

Status and Conservation Management Strategies for Threatened Plants of Jammu and Kashmir

Shreekar Pant* and Virbala Sharma Pant

Centre for Biodiversity Studies, School of Biosciences & Biotechnology, Baba Ghulam Shah Badshah University, Rajouri-185 131, J&K, India

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*Corresponding Author

Tel : +91-94191-73280
Fax : +91-962241001

Email:
shreekarpant.2@rediffmail.com

Summary

The state of Jammu and Kashmir harbours a rich diversity of economically important plants. A perusal of literature indicates that study pertaining to the diversity, nativity, endemism, rarity, review of *in-situ* & *ex-situ* conservation programmes, agrotechniques, medicinal plants in pharmaceutical preparations, trade and problems related to cultivation of threatened plants for conservation and strategy action plan had not been carried out so far. Therefore, in present an attempt has been made to describe 63 species (trees: 07 spp.; shrubs: 09 spp.; herbs: 47 spp.) of threatened plants. Liliaceae, Asteraceae, Apiaceae, Ranunculaceae, Ericaceae, Solanaceae, Polygonaceae, Orchidaceae, Rutaceae, Lauraceae and Gentianaceae are the dominant families. Twenty four families are represented by single species. Different plant parts such as roots/rhizomes/tubers (38 spp.), leaves (17 spp.), whole plant (10 spp.), bark (8 spp.), fruits (5 spp.), seeds (4 spp.), flowers/resin (2 spp., each) and inflorescence/stem (1 spp., each) are used for the treatment of various ailments. Amongst the threatened plants, 49 are native to the Himalayan region, 01 endemic and 17 near endemic to Indian Himalayan Region (IHR). All the described sixty three (63) species have been categorized as Critically Endangered (11 spp.); Endangered (21 spp.); Vulnerable (26 spp.); Near Threatened (02 spp.) and Least Concern (03 spp.) as per new International Union of Conservation of nature and natural resources (IUCN) criteria. Available information on threatened plants was used either traditionally or in pharmaceutical preparation. *In-situ* and *ex-situ* conservation initiatives and agrotechniques are reviewed and highlighted the problems related to its conservation. Moreover appropriate strategy and action plan for conservation and management of threatened plants has been suggested.

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Key Words: Diversity, Status, Jammu & Kashmir, Conservation prioritization, Rarity

Introduction

India is one of the world's top 12 mega diversity countries [1] with 10 biogeographic regions [2]. In addition it has over 40 sites which are known for their high endemism and genetic diversity [3]. [4] in their updated list of world's biodiversity hotspots, included two from India. The climatic and altitudinal variations, coupled with varied ecological habitats of the country, have contributed to the development of immensely rich vegetation with a unique diversity in medicinal plants which provides an important source of medicinal raw materials for traditional medicine systems as well as for pharmaceutical industries in the country and abroad. As a result of the increasing demand of medicinal plants, most of which is still collected from the wild, and creating a constant pressure on existing resources, leading to continuous depletion of some of the species in the forests, and at the same time forest land is losing its natural flora at an alarming rate – 1.5 mha every year – and what is left at present is only 8% against a mandatory 33% of the geographical area [5]. Especially in the Himalayan region, rich diversity of plant resources is used by the inhabitants of IHR for medicine, wild edible, fuel, fodder, timber, making agricultural implements and for religious purposes. Among the various uses of the plant resources, medicinal use is prominent throughout the Himalayan region. The wild medicinal plants are one of the sources of income

generation due to their various traditional and modern therapeutic uses [6]. Now a days it has been realized that medicinal plants of this region offers an advantage in having much greater possibilities of providing novel biomolecules. The unique diversity of medicinal plants in the region is manifested by the presence of a number of native (31%), endemic (15.5%) and many threatened/sensitive elements [6]. Further, it is estimated that 70 - 80% of the people world wide relies chiefly on indigenous herbal medicines for their primary health care [7-8]. Simultaneously, increasing demand of plants and their products in global markets have become a potential source of employment generation and sustainable development of the rural societies. Affordable healthcare and cultivation of potential plants are the important features to promote conservation strategy for the threatened plants. Keeping in view the depletion of the medicinal resources, various government and non government organizations are involved in conservation of these species in Himalayan region in general and particular.

Jammu and Kashmir (32° 17' to 37° 20' N latitude and 73° 25' to 80° 30' E longitudes) the extreme north region of India extends to over 640 km from north to south and 480 km from east to west, covering an area of about 2,22,236 km² in the North Western Himalaya [9]. The entire state is divided into

three main geographical regions namely the Pir Panjal, the Zaskar and the middle mountain of Lesser Himalaya. It supports the vegetation from sub-tropical zone to alpine zone and forms a complex habitat which supports a number of rare, endemic and threatened plants. Also, the mosaic of ethnic groups in the state is very complex and major portion is occupied by the various ethnic groups like Gaddis, Gujjars, Bakarwals, Rhotas, Paharis, Sikhs, Ladakhis, Hanjigs, Dards, Kashmiris, Dogras, Bot, etc [9]. These groups meet their daily requirements like fuel, fodder, medicine, wild edibles, etc by exploiting the available bio-resources of the region and they have their own folk system of medicine for health care. The knowledge possessed and the practices followed by them are inherited from generation to generation. But, with the advent of modernization excessive extraction of economically important plants and destruction of their natural habitats, a number of plants fall under the threatened category. A large number of studies have been carried out to study the diversity, distribution pattern of the threatened species in other Himalayan states by [11-14]. However, in Jammu and Kashmir, information on this aspect is not available so far except few fragmentary information like (Conservation Assessment and management Prioritization) CAMP workshop [14-15, 6]. Therefore, it is necessary to i.) study the diversity and utilization pattern of these species; ii.) identify nativity and endemism; iii.) document folklore uses; iv) and suggest suitable conservation and management strategies.

Methodology

The present study is the review of existing information on the threatened plants of the state. For nomenclature and nativity of the species [16, 6] were followed. Endemism of the species was identified based on biogeographical distribution. The species restricted to the IHR have been identified as endemic, whereas the species with extended distribution to adjacent countries have been identified as near endemic [17,6]. Rarity categorization of medicinal plants is based on [18- 19, 6, 14]. Folklore uses of the species are based on the primary as well as secondary information available [20, 6, 15].

Results

Diversity and Utilization

The study enlisted 63 species of threatened plants belonging to 53 genera and 36 families (Appendix I). These 63 species represent different life forms: trees (07 spp.), shrubs (09 spp.), and herbs (47 spp.) and Liliaceae, Asteraceae, Apiaceae, Ranunculaceae, Ericaceae, Solanaceae, Polygonaceae, Orchidaceae, Rutaceae, Lauraceae and Gentianaceae are the dominant families. Different plant parts such as roots/rhizomes/tubers (38 spp.), leaves (17 spp.), whole plant (10 spp.), bark (8 spp.), fruits (5 spp.), seeds (4 spp.), flowers and resin (2 spp., each) and inflorescence and stem (1 spp., each) are used by the native communities. Twenty four families are represented by single species, indicating a poor genetic base.

Native and Endemic species

A total of 49 species are native to Himalayan region, while 14 species are non-natives, originated from other

biogeographic regions including Africa, Australia, Oriental India, Tropical Asia, Europe, America, China, Malaya, Java, Japan, New Zealand and Sri Lanka. Only one species i.e., *Angelica glauca* is identified as endemic whereas 17 species as near-endemic.

Overexploitation of Species

Overexploitation of various parts of the medicinal plants is done by the local communities to cope with the environment conditions and also for income generation. Most of these plant species are used for pharmaceutical preparations. The interviews of the knowledgeable persons (i.e., *village vaidhyas*) revealed that the local inhabitants over exploits some of the commercially viable medicinal plants for income generation and are traded either in the local or in the State market.

Rarity

As per the new criteria of International Union for Conservation of Nature and Natural Resources (IUCN), of the total identified 63 species, 21 species are categorized as Endangered, 11 Critically Endangered, 26 Vulnerable, 2 Near Threatened, 3 Least Concern (Ved *et al.* 2003) for Jammu and Kashmir whereas 17 species are identified as globally threatened (Appendix 1).

Conservation status of threatened plants

In-situ

The Central and State Governments have attempted for the *in-situ* conservation of biological resources all over India. At present, the J&K State comprises one (proposed) Biosphere Reserve, 4 National Parks and 15 Wildlife Sanctuaries for the *in-situ* conservation of biological diversity [9]. These protected areas cover different altitudinal zones ranging from tropical to alpine. Notifications of these protected areas are helping largely in the *in-situ* conservation of threatened and economically important plants. Besides these protected areas, there are a large number of Reserve Forests and unprotected areas located at different elevations to help in the *in-situ* conservation. At present, fragmentary information is available on the various aspects (including diversity, geographical distribution, utilization pattern, and folklore information) of threatened plants in the state. Therefore, there is an urgent need to identify the areas (protected and unprotected) and notify rich areas as Economically Important Plant Conservation Zones (EIPAZs) at different altitudinal zones with the participation of the native communities and the various organizations (State, Central and NGOs).

Ex-situ

Like other Indian Himalayan states, Jammu and Kashmir is also considered as Herbal State. Being a herbal state, development of conservation repository like herbal gardens, medicinal plant nurseries and cultivation in the farmer's field of threatened plants has been promoted to some extent but not as much as required. Various organizations are involved in the conservation of threatened/economically important plants. The list of Governmental and non governmental organizations involved in the *ex-situ* conservation of threatened and economically important plants are given in Table 1.

Table.1. Government and Non Governmental organizations engaged in conservation of threatened medicinal plants in J&K

Government Organizations
Centre for Biodiversity, Studies, Baba Ghulam Shah Badshah University, Rajouri, J&K
Defence Institute of High Altitude Research, Leh, J&K
Indian Institute of Integrative Medicine (formerly RRL), J&K
SKAUST Jammu and Kashmir (including all regional research stations)
Sri Mata Vaishno Devi University, Katra, J&K
State Forest Research Institute, J&K
University of Jammu, Jammu, J&K
University of Kashmir, Srinagar, J&K
Non Governmental Organizations
NOMAD, Leh, J&K
WWF-India, Jammu & Kashmir (including regional offices)
Pragya, Field office, Leh, J&K

Conservation technology of threatened plants

In general, amongst the threatened and economically important plants, conservation technology i.e., *in-vitro* and agro technology of *Saussurea costus*, *Angelica glauca*, *Dioscorea deltoidea*, *Allium stracheyi*, *Dactylorhiza hatagirea*, *Podophyllum hexandrum*, *Rheum emodi*, *Taxus baccata* subsp. *wallichiana*, *Aconitum heterophyllum*, *Zanthoxylum armatum*, *Valeriana jatamansi*, *Picrorhiza kurrooa*, etc. are known. Still, there are many other commercially viable threatened/economically important plants whose conservation technologies are yet to be standardized. Development of conservation technologies of threatened/economically important plants will not only help in promoting mass cultivation in farmers fields but also, help in reducing pressure on wild stock.

In Jammu and Kashmir, various organizations such as Indian Institute of Integrative Medicine, Jammu (formerly known as RRL, Jammu), University of Jammu, Jammu, Centre for Biodiversity Studies, BGSB University, Rajouri, University of Kashmir, Srinagar, Sher-a-Kashmir Agriculture University of Science and Technology, Jammu and Srinagar, State forest Research Institute, J&K, Defence Institute of High Altitude Research, Leh and Shree Mata Vaishno Devi University, Jammu are actively engaged in developing conservation technologies for these species.

Discussion & Conclusion

This paper provides comprehensive information on diversity, utilization pattern, status and indigenous/folklore uses of threatened plants of the state. The study shows that more than 77% species are native, 26% are near-endemic and 0.015 % are endemic to this region and also indicates the importance of their conservation.

Overexploitation of roots/rhizomes/tubers (60%), leaves (26%), whole plant (0.15%), bark (0.12%), fruits (0.07%), seeds (0.63%), flowers and resin (0.031%, each) and inflorescence and stem (0.0158%, each) of the threatened plants indicates that they faces grave threats on these species. All the sixty three species are used as medicine, 19 as edible, 4 as spices, fuel and for religious purposes, three as fodder and two as dye (Appendix I). Further, most of the threatened plants are used in pharmaceutical industries and in Ayurvedic, Unani and Tibetan system of medicine. They are also used in folklore/traditional way. According to the All India Trade Survey of prioritized medicinal plants, demand of some high-value medicinal plants has increased 50%, whereas availability has declined by 26% [21]. The ever-increasing demand of these species in the both pharmaceutical industries and in traditional system has resulted in habitat degradation and overexploitation. If overexploitation of these plants continues, many species may decrease in, and ultimately disappear from their natural habitats. This applies particularly to economically important plants with multiple uses [6, 22, 12]. Moreover the present study has only focused on the threatened plants of the J&K but many other species also faces high degree of pressures, calls an urgent need for adequate conservation and management.

To achieve the goals, a collaborative work plan has to be prepared involving various stakeholders i.e., scientists, technocrats, government organizations, NGOs and farmers to implement the rule of section 8 of Biodiversity Act 2002, i.e., conservation of biological diversity, sustainable use of its components and fair and equitable sharing of benefits arising out of the use of biological resources and knowledge to meet out the market demands and conservation of threatened and economically important plant biodiversity of the J&K State as well as India.

Appendix I. Conservation status of threatened plants in Jammu & Kashmir, India

<i>Taxa</i>	LF	Part (s) used	Nativity	Conservation Status	Folklore Uses
Alliaceae <i>Allium stracheyi</i> (G)	H	Rt, Lf	Reg Himal	Vulnerable	Medicinal (Antidiabetic, cough); edible; as spices
Apiaceae <i>Angelica glauca</i> (G) **	H	Rt	Reg Himal	Endangered	Medicinal (Dysentery, gastric complaints, stomach complaints, vomiting); edible (flavouring agent)
<i>Bunium persicum</i>	H	Fr	Persea	Endangered	Medicinal (Liver complaints, gastric); as spices
<i>Ferula jaeskeana</i>	H	Resin	Reg Himal Bor Occ Turkest	Vulnerable	Medicinal (Rheumatism, toothache, wounds, poultices); as spices
<i>Heracleum lanatum</i>	H	Wp	Amer Bor As Occ	Vulnerable	Medicinal (Leucoderma, menstrual complaints); edible
Apocynaceae <i>Rauvolfia serpentine</i>	Sh	Rt	Ind Or Java	Vulnerable	Medicinal (Antihypertensive, reduce blood pressure)
Asclepiadaceae <i>Ceropegia bulbosa</i>	H	Wp	Ind Or	Vulnerable	Medicinal (Cure skin, diarrhea, jaundice, tuberculosis, stroke, migraine, menstrual problems, fertility problems, urinary problems, piles, wounds and poison bites)
Asteraceae <i>Artemisia maritima</i>	H	Wp	Europe Reg Caucas	Vulnerable	Medicinal (Anthelmintic, antiseptic on cuts, gastric complaints, blood purifier)
<i>Jurinea dolomiaea</i>	H	Rt	Reg Himal	Endangered	Medicinal (Colic, puerperal fever, fevers and incense)
<i>Saussurea costus</i> (G)	H	Rt	Reg Himal	Critically Endangered	Medicinal (Asthma, dysentery, rheumatism, cough, stomach pain, skin disease, bronchitis, ulcer, toothache)
<i>S. gossypiphora</i>	H	Rt, Infl	Reg Himal	Near Threatened	Medicinal (Burns, cuts); religious
<i>S. obvallata</i>	H	Wp	Reg Himal	Vulnerable	Medicinal (Burns, cuts, also used in veterinary practice); religious
Balanophoraceae <i>Balanophora</i> <i>laccidentals</i>	H	Wp	Reg Himal	Endangered	Medicinal (Cold, cough)
Betulaceae <i>Betula utilis</i>	T	Resin, Bk	Reg Himal Japon	Critically Endangered	Medicinal (Antiseptic, burns, cuts, ear complaints, jaundice, wounds); fodder; fuel; religious
Boraginaceae <i>Arnebia benthami</i> (G)*	H	Rt	Reg Himal	Critically Endangered	Medicinal (Antiseptic, boils, cuts, wounds, hair tonic); miscellaneous (red dye for hair)
<i>Arnebia euchroma</i>	H	Rt	Reg Himal	Endangered	Medicinal (Tonic for brain); miscellaneous (dye for hair)
Colchicaceae <i>Colchicum luteum</i> (G) *	H	Rt	Reg Himal	Vulnerable	Medicinal (Aphrodisiac, carminative, laxative, treat gout, rheumatism. They contain the toxic alkaloid 'colchicine' which is used externally to relieve pain)
Crassulaceae <i>Rhodiola heterodonta</i> (G)	H	Rt	Reg Himal	Vulnerable	Medicinal (Sexual potency, stomach ache, intestinal discomfort)
Cupressaceae <i>Juniperus polycarpus</i>	T	Lf	Reg Himal	Endangered	Medicinal (For animal the oil is used for wound healing, repel flies, nervous disorder); religious

Datisceaeae <i>Datisca cannabina</i>	T	Rt, Lf	Oriens Reg Himal	Endangered	Medicinal (Diuretic, febrifuge, purgative, sedative, rheumatism); dye
Dioscoreaceae <i>Dioscorea deltoidea</i> (G)	H	Tb	Ind Or	Endangered	Medicinal (Liver complaints; cold; cough); edible
Elaeagnaceae <i>Hippophae rhamnoides</i>	Sh	Fr	Europe As Bor	Vulnerable	Medicinal (Aphrodisiac, ling disease); edible; fuel
Ephederaceae <i>Ephedra gerardiana</i>	H	Lf, Rt, St	Europe As Bor	Endangered	Medicinal (Asthma, blood purifier, headache, hepatic disease, rheumatism, snuff); edible
Ericaceae <i>Rhododendron anthopogon</i> *	Sh	Lf	Reg Himal As Bor	Vulnerable	Medicinal (Bronchitis, cold, cough); fodder
<i>R. campanulatum</i> *	Sh	Lf, Rt, Fl	Reg Himal	Vulnerable	Medicinal (Cold, cough, rheumatism, headache, sciatica, skin disease, syphilis, tonic, fever); edible, fuel
<i>R. lepidotum</i>	Sh	Lf	Reg Himal	Near Threatened	Medicinal (Cold, cough, rheumatism, headache, sciatica, skin disease, syphilis, tonic, fever); edible
Euphorbiaceae <i>Embelia tsjeriam-cottam</i>	Sh	Fr, Bk, Rt, Lf, Sd	Ind Or	Vulnerable	Medicinal (Blood purification, bronchitis, cholera, fever, itch, pneumonia, pregnancy problems, sores, throat complaints, ulcers)
Gentianaceae <i>Gentiana kurrooa</i> (G)	H	Wp	Reg Himal	Critically Endangered	Medicinal (Appetite, gastric secretion, stomachic, fever, urinary complaints); ingredient of local liquor
<i>Swertia chirayita</i>	H	Wp	Reg Himal	Critically Endangered	Medicinal (Cough, antidiabetic, blood purifier and urinary discharge, malaria fever)
Gesneriaceae <i>Didymocarpus pedicillata</i> *	H	Lf	Reg Himal	Endangered	Medicinal (Stone in kidney, bladder)
Hypericaceae <i>Hypericum perforatum</i>	H	Lf	Reg Himal	Vulnerable	Medicinal (Cuts, malarial fever; astringent, expectorant and diuretic properties, pulmonary, urinal troubles, diarrhoea; sores, ulcers, swellings, rheumatism); fuel; fodder; dye
Labiatae <i>Eremoschys superba</i> (G)	H	Rt	Reg Himal	Vulnerable	Medicinal (Veterinary practices used for enhancement lactation)
Lamiaceae <i>Roylea cinerea</i> (G) *	Sh	Lf, Rt	Reg Himal	Vulnerable	Medicinal (Decoction of them is given as a bitter tonic and febrifuge)
Lauraceae <i>Cinnamomum tamala</i> *	T	Bk, Lf	Reg Himal	Endangered	Medicinal (Heart & throat complaints); as spices
<i>Litsea glutinosa</i>	T	Bk	Reg Himal Malaya	Endangered	Medicinal (Boils, dysentery, diarrhoea)
Liliaceae <i>Eremurus himalaicus</i>	H	Lf, Sd	Reg Himal	Least Concern	Medicinal (Indigestion); edible
<i>Fritillaria roylei</i> (G) *	H	Rt/Bb	Reg Himal	Endangered	Medicinal (Asthma, bronchitis, burns, stomach disease, tonic); edible
<i>Gloriosa superb</i>	H	Rh	As Trop	Vulnerable	Medicinal (Rheumatic pain, antiabortifacient, ulcer, leprosy, piles, gout)
<i>Lilium polyphyllum</i> *	H	Bb	Reg Himal	Critically Endangered	Medicinal (Increase immune system, as tonic)
<i>Paris pollyphylla</i>	H	Rh	Reg Himal China	Endangered	Medicinal (Diarrhoea, fever)
<i>Polygonatum verticillatum</i>	H	Tb	Europe As Bor	Vulnerable	Medicinal (Appetite, nervine tonic); edible

Orchidaceae						
<i>Dienia muscifera</i>	H	Rh	Asia Trop	Near Threatened	Medicine (Increase immune system)	
<i>Dactylorhiza hatagirea</i> *	H	Tb	Reg Himal	Critically Endangered	Medicinal (Astringent, bone fracture, expectorant, tonic, wounds, enhancement of potency); edible	
<i>Habenaria intermedia</i> (G) *	H	Rt	Reg Himal	Endangered	Medicinal (Tonic); edible	
Papaveraceae						
<i>Meconopsis aculeate</i> (G) *	H	Wp	Reg Himal	Endangered	Medicinal (Backache, colic, renal pain, tonic)	
Podophyllaceae						
<i>Podophyllum hexandrum</i>	H	Rh, Fr	Reg Himal	Endangered	Medicinal (Cancer, cough, cuts, wounds, diarrhoea, fever, ulcer, skin disease, tumor); edible	
Polygonaceae						
<i>Rheum emodi</i> (G)	H	Rh	Reg Himal	Endangered	Medicinal (Abdominal pain, appetite, asthma, bronchitis, fever, cuts, laxative, eye disease, skin disease, wounds); edible	
<i>R. spiciforme</i>	H	Rt	Reg Himal	Vulnerable	Medicinal (Abdominal pain, appetite, asthma, bronchitis, fever, cuts, skin disease, wounds); edible	
<i>R. webbianum</i> (G) *	H	Lf, Rt	Reg Himal	Vulnerable	Medicinal (Abdominal disease, appetite, boils, astringent, wounds); edible	
Ranunculaceae						
<i>Aconitum chasmanthus</i> (G) *	H	Rt	Reg Himal	Critically Endangered	Medicinal (Fever, cold, cough)	
<i>A. heterophyllum</i> (G) *	H	Rt	Reg Himal	Critically Endangered	Medicinal (Cough, diarrhoea, digestive complaints, dysentery, fever, gastric, stomachache, vomit)	
<i>A. deinorrhizum</i>	H	Wp	Reg Himal	Endangered	Medicinal (Fever, cold, cough)	
<i>A. violaceum</i> (G) *	H	Rt	Reg Himal	Vulnerable	Medicinal (Gastrointestinal complaints, renal pain, rheumatism, stomachache)	
Rutaceae						
<i>Zanthoxylum armatum</i>	Sh	Bk, Fr, Sd, Rt	Reg Himal China	Vulnerable	Medicinal (Anthelmintic, carminative, cough, cholera, fever, itching, piles, leucoderma, rheumatism, tonic, indigestion, tooth complaints); edible	
<i>Dictamnus albus</i>	T	Wp	Europe As Bor	Least Concern	Medicinal (Abortifacient, Anthelmintic, Antibacterial, Antispasmodic, Aromatic, Digestive, Diuretic, Emmenagogue, Expectorant, Febrifuge, Galactagogue)	
Saxifragaceae						
<i>Bergenia stracheyi</i> *	H	Rt	Reg Himal	Vulnerable	Medicinal (Antiscorbic, astringent, fever, tonic, cuts, wounds); edible	
Scrophulariaceae						
<i>Picrorhiza kurrooa</i>	H	Rt	Reg Himal	Endangered	Medicinal (Abdominal pain, cough, diabetes, constipation, vaginal and urethral discharge, anemia, cold, dyspepsia, jaundice, dysentery, fever)	
Solanaceae						
<i>Atropa acuminata</i>	H	Rt, Lf	Reg Himal	Endangered	Medicinal (Sedative, cough, cold, fever, diuretic)	
<i>Hyoscyamus niger</i>	H	Sd, Lf, Fl, Bk, Rt	Europe As Occ Reg Himal	Vulnerable	Medicinal (Hysteria, muscle pain, whooping cough, astringent, toothache)	
<i>Phsochlaina prealta</i>	H	Sd	Reg Himal	Vulnerable	Medicinal (Epilepsy, liver complaints, boils, ulcers)	
Symplocaceae						
<i>Symplocos paniculata</i>	Sh	Bk	China Japan Korea Reg Himal	Least Concern	Medicinal (Astringent, cooling, tonic, menorrhagia, bowel complaints, eye diseases, ulcers, it is also used as a gargle for giving firmness to spongy and bleeding gums)	

<i>Taxaceae</i>					
<i>Taxus baccata subsp. Wallichiana</i>	T	Lf, Bk	Reg Bor Temp	Endangered	Medicinal (Swelling, anticancer); edible; fuel, house building
<i>Valerianaceae</i>					
<i>Valeriana jatamansi</i>	H	Rh	Reg Himal	Vulnerable	Medicinal (Antidote to poisonous stings of insects, epilepsy, hysteria, skin disease)

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