

Ethnobotany of Higher Plants in Spiti Cold Desert of Western Himalaya

K.N. Singh^{*1}, Brij Lal¹ and N.P. Todaria²

¹Biodiversity Division, Institute of Himalayan Bioresource Technology, CSIR, Palampur-176 061, Himachal Pradesh, India

²Forestry Department, HNB Garhwal University, Srinagar, Uttarakhand, India

*knsingh.ecology@gmail.com

Abstract: The present article deals with the plants used in traditional phytotherapy amongst indigenous people of Bhotia community of Indian western Himalaya. Ethnobotanical surveys were conducted during 2002–2009 in Spiti valley to collect information on traditional use of plant species as medicine from different localities. A total of 50 plant species belonging to 25 families; have been reported to be used for treating different ailments ranging from cough and cold to jaundice. Among the plant parts used as a remedy, leaves (31%) were recorded to be used to a large extent followed by flowers (17%), and whole plant (16%), respectively. The species reported are enumerated in tabular form with their family in alphabetical order followed by scientific name of plant and collection number. Local name of plant, part(s) used, locality, name of ailments treated, mode of preparation and prescription of medicine are given. Total 29 claims of herbal preparations utilized in traditional medicines have been identified as hitherto unknown or lesser known and are marked with asterisk (*). Information from selective relevant literature, are also provided for a comparative account on medicinal uses across communities and traditional systems of medicine in India.

[K.N. Singh, Brij Lal and N.P. Todaria. **Ethnobotany of Higher Plants in Spiti Cold Desert of Western Himalaya**. Nature and Science 2012;10(5):7-14]. (ISSN: 1545-0740). <http://www.sciencepub.net/nature>. 2

Keywords: Bhotia community; ethnobotany; indigenous phytotherapy; Spiti valley; traditional medicines; Western Himalaya

1. Introduction

Indian subcontinent represents one of the greatest emporia of traditional medicines in the world. Even today, a large number of population living in high mountains and remote rural areas depend upon traditional medicines for treating different ailments. Among the ethnic groups inhabiting western Himalayan region in India, *Bhot* (also called as *Bhotia*) is one of the predominating tribes living in high mountain areas of Himachal Pradesh and Uttarakhand states. In Himachal Pradesh, the *Bhot* community is confined to Spiti valley only. Spiti (31°42'-32°58'N and 77°21'-78°35'E) with an area of 5582 km², is a sub-division of Lahaul-Spiti district in Himachal Pradesh (Figure1). The area comes under trans Himalayan arid zone (Indian cold deserts), bounded by Tibet on the north east, Kinnaur in south-east, Kullu in west and Ladakh in north, with an average elevation of 5500 m (Sharma, 1994). Being in an unique geographical location, the valley is experienced with harsh climatic conditions like dry and cold weather, heavy snowfall, low temperature (some times goes down to -40°C in winter) and low annual precipitation (c500 mm). In Spiti, vegetation is quite sparse and mostly represented by shrubs (*Hippophae*, *Rosa*, *Artemisia*, and *Ephedra*) and herbaceous plants like *Allium*, *Aquilegia*, *Arnebia*, *Dactylorhiza*, *Primula*, *Thymus* etc. Tree species are

almost absent except juniper, poplar, and willows planted around human inhabitations.

Bhots inhabiting Spiti valley, are overwhelmingly Buddhists (Census of India, 1991). Agriculture is the main occupation of the inhabitants, but they also depend upon their ambient natural plant resources for fuel, fodder, household materials, and healthcare to a great extent (Singh *et al.*, 2008*). People in Spiti valley still use various plants as traditional remedies in treating several diseases they suffer from in their life. Though many local inhabitants have varying degrees of knowledge regarding the medicinal uses of some plants growing around, the *Amchis* or *Amjis* (local traditional healers) are considered the real custodians of traditional medicines. This is why the people have great faith in *Amchis*. Despite availability of modern medical facilities in the valley, people still prefer to consult first their traditional healers.

Amchis acquired traditional knowledge about the medicinal properties of plants from their ancestors through oral discussions and practices passed on from one generation to another. In recent past, the number of persons possessing traditional knowledge (including traditional healers) started decreasing rapidly in the valley due to modernization and urbanization. With the emergence of new avenues, the young generation becomes motivated towards economy oriented occupations and least inspired by

the traditional system of medicine. Secondly, decline in population of medicinal plants due to over exploitation and changing land use patterns in the

present study area, has also reduced the recognition of traditional medicines to some extent (Singh *et al.*, 2008).

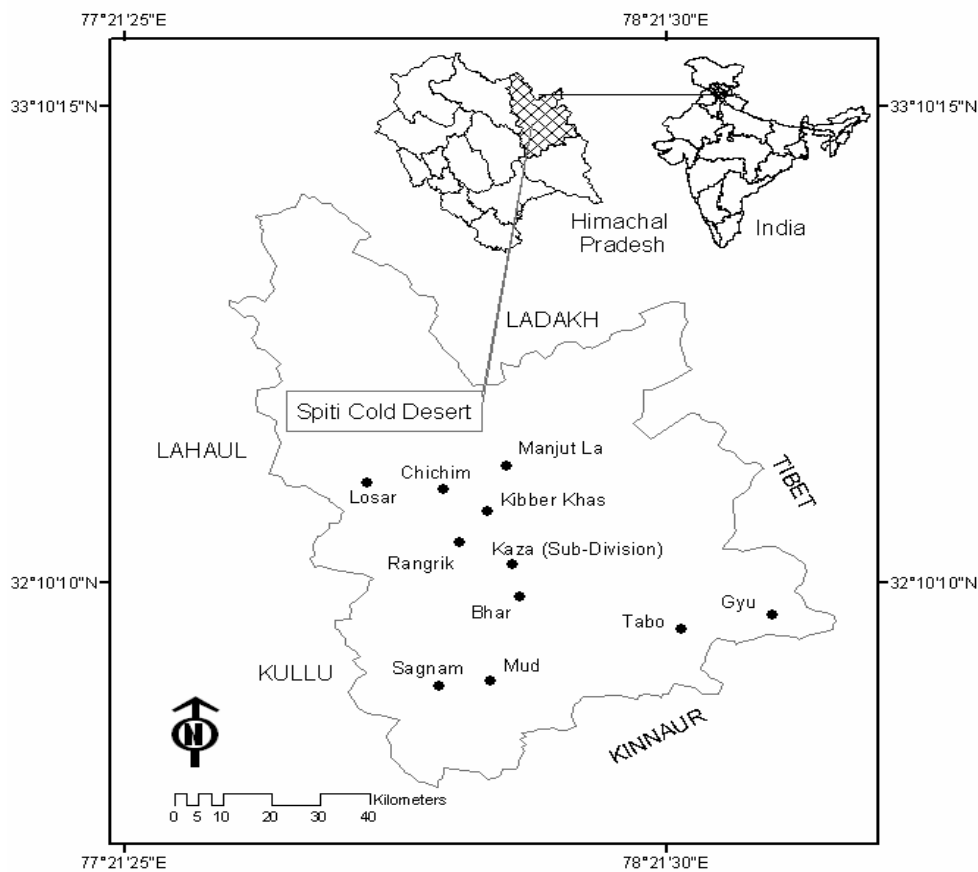


Figure 1. Map showing study area

Keeping in view the importance of traditional medicines and risk of its erosion, the present study was aimed at recording of existing information on traditional medicines amongst the *Bhots* of Spiti valley, before it is lost for ever.

Over last 3 decades, efforts towards the documentation of information on traditional medicines from Spiti region were made by a few workers (Uniyal *et al.*, 1973; Aswal and Mehrotra, 1987, 1994; Jain, 1996; Kala, 2000; Sood *et al.*, 2001; Brij Lal *et al.*, 2001, 2004; Singh and Brij Lal, 2008). But, no comprehensive information has been brought out so far on traditional phytotherapy from Spiti valley. Therefore, attempts were made to document and prepare a comprehensive account on the traditional medicine wisdom of *Bhot* community in Spiti valley.

2. Material and Methods

2.1. Ethnobotanical Survey

In order to record information on plant associated traditional medicines, various ethnobotanical surveys were conducted among the *Bhots* residing in Spiti valley during 2002-2009. Since, the valley remains cutoff from rest parts of the country for 6-7 months due to heavy snow fall, maximum field surveys were conducted between June and October, when snow starts melting and day temperature increases. During this period vegetation comes in full bloom and eases plant collection. Information in details (plant name, part used, mode of prescription, ailment treated, etc.) on plants used in traditional remedies, were gathered by way of developing close contacts, through interviews and discussions with local people particularly traditional

practitioners following Jain (1987), Martin (1995), and Cotton (1996). Structured questionnaires were used to collect data on medicinal use of plants and diseases treated.

2.2. Presentation of Data

The data collected, were tabulated in Table 1, with family name in alphabetical order, scientific name of plant, voucher number, local name, part(s) used, locality, altitude, use and route of administration as recorded during the field surveys conducted in Spiti valley. In order to provide comparative account, the acquired information on the uses recorded in Spiti valley (URSV) were cross-checked with the three most relevant sources namely Indian Medicinal Plants (IMP) by Kirtikar and Basu (1976), Dictionary of Indian Folk Medicine and Ethnobotany (DIFME) by Jain (1991) and Ethnobotany of Cold Desert Tribes of Lahaul-Spiti (ECDT) by Sood *et al.* (2001) so as to search out more about what have already been documented. New claims or lesser known uses reported are marked with an asterisk (*).

3. Results

Under present investigation, 50 species (48 angiosperms and 2 gymnosperms) belonging to 25 families have been reported to be used for treating over 20 different ailments from cough and cold to jaundice (Table 1). These species are sparsely distributed between the altitudinal ranges of 3300 to 4800 m amsl. About 50% of the plants reported belong to only 5 families i.e. 12 species belong to Asteraceae, 4 to Apiaceae, 3 each to Fabaceae, Gentianaceae and Polygonaceae, respectively.

Most of the species are recorded to have more than one therapeutic use. Of the 50 medicinal plants reported, 24 are used to cure jaundice, 22 to cure joint pains, 18 to purify blood, 18 to cure stomach disorders, 10 to cure cold and cough, 8 are taken orally as general tonic and 4 are applied to cure each eye diseases and dysentery (Table 1). About 42 plants are prescribed to cure other ailments like kidney problems, fever, headache, food poisoning, burns, chest pain, toothache, swelling, tuberculosis, child delivery, urinary, heart, liver and lung complaints, cuts and wounds.

The recorded information on medical uses were compared with the published relevant literature (Kirtikar and Basu, 1976; Jain, 1991; Sood *et al.*, 2001) so as to present a comprehensive account and identify leads on new or lesser known uses. It is revealed that present study throws light on 29 new claims or lesser known herbal preparations utilized in traditional medicines which are marked with asterisk (*).

The information in Table 1 revealed that out of the 50 species, 18, 26, and 18 species reported in IMP, DIFME and ECDT, respectively have some different and a few common medicinal use. The number of species reported to be used to cure common ailments prevailing in the area like jaundice (24 species), joints pains (22), stomach disorders (18) blood purifier (18), and cough and cold (10) are higher in comparison to the number of plants as reported in the above mentioned literature. Further, it also confirms that the diseases as mentioned above occur commonly in the area; hence a large number of locally available plants were discovered as remedies by the natives to treat them. Among the 50 plants, 4 species were reported in Ayurveda and 6 in Yunani systems of medicine for treating different ailments. Out of the 18 species reported earlier from Lahaul-Spiti (Sood *et al.*, 2001), about 9 species have been reported for similar uses as being described above (Table 1). Such comparable information validates the importance of these 9 species for corresponding utilities.

4. Discussions

The information collected revealed that native people of Spiti valley have a great respect and faith in *Amchi system of medicine* being practiced in the area for ages. Elderly family heads of *Bhot* community and *Amchis* (local practitioners) inherit a rich traditional knowledge and people still use the herbal medicines prescribed by local healers. Despite emergence of modern medical facilities, the native people are still dependent to a large extent on locally available plant resources to cure different ailments. In present article, ethnobotanical information on 50 plant species discussed, provides the firsthand information and a scientific base to researchers for phytochemical and pharmacological studies. It is observed that ailments like jaundice, joint pains, stomach disorders and blood related problems are common in the area and thus maximum of the plants are reported in use to prepare the herbal drugs to cure these ailments. Generally, both fresh as well as dried plant material is used as medicine but the fresh material is believed to be more effective. Among plant parts, leaves, flowers and entire plant are reported to be used to a great extent i.e. leaves 31%; flowers 17% and entire plant 16% respectively. It indicates that local people know about the efficacy of leaves and flowers for higher healing properties than other plant parts.

These days all scientific disciplines now recognize the importance of plants as sources of medicines and have initiated active research programmes either to isolate new lead compounds or to produce standardized extracts (Gurib-Fakim, 2006). Therefore, information on lesser known or new herbal preparations from 29 plant species namely *Allium*

carolinianum, *Aphragmus oxycarpus*, *Arnebia euchroma*, *Artemisia maritima*, *Astragalus thomsonianus*, *Chaerophyllum villosum*, *Corydalis moorcroftiana*, *Crepis flexuosa*, *Ephedra regeliana*, *Erigeron borealis*, *Ferula jaeschkeana*, *Gentiana moorcroftiana*, *Gentiana tubiflora*, *Gentianopsis detonsa*, *Hippophae rhamnoides*, *H. Tibetana*, *Iris ensata*, *Lactuca rapunculoides*, *Oxytropis lapponica*, *Pedicularis punctata*, *Pleurospermum stylosum*, *Polygonum tortuosum*, *Rubia tibetica*, *Rumex orientalis*, *Saussurea glanduligera*, *Scorzonera divaricata*, *Sedum tibeticum*, *Tanacetum falconeri* and

Thermopsis inflata from Spiti valley will provide pharmacological leads to discover new potential drugs against various ailments reported to be cured under present investigation which may contribute in new leads to modern healthcare.

The observations emanating from present study need to be substantiated with pharmacological studies in order to evaluate their effectiveness. It is imperative so that efficacy of the various indigenous practices associated with these species can be validated for the production of new potential health care products.

Table 1. Enumeration of the plants used traditionally as medicine in Spiti valley

Family & scientific name	Local name	Part used	Locality Altitude (m)	URSV (Mode of preparation and ailments cured)	IMP(Kirtikar and Basu, 1976)	DIFME (Jain, 1991)	ECDT (Sood <i>et al.</i> , 2001)
APIACEAE <i>Bupleurum falcatum</i> Linn. (PLP 4275)	Thonpu	Lf, Fl	Teling (3704)	Fresh parts are collected, dried under shade and powdered. The powder is taken orally with lukewarm water to cure stomach pain	Diaphoretic, thoracic cures liver troubles, abdominal inflammation, fever, flatulence, indigestion, malaria	Cures abdominal inflammation, fever and liver complaints	—
<i>Chaerophyllum villosum</i> Wall.ex DC. (PLP 4278)	Shigu zera	Sd, Lf	Sagnum (3851)	Seeds and leaves are directly consumed as vegetable to cure cold and cough*. It is also reported to cure stomach pain caused due to cold	—	—	Roots eaten raw to cure abdominal pain.
<i>Ferula jaeschkeana</i> Vatke (PLP 4300)	Thunak	Sd, Rt	Bhar (3908)	Powder prepared from the dried parts is consumed daily with water to cure chest pain*	Wounds and bruises	Controls rheumatism, toothache, wounds and used as spice	—
<i>Pleurospermum stylosum</i> Benth. ex Cl. (PLP 4310)	Yumodijen	Wp	Sagnum-Tud (3851)	All parts including roots are dried under shade and powdered. Small tablets (about 2-5 g) prepared from the powder are given to pregnant ladies to reduce the pain during delivery*	—	—	—
ASTERACEAE <i>Scorzonera divaricata</i> Turcz. (PLP 4203)	Thunpu	Sh, Lf	Langza (4252)	Decoction of leaves and shoots is prepared at low temperature and taken orally to cure jaundice and dysentery*	—	—	—
<i>Saussurea glanduligera</i> Sch.-Bip. ex Hook.f. (PLP 4309)	Pang-Poy	Lf, Fl	Sagnum-Tud (3857)	Fresh juice of leaves and flowers along with other ingredients is taken as an antidote against food poisoning. The dried powder is also consumed as cooling agent*	—	—	—
<i>Lactuca rapunculoides</i> (DC.) Clarke (PLP 4315)	Gonpu	Lf	Sagnum (3900)	Sap of young leaves mixed with equal quantity of water is taken to cure severe stomach pain and cramps for immediate relief*	—	—	—
<i>Artemisia scoparia</i> Waldst. and Kit (PLP 4334)	Phur-Mang	Lf, Sd	Lari (3345)	Dried leaves and seeds are crushed and boiled in water at low temperature till it becomes a paste. The concentrate thus obtained is mixed with mustard oil and is applied on ear and tooth to reduce the pain	Purgative, controls ear pain, smoke cures burns	Medicine for ear ache	—
<i>Erigeron borealis</i> (Vierch.) Simmons (PLP 4342)	Mathok-Lugmik	Lf	Kaza-Tud (3703)	Leaves are dried under shade and powdered. The powder along with other ingredient is taken as an antidote in food poisoning*	—	—	—
<i>Taraxacum officinale</i> Wigg. (PLP 1513)	Sarchen-Metok	Wp	Humna (3700)	Powder of aerial parts is taken with milk or water to cure joint pains and kidney problems	Diuretic, tonic, aperient, cures kidney and liver disorders	Diuretic, cures blister, wounds, liver and bowel complaints, dislocation of joints, blood purification, dysentery, gastric ulcer, headache.	Flower powder cures headache and fever

<i>Artemisia maritima</i> Linn. (PLP 1560)	Shoma	Rt	Kaza (3650)	Juice of fresh roots is applied externally on skin to cure boils caused due to burn*. Also taken orally to cure stomach pain	Stomachic, appetiser, aphrodisiac, abdominal pain, indigestion, mucous diarrhea (Ayurveda). Laxative, anthelminthic, alexiteric, vulnerary, stops expectoration and removes bad humours, cures scorpion sting, toothache, gripping, ophthalmia, inflammation (Yunani)	Anthelmentic, antiseptic, helps in gastric trouble and cuts, acts as blood purifier	Decoction of leaves and flowers orally taken to remove abdominal parasites
<i>Erigeron multiradiatus</i> Benth. (PLP 4247)	Luk-Mik	Lf	Shagtal-Gete (4197)	Juice of fresh leaves is taken with equal quantity of water to get relief from burning sensation in the stomach	–	Brain tonic, renal and stomach pain	–
<i>Tanacetum falconeri</i> Hook.f. (PLP 4284)	Khanpa	Wp	Mud (3808)	Whole plant is dried under shade and powdered. The powder is taken along with other ingredients to cure joint pains. Also prescribed for purifying blood *	–	–	–
<i>Lactuca macrorhiza</i> Hook.f. (PLP 4292)	Gonpu	Wp	Mud (3832)	Plant powder along with other ingredients is used to cure stomachache	–	–	Powder of aerial parts used as laxative in chronic constipation
<i>Crepis flexuosa</i> (DC.) Benth. (PLP 1534)	Homa Sili	Wp	Rangrik-Humna (3697)	Fresh juice of the plant mixed with equal amount of water is taken once a day to cure jaundice*. It is taken regularly until it is cured	–	Reported to cure constipation	–
<i>Cousinia thomsoni</i> C. B. Clarke (PLP 4208)	Tulse	Rt	Kibber (4300)	About 2-2.5 g of root powder is taken regularly to cure swellings and joint pains	–	–	Powder of roots given to cure inflammation and rheumatism
BORAGINACEAE <i>Arnebia euchroma</i> (Royle) Jonston (PLP 4205)	Khamed	Rt	Kibber (4102)	Fresh roots are crushed and extracted. The extract is filtered with the help of muslin cloth and taken to cure cough and dryness in the throat*. This is also used by the "Amchis" as blood purifier	–	Cures backache and used as tonic for brain	Used for purifying blood and as antiseptic
<i>Lindelofia longiflora</i> (Royle ex Benth.) Bail. (PLP 4256)	Showarag	Lf	Chang-Lung (4022)	Ash of leaves is applied on cuts and wounds for checking bleeding and quick healing	–	Used to cure diarrhea and inflammation	Fresh leaves applied as bandage on cuts and wounds
BRASSICACEAE <i>Aphragmus oxycarpus</i> (Hk.f. & Th.) Jafri (PLP 1520)	Chhuruk	Wp	Humna (3650)	Powder of dried parts is used along with other ingredients to regulate urine flow*	–	–	–
<i>Lepidium latifolium</i> Linn. (PLP 4226)	Chulti	Lf, Fl	Rangrik (3697)	Powder of dried leaves and flowers is taken daily with water to cure joint pains	Depurative and antiscorbutic, cures skin diseases	Medicine for rheumatism	Powder of aerial parts is given to cure rheumatic pain
CAPPARIDACEAE <i>Capparis spinosa</i> Linn. (PLP 4330)	Martokpa	Sh	Tabo (3366)	Green shoots are cut and dried in shade to prepare powder. Powder is taken orally twice a day to cure urinary troubles and liver infection	Aperient, expectorant, anthelminthic, emmenagogue, analgesic, cures rheumatism, paralysis, toothache, enlarged spleen, tubercular glands, juice kills worms in ear, used as tonic, (Yunani). Diuretic, stimulant, anti scorbutic, used to cure sores, snake bite, earache, gouts	Cures paralysis, toothache, rheumatism and also used as vegetable	Powdered bark for urinary and liver problems
CHENOPODIACEAE <i>Chenopodium botrys</i> Linn. (PLP 4301)	Sha	Sh, Lf	Sagnum (3851)	Vegetable prepared from tender shoots and leaves is found effective to cure severe headache	Used in catarrh and humoral asthma	Used as diuretic, laxative, anthelmentic, cures headache, stomachache and liver complaints	Soup prepared from leaves is prescribed for gastric disorders
CRASSULACEAE <i>Sedum tibeticum</i> Hook.f. & Th. (PLP 4262)	Sholo	Wp	Khongme-Tud (4800)	Sap of fresh plant parts along with other ingredients cures heart and lung troubles*	–	–	–
ELAEAGNACEAE <i>Hippophae rhamnoides</i> Linn. (PLP 4268)	Cherma	Br	Rangrik (3620)	Dried berries are used to prepare herbal tea, which is quite effective to cure tuberculosis. Also cures jaundice and helps in blood purification*	Cures eruptions and lung complaints	Used as aphrodisiac, pickle and tea cure lung disorder	Pulverized berries prescribed for tuberculosis
<i>Hippophae tibetana</i> Schlecht. (PLP 4348)	Chhr-Tuan	Br	Takcha (4123)	Dried berries are crushed and boiled in water and the decoction obtained is taken as tea to cure cough, congestion, jaundice and also as blood purifier*	–	Acts as appetizer	–

EPHEDERACEAE <i>Ephedra Gerardiana</i> Wall. ex Stapf. (PLP 4232)	Tse	Sh	Kee (3658)	Extract of young and fresh shoots is used in joint pains	Diaphoretic, antipyretic, astringent, stimulant, cures rheumatism, syphilis, respiratory troubles, asthmatic paroxysms, heart failure, cardiac problems	Cures asthma, headache, jaundice, hepatic disorder, rheumatism and acts as blood purifier	Powder of plant is given to cure liver complaints, cough, fever, cardiac ailments
<i>Ephedra regeliana</i> Florin. (PLP 4333)	Thak-Tse	Sh	Lari (3345)	Juice extracted from fresh leaves and berries is used to cure joint pains. Also consumed as a tonic for general weakness*	-	-	-
FABACEAE <i>Astragalus thomsonianus</i> Benth. (PLP 4210)	Satkar	Fl, Lf	Langza (4252)	Powder is used for treating gastric troubles due to cold and also reduces swelling and joint pains*	-	-	-
<i>Thermopsis inflata</i> Camb. (PLP 4213)	Tapa	Sd	Hikkim (4516)	Seed powder is consumed to cure joint pains. Also taken orally with milk or water as a general tonic to improve the health*	-	-	-
<i>Oxytropis lapponica</i> (Wahl) Gay. (PLP 1840)	Chhushin Darm	Wp	Humna (3650)	Whole plant is boiled in water and the water is applied externally to treat joint pain*	-	-	-
FUMARIACEAE <i>Corydalis moorcroftiana</i> Wall. ex Hk.f. & Th. (PLP 4263)	Tongre- sewa	Fl, Lf	Khongme- Tud (4800)	Fresh leaves and flowers are collected and dried in shade and powdered. The powder is consumed with water to cure pain and swelling in bones *	-	-	-
GENTIANACEAE <i>Gentiana moorcroftiana</i> Wall. ex G. Don (PLP 4218)	Santik	Fl, Lf	Rangrik- Humna (3661)	Fresh plant parts are crushed and extracted. The extract obtained is taken in empty stomach to cure jaundice and for blood purification*	-	-	-
<i>Gentiana tubiflora</i> (G. Don) Griseb. (PLP 1514)	Chatik	Wp	Humna (3700)	Fresh plant juice is mixed with equal quantity of water and about half glass of the mixture is taken orally in morning hours to cure jaundice*	-	-	-
<i>Gentianopsis detonsa</i> (Rottb.) Ma. (PLP 1844)	Chatik	Lf, Fl	Humna (3740)	Fresh leaves and flowers are crushed to extract the juice. The juice is taken orally to cure jaundice and also for purification of blood*	-	Cures cough, fever, headache and nausea	-
GERANIACEAE <i>Geranium pratense</i> Linn. (PLP 4285)	Podh-Lo	Wp	Mud (3808)	About one spoon of plant powder is taken orally with water to cure cough, jaundice and stomach disorders	Used as vulnerary	-	Powder of plant is given to cure gastric disorders
IRIDACEAE <i>Iris ensata</i> Thunb. (PLP 4336)	Thema	Sd	Lari (3306)	About 10 g seed powder is consumed orally to kill the worms in the stomach*	Alternative, purifies blood, venereal affections, liver complaints, dropsy	-	-
LAMIACEAE <i>Dracocephalum heterophyllum</i> Benth. (PLP 4201)	Shim- thingli	Lf, Fl	Lanza (4252)	Juice of fresh leaves and flowers is filtered and used in treating eye diseases like irritation, burning sensation and pain	-	Helps to control various eye diseases	Flower powder is given for eye ailments
<i>Hyssopus officinalis</i> Linn. (PLP 4271)	Tiyanku	Fl, Lf	Teling (3704)	Powder of fresh parts is taken directly with water to cure cough and cold. It is also used as an ingredient in the medicine to purify the blood	Anthelmintic, expectorant, carminative, alexipharmic, laxative, useful in inflammation, paralysis, chronic bronchitis, inflammation of lungs, asthma, pain in muscles, chest and liver, strengthens the teeth, scabies, earache (Yunani). Effective to cure cold, cough, consumption, lung complaints, uterine and vesical affections, indurations of liver or spleen, hysteria and colic, round worms	Cures cough, cold and acts an ingredient in the medicine to purify blood	-
LILIACEAE <i>Allium carolinianum</i> DC. (PLP 4207)	Lahud	Fl, Lf, Rh	Lanza (4114)	Paste of fresh parts is taken orally with water to cure stomach pain. Vegetable prepared from leaves and rhizome is consumed to cure stomach disorders*	-	Acts as diuretic, stimulant and in seasoning food	-

ORCHIDACEAE <i>Dactylorhiza hatagirea</i> (D. Don.) Soo. (PLP 4217)	Wangpo-lakpa	Rh	Rangrik-Humna (3661)	About 1 kg shade dried and grinded rhizomes is boiled in 2 liter of milk at low temperature until it gets concentrated. The preparation is powdered and mixed with refined butter to prepare small tablets (about 1-2 g). One tablet is taken with one glass of milk in empty stomach to increase semen concentration. Also considered as general tonic to increase the vigour vitality	Expectorant and astringent	Used as general tonic, expectorant, cures wounds and fractured bones	—
POLYGONACEAE <i>Rheum emodi</i> Wall. ex Meissn. (PLP 4313)	Tukshu	Lf, Rt	Sagnum-Tud (3832)	Juice of young leaves and roots is taken with water to cure stomach pain due to internal injury	Tonic, laxative, cures dysentery, bad ulcers (Ayurveda). Alexiteric, purgative, diuretic, emmenagogue, biliousness, cures lumbago, heating of brain, sore eyes, piles, chronic bronchitis, fever, asthma, pains, bruises (Yunani)	Cures abdominal pain, asthma, bronchitis, fever, cuts, dysentery, eye diseases, piles, skin disorders, sprains, ulcer, wounds and act as appetiser	—
<i>Rumex orientalis</i> Bernh. Ex Schult. F. (PLP 4293)	Shomang	Lf	Mud (3836)	Juice of fresh leaves is applied directly to cure burned skin due to hot water*	—	—	Paste of leaves applied to cure irritation caused by <i>Urtica</i> species
<i>Polygonum tortuosum</i> D. Don. (PLP 4215)	Nayalo	Fl, Lf	Hikkim (3851)	Plant powder is used to cure stomach and intestinal troubles. Also considered as cooling agent and taken orally with water to cure jaundice*	—	—	Powder of aerial parts is prescribed for dysentery and to cure dehydration
RANUNCULA-CEAE <i>Aconitum rotundifolium</i> Kar. & Kir. (PLP 4264)	Bonkar	Wp	Khongme-Tud (4800)	Fresh plant parts are crushed with water and filtered. The filtrate is used as medicine to cure jaundice and for blood purification	Bitter, tonic, digestive, stomachic, cures dysentery, bilious complaints, diarrhea, vomiting, snake, scorpion and rat bite, acts as fever tonic, (Ayurveda). Tonic, cures piles, dysentery, bilious and gastric complaints, plethoric (Yunani)	Acts as antipyretic and used against insect bite, cures headache	—
ROSACEAE <i>Rosa webbiana</i> Wall. ex Royle (PLP 4233)	T-siya, Seva	Fl, Fr	Kee (3658)	Flower and fruit juice is consumed to cure jaundice. It is used as a tonic for vigour vitality	—	Cures hepatitis, jaundice and stomach pain	—
RUBIACEAE <i>Rubia tibetica</i> Hook.f. (1893)	Thak-Thokpa	Br, Sd	Kee (4000)	Ripened fruits are dried and powdered. The powder along with other ingredient is taken as blood purifier*	—	—	—
SAXIFRAGACEAE <i>Bergenia stracheyi</i> (Hk.f. & Th.) Engl. (PLP 2728)	Gatikpa	Rt	Sagnum-Tud (3857)	Paste prepared from the roots is applied for treating ulcers and blisters in mouth.	—	Antiscorbutic, astringent, diuretic, tonic, and cures joint dislocation, cuts and wounds	—
SCROPHULARIACEAE <i>Pedicularis punctata</i> Deene. (PLP 4245)	Lungru-serpo	Fl, Lf	Gete (4415)	Powder of dried leaves and flowers is used as an ingredient to control blood pressure*	—	—	—
SOLANACEAE <i>Hyoscyamus niger</i> Linn. (PLP 4344)	Thuglang	Sd	Kee-Humna (3625)	Seed smoke is inhaled to cure toothache. Effective to kill worms causing pain and swelling in gums.	Pungent, toxic, heating, stomachic, astringent to the bowels, cure "Kapha" (phlegm) (Ayurveda). Expectorant, hypnotic aphrodisiac, haemostatic, depilatory, cures toothache, bleeding of gums, liver pain, gouty swellings, inflammations of breasts and testes, nasal and eye troubles, earache, fever, headache, joint pains, scabies, bronchitis (Yunani)	Cures cough, toothache, muscular pain, hysteria and acts as vermifacient, astringent and sedative	Seeds used for toothache
TAMARICACEAE <i>Myricaria germanica</i> (Linn.) Desv. (PLP 1846)	Humbu	Sh, Lf	Bhar (3908)	Sap of fresh young shoots with tender leaves is used as one of the ingredients to cure joint pains.	Used as an aperient and cures jaundice	Cures rheumatism	Powder of leaves and flowers cures rheumatism

Part used: Wp-Whole plant, Lf- Leaves, Fl- Flowers, Rt- Roots, Sd- Seeds, Rh-Rhizome, Fr- Fruits, Sh- Shoots, Br-Berries

* Lesser known or unknown medical remedies reported

Acknowledgements:

This paper is dedicated in fond memory of Late Dr. H.R. Negi, Scientist of the Institute of Himalayan Bioresource Technology for his inspirations and guidance to carryout ethnobotanical research in Spiti valley of western Himalaya. Authors are grateful to National Bioresource Development Board, Government of India, for financial support. First author is also thankful to CSIR, New Delhi, for the award of Senior Research Fellowship. Thanks are also due to the local healers and tribal people of Spiti valley for sharing valuable information.

Corresponding Author:

K.N. Singh (Ph.D.)
A.Ag, British Columbia Institute of Agrologists,
British Columbia, Canada
3605 Fieldgate Street, Abbotsford, BC, Canada, V2T
6W5
E-mail: knsingh.ecology@gmail.com

References

- Aswal BS, Mehrotra BN. Ethnobotanical studies on the flora of Lahul valley (North-West Himalayas). In. Sharma MR, Gupta BK, eds., Recent Advances in Plant Sciences, 1987.
- Aswal BS, Mehrotra BN. Flora of Lahaul-Spiti (a cold desert in north west Himalaya). Dehra Dun, Bishen Singh Mehendra Pal Singh, 1994.
- Brij Lal, Ahuja PS, Gupta AK. Application of Seabuckthorn in Amchi System of Medicine. In. Singh V, Khosla PK, eds., Proceedings of International Workshop on Seabuckthorn. New Delhi, 2001, pp. 239-242.
- Brij Lal, Negi HR, Singh RD, Ahuja PS. Medicinal uses of *Dactylorhiza hatagirea* among the natives of higher altitudes in western Himalaya. Journal of Orchid Society of India 2004; 18(1-2): 97-100.
- Census of India. District Census Hand Book - Lahul and Spiti, Directorate of Census Operations, Himachal Pradesh, India, 1991, Series-9.
- Cotton CM. Ethnobotany - principles and applications. New York, John Wiley and Sons, 1996.
- Gurib-Fakim A. Medicinal plants: traditions of yesterday and drugs of tomorrow. Mol Aspects Med 2006; 27: 1-93.
- Jain S. Traditional healing and modern medical facilities among an Indo-Tibetan community (a brief ethno-medical survey of the boths of Spiti). sMan-Tsis (Journal of Tibetan Med Astro) 1996; 2 (1): 30-43.
- Jain SK. A manual of ethnobotany. Jodhpur, Scientific Publishers, 1987.
- Jain SK. Dictionary of Indian Folk Medicine and Ethnobotany. New Delhi, Deep Publications, 1991.
- Kala CP. Status and conservation of rare and endangered medicinal plants in the Indian trans-Himalaya. Biological Conservation 2000; 93: 371-379.
- Kirtikar KR, Basu BD. Indian Medicinal Plants. Vol I-IV. New Delhi, Periodical Experts, 1976.
- Martin GJ. Ethnobotany: A Methods Manual. London, Chapman and Hall, 1995.
- Sharma V. Ecodiversity of Himachal Pradesh: a status report. Him Insight 1994; 1(2): 17-24.
- Singh KN, Brij Lal. Ethno-medicines used by tribal communities against four common ailments in Lahaul-Spiti, western Himalaya. Journal of Ethnopharmacology 2008; 115: 147-159.
- Singh KN, Brij Lal, Ahuja PS. Species richness, distribution pattern and conservation of higher plants in Spiti cold desert of trans-Himalaya, India. International Journal of Biodiversity Science and Management 2008; 3(4): 223-233.
- Singh KN, Gopichand, Kumar A, Brij Lal and Todaria NP. Species diversity and population status of threatened plants in different landscape elements of the Rohtang pass, western Himalaya. Journal of Mountain Science 2008*; 5: 73-83.
- Sood SK, Nath R, Kalia DC. Ethnobotany of Cold Desert Tribes of Lahoul-Spiti (N. W. Himalaya). New Delhi, Deep Publication, 2001.
- Tang W, Eisenbrand G. Chinese Drugs of Plant Origin - Chemistry, Pharmacology, and Use in Traditional and Modern Medicine. New York, Springer-Verlag, 1992.
- Uniyal MR, Bhat AV, Chaturvedi PN. Preliminary observations on medicinal plants of Lahul Spiti forest division in Himachal Pradesh. Bulletin of Medico-ethnobotanical Research 1973; 3(1): 1-26.