



ETHNOPHARMACOLOGICAL USES OF PLANTS AMONG INHABITANTS SURROUNDING SURU AND ZANSKAR VALLEYS OF COLD DESERT, LADAKH

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ABSTRACT

Trans Himalaya of the Indian Himalayan region is repository of indigenous knowledge and practices. Recent re-emergence of herbal medicine along with the ever-escalating threats to biodiversity and the intensifying biopiracy controversies have necessitated an urgent need of documentation of the traditional use (s) of bioresources. Therefore, an attempt has been made to document the ethnopharmacological uses of plants utilized in the traditional medicine system/household remedies by the inhabitants of the cold desert. We recorded a total of 68 plant species belonging to 58 genera and 34 families which are used traditionally to cure various diseases/ailments. Thirty three plant species are non-native whereas thirty five species are native to Indian Himalayan region. Various part (s) of these species are used to cure cough/cold, bronchitis, fever, liver disorders, kidney stone, joints pain etc. The study would help in developing a comprehensive data base of ethnopharmacological uses of plants, help in strengthening the health care system in the villages/rural areas and also in conserving the traditional knowledge and practices for posterity.

KEY WORDS: Ethnopharmacology, Cold desert, Trans Himalaya, Suru and Zanskar Valleys



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INTRODUCTION

Plants assume greater significance in view of the fact that they are primary producers besides providing habitat to variety of animals, microbes and innumerable services to human beings. Besides more than 43 % of the total flowering plants are reported to be of medicinal importance and large numbers of them are used in Indian System of Medicines ^[1]. Many plants growing in wild are panacea to different kinds of ailments and diseases. Besides, over three fourth of the world population relies on the use of the traditional medicines of plant origin and depends upon them for primary health care needs ^[2]. India is one of the leading countries in Asia in terms of the wealth of traditional knowledge systems related to the use of plant species and blessed with rich and diverse heritage of cultural/traditional medicinal systems like Ayurveda, Siddha, Unani and Sowa rigpa (*Amchi* or Tibetan System of Medicine). In the Indian Himalayan Region (IHR) the use of medicinal herbs/plants is still a tradition continued by ethnic /local communities. Even today, common traditional practice and household remedies have much potential or most of the people depend upon the common household remedies ^[3]. Among all the traditional systems, *Sowa rigpa* (*Amchi* or Tibetan System of Medicine) is one of the oldest medicine systems and widely used in trans Himalayan region especially in a part of Ladakh. Written accounts testify the usefulness of plants for medicinal purposes, perhaps the earliest uses were documented in Vedas in about 4500-600 B.C. which represents the oldest repository of human knowledge ^[4]. IHR is considered as hot-spot of the biological diversity ^[5] and harbors 18,440 species of flora ^[6]. The rich biodiversity of the region is utilized for the various purposes such as obtaining medicines, wild edibles, fuel, fodder, timber, making agricultural implements as well as for the religious ceremonies. Till date, 1748 medicinal plants, 675 wild edibles, 155 sacred plants, 118 essential oil yielding plants and 279 fodder plants have been recorded from the IHR ^{[7] [8] [9] [10] [11]}. Suru and Zaskar Valleys a part of the Trans-Himalaya, situated south of Kargil district. Suru Valley stretches between

33°51' N to 34°17' N latitudes and 75° 57' E to 76° 21' E, while Zaskar Valley lies between 32° 52' N to 33° 52' N latitudes and 76° 14' E to 77° 32' E longitude, at an altitude of 2,900-5,900 m. Suru Valley dividing the two of the world's largest formidable mountain ranges, viz. the Great Himalaya and the Karakoram. Lying nestled along the north-eastern foothills of the Great Himalayan wall, the general topography of the Valley is rugged and mountainous, with extremely irregular boundaries. It is triangular in outline, with the Nun-Kun mountain belt forming the base. The Valley is bounded on the northwest with Drass and on the northeast with Zaskar. Whereas the Zaskar is surrounded by Penzi-la and Durung Drung Glacier in the north-west; Haptal, Shimiling, Yaranchu Glacier, Omasi-la (5342 m) and Hagshula (4975 m) in the west and south-west; Yar-la (5697 m) in the east; Baralacha-la (4650 m) in the southeast; and Perfi-la (4444 m), Namki-la (4460 m) and Charchar-la (5830 m) in the north. In the west, Omasi-la along the Great Himalaya connects the Zaskar with Paddar Valley of Kishtwar ^[12]. The majority of people in Zaskar valley belongs to Boto tribe of Buddhist community, where as the people of Suru valley mainly belongs to shia sect of Islam except in Rangdum, where the people follow the Buddhism and rest of the inhabitants belongs to different tribes viz. purig, balti, dardis and boto. The people of both the valleys are mostly farmers and most of them depend upon agricultural and wild resources, majority of people know little or more about the indigenous uses of the plants. In the remote areas of both the valleys, there are only three to four families, where only the male elder persons are well versed with medicinal practices. In these remote areas, majority of the population depends on traditional medicinal health care systems. Several studies have been carried out on the use of the medicinal plants in the IHR in general and Jammu & Kashmir state in particular but most of them focused on the enumeration of medicinal plants. In these areas local inhabitants depends on *Amchies* (local doctor) of Boto (the Buddhist) tribal community for the

treatments of various diseases but in the suru valley, we observed only two or three *Amchies*, therefore they invite the *Amchies* from the other parts of the Ladakh for the treatments of various diseases. A very few studies have been conducted on the plants used in common house hold remedies ^{[13] [14] [15] [16] [17]}. Therefore, we conducted this study in the surrounding villages of Suru and Zanskar valleys, a part of trans Himalaya, J&K State to document the indigenous knowledge and practices of the species used in house hold remedies. The vegetation of both the valleys mainly comprises the sub-alpine, alpine, oasitic and desertic herbs with a few scattered scrubs.

METHODOLOGY

The surveys were conducted from 2010-2013 in the Suru (2000-4400 m amsl) and Zanskar (3000-5000 m amsl) valleys. The details of the survey areas of both the valleys are presented in (table.1). A total of six surveys were conducted in order to collect ethnopharmacological information's and also verified the information with each informant in the each village. Most of the information on uses and dosage was found to be parallel with each village, which is given in the (table 2) but some information on dosage was not parallel, therefore some of the dosage are not included in the table but their uses were mentioned. During each field surveys one-two weeks were spent with the locals in each village. The knowledgeable persons including *Amchies* in the Suru valley was very less as compared to Zanskar Valley, in each village it varies from 2-7 and 3-14 respectively and comprises mostly male as compare to female of different age groups. The information on local names of plant, part (s) used, method of dosage and mode of administration was recorded. For collection of plants we visited the field along with knowledgeable person or *Amchi* so as to ascertain the correct identification of the plant. These plants were photographed, collected for identification and herbarium preparation following standard methods ^[18]. Identification was done with the help of published literatures and the local floras ^{[19] [20] [21] [22] [23] [24]}. The

nativity and endemism of the species have been identified based on the distribution of the species ^{[25] [26] [27] [7]}. The species restricted to IHR have been identified as endemic and those extended to neighboring countries and states, considered as near endemic ^[7]. For the future reference the voucher specimens are deposited in the herbarium of Centre for Biodiversity Studies, BGSB University, Rajouri, J&K.

RESULTS AND DISCUSSION

The present investigation recorded ethnopharmacological information on 68 plant species, belonging to 58 genera and 34 families along an altitudinal ranges between 2000-5000m amsl distributed in both the areas within different life forms i.e., trees (3 spp.), shrubs (4 spp.) and herbs (61 spp.). They grow in diverse range of habitats, such as valley plains, alpine pastures, rocky, dry slopes, bouldaries and alpine mountains. These species were used by local inhabitants for curing various diseases/ailments/sexual dysfunctions such as antispasmodic, rheumatism, inflammation, indigestion, aphrodisiac, arthritis, asthma, blood purification, cold/cough, diarrhea, fever, liver disorders, pulmonary problems, bronchitis, tooth/gums, kidney stone, constipation, malaria etc (Table-1) & (Fig. 1). Out of the total 34 families, Asteraceae (9 spp.) is the most dominant family followed by Ranunculaceae (6 spp.), Boraginaceae and Polygonaceae (4 spp.), Apiaceae, Crassulaceae, Rosaceae, Brassicaceae and Lamiaceae (3 spp.), Chenopodiaceae, Gentianaceae, Plantaginaceae, Scrophulariaceae and Solanaceae (2 spp.). Out of 34 families, a total of 20 families represents only one species (Fig. 2). The utilization pattern of the species indicated that leaves (29 spp.), whole plants (18 spp.), roots (16 spp.), seeds (12 spp.), fruits (7 spp.), flowers (8 spp.), barks (3 spp.), bulb (2 spp.), shoot (1 sp.) and aerial part (1 sp.) are used by the local inhabitants for various purposes. Out of 68 species, 35 species are native to the Indian Himalayan region while the rest 33 are non-native i.e., originating from other

biogeographical regions. In the present investigation, only one species i.e., *Saussurea bracteata* is identified as endemic where as 17 species are identified as near endemic.

Using new criteria of International Union for Conservation of Nature and Natural Resources (IUCN), 5 species are categorized as Critical Endangered, 6 Endangered and 8 Vulnerable [28] and based on our field observations 23 species are common, 15 occasional and 10 are frequently present in the study area. The study provides ample information on the indigenous uses and traditional practices of the plants used in household remedies or *Amchi* a Tibetan Medicine Systems. The inhabitants of the region use traditional medicine to cure the various diseases, they use different plant part (s) in different ratio to cure various disease/aliments. A total of 107 informants belonging to age group 29 to 97 years were interviewed and out of those only 80 % people were found knowledgeable. Further analysis reveals les that only 20% informant's belongs to age group of 29-40, 50% belongs to 50-70 age group and only 10% belongs to 80-97 age group. Again

from out of 80 % informants, 80% are male, 10 % female and 10% are *Amchies* (including both male and female). From the 10% of *Amchies*, 97% are male and only 3% are female. In these regions most of the informants are from age group of 50-70, and very less from the age group of 80-97, from this, it can be concluded that young generations of this region lacks traditional knowledge and if this will continue it will lead to degrade the traditional knowledge system day by day. Such knowledge could be strewn to the new generation for awareness and wider acceptability. Therefore, documentation of information on indigenous knowledge is the need of the hour and also it will help in conserving the bio-wealth and traditional wealth of the region. Therefore, it is the need of the hour to document the valid information about the traditional health care systems/practices. Further, based on the study it may be suggested that the plants reported in this communication may be taken up for scientific analysis including phytochemical and pharmacological studies to find out some useful indicators for the process of discovery of new drugs of plant origin.

Table 1

List of survey areas along with their altitude and coordinates of Suru and Zanskar Valleys

S.No.	Villages/Sites	Altitude (m amsl)	Coordinates
Suru Valley			
1	Chumikchan	3243	N34°16'.999 E75°56'.829
2	Kartsekhar	3289	N34°15'.550 E76°00'.077
3	Tsangra	3117	N34°13'.503 E75°58'.375
4	Thangbu	3157	N34°12'.643 E75°56'.169
5	Damsna	3202	N34°10'.701 E75°55'.954
6	Achambur	3468	N34°04'.108 E75°55'.28
7	Panikhar	3346	N34°06'.626 E75°56'.710
8	Parkachik	3551	N34°05'.439 E75°59'.486
Zanskar Valley			
1	Rantaksha	3670	N33°33'.869 E76°45'.691
2	Padum	3588	N33°27'.976 E76°52'.717
3	Pipicha	3675	N33°23'.214 E76°55'.711
4	Raru	3736	N33°19'.927 E76°58'.062
5	Munay	3783	N33°20'.923 E76°56'.455
6	Tseta	3986	N33°10'.660 E77°10'.027
7	Khi	4046	N33°05'.638 E77°12'.745
8	Kyalbok	3830	N33°14'.350 E77°07'.296
9	Cha	3953	N33°14'.651 E77°07'.589
10	Phuktal	3874	N33°15'.962 E77°10'.707
11	Amu	3876	N33°14'.847 E77°04'.432
12	Echar	3724	N33°18'.259 E76° 59'.301
13	Munay	3783	N33°20'.923 E76° 56'.455
14	Thangso	5280	N33°04'.715 E77°11'.395

Table 2
Ethno-pharmacological uses of plants from Suru and Zanskar Valleys

Taxa	Vernacular name (s)	Part used (s)	Uses/mode of administration
Alliaceae			
<i>Allium humile</i> Kunth*	Skochey	Lf, Bb	Leaves decoction is given to patient thrice a day against stomach complaints & indigestion, for a period of one week.
Amaranthaceae			
<i>Amaranthus spinosus</i> L.	Chulai	Rt	Root decoction is carminative, and promotes onset of menstruation. Recommended for a week, twice a day.
Apiaceae			
<i>Anthriscus nemorosa</i> (Bieb.) Spr.	Sunak	Lf, Fl	One to two gram of leaves power placed on a fire post of cow dung and the patient allowed to inhale the smoke twice a day to cure rheumatism and inflammation.
<i>Bunium persicum</i> (Boiss.) Fedt.	Thayou/ Korneet	Sd, Lf, Fr	Seeds and leaves extract given to the patient with boiled water twice a day to cure abdominal pain.
<i>Carum carvi</i> L.	Kornyot	Lf, Bk, Sd	Leaves decoction is given to the patient after meal to cure acidity & indigestion. Bark extract is also used to cure rheumatism and nose pain.
Asteraceae			
<i>Carduus nutans</i> L. var. <i>lucidus</i> DC.	Jangchar	Lf, Rt	Fresh leaves and roots are chewed to initiate vomiting in case of indigestion.
<i>Lactuca tatarica</i> C.A. Mey.	Chamati	Wp	Dried plant is grind into powder and given to patient twice a day to treat vomiting.
<i>Lactuca sativa</i> L.	Dums	Lf	Leaves extract with pinch of salt given twice a day to cure fever and the same is also used against lack of appetite.
<i>Saussurea lappa</i> (Decne.) Sch. Bip.	Rustsa	Rt	Roots decoctions is used to cure kidney related problems, if taken twice or thrice a day.
<i>Saussurea bracteata</i> Dcne. **	Spang-rtsa-do-bo	Fl, Lf	Flower paste is believed to cure boils and leaf decoction is used against to cure headache, cough and fever.
<i>Senecio chrysanthemoides</i> DC.	Unarswah	Lf	Leaves paste is applied to the forehead to relief headache and sometimes its poultice help to reduce body pain.
<i>Taraxacum officinale</i> Wigg. Boiss.	Khurchot/ Khormang	Wp	The young plants are collected before it gets mature then cooked with butter and other spices and have it with local bread. It is believed to increase the immunity.
<i>Waldheimia stoliczkai</i> (C.B. Clarke) Ostenf.	Sulu	Lf, Fl	Shoot and leaf decoction at least twice or thrice a day is used to cure headache, fever and bronchial problems and is also claimed to act as blood purifier.
<i>Waldheimia tomentosa</i> (Decne.) Regel.	Palu	Lf, Sd	Seeds are consumed raw to cure acidity if used at least once a day. Fresh leaves are applied in a poultice form twice a day to cure arthritis.
Berberidaceae			
<i>Berberis ulcina</i> Hk.f.&Th.	Kirsing (Khichirma)	Rt, Fr	Root extract is used to cure piles, diarrhea and ophthalmic diseases. Dried fruits are administered orally against ring worm.
Betulaceae			
<i>Betula utilis</i> D. Don	Troga	Bk, Lf	Leaves paste used as an antiseptic and while bark paste against burns and wounds.
Boraginaceae			
<i>Arnebia benthamii</i> (wall. ex G.Don) John. *	Demok	Rt	Root of the plant soaked in the oil of apricot and applied to the hair at least once a day as hair tonic.
<i>Arnebia euchroma</i> (Royle) John.	Demok	Rt	Roots used as blood purifier, to treat cold, cough, lung and pulmonary problems.
<i>Microula tibetica</i> Benth. *	Chharuknokmau	Wp	Used in pulmonary disorders.
<i>Onosma hispidum</i> Wall.ex G. Don	Deemok	Lf, Rt	Fresh leaves and roots decoction is claimed to stop blood vomiting and act as a blood purifier.
Capparidaceae			
<i>Capparis spinosa</i> L.	Kabra	Lf	Leaves decoction once a day is used to cure hyperacidity and other stomach related problems.
Chenopodiaceae			
<i>Chenopodium album</i> L.	Janchi nkarpo	Lf, Sd, Fl	About 300-400 ml of seed and leaves decoctions twice a day is used to cure gastric troubles and also believed that it act as a diuretic.
<i>Chenopodium murale</i> L.	Jangehi	Lf	Leaves decoctions is used to reduce abdominal pain and used against liver disorders, if taken twice a day for a week.
Convolvulaceae			
<i>Convolvulus arvensis</i> L.	Khri khrik mo	Wp	Used against rheumatic pain, cuts and wounds.
Crassulaceae			
<i>Rhodiola heterodonta</i> (Hk. f. &Th.) Boriss.	Shrolo	Wp	Decoctions used to cure cough and lung infection.
<i>Sedum quadrifidum</i> Pall.	Lugmik	Lf, Fl, Rt	Decoctions used to cure cold and cough.
<i>Sedum tibeticum</i> Hk.f.&Th.	Shrolo	Wp	Dry leaves in semi crushed form with 200 ml of curd are used to decrease obesity and act as diuretic.
Cruciferae			
<i>Capsella bursa-pastoris</i> (L.) Medik.	Shamasho	Lf, St	Leaves and stem decoction is used against fever and believed to increase immune system.
<i>Sisymbrium orientale</i> L.	Staga	Sd	Small tablets of rolled powdered seeds along with butter or milk given to the patient, twice a day, act as an appetizer and carminative.
<i>Lepidium latifolium</i> L.	Seoji	Wp	Plant paste is applied to the affected area to cure rheumatism.
Cupressaceae			

<i>Juniperus macropoda</i> Boiss.	Shukpa	Lf	Used as febrifuge, anti-inflammatory, constipation, menstrual problems and inflammation of lungs, liver spleen, kidney and gall bladder.
Elaeagnaceae			
<i>Hippophae rhamnoides</i> L.	Tseta-loo-loo	Fr, Fl	Fruit juice is diluted with water and given as a health tonic especially to the children's.
Ephederaceae			
<i>Ephedra Gerardiana</i> Wall. ex Stapf	Tsepath	Ap	Decoction of aerial part is given twice a day for a week to cure bronchial problems and it is also believes that it cures irregularities of menstruation.
Ericaceae			
<i>Rhododendron anthopogon</i> D. Don *	Tali	Lf	Leaves decoction used as expectorant if used twice a day and also used on <i>Vata</i> .
Fabaceae			
<i>Cicer microphyllum</i> Benth.	Sari	Lf, Sd	Leaf used in tongue infections, while seed decoction is given twice in a day to cure jaundice.
Gentianaceae			
<i>Jaeschkea oligosperma</i> (Griseb.) Knobl. *	Tikta	Wp	Consumed either raw or with milk and is believe to act as a blood purifier.
<i>Swertia petiolata</i> D. Don *	Zantik	Wp	Decoction of whole plant twice a day is recommended for headache and body ache.
Juglandaceae			
<i>Juglans regia</i> L. *	Starga	Fr, Bk	One to two dry kernels is roasted directly on fire and used in treatment of constipation. Bark powder is used against tooth and gums related problems.
Lamiaceae			
<i>Elsholtzia densa</i> Benth.	Sanuk	Lf	Paste of the leaves is applied twice or thrice on the cuts and burns to relief pain.
<i>Mentha longifolia</i> (L.) Hudson	Fololing	Wp	Whole plant is boiled in water and given twice preferably (morning and evening) to cure stomach related complaints.
<i>Thymus linearis</i> Benth.	Tumburik	Wp	Pants are collected before sun rise and used as spices and also given to cattle to recover from dehydration.
Liliaceae			
<i>Tulipa stellata</i> Hook .f.	Kapi-tsong	Bb	Two to three roasted bulbs are given as tonic and to cure rheumatism.
Morinaceae			
<i>Morina longifolia</i> Wall. ex DC. *	Agzayma	Sd, Rt	Seed and Root decoction are used to cure Boils.
Orchidaceae			
<i>Dactylorhiza hatagirea</i> (D. Don) Soo *	Wanglak	Rt	Crushed root mixed with a glass of hot milk is used to enhance vigorness and aphrodisiac if taken once in a day regularly.
Papaveraceae			
<i>Meconopsis aculeata</i> Royle *	Tser-non	Wp	Whole plant is used against ulcer, lung, liver, spinal cord disorder and back pain.
Plantaginaceae			
<i>Plantago asiatica</i> L.	Karachey	Lf	Leaves are boiled in the water than filtered with piece of cloths and about 50 ml given to the patient twice a day to purify the blood.
<i>Plantago himalaica</i> Pilg. *	Tharum	Sd	Seed powder of 5-10 gm is mixed with curd and is given to the patient twice a day to cure diarrhea and helps in liver related problems.
Podophyllaceae			
<i>Podophyllum hexandrum</i> Royle	Denmokushu	Rt, Fr	Whole plant is used in menstrual irregularity, diseases of uterus and improves lung and blood circulation. Young ripe fruits are used to cure high altitude mountain sickness.
Polygonaceae			
<i>Oxyria digyna</i> (L.) Hill	Chumcha/Suchli	Wp	Whole plant decoctions twice or thrice in a day used to cure indigestion.
<i>Polygonum hydropiper</i> L.	Chumerche	Sd	Seeds decoctions given to the patient for one week, thrice a day which acts as a diuretic and also helps to reduce obesity.
<i>Rheum webbianum</i> Royle *	Lachu	Rt	Roots are eaten raw to improve health.
<i>Rumex acetosa</i> L.	Shoma	Lf	Leaves paste is applied to the affected area about twice or thrice a day to cure back pain
Ranunculaceae			
<i>Aconitum heterophyllum</i> Wall. ex Royle *	Buma karmo	Rt	Root extract is used against toothache, stomach pain and gastric problems if taken once in a day.
<i>Aconitum violaceum</i> Jacq. ex stapf*	Buma naqpo	Wp, Rt	Used as carminative as well as useful in lung diseases.
<i>Clematis orientalis</i> L.	Lmong	Lf	Apply latex on the surface of the inflamed area after regular interval of 5-6 hours to relieve pain.
<i>Delphinium brunonianum</i> Royle	Chargosposz	Lf, Fl	Leaves decoction once in a day given to the patient to cure malaria and paste of flower is also used to cure throat pain.
<i>Delphinium viscosum</i> Hk. f. & Th. *	Bilamonok	Wp	Paste made up from shoot and leaves apply on the inflamed area to relive pain.
<i>Thalictrum minus</i> L.	Chak-achoo	Wp	Decoctions of the plant used twice in a day used as eye sterilizer, also used to cure gout and rheumatism.
Rosaceae			
<i>Potentilla atrisanguinea</i> Lodd. *	Skialdaepo	Lf	Leaves paste used to cure stomach related problem, cold/cough, and throat infection if taken twice or thrice in a day.
<i>Potentilla fruticosa</i> L.	Sonmayaspa	Lf	Decoction of the leaves given to the patient once or twice a day for fever and dried leaves used as tea.
<i>Prunus armeniaca</i> L.	Chuli-changma	Sd	Seed oil given to women after delivery for speedy recovery, and also used to stimulate growth of long healthy hairs if applied regularly.
Saxifragaceae			

<i>Bergenia stracheyi</i> (Hk.f. & Th.) Engl. *	Shapur	Lf, Rt	Root decoction is given to the patient twice or thrice in a day to cure kidney stone.
Scrophulariaceae			
<i>Pedicularis oederi</i> Vahl	Lugru serpo	Wp	Whole plant consumed raw in case of food poisoning, whenever required.
<i>Picrorhiza kurrooa</i> Royle ex Benth.	Hong-lain	Rt	Root decoction once in a day is given to patient to cure stomach and liver related problems for a period of one to two months.
Solanaceae			
<i>Hyoscyamus niger</i> L.	Gya langtang	Sd, Lf	3 to 4 gm of crushed dried leaves is fumigated and used against asthma and the fumigation of seeds is used against the tooth infection.
<i>Solanum nigrum</i> L.	Suklo/Tsigma	Sd, Fr	Seed and fruit paste are apply on the face once in a day to protect from sun burns.
Tamaricaceae			
<i>Myricaria germanica</i> (L.) Desv.	Umboo	Lf	Leaves decoction once a day preferably in the morning is given to the patient to purify the blood.
Zygophyllaceae			
<i>Tribulus terrestris</i> L.	Jena	Wp	A decoction of the whole plant is filtered by a piece of cloth and a glass of this decoction is given for a period of 10-20 days to cure urinary disorders.

Abbreviations Used: LF-Life form; Rt-Root; Lf-Leaf; Sd-Seed; Fl-Flower, Fr-Fruit; Wp-Whole plant; Ap-Aerial Part; Bb-Bulb; Bk-Bark; H-Herb; Sh-Shrub; T-Tree; *Near Endemic and **-Endemic

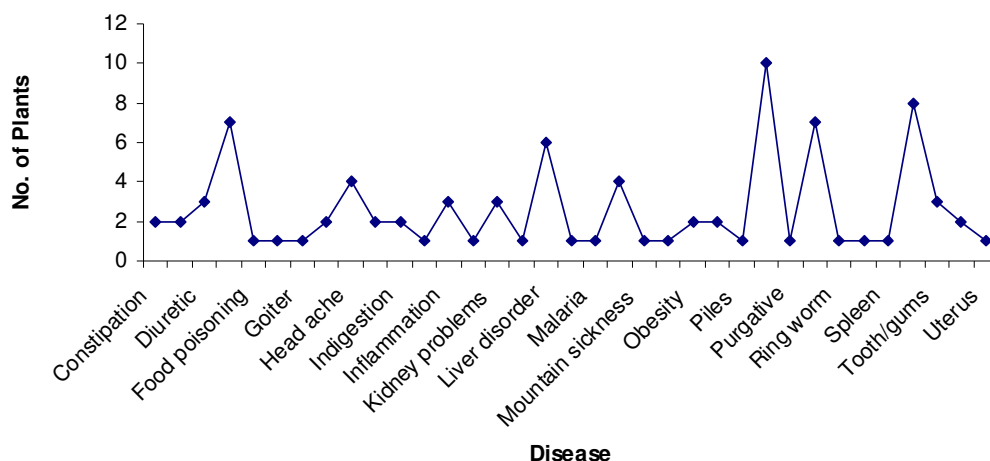


Figure 1
Number of plants used for curing various diseases/ailments

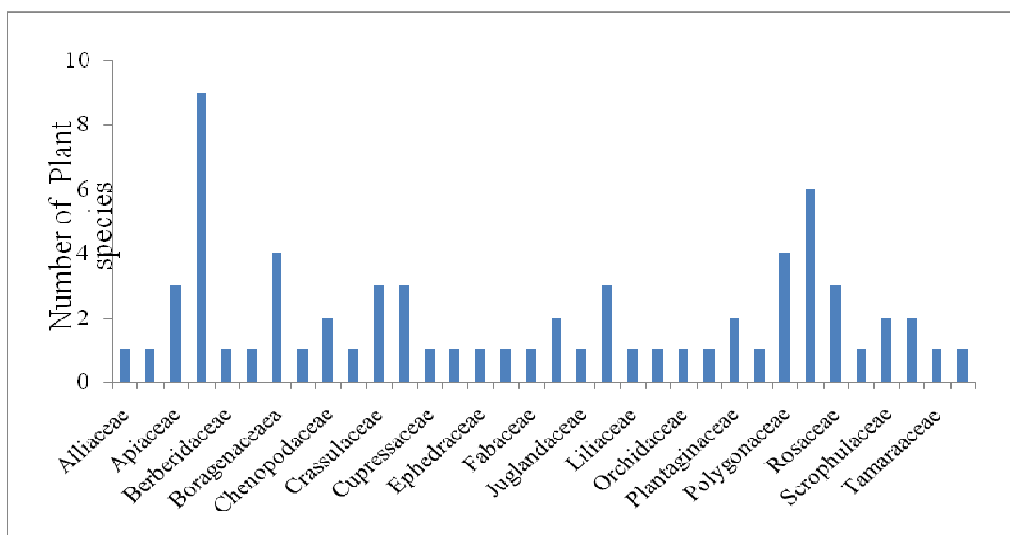


Figure 2
Family wise distribution of medicinal plants in Suru and Zaskar Valleys

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