

## Medicinal Strength of Some Alpine and Sub-Alpine Zones of Western Himalaya, India

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**Abstract:** The Uttarakhand region is the easternmost part of the Western Himalaya. The vegetational wealth of Western Himalaya is well known since ancient time. The varying topographic conditions of this region thrive on different types of vegetation. It has a rich medicinal plant flora of over 1000 documented species having medicinal value. Out of these, more than 700 species are much in use in the country, mostly by local people living in the villages as a household remedy in several diseases. With the increasing biotic pressure, the forests and alpine are getting degraded and in the process ground flora and shrubs which happen to provide bulk of the medicinal plants are also under strain. In the present study a field survey made from August to December 2008 in four alpine and sub-alpine zone viz. Tungnath of district Rudraprayg and Rudranath, Mandal and Valley of Flower of district Chamoli in order to refine the medicinal strength of above places. The altitudinal range, local name, part used, use/cure and status of some important medicinal plants are compiled based on the earlier publications as well as personal communication with local persons, rural folks and vaidyas. [New York Science Journal. 2009;2(5):41-46]. (ISSN: 1554-0200).

### Introduction:

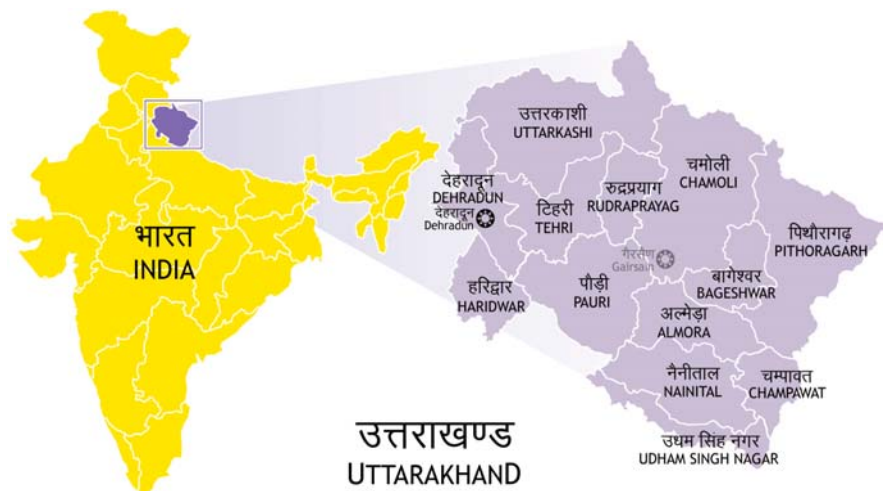
The Himalaya has been a perennial source of attraction, curiosity and challenge to human intellect throughout the ages. Amongst several assets, the vegetation provides an everlasting field of investigation. The diversity, copiousness as well as uniqueness of the plant components in various habitats retained sound and aesthetic environment of the Himalaya. However, in the recent past couple of years excessive exploitation of vegetation, unplanned land use, natural disasters and several developmental processes, accelerated deterioration of biodiversity and harmonious ecosystem of the Himalaya (Gaur, 1999). The state of Uttarakhand is bestowed with a divers array of natural vegetation ranging from the sal forests to Terai-Bhabar to treeless herbaceous meadows in the high alpine region. The alpine meadows, locally called *Bugyals* in Uttarakhand, are said to be nature's own garden where a multitude of colorful herbs, a variety of medicinal plants and nutritious grass grow in great profusion. Besides forming the crucial headwaters of the Hiamalayan Rivers and habitat for high altitude fauna, *Bugyals* are closely linked with the local livelihoods and religious sentiments (Rawat, 2005).

The alpine zone represents one of the most fascinating biomes in the Himalaya. It forms nearly 33% of the geographical area in the region, of which about 25.88% area is vegetated and remaining 7.12% are falls under perpetual snow (Anonymous, 1989). In the state of Uttarakhand the alpine zone forms about 24.11% of the geographical area. Limited by a distinct tree-line towards lower elevation which ranges between 3300-3600 m above sea level in the western and 3700-4000 m above sea level in the eastern Himalaya, the alpine vegetation comprises closely matted dwarf shrubs, herbaceous meadows, bogs, and snow-swept grounds characterized by cushion shaped plants. In greater Himalaya, alpine region is generally separated by a distinct tree-line where forests of birch-rhododendron (*Betula utilis-Rhododendron campanulatum*), high altitude fir (*Abies spectabilis*) and brown oak (*Quercus semecarpifolia*) terminte. The broad physiognomic units of alpine vegetation in the Western Himalaya include the stunted forests or *Krummholz*, alpine scrub, alpine meadows, and pioneer communities on scree slopes and moraines (Rawat and Rodgers, 1988).

### Material and Methods:

Present study is based on the field survey made from August to December 2008 in four alpine and sub-alpine zone viz. Tungnath of district Rudraprayg and Rudranath, Mandal and Valley of Flower of district Chamoli (Fig.1) in order to refine the medicinal strength of above places. The notable contribution to medicinal strength of above places have also been reported by several workers (Gaur, 1999; Rawat,

1989; Rawat, 2005; Kala et al., 1998; Nautiyal et al., 2000; Rau, 1975; Rawat and Pangtey, 1987; Rawat et al., 2001; Samant et al., 1998).



**Fig.1 Map of Uttarakhand Districts, India**

### Result and Discussion:

It is generally known that the distribution of alpine vegetation is governed by adverse edaphic and climatic factors. Scanty rainfall, high wind velocity, low temperature, high ultraviolet (UV) radiation, snow-storms, and blizzards are common at high altitudes. Vegetation in the alpine zone exhibits a characteristic adaptation to the environment. The plants are generally dwarfed, stunted, woolly or spiny, and develop a mosaic patch of different plant forms. They possess an early growth initiation with a short vegetative span ranging from several days to a few months (Nautiyal et al., 2001).

A large number of medicinal plants of great commercial value grow spontaneously in the alpine and sub-alpine zone of Rudraprayag and Chamoli district. Some of these grown in the valleys, some in sub-mountain tracts while some other in high altitudes. In the present study altitudinal range, local name, part used, use/cure (Table-1) and status (Table-2; Plate-1-a-j) of some important medicinal plants are compiled based on the earlier publications as well as personal communication with local persons, rural folks and vaidyas. Of about 1400 species of vascular plants reported from the alpine region of Uttarakhand, at least 350-400 species are known to have one or other kind of medicinal use (Rawat, 2005).

**Table-1 List of some important MAPs reported in the alpine and sub-alpine region of Western Himalaya, India**

S. No.	Scientific Name	Local Name	Altitudinal Range	Part Used	Use/Cure
1.	<i>Aconitum atrox</i> (Bruhl.) Mukherjee	Mitha	3400-3900	Roots	Deadly poisonous, small quantity used as Anti-arthritis and sedative
2.	<i>Aconitum heterophyllum</i> Wall.	Atis	3300-4500	Roots	Aphrodisiac, tonic
3.	<i>Allium wallichii</i> Kunth.	Gopka	3300-4200	Leaves	Indigestion
4.	<i>Angelica archangelica</i> L.	Rickchoru	3300-3600	Rhizome, Seed	Stimulant, expectorant
5.	<i>Angelica glauca</i> Edgew.	Chora	3000-3800	Rhizome, Whole plant	Dysentery, bronchitis, constipation
6.	<i>Arnebia benthamii</i>	Balchhari	3300-3800	Root	Hair tonic, fever, headache,

	(Don) Johnston				cuts and wounds
7.	<i>Artemisia gmelinii</i> Webb. Ex Stechm.	Purcha	2500-3000	Whole plant	Insecticide
8.	<i>Bergenia ciliata</i> (HK.f. & Th.) Engler	Silphar	1000-3000	Root	Stone, fébrifuge, digestive
9.	<i>Betula utilis</i> Don	Bhoj pat	2400-3000	Seed	Abortifacient
10.	<i>Carum carvi</i> L.	Kala jeera	2000-3800	Seed	Local spice, appetizer, cold and cough
11.	<i>Cirsium wallichii</i> DC.	Shyam Kanya	300-3000	Leaves, Root	Hepatic and spleen trouble, scorpion stings, chest pain
12.	<i>Dactylorhiza hatagira</i> (Don) Soo	Hatha jari	2800-4000	Tubers	Tonic, astringent, Ayurvedic formulations
13.	<i>Fagopyrum esculentum</i> (L.) Moench	Palthi	1200-4100	Whole plant	Health food
14.	<i>Fritillaria roylei</i> Hk.	Ksheer kakoli	2700-4000	Whole plant	Ayurvedic formulations, general tonic
15.	<i>Gaultheria trichophylla</i> Royle	Tunglu	2000-4000	Fruits	Appetizer
16.	<i>Hippiphae salicifolia</i> D.Don	Tarbu	2000-3600	Fruit	Appetizer, source of vitamin C
17.	<i>Malaxis muscifera</i> (Lindl.) Kuntz.	Jeevak	1600-3600	Tubers	Tonic
18.	<i>Nardistachys grandiflora</i> DC.	Jata mansi	3600-4800	Rhizome	Incense, Stimulant, Heart tonic
19.	<i>Origanum vulgare</i> L.	Ban tulsi	1000-4000	Whole plant	Tonic, bronchitis, hysteria
20.	<i>Picrorhiza kurrooa</i> Benth.	Kutki	1500-3000	Whole plant	Fever, stomachache
21.	<i>Plantago major</i> L.	Lahuriya	1500-3000	Whole plant	Dysentery
22.	<i>Podophyllum hexandrum</i> Royle	Van kakri	3000-4000	Root, Fruit	Roots to treat Sceptic wounds
23.	<i>Polygonatum cirrhifolium</i> (Wall.) Royle	Maida	1600-3600	Root	Cold, Cough
24.	<i>Polygonatum verticillatum</i> (L.) All.	Mahamaida	1400-4000	Root	Urino-genital disorders, nerve tonic
25.	<i>Potentilla fulgens</i> Wall. ex Hk.f.	Bajra Danti	2700-4300	Root	Astringent
26.	<i>Primula macrophylla</i> D.Don	Ram Jayan	1800-4500	Flower	Urinary ailments
27.	<i>Rheum emodi</i> Wall. Ex meissn	Archa	3300-5200	Rhizome	Purgative and astringent tonic
28.	<i>Rheum moorcroftianum</i> Royle	Dolu	2700-3500	Rhizome	Dysentery, internal injury
29.	<i>Rhododendron anthopogon</i> Don	Kooti	3000-3800	Whole plant	Incense, giddiness, antidote to Aconite poison
30.	<i>Ribes alpestre</i> Decne.	Kontilo	3200-3800	Fruit	Source of Vitamin C
31.	<i>Rumex acetosa</i> L.	Chukil jhar	1500-3000	Whole plant	Cuts and wounds, tonic
32.	<i>Saussurea costus</i> (Falc.) Lipsch.	Kooth	3000-4000	Whole plant	Lumbar pain, menorrhea, headache
33.	<i>Saussurea obvallata</i> (DC.) Edgew.	Brahma Kamal	4000-5600	Whole plant	Cough
34.	<i>Swertia ciliate</i> Burt	Chiraita	1200-3500	Whole plant	Blood diseases, purifier
35.	<i>Taxus wallichina</i> Zucc.	Thuner	1100-3650	Leaves, Bark	Tonic, anti-cancerous

**Table-2 Status of some important MAPs in the alpine and sub-alpine region of Western Himalaya, India**

S. No.	Scientific Name	Local Name	IUCN Status (Global)	Status in UK (Regional)*
1.	<i>Aconitum balfourii</i>	Mitha	Vulnerable	Vulnerable
2.	<i>Aconitum heterophyllum</i>	Atees	Critically Endangered	Critically Endangered
3.	<i>Allium wallichii</i>	Lhadum	-	-
4.	<i>Angelica archangelica</i>	Rickchoru	Endangered	Endangered
5.	<i>Angelica glauca</i>	Choru	Endangered	Endangered
6.	<i>Bergenia ciliata</i>	Pasanbhed	-	Near Threatened
7.	<i>Betula utilis</i>	Bhojpatra	-	Near Threatened
8.	<i>Carum carvi</i>	Kala Jira	-	-
9.	<i>Dactylorhiza hatagirea</i>	Hatha jari	-	Critically Endangered
10.	<i>Hippophae salicifolia</i>	Tarbu	-	-
11.	<i>Nardostachys grandiflora</i>	Mansi	-	Critically Endangered
12.	<i>Picrorhiza kurrooa</i>	Kutki	-	Critically Endangered
13.	<i>Podophyllum hexandrum</i>	Van Kakri	-	Vulnerable
14.	<i>Polygonatum verticillatum</i>	Maha Maida	-	-
15.	<i>Rheum emodi</i>	Archa	Endangered	Endangered
16.	<i>Rheum moorcroftianum</i>	Dolu	-	Near Threatened
17.	<i>Rhododendron anthopogon</i>	Kooti	Near Threatened	-
18.	<i>Ribes alpestre</i>	Kontilo	-	-
19.	<i>Saussurea obvallata</i>	Brahma Kamal	Endangered	-
20.	<i>Swertia ciliata</i>	Chiraita	-	-

\*Regional status as per the Shimla CAMP (Ved et. al., 2003)

Owing to the rapid rate of destruction of forests precious herbal medicines are becoming rare day by day. Some of these medicinal plants are much threatened and others are vanishing rapidly. So, it is indispensable to take necessary steps to protect the plant from degeneration (Dobhal and Bhandari, 2006). Considering the increasing demand for herbal drugs in general and Himalayan medicinal plants in particular and consequent depletion of several species, it is imperative to initiate urgent steps for conservation (Nautiyal et al., 2001).

There is a need to establish a systematic and organized collection of valuable medicinal plants of the region. Cottage industries should be established for preparation of crude medicines, powders etc. The survey of medicinal plants in their natural habitats should be priority for research work. Studies should be carried out within two or three years for screening the importance and status of the medicinal plants. On account of ignorance and unemployment, the valuable herbs of the area are disappearing at an alarming rate. Greedy herb contractors with the help of local people also play a great role in the exploitation and depletion of this great strength.





**Palte-1-(a-j):** **Some important endangered medicinal plants of Western Himalaya;**  
**(a)***Podophyllum hexandrum*, **(b)** *Angelica archangelica* **(c)** *Angelica glauca* **(d)***Fritillaria roylei* **(e)** *Rheum moorcroftianum* **(f)** *Nardostachys grandiflora* **(g)***Aconitum balfourii* **(h)** *Aconitum heterophyllum* **(i)** *Dactylorhiza hatagirea* **(j)***Picrorhiza kurrooa*

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**References:**

- Anonymous, 1989. The State of forest Report 1989. Forest Survey of India, Government of India, Dehradun
- Dobhal, Upma and Bhandari, Sneh Lata 2006. Medicinal wealth of district Pauri Garhwal, Uttaranchal, India. *J. Cur. Sci.* 9(2): 899-902
- Gaur, R. D. 1999. Flora of the district Garhwal, North West Himalaya. Transmedia Publication, Srinagar (Garhwal)
- Kala, C. P., Rawat, G. S. and Uniyal, V. K. 1998. Ecology and conservation of valley of flowers National park, Garhwal Himalaya. Wildlife Institute of India, Dehradun, pp. 99
- Nautiyal, A. R., Nautiyal, M. C. and Purohit, A. N. 2000. Harvesting Herbs-2000. Bishen Singh Mahendra Pal Singh Publication, Dehradun
- Nautiyal, B. P., Prakash, Vinay, Chauhan, R. S., Purohit, Harish and Nautiyal, M. C. 2001. Assessment of germinability, productivity and cost benefit analysis of *Picrorhiza kurrooa* cultivated at lower altitudes. *Cur. Sci.* 81(3): 101-108
- Nautiyal, M. C., Nautiyal, B. P. and Prakash, Vinay 2001. Phenology and growth form distribution in an alpine pasture at Tungnath, Garhwal, Himalaya. *Mot. Res. and Dev.* 21(2): 177-183
- Rau, M. A. 1975. High altitude flowering plants of west Himalaya. Botanical Survey of India, Howrah, India
- Rawat, A. S. 1989. Eco-Physiology and multiplication of some alpine herbs. Ph. D. Thesis, H. N. B. Garhwal Unievrstity, Srinagar.
- Rawat, G. S. 2005. Alpine meadows of Uttaranchal. Bishen Singh Mahendra Pal Singh Publication, Dehradun
- Rawat, G. S. and Pangtey, Y. P. S. 1987. A contribution to the ethnobotany of alpine regions of Kumon. *J. Eco. Tax. Bot.* 2(1): 139-147
- Rawat, G. S. and Rodgers, W. A. 1988. The alpine meadows of Uttar Pradesh: An ecological review. In *Rangeland Resources and Management* (Eds. P. Singh and P. S. Pathak). Range Management Society of India. Jhansi, India pp. 119-137
- Rawat, G. S., Adhikari, B. S. and Rana, B. S. 2001. Vegetation surveys in the Indian Trans-Himalaya in Anonymous (Ed.) *Conserving Biodiversity in the Trans-Himalaya: New Initiatives of Field Conservation in Ladakh* pp. 7-14. Wildlife institute of India, Dehradun
- Samant, S. S., Dhar, U. and Palni, L. M. S. 1998. Medicinal Plants of Indian Himalaya: Diversity, Distribution and Potential values. G. B. Pant Institute of Himalayan Environment and Development, Almora

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