

# Indigenous Knowledge on the Utilization of Medicinal Plant Diversity in the Siwalik Region of Garhwal Himalaya, Uttarakhand

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**ABSTRACT** : Ever since the dawn of civilization, the ambient vegetation and the resources constituted major source of human existence for various substantial requirements. Our present knowledge on plant resources emerged from the traditional heritable knowledge descended from generation to generation. However, traditional knowledge pertaining to several aspects remained untapped from various remote localities or populations. Furthermore, with the present trends of excessive exploitation of natural resources and degradation of habitats, conservation and ecological management require coherence of traditional skills and modern approaches. Therefore, the present study is to record traditional plant based knowledge among the inhabitants of Siwalik region of Uttarakhand Himalaya. Extensive field survey was made for the collection of data on the medicinal aspects of plant species in the study area covering the parts of districts Pauri, Dehradun and Haridwar. During the course of study 130 plant species belonging to 65 families are reported, used as traditional medicine by the local inhabitants of this region.

**Keywords** : Ethnomedicine, Indigenous knowledge, Garhwal Himalaya, Uttarakhand

## INTRODUCTION

The Himalaya has a great reservoir of biodiversity and a large number of ethnic communities with their own traditional knowledge system. The rich biodiversity shows variations in species composition from east to west as well as from low to high elevation, with secondary influence of geology and soil (Champion and Seth, 1968). The Uttarakhand Himalaya is characterized by a rich diversity of ethnomedicinal plants and occupies an important position in Vedic treatises. The Garhwal and Kumaon Himalaya of Uttarakhand state covers 5.5 per cent of the total western Himalayan region and a numbers of workers carried out studies on the plants of economic values in this part of Himalaya (Arya et al., 1999; Bhatt and Gaur, 1992; Gaur, 2008; Gaur and Nautiyal, 1993; Gaur et al., 1997; Joshi and Pandey, 2000; Mehta and Bhatt, 2007; Negi and Gaur, 1991; Negi and Gaur, 1994; Shah and Joshi, 1990; Sharma, 2010; Tiwari and Pandey, 2010). During the last few decades there has been an increasing

interest in the study of medicinal plants and their traditional use in different parts of the state either by tribal people or the indigenous communities (Gangwar et al., 2010; Gaur, 1999; Gaur et al., 2010; Negi et al., 2002; Nazir et al., 2010; Pandey and Pandey, 2010; Sharma et al., 2010, 2011).

Forests are the principal source of raw material for plant based medicine. Medicinal plants have been used as a major source of therapeutic agents by man for thousands of years. The herbal drugs obtained from the plants are believed to be more effective in the treatment of different ailment (Shiddhiqui et al., 1995). More than 90% of raw matter required in the field of pharmaceutical is obtained from the wild resources (Kehimker, 2000). Collection of information and documentation of traditional knowledge plays an important role in scientific research on drug development (Ragupathy et al., 2008). The local communities and the indigenous people residing in the remote localities have good knowledge about utilization of herbal resources and natural reserves. They mainly rely directly on the

endemic vegetation for their illness and treatment of various types of ailments. The tradition based knowledge system becomes an opportunity for successful conservation and sustainable development. For the proper scientific transformation of traditional knowledge a sound rapport to local communities, understanding of their language, folk knowledge of plant species and pattern of utilization system is essential. Throughout the world there has been a great concern to restore the available old traditional practices among different ethnic societies. But unfortunately much of this prosperity of knowledge is today becoming lost as traditional culture becomes ended. So there is a great need of ethnobotanical operations for the documentation of this knowledge an important component of traditional wisdom as soon as possible.

The present study is carried out in Siwalik ranges of Himalaya, starting from 400 m upto 2000 m asl. In this region there are distinct local inhabitants as well as some tribal pockets of Tharus, Bhojas, Gujjars, Jaunsaris, Raji who are accustomed to use natural resources in sustainable manner for the long past. Majority of population dwell in small villages surrounded by crop fields and forests. Their livelihood is greatly dependent on the traditionally maintained ecosystems. Their beliefs and actions are related with the conservation of nature, in the terms of resource utilization.

The main objective of the project is to carry out detailed investigations on plant utilization from the Siwalik region

of Garhwal Himalaya. The most important aspect of the study is to translate local version of usage pattern into the scientific or botanical terms, for the wider understanding. Usually local names of plants vary from place to place, therefore, the correct determination of the plants is only based on the botanical names, and subsequently the information is considered as authentic. Thus the primary aim of the study is to tap the information in systematic manner. Secondly, during the course of development, the local usage pattern is dwindling fast, evidently, it is essential to tap the information before it is likely to be vanished from the inhabitants system.

## MATERIALS AND METHODS

The study was conducted in different villages of the Shiwalik Himalaya in districts Pauri ( $29^{\circ}45'$  to  $30^{\circ}15'$  N- $78^{\circ}24'$  to  $79^{\circ}23'$  E), Dehradun ( $30^{\circ}19'$  N- $78^{\circ}04'$  E) and Haridwar ( $29^{\circ}96'$  N- $78^{\circ}16'$  E) (Fig. 1). Extensive field survey and plant collection were made during the course of study. Interviews with folk priest, women folk, graziers, vaidyas and elderly populace were conducted to receive reliable information. The questionnaires were used to obtain information on medicinal plants with their local names, parts used, ailment treated, mode of preparation and administration. Information on various utilization of medicinal plants has been recorded through personal interviews and group discussions with the people of different age group.



Fig. 1. Map of Study Area.

In absence of medicinen the medicinal plants collected from the forest area were shown to them and other knowledgeable persons for necessary information. The data on medicinal properties of the plant used for curing ailments were cross checked at least from the 4-8 informants. All age classes were interviewed for the collection of information, but preference was given mostly to older age class having much knowledge about use of medicine. The information was cross-checked by consulting important works done on medicinal plants (Nair and Mohanan, 1998; Jain, 1968, 1991; Gaur, 1999). The collected plant specimens are identified with the help of relevant floras (Babu, 1977; Gaur, 1999) and deposited in the Herbarium, Botany Department, HNB Garhwal University Srinagar (GUH) following the usual methods of Herbarium (Jain and Rao, 1977; Rao and Sharma, 1990; Singh and Subramaniam, 2008; Gaur, 2009).

## RESULTS AND DISCUSSION

It is evident from the present findings that the Shiwalik region is endowed with large number of medicinal plants and represents their multiple traditional uses. This study reveals that the local communities of study area still depend on medicinal plants for primary healthcare. The families are arranged in alphabetical order with their plant species, following usual citation, available vernacular names, habit, distribution, altitudinal range and with ethnomedicinal uses, including diseases treated with specific plant part (Table 1). The most of the reported plant species are common to the locality while some other are rare and uncommon in their occurrence due to natural disturbance or over exploitation reasons, indicates the need of proper conservation.

**Table 1.** General details, uses, parts used and preparation of the medicinal plants

S.No.	Family/Botanical name	Common name	Habit	Dist	Altitude (m asl)	Plant part used	Ailment treated
<b>Acanthaceae</b>							
1.	<i>Adhatoda vasica</i> Nees	<i>Basinga, Bansa</i>	S	Ab	600-1000	Lv Flb, Rt	Rheumatism, Cough, Anthelmintic
<b>Amaranthaceae</b>							
2.	<i>Achyranthes aspera</i> L.	<i>Lichkura</i>	H	C	600-800	Sd WP	Skin diseases Colic
<b>Anacardiaceae</b>							
3.	<i>Rhus parviflora</i> Roxb.	<i>Tungla</i>	S	C	300-1000	St	Suppressed urination
<b>Annonaceae</b>							
4.	<i>Annona squamosa</i> L.	<i>Sitaphal</i>	S	C	up to 1000	Lv Sd	Wounds Kill lice
<b>Apiaceae</b>							
5.	<i>Bupleurum falcatum</i> L.	<i>Jangli Jeera</i>	H	UC	800-2500	Rt	Liver troubles
6.	<i>Centella asiatica</i> (L.) Urban	<i>Brahmi</i>	H	C	500-100	Lv	Headache
<b>Apocynaceae</b>							
7.	<i>Carissa opaca</i> Stapf.	<i>Karonda</i>	S	Ab	600-1000	Rt brk	Fever
8.	<i>Quirivelia frutescens</i> (L.)M.R. & S.M. Almeida	<i>Kali dudhi, Dudhi bel</i>	Cl	C	up to 1500	Rt St	Skin disease and Fever Toothache
<b>Araceae</b>							
9.	<i>Acorus calamus</i> L.	<i>Bauj</i>	H	UC	800-2000	Rh	Diarrhoea, Dysentery, Liver tonic
<b>Araliaceae</b>							
10.	<i>Hedera nepalensis</i> K. Koch.	<i>Banda, Bandu</i>	Cl	C	up to 2500	Lv	Ulcers, Asthma & Bronchitis, Anthelmintic
<b>Asteraceae</b>							
11.	<i>Circium wallichii</i> DC.	<i>Kandelya</i>	H	UC	up to 2000	Rt	Refreshing cold drink
12.	<i>Eupatorium adenophorum</i> Spreng.	<i>Basiya</i>	H	C	up to 2200	Lv	Blood clotting
13.	<i>Gerbera gossypina</i> (Royle) Beauv.	<i>Kabasi</i>	H	C	up to 2600	Rt	Laxative and in Blood pressure
14.	<i>Inula cappa</i> DC.	<i>Tangiri</i>	S	UC	up to 1500	Rt	Suppression of urination
<b>Bignoniaceae</b>							
15.	<i>Oroxylum indicum</i> (L.)Vent.	<i>Tantiya</i>	T	C	up to 1500	Rt Sd St	Stomachache and Diarrhoea Piles Wounds

Table 1. Continued

S.No.	Family/Botanical name	Common name	Habit	Dist	Altitude (m asl)	Plant part used	Ailment treated
<b>Bombacaceae</b>							
16.	<i>Bombax ceiba</i> L.	<i>Semal</i>	T	C	up to 1000	Gu Rt	Aphrodisiac Stimulant and tonic
<b>Boraginaceae</b>							
17.	<i>Ehretia laevis</i> Roxb.	<i>Chamrore</i>	T	C	up to 1000	Rt	Joints pain and Wounds
<b>Brassicaceae</b>							
18.	<i>Capsella bursa-pastoris</i> (L.)Medik.	<i>Chainya</i>	H	C	500-3500	Sd	Astringent
<b>Caesalpiniaceae</b>							
19.	<i>Bauhinia variegata</i> L.	<i>Guiral</i>	T	C	up to 1200	Lv	Cough
20.	<i>Cassia floribunda</i> Cavan	<i>Chakunda, Taror</i>	S	C	600-1200	Sd	Digestive and Respiratory troubles.
21.	<i>Cassia occidentalis</i> L.	<i>Chakunda</i>	S	C	up to 1500	Fl Fr	Wounds Eczema
<b>Caryophyllaceae</b>							
22.	<i>Stellaria media</i> (L.) Vill.	<i>Badiyallu</i>	H	Ab	up to 1000	Lv Rt	Burns Boils and Blisters
<b>Celastraceae</b>							
23.	<i>Celastrus paniculatus</i> Willd.	<i>Malkuni, Umjan</i>	S	UC	up to 1000	Sd Fr	Rheumatism Dysentery
<b>Combretaceae</b>							
24.	<i>Terminalia bellirica</i> Roxb.	<i>Bahera</i>	T	C	up to 1200	Fr	Digestion, Asthma & Bronchitis, Eye troubles
25.	<i>Terminalia alata</i> Wight. & Arn.	<i>Asian, Asin</i>	T	C	up to 800	Brk	Leucorrhoea and Cuts
<b>Commelinaceae</b>							
26.	<i>Commelina benghalensis</i> L.	<i>Kansura</i>	H	C	up to 1200	Rt	Liver disease
<b>Convulvulaceae</b>							
27.	<i>Ipomoea pes-trigridis</i> L.	<i>Gheebati</i>	Cl	C	up to 1500	Rt	Fever
<b>Cucurbitaceae</b>							
28.	<i>Trichosanthes tricuspidata</i> Lour.	<i>Indrian</i>	Cl	C	500-2000	Fr, Sd	Diabetic diseases
<b>Dioscoreaceae</b>							
29.	<i>Dioscorea belophylla</i> Prain	<i>Tairu</i>	Cl	C	up to 1200	Tu	Aphrodisiac
30.	<i>Dioscorea bulbifera</i> L.	<i>Genthi</i>	Cl	C	up to 1500	Tu	Colic, Piles and Jaundice
<b>Dipsacaceae</b>							
31.	<i>Dipsacus inermis</i> Wall.	<i>Phulee</i>	H	C	1200-3000	Rt	Leucoderma
<b>Dipterocarpaceae</b>							
32.	<i>Shorea robusta</i> Gaertn.	<i>Saal</i>	T	C	500-1000	GR	Skin diseases and Leucoderma.
<b>Ericaceae</b>							
33.	<i>Lyonia ovalifolia</i> (Wall.) Drude	<i>Anyar</i>	T	C	up to 2000	Lv	Skin diseases
34.	<i>Rhododendron arboreum</i> Smith.	<i>Burans</i>	S	C	1200-2500	Fl Lv	Fever Headache
35.	<i>Drypetes roxburghii</i> (Wall.) Hurus	<i>Jiyapota, Juti</i>	T	UC	up to 800	Fr Lv	Psychomedicine Fever, Skin disease
36.	<i>Mallotus philippensis</i> Muell.-Arg.	<i>Ruina</i>	T	C	600-1000	Lv	Itching
<b>Fabaceae</b>							
37.	<i>Mucuna pruriens</i> (L.) DC.	<i>Dankuli, Gaunchi</i>	Cl	UC	up to 1000	Sd	Laxative, Diabetes
38.	<i>Erythrina arborescens</i> Roxb.	<i>Mandiro</i>	T	UC	up to 1500	Lv	Anthelmintic
39.	<i>Abrus precatorius</i> L.	<i>Ratigiri, Ratti</i>	Cl	C	up to 1500	Rt Sd	Syphilis Abortifacient
40.	<i>Butea monospema</i> (Lamb.)Taub.	<i>Dhaak</i>	T	C	up to 800	Gu Sd	Diarrhoea and Dysentery Vermifuge and Anthelmintic
41.	<i>Crotalaria burhia</i> Buch.-Ham.	<i>Sisai</i>	H	Ra	1000-2500	Rt	Skin diseases
42.	<i>Crotalaria juncea</i> L.	<i>Sunn</i>	H	UC	up to 1200	Sd	Blood purifier and Skin diseases.
43.	<i>Dalbergia latifolia</i> Roxb.	<i>Kala Shisham</i>	T	UC	up to 800	Sd	Digestive disorders
44.	<i>Dalbergia sissoo</i> Roxb.	<i>Shisham</i>	T	C	up to 700	Re Lf Fl	Skin diseases Leucorrhoea Menstrual disorders
45.	<i>Desmodium elegans</i> DC.	<i>Chamlai</i>	S	UC	up to 2500	Rt	Epilepsy
46.	<i>Desmodium gangeticum</i> (L.) DC.	<i>Sarivan, Salpalnu</i>	H	C	up to 1500	Rt	Astringent and Tonic, Febrifuge, Expectorant
47.	<i>Desmodium microphyllum</i> (Thunb.) Sansuri DC.	<i>Sansuri</i>	H	C	600-1000	Rt	Tonic

Table 1. Continued

S.No.	Family/Botanical name	Common name	Habit	Dist	Altitude (m asl)	Plant part used	Ailment treated
48.	<i>Dolichos tenuicaulis</i> (Baker) Craib	<i>Barchur</i>	S	Ra	up to 2000	Sd Rt	Febrifuge Tonic.
49.	<i>Flemingia paniculata</i> Wall.	<i>Saalpani</i>	S	C	up to 1000	Rt	Colic
50.	<i>Flemingia vestita</i> Benth.	<i>Jungli Bhatya</i>	H	C	500-1500	Rt	Blood dysentery
51.	<i>Indigofera heterantha</i> Wall.	<i>Saakina</i>	S	C	up to 1500	Flb	Digestive disorder
52.	<i>Lathyrus apahaca</i> L.	<i>Kurphali</i>	H	Ab	up to 1000	Rt	Febrifuge
53.	<i>Melilotus indica</i> (L.)	<i>Ban-methula</i>	H	Ab	up to 1000	Sd Lv	Body swelling Dysentery
54.	<i>Milletia extensa</i> (Benth.) Baker	<i>Gauj</i>	Cl	UC	600-1500	Rt	To prevent conception
55.	<i>Ougeinia oojeinensis</i> (Roxb.) Hoechr.	<i>Sandan</i>	T	C	500-1500	Gu	Digestive troubles
56.	<i>Pueraria tuberosa</i> DC.	<i>Sirwala, Siralu</i>	Cl	C	600-1500	Tu	Debility
57.	<i>Rhynchosia rothii</i> Benth.	<i>Ban-tor</i>	Cl	Ra	500-1000	Rt	Tonic
58.	<i>Zornia gibbosa</i> Span	<i>Kuri, Dwipati</i>	H	C	up to 800	Sd Rt	Nerve tonic induce sleep in infants.
<b>Fagaceae</b>							
59.	<i>Quercus leucotrichophora</i> A. Camus	<i>Banj</i>	T	C	1000-2400	GR Brk	Digestive troubles Dysentery
<b>Flacourtiaceae</b>							
60.	<i>Flacourtia indica</i> (Burm. f.) Merr.	<i>Kandai</i>	T	C	up to 1000	St brk Fr	Eye disease Liver troubles
<b>Geraniaceae</b>							
61.	<i>Geranium nepalense</i> Sw.	<i>Ratanjot</i>	H	C	up to 1500	Rt	Stomach complaint
<b>Hypericaceae</b>							
62.	<i>Hypericum oblongifolium</i> Choisy	<i>Chaya</i>	S	Ra	up to 2200	Lv	Cuts and Wounds
<b>Lamiaceae</b>							
63.	<i>Elsholtzia fruticosa</i> (D.Don) Rehder	<i>Bhangria</i>	H	UC	up to 2000	Sd	Carminative
64.	<i>Mentha longifolia</i> (L.) Huds.	<i>Pudina</i>	H	C	up to 1200	Lv, Rt	Indigestion
65.	<i>Micromeria biflora</i> (Buch.-Ham.) ex D.Don) Benth.	<i>K a h p u , Van-Ajwain</i>	H	C	up to 2500	Lv	Fever, Colic, Pimples
66.	<i>Roylea cinerea</i> (D.Don) Baill.	<i>Kadwi, Tiuna</i>	S	C	400-1500	Lv YT	Fever, Malaria Diabetes.
67.	<i>Scutellaria scandena</i> Buch.-Ham. ex D. Don	<i>Kappu, Kaphu</i>	H	C	500-1500	Lv, Rt	Digestive disorders
<b>Lamiaceae</b>							
68.	<i>Coleus forskohlii</i> (Poir) Briq.	<i>Pilwari</i>	H	UC	600-2000	Rt WP	Wormicide Cough and Cold
<b>Lathyraceae</b>							
69.	<i>Woodfordia fruticosa</i> (L.) Kurtz	<i>Dhaua, Dhau</i>	S	C	500-1400	Flb	Dysentery and Fever
<b>Lauraceae</b>							
70.	<i>Litsea glutinosa</i> (Lour.) Robin.	<i>Singrau</i>	T	UC	up to 2000	Brk Fr	Diarrhoea and Dysentery Rheumatism
<b>Liliaceae</b>							
71.	<i>Polygonatum cirrhifolium</i> (Wall.) Meda Royle		H	Ra	1000-3000	Rt	Febrifuge, Aphrodisiac.
72.	<i>Polygonatum verticillatum</i> (L.) All.	<i>Meda</i>	H	UC	1000-3000	Sh	Indigestion
<b>Linaceae</b>							
73.	<i>Reinwardtia indica</i> Dumort.	<i>Pheunli</i>	S	Ab	up to 800	Fl	Tongue infection
<b>Malvaceae</b>							
74.	<i>Urena lobata</i> L.	<i>Bala, Unga</i>	H	C	up to 2000	Brk Lv	Urinary troubles Wounds
<b>Menispermaceae</b>							
75.	<i>Cissampelos pariera</i> L.	<i>Paari</i>	Cl	UC	up to 2000	Rt	Colic, Cough, Malaria, Indigestion and Urinary complaints
76.	<i>Stephania glabra</i> Miers	<i>Gindaru</i>	Cl	C	up to 1500	Tu	Psychomedicine
77.	<i>Tinospora cordifolia</i> (Willd.) Miers	<i>Giloi</i>	Cl	Ra	up to 1000	St Rt	Diabetes Leprosy

Table 1. Continued

S.No.	Family/Botanical name	Common name	Habit	Dist	Altitude (m asl)	Plant part used	Ailment treated
<b>Mimosaceae</b>							
78.	<i>Acacia nilotica</i> (L) Delile	<i>Babul</i>	T	C	300-1200	Brk	Fever and Cough
79.	<i>Acacia catechu</i> Willd	<i>Khair</i>	T	C	up to 800	Brk	Astringent and Tonic
80.	<i>Acacia gageana</i> Craib	<i>Kingari</i>	S	UC	up to 800	Gu	Digestive disorders
81.	<i>Mimosa pudica</i> L.	<i>Chui-mui</i>	H	C	up to 1000	WP	Dysentery
<b>Moraceae</b>							
82.	<i>Ficus auriculata</i> Lour	<i>Timla</i>	T	C	up to 2000	Ufr	Dysentery
83.	<i>Ficus bengalensis</i> L.	<i>Bargad</i>	T	C	up to 1200	Lv YB, Lt	Diabetes Boils and blisters
84.	<i>Ficus sarmentosa</i> Buch.- Ham. ex Wall.	<i>Beduli, Kabhira</i>	Cl	UC	1000-1800	Fi	Stomach troubles, Indigestion
85.	<i>Ficus palmata</i> Forsk.	<i>Bedu</i>	T	C	up to 1800	Lv	Digestive troubles
86.	<i>Ficus religiosa</i> L.	<i>Peepal</i>	T	C	up to 1500	Fi Brk	Asthma & Bronchitis Dermatitis and Sexual weakness
<b>Myricaceae</b>							
87.	<i>Myrica esculenta</i> Buch.-Ham. ex D.Don.	<i>Kaphal</i>	T	C	900-2000	Brk	Asthma and Fever
<b>Nyctaginaceae</b>							
88.	<i>Boerhavia diffusa</i> L.	<i>Pundera</i>	H	C	up to 2000	Lf WP Rt	Eye complaints Liver troubles Asthma and bronchitis
<b>Oleaceae</b>							
89.	<i>Olea glandulifera</i> Wall. ex G. Don	<i>Gairi, Gaid</i>	T	C	up to 2000	Fl, Sd	Fever
<b>Orchidaceae</b>							
90.	<i>Oberonia falconeri</i> Hook. f.	<i>Hadjor</i>	E	UC	up to 1500	St, Lv	Bone injuries
<b>Oxalidaceae</b>							
91.	<i>Oxalis corniculata</i> L.	<i>B h i l m o r a , Khati-Buti</i>	H	C	up to 1000	Lv	Fever
<b>Plumbaginaceae</b>							
92.	<i>Plumbago zeylanica</i> L.	<i>Chipkura, Chitrak</i>	S	C	up to 2000	Rt	Liver tonic, Jaundice
<b>Poaceae</b>							
93.	<i>Coix lacryma-jobi</i> L.	<i>Sankuru</i>	S	UC	500-3000	Fr	Diarrhoea and Dysentery
94.	<i>Dendrocalamus strictus</i> Nees.	(Roxb.) <i>Bans</i>	S	C	up to 1000	Lv	Anthelmintic
<b>Polygalaceae</b>							
95.	<i>Polygala arvensis</i> Willd.	<i>Miradu, Mirdoi</i>	H	C	up to 1600	Rt WP	Astringent Paralysis
<b>Polygonaceae</b>							
96.	<i>Fagopyrum dibotrys</i> (D.Dun) Hara	<i>Oagai</i>	H	C	up to 3000	Lv	Stomachache
97.	<i>Persicaria barbata</i> (L.) Hara	<i>Miria</i>	H	C	up to 1500	WP Rt	Colic to prevent conception
98.	<i>Persicaria capitata</i> (Buch.-Ham.) H.Gross.	(Buch.-Ham.) <i>Kaflya, Dhadhura</i>	H	Ab	up to 2500	Rt	Boils , Dysentery
99.	<i>Persicaria chinensis</i> (L.) H.Gross	<i>Ametha</i>	H	C	up to 2500	WP	Stomachache
100.	<i>Rumex hastatus</i> D.Don	<i>Ametha, Almora</i>	S	C	500-1000	Rt	Boils
101.	<i>Rumex napalensis</i> Spreng.	<i>Khullya</i>	S	C	up to 1500	Rt	Boils and blister
<b>Ranunculaceae</b>							
102.	<i>Delphinium denudatum</i> Wall. ex Hook.	ex <i>Nirbishi, Munil</i>	H	UC	600-2000	Rt	Cuts, Wounds, Burns, Pimples, Cough
103.	<i>Thalictrum foliolosum</i> DC.	<i>Kirmoli</i>	H	C	up to 2000	Rt	Ophthalmic diseases, Fever
<b>Rosaceae</b>							
104.	<i>Pyrus pashia</i> Buch.-Ham.	<i>Mol, Melu</i>	T	C	up to 1500	Fr	Fever
105.	<i>Rubus ellipticus</i> Smith	<i>Hissar, Hisol</i>	S	C	600-1000	Rt	Stomachache
106.	<i>Rubus niveus</i> Thunb.	<i>Kali Hissar</i>	Cl	UC	1000-2500	Rt	Febrifuge
<b>Rubiaceae</b>							
107.	<i>Pavetta tomentosum</i> Roxb. ex Smith	ex J.E. <i>Angari</i>	S	UC	up to 1200	Fr	Anthelmintic
<b>Rutaceae</b>							

**Table 1.** Continued

S.No.	Family/Botanical name	Common name	Habit	Dist	Altitude (m asl)	Plant part used	Ailment treated
108	<i>Aegle marmelos</i> Corr.	<i>Belpatri</i>	T	C	up to 1200	Fr Rt Sd	Dysentery and Diarrhoea Fever and Cough Piles and Blood dysentery
109	<i>Glycosmis arborea</i> (Roxb.) DC.	<i>Ban Nimboo</i>	S	UC	up to 1000	Fr	Liver troubles
110	<i>Murraya koenigii</i> Spreng.	<i>Gandella, Gandel</i>	S	C	up to 1000	Lv	Dysentery, Anthelmintic
111	<i>Zanthoxylum armatum</i> DC.	<i>Temru</i>	S	UC	600-1200	Fr Sd	Stomachache Psychomedicine
<b>Sapindaceae</b>							
112	<i>Dodonaea viscosa</i> L.	<i>Aliar</i>	S	UC	up to 1200	Lv	Antiwormicide
113	<i>Schleichera oleosa</i> (Lour) Oken	<i>Kusum</i>	T	C	up to 1000	Sd	Skin burning
<b>Scrophulariaceae</b>							
114	<i>Linderbergia indica</i> (L.)Vatke	<i>Phiunl</i>	H	C	1500	Lv	Toothache
115	<i>Verbascum thapsus</i> L.	<i>Akalvir, Kutalenga</i>	H	C	500-2000	Rt	Colic pain and Fever, antidote to snake bite.
<b>Smilacaceae</b>							
116	<i>Smilax aspera</i> L.	<i>Kukurdar</i>	Cl	UC	up to 1200	Rt	Rheumatism.
<b>Solanaceae</b>							
117	<i>Datura stramonium</i> L.	<i>Dhatura</i>	H	C	500-2000	Sd	Intoxicant
118	<i>Solanum nigrum</i> L.	<i>Makoi</i>	H	C	up to 2000	WP Fr	Liver disorders, Piles and Dysentery, Diarrhoea Fever and Eye-ailments
119	<i>Solanum surattense</i> Andr.	<i>Berkateli, Konkaru, Uwain</i>	H	C	up to 1500	Fr Fl	Fever, Cough, Asthma and Gonorrhoea Diarrhoea
<b>Sterculiaceae</b>							
120	<i>Helicteris isora</i> L.	<i>Marorphali</i>	S	C	up to 800	Rt Fr	Diabetes Chronic colic and Dysentery
<b>Tiliaceae</b>							
121	<i>Grewia optiva</i> J.R. Drumm.	<i>Bhimal</i>	T	C	up to 1500	Fr	Fever
122	<i>Triumfetta rhomboidea</i> Jacq.	<i>Chiryri</i>	H	C	up to 1200	WP	Anthelmintic
<b>Ulmaceae</b>							
123	<i>Holoptelea integrifolia</i> Planch.	<i>Kanju</i>	T	UC	up to 800	Lv	Boils & Blisters
<b>Urticaceae</b>							
124	<i>Boehmeria rugulosa</i> Wedd.	<i>Gainthi</i>	T	C	up to 1000	St brk	Bone fracture
125	<i>Debregeasia salicifolia</i> (D.Don) Rendle	<i>Simroo, Syansru</i>	S	C	up to 1500	Brk	Bone fracture
126	<i>Urtica dioica</i> L.	<i>Kandali</i>	H	C	400-2000	WP	Rheumatic pain, Ear-ache
<b>Valerianaceae</b>							
127	<i>Valeriana hardwickii</i> Wall.	<i>Sumaya</i>	H	UC	1000-3500	Rt	Jaundice, Loss of appetite, Fits, headache, Diseases of blood and eyes
<b>Verbenaceae</b>							
128	<i>Gmelina arborea</i> Roxb.	<i>Kumhar</i>	T	UC	up to 1000	Lv	Fever and Gonorrhoea.
<b>Violaceae</b>							
129	<i>Viola canescens</i> Wall.	<i>Banaspa, Thangtu</i>	H	C	up to 3000	Fl Lv	Chronic cough and bronchitis Cuts and wounds
<b>Zingiberaceae</b>							
130	<i>Hedychium spicatum</i> Buch.- Ham.	<i>Kapoor-Kachri</i>	H	C	up to 1800	Rh	Dysentery

**Abbreviations:** H= Herb; S= Shrub; T= Tree; Cl= Climber; E= Epiphyte; C= Common; UC= Uncommon; Ra= Rare; Ab= Abundant; Dist= Distribution; GR= Gum-resin; Lv= Leaves; Sd= Seeds; Tu= Tubers; Rh= Rhizomes; Ufr= Unripe fruits; Fi= Figs; Fl= Flowers; Fr= Fruits; WP= Whole plant; Brk= Bark; Rt= Roots; Flb= Flower buds; YT=Young twigs; Gu= Gum; Lt= Latex

In general the fresh plant parts are used for preparation of medicine and during its non-availability dried parts are also taken. The most privileged family used for the curing of disease was the Fabaceae (16%) followed by Polygonaceae (4.65%), Lamiaceae (3.8%), Moraceae (3.8%), Asteraceae (3.1%) etc (Fig. 2). Although all the parts are

in use to various remedies, however, interestingly use of roots is very frequent (27%) as compared to leaves (20%), seeds (12%), fruits (10%) and other parts (Fig. 3). The diseases treated commonly through the herbal preparations are fever (7.8%), digestive disorders (7.3%), dysentery (6.8%), skin disorders (6.3%), liver diseases (4.7%), cough

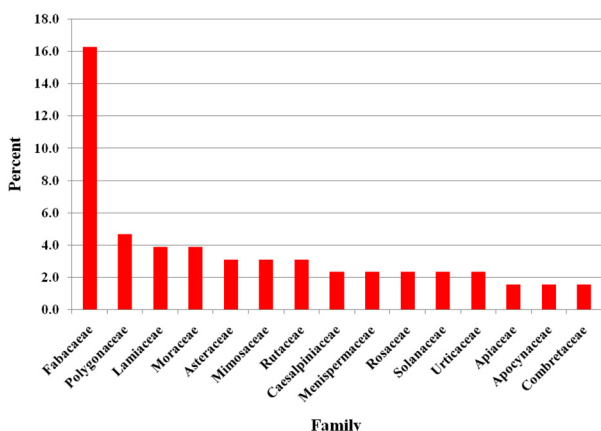


Fig. 2. Major families used for ethnobotanical purpose.

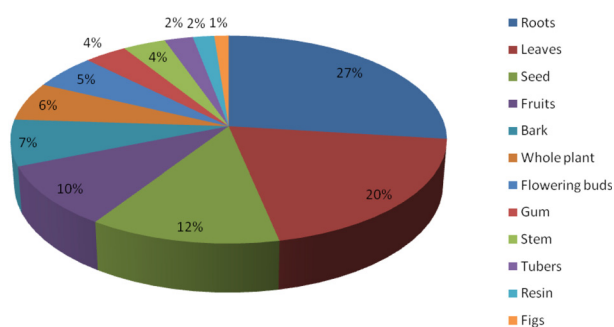


Fig. 3. Plant parts used in preparations.

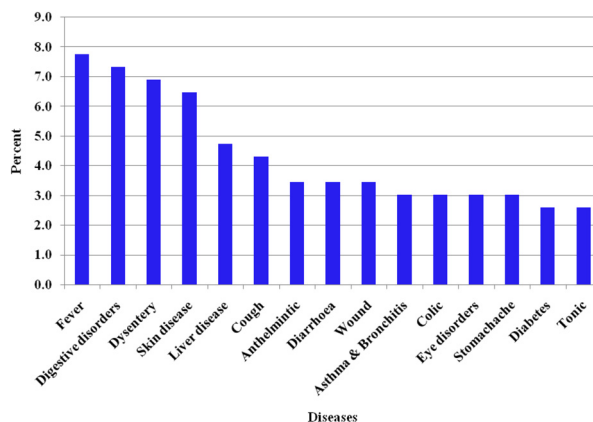


Fig.4. Common diseases treated by tribal people.

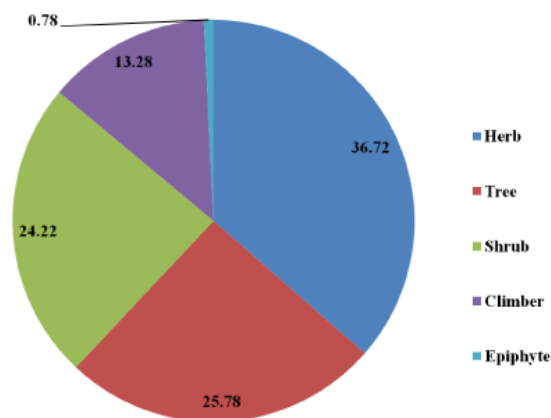


Fig. 5. Diversity of plant species.

(4.3%), anthelmintic (3.4%) and so on (Fig. 4). During the present study it has been noticed that herbaceous plants are more commonly used (36.72%) as compared to shrubs (24.22%), trees (25.78%), climbers (13.28%) and epiphyte (0.78%) (Fig. 5). The medicinemen prepare herbal remedies in different forms, such as decoction, powder, paste, juice, infusion and pills, which are administered internally or externally. The dosage pattern varies with the drug preparation, age of the patient, severity of the diseases, and personal judgement of the practitioner. Psycho-medicinal aspects are also found common among the locales for the treatment of some ailments. It was observed during the survey period that the old folk have good knowledge about the medicinal preparations compared to the young generation, who generally knows only about the vernaculars.

This study shown that even though the convenience of western medicine for simple and complicated diseases is accessible, the people of the study area still continue

practiced traditional medicine system and rely on them. The present investigation reveals that the local medicineman of the study area have good knowledge of medicinal property of various plant species of their surrounding atmosphere. The herbal drugs are very popular among the tribals as well as in non tribal rural population. The ethnomedicinal studies contributed a heap of knowledge on various indigenous traditional systems, which still exist in various societies, and are generated as result of long period of trials and experiences. In an estimate about 60-80% of the total population is still dependent on traditional medicines for their healthcare. Such indigenous knowledge prevailing in the rural and remote communities, warranted proper botanical transformation and retrieval before to be vanished with the present day modernization system. It important to recognize the role of the traditional health care practices for future sustainable development.



The information on medicinal plants obtained from the tribal communities is useful for researches in field of pharmacology, in clinical and biological studies. Therefore rapid efforts should be made for the documentation of such valuable knowledge for future perspectives. However the over exploitation of herbal drugs for commercial purposes resulting in depletion of natural resources and as a result of this more of the species are becoming rare and endangered. It is necessary to develop strategies for conservation of nature and natural resources among the tribal tracts or in interior localities to protect the fast disappearing medicinal plants and indigenous knowledge system.

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