

Ethno-botanical recordings from doonagiri sacred Groove in Dwarahat, Kumaun Himalayas (Uttarakhand), India

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ABSTRACT

In Uttarakhand state villages have their sacred groove (ancient temple forests) both in Garhwal and Kumaon regions, where deities or spirits are worshipped by local communities. These protected forests containing different indigenous wild life species and natural water springs are on the verge of disappearance due to anthropogenic activities. Uttarakhand has age-old tradition of protecting temple forest near villages, where deities are worshipped in a sacred grove. The vegetation growing in groves are not allowed to cut, as believed to the deity. Only the dead / dried fallen parts are used by them. Even sudden dying of plants of these forest are said to be bio-indicator of mishappenings for the villagers. This restriction in forests have helped conservation of indigenous species of these areas. The future studies should be conducted because documentation of medicinal plants present in these sacred temple forests of Uttarakhand has not been done widely. Hence this study work for future references before planning them as a tourism spots. Most species growing there occurs naturally in remote habitats. Over exploitation of forests by human greed have caused extinction of many wild flora and faunas. These sacred grooves can serve as germplasm bank and a model for biodiversity conservation. In Kumaon regions of Uttarakhand, such (enlisting) has been least done, hence this will be the pioneer work with important findings for the future reference. The purpose is to document the sacred groves biodiversity of Uttarakhand, but also look broadly at measures to conserve them and restore their lost pristine glory.

Key words: Sacred groove, Indigenous species, Ethno-botanical, Germplasm bank, etc.

STUDY SITE: DWARAHAT

(29° - 46' - 54" (North) Latitude to 79° - 28' - 8" (East) Longitude and 1650 m (above msl)

Dwarahat, a small town formerly known as 'a doorway to market' spreads along wide valley of the river Ramganga. An archeologically historical important town (Fig. 1) was once the ruling capital of 'Katyuri' dynasty and famous for 8 groups of ancient temple, viz. Mrityunjay, Dhawaj, Badrinath, Durga, Gugar Dev, Ratan Dev etc. These are splen-

did examples of the grandeur of Katyuri architecture, range past from 10th to 11th century A.D and popularly also known as "Khajuraho of Kumaon Himalayas".

Around 14 Km away from Dwarahat is the famous Doonagiri temple (2765 m) on the top hill considered as sacred groove devoted to goddess Durga. The other high, prominent peaks are Bhatkote (2,231m) Chakhutia (1,977m) Pandukholi (2296 m) and Mansa Devi (2407 m) trek the rugged beauty,

offers a breathtaking sight especially for trekkers. The vegetation enroute comprises of Oak, chir pine, deodar and *Rhododendron* mixed forest. The whole Dwarahat area and surrounding hills range extend from Ramganga river in the west, to river Kosi in the east and in the south, the steep valley bounds it with alluvial fans in the north of Shiwaliks and are denudation hills of Pre- Tertiary rocks (Atkinson, 1980).

General History

The **Dhronagiri (Doonagiri)**, a mythic hill is well known for wildlife wealth hot spot pocket of medicinal plants diversity in Almora district (Arya (2001); Shah (1973); Shah and Joshi (1971); Shah and Jain (1988). Tremendous other contribution has made towards the ethno-botanical exploration of Kumaon Himalaya by Bhatt and Gaur (1988); Kalakoti and Pangtey *et al.*, (1987-88); Saxena and Singh (1982); Saxena *et al.* (1991); Methela *et al.* (1979); Shah (1983) etc.

However, the indigenous herbal practices of rural people of subalpine and temperate Himalaya like Dwarahat, Dhronagiri and adjoining areas i.e. Pandukholi, Bhartkot (Bhatkhot), Tarak-Tal (Taragtal) and Khera - Khanshar are still unexplored.

Method of Survey

The information gathered by phyto-sociological study & plants collection trip to Dwarahat and nearby sacred grooves in the year 2014 - 2015. During survey about 25 old persons per villagers were interviewed for collecting the ethno-botanical information. Most plant species reported has similarity as reported by the earlier workers (Bisht *et al.*, 1995; Joshi and Talpatra, 1960; Lata, 1996; Upreti, 1983) etc. However such studies regarding medicinal importance of plants from other parts of Kumaun and Garhwal Himalaya have been also conducted by several other workers (Bisht *et al.*, 1988; Samant *et al.*, 1998, 2001; Negi *et al.*, 1999 and Dhar *et al.*, 2002).

Medicinal Plant Biodiversity of Doonagiri Sacred Groove in Dwarahat, Kumaun Himalayas Region

Agave americana Linn. Wild. (Family: Agavaceae), Local name: Rambans, Altitude: 1200 – 1600 m. 1-2

teaspoon powder of the seed with about 50 mL of hot water twice a day is given orally for the treatment of boils and blood purification. About 25-30 ml leaf juice from young plants thrice a day for one week is also given for abortion in early pregnancy.

Angelica glauca Edgew. (Family: Apiaceae), Local name: Gandrayan and Chippi, Wild, Cultivated. Flowering in July- Aug, Fruiting: Sep-Oct and Harvesting: March-June. Leaf powder in the form of paste mixed with the oil of yellow sarson (*Brassica campestris*) is applied locally for about one month to cure white patches on skin, while about one teaspoonful dried powder of the root with hot water is given orally twice a day for one week in case of acute bronchitis and constipation. Rhizome is used as an appetizer, carminative, diuretic, diaphoretic, stimulant, emmenagogue and for leprosy, eczema, cough, gout and blood purification.

Artemisia capillaris Common Name: Jhirum, (Family: Asteraceae) Decoction of leaves taken as a bitter tonic for worms and colic.

Asparagus racemosus Willd. Common Name: Satawari, Habit: herb. (Family: Liliaceae), Local name: Satawar. Used as herbal tonic, diuretic and galactagogue. Fresh root is mixed with honey and given for dyspepsia. Roots form a constituents of medicinal oils used for nervous and rheumatic complaints. The sweet and bitter herb is particularly balancing to pitt dosha. Useful for hyperactivity, stomach ulcers, dysentery, and bronchial infection. Roots are good for eyes, muscles reproductive organs, increases milk secretion and help to regain vigour and vitality. Root decoction with jaggery used as arborifacient.

Berberis chitria, *B. asiatica* Roxb ex DC. Habit : Shrub (Family: Berberidaceae), Local name: Kilmora / Kilmadu. Altitude: 2500-3000 m. Flowering in March –June. Mature fruits are eaten locally, whereas the flowers are used for the preparation of 'Chutney. However, the extract of fresh root applied externally for the treatment of eye disease, in acute diarrhoea and intermittent fever, Anticancer, Hyoglycaemic, Pharmacological.

Bergenia lingulata (Wallich) Engl. (Family: Saxifragaceae), Local name: Silphari. Altitude: 2500-3000 m. Flowering in April-June. Uses in urinary troubles and anti inflammatory, Anticancer, Antiprotozoal, Pharmacological. About 5 g of root paste with one glass of hot water is taken orally twice or thrice a day for a week for the treatment of



Fig 1. Map showing the research conducted study site.

stomach pain caused by stone, fresh root are chewed to get relief from painful urination. Leaf paste used externally around the boils for healing.

Berginia ciliata Common Name: Pasanhed (Family: Saxifragaceae) The rhizomatous part used as tonic and febrifuge, used in digestive and cutaneous disorders, dry leaves adulterated with tea. An important drug is obtained from rhizome for dissolving kidney and bladder stone.

Bluplerum hamiltoni Common Name: Jangli jeera, (Family: Apiaceae) Roots used in stomach and liver disorders.

Callicarpa macrophylla Vahl., Local name: Dahya. (Family: Verbenaceae), Fresh leaf decoction is used as regular mouth wash for 3-5 days or until recovery from sores & gingivitis.

Cardamine impatiens (Family: Brassicaceae). Juice of plant is given in fever.

Carthamus tinctorius Linn. (Family: Asteraceae), Wild. 1-2 teaspoonful of leaf powder mixed with one glass of milk is given to pregnant ladies as tonic for having healthy child. The dried powder of flowers mixed with coconut oil is used as a natural hair tonic to prevent hair fall.

Cedrus deodara (Roxb.) L. ex G. Don (Family: - Pinaceae), Local name: -Diar or Deodar. Elevation: 2500-3000 m. Small pieces of heart-wood (about 100-200 g) of mature tree when dipped over night in 100-200 mL of hot water, the resulting extract is given orally for about 30 days to the patients suffering from piles.

Centella asiatica Common Name: Brahmi (Family: - Apiaceae). It is alterative, tonic diuretic and blood purifier. It is remedy for skin diseases, chronic nervous disorders and rheumatism. The powder of leaves mixed with milk and given in mental weakness and to improve memory

Commelina bengalensis Common name: Kanjula (Family: Commelinaceae) Plant juice is given in dysentery and paste applied on body swelling and ache.

Cymbopogon distans Habit: grass, (Family: - Poaceae), Local name: Aging has. It yields an essential oil used in soap and as a flavouring lemon scent. Considered as a carminative, mosquito repellents. Tonic used in cough, chronic rheumatism, cholera, dyspepsia and gout.

Cynodon dactylon and ***Cymbopogon dactylon*** (L.)

Pers. Habit: grass, (Family: Poaceae) Local name: Doob, Dhub, Dhuba, Hariali. Medically oil used in decoction, for anasarca. Rhizomes used in genitor-urinary troubles. Root taken in fever and in internal injury. Decoction of root taken as diuretic, in hysteria, epilepsy and secondary syphilis. Its Therapeutic uses are as diuretic, dropsy, syphilis, wound infection and in curing piles.

Dicliptera bupleuroides Nees, (Family :- Acanthaceae), Local name: Kuthi, Pateev, Sommi. Crushed fresh leaves are applied gently on the effected portion of the body thrice a day for one week in eczema.

Erigeron karvinskianus*, *E. bonariensis Habit: herb, (Family:-Asteraceae), Local name: Maredi. Used as stimulating, diuretic in febrile conditions. Astringent, hemostatic and diuretic in diarrhea and dysentery. Uterine haemorrhages, dropsy, gravel and renal affections, also used for ring-worm and eczema infections.

Ficus auriculata Lour. (Family: - Moraceae), Local name: Timla, Domesticated. Fruits are edible. Un-ripe fruits are used for vegetable and to cure diabetes and high blood pressure. The latex of the plant is used externally in eye ailment.

Ficus nerifolia Wall. ex Miq. Corner; ***F. nemoralis*** (Family: Moraceae), Local name: Dudhila, Domesticated. Altitude; 1500- 3200 m. Leaves contain milky latex. Local inhabitants give its fresh leaves to their domestic animals (goats, cow buffalo) for enhancing lactation.

Geranium nepalense Common Name: Syuli (Family:-Geraniaceae) The plant infusion is used in fever and renal disorders. The root paste is applied externally on itching and eczema.

Girardiana heterophylle Decne. Habit: Shrub (Family: Urticaceae) Local name: Bichua, bichu. Bark yield a fibre used in rope, twines and rough cloths manufacturing. Decoction of leaves used as febrifuge. Leaves applied to swollen joints.

Grewia optiva J.R. Drum ex. Burret (Family: Tiliaceae), Local name: Bhimal / Bhaikuwa, Domesticated. Seeds are laxative. Paste of the seeds mixed with a glass of hot milk is given to pregnant ladies to facilitate easy delivery. Leaves enhancing lactation potential in cattles. The fibers of young stems are crushed into paste and mixed with hot water and used as shampoo by local ladies for washing hair.

Innula cupsidata Common Name:- Jhuri (Family:- Asteraceae) Root decoction given in dyspepsia and colic, root also used in local beverages.

Juglans regia Linn. (Family: Juglandaceae), Local name: Akhrot, Domesticated. Rind of young fruit is ground to paste with water and applied on the head in cases of loss of hair caused by a special kind of hair fall disease locally known as "Khaair". Some people also use the fresh rind to treat tooth problems. Bark mostly used in artistic ink, natural colours, soap making etc.

Myrica esculenta Buch. Ham. Habit: Tree, (Family: Myricaceae) Local name: Kafal, Kaiphal. Fruits are edible, used for preparing a refreshing drinks. Wax on the pericarp used for making candles. Bark used for tanning and dyeing. It is astringent, carminative and antiseptic. Decoction considered useful in asthma, diarrhea, fevers, chronic bronchitis, lung affections, dysentery and diuresis. Bark chewed to relieve toothache and lotion prepared from it is used for washing putrid sores, also used as fish poison.

Nepeta ciliaris Common Name: Nueet (Family: Lamiaceae) Decoction of leaves and seeds taken in fever, Leaves also yield essential oil.

Pinus roxburghii Sargent (Family: Pinaceae), Local name: Chir / Sauo, Wild. Seeds (chilgoza) are edible. Fresh resin is applied locally on cuts and wounds and then tightened with clean cloth for about 5-7 days to prevent infection from micro-organisms. Used in paint industry making varnish, turpentine oil, lacquers, disinfectant etc.

Premna mucronata Roxb., (Family: Verbenaceae), Local name: Againoi, Againbai, Agnimatha. Young stem paste is applied gently on and around boils twice a day for one week to get complete cure.

Pyracantha crenulata Linn. (Family: Apiaceae), Local name: Ghingar, Wild. Ripe fruit is delicious and eaten by local people to cure constipation. While 25-30 ripe fruits with small pinch of salt twice a day for 15 days is given to pregnant anemic ladies to overcome anemic condition.

Pyrus pashia Buch-Ham. ex D. Don (Family: Rosaceae), Local name: Mehal, Wild. The ripen fruit is delicious and eaten by children. 4-5 ripen fruits twice a day for 15-30 days are advised by the local Vaidya for the treatment of asthma.

Quercus leucotrichophora A. Camus (Family: Fagaceae), Local name: Baj, Wild. Gum of the tree is used for gonorrheal and digestive disorders. 25-30

ml decoction of about 50 g bark twice a day for one to two weeks is given to the patients suffering from asthma.

Rhododendron arboretum Sm. Habit: Tree, (Family: Ericaceae), Local name: Burans. Flowers used for drink preparation and eaten raw. Useful for heart patients, in diarrhea and dysentery.

Ricinus communis Linn. (Family: Euphorbiaceae), Local name: Arendi, Wild. Leaves are used for the treatment of arthritis. 2-3 young leaves are tightened overnight with the help of thin cloth daily for a week or longer. The seed oil is used for the treatment of spondylitis and joint pain. About 20-25 mL decoction of the young leaves twice a day for 15-30 days is given to control diabetes.

Rubia manjith Common name:- Manjeeth (Family: Rubiaceae) Root medicinal as tonic and astringent, stem used as an antidote to snakebite, flowers extract in bacillary dysentery.

Rubus ellipticus*, *R. lasiocarpus Smith Habit: Shrub (Family: Rosaceae), Local name: Hissalu, Wild. Fruits are delicious. 1-2 spoonfuls paste of the young leaves with cold water thrice a day is given orally in case of acute diarrhea. While, the same amount of paste is administered orally with hot water in case of constipation. A decoction of the root is used for curing dysentery and as an intoxicant for the preparation of local wine.

Rumex hastatus Common name:- Almoru (Family: Polygonaceae) The leaf extract of plant are applied on wounds and cuts to check bleeding. Plant is also believed to relieve from suffering of nettle sting.

Rumex hastatus D. Don Habit: Shrub (Family: Polygonaceae) Local name: Chilmora, Amlora, Bhilmora. 2500-3000 m. Young stem and leaves are used as a blood purifier and given in the form of green vegetable to patients suffering from skin diseases like skin dryness, warts, boils, etc. Leaves have a pleasant acid taste, used in chutney and pickles.

Solanum incanum Linn. (Family: Solanaceae), Local name: Bis, Wild. Seed powder given in asthma and symptoms like tuberculosis. The paste of the fresh fruit is applied externally on cuts and wounds.

Taraxacum officinale Common Name:- Kanfulia (Family: Asteraceae) The root extract is used in treatment of migraines, hepatitis and headache.

Taxus baccata Hook. L. subsp. *wallichiana* (Zucc.) Pilger (Family: Taxaceae), Local name:

Thuner. Altitude: 2500-3000 m. September-October. Used in asthma and bronchitis. Bark is used to prepare tea in case of cold and cough, to warm up the body, and has an anticancer property.

Thalictrum foliosum Common Name:- Mamiri (Family: Berberidaceae) Roots used in ophthalmic and also in colic and fever. The rhizome used as an antiperiodic, and purgative. Paste of plant locally used in skin diseases.

Toona hexandra, ***T. ciliata*** (Wallich ex Roxb.) M. Roem. Syn. *Cedrella toona* Roxb. ex Rottb. & Willd. (Family: Meliaceae), Domesticated. Leaves are used as a natural insecticide while storing the grains. About 50 ml decoction of the leaves twice a day for 15-30 days is given to the patients suffering from diabetes.

Trifolium prantense Common Name:- Mithla (Family: Fabaceae) The dried pods are used in cough and bronchitis root paste applied externally on venereal diseases.

Ulmus wallichiana Planchon, (Family: Ulmaceae), Local name: Chamor-mao, Mairu. Fresh stem bark paste of *Ulmus wallichiana* mixed with *Cuscuta europaea* in a ratio of 4:1 is applied on fractured bone part thoroughly and tightened with thin cloth by giving support with a hard cardboard paper and allow the patient bed rest for 30-45 days to get cured.

Urtica dioica L.) Local name: Shisoon, Bicchu, Kandali (Family: Urticaceae) Altitude from foot hill to – 3000 m. Young leaves are cooked and eaten in the form of vegetable. About 5-10 mL juice of young leaves and twigs is given for 3-5 days to women in case of menstrual disorder. Sometimes the juice is also given for the treatment of diabetes and urinary disorder, whereas the small young and soft stem is applied locally into the anus of small children in case of chronic constipation. The seed oil of plant is believed to be medicinal in sciatica; rheumatism and several skin ailments. Hair wash from leaf extract believed to avoid baldness and cure anemia.

Valeriana jatamansi Jones (Family: Valerianaceae). Altitude: 2500 - 3000 m. Flowering in March - June. Aphrodisiac, cardiac tonic and scented flavour used for perfumery industry purposes.

Verbascum thapsus Linn. Local name: Akkal Veer or Ban tambaku. Altitude: 2500-3000 m (Family: Scrophulariaceae). Dry leaves are used to smoke as an alternate to tobacco, whereas a small amount of

dry leaf powder with hot milk is given to get relief from mental tension. However, flowers are boiled and extract is used for the treatment of chronic bronchitis.

Viola canescens Common Name:- Banfsa : (Family: Violaceae) The decoction of plant is useful in malarial fever, bronchitis and asthma. Root used as emetic, flower demulcent Leaf juice applied on wounds and cuts

Zanthoxylum armatum DC. ***Z. alatum*** Roxb. Local name: Timur. Altitude: 2500-3500 m. (Family: Rutaceae), Flowering in April - October. Toothache aromatic tonic in fever and cholera. Natural insecticides, cold and cough and hot spices. Dry fruits are used as hot spices in case of acute cold and cough. The young branches used as a tooth brush while dried leaves acts as natural insecticide.

Major Impacts and Needs for Conservation

The over extraction of wild plants for commercial purpose is not only causing depletion but, other activities such as new roads construction, deforestation, agriculture expansion, repeatedly occurring wild forest fires, overgrazing by livestock's, increase in tourism activities are the major detrimental negative impacts upon forest.

The major plants reported during field survey are listed in Endangered category of high alpine areas also recorded by Maheshwari (1982), Shah *et al.* (1971, 1988) etc. Ethno-medicinal recordings help pharmaceutical industries as an excellent source for variety of lead molecules to new drugs discovery. The local, traditional herbal practitioner known as "Vaidyas" have very good knowledge of these plants identification and their herbal preparations.

Conclusion

The fascinating medicinal plants biodiversity of Pandukholi, Bharatkhot, Mansa devi and Dhronagiri forest areas of Dwarahat are locally famous as "***Jari Bootiyon Ka Ghar***" (**home of herbal medicines**) which attracted the attention of herbal practitioners from the period of Ramayana and Mahabharata. The mythological evidences in epics proves that, during exile period the Pandavas, they used remote and dense forest of Pandukholi for their Vanashram. The adjacent **Doonagiri** (sacred groove) was having source of '**Sanjivani Booti**' as

used by Sushain Vaidya during Ramayana. These areas flora are being traditionally used by the locals and herbal practitioners for their indigenous tradition knowledge as health care.

Thus, Dwarahat forest division, needs high attention of the administrators, scientists and environmentalist to declare it as high altitude national medicinal reserve forest. Most plants listed in endangered status are now banned by Forest Department to exploit, but their demand in herbal trade is high along some powerful social elements engaged in its illegal supply.

Although, selection of medicinal plant species for hilly cultivation by farmers is negligible as compared to the market demands, but the efforts are now appreciable by public private partnership (PPP model) initial stage and need further awareness, motivation and financial support. If the Government organizations and private herbal companies like Patanjali, Ayur, Dabur, Baidyanath, Himalayan Drug Company, Charak, Hoechst India Ltd. etc. come forward to tie up with villagers can be highly beneficial for stakeholders along Himalayan biodiversity conservation.

The efforts to relocate and maintain the biodiversity of the remote and sensitive hilly areas of the country through both *In-situ* and *Ex-situ* **Conservations** modes, along the Stakeholders Intellectual Property Rights (IPR) values are now extremely important. However, biotechnological approaches like tissue culture techniques for the development of successful protocols for mass propagation of the threatened plant species of economic value will be an additional tool to restore the valuable genetic resources of this veritable emporium of Dwarahat hills in Uttarakhand Himalaya habitats.

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