ellipticum* Ledeb.**; *FPP. 170; FBI. 4:149; FUGP. 2:92; FD.22.*

An erect, annual, pubescent herb with bulbous hairs. Leaves elliptic-oblong, obtuse apex, nerves prominent abaxially. Infloresence spike, helicoid when young. Calyx penta-partite. Corolla lobes rounded with crenulate margins. Stigma with conical appendage, bifid at apex. Fruit 4 nulets.

Common Name:- Pili-Buti

Flowering and Fruiting:- November – March

Ethnobotanical Uses:

- Root paste is applied on snake bite.
- Leaves juice is applied on wounds, sores, boils and pimples.

Convolvulaceae

Leafless climbing herb, parasitic.	*Cuscuta*
Leafy herb, non-parasitic.	
Spinulose pollen grains.	*Ipomoea*
Non-spinulose pollen grains.	
Style free, 2.	*Evolvulus*
Style single, entire or bifurcated.	*Convolvulus*

***Convolvulus* L.**

Peduncle longer than leaves, hastate-sagittate.	*C.arvensis*
Peduncle shorter than leaves, acute.	*C. microphyllus*

***Convolvulus arvensis* L.**; *SPL.153; FBI. 4 : 219; FUGP.2: 106; FID. 243;FD.239; FPP. 175; FH.140.*

A perennial, herbaceous, creeping twinner. Leaves petiolate, ovate or lanceolate, sagitate at base, apex mucronate. Flowers solitary or in cluster of 2-3 on an axillary stalk, with a paired small bracts. Sepals unequal, ovate, obtuse. Corolla purple with a white centre with spreading lobes. Stamens papillose margined, unequal filaments. Ovary bilocular, 2-ovule in each locule. Fruits 4-valved. Seeds usually 4.

Common Name:- Hirankhuri

Flowering and Fruiting: September – April

Ethnobotanical Uses:

- Whole plant material is used as tonic for kids.
- It is also used as medicine to improve memory.
- Paste of leaves is applied on boils.

***Convolvulus microphyllus* Sieb. *ex* Spreng.**; *FBI.4 : 218; FID. 247; FPP.135;FUGP. 2: 105; FD.239; FH. 141.*

A perennial, diffuse, procumbent, pubescent herb. Leaves sub-sessile, linear-oblanceolate, radical leaves larger, apex mucronate, sparsely hairy dorso-ventrally. Flowers solitary, paired, pinkish-white. Calyx penta-lobed, lobes lanceolate, acuminate, unequal. Corolla infundibular. Stamens with equal filaments. Fruit rounded, globose capsule.

Common Name :- Santari

Flowering and Fruiting: August – December

Ethnobotanical Uses:

- Important constituent of brain tonic drug "Sankh-Pushpi".

***Cuscuta* L.**

Style 1, stigma conical, petals equal to sepals. *C. reflexa*

Style 2, stigma globose, petals longer than sepals. *C. hyalina*

***Cuscuta reflexa* Roxb.**; *FBI.4 :225,1883; FF. 368; FUGP.2: 100; FFP. 346;FD.240; FID. 266; FPP. 176; FH. 146.*

A parasitic, yellowish, leafless, thread-like, succulent twinner grows over trees or shrubs. Inflorescence cymose or racemose. Flowers yellow or creamy-white, fragrant, pedicellate. Calyx cupulate, thick. Corolla triangularly ovate, obtuse, reflexed. Fruit a 4-seeded capsule **(Plate-10).**

Common Name:- Amarbel, Dodder

Flowering & Fruiting:- January – March

Ethnobotanical Uses:

- It is utilized in treatment of liver related diseases.
- Decoction of stem is employed in constipation and flatulence.
- Stem paste is given with curd to cure diarrhoea.

***Cuscuta hyalina* Roth.**; *FBI. 4:226; FD.240; FID. 247.*

An annual, highly branched, finger-like parasite. Inflorescence umbellate cyme. Flowers bracteate, bracts triangular. Calyx infundibular. Corolla campanulate. Anthers flattened, filiform. Stigma capitate. Fruit a globose capsule.

Common Name:- Amarbel

Flowering and Fruiting:- August-March

Ethnobotanical Uses:

- The boiled stem extract is useful in treatment of chest pain.

***Evolvulus* Linn**.

Leaves elliptic, petals pale blue. *E. alsinoides*

Leaves sub-orbicular, petals white. *E. nummularius*

***Evolvulus alsinoides* L.**; *FBI. 4: 220, 1883; FUGP. 2: 104; FD.230; FPP. 176;FID. 250; FH. 141; SPL.157.*

A profusely branched, diffuse, ascending herb. Root stock perennial. Leaves variable, lanceolate to ovate, sub-sessile, apex mucronate. Flowers 1-3, axillary, blue to white, bracts hirsute. Corolla sub-rotate. Fruit a globose, tetra-valved, 4-seeded capsule.

Common Name:- Shankhpushpi

Flowering and Fruiting:- Throught the year

Ethnobotanical Uses:

- It is used to prepare tonics and medicine for fever.
- Also used in treatment of syphilis, diarrhoea,bronchitis and asthma.

***Evolvulus nummularius* L.**; *FH.141; SPL.157; SFUGP.166.*

A herbaceous, prostrate, annual creeper. Leaves glossy smooth, ovate to oblong, sub-orbicular, apex obtuse. Inflorescence solitary, axillary. Flowers white in color. Fruit globose capsule **(Plate-25).**

Flowering and Fruiting: August – December

Ethnobotanical Uses:

- Plant used as anthelmintic.
- Fresh plant juice is used to treat amoebic dysentery.

***Ipomoea* Linn.**

Leaves palmate, deeply lobed.

Flowers 1-3 in lax cyme, leaves digitately 5-lobed. *I. carica*

Leaves simple, entire or shallowly lobed.

Leaves not white-woolly at lower surface.

Calyx smooth.

Corolla tube more than 5cm long. *I. fistulosa*

Corolla tube equal or less than 5 cm long.

Flower purple or pink, corolla tube 3-5cm long. *I. aquatica*

Flowers white, corolla tube 2-4 cm long. *I. indica*

Calyx pubescent.

Corolla 5-9 cm in length. *I. nil*

***Ipomoea aquatica* Forsk.**; *FBI.4: 210; FPP.178; FID.252; FH.143; SPL.158;FUGP. 2: 114; FD.234.*

An aquatic, annual, glabrous, hollow trailer. Leaves alternate, long, variable, ovate to oblong, apex acute, sagittate. Inflorescence axillary cymes. Flowers pedicellate, pink, purple at centre. Calyx membranous, sub-equal. Corolla smooth, infundibular, 5 cm long. Filaments uneven, pubescent basal. Fruit globose capsule with 4 seeds.

Common Name:- Kalmi Sag

Flowering and Fruiting:- October - January

Ethnobotanical Uses:

- Young plant parts are used as vegetables.
- Leaf paste is applied on ringworm, leprosy and other skin disorders.
- It is also used in treatment of fever, jaundice and to increase breast milk.

***Ipomoea cairica* (L.)Sweet**; *SFUGP.2: 162; FD.238; FPP. 178; FID. 252; FH. 378; FBI. 4: 214; FF. 367.*

A perennial, glabrous climber with tuberous roots. Leaves 3-5cm long, deeply palmate, penta-lobed, oblanceolate, mucronate, psuedostipulate. Inflorescence axillary cyme. Flowers pale-voilet, campanulate. Calyx lobes unequal. Filaments pilose at base. Fruit a sub-globose, glabrous capsule **(Plate-28).**

Flowering and Fruiting:- Throughout the year

Ethnobotanical Uses :

- The plant is useful in treatment of cough, asthma and tuberculosis.
- Leaf paste is applied in skin diseases.

***Ipomoea fistulosa* Mart.**; *SFUGP.163; FPP.179; FID. 255; FFP. 365; FD.234.*

An ascending, perennial shrub, up to 3 m tall, branches fistulose, filled with milky sap. Leaves glabrous, ovate to ovate-oblong, apex acute, base hastate. Inflorescence lax cymes. Flowers pale lilac in color. Fruit tetra-seeded, ovoid capsule.

Common Name:- Vilayati Aak

Flowering and Fruiting:- September – December

Ethnobotanical Uses:

- Plant is used for field fencing.

***Ipomoea indica* (Burm.) Merr.**; *FID. 256.*

A prostrate, sparsely branched, perennial climber. Stem highly retrosely pilose. Leaves cordate, ovate to orbicular in outline, entire or lobed, acuminate. Inflorescence axillary, umbellate cymes. Flowers with filiform bracts, rarely foliaceous. Corolla infundibular, deep blue to purple **(Plate-10).**

Flowering and Fruiting:- October – February

Ethnobotanical Uses:

- Plant roots are used in treatment of dysentery.

***Ipomoea nil* (L.) Roth**; *FD.238; FPP. 180; FID., 257; FH. 143.*

An annual, shrubby, scattering twinner with retrosely hirsute stem. Leaves tri-lobed, ovate-cordate, lateral lobes obliquely ovate. Inflorescence axillary, umbellate cymes. Flowers deep blue tinged with pink. Corolla bell-shaped. Fruit sub-globose, smooth, 6-seeded case.

Common Name :- Kala dana

Flowering and Fruiting:- August – January

Ethnobotanical Uses :

- Seeds are employed in treatment of urinary disorders.
- Dried seeds contain an oil and used as purgative.

Solanaceae

Fruit is a capsule.	
Persistent calyx larger and covering the fruit.	*Nicotiana*
Persistent calyx reflexed, shorter.	*Datura*
Fruit is a berry.	
Plants herbaceous.	
Flowers solitary.	*Physalis*
Flowers umbelliform or typical raceme.	
Undershrub, flowers sessile.	*Withania*
Herbs or shrubs, flowers pedicellate.	
Leaves fragrant.	*Lycopersicon*
Leaves non-fragrant.	*Solanum*

***Datura* L.**

Plants tomentose.	
Capsule reflexed, corolla white, 10-toothed.	*D. innoxia*
Capsule 4 valved, corolla white, 5-toothed.	*D. stramonium*
Plant minutely pubescent.	*D. metel*

***Datura innoxia* Mill.**; *FD.243; FPP. 183; FH. 147; SPL.179; FBI. 4: 243; FID.268; FUGP. 2: 9; FFP. 370.*

A short, divaricately branched, perennial herb about 80-90 cm high. Stem zig-zag, hairs glandular, base woody. Leaves petiolate, large, ovate, acute, finely pubescent on both surfaces. Flowers solitary, white, pendulous. Calyx fused, toothed, hairy. Corolla with 5 petals, white, gamopetalous, infundibular, twisted. Stamens 5, epipetalous. Ovary superior, oblique, hairy. Fruit globose, spiny, capsule with persistent calyx **(Plate-10).**

Common Name:- Safed Datura

Flowering and Fruiting:- Throughout the year

Ethnobotanical Uses:

- Seeds are used to treat hydrophobia.
- Seeds are said to be smoked in asthma.
- Leaves and seeds are used to relieve pain.
- Roasted leaves are applied on enlarged testicles.

***Datura metel* L.**; *SPL.179; FBI. 4: 242; FUGP. 2: 9; FFP. 372.*

A glabrous, dichotomously branched, annual herb about 1.5 m tall. Stem branches dark purple with whitish leaf scars. Leaves entire, petiolated, ovate- lanceolate, dentate. Flowers solitary, finely pubescent. Sepals 5, gamosepalous, Petals violet outside, white inside, fused, funnel shaped. Stamens 5, short, adnate to corolla, anther purple. Fruit globose, cone shaped, spiny capsule. Seeds many, brown in color.

Common Name:- Kala Dhatura

Flowering and Fruiting:- September – March

Ethnobotanical Uses:

- Leaves are used as narcotic and anti-spasmodic.
- Seeds are said to be smoked in asthma.
- Purified seeds are used for jaundice, fever and anemia.

***Datura stramonium* L.**; *SPL.179; FBI. 4: 242; FUGP. 2: 8; FH. 147.*

A glabrous, erect, branched, rough, annual herb about 60-90 cm tall. Stem branches green. Leaves petiolate, rhomboid-ovate, dentate, apex acute. Calyx ovate-lanceolate, penta-lobed. Corolla white, 5- lobed, fused, cuspidate. Stamens 5, adnate, anthers white. Fruit conical capsule with sharp spines. Seeds brown, reticulate **(Plate-11).**

Common Name:- Dhatura

Flowering and Fruiting:- September - December

Ethnobotanical Uses:

- It is used as cerebral depressant.
- Alsoo used in muscular pain and rheumatism.
- Leaves are useful in treatment of asthma and bronchitis.

***Nicotiana* L.**

Flowers greenish yellow, corolla campanulate. *N. rustica*

Flowers pinkish white, corolla tubular. *N. plumbaginifolia*

***Nicotiana plumbaginifolia* Viv.**; *FD.242; SFUGP.176; FPP. 184; FH.149.*

Annual, sticky, glandular, erect herb about 1 m tall. Leaves rosette, upper leaves sessile, lower one semi-amplexicaul, sticky, pubescent on both surfaces, lanceolate with glands.

Inflorescence raceme. Flowers pinkish white. Sepals 5, gamosepalous, linear- lanceolate. Petals 5, penta-lobed, tubular. Stamens 5, dithecous anthers. Fruit ellipsoid capsule with persistent calyx and many brown colored seeds **(Plate-24).**

Common Name:- Jungali Tambaku

Flowering and Fruiting:- February – July

Ethnobotanical Uses:

- It is grown as an ornamental plant.

***Nicotiana rustica* L.**; *SPL.180; FBI. 4: 245; FUGP. 2:12; FD.242; FPP.185.*

A glandular, erect, unbranched, densely hairy, annual herb, up to 1 m high. Leaves petiolate, upper one large, broad, lower one narrow, small, sticky, gland dotted. Inflorescence terminal raceme. Flower greenish yellow, ebracteate. Calyx gamosepalous, toothed, triangular. Corolla fused, companulate. Fruit globose capsule. seeds many, brown in color.

Common Name:- Tambaku

Flowering and Fruiting:- November – March

Ethnobotanical Uses:

- The plant leaves contains strong narcotic.
- Leaves used for chewing and smoking in the form of hukkas.

Lycopersicon Mill.

***Lycopersicon esculentum* Mill.**; *FBI.4,237; SPL.185.*

An erect, branched,pubescent, spreading herb. Leaves compound, imparipinnate, leaflets ovate-oblong, dentate irregularly, fragrant. Inflorescence raceme. Flowers yellow, bisexual, pendulous. Fruit pulpy, red, round berries. Seeds ovate, minute, cream colored **(Plate-11).**

Common name:-Tomato

Flowering and Fruiting:- November- March

Ethnobotanical Uses :

- Fruit is considered as appetizer and consumed raw as ‘Salad’.
- Also also used in the preparation of juices, sauces, soup and chutney.
- Fresh ripe fruit are eaten raw with salt used as wormicide.

***Physalis* L.**

Anthers yellow, corolla not spotted. *P. minima*

Anthers not yellow, corolla spotted. *P.angulata*

***Physalis minima* L.**; *SPL.183; FBI. 4: 238; FUGP. 2: 5; FID. 271; FD.241; FPP. 185; FH.149.*

An erect, branched, diffuse, annual herb, stem slightly hairy. Leaves petiolate, entire, sparsely hairy, acuminate. Flowers pedicellate, solitary. calyx campanulate, acute, lobed. Corolla yellowish, not spotted, shortly lobed. Stamens filliform, filaments adnate to corolla tube, anthers yellow. Ovary smooth, superior, oblique, style glabrous. Fruit globose berry with persistent calyx. Seeds reniform, orange-yellow in color.

Common Name:-Rasbhari, Tulatipati

Flowering and Fruiting:- August – December

Ethnobotanical Uses:

- Used as tonic, diuretic and purgative.
- Leaf juice is used in case of ear ache.
- Fruits and leaves are edible.
- Fruits are also used in colic complaints.

***Physalis angulata* L.**; *SPL.183;FBI. 4: 238, 1883; FH. 149.*

A branched, erect, annual herb, up to 50 cm tall. Stem angular, much-branched. Leaves simple, entire, petiolate, acuminate. Flowers solitary, axillary. Calyx campanulate, 5-lobed, lanceolate. Corolla yellow, spotted with brownish-black dots. Stamens 5, unequal, anthers bluish, oblong. Ovary superior, oblique, style linear. Fruit ellipsoid barriers, enclosed in a balloon-like calyx. Seeds yellowish, many, reniform **(Plate-11).**

Common Name:- Bhambolan, Papotan

Flowering and Fruiting:- September - March

Ethnobotanical Uses:

- Fruits are edible.
- Leaves used in stomach ache.

***Solanum* L.**

Unarmed herbs.

Berries dull, numerous flowers on peduncle. *S. nigrum*

Herbs armed with prickles.

Undershrub, flowers purple. *S. surattense*

***Solanum nigrum* L.**; *FBI.4:229;FUGP.2:124; SPL.186.*

A highly branched, erect, difuse herb. Leaves long , ovate, lobed, dark green. Flowers white, small, drooping, pedicellate. Sepals 5, fused, cup shaped, persistent. Petals 5, campanulate. Stamens 5, filaments short. Fruit berry, yellow when young but black when mature, shiny, globose with many seeds **(Plate-11).**

Common Name:- Makoi

Flowering and Fruiting:- August –December

Ethnobotanical Uses:

- The plant used in fevers, diarrhoea and eye troubles.
- The herb decoction used as narcotic and antispasmodic.
- The leaf extract is taken orally to cure whooping cough.

Solanum surattense* Burm. *f.; *FD.245; FPP. 187; FBI. 4 : 236; FUGP.2: 125; SPL. 187; FH.,* 150.

A highly branched, prickly, pubescent, diffuse, sub erect, perennial undershrub. Stem zig-zag, armed with yellow, straight, shiny prickles. Leaves ovate-elliptic, oblong, petiole short, midrib and lateral vein prominent, prickly. Inflorescence cyme. Flower pedicellate, actinomorphic, purple. Calyx tubular, pubescent, prickly. Corolla bluish purple, lobed, pubescent outside. Stamens smooth, anther yellow. Fruit berry, white when young, yellow on maturity, pubescent at base, ovoid with accrescent calyx. Seeds pale brown.

Common Name.-: Kantakeri

Flowering and Fruiting:- Almost throughout year

Ethnobotanical Uses :

- Leaves decoction is used for rheumatism.
- Fruit is used for treating cough and tooth ache.
- Decoction of the whole plant is useful in jaundice and liver disorder.
- Herb is useful in dengue fever, and fever accompanied by chest pain.

***Withania* Pauq.**

***Withania somnifera* (L.) Dunal *in* DC.**; *FBI. 4: 239; FUGP. 2: 6; FF. 372; FID.278; FD.241; FH. 150 SPL.182.*

An erect, highly branched, perennial undershrub upto 100 cm tall. Stem erect, stout, densely clothed with stellate hairs. Leaves petiolate, entire, obovate, acute, adaxial smooth, abaxial pubescent, midrib prominent. Inflorescence umbellate cyme. Flowers axillary, in cluster of 5, greenish yellow. Calyx long, densely tomentose. Corolla with 5 petals, hairy, lanceolate, acute. Stamens 5, filaments adnate to corolla tube at base, anthers ovate. Ovary superior. Fruit orange-red, smooth, round berries with enlarged, toothed, persistent calyx. Seeds wrinkled, light brown in color **(Plate-28).**

Common Name:- Ashwgandha, Asgandh

Flowering and Fruiting:- Throughout the year

Ethnobotanical Uses:

- Powdered roots are employed to improve sexual power.
- Leaf decoction is used to cure painful swelling.
- Root powder is used to get relief in inflammation.
- Root paste is applied to cure rheumatism, ulcers, fever and cough.

Scrophulariaceae

Phyllotaxy alternate.	*Verbascum*
Phyllotaxy opposite.	
Corolla not spurred, capsule dehiscence through valves.	
Corolla bilabiate.	
Stamens 4, all fertile.	
Anthers divaricate.	*Mazus*
Anthers not divaricate.	
Flower solitary, leaves succulent.	*Bacopa*
Inflorescence spike, leaves non-succulent.	
Spike not interrupted, flowers orange.	*Lindenbergia*
Interrupted spike, flowers white.	*Striga*
Corolla not bilabiate.	
Stamens 4, capsule septicidal.	*Scoparia*
Stamens 2. capsule loculicidal.	*Veronica*

Bacopa Aubl.

***Bacopa monnieri* (L.) Wettst.**; *FD.253; FPP.189; FH.15; FUGP. 2:17.*

A succulent, creeping, perennial herb. Roots arising from node. Leaves opposite deccusate, succulent, sessile, entire, obovate-oblong. Flowers borne in axil of leaves, pedicellate, purplish-white with blue veins. Sepals 5, unequal, lobed. Petals 5, puplish-white, fused, corolla tube longer than calyx tube, spotted with shining dots. Stamens 4, anthers bluish-purple. Stigma bilobed. Fruit smooth, ovoid capsule with persistent calyx. Seeds numerous, reticulate, oblong.

Common Name:- Jalneem, Brahmi

Flowering and Fruiting:- April – September

Ethnobotanical Uses:

- The plant extract is an important nerve tonic.
- It is an important medicine for epilepsy.
- Also used in bronchitis, asthma and diarrhoea.

Lindenbergia Lehm.

Plant annual, calyx segments round. *L. indica*

Plant perennials, calyx segments acute. *L.macrostachya*

***Lindenbergia Indica*(L.) Vatke Kuntze**; *FD.252; FPP.190; FH. 152; FBI.4:262; FUGP. 2: 33.*

A branched, annual herb, densely clothed with glandular hairs, about 10-20 cm tall. Stem branches tufted. Leaves opposite, petiolated, elliptic ovate, serrate-dentate, rounded base, apex acute. Inflorescence spike or raceme. Flowers axillary with short pedicel, orange in color. Calyx lobed, obtuse. Corolla bi- lipped, orange with reddish purple dots, pubescent outside. Ovary hairy. Fruit oblong, pubescent capsule with seeds many, minute, ellipsoid seeds.

Common Name:- Gazdar, Pili-Buti

Flowering and Fruiting:- October – February

Ethnobotanical Uses:

- Juice given in chronic bronchitis.
- It is also used for treatment of skin disorders.

***Lindenbergia macrostachya* (Benth.)Benth.**; *FBI. 4:262; FUGP. 2:33;FH.153.*

An erect, glabrous, perennial undershrub upto 60- 100 cm tall. Leaves long, entire, petiole short, ovate, serrate-dentate. Inflorescence spike. Flowers small, yellow, bracteate. Calyx lobed, longer than bracts, acute. Corolla bi-lipped, upper one tri-lobed, lower bi-lobed, recurved. Stigma bilobed. Fruit lanceolate, hairy capsule with persistent calyx.

Common Name:- Pili-Buti

Flowering and Fruiting:- March –May

- Plant juice is recommended in bronchitis, fevers and swellings.
- Leaf paste is applied in snake bite.

Mazus Lour.

***Mazus pumilus* (Burm. f.) Steenis**; *FPP. 191; FH. 154; FUGP. 2: 19;FD.252.*

Annual, small, glabrous, prostrate herb upto 10 cm tall. Leaves rosette at base, petiolate, ovate, round at apex, cuneate at base, sapthulate. Inflorescence racemose. Flower purpulish white. Calyx lobed, campanulate, persistent. Corolla bi-lipped. Fruit sub-globose capsule with many, small, pale seeds **(Plate-12).**

Common Name:- Japani Majus

Flowering and Fruiting:- November – March

Ethnobotanical Uses:

- Infusion given as a tonic, aperients and febrifuge.

Scoparia L.

***Scoparia dulcis* L.**; *SPL.116; FBI. 4: 289; FUGP. 2: 27; FPP. 191; FH.154.*

A highly branched, ascending, ribbed, small sized, leafy undershrub about 20- 30 cm tall. Leaves short petioled, opposite, rhomboid, elliptic, obtuse, base tapering, serrate margin. Inflorescence panicle. Flowers terminal, white, pedicelled. Sepals 4, lobed, tubular, white. Stamens 4. Fruit globose capsule. Seeds numerous, minute, reticulate **(Plate-12).**

Common Name:- Mithi Patti, Sweet Broom Weed

Flowering and Fruiting:- December – March

Ethnobotanical Uses:

- Stem and leaves useful in anaemia and diabetes mellitus.

- Leaf infusion used in fever, toothache and bronchitis.
- Plant decoction is recommended for kidney related disorders.

Striga Lour.

***Striga angustifolia* (D. Don.) C.J. Sald.**; *FPP. 192; FH.154; FBI.4:299. FUGP. 2:31; FD.251.*

Annual, branched, erect herb about 15-25 cm tall. Leaves linear, sessile, scabrous, acuminate. Inflorescence interrupted spike. Flower single, sessile, axillary, white. Calyx campanulate, scabrous, acute, lobed, each lobe with 3 ribs, one extending upto apex, other two at lateral side. Corolla bi-lipped, upper lip shorter than lower, white, tubular, upper surface hairy. Fruit ellipsoid-oblong capsule.

Flowering and Fruiting:- September –December

Ethnobotanical Uses:

- Whole plant is used to treat intestinal parasites.
- Root paste is applied in skin diseases.
- It is also used to improve taste and appetite.

Verbascum L.

***Verbascum chinensis* (L.) Santapau**; *FD.249; FPP. 192; FH. 154; FBI. 4: 251. FUGP. 2: 15.*

An erect, tomentose, branched, annual herb about 25-35 cm tall. Stem angular, branched near apex. Radical leaves petiolate, pinnatisect, lobed, terminal lobe large. Cauline leaves sessile, small, cordate, dentate, pubescent. Inflorescence raceme. Flowers sessile, yellow, terminal, bracteate. Calyx small, segmented, segments oblong-linear. Corolla yellow, pubescent, filaments covered with purple hairs. Fruit sub-globose, smooth capsule. Seeds oblong.

Common Name:- Gadar-Tamakhu

Flowering and Fruiting:- December – June

Ethnobotanical Uses:

- Plant juice is used as febrifuge, and for skin eruptions.
- Leaf juice is useful in treatment of diarrhoea.

Veronica L.

***Veronica anagallis-aquatica* L.**, *FD.255; FPP. 193; FH. 154; SPL.12; FBI. 4: 293; FUGP. 2:28.*

A succulent, glandular, glabrous, erect, annual herb about 10-40 cm tall with branched, hollow stem. Leaves sessile, lanceolate, amplexicaul base, dentate margin. Inflorescence raceme. Flowers white, axillary, pedicellate. Calyx segmented, segments ovate. Corolla white. Fruit compressed, smooth capsule with many convex seeds.

Common Name:- Titlokia

Flowering and Fruiting:- December – April

Ethnobotanical Uses:

- Leaves are used as salad.
- Roots are used in the preparation of gargles.

Bignoniaceae

Leaves simple. *Tecomella*

Leaves pinnately compound. *Kigellia*

Kigellia DC.

***Kigellia africana* (Lam.) Benth.**; *FFP. 380; FD.258.*

A medium sized, highly branched, evergreen tree with round canopy. Leaves pinnately compound, leaflets odd in number,obovate, oblong. Inflorescence lax raceme. Flowers hanging, scarlet-red with yellowstripes. Fruit gourd shaped woody capsule, hanging downward with cord-like stalk.

Common Name :- Balam Khira

Flowering and Fruiting :- April – August

Ethnobotanical Uses:

- Powdered fruit is used for digestive purposes.
- Bark paste is applied for skin diseases.
- Decoction of bark is given in treatment of diarrhoea.

Tecomella Seem.

***Tecomella undulata* (Sm.) Seem.**; *FUGP. 2:171; FID.26 (2):551, 1919; FD.257.*

A profusely branched, medium sized, drooping tree clothed with minute hairs. Leaves opposite, simple, oblong, undulating, prominent midrib at base. Inflorescence cymes

arranged in acropetal manner. Flower pedicellate, bisexual. Calyx campanulate, lobes broad, ovate, orange- yellow with black dots. Corolla yellow, lobes almost equal-sized. Stamens exerted, filaments long. Ovary bicarpellary, situated on yellow disc, stigma bi-lamillate, style long, glabrous. Fruit smooth, curved capsule. Seeds winged.

Common Name:- Rohida

Flowering and Fruiting:- January – April

Ethnobotanical Uses:

- Foliage of the plant provide good fodder for grazing animals.
- Flowers are useful in jaundice and liver disorders.
- Wood is useful for furniture making.
- Bark decoction iis used for tuberculosis, rheumatism, syphilis and cancer.

Pedaliaceae

Fruit indehiscent, quadrangular, spine at each angle.	*Pedalium*
Fruits dehiscent, oblong, compressed, non-spiny.	*Sesamum*

Pedalium L.

***Pedalium murex* L.**; *FBI. 4:386, 1884; FD.263; FPP., 197; FID. 293.*

A sub-prostrate, spreading, diffuse, succulent, annual herb. Stem highly branched with glandular protuberances. Leaves opposite, succulent, ovate, apex truncate, petiole glandular. Flowers solitary, axillary, yellow. Calyx minutely scaly outside. Corolla lobes connate, obtuse. Ovary minutely papillose. Fruit pyramidal, quadrangular capsule with spine at each angle. Seeds pendulous.

Common Name:- Vilayti Gokhru

Flowering and Fruiting:- August – December

Ethnobotanical Uses :

- Sap of fresh leaves with water is used to treat gonorrhoea and dysuria.
- It is also used in calculi and burning micturition.

Sesamum L.

***Sesamum indicum* L.**; *SPL.634; FBI. 4: 387; FUGP.2: 175; FD.262; FPP. 197.*

An erect, annual herb up to 30-60 cm tall. Stem branched, minutely pubescent, tetra-angular. Leaves opposite, variable, linear-oblong, margins serrate, round apex, sparsely

pubescent. Inflorescence raceme. Flowers axillary, 1-3 per cluster. Calyx lobed, pubescent, persistent. Corolla purplish-pink or white. Ovary compressed. Fruit compressed, tetra-angular, grooved capsule. Seeds smooth, black in color.

Common Name:- Til

Flowering and Fruiting: August – November

Ethnobotanical Uses:

- 'Til oil' is extracted from seeds used for various purposes.
- Leaves are given in cholera and dysentery.
- Seed-oil is used for massage on leucoderma and for healthy hair growth.

Acanthaceae

Flowers in dense spike.

Corolla distinctly bi-lipped. *Justicia*

Corolla not bilipped. *Barleria*

Flowers in axillary cluster .

Flowers in lax axillary cymes. *Ruellia*

Barleria L.

***Barleria prionitis* L.**; *SPL.636; FBI. 4: 482; FUGP. 2: 69; FFP. 379; FD.274; FPP. 200; FH. 159; FID.297.*

A diffuse, glabrous, prickly, perennial undershrub about 1 m high. Stem highly branched, tetragonous. Leaves petiolate, elliptic, acuminate, tapering as a bristle, pubescent. Inflorescence spike. Flowers sessile, bracteate, bracteolate. Calyx glandular, pubescent, bi-segmented, outer longer, inner lanceolate. Corolla bi-lipped, upper lip 4 lobed, lower one unilobed, orange-yellow. Stamens 4, 2 fertile, 2 staminode with hairy filaments. Ovary smooth, stigma orange. Fruit ellipsoid, beaked capsule with 2 hairy Seeds **(Plate-12).**

Common Name:- Vajradanti

Flowering and Fruiting:- October –February

Ethnobotanical Uses:

- Raw leave are chewed to get relief in tooth ache.
- Leaf ash is used with honey for cough.
- Leaves paste is useful in boils and cracked heel.

Justicia L.

Flower white-pink. *J.adhatoda*

Flower pale-violet. *J.procumbens*

***Justicia adhatoda* L.**; *FUGP. 2: 76: FPP. 198; FH. 159; FBI. 4:540; FFP.388; FF. 390; FD.271.*

An evergreen, diffuse, branched, perennial shrub about 10-25 cm tall. Stem branched, branches ascending, internodes short, bark yellowish. Leaves opposite, lanceolate, acuminate, covered with minute hairs, abaxial dark green, adaxial pale-green. Inflorescence spike. Flowers white pink, shortly pedicelled, bracteate, bracts smooth, elliptic. Calyx penta-lobed,acute, minutely hairy. Corolla pubescent, campanulate, whitish-pink. Ovary and style pubescent. Fruit hairy, club shaped capsule with 4 wrinkled Seeds.

Common Name:- Bansa

Flowering and Fruiting:- November – July

Ethnobotanical Uses:

- Leaf ash is used for treatment of cough.
- Leaf juice used to treat dysentery, diarrhoea and tumours.

***Justicia procumbens* L.**; *SPL.15; FBI. 4:539; FID. 304.*

An erect, diffuse, divaricately branched, annual shrub about 30 cm tall. Stem quadrangular, pubescent. Leaves opposite, elliptic-lanceolate, ciliate margins. Inflorescence terminal spike. Flowers bracteate. Calyx unequally segmented. Corolla bi-lipped, upper lip longer, bi-lobed, lower one 3-lobed, pale-violet. Fruit oblong-pointed apex, pubescent capsule with tuberculate, brown seeds.

Common Name:- Makhania Ghas

Flowering and Fruiting:- July – October

Ethnobotanical Uses:

- Leaves juice is squeezed into the eyes for treatment of ophthalmia.
- It is also used as laxative, anthelmintic, diuretic and febrifuge.
- Plant infusion used in asthma, cough, rheumatism and liver disorders.

***Ruellia* L.**

Shrub, flowers bluish-violet, 2 in axil. *R. tuberosa*

Herb, flowers pale-violet, solitary or 3in axil. *R. prostrata*

***Ruellia prostrata* Poir.**; *FBI. 4: 411; FD.273; FPP. 201; FUGP.2:57.*

A perennial, straggling, branched herb upto 50 cm long. Stem branches purple tinged with long internodes, pubescent at nodes. Leaves ovate, entire, adaxial dark green, abaxial pale, minutely pubescent. Flowers solitary, sessile, bracteate, bracteolate, violet in color. Calyx with 5 sepals, lobes linear-subulate, acute, pubescent. Corolla greyish-purple, hairy, funnel-shaped. Fruit club shaped, hairy capsule with 16-20 hygroscopic seeds.

Flowering and Fruiting:- October – April

Plant decoction is used in fever, cough, indigestion and liver disorders.

***Ruellia tuberosa* L.**; *SPL.635; FUGP. 2: 59; FD.272; FPP. 205; FH.164.*

A perennial, erect, branched shrub with tetra-angular branches, root tuberous, numerous. Stem stout, nodes swollen. Leaves with long petiole, narrow at base, acute apex, entire. Inflorescence dichasial cyme. Flower axillary, paired, bracteate, bracteolate. Calyx lobed, lobes equal. Corolla tubular, penta-lobed. Fruit beaked capsule. Seeds minute, black in color.

Flowering and Fruiting:- Throughout the year

Ethnobotanical Uses:

- Used as anti-diabetic, analgesic and gastric tonic.
- Also useful in treatment of gonorrhea.

Verbenaceae

Inflorescene spike, centripetal arrangement of flowers.

Peduncle elongated. *Verbena*

Peduncle short.

Erect shrubs or undershrubs, drupes fleshy. *Lantana*

Inflorescene cymose, centrifugal arrangement of flowers.

Flowers actinomorphic, stamens of equal length. *Tectona*

Flowers zygomorphic, stamens didynamous. *Clerodendrum*

***Clerodendrum*L.**

Phyllotaxy whorled, corolla tube short. *C. indicum*

Phyllotaxy opposite, corolla tube longer. *C. phlomoides*

***Clerodendrum indicum* (L.) Kuntze.**; *FD.284; FPP. 207; FH. 166; SPL.109; FUGP. 2: 93; FFP. 399; FID. 309.*

A profusely branched, glabrous, perennial shrub upto 2 m tall. Stem branches hollow, furrowed. Phyllotaxy whorled, leaves simple, subsessile, lanceolate, entire, acute apex. Inflorescence panicle. Flowers pedicellate, white, bracteate, bracts linear-lanceolate. Calyx penta-lobed, lobes oblong, acute. Corolla smooth, gamopetalous forming a long tube, white to yellow. Fruit bluish-green drupe with acrescent calyx.

Common Name:- Bharangi

Flowering and Fruiting:- August – December

Ethnobotanical Uses:

- Resin obtained from plant is useful in rheumatism.
- Root are used in treatment of asthma and cough.
- Leaves are used as vermifuge and anti- inflammatory.

***Clerodendrum phlomoides* Hort. Ital. *ex* D.C.**; *FBI. 4: 590; FH. 166; FFP. 396; FD. 283; FPP. 208.*

A highly branched, perennial shrub about 2-3 m tall. Stem tetra-angular, greyish-white, branches covered with whitish hairs, lenticelled. Leaves opposite, petiolate, petiole hairy, ovate, entire, undulate, abaxial smooth, adaxial hairy, acute apex. Inflorescence axillary dichasial cyme. Flower pedicellate, white, fragrant, bracteates, bracts lanceolate. Calyx campanulate, persistent, smooth, ovate, acuminate. Corolla gamopetalous, forming a glandular tube, hairy outside. Fruit ovoid, black colored with accrescent calyx **(Plate-12).**

Common Name:- Arni

Flowering and Fruiting:- October – January

Ethnobotanical Uses:

- Plants eaten as fodder by goats.
- Leaves are given to cattle to treat diarrhoea.

***Lantana* L.**

Spinous plant, flowers red, orange or yellow. *L. camara*

Non-spinous plant, flowers white. *L. indica*

***Lantana camara* L.. var. *aculeata* (L.) Moldenke**; *FD.277;FPP. 209; FH.166; FUGP. 2: 84; FF. 392.*

A prickly, evergreen, aromatic, straggling, branched, perennial shrub about 1-2m tall. Stem branches armed with minute recurved prickles. Leaves opposite, petiolate, ovate-lanceolate, serrate, acute apex. Inflorescence capitate spike. Flowers pedicellate, orange-yellow or pink colored, bracteate, bracts longer than calyx. Sepals small, hairy, membranous. Petals fused, penta-lobed, tubular. Stamens 4, didynamous, anthers yellow. Fruit single seeded, blackish-brown drupe **(Plate-13).**

Common Name:- Panchrangia

Flowering and Fruiting:- Throughout the year

Ethnobotanical Uses:

- Young twigs are used as tooth brushes.
- Plant decoction is used as antidote for snake bite.
- Decoction of root is employed as mouthwash in tooth ache.

***Lantana indica* Roxb.**; *FBI. 4:562; FUGP. 2:216; FFP. 396; FD.277; FPP.209.*

An erect, straggling, pubescent, shrub about 1m tall. Stem quadrangular. Leaves opposite, simple, dentate. Inflorescence capitate head. Flower sessile, axillary, fragrant, white. Calyx papery, persistent, truncate. Corolla white, tetra-lobed, tubular. Fruit drupe with acrescent calyx, purple in color.

Common Name:- Tulsidal

Flowering and Fruiting :- September - January

Ethnobotanical Uses:

- The Fruits are eaten raw.

Tectona L.

***Tectona grandis* L.**; *FUGP. 2: 87; FFP. 401; FF. 394; FD.280; FPP. 210.*

A bulky deciduous, tomentose, perennial tree about 40-45 m tall. Stem branches quadrangular, bark brown. Leaves opposite, large, elliptic-ovate, acute apex, adaxial rough, abaxial pubescent, hairs yellowish grey. Inflorescence multichasial cymose.

Flowers numerous, creamish, bracteates, bracts acute. Calyx campanulate, persistent, lobed. Corolla white, smooth, tubular. Fruit pubescent, sub-globose drupe. Seeds 1-4, ovoid in shape **(Plate-13).**

Common Name:- Sagwan, Sagaun

Flowering and Fruiting:- June – January

Ethnobotanical Uses:

- Flowers used in treatment of bronchitis.
- Leaves are used for wrapping.
- Root-bark is used for colouring mats.
- The wood is very durable and widely used in furniture manufacturing.

Verbena L.

***Verbena bonariensis* L.**; *SPL.29; FBI. 4: 463; FH. 167.*

An erect, slender, branched, pubescent, perennial herb about 1-2m tall. Stem tetra-angular, clothed with hairs. Leaves opposite, semi-amplexicaul, sessile, lanceolate, dentate margin, acute apex. Inflorescence cymose to form a terminal spike. Flowers sessile, redish-purple, bracteate, bracts lanceolate, acuminate. Calyx lobes unequal, acrescent. Corolla gamopetalous, obliquely penta lobed, purplish. Fruit cluster of 4 pyrenes, covered with persistent calyx **(Plate-13).**

Flowering and Fruiting:- April – October

Ethnobotanical Uses:

- Plant is used against fever and ulcers.

Lamiaceae

Calyx equally dentate or lobed.

Corolla distinctly 2-lipped. *Anisomeles*

Calyx unequally dentate or bi-lipped.

Fertile stamens 2. *Salvia*

Fertile stamens 4.

Scented shrub, calyx less than 5-lobed. *Ocimum*

Non-scented herb, calyx more than 5-lobed. *Leucas*

Anisomeles R. Br.

***Anisomeles indica* (L.) Kuntze**; *FD.289; FPP. 211; FH. 171; SPL.571; FBI. 4:672; FUGP. 2: 109.*

A highly branched, pubescent, annual herb or undershrub, about 1-2m tall. Stem tetra-angular, bark greyish-green. Leaves opposite, simple, entire, ovate, acute, dentate, petiole densely hairy. Inflorescence clustered spike. Flowers axillary, dark purplish-pink, bracteate, bracts linear, pubescent. Calyx sub-sessile, lanceolate, dentate, persistent. Corolla gamopetalous, bi-lipped, upper lip purplish, round, lower one dark purple, longer than upper one, bilobed. Fruit 4 nutlets, glabrous, shining, black in color.

Common Name:- Parpata, Kala bhangra

Flowering and Fruiting:- August – December

Ethnobotanical Uses:

- Root paste is applied onrheumatism.
- It is used as an astringent and carminative.
- Seed oil is used to cure uterine infections.
- Plant ash mixed with coconut oil and applied to remove dandruff.

***Leucas* R. Br.**

***Leucas cephalotes* (Roth) Spreng.**; *FBI. 4: 689; FUGP. 2: 114; FD.289; FPP. 213; FH. 171.*

An aromatic, robust,pubescent, erect, branched herb up to 1 m tall. Stem and branches angular. Leaves opposite, entire, lanceolate, serrate, petiolate, membranous, abaxial and adaxial pubescent. Flowers white, bracteate, bracts several, foliaceous, acute, awned, ciliate. Clayx gamosepalous, forming a tube, curved, mouth oblique, toothed, hairy. Corolla bilipped, upper lip longer than lower, anthers yellow. Fruit nutlet, glabrous, oblong-obovoid, dark brown in color.

Common Name:- Goma

Flowering and Fruiting:- June – November

Ethnobotanical Uses:

- Used as stimulant, laxative and anthelmintic.
- Juice of root is given in rheumatism.
- Juice of flowers is given in coughs, colds and jaundice.
- Seeds yield an oil, used as an illuminant.

***Ocimum* L.**

Calyx pubescent, seeds mucilaginous upon wetting.

Flower white. *O. americanum*

Flower white-purple. *O. basilicum*

***Ocimum americanum* L.**; *FD.286; FBI. 4: 607; FUGP. 2: 99; FPP. 215.*

An erect, aromatic, pubescent, highly branched, annual herb about 20-60 cm tall. Stem branches tetra-angular. Leaves opposite, petiolate, ovate-lanceolate, entire, glandular, fragrant. Inflorescence verticillaster. Flowers purplish-white, sub-sessile, bracteate, bracts lanceolate, ciliate. Calyx hairy, bilipped, lower one toothed, upper one round. Corolla purplish-white, bilabiate, upper lip toothed, lower lip obtuse. Stamens 4, didynamous, anthers yellow, filaments long. Fruit ellipsoid, punctuate, black, colored nutlets **(Plate-13).**

Common Name:- Rama Tulsi

Flowering and Fruiting:- Throughout the year

Ethnobotanical Uses:

- The leaves mixed with the tea are used in fever.
- Seed decoction in potash water is used as coolant in fever.
- Seed powder is used in case of leucoderma and other skin diseases.
- Fragrant leaves used in sauces and soups.

***Ocimum basilicum* L.**; *SPL.597; FBI. 4: 608; FUGP. 2: 99; FD.286;*

An aromatic, erect, smooth, perennial herb about 70-100 cm tall. Stem branches purplish-green, glabrous. Leaves opposite, long, lanceolate, entire, apex acute, oil gland dotted. Inflorescence verticillaster. Flower small, deciduous, whitish-pink, bracteate, bracts ovate, deciduous, acute. Calyx campanulate, persistent, biliped. Corolla pinkish-white, bilabiate, lower lip unlobed, upper one tetra-lobed, smooth. Stamens exserted, dehiscence longitudinal. Fruit ellipsoid, black nutlets.

Common Name:- Sweet basil, Jangli Tulsi

Flowering and Fruiting:- Throughout the year

Ethnobotanical Uses:

- Leaves yield a volatile oil, used as a flavouring agent and perfume.
- Leaf along with honey is used as decoction to cure cold, cough and fever.
- It is used as a flavoring for confectionary, sauces, pickles and beverages.
- Leaves juice used as a nasal douche and for ringworm.

- Plant considered stomachic, antipyretic, expectorant and stimulant.

Salvia L.

***Salvia plebeia* R. Br.**; *FBI. 4: 655; FUGP. 2: 256; FD.288; FPP. 216; FH. 174.*

An annual, hairy, branched herb. Stem obtusely tetra-angular, grooved. Leaves opposite, lanceolate, acute or obtuse. Inflorescence panicle. Flowers bisexual, bracteate, bracts reflexed. Calyx bilipped, campanulate, persistent. Corolla white, bilabiate. Fruit ellipsoid, brown colored nutlet **(Plate-14).**

Common Name:- Sathi

Flowering and Fruiting:- September – March

Ethnobotanical Uses:

- Plant used as diuretic, astringent and anthelmintic.
- Leaves are used in tooth ache.
- Seeds used for treatment of diarrhoea, leucorrhea and haemorrhoids.

Nyctaginaceae

Climbers, flower without involucres.	*Boerhavia*
Erect herbs ,involucres present.	*Mirabilis*

Boerhavia L.

Perennial herb or shrub.	
Leaves almost equal, flowers pedicellate, inflorescence umbel.	*B. chinensis*
Leaves unequal paired, flowers sessile, inflorescence head.	*B. diffusa*
Annual herb.	
Fruit sticky when wet, conical in shape.	*B.erecta*
Fruit non-sticky, club shaped.	*B. plumbaginea*

***Boerhavia chinensis* (L.) Rottb.**; *FH. 175; FBI. 4: 709; FUGP. 2: 128.*

A straggling, smooth, robust shrub. Leaves opposite, paired, triangular, acuminate, ovate, base cordate, adaxial smooth, abaxial hairy. Inflorescence umbel. Flower pinkish, bracteolate, lanceolate, perianth lobed. Stamen 4-5, exserted. Fruit club-shaped, glandular.

Common Name:- Punarnava

Flowering and Fruiting:- Throughout the year

Ethnobotanical Uses:

- Plant used to cure jaundice.
- Root paste is applied on swellings, boils and rheumatism.
- Decoction of root is given in bronchitis, sore throat and general debility.

***Boerhavia diffusa* L.**; *SPL.3: FUGP. 2: 127; FD.292; FPP. 218; FH. 176.*

A diffuse, highly branched, spreading, perennial herb. Stem branches swollen at nodes, smooth. Leaves petiolate, unequally paired, ovate, cordate at base, abaxial whitish smooth. Inflorescence panicle. Flower pedicellate, pinkish-white, axillary, bracteate, bracts lanceolate. Perianth campanulate, glandular, pubescent. Stamens 3-5, exserted. Stigma capitate. Fruit obovoid, clavate with 5 seeds. **(Plate-14).**

Common Name:- Santhi, Punarnava

Flowering and Fruiting:- Throughout the year

Ethnobotanical Uses:

- Root paste is used to cure boils and dropsy.
- Root paste is applied on pubic area for easy delivery.
- Leaf juice is used in treatment of jaundice.

***Boerhavia erecta* L.**; *SPL.3.*

An annual, decumbent, highly branched, glabrous herb. Stem sticky, thick at nodes. Leaves simple, linear-oblong, entire. Inflorescence umbel-like cluster. Flower axillary, pedicellate, bracteolate, bracteoles deciduous, perianth penta-lobed, campanulate, pinkish-white. Stigma peltate. Fruit conical, penta-ribbed, sticky when wet. Seed single.

Common Name:- Shweta

Flowering and Fruiting:- August – November

Ethnobotanical Uses:

- Leaves are used as vegetable and in soups.

***Boerhavia plumbaginea* Cav.**; *FID. 318; FBI. 4:710; FUGP. 3:3.*

A highly branched, smooth, decumbent, annual herb. Stem glabrous. Leaves opposite, thick, ovate with cordate base, mucronate. Flower axillary, bracteolate, deciduous. Perianth campanulate, lobed. Fruit club shaped, glandular.

Common Name:- Satha

Flowering and Fruiting:- August – November

- Root decoction is used for treatment of asthma and bronchitis.

Mirabilis L.

***Mirabilis jalapa* L.**; *SPL.177; FUGP.2:129; FF. 410; FD.292; FPP. 219.*

An erect, highly branched, perennial shrub. Stem fleshy, smooth, nodes swollen. Leaves petiolate, ovate, base cordate. Flowers redish-pink or variegated. Calyx gamosepalous, forming involucres. Corolla tubular, elongated. Stamens 5. Fruit velvety, single seeded **(Plate-14).**

Common Name:- Gulabas, Sukhdarshan

Flowering and Fruiting:- August – November

Ethnobotanical Uses:

- It is grown for ornamental purpose.
- Paste of leaves applied on boils, wounds and swellings.

Amaranthaceae

Phyllotaxy alternate.	
Staminodes present.	*Aerva*
Staminodes absent.	
Inflorescence terminal spikes, ovules 2 or more.	*Celosia*
Inflorescence axillary panicle or spike, ovule single.	
Flowers bisexual, pink.	*Digera*
Flowers unisexual or polygamous.	*Amaranthus*
Phyllotaxy opposite or whorled.	
Anthers single celled.	
Inflorescence terminal spike, stigma bifid.	*Gomphrena*
Inflorescence head, stigma capitate.	*Alternanthera*
Anthers bi-celled.	
Inflorescence robust spike.	*Achyranthes*

Achyranthes L.

Leaves tip pointed.	*A. aspera* var. *argentea*
Leaves tip rounded.	*A. aspera* var.*porphyristachya*

***Achyranthes aspera* var.*argentea*L.**; *SPL.204; FBI. 4: 730; FUGP. 2:140; FF. 413; FD.299; FPP. 220; FH. 176.*

A straggling, branched, perennial herb about 1.5 m tall. Stem angular, pubescent, woody at base. Leaves opposite, petiolate, entire, simple, smooth, acute apex. Inflorescence robust spike. Flower axillary, terminal, greenish-white, bracteate, bracts membranous, bracteoles spiny. Perianth pointed, spiny, persistent. Stamens 5, psuedostaminode alternateing. Utricle oblong, seeds many, reddish-brown **(Plate-9).**

Common Name:- Chirchita, Latjira

Flowering and Fruiting:- April – November

Ethnobotanical Uses:

- Whole plant used in treatment of diarrhea, cholera and dysentery.
- Decoction of leaves used in cough and abdominal pain.
- Root decoction mixed with garlic and ajwain is used to cure asthma.

***Achyranthes aspera* Linn. var. *porphyristachya* Hook.**; *SPL.204; FUGP.3: 18; FD. 299; FPP., 220; FID., 319;FH.,176.*

A pubescent, erect, branched,annual herb about 1 m high. Stem branches ascending, spreading at base. Leaves opposite, elliptic-ovate, acuminate, rounded at base, hairy midrib. Inflorescence peduncled spike. Flower axillary, clustered at top, bracteate, bracteolate. Perianth acuminate, margins white, pointed tip. Fruit urticle **(Plate-14).**

Common Name:- Chirchita

Flowering and Fruiting:- August - February

Ethnobotanical Uses:

- Seeds mixed with milk used as tonic.
- The plant is used as antidote against snake bite.
- Water extract of plant is used against pneumonia.

Aerva Forsk.

***Aerva javanica* (Burm. *f.*) Juss. &Schult.**; *FBI. 4: 727; FFP. 412;FD. 294; FPP. 221.*

An erect, highly branched, perennial herb, up to 1 m tall. Stem branches hairy, woody at base. Leaves alternate, small, sessile, linear, oblong, silvery lusture, acuminate. Inflorescence leafless panicles. Flower sessile, unisexual, bracteole transparent.

Staminate flower with perianth 5-lobed, elongated, pubescent on lower side. Pistillate flower with short perianth, stigma 2. Fruit ovoid utricle with black seeds.

Common Name:- Chaya

Flowering and Fruiting:- October - March

Ethnobotanical Uses:

- The roots are given in the treatment of headache and jaundice.
- Seeds are useful in rheumatism.
- Decoction of plant is given in calculi and burning micturition.

Alternanthera Forsk.

Terrestrial, annual herb.

Prickly heads, perianth with spiny tip. *A. pungens*

Non- prickly heads, perianth without spiny tip.

Leaves oblong-lanceolate, pseudostaminodes entire. *A. sessilis*

Leaves elliptic or obovate, pseudostaminodes toothed. *A. ficoidea*

***Alternanthera pungens* Kunth H.B.K.**; *FD.298; SFUGP.233; FPP., 222; FH.,178; SPL.205.*

A perennial, prostrate, spreading, pubescent herb. Stem branching zig-zag. Leaves opposite, sessile, entire, obtuse, base tapering. Inflorescence axillary spike. Perianth inconspicuous, tepals spinous when mature. Fruit spinous, ellipsoid utricle **(Plate-15).**

Common Name:- Kantewali Santhi

Flowering and Fruiting:- August – March

Ethnobotanical Uses :

- It is used as fodder plant.
- Its decoction is used in treatment of gonorrhoea.

***Alternanthera sessilis* (L.) R. Br. *ex* DC.**; *FBI. 4: 731; FUGP. 2: 142; FD.299; FPP. 221; FH.178; SPL. 225.*

A glabrous, annual, spreading herb rooting at nodes. Stem highly branched, polymorphic, branches greyish with purple tinge. Leaves with short petiole, glabrous and fleshy, linear, apex obtuse, tapering towards the base. Flowers small, sessile, axillary, white, bracteolate, arranged in sessile heads. Calyx ovate, acute, scarious. Ovary compressed. Fruit obcordate utricle with suborbicular seeds **(Plate-15).**

Common Name:- Ghardughi

Flowering and Fruiting:- Throughout the year

Ethnobotanical Uses:

- Leaf poultice is used for boils.
- Decoction of plant is given to nursing mother to increase the milk.

***Alternanthera ficoidea* (L.) Sm. P. Beauv.**; *FPP. 222; SPL.225.*

A procumbent, perennial herb, up to 40-80 cm high. Stem branched, moderately hairy above. Leaves ovate, apex acute, base narrowed with petiole, glabrescent above, hairy below. Flowers white, in axillary heads. Bracts and bracteoles white, membranous, mucronate. Tepals unequal, white, acute, outer 3 broad, hairy, inner 2 narrower. Stamens 5, fertile, alternating pseudostaminodes. Fruit obcordate, brown utricle.

Common Name:- Kusal

Flowering and Fruiting:- June – October

Ethnobotanical Uses:

- Leaves and shoots are edible and eaten raw as well as boiled.

***Amaranthus* L.**

Fruit indehiscent, leaf axil non-spiny.	*A. viridis*
Fruit dehiscent, leaf axil spiny.	*A. spinosus*

***Amaranthus spinosus* L.**, *SPL.991; FBI. 4: 718; FUGP. 2: 133; FPP. 223.*

An annual, erect herb armed with spines. Stem branches smooth, angular, grooved, reddish tinged. Leaves alternate, petiolate, ovate-lanceolate, apex acute, spines in axil of leaves, divaricate, straight, sharp. Inflorescence clustered spike. Flowers axillary, sessile, green, bracteate, unisexual. Staminate flower terminal, perianth penta-lobed. Pistillate flower with non bristled perianth. Fruit ovoid, compressed capsule. Seeds many, black in color.

Common Name:- Kantili Cholai

Flowering and Fruiting:- Throughout the year

Ethnobotanical Uses:

- Infusion of shoots used in eczema.

- Plant juice is useful in treatment of leprosy, bronchitis, piles and leucorrhoea.

***Amaranthus viridis* L.**; *SPL.2:1405; FBI.4: 720; FUGP.2:136; FPP.223; FD.297.*

An erect, ascending, highly branched, annual herb about 60 cm tall. Stem branches angular, glabrous, purple tinged. Leaves alternate, long petiolate, obtuse, base cuneate. Inflorescence spike. Flower axillary, unisexual, bracteate, bracts papery, smaller than perianth. Perianth persistent, spathulate in pistilate flower, membranous in staminate one. Fruit indehiscent, compressed utricle with accrescent perianth. Seeds black colored **(Plate-15).**

Common Name:- Jungli Cholai

Flowering and Fruiting:- May – December

Ethnobotanical Uses:

- Plant is considered as a good source of iron and act as appetizer.
- Leaves and tender shoots are used as vegetables.
- Whole plant is given to cure kidney stone.

Celosia L.

***Celosia argentea* L.**, *SPL.205; FBI. 4: 714; FUGP. 2: 131; FD.295; FPP. 224.*

A glabrous, branched, erect, annual herb about 1-1.5 m tall. Leaves alternate, subsessile, elongated, linear-lanceolate, acute. Inflorescence spike. Flowers pinkish, shiny white when young, bractaeate, persistent, bracteole lanceolate. Perianth concave, segmented. Fruit ellipsoid capsule with 4-8 seeds **(Plate-15).**

Common Name:- Makhmali, Safed Murge ka Phool

Flowering and Fruiting:- August – November

Ethnobotanical Uses:

- Flowers are used for the treatment of diarrhoea.
- Seeds are used to cure painful micturition and dysentry.

Digera Forsk.

***Digera muricata* (L.) Mart.**; *FPP. 224; FH. 179; FBI. 4: 717; FUGP. 2: 132.*

Annual, sparsely hairy, spreading herb about 40-60 cm high. Leaves alternate, petiolate, elliptic-lanceolate, acute, dentate, edges red tinged. Inflorescence spike. Flower rosy-pink, axillary, sessile, bracteate, bracteolate. Perianth pink, ovate- oblong, segmented, longer than bracts. Fruit compressed, globose nut, with persistent bracts and style base.

Common Name:- Lhasua, Kundra

Flowering and Fruiting:- December – July

Ethnobotanical Uses:

- The leaves and young shoot are locally used as a vegetable.
- Seeds and flowers prescribed for urinary discharges.
- Whole plant is also used as godder especially by sheep and goats.

Gomphrena L.

***Gomphrena celosioides* Mart.**; *FD.298; SFUGP.235; FPP. 225; FH. 179.*

A decumbent, perennial, erect, branched, pubescent herb. Leaves opposite, sub-sessile, elongated, elliptic, acute, abaxially coated with white hairs. Inflorescence terminal spike. Flowers sessile, white. Perianth lobed, lobes lanceolate, persistent. Stamens 5, stigma bilobed. Fruit capsule with accrescent perianth **(Plate-25).**

Common Name:- Kasia

Flowering and Fruiting:- Throughout the year

Ethnobotanical Uses:

- It is commonly cultivated in gardens.
- Plant used for treatment of malaria, jaundice, cough and diarrhoea.

Chenopodiaceae

Chenopodium L.

Herbs, without smell.

Leaf subentire, seeds glabrous, shining.	*C. album*
Leaf dentate, seeds rugose, dull black.	*C. murale*
Undershrub,strongly foetid-smelling.	*C. allanii*

***Chenopodium album* L.**, *SPL.219; FBI. 5: 3; FUGP. 2: 143; FID. 328; FPP. 227.* An erect, highly branched, annual herb, about 1 m tall. Stem branches angular, streaked with dark green-reddish lines. Leaves alternate, long petiolate, entire, elliptic-oblong, acute. Inflorescence clustered panicle. Flowers pentamerous, yellowish-green. Perianth with 5 tepals, connate, greenish-yellow. Stamens exserted. Stigma 2, ovary globose. Fruit urticle with persistent perianth. Seeds shining black in color **(Plate-16).**

Common Name:- Bathua

Flowering and Fruiting:- October – March

Ethnobotanical Uses:

- Leaves are used in treatment of urinary troubles and colic pain.
- Being rich in iron content, it is used as vegetable.
- The decoction of seeds is given to induce abortion in women.
- Green leaves and young shoots are used for making "Rayta".

***Chenopodium allanii* Aellen.**, *SPL.219; FF. 414; FF. 414; FD.301; FPP. 227.*

An erect, highly branched, foetid smelling, perennial pubescent herb, up to1.5 m tall. Stem ribbed, purple tinged. Leaves opposite, simple, petiolate, dentate, lanceolate, apex acute, gland dotted at base. Inflorescence terminal spike. Flower axillary, clustered, greenish-purple. Perianth green, persistent, 5-lobed. Stigma 3-5. Fruit single seeded utricle with brown colored seeds.

Common Name:- Sadbathua

Flowering and Fruiting:- Throughout the year

Ethnobotanical Uses:

- It is useful in treatment of roundworms, hookworms and intestinal infections.

***Chenopodium murale* L.**; *SPL.219;FBI. 5: 4; FUGP. 2:144;FD.302; FPP. 228.*

An erect, branched, glabrous herb about 50-60 cm high. Stem angular, branched, ribbed. Leaves opposite, petiolate, ovate-rhomboid, dentate, base cuneate, apex acute. Inflorescence racemose. Flowers sessile, green, irregular. Perianth with 5 tepals, ovate, obtuse, keeled at back. Stamens 5, caducous, anthers exserted. Ovary globose, stigma glandular. Fruit an utricle with accrescent calyx. Seeds black.

Common Name:- Jungli Bathua

Flowering and Fruiting:- December – March

Ethnobotanical Uses:

- Its shoot and leaves are commonly eaten as greens.
- The whole plant is used as fodder.

Polygonaceae

Persistent perianth devoid of appendages. *Polygonum*

Persistent perianth with appendages.

Unisexual flower, perianth recurved. *Rumex*

Polygonum L.

Polygonum plebeium* R. Br.; FBI. 5: 27; FUGP. 2: 149; FD.305; FPP. 231.*

A diffuse, prostrate, branched, annual herb about 35 cm tall. Stem branches spreading. Leaves opposite, sub-sessile, linear, oblong, with hyaline stipules. Flowers pink, sessile, axillary. Perianth with 5 tepals, persistent, segmented, outerside green, midrib red. Stamens 5-8, anthers pink. Gynoecium trigonous, stigma capitate. Fruit trigonous nutlets, shining, black colored.

Common Name:- Rani ka phool

Flowering and Fruiting:- October – March

Ethnobotanical Uses:

- Plant decoction is given in pneumonia and bowel complaints.
- Plant ash mixed with oil is applied on eczema, wounds and ulcers.

Rumex L.

***Rumex dentatus* L.**, *FBI. 5: 59; FUGP. 2: 158; FD.307; FPP. 231; FH. 182.*

An erect, glabrous, annual herb about 30-60 cm tall. Stem grooved, reddish tinged. Leaves oblong, smooth, cordate at base, petiolated. Inflorescence verticillate cluster. Flower pedicellate, green, actinomorphic. Perianth persistent, biseriate, inner segment broadly ovate, dentate, enlarged in fruit. Fruit trigonous or winged nutlets, brown in color.

Common Name:- Jangli Palak

Flowering and Fruiting:- December -May

Ethnobotanical Uses:

- Leaves used as a vegetable.
- Leaves are good source of vitamin A, C, calcium and beta carotene.
- Roots are useful in skin disorders.

Euphorbiaceae

Inflorescence cyathium. *Euphorbia*

Inflorescence not cyathium.

Leaves mottled with yellow or red spots. *Acalypha*

Leaves not mottled.

Leaves lobed or trifoliate.

Staminate perianth bi-seriate, tepals 10. *Jatropha*

Staminate perianth uni-seriate, tepals 4-5. *Ricinus*

Leaves neither lobed nor trifoliate.

Disk absent. *Putranjiva*

Disk present.

Flower bisexual, clustered 1-3 in leaf axil. *Phyllanthus*

Flower unisexual, arranged in terminal spike. *Croton*

Acalypha L.

***Acalypha indica* L.**, *SPL.1003; FBI. 5: 416; FUGP. 2: 209; FD.316; FPP. 233.*

An erect, branched, annual herb about 70-100 cm high. Stem angular, finely pubescent. Leaves alternate, simple, rhomboid-ovate, sub-acute, smooth, midrib hairy, long petiole, stipule minute, pilose. Inflorescence spike. Staminate flowers minute, at top of spike, ebracteate. Pistillate flower at base of spike. Sepals 3, triangular. Carpel 3, ovary deeply trilobed, style short. Fruit capsule with persistent bract. Seeds ovoid, pale-brown.

Common Name:- Kuppi

Flowering and Fruiting:- June – October

Ethnobotanical Uses:

- Leaf paste is very useful in snake bite.
- Leaves juice is applied on ringworm and rheumatic arthritis.
- Leaf juice is also used in treatment of skin problems.

Croton L.

***Croton bonplandianum* Baill.**; *SFUGP.243; FPP. 234; FH. 185; FFP. 459.*

A diffuse, erect, highly branched, perennial shrub. Stem branches ribbed, pubescent, hairs stellate. Leaves alternate, simple, ovate-lanceolate, base cordate, apex acute, gland dotted at base. Inflorescence terminal raceme. Flowers unisexual. Staminate flowers axillary, yellow, bracteate, stamens 15. Pistillate flower solitary, ovary pubescent, glandular at base. Fruit trigonous capsule with oblong seeds **(Plate-16).**

Common Name:- Jangli Jamal Ghota

Flowering and Fruiting:- November – May

Ethnobotanical Uses:

- It is commonly grown in garden.
- The stem juice is good medicine and used as an eye drop.
- Leaf decoction is employed to prevent dandruff .

Euphorbia **L.**

Decumbent or erect herbs, Involucral glands without appendages.

Stem dichotomously branched, Inflorescence cythium heads.

Capsule globose, pubescent. *E. hirta*

Prostrate herbs, Involucral glands covered with appendages.

Fruit pubescent along keels only. *E. prostrata*

Fruit pubescent throughout.

Seeds 5-6 furrowed. *E.thymifolia*

Seeds tetra-angular. *E. granulata*

Euphorbia hirta **L.**; *SPL.454; FUGP.2:187; FD.312; FPP. 237; FID.342.*

A decumbent, annual herb about 10-30 cm tall. Stem dichotomously branched, clothed with minute, curved hairs. Leaves opposite, petiolate, variable, lanceolate-ovate to rhomboid-oblong, pubescent on both surfaces, stipulate. Inflorescence cymose heads. Flowers axillary at a pair of leaves, involucres crowded, minute, cup-shaped, glands 4, subglobose. Fruit trigonous, globose capsule. Seeds tetra-angular, reddish **(Plate-16).**

Common Name:- Dudhi, Dudhibel

Flowering and Fruiting:- Throughout the year

Ethnobotanical Uses:

- Plant decoction used in bronchial infections.
- It is also used in diseases of genito-urinary tract.
- Latex is applied on ringworm, rheumatism and piles.
- Latex is also useful to treat wounds and lip cracks.

Euphorbia prostrata **Ait.**, *FBI. 5: 266; FID., 344; FD.313; FH. 187.*

A prostrate, highly branched annual herb about 20 cm tall. Stem highly branched, flattened at base, hairy at upper side. Leaves opposite, shortly petioled, oblong-obovate, dentate, stipules free above, deltoid at base. Inflorescence axillary raceme. Involucres

campanulate, pentalobed, appendaged glands 4. Capsule hairy at angles, glabrous at sides. Seeds reddish, tetra-angular.

Common Name:- Dudhi

Flowering and Fruiting:- Throughout the year

Ethnobotanical Uses:

- It posses high contents of flavonoids, phenolics and phenolic acids.
- It is recommended for treatment of bleeding hemorrhoids.

***Euphorbia thymifolia* L.**, *SPL.454; FBI. 5: 252; FUGP. 2: 188; FD.313.*

Annual, hispid, small herb. Stem divaricately branched. Leaves opposite, petiolate, elliptic-oblong, adaxial smooth, abaxial slightly pubescent, stipules caducous. Inflorescence cyathium. Involucres axillary, 2-3 per cluster. Glands minute, pink. Fruit long, hairy capsule. Seeds tetra-angular, 5-6 furrowed, reddish.

Common Name:- Lal Dudhi

Flowering and Fruiting:- June – December

Ethnobotanical Uses:

- Plant is very useful for treatment of ringworm.
- Its leaves are used to be applied on boils and wounds.

***Euphorbia granulata* Forssk.**; *FBI. 5: 252; FUGP. 2: 188; FID. 341; FPP.236.*

A highly branched, prostrate, annual herb about 15-20 cm tall. Stem branches spreading in all directions, brittle. Leaves opposite, minute, shortly petiolate, entire, apex round, stipulate, coriaceous. Inflorescence caythium. Flowers minute, white, axillary, glandular, 3-4, sessile. Petal like appendages surrounding the involucres. Fruit a capsule, covered with hairs. Seeds tetra-angular, brown in color.

Common Name:- Dudheli

Flowering and Fruiting:- August– December

- Whole plant is used as fodder.
- It is believed to increase the amount of milk in cattle.

Jatropha L.

***Jatropha curcas* L.**, *SPL.1006; FBI. 5: 383; FUGP. 2: 215; FF. 453; FH. 189.*

A perennial, irregularly branched, small tree filled with latex. Leaves opposite,

petiolated, apex obtuse, ovate- orbicular, triangular to penta- angular, stipules minute. Inflorescence cymose. Flowers axillary, yellowish, bisexual. Corolla greenish-yellow, campanulate. Ovary trilocular. Fruit ovoid, trilobed capsule. Seeds glabrous, brown, oily.

Common Name:- Ratanjot

Flowering and Fruiting:- June – September.

Ethnobotanical Uses:

- Leaves are believed to contain insecticidal properties.
- Leaves decoction is used as mouthwash to strengthen gums.
- Seed oil is applied on eczema, itches, scabies, herpes and wounds.
- This plant is widely used for the manufacture of biodiesel now-a-days.

***Phyllanthus* L.**

***Phyllanthus amarus* Schumach. & Thonn.**; *FID. 345; FH. 189.*

An ascending, annual herb about 30-50 cm tall. Leaves alternate, small, arranged on a branchlet, elliptic-oblong, obtuse, base unequal, stipulate, lanceolate. Staminate flowers minute, 1-2, axillary. Calyx penta-lobed, acute with segmented, non-glandular, disc. Stamens 3, connate, anthers sessile. Pistillate flowers with short pedicel, obovate, acute, margins membranous. Style free, bifid. Fruit obtuse, trigonous capsule. Seeds trigonous, pale-brown in color.

Common Name:- Aamlaki, Jangli Amla

Flowering and Fruiting:- July - December

Ethnobotanical Uses:

- Whole plant used for treatment of gonorrhea and other genital disorders.
- It is also used as a single drug in treatment of jaundice.
- Plant is very useful against indigestion and chronic dysentery.

***Putranjiva* Wall.**

***Putranjiva roxburghii* Wall.**; *FBI. 5: 336; FUGP. 2: 202; FF. 450; FD.317;FPP.240; FH. 187.*

A perennial, evergreen, large sized, branched tree about 12-18 m tall. Stem branches drooping, spreading, bark whitish-grey. Leaves alternate, shortly petioled, obovate, dark green, acuminate with small, triangular, deciduous stipules. Flowers unisexual, small sized. Staminate flower shortly pedicelled, clustered, small, yellow. Pistillate flowers 1-3

in leaf axil, fan shaped. Fruit ellipsoid, single seeded drupe with ovoid, hard seeds **(Plate-28).**

Common Name:- Putranjiva

Flowering and Fruiting:- March – September

Ethnobotanical Uses:

- Fruits are used for treatment of fever, cold and rheumatism.
- Seeds are believed to be conception-promoting.
- It is also used against veginal infection and urinogenital disorders.
- Wood used in construction and agricultural implements.

Ricinus L.

***Ricinus communis* L.**; *SPL.1007; FBI. 5: 457; FUGP. 2: 212; FFP. 461; FF.456; FD.316; FP. 240; FH. 190.*

A perennial, evergreen, branched, shrub. Stem hollow, branched, herbaceous. Leaves alternate, petiolate, palmate, irregularly dentate with ovate stipules. Inflorescence panicled raceme. Pistillate flowers at top, spathaceous calyx, purple, ovary trilocular. Staminate flower at base. Calyx elliptic-ovate, pale- green. Corolla penta-lobed, stamens many, filaments connate. Fruit trilobed, spiny, sub globose green capsule. Seeds glabrous, caruncled **(Plate-16).**

Common Name:- Aarandi, Arand

Flowering and Fruiting:- Throughout the year

Ethnobotanical Uses:

- Leaves juice is employed in obesity, constipation and colic.
- Leaf juice is also applied to breast to increase milk secretion in women.
- Purified oil act as best medicine against constipation.
- Seed oil is applied to get relief from stomach ache and to induce labour pain.

Cannabinaceae

Cannabis Linn.

***Cannabis sativa* L.**, *SPL.1027; FUGP. 3: 124; FD.329; FPP. 245; FH. 194.*

An annual, erect, branched, tall herb. Leaves slightly aromatic, palmately-partite, coarsely toothed, acuminate, pubescent beneath. Inflorescence cyme. Flowers axillary, greenish- yellow. Fruit a compressed nut enclosed in the persistent tepals **(Plate-17).**

Common Name:-Bhang

Flowering and Fruiting:- March – November

Ethnobotanical Uses:

- The leaves are used for worshipping'Lord Shiva'.
- Stems, leaves and flowers are used for preparation of 'Bhang' and'Charas'.
- Leaves are also used for smoking pipe.
- Stem is used as a source of fibre.

Moraceae

Inflorescence hypanthodium.	*Ficus*
Inflorescence spike or catkin.	*Morus*

***Ficus* L.**

Receptacle sessile.	
Leaves tomentose when young.	*F. benghalensis*
Leaves glabrous.	*F. religiosa*
Receptacle stalked.	
Large sized tree, receptacle reddish-orange.	*F. racemosa*

***Ficus benghalensis* L.**; *SPL.1059; FBI. 5: 499; FUGP.2:238;FF. 471; FD.324; FPP. 243; FH. 195.*

An evergreen, large-sized, tall, branched tree. Stem branches spreading horizontally, barked, smooth, intervaled with prop roots modified into supporting branches. Leaves alternate, simple, entire, petiole long, cordate base, abaxial pubescent, adaxial smooth, stipules ensheathing. Inflorescence hypanthodium, axillary, sessile, bracts 3, numerous florets on fleshy receptacle. Staminate florets near ostiole, Stamen 1, pistillate at base, style long, neuter floret in between both. Fruit green when young but red when mature **(Plate-17).**

Common Name:- Bargad, Bar

Flowering and Fruiting:- June – October

Ethnobotanical Uses:

- Root paste is applied in leucoderma and ringworm.

- Fruits are employed in indigestion, sexual debility, piles and general debility.
- Stem decoction is used to get relief from piles and exudation of puss.
- Bark infusion used as a tonic and in treatment of dysentery and diabetes.

***Ficus religiosa* L.**; *SPL.1059; FBI. 5: 513FUGP.2: 241; FFP. 476; FF. 475; FD.325; FPP. 244; FH. 195.*

A perennial, deciduous, large sized tree. Stem branches barked, whitish grey. Leaves alternate, simple, stipulate, petiole long, entire, adaxial surface shining, dark green, abaxial dull green, acuminate, cordate at base, margins undulate, tips elongated. Inflorencence hypanthodium, paired, sessile, axillary, dark purple. Staminate florets sessile, near ostiole, stamen 1, filaments short. Pistillate florets stalked, at basal portion, asepalous, apetalous. Neuter florets at lateral sides **(Plate-17).**

Common Name:- Peepal

Flowering and Fruiting:- February – April

Ethnobotanical Uses:

- The plant is worshipped by people.
- Twigs are used as tooth brushes.
- Unripe fruits are useful in premature ejaculation and general debility.
- Stem bark is used in skin problems, throat and urinary infections.
- Leaf powder mixed with water is taken orally to get relief from body pain.

***Ficus racemosa* L.**; *SPL.1060; FPP. 243; FH.195; FBI. 5: 535; FUGP. 2: 248; FFP. 480; FF. 482; FD.326.*

A medium sized, deciduous, glabrous tree. Stem branched, reddish-brown, barked, minutely pubescent. Leaves alternate, simple, petiolate, elliptic-ovate, smooth with triangular stipules. Inflorescence hypanthodium, clustered on leafless branchlets, sub-globose, glabrous, reddish- orange. Staminate flowers near ostiole, pistillate flower at base, gall florets at lateral side. Perianth fused, membranous, dentate, persistent. Style elongated, stigma subterminal. Fruit achene **(Plate-17).**

Common Name:- Gular

Flowering and Fruiting:- May – September

Ethnobotanical Uses:

- Unripe fruits are used in jaundice and diarrhoea.

- Root juice is applied in case of mumps and other glandular swellings.
- Decoction of bark is useful in diabetes, bleeding piles and leucorrhoea.

***Morus* L.**

Leaves entire, not lobed. *M. alba*

Leaves deeply trilobed. *M.indica*

***Morus alba* L.**; *SPL.936; FBI. 5: 492; FUGP. 2: 231; FFP. 472; FF. 467; FD.328; FPP. 244; FH.197.*

A medium-sized, deciduous, monoecious, branched tree about 8-12 m high. Stem whitish, spreading branches. Leaves opposite, simple, dentate, round at base, adaxial smooth. Inflorescence catkin. Male inflorescence longer than female. Calyx free, ovate, keeled, unequal. Fruit drooping achene, greenish-dark purple, black on ripening **(Plate-18).**

Common Name:- Mulberry, Shahtoot

Flowering and Fruiting:- April – September

Ethnobotanical Uses:

- Leaves act as food for rearing silk-worms.
- Leaf paste is useful for healing of wounds.
- Shoots are woven into durable baskets.
- Fruits are eaten and also used for sore throat, dyspepsia and melancholia.

***Morus indica* L.**; *SPL.986;FBI. 5:492; FUGP. 3:136; FD.328.*

A medium sized, branched tree. Leaves alternate, petiolate, lobed, elliptic- ovate, dentate margins, elongated tip. Inflorescence catkin. Staminate flowers pubescent, long. Pistillate flowers short, smooth. Sepals free, ovate. Style pubescent, connate. Fruit succulent achene with accrescent calyx **(Plate-18).**

Common Name:- Shehtoot

Flowering and Fruiting:- February – June

Ethnobotanical Uses :

- Fruits are delicious and useful for the treatment of jaundice.
- Wood is used as cheap quality timber.

Casuarinaceae

Casuarina L.

***Casuarina equisetifolia* L.**; *FBI. 5: 598; FUGP. 2: 250; FD.330.*

A perennial, tall tree about 20-25m high. Stem branches drooping, brownish-grey, terminates into branchlets. Leaves reduced, needle like. Inflorescence spike. Staminate flowerssmall, numerous, stamen single, perianth reduced. Pistillate flowers globose, brownish red, clustered into cone. Fruit winged nutlet with numerous seeds **(Plate-18).**

Common Name:- Vilayti Jhau, Jangli Saru

Flowering and Fruiting:- March – July

Ethnobotanical Uses:

- Wood used as a fuel and for fencing purpose.
- Bark is employed in diarrhea and dysentery.
- Bark yields a dye which is used for dyeing and tanning.
- Needles are used for making activated carbon.

Ceratophyllaceae

*Ceratophyllum*L.

***Ceratophyllum demersum* L.**; *SPL.992; FBI. 5: 639; FUGP. 2: 255; FD.331; FPP. 245; FH. 199.*

A submerged, rootless, highly branched, aquatic, perennial herb. Leaves whorled, divided into filiform, brittle, serrate segments. Male flowers solitary sessile, axillary. Perianth segments 6-12, narrow subvalvate. Stamens 10-30, short filaments, anthers extrose. Female flowers have perianth with an acute apex. Style subulate, stigmatic on one side. Fruit nutlets with persistent perianth. Seeds pendulous.

Flowering and Fruiting:- September – April

Ethnobotanical Uses:

- The herb is a rich source of calcium, magnesium and protein.
- It is useful in biliousness.
- Also act as cooling agent, purgative and antibacterial.

Hydrocharitaceae

Leafy, branched herb, Leaves small. *Hydrilla*

Unbranched herb, Leaves long, ribbon-like. V*allisneria*

Hydrilla Rich.

***Hydrilla verticillata* (L. *f*.) Royle**; *FBI. 5: 659; FUGP. 2: 262; FD.331; FPP. 246.*

A submerged, fresh water, highly branched, leafy herb about 30-40 cm long. Rootlets arising from nodes. Leaves whorled, but opposite at lower side, sessile, linear-oblong, entire. Flowers unisexual, perianth segmented, variable. Staminate flower stalked. Pistillate sessile. Fruit smooth, muricate berry.

Common Name:- Jhangi, Kureli

Flowering and Fruiting:- October – February

Ethnobotanical Uses:

- This aquatic herb is used as green manure as well as food for some fishes.

*Vallisneria*L.

***Vallisneria spiralis* L.**; *SPL.1015; FBI. 5: 660; FUGP. 2: 263; FD.331; FPP. 246; FH. 199.*

An aquatic, submerged, stoloniferous, perennial herb. Leaves alternate, radical, linear, ribbon-like, translucent. Plant dioecious, staminate flower numerous, minute, floating, pedicelled, reaching at water surface on maturity. Perianth buoyant, helps in floating of flower. Pistillate flower solitary, pedicel long, stigma 3, notched. Fruit linear, enclosed in spathe. Seeds many, oblong.

Flowering and Fruiting:- September – April

Ethnobotanical Uses:

- Young leaves are consumed as salad.

Musaceae

*Musa*L.

***Musa paradisiaca*L.**; SPL. *1043; FBI. 6 : 262.*

A stoloniferous, evergreen plant, 2-4 meter tall. Leaves large, oblong, parallel-veined, erect or ascending. Inflorescence spadix. Spikes drooping, about as long as the leaves. Bracts many-flowered, deciduous. Flowers small. Fruits oblong, yellowish-green when ripe, sweet, edible berries. Seeds brownish-black (if present) **(Plate-18).**

Common Name:- Kela

Flowering and Fruiting:- April-October

Ethnobotanical Uses:

- Planted in garden and fruit orchards.
- Plant is worshipped by people.
- Raw fruits are used as vegetable.
- Ripe fruits are eaten and provides quick energy.
- Root juice with honey is used in adenitis and cough.

Liliaceae

Annual, erect herb. *Asphodelus*

Perennial, climbing shrub. *Asparagus*

Asparagus L.

***Asparagus racemosus* Willd.**; *FBI. 5: 316; FUGP. 2: 327; FID. 350; FFP. 519; FF. 523; FD.336; FPP. 248; FH.204.*

A highly branched, spinous undershrub with fascicled roots. Stem branches angular, triquetrous, greyish-white. Leaves scaly, membranous, simple, cladode falcate, triquetrous. Inflorescence raceme. Flowers pedicellate, small, white, bisexual. Perianth segmented, white, oblong. Stamen epiphyllous, antitepalous, anthers versatile. Ovary trilobed, stigma 3. Fruit globose berry, red colored **(Plate-19).**

Common Name:- Satavar

Flowering and Fruiting:- October – January

Ethnobotanical Uses:

- Dried and powdered roots taken with milk as tonic for lactation in women.
- It is also used in case of seminal weakness as well as in general debility.
- Roots are very effective in burning micturition, peptic ulcers and piles.

Asphodelus L.

***Asphodelus tenuifolius* Cav.**; *FBI. 6: 332; FUGP. 2: 333; FID., 351; FD.337; FPP. 248; FH. 204.*

A rhizomatous, leafy, annual herb, branched at base. Stem much reduced. Leaves sessile, rosette, fistular, ensheathing at base. Inflorescence raceme or panicle. Flowers shortly

pedicellate, solitary, axillary, whitish, bracteate. Perianth segmented, oblong, obtuse, white, prominent brownish keel. Stamens 6, brown coloured. Fruit globose capsule with trigonous, acute, black seeds.

Common Name:- Pyazi

Flowering and Fruiting:- November – March

Ethnobotanical Uses:

- Plant paste is applied in case of swellings.
- Decoction of plant is useful in treatment of kidney stones.

Pontederiaceae

***Eichhornia* Kunth.**

***Eichhornia crassipes* (Mart.) Solms.**; *FD.338; FPP. 250; FH. 206.*

An aquatic, perennial, floating herb. Stilt roots highly developed. Stem spreading. Leaves rosette, entire, petiole swollen into green bladders, round at base, spathulate. Inflorescence spike. Flowers clustered, bluish violet, perianth hexa-lobed, obovate, posterior segment yellow dotted. Ovary superior, trilocular with many ovules. Fruit capsule.

Common Name:- Jal-Kumbhi

Flowering and Fruiting:- August – December

Ethnobotanical Uses :

- Plant is used to extract fibres for making basket etc.
- It is also used as cattle feed.

Commelinaceae

***Commelina* L.**

***Commelina benghalensis* L.**; *SPL.41; FBI. 6: 370; FUGP. 2: 339; FD.340; FPP. 250; FH. 208.*

A pubescent, straggling, annual herb about 25-30 cm tall. Stem slender, yellowish green, clothed with colorless hairs, dichotomously branched, creeping, rooted at basal portion. Leaves alternate, sessile, oblong, obtuse, cordate at base, ensheathing, purple colored. Spathe at terminal of each branchlet, funnel shaped. Inflorescence dichasial cyme having inner staminate, outer perfect flower. Flowers bluish-violet, sessile, cleistogamous, yellowish-white, solitary. Ovary superior, trilocular, 3 celled. Fruit elliptic, membranous

capsule with 5 wrinkled seeds **(Plate-19).**

Common Name:- Buchna

Flowering and Fruiting:- August – January

Ethnobotanical Uses:

- Used as laxative, refrigerant and also used in leprosy.
- Plant juice is recommended in dysentery.
- Plant leaves are edible.

Arecaceae

Phoenix L.

***Phoenix sylvestris* (L.) Roxb.**; *FBI. 6: 425; FUGP. 2: 354; FF. 526; FD.343; FPP. 252; FH.209.*

A perennial tree with crown of leaves at apex, about 10-15 m tall. Stem columnar, unbranched, ornamented with persistent leaf traces. Leaves alternate, pinnately compound, leaflets 3-8 cm long, greyish-green, pendulous, compressed leaf apex. Male inflorescence spadix, white, 6-10 cm long, spathe long, valvate. Female inflorescence green spadix, peduncled. Fruit oblong, reddish-brown, edible drupe, arranged on a long peduncle. Seeds grooved at centre on one surface, brownish, membranous, hard.

Common Name:- Khajoor

Flowering and Fruiting:- August – December

Ethnobotanical Uses:

- Every part of this plant is useful in one or the other way.
- The plant sap is used in preparation of 'Toddy'.
- Fruits are used in sexual debility, leprosy, fever and tuberculosis.
- Leaves are utilized for making bags, brooms, fans and mats.
- Roots used for tooth ache and nervous debility.
- Wood used for temporary construction, bridges and tent-pegs.

Typhaceae

Typha L.

***Typha domingensis* Pers.**; *FBI.6: 489; FUGP. 2: 359; FD.344; FPP. 252; SPL. 971; FH.210.*

A perennial, semiaquatic shrub upto 3m tall. Leaves ensheathing the base, thick,

distichous. Male inflorescence cylindrical spike, bracteolate, brown, pointed, intervaled with pale-brown female inflorescence, stigma longer than hairs. Seeds, lightly pubescent, minute.

Common Name:- Patera

Flowering and Fruiting:- August – April

Ethnobotanical Uses:

- Rhizomes, young shoots are edible.
- Silky florets are used for stuffing purpose.
- Oil is extracted from seeds.

Araceae

Colocasia Schott

***Colocasia esculenta* (L.) Schott**; *FPP.252; SPL.965; FBI. 6: 523; FUGP.2:365.*

An erect, less branched, perennial herb about 70-100 cm tall. Stem rhizomatous. Leaves alternate, dark green, petiolate, oblong, ovate, cordate at base, cuspidate at apex. Flowers whitish-cream, spathulate, spathe petaloid. Pistillate flowers at base, staminate above, neutral flower in between two, peltate. Fruit an aggregate of berries **(Plate-25).**

Common Name:- Arvi, Kachalu

Flowering and Fruiting:- July - September

Ethnobotanical Uses:

- The corm of this plant is cooked as vegetable.
- Leaves are used as vegetables and for making “chutney”.
- Petiole juice is used as astringent.
- Corm juice of this plant is applied on scalp for good growth of hairs.

Lemnaceae

Plant without roots.	*Wolffia*
Plant with roots.	
Several roots with fronds.	*Spirodela*
Single root with fronds.	*Lemna*

Lemna L.

***Lemna minor* L.**; *SPL.970; FBI. 6: 556; FUGP. 3: 368; FD.347; FH.212.*

A free floating, perennial hydrophyte. Plant body thalloid, asymmetrical, entire, dark green, flat,convex and reddish beneath. Fronds oblong, ovate, each with single root fibre, opaque. Root cap acute, ensheathed appendages. Winged fruits with 10-12 seeds **(Plate-19).**

Common Name:- Pani Ka Boor

Flowering and Fruiting:- Not observed

Ethnobotanical Uses:

- Water birds and some fishes feed on the plant.
- Used in carp nurseries as it promotes growth of zooplanktons.

Spirodela Schleid

***Spirodela polyrrhiza* (L.) Schleid.**, *FUGP. 2: 368; FD.346; FPP. 253; FH. 212.*

A herbaceous, highly reduced, free floating, hydrophyte. Fronds herbaceous, dark green, thick, ovate-orbicular, convex and opaque below, round at apex. Rootlets many, arising from fronds, fibrous. Bilipped spathe. Fruit winged. Seeds 1-2, slightly winged**.**

Common Name:- Chowpatti

Flowering and Fruiting:- August – October

Ethnobotanical Uses:

- Whole plant is used to cure from cold and urination problem.

Wolffia Horkel *ex* Schleid.

Wolffia arrhiza* (L.) Horkel;FD.347; FID. 361.*

A small sized, free floating, glandular, herbaceous hydrophyte. Fronds ovate- oblong convex on both surfaces, solitary and sessile when young, rootless, glandular.

Flowering and Fruiting :- Not observed.

Ethnobotanical Uses :

- Aquatic food.

Potamogetonaceae

Potamogeton L.

Leaves oblanceolate, margin wavy. *P. crispus*

Leaves linear to filiform, margin entire. *P.pectinatus*

***Potamogeton crispus* L.**; *SPL.126;FBI. 6: 566; FUGP. 2: 375; FD.349; FPP.256; FH. 214.*

An aquatic, submerged, rooted, perennial, branched herb. Stem branches bouyont, compressed. Leaves sessile, semiamplexicaul, linear- oblong, dentate margin, stipules caducous. Inflorescence spike. Flowers yellowish green, floating above the water surface. Calyx long, clawed, limb suborbicular. Fruit obliquely ovoid, compressed, beaked drupelet.

Flowering and Fruiting:- November – March

Ethnobotanical Uses:

- Plant is used as fodder.

***Potamogeton pectinatus* L.**, *SPL.127; FBI. 6: 567; FUGP. 2: 375; FD.349; FPP.256; FH. 214.*

A partly submerged, aquatic, rhizomatous, perennial herb. Stem slender, dichotomously branched. Leaves alternate, filliform, linear, acute, recurved margins. Stipules sheathing, elongated. Inflorescence spike, above the water surface. Flower whorled, calyx long, limbs broadly obovoid. Fruit obliquely obovoid, beaked, drupelet.

Flowering and Fruiting:- September – December

Ethnobotanical Uses:

- Root-stocks contain starch.

Cyperaceae

Flowering glumes distichous.

Glumes many, rachilla of spikelet persistent. *Cyperus*

Glumes few, rachilla of spikelet deciduous. *Kyllinga*

Flowering glumes spirally arranged or the lowest one subdistichous.

Style base dilated, constricted or articulated above the nut.

Leaves absent, hypogynous bristles present. *Eleocharis*

Leaves present, hypogynous bristles absent.

Style deciduous, leaving a tumor on nut. *Bulbostylis*

Style persistent, if deciduous not leaving a tumor on nut. *Fimbristylis*

Bulbostylis Kunth.

***Bulbostylis barbata* (Rottb) C.B. Clarke**; *FBI. 6: 651; FBI. 6: 651; FUGP. 2:408; FD.361; FH. 215.*

A tufted, annual herb about 6-25 cm long. Roots fibrous, stem slender. Leaves alternate, simple, compressed at base, ensheathing, pilose mouth. Inflorescence spikelet. Flowers small, reddish-brown, 3-20 heads on top of stem, bracts filliform, longer than spike, glumaceous, boat-shaped. Fruit obovoid, trigonous nut, yellowish brown in color.

Common Name:- Piazza

Flowering and Fruiting:- September – December

Ethnobotanical Uses:

- Herb is boiled in water and given in treatment of intestinal disorders.

Cyperus L.

Stigmas two, nuts compressed.	
Leaf blade broad at base.	
Inflorescence spikes, arranged in compound umbel.	*C. alopecuroides*
Inflorescence a head of spikelets.	*C. michelianus*
Leaf blade narrow, flat trigonous.	
Nuts laterally compressed.	*C. flavidus*
Nuts dorsally compressed.	
Three spikes aggregated into compact head.	*C. dubius*
Head solitary.	
Stigmas three, nuts triquetrous.	
Inflorescence solitary head of 3-8white spikelets.	*C. niveus*
Inflorescence umbellate, rarely solitary head, no white spikelets.	
Spikelets globose heads.	*C. difformis*
Spikelets shortly spicate.	
Rachilla of spikelets winged.	
Stolons bulbiferous.	*C. bulbosus*
Rachilla of spikelets non-winged.	
Glumes aristate or cuspidate.	*C. compressus*
Glumes non-aristate or cuspidate.	*C. iria*

***Cyperus alopecuroides* (C.B. Clarke) Rottb.**; *FD.352; FPP. 258; FH. 218; FBI.*

6:595, 1893; FUGP. 2:394.

A glabrous, erect, perennial tufted herb. Roots fibrous, stem trigonous, branched, shiny green, ensheathed with leaves. Leaves, alternate, tri-veined, glabrous, acuminate. Inflorescence spikelet. Flower pale-brown, bracts 3, leafy, unequal sized, glumes boat shaped, sub-orbicular, acute, apiculate. Stamens 2. Fruit obovate nut, yellowish-brown in color.

Common Name:- Mota Patera

Flowering and Fruiting:- August-November

Ethnobotanical Uses:

- Leaves paste used in skin diseases.
- It yields fibres which are used for making mats.

***Cyperus bulbosus* Vahl**; *FBI. 6: 611; FUGP. 2: 391; FPP. 259; FH. 217.*

An erect, stoloniferous, smooth, perennial herb. Bulbs numerous, enclosed in black scaly leaves. Leaves more clustered at stem base, whip like, blade linear, acuminate at tip. Inflorescence compound spikelet, sessile, winged, translucent at internodes, brownish. Bracts elliptic, obtuse. Stamens 2-3, anthers versatile. Fruit trigonous, black nutlet.

Common Name:- Motha

Flowering and Fruiting:- August – November

Ethnobotanical Uses:

- Roasted tubers have the flavour of potatoes.
- These are baked into bread or cooked into puddings.

***Cyperus compactus* Retz.**; *FH. 217; FUGP. 2: 398.*

A rhizomatous, erect, glabrous, perennial herb about 30-120 cm tall. Stem trigonous, striated longitudinally. Leaves with spongy margins, keel smooth, linear, acuminate, sheaths reddish-brown. Inflorescence mixed type- primary umbel, secondary umbel and spikes of spikelets, bracteate, reddish-brown, linear-lanceolate. Glumes oblong-lanceolate. Fruit beaked, oblong, trigonous nutlets, deep brown in color.

Flowering and Fruiting:- May – July

Ethnobotanical Uses:

- It is used for the manufacture of coarse mats.

***Cyperus compressus* L.**; *SPL.46;FBI. 6: 605; FUGP. 2: 384; FD.356; FH. 217.*

An erect, glabrous, greyish-green, angular, annual herb about 40 cm high. Roots fibrous. Culm trigonous. Leaves 1-4 at base, linear, acuminate. Inflorescence umbellate spike, spikelets sessile, compressed laterally, spreading bracts, ovate, sub-qudrangular. Fruit triquetrous, obovoid, dark brown nut.

Common Name:- Mothi

Flowering and Fruiting:- August –December

Ethnobotanical Uses:

- Plant is used as fodder.

***Cyperus cuspidatus* Kunth.**; *SPL.1: 204, 1815; FH. 217; FUGP. 2: 381; FD. 354.*

Annual, erect, sedge about 10-25 cm tall. Culm tufted. Leaves ensheathing, linear, acuminate. Inflorescence umbellate spike, spikelet 8-20 flowered, glumaceous, globose. Fruit trigonous, obovoid nut.

Flowering and Fruiting:- August –October

Ethnobotanical Uses:

- It is used as fodder.

***Cyperus difformis* L.**; *FBI. 6: 599; FUGP. 2: 382; FD.355; FPP. 259; FH. 219.*

An erect, glabrous, tufted, annual herb with fibrous root, about 40-60 cm tall. Culm triquetrous, covered with loose membranous sheath. Leaves glabrous, shorter than stem, accuminate, flaccid. Inflorescence spikelet, sessile, compact, globose, cluster. Bracts 3-4, leafy, sharply keeled. Flower glumaceous, 10-30 in a spikelet, rachilla without wings. Fruit ellipsoid achene, pale brown in color.

Flowering and Fruiting:- July – December

Ethnobotanical Uses:

- Leaves posses antibiotic properties and used in skin disorders.
- Also used as fodder.

***Cyperus dubius* Rottb. Endl.**; *FD.353; FPP. 261; FH. 220; FUGP. 2: 396.*

A glabrous, small sized, tufted herb about 8-25 cm long. Rootstock thick, short. Stem trigonous, ensheathed with leaf bases. Leaves linear, subequal. Inflorescence ovoid head, spikelets white. Bracts foliaceous. Glumes keeled, green, persistent. Fruit a laterally

compressed, ellipsoid achene.

Flowering and Fruiting:- August – December

Ethnobotanical Uses:

- Root oil used for stimulating liver.

***Cyperus flavidus* Retz.**; *FH. 219; FPP. 260; FUGP. 2: 392; FBI. 6: 591.*

An erect, glabrous, perennial herb about 40 cm high. Roots fibrous, stem trigonous, tufted, covered with cataphylls. Leaves linear, filliform, yellow-brown, ensheathing. Inflorescence umbellate spikelet, numerous flowered, glumes ovate, style armed. Stamens 2-3. Fruit ellipsoid, laterally compressed, pale-brown nut.

Flowering and Fruiting:- June – October

***Cyperus iria* L.**, *SPL.1: 45; FBI. 6: 606; FUGP. 3: 385; FD.357; FPP. 260.*

Annual, glabrous, erect, short lived herb about 60 cm high. Roots fibrous, culm triquetrous, striated longitudinally. Leaves equaling the stem, basal, linear, acuminate, narrow leaf blades. Inflorescence umbellate spike, 8-12, loosely arranged flowers, glumes boat-shaped, keel scabrous. Stamens 2-3. Fruit an ellipsoid, triqueterous, minutely punctuate nut with black color **(Plate-19).**

Common Name:- Motha

Flowering and Fruiting:- September – December

Ethnobotanical Uses:

- Used as fodder.
- Stems (culms) woven to form mats.

***Cyperus michelianus* Rottb.**; *FD.352; FH. 220; FBI. 6: 596, 1893; FUGP. 2:395.*

A branched, annual herb about 20-25 cm high. Stem branched at base, tufted. Leaves tristichous, narrowly linear, acuminate. Inflorescence a head composed of spikelets, numerous, glumaceous, keel rounded. Fruit ellipsoid nut.

Flowering and Fruiting:- July – October

Ethnobotanical Uses:

- Used as fodder.

***Cyperus niveus* Retz.**; *FBI. 6: 601; FUGP. 3:327; FD.354; FPP., 261; FH.219.*

A rhizomatous, woody, annual herb. Culm sympodial, longer than leaves. Leaves alternate, filliform, narrow, linear, persistent leaf sheaths. Inflorescence compound spike of 3-8 spikelets. Each spikelet consist of 20-40 glumaceous flowers having stamen base persistent. Fruit a trigonous, obovoid, dark brown nut.

Flowering and Fruiting: August – December

Ethnobotanical Uses:

- Plant is used as fodder for cattles.

Eleocharis R. Br.

***Eleocharis palustris* L.**; *FBI. 6: 628; FUGP. 2: 400; FD.358; FPP. 262; FH. 220.*

An erect, rhizomatous, marshy, annual herb about 45 cm high. Stem tufted, longitudinally striate, aphyllous, sheaths membranous. Inflorescence solitary, terminal, spikelet. Flower bracteate, glumes lanceolate, imbricate. Fruit broadly obovoid, biconvex nut, pale brown in color.

Flowering and Fruiting:- September – December

Ethnobotanical Uses:

- Plant ash is useful in cuts.
- Also used for stuffing and bedding.

Fimbristylis Vahl

Spikelets numerous, glumes glabrous. *F.dichotoma*

Spikelets few, glumes hairy in upper half. *F.ferruginea*

***Fimbristylis dichotoma* (L.) Vahl.**, *FBI. 6: 635; FUGP. 2: 403; FD.359; FPP. 263; FH. 222.*

A tufted, annual herb about 10-40 cm long. Root fibrous, culm slender, striated, margins membranous. Inflorescence umbellate spikelet, sessile, orange in color. Flower bracteate, bracts longer than inflorescence, glumaceous. Glumes boat-shaped, keeled, pale brown, prominent. Rachilla deeply pitted when glumes shed. Fruit transversly rugose, ribbed nut, pale-brown in color.

Flowering and Fruiting:- August – November

Ethnobotanical Uses:

- Used as fodder for grazing animals.

***Fimbristylis ferruginea* (L.) Vahl.**; *FBI. 6: 638; FUGP. 2: 405; FD.359; FPP. 263; FH. 222.*

An erect, annual herb about 20-70 cm tall. Stem tufted, longitudinally striated. Leaves distichious, subequal to stem. Inflorescence umbellate spike, spikelets few, clustered, shortly pedicelled. Glumes broadly ovate, concave, keeled, slightly excurrent. Style pubescent, flattened on edges. Fruit an apiculate, pale brown nut.

Flowering and Fruiting:- September – December

Ethnobotanical Uses:

- Culms provide fibres which are used in making mats and huts.

Kyllinga Rottb.

***Kyllinga brevifolia* Rottb.**; *FBI. 6: 588; FUGP. 2: 396; FPP. 259; FH.217.*

An erect, rhizomatous, glabrous herb about 30 cm tall. Leaves alternate, linear, acuminate. Inflorescence spikelet. Flowers white, glume brownish-yellow, obtuse. Stamens 2. Fruit a laterally compressed, ellipsoid nut.

Flowering and Fruiting:- April-July

Ethnobotanical Uses:

- Plant is used as fodder.
- Roots and rhizome are aromatic.

Poaceae

Spikelets base without spathe or spatheole.
Feather shaped inflorescence.
Spikelets surrounded by conspicuous hairs forming panicle. *Saccharum*
Spikelets not surrounded by conspicuous hairs forming panicle. *Phragmites*
Inflorescence not feather shaped.
Unawned spikelets.
Bristles subtended spikelets.
Cup forming bristles. *Cenchrus*
Non-cup forming bristles. *Setaria*
Non-bristle subtended spikelets.
Upper glumes unarmed.

Silverywhite racemes.	*Imperata*
Non-silvery white racemes.	
Pedicels not fused.	
Winged keels of involucral glumes.	*Phalaris*
Not winged keel of involucral glumes.	*Eragrostris*
Inflorescence terminal, digitate spikes.	
Unawned spikelets.	
Usually two racemes.	*Paspalum*
Usually more than two racemes.	
Spikelets single flowered.	*Cynodon*
Spikelets with two or more flowered.	
Spikes long, plano-convex.	*Digitaria*
Spikes long or short, laterally compressed.	
Spikelet ending rachis.	*Eleusine*
Inflorescence spiciform racemes.	
Racemes or spiciform racemes upto 2 cm, pointed upward.	*Echinochloa*
Racemes or spiciform racemes more than 2 cm, ascending or spreading.	
Awned spikelets.	
Lower involucral glume not having pits.	*Dicanthium*
Unawned spikelets.	
Two-flowered, neither shining nor brown spikelets.	*Brachiaria*
Inflorescence narrow or lobulate panicle.	
Spikelets awned.	
Open panicles, branches erect or ascending.	*Sorghum*
Unawned spikelets.	
One to two flowered spikelets.	*Panicum*
More than two flowered spikelets.	*Poa*

***Arundo* L.**

***Arundo donax* L.**; *SPL.81; FBI. 7: 302; GBCIP.413; FD.373; FH.229.*

An erect, perennial grass about 3-6 m tall. Stem branched, hollow, nodded, glabrous. Leaves linear lanceolate, pointed with striate sheaths, ligule pubescent. Inflorescence panicle, drooping with scabrous branches. Spikelet light brown, 2-7 flowered. Involucral glumes glabrous, lemma hairy. Fruit grooved caryopsis, brown in color.

Common Name:- Narhal

Flowering and Fruiting:- August – February

Ethnobotanical Uses:

- The plant is used for making baskets, mats and musical pipes.
- Stem and leaves yield a pulp which is used for rayon manufacture.
- Pulp is rich in cellulose, and suitable for manufacture of high quality paper.

Avena L.

***Avena sativa* L.**; *SPL.79;FBI. 7: 275, 1896; FH. 229; FD.399; FPP. 271.*

Annual, glabrous, shiny herb about 120 cm high. Culms simple, stout, fistular. Leaves linear-lanceolate, ligulate. Inflorescence terminal, panicled spike, spikelet 2-3 flowered, hanging from one side. Each floret bisexual, awned. Involucral glumes attached to fruit, white at base, palea free, silky **(Plate-20).**

Common Name:-Jai

Flowering and Fruiting:- January **–** April

Ethnobotanical Uses:

- It is a source of 'Oat meal', seed powder is used for weight loss.
- Seed paste is applied on face in order to get glow.
- Whole plant is used as good fodder.

Brachiaria Griseb.

***Brachiaria ramosa* (Linn.) Stapf**.; *GBCIP.284; FD.397; FPP., 272; FID. 391; FH. 229; FBI. 7: 36.*

A sub-erect, annual herb about 60 cm tall. Stem profusely branched at base, fascicled. Leaves linear-lanceolate, smooth, amplexicaul. Inflorescence sub-pyramidal panicle, rachis flattened, terminates as spike like raceme. Spikelet alternate, paired, one sessile, another pedicellate. Lower floret neuter, upper one hermaphrodite. Glumes ovate-rounded, rugose. Fruit slightly compressed caryopsis.

Common Name:- Murat

Flowering and Fruiting:- August – December

Ethnobotanical Uses:

- It is used as fodder for cattles.

Cenchrus Linn.

Involucral bristles retrorsely scarbid. *C. biflorus*

Involucral bristles antrorsely scarbid.

Bristles connate at base only. *C. ciliaris*

***Cenchrus biflorus* Roxb.**; *FBI. 7:89; FD.377; FPP. 272; FID. 392.*

A glabrous, ascending, tufted, annual herb with rooting at lower nodes. Leaves finely scarbid, linear-lanceolate, acuminate, ligule as densely ciliate rim. Inflorescence terminal panicle, spiny, rachis angular, bristles united at base. Glumes thinly membranous, obtuse, upper floral glume equaling to lower one. Fruit caryopsis.

Common name:- Bharunt

Flowering and Fruiting:- August - December

Ethnobotanical Uses :

- It is consumed along with bajra as a minor cereal during food scarcity.

***Cenchrus ciliaris* L.**; *GBCIP.287; FPP. 237; FID. 393; FH. 230; FBI. 7: 88.*

An ascending, highly branched, perennial herb with woody rootstock. Stem branches tufted, culms decumbent, rigid. Leaves alternate, linear, pointed at tip, flat, convolute when dry. Inflorescence typical raceme, dense, pale purple, bristly, rachis angular. Spikelet hairy, glumes 4, ovate, acuminate, membranous, lower involucral glume single-nerved, hyaline, upper1-3 nerved. Fruit dorsally compressed caryopsis.

Common Name:- Dhaman

Flowering and Fruiting:- August – December

Ethnobotanical Uses:

- It is widely used as good fodder.

Chloris Sw.

***Chloris barbata* Sw.**; *GBCIP.465; FBI. 7: 292, 1896; FD. 388; FH. 230.*

A perennial, ascending herb. Stem highly branched, creeping at base, geniculate. Leaves narrowly linear, acuminate. Inflorescence spike. Lowest floret hermaphrodite. Glume broad elliptic, pubescent at margin, awned. Fruit caryopsis.

Flowering and Fruiting:- August – December

Ethnobotanical Uses:

- It is a good fodder grass.

Cymbopogon Spreng.

***Cymbopogon commutatus* (Steud.) Stapf**; *FH. 232; GBCIP.131.*

An erect, tufted, perennial grass about 1 m tall. Leaves alternate, linear, adaxial glabrescent, abaxial woolly in basal leaves. Inflorescence panicle of short dense raceme. Spikelets dimorphic, sessile, linear-lanceolate, pedicelled.

Flowering and Fruiting: August – October

Ethnobotanical Uses:

- Leaves yield an oil used in making face cream.

Cynodon Rich.

***Cynodon dactylon* (L.) Pers.**; *FBI.7: 288; GBCIP.469; FD.390; FPP. 275; FH. 230; FID. 401; SPL.1: 58.*

A perennial, tufted herb. Stem branched and extensively creeping at base, nodes many. Culm slender, erect. Leaves linear, glaucous, distichous, sheath pubescent. Inflorescence spike, digitate, spikelet sessile, single flowered, laterally compressed. Floral glumes obliquely oblong, lemmas longer than the upper glume, ligule as a ring of white hairs. Fruit oblong caryopsis **(Plate-20).**

Common Name:- Doob Ghas

Flowering and Fruiting:- Throughout the year

Ethnobotanical Uses:

- Plant is used for worshipping Lord Ganesha.
- Root and leaves crushed with rice and paste is applied in case of goitre.
- Plant juice is employed to cures piles and regulates menstrual cycle.
- Rhizomes are used in urinogenital problems.

Dendrocalamus Nees

***Dendrocalamus strictus*(Roxb.) Nees**; *FBI. 7: 404, 1896; FFP. 538; FH. 232.*

A deciduous, densely-tufted, gregarious, perennial shrub. Culms dark green, variable, nodes somewhat swollen, with prominent internodes, sheathed. Leaves variable, linear-lanceolate, rough, hairy on both surfaces. Inflorescence branching panicles. Spikelets hairy, upper 2-3 fertile, sterile flowers many. Glumes boat-shaped. Stamens long,

exserted. Fruit ovoid, beaked caryopsis.

Common Name:- Baans

Flowering and Fruiting:- October – December

Ethnobotanical Uses:

- Culms used for making furniture, baskets, and musical instruments.
- Used for paper-pulp and preparation of activated carbon.
- Leaves are used as fodder.

Dichanthium Willemet.

***Dichanthium annulatum* (Forsk.) Stapf.;** *GBCIP.133; FD.395; FPP. 276.*

An ascending, perennial herb about 1 m high. Stem branches tufted, nodes many. Leaves linear-lanceolate, acuminate, hairy. Inflorescence fascicled raceme. Spikelets 3 or more, greenish purple, dimorphic, sessile one hermaphrodite, pedicellate one neuter or staminate. Upper glume reduced to slender awn. Fruit obovate caryopsis **(Plate-20).**

Common Name:- Karad

Flowering and Fruiting:- August – October

Ethnobotanical Uses:

- Plant is used as fodder.

Echinochloa Beauv.

***Echinochloa colona* (L.) Link.**; *GBCIP.308; FD.393; FPP. 277; FH. 234.*

A slender, annual, genticulately ascending herb about 60 cm tall. Stem shortly creeping at base, smooth, dull green, hairy at nodes. Leaves narrowly lanceolate, acuminate, margin scarbid. Inflorescence spike. Spikelet secund, sessile, globosely ovoid. Glumes 4, lower floral glume similar to empty hyaline palea. Fruit broadly elliptic caryopsis.

Common Name:- Jiria

Flowering and Fruiting:- September – November

Ethnobotanical Uses:

- Used as fodder.

Eleusine Gaertn.

***Eleusine indica* (L.) Gaertn.**; *FBI. 7: 293, 1896; GBCIP.493; FD.391; SPL.1520.*

An erect, branched herb about 30-60 cm tall. Culm smooth, compressed. Leaves

distichous, linear-lanceolate, flat, enseathed. Inflorescence spike. Spikelet bi-seriate, secund, 3-6 floret. Floral glumes 3-nerved. Fruit trigonous caryopsis **(Plate-20).**

Flowering and Fruiting:- September – Novmber

Ethnobotanical Uses:

- Grains are edible.
- Culms used for making hats.

Crysopogon L.

***Crysopogon zizanioides (L.)*Roberty**; *GBCIP.258; FD.402; FPP. 291; FH. 242; FID.437.*

A perennial, thickly tufted grass about 1.5 m high. Rootstock spongy and aromatic. Leaves rigid, erect, ensheathed. Inflorescence compound panicle, contracted, spikelet dimorphic, sessile one linear-lanceolate, purplish- brown, involucral glumes muriculate on the back, pedicellate spikelet having lower involucral glume tubercled on the back and upper tubercled on the keel.

Common Name:- Khas Ghass

Flowering and Fruiting:- July – November

Ethnobotanical Uses:

- Plant is used as fodder for cattles.

Eragrostis Beauv.

Spikelets breaking upwards from base, rachis tough.

Plants glandular. *E.cilianensis*

Plants non-glandular. *E.minor*

***Eragrostis cilianensis* (All.) Vignolo-Lutati;** *GBCIP.503; FD.384; FPP. 279; FH. 235; FBI. 7: 320; SPL.70.*

A geniculately ascending, glandular, annual herb about 60-90 cm tall. Stem glabrous, highly branched at base. Leaves linear-lanceolate, margin serrulate, prominent midrib, glandular at base, ligulate. Inflorescence panicle, open or contracted, rachis angular, glandular, spikelet pale-green, linear-ovate- oblong, 10-40 florets in each spikelet. Involucral glumes keeled, membranous. Floral glumes broadly ovate, oblique. Fruit globose, reddish brown caryopsis.

Common Name:- Pongya

Flowering and Fruiting:- August – December

Ethnobotanical Uses:

- Grains are consumed as food.
- Straw is useful for mating and thatching.
- Plant is also used as fodder for cattles.

***Eragrostis minor* Host**; *FH. 235; GBCIP.512; FD.384; FPP. 280; SPL.68.*

Annual, tufted grass, about 50 cm tall. Leaves linear, acute, ensheathed at base, sheath thickly pubescent at mouth. Inflorescence oblong panicle. Spikelets narrowly oblong, pale green or purplish, longer than the pedicels. Rachilla not fragile, tough, persistent. Fruit a brown colored, round caryopsis **(Plate-23).**

Flowering and Fruiting:- August – December

Ethnobotanical Uses:

- It is used as good fodder.

Imperata Cyr.

***Imperata cylindrica* (L.) P. Beauv.**; *GBCIP.169; FD.381; FPP. 282; FH. 236; FBI. 7: 107.*

Annual, erect, simple, slender grass up to 60 cm high. Stem creeping, rootstock stoloniferous. Leaves linear, flat, acuminate, prominent white midrib. Inflorescence panicle, appressed, crowded. Spikelet lanceolate, anther versatile, orange colored. Fruit silvery- white, small, oblong caryopsis **(Plate-25).**

Common Name: Seeta Ghass

Flowering and Fruiting:- April- October

Ethnobotanical Uses:

- It is used for making ropes, brushes, mates and for making packing material.
- Also useful for manufacturing of paper.

Pennisetum Rich.

***Pennisetum glaucum* (Linn.) R. Br.**; *GBCIP.350; FD.380; FPP. 287; FBI. 7: 82.*

An erect, stout, annual herb up to 3 m high. Leaves long, sessile, linear- lanceolate. Inflorescence dense panicle-spike, involucral glumes numerous, persistent, ciliate

bristles. Spikelet deciduous, oblong, dimorphic, lower one staminate or neuter, upper one hermaphrodite. Fruit glabrous, ellipsoid caryopsis.

Common Name:- Bajra

Flowering and Fruiting:- September – January

Ethnobotanical Uses:

- Grains are ground into flour for making chapatis.
- Grains are given as food for nursing women to increase breasts milk.
- Green ears are roasted and eaten.
- It is also suitable for making malt.
- Also used as a fodder for cattles.

***Phalaris* L.**

***Phalaris minor* Retz.**; *FBI. 7: 221; GBCIP.616; FD.382; FPP. 287; FH. 238.*

A decumbent, annual grass. Stem branched, with swollen nodes. Leaves alternate, linear-lanceolate, pointed at tip. Inflorescence panicled cylindric spike, spikelet laterally compressed, flattened, floret single with imperfect glume. Glumes boat-shaped, keeled, wings when empty. Fruit caryopsis with free grains.

Common Name:- Chiriya-bajra

Flowering and Fruiting:- December – March

Ethnobotanical Uses:

- It is mixed with wheat grains in storage to keep away mice.
- Cattle eat it as fodder.
- Grains also used as bird feed.

***Poa* L.**

***Poa annua* L.**; *SPL.68; FBI. 7: 343; GBCIP.555; FD.407; FH. 239.*

A glabrous, tufted, sub-erect, annual herb. Leaves rectilinear, flat, flaccid. Inflorescence ovate panicle, branches filliform. Spikelet oblong, green, floret 3-7. Involucral glumes unequal. Floral glumes silky, ciliate below keel, nerved. Fruit oblong caryopsis.

Flowering and Fruiting:- December – March

Ethnobotanical Uses:

- Used as cattle fodder.

Saccharum L.

***Saccharum spontaneum* L.**; *FBI. 7: 118; FF. 540; FD.371; FPP. 288; FID. 428*.

An erect, perennial herb about 3 m tall. Stem branched, fistular and silky below, solid above, tufted. Leaves rectilinear, acuminate, coriaceous, glabrous, midrib white, ligule deltoid. Panicle conical-oblong, branches ascending. Spikelets paired, awnless, dimorphic, pedicellate one staminate or neuter, sessile one hermaphrodite. Glumes 4, lower involucral glume lanceolate, upper one keeled, single nerved. Upper floral glume slender, ciliate, palea minute. Fruit caryopsis.

Common Name:- Kans

Flowering and Fruiting:- September – January

Ethnobotanical Uses:

- Used for roof thatching.
- Also useful as fodder at the time of scarcity.

Setaria Beauv.

***Setaria verticillata* (L.) P. Beauv.**; *FBI. 7: 80; GBCIP.365; FD.378; FID. 430; FPP. 289; FH. 241.*

An climbing, tufted, annual herb about 30-90 cm tall. Stem stout, branched at base, glabrous, angular. Leaves thin, linear-lanceolate, mid nerve keeled near base. Inflorescence spirally twisted, oblong panicle, bristle rough, barbed. Spikelets obtuse, pale-green, glumes unequal, upper floret hermaphrodite, lower one sterile. Stigma purple. Fruit whitish, broady elliptic, translucent caryopsis **(Plate-26).**

Flowering and Fruiting:- September – November

Ethnobotanical Uses:

- Seeds are roasted and used to remove extra fat from the body.
- Grain used for the preparation of an alchoholic drink.
- Young grass used as fodder.

Sorghum Moench.

***Sorghum halepense* (L.) Pers.**; *FBI. 7: 182; GBCIP.222; FD.400; FPP. 290; FH. 241; FID. 431; SPL.1047.*

An erect, branched, stout, tall, perennial grass. Stem diverged, glabrous, leafy. Leaves linear-lanceolate, serrulate, midrib stout, striate, ligule present. Inflorescence compound

panicle, smooth rachis, spikelet sessile, ovoid-lanceolate, compressed at dorsal side, purple colored, dimorphic, sessile one hermaphrodite, pedicellate one neuter or staminate. Glumes 4, lower involucral glume acute and silky, upper one lanceolate, acuminate, upper floral glume oblong, bi-lobed, clliate, awned, lower one hyaline, ciliate. Fruit caryopsis **(Plate-23).**

Common Name:- Baru Ghass

Flowering and Fruiting:- October – March

Ethnobotanical Uses:

- It is very fine grass and used as good fodder.
- When taken in higher quantity, it may be poisonous to stock animals.

CHAPTER - 6

RESULT AND DISCUSSION

Present study has been conducted to document the floristic diversity and ethnobotanical knowledge of the study area. Geographically, district Saharanpur is located in the North-West edge of Uttar Pradesh. It lies between 29° 34' and 30° 34' North latitude and 77° 7' and 87° 12' East longitude. The area of district is 3860 sq. km., of which forest area is about 67014 hectares. The region forms the northern most part of Ganga-Yamuna Doab. In the North of the district lies district Dehradun of Uttarakhand state and districts Yamuna Nagar and Karnal of Haryana state in the west, district Muzaffarnagar and Shamli in the south and district Haridwar of Uttarakhand state in the east.

The district Saharanpur is characterized with the Shiwalik, Bhabar, Tarai, Khadar and the plain. Hilly tract of the Shiwalik, range along the northern border is stretching from west to east directions, which have a breadth of 10-16 kilometres. The whole range is forested. Lying immediately below the Shiwaliks is the Bhabar tract intersected by numerous torrents that drain rainy water into the Yamuna river and its tributaries.

The northern part of the district is a hilly tract and most of the forests are there. The southern part is mostly plain region and constitute major part of the district. The district shares its border with three states i.e. Haryana, Himachal Pradesh and Uttarakhand. Therefore, climatic variations in adjoining regions has great impact on the vegetation of Saharanpur district. Further, due to northern part of Saharanpur being hilly and rest of the adjoining district of Uttar Pradesh being plain, the rainfall in the Saharanpur district is comparatively more than the other adjoining districts. The floristic diversity of this region shows affinities with vegetation of adjoining regions.

In the present study 303 plant species belonging to 208 genera and 74 families have been described from various sites of district Saharanpur, Uttar Pradesh. The dicotyledons are represented by 250 species belonging to 169 genera and 62 families whereas monocotyledons by 53 species belonging to 39 genera and 12 families**.** The statistical analysis of families, genera and species as shown in Fig. 1.1 and 1.2, revealed that dicotyledons constitute the dominant forms over the monocotyledons in this area (Table 1.1).

Table: 1.1. List of the total families, genera and species of dicotyledons and monocotyledons.

S.No.	Class	Families	Genera	Species
1.	Dicotyledons	62	169	250
2.	Monocotyledons	12	39	53
	Total	**74**	**208**	**303**

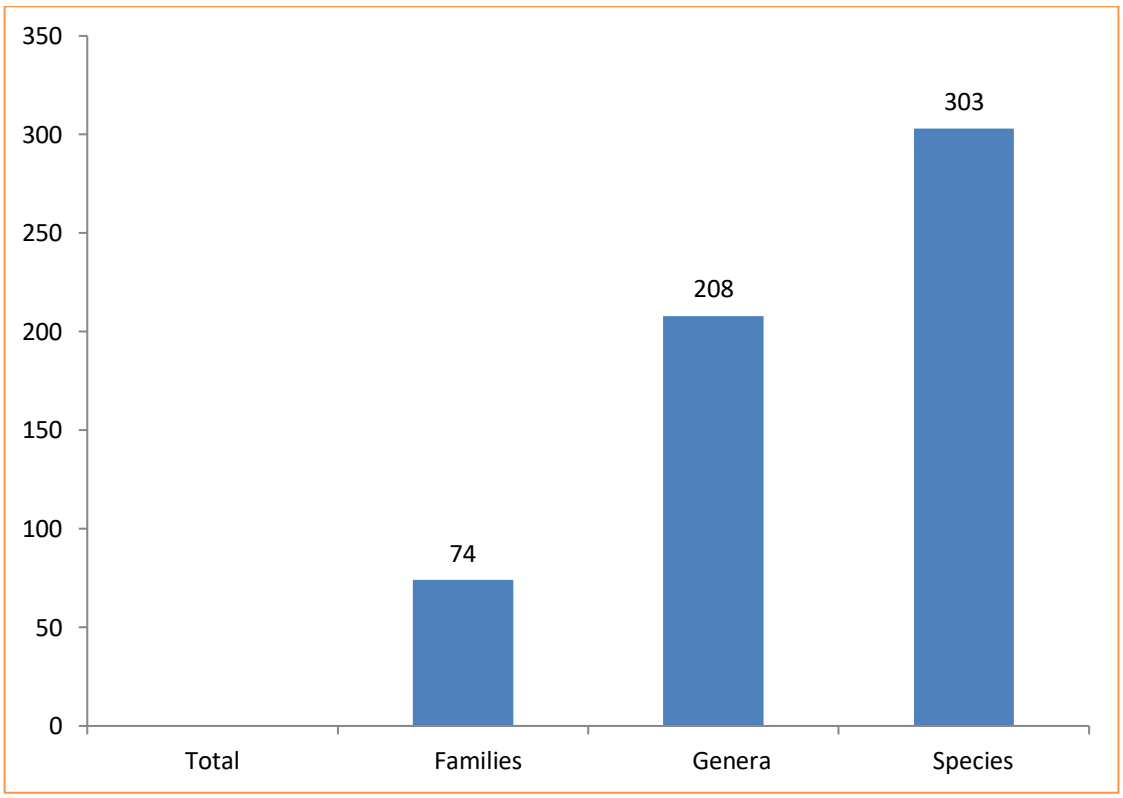


Fig. 1.1. Graphical representation of total number of families, genera and species.

In present study total **04 plant species** recorded as **parasite** which includes *Cuscuta hyalina*, *Cuscuta reflexa*, *Striga augustifolia* and *Verbascum chinense.*

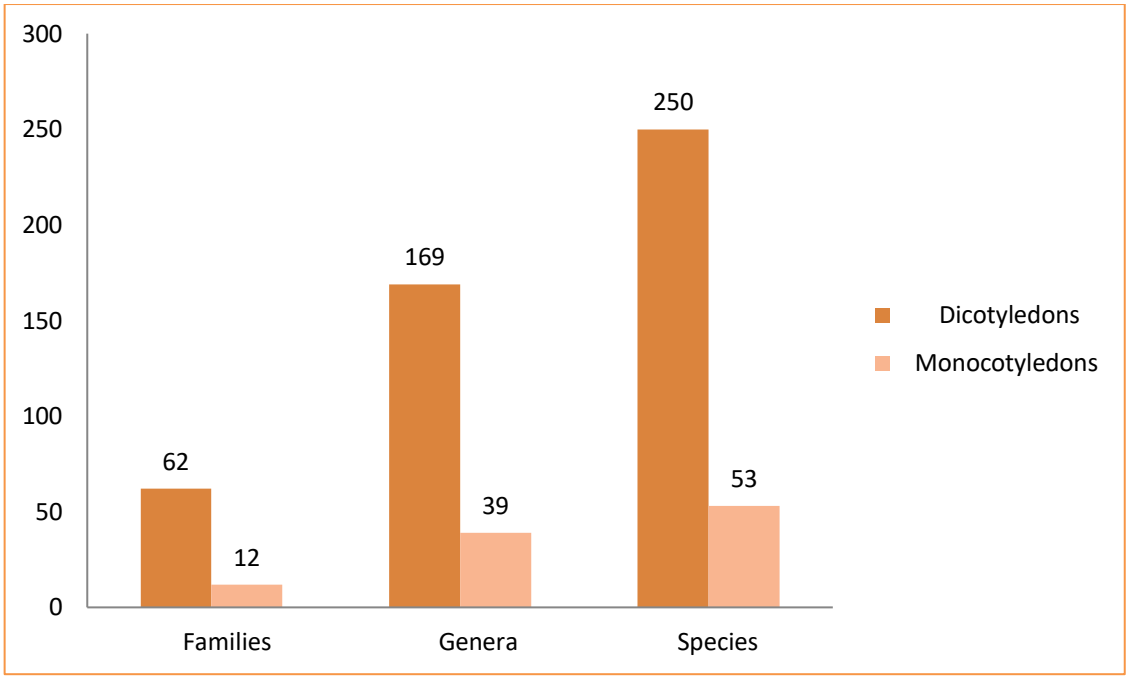


Fig. 1.2. Graphical representation of monocot and dicot families, genera and species.

Out of the total reported **303** species of plants, **209** species belongs to herbs, **48** species belongs to shrubs, **30** species belongs to trees and **16** species are of climbers (Table 1.2 and Fig. 1.3).

Table: 1.2. List of types of habit from total collected plant species.

Sr. No.	**Habit**	**No. of Species**	**Percentage (%)**
1.	Herbs	209	68.98%
2.	Shrubs	48	15.84 %
3.	Trees	30	9.90 %
4.	Climbers	16	5.28 %
Total		**303**	**100 %**

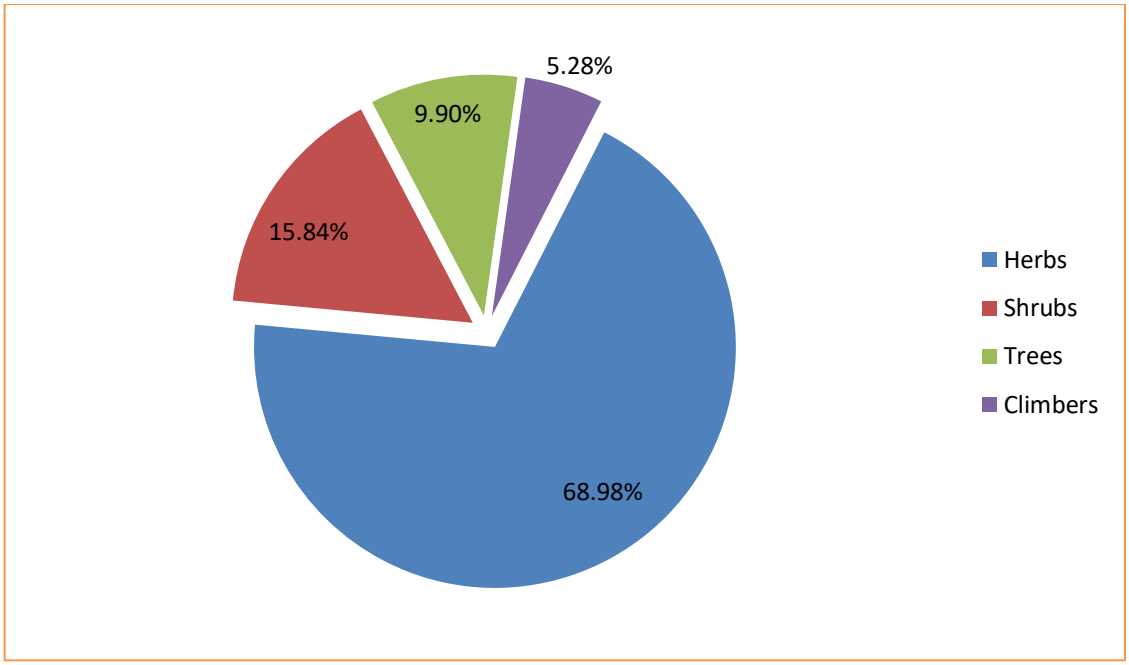


Fig. 1.3. Pie chart showing percentage of Ethnobotanically Important Plant Forms found in study area.

The ratio of families of monocots and dicots is 1: 5.25. The ratio of monocot and dicot genera is 1: 4.33, of species 1: 4.72 in present study. This analysis of present study is shown in table 1.3.

Table:1.3 Comparative ratio of monocots to dicots, family to genera and genera to species.

Sr. No.	Category	Taxa	Ratio
1.	Monocot to Dicot	Family Genera Species	1 : 5.25 1 : 4.33 1 : 4.72
2.	Family to Genera	Dicot Monocot Total	1 : 2.68 1 : 3.25 1 : 2.77
3.	Genera to species	Dicot Monocot Total	1 : 1.48 1 : 1.36 1 : 1.45

The present study revealed that ratio of total number of genera to species is 1:1.45, ratio of total number of families to genera is 1: 2.77 and ratio of total number of monocots to dicots is 1: 4.72.

In the present study, family Fabaceae ranks at first followed by family Poaceae. Family Fabaceae is represented by 24 species belonging to 15 genera and family Poaceae is represented by 22 species belonging to 20 genera.

Family wise analysis revealed that 11 largest families of the study area are Fabaceae (24), Poaceae (22), Asteraceae (16), Cyperaceae (16), Malvaceae(12), Mimosaceae (12), Amaranthaceae (11), Convolvulacae (11), Solanaceae (11), Cucurbitaceae (10) followed by Euphorbiaceae(10) as shown in Table 1.4.

Table: 1.4 List of dominant families.

Sr. No.	Name Of Families	No. of Plant Species
1.	Fabaceae	24
2.	Poaceae	22
3.	Asteraceae	16
4.	Cyperaceae	16
5.	Malvaceae	12
6.	Mimosaceae	12
7.	Amaranthaceae	11
8.	Convolvulaceae	11
9.	Solanaceae	11
10.	Cucurbitaceae	10
11.	Euphorbiaceae	10

Seven dominant genera which represented with 4 or more species includes *Cyperus* which is represented by 11 species followed by *Ipomoea*(5), *Sida*(5), *Acacia*(4), *Boerhaavia*(4), *Corchorus*(4) and *Euphorbia*(4). See Table 1.5.

Table:1.5 List of Dominant genera

Sr. No.	Name of Genera	No. of Plant Species
1.	*Cyperus*	11
2.	*Ipomoea*	5
3.	*Sida*	5
4.	*Acacia*	4
5.	*Boerhaavia*	4
6.	*Corchorus*	4
7.	*Euphorbia*	4

The total belief on the traditional utilization of plants among the indigenous societies is based on their long life experiences and it will be of great importance, if such knowledge is properly documented and given due importance. The present investigation is an attempt to provide the precious information on 303 plant species belonging to 74 families and their ethnobotanical uses against various human disorders, obtained from tribal and rural people in Saharanpur district of Uttar Pradesh.

During this study, it is observed a single plant species is used for various purposes such as for medicinal, edible, religious, timber, fiber, fodder and other miscellaneous purposes. Similarly, a single plant species and its different parts are also used for various purposes and for the treatment of different diseases.

Out of these 303 plant species belonging to 74 families, the dominant 11 families are Fabaceae with 7.92% (24) plant species, Poaceae with 7.26% (22) plant species, Asteraceae and Cyperaceae with 5.28% (16) plant species, Malvaceae and Mimosaceae with 3.96% (12) plant species, Amaranthaceae, Convolvulaceae and Solanaceae with

3.63% (11) plant species, Cucubitaceae and Euphorbiaceae with 3.30% (10) plant species as shown in Table 1.6 and Fig. 1.4 & 1.5. These families are followed by Scrophulariaceae with 2.64% (8) plant species, Caesalpiniaceae with 2.31% (7) plant species and Verbenaceae with 1.98% (6) plant species. Family Acanthaceae, Boraginaceae, Brassicaceae, Lamiaceae, Moraceae, Nyctaginaceae and Tiliaceae are represented with 1.65% (5) plant species. Similarlly, family Apocynaceae, Asclepiadaceae and Caryophyllaceae are represented with 1.32% (4) plant species. And, rest of the families are recorded with less than 4 species. Fabaceae , Poaceae, Asteraceae and Cyperaceae are the most dominant families from floristic as well as ethnobotanical point of view, recorded during the exploration in the study area.

Table: 1.6 Percentage of the plant species used among the Dominant family of study area:

S.No.	Name of families	Percentage of plant species used
1.	Fabaceae	7.92
2.	Poaceae	7.26
3.	Asteraceae	5.28
4.	Cyperaceae	5.28
5.	Malvaceae	3.96
6.	Mimosaceae	3.96
7.	Amaranthaceae	3.63
8.	Convolvulaceae	3.63
9.	Solanaceae	3.63
10.	Cucurbitaceae	3.30
11.	Euphorbiaceae	3.30

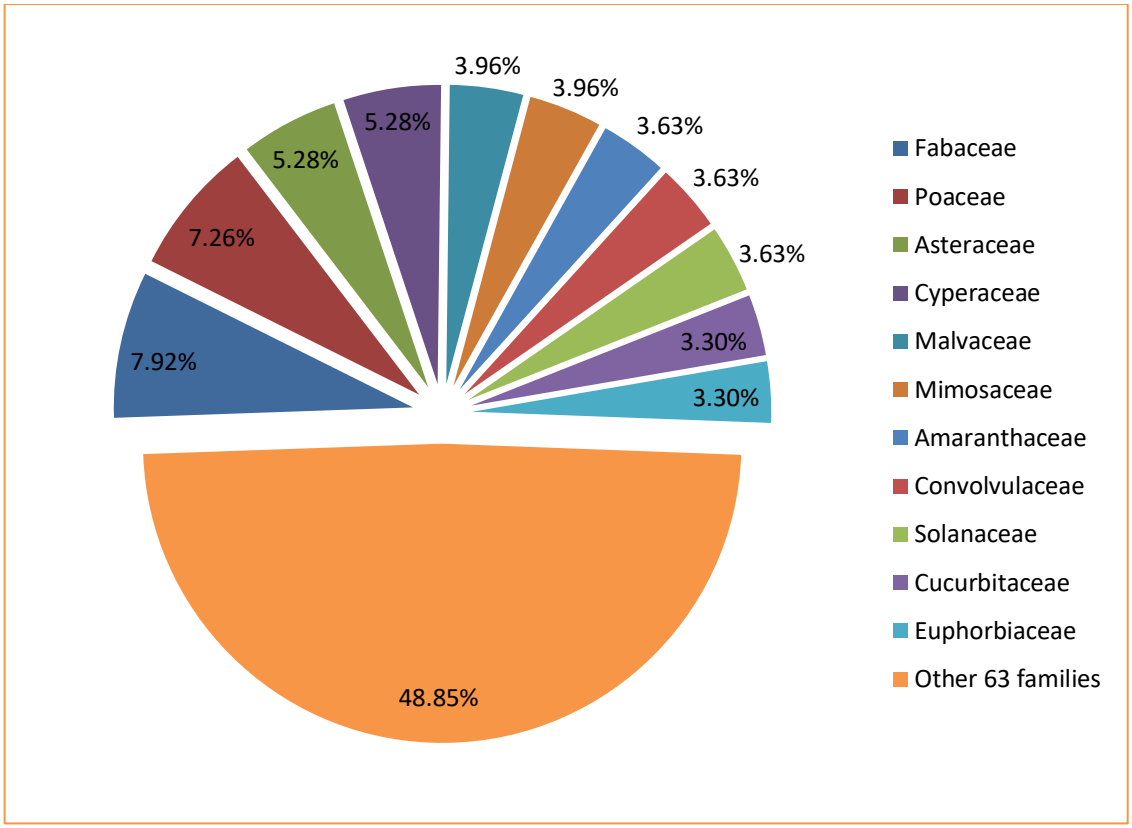


Fig. 1.4. Pie chart showing percentage of plant species used among the dominant families of study area.

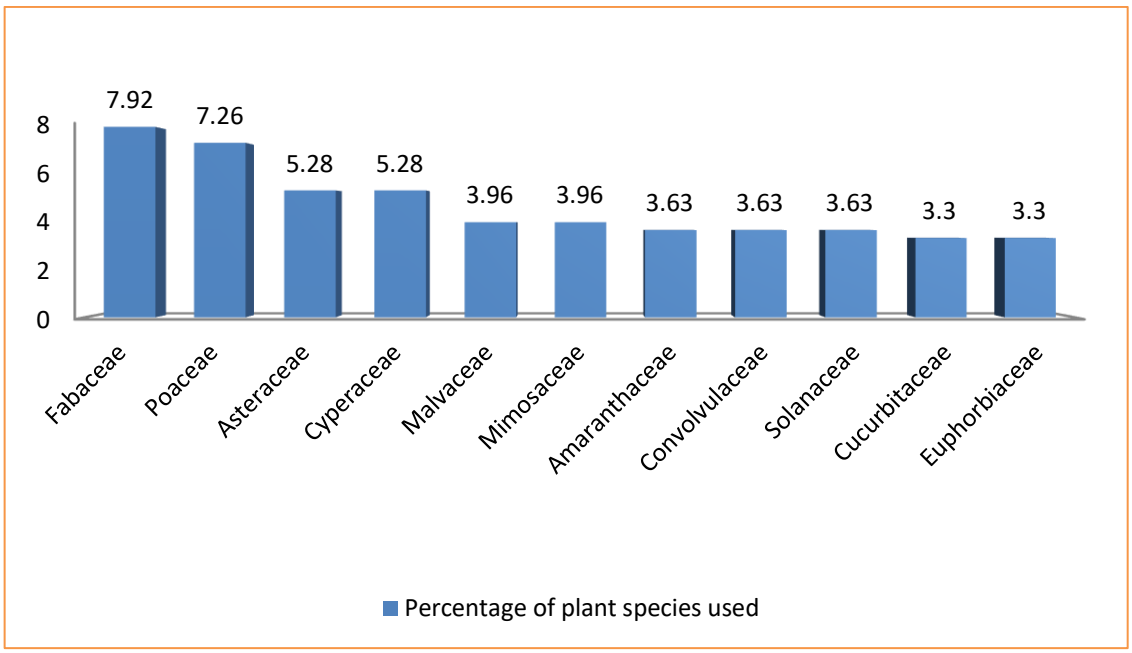


Fig. 1.5. Graphical representation showing percentage of the plant species used among dominant families of study area.

Out of the recorded 303 plant species, 36.18% plant species are used for medicinal purpose followed by 16.84% plant species used for edible purpose, 12.90% plant species are used for miscellaneous purposes, 11.84% plant species used as fodder, 6.05% plant species used for timber wood which are used for plywood manufacture, house construction, furniture, agricultural implements and musical instruments, 5.0% plant species used as fuel, 3.42% plant species used for religious purpose, 2.90% plant species used as fibres, 2.50% plant species used for insecticidal purpose, 2.37% plant species used for ornamental purpose as shown in Table 1.7 and Fig. 1.6 & 1.7.

Table: 1.7. Percentage of mode of plants used by rural people of study area

S.No.	Mode of plant used	Percentage of plant species used
1.	Medicinal	36.18
2.	Food	16.84
3.	Fodder	11.84
4.	Timber	6.05
5.	Religious	3.42
6.	Fuel	5.00
7.	Ornamental	2.37
8.	Insecticide	2.50
9.	Fibre	2.90
10.	Miscellaneous use	12.90

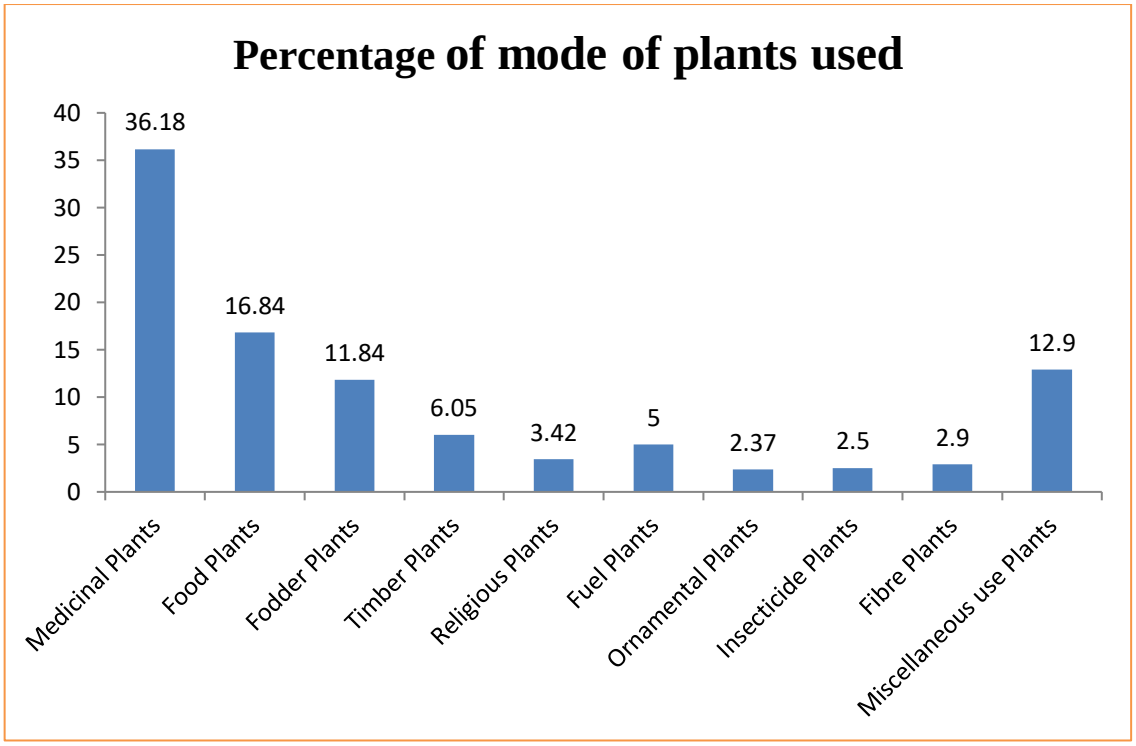


Fig. 1.6. Graphical Representation showing percentages of mode of plants used by rural people of study area.

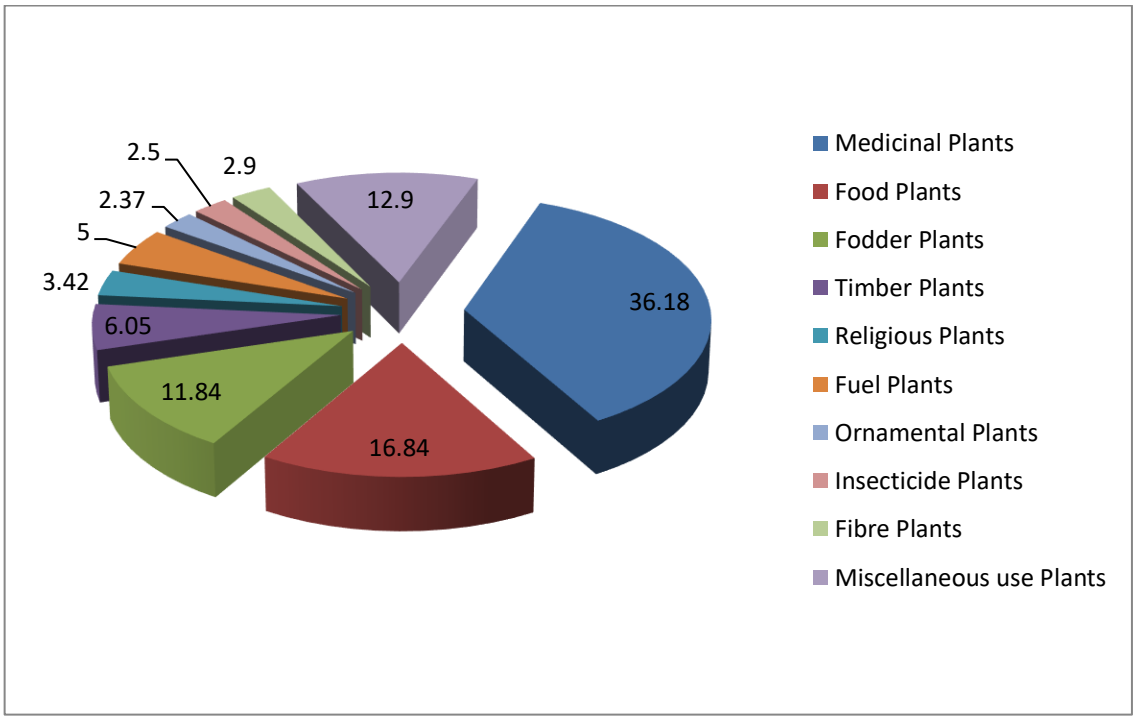


Fig. 1.7. Pie chart showing percentages of mode of plants used by rural people of study area.

It was observed that rural people used various plant parts for different ethno-botanical purposes in the study area. Most commonly used plant part was leaves (23.97%), followed by root (13.08%), whole plant (11.14%), fruits (10.90%), seeds (10.05%), stem (9.44%), miscellaneous plant parts (4.96%), flowers (4.72%), bark (3.87%), twigs (3.63%), underground parts (2.06%) and gum and resin (1.09% each) which were used for various ethnobotanical purposes. Mostly leaves, whole plants, seed, fruit, stem, root, and flowers are used by rural people of the district Saharanpur to fulfil their basic needs (See Table 1.8 and Fig. 1.8 and 1.9).

Table 1.8. Percentage of plants parts used for the different ethnobotanical purposes by the rural people of study area

S.No.	Name of plant parts used	Percentage of plant parts used
1.	Leaves	23.97
2.	Root	13.08
3.	Whole plant	11.14
4.	Fruit	10.90
5.	Seed	10.05
6.	Stem	9.44
7.	Flowers	4.72
8.	Bark	3.87
9.	Twigs	3.63
10.	Underground part	2.06
11.	Gum	1.09
12.	Resin	1.09
13.	Miscellaneous plant parts	4.96

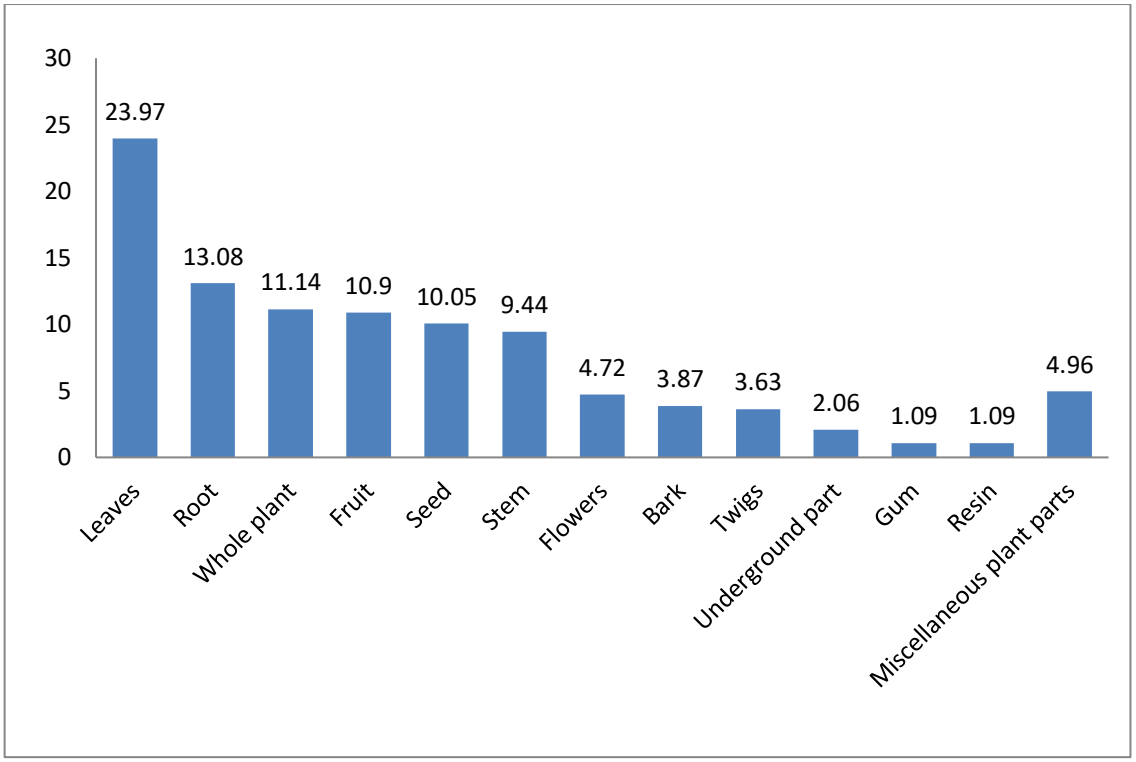


Fig. 1.8. Graphical Representation showing percentages of plant parts used by rural people of study area.

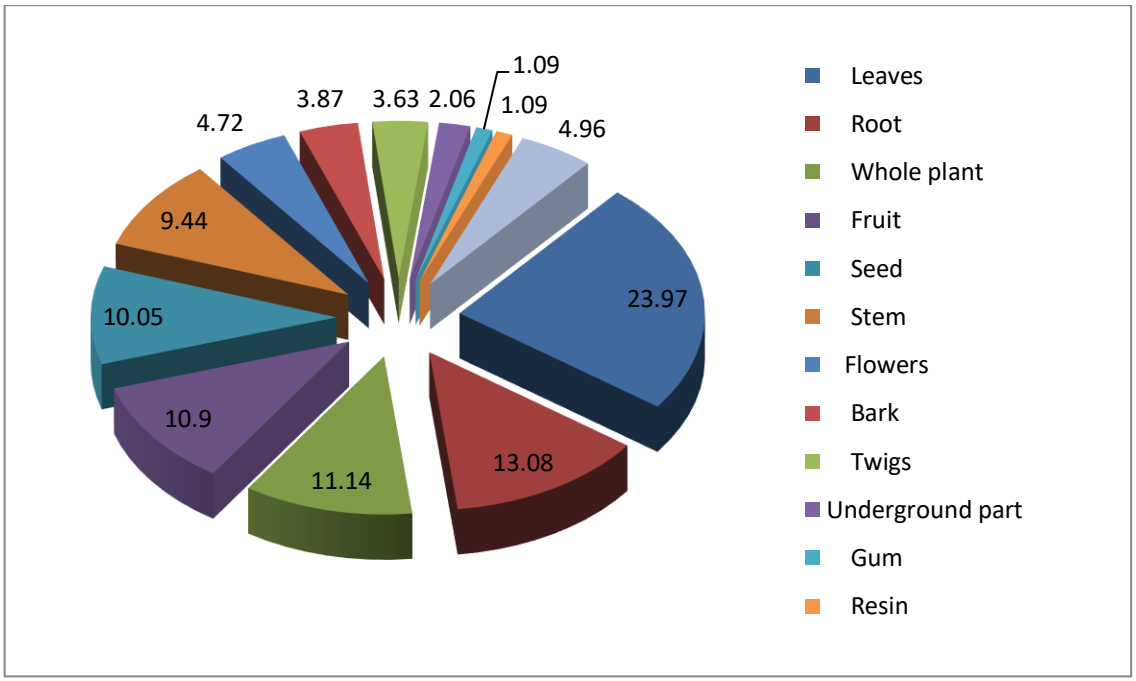


Fig. 1.9. Pie chart showing percentage of plant parts used by the rural people of study area.

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