

Current status of ethnomedicinal plants in the Darjeeling Himalaya

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Darjeeling Himalayan region is characterized by a rich diversity of ethnomedicinal plants as well as a rich heritage of traditional medicine practices. The present study has revealed that 281 species of plants belonging to 108 different families are used in the folk-medicine of this region. Among the enumerated plants, about 58% shows hitherto unreported uses. However, 14% of the medicinal plants of this region is under different categories of threat. Therefore, domestication of important medicinal plants of this region is of utmost necessity.

Keywords: Darjeeling Himalaya, ethnomedicine, traditional medicine, herbal drugs, folk medicine.

DARJEELING Himalaya is situated between the 87°59'–88°53'E and 28°31'–27°13'N in the Eastern Himalayan region of India¹. It is a frontier district running up between Nepal and Bhutan, and stretching from the plains of Bengal in the south to Sikkim in the north. It is bordered by Bhutan in the east and Nepal in the west². The three hill subdivisions of Darjeeling district, Kalimpong, Kurseong and Darjeeling sadar consisting of eight developmental blocks and occupying an area of 2417 km² comprise the Darjeeling Himalaya (Figure 1). The altitudinal range of this hilly region varies from 130 to 3660 m. Due to their great variation, a wide array of climatic zones are available, which favour the luxuriant growth of diversified and rich vegetation. This region is also the abode of many endemic elements and a number of species which have become rare, threatened or endangered^{3,4}.

People living in villages and far-flung areas depend completely on forest resources for maintaining their day-to-day needs like medicine, food, fuel and household articles. Darjeeling Himalaya also has rich ethnomedicinal traditions for which literature is available. With only eight hospitals and 24 Public Health Centres, modern medical facilities are lacking in the Darjeeling hills. The doctor to people ratio is 1 : 4892. Therefore, people are largely dependent on herbal medicine for their healthcare⁵. The lack of hospitals in this region forces people to follow the ethnic practices.

Socio-economic status of the people

The major ethnic communities of Darjeeling hills whose descendents continue to live in remote areas are Lepcha, Bhutia and Nepalese. Each of these groups has its own distinct form of worship, culture, language and tradition. All of

them are exceedingly generous, light-hearted and law-abiding people bonded together by Nepali language, which is the medium of communication among them.

Traditionally, the chief occupation of the people of Darjeeling had been agriculture, agro-forestry, horticulture, animal husbandry, etc. Agricultural practices in these hills are mostly subsistence agriculture, which is characterized by low input, low risk and low yield. The geometric progression in human population has been exerting pressure on traditional practice and leading to the fragmentation of land-holding size. At present, only 13% of the total land is utilized for cropping, which is low compared to other zones. Utilization of land for tea plantation and timber extraction has changed the traditional practices and people have turned to various secondary occupations as tea leaf pluckers, labourers, masons, carpenters, etc.

Also, too much reliance on tourism has forced the people of this region to a marginal role of commission agents, menials, cooks, drivers, etc. The result of all these factors has been devastating for the people of Darjeeling hills. They have been pushed to a marginal existence, while the wealth generated here has been siphoned-off to the plains or translated into consolidation of power in the hands of the government. Thus one of the richest regions of the world in terms of natural resources has become the abode of one of the poorest groups of people in the universe. To date, drinking water, healthcare, communication and transportation are the biggest problems here.

The total population of this region is about 800,000, of which 72.77% lives in the rural areas; the total SC/ST population is about 18%. The male:female ratio is lopsided, with 982 females for every 1000 males⁶.

Medicinal plant conservation and utilization in Darjeeling hills

Many medicinal plants of the Darjeeling hills are rapidly getting extinct or being threatened due to anthropogenic

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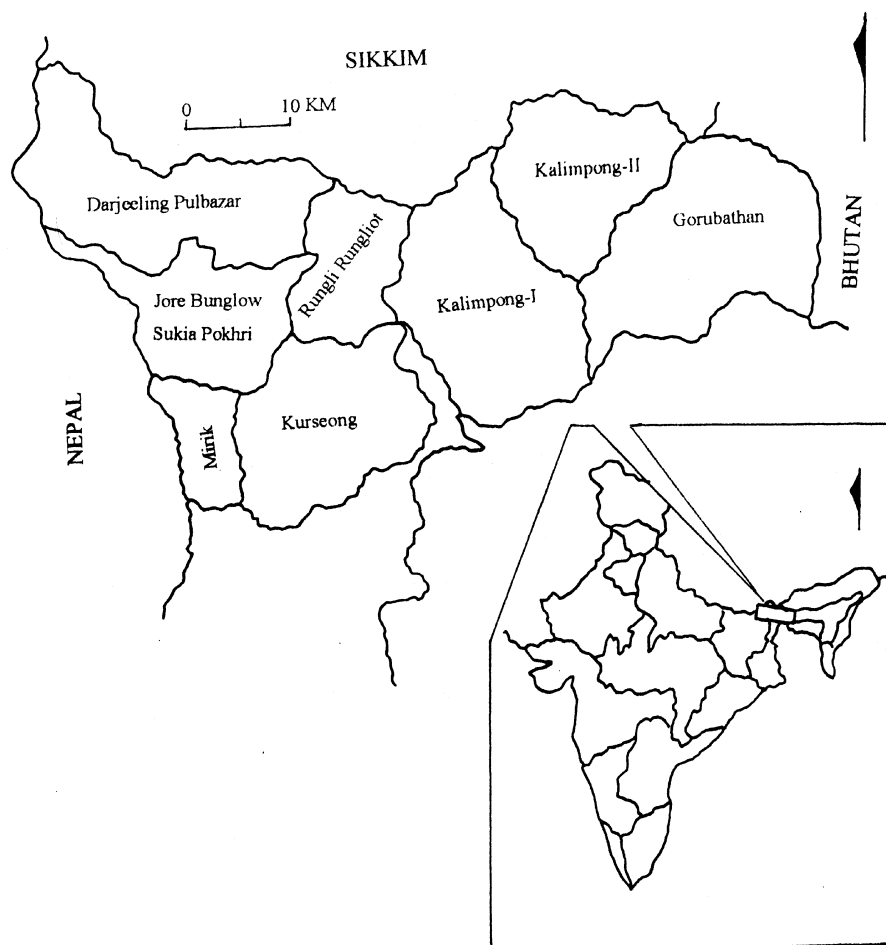


Figure 1. Location map of Darjeeling Himalaya showing eight developmental blocks.

activities. The Silviculture Department of the Darjeeling hills forest has recently woken up to preserve and maintain some of the medicinal plants in its nurseries. Till date, the department has been conserving 129 species of medicinal plants in its nurseries spread over 14 different locations of the region.

The directorate of *Cinchona* and other medicinal plants situated in Mungpoo, Darjeeling district has been doing commercial cultivation of medicinal and aromatic plants like *Cinchona*, *Ipecac*, *Dioscorea*, *Citronella*, *Rauwolfia*, etc. The area under cultivation of medicinal plants by this Directorate is approximately 6000 acres. Enrichment of the active principle contents of different medicinal plants has been the major achievement of this Directorate. Recently plantation trials of exotic medicinal and aromatic plants like *Vanilla*, *Pogostemon* and *Stevia* are also being carried out by the Directorate.

St. Alphonsus Social and Agricultural Centre, an organization of Christian missionaries, is involved in the cultivation of medicinal plants, especially *Taxus baccata*, for rural upliftment in the Kurseong subdivision, Darjeeling district. The centre has already started cultivation in approximately 300 acres of the area.

The Earth group, a local NGO from Darjeeling, is involved in economy generation scheme through medicinal plant cultivation with the support of the State Forest Department and the Ashoka Trust for Research in Ecology and the Environment. The Federation of Societies of Environmental Protection, another NGO is also involved in the collection and marketing of local herbs for rural upliftment.

The Panchavati Greentech Research Society, a private institution is working in the field of conservation of important medicinal plants and alleviation of rural poverty by domestication and marketing of medicinal plants. They have already domesticated plants like *Swertia chirata*, *Piper longum*, *Gloriosa superba*, *Rubia cordifolia*, etc. However, lack of funds, trained manpower and infrastructural facilities have retarded the growth of the medicinal plant sector in this region.

Enumeration of ethnomedicinal plants from Darjeeling hills

Darjeeling Himalaya is not only a rich repository of medicinal plants, but has also nurtured several distinct ethnomedicinal

systems over a long period of time. Among these, the most prominent ones are the Nepali jaributi, Lepcha herbal and the Tibetan system. All these systems rely on the local plant resources and the borderline between them is not well demarcated. Enumeration of ethnomedicinal plants of this region is naturally inclusive of all the traditional practices together. Biswas⁷ has described 147 medicinal plants found in the Darjeeling and Sikkim Himalayas. Historically, Darjeeling was once a part of Sikkim and hence it is customary among authors to include Darjeeling hills when preparing any book or write-up on Sikkim. Thus, while detailing the status, uses and potential of medicinal plants of the Sikkim Himalaya, Rai and Sharma⁸ described 40 different genera of medicinal plants. While working on ethnomedicinal plants in the fringe areas of Sikkim and Darjeeling Himalayas, Rai *et al.*⁹ enumerated 47 species of plants. Works exclusively on the medicinal plants of Darjeeling Himalaya have been few and far between. Yonzon *et al.*¹⁰ mentioned 75 plants of ethnomedicinal importance from Darjeeling. Rai and Bhujel¹¹ have enumerated 18 new plants used in ethnomedicine. They also noted the use of 30 monocot species in traditional medicine of Darjeeling hills¹². Saini¹³ has enlisted 129 medicinal plants studied by the Silviculture Forest Division of Darjeeling. Recently, Das and Mandal¹⁴ have described 91 species of common medicinal plants from Darjeeling hills. Thus it is clear that publication on the medicinal plants of this region is neither exhaustive nor exclusive for Darjeeling Himalaya. We have tried to prepare a complete list of medicinal plants (Table 1) used in the traditional system of medicine in the Darjeeling Himalayan region. However, it may be emphasized that this enumeration is by no means total and includes only the common species that have been verified through more than one source, i.e. traditional healers, medicine men, priests, village seniors, etc.

Threatened medicinal plants of Darjeeling Himalaya

Anthropogenic activities are the main factors responsible for the rarity of species. Besides, natural calamities like landslips, earthquakes, etc. coupled with the demographic variation caused by increased birth rate and population migration lead to the loss of biodiversity¹⁵. Excessive collection of timber, fuel wood, food plants and commercial exploitation of medicinal plants have provided a great deal of vulnerability to

Table 1. Diversity of ethnomedicinal plants in Darjeeling Himalaya

Category	Dicots	Monocots	Gymno- sperms	Pterido- phytes	Total
Family	85	12	04	07	108
Genus	182	32	06	09	229
Species	225	41	06	09	281
Species showing new ethnomedi- cinal uses	132	24	04	04	164

individual species. By nature, forests serve as the best biodiversity habitats and harbour 90% of ethnomedicinal plants¹⁶.

In the case of Darjeeling Himalaya, tourists coming on excursion, trekking or mountaineering rampantly collect botanical specimens. In some cases, this is the medium by which biopiracy of important plants takes place. In the quest for revenue generation, the policy of the Forest Departments regarding clear felling of forest trees causes severe loss of habitat for a myriad of species. Similarly, an outdated measure of afforestation, whereby planting policies like monoculture and block cultivation are still encouraged, has led to substantial loss of medicinal plant biodiversity. In the higher reaches of Darjeeling Himalaya, cattle grazing is one of the most destructive activities. Permanent cow-sheds for yak and zo are found even beyond 3400 m. The Sandakphu area in the Singalila range is a natural habitat of precious medicinal plants like *Aconitum*, *Picrorhiza*, *Nardostachys*, *Dactylorhiza*, etc., which are being destroyed by grazing. Some of the ayurvedic companies of the country accelerate the obliteration of species from this region. These establishments pay money to the local people to make them indiscriminately collect the raw biomass of medicinal plants, which is transported to their factory. The natural population of *T. baccata* has almost been completely obliterated due to this practice. There are 70-odd tea gardens in the region, occupying 11% of the available land. Use of herbicides and other chemicals is also one of the causes for the loss of important species.

Rarity of species is determined by field study, visual estimation, literature and herbaria. The criterion for categorization of threatened species is based on the IUCN¹⁷. Out of a total of 281 odd ethnomedicinal plants (Table 1) reported from Darjeeling hills, 40 species (14%) have been categorized as threatened (Table 2). Many of these plants are endemic to this region. Unless urgent measures are initiated, these valuable resources may vanish from the surface of the earth.

Conclusion

In the present study it was found that a total of 281 species of plants belonging to 229 genera and 108 different families are used in the Darjeeling Himalayan region in folk-medicine. Among these, 164 (58%) species of plants show hitherto unreported ethnomedicinal uses¹⁸. Only a few families, viz. Asteraceae (with 14 genera and 16 species), Zingiberaceae (with 9 genera and 13 species), Ericaceae (with 3 genera and 10 species) and Rutaceae (with 5 genera and 9 species) are dominant in terms of total number of medicinal plants (Figure 2). The medicinal recipe is generally prepared in the form of infusion or decoction (by soaking in hot water or boiling); extract or juice (by crushing the fresh plant parts with or without water) and paste or powder (by grinding the fresh or dried plant parts). It has been established that Darjeeling hills is not only rich in

Table 2. Threatened medicinal plants of the Darjeeling Himalaya

Botanical name	Family	Local name (Nepali)	Life form	Altitudinal range (m asl)	Threat status
<i>Abutilon indicum</i> (Linn.) Sw.	Malvaceae	Ghanti phool	Shrub	100–2200	EX
<i>Aconitum heterophyllum</i> Wall.	Ranunculaceae	Bikhumma	Herb	3000–3500	CR
<i>Aconitum palmatum</i> D. Don.	Ranunculaceae	Bikhumma	Herb	2800–3600	CR
<i>Aconitum spicatum</i> Stapf.	Ranunculaceae	Bikh	Herb	2800–3600	VL
<i>Aeschynanthus sikkimensis</i> (Cl.) Stapf.	Gesneriaceae	Sinduray	Herb	1500–2400	CR
<i>Cissampelos pareira</i> Linn.	Menispermaceae	Batulay	Climber	100–300	VL
<i>Cinnamomum tamala</i> Nees & Eberm.	Lauraceae	Sinkauli	Tree	1200–2100	LR
<i>Clematis buchaniana</i> DC.	Ranunculaceae	Pinasay lahara	Climber	1200–2700	VL
<i>Curcuma zeadaria</i> Rosc.	Zingiberaceae	Kalo hardi	Herb	1000–1500	CR
<i>Dactylorhiza hatagirea</i> (Don) Soo	Orchidaceae	Panch aunlay	Herb	3000–3660	CR
<i>Elaeocarpus granitus</i> Roxb.	Elaeocarpaceae	Rudraksha	Tree	100–500	EN
<i>Gloriosa superba</i> Linn.	Liliaceae	Bikhphool	Herb	300–2000	EX
<i>Gynocardia odorata</i> R. Br.	Flacourteaceae	Gantay	Tree	1400–2100	EN
<i>Hedychium spicatum</i> Ham. ex Sm.	Zingiberaceae	Dudh kewnra	Herb	1500–2200	VL
<i>Juglans regia</i> Linn.	Juglandaceae	Okkhar	Tree	900–2500	VL
<i>Mahonia acanthifolia</i> G. Don.	Berberidaceae	Chutro	Tree	1600–2400	LR
<i>Mesua ferrea</i> Linn.	Clusiaceae	Negeswor	Tree	900–1500	EN
<i>Nardostachys jatamansi</i> DC.	Valerianaceae	Jatamaasi	Herb	3300–3600	CR
<i>Ophioglossum vulgatum</i> Linn.	Ophioglossaceae	Jibray saag	Herb	1500–2700	EN
<i>Piper longum</i> Linn.	Piperaceae	Pipla	Climber	200–1400	VL
<i>Panax pseudoginseng</i> Wall.	Araliaceae	Salanay	Herb	1900–2800	EN
<i>Picrorhiza kurroa</i> Royle ex Benth.	Scrophulariaceae	Kutki	Herb	2700–3660	CR
<i>Podophyllum hexandrum</i> Royle.	Podophyllaceae	Papari	Herb	2800–3660	CR
<i>Rheum acuminatum</i> Hook f. & Th.	Polygonaceae	Padamchal	Herb	3000–3600	EN
<i>Rhododendron anthopogon</i> D. Don.	Ericaceae	Sunpatay	Shrub	300–3600	VL
<i>Rhododendron arboreum</i> Sm.	Ericaceae	Lali Gurans	Tree	1700–3000	VL
<i>Rhododendron campanulatum</i> D. Don.	Ericaceae	Nilo Chimal	Shrub	2500–3600	LR
<i>Rhus semialata</i> Murr.	Anacardiaceae	Bhakimlo	Tree	1000–2000	VL
<i>Saussurea costus</i> (Falc.) Lipsch.	Asteraceae	Kuth	Herb	2500–3300	EN
<i>Stephania glabra</i> (Roxb.) Miers	Menispermaceae	Nimilahara	Climber	1500–2000	EN
<i>Stephania hernandifolia</i> (Willd.) Walp.	Menispermaceae	Tamarkay	Climber	100–1500	CR
<i>Swertia chirata</i> Buch.-Ham.	Gentianaceae	Chireto	Herb	1500–2500	VL
<i>Swertia pedicillata</i> Ban.	Gentianaceae	Chireto	Herb	2200–3000	EN
<i>Taxus baccata</i> Linn.	Taxaceae	Dhyangre salla	Tree	1500–2700	CR
<i>Thalictrum foliolosum</i> DC.	Ranunculaceae	Chitray	Herb	1500–2500	VL
<i>Tinospora cordifolia</i> (Willd.) Miers.	Menispermaceae	Gurjo	Climber	200–1000	EN
<i>Valeriana herdwickii</i> Wall.	Valerianaceae	Nakli jatamaasi	Herb	1500–3400	EN
<i>Viscum articulatum</i> Burm.	Loranthaceae	Harchur	Herb	1000–2200	VL
<i>Woodfordia fruticosa</i> Kurz.	Lythraceae	Dhangera	Shrub	100–1200	LR
<i>Zanthoxylum oxyphyllum</i> Edgew.	Rutaceae	Timmur	Shrub	188–2800	EN

CR, Critically rare; EN, Endangered; VL, Vulnerable; LR, Low risk-near threatened; Ex, Extinct in the wild.

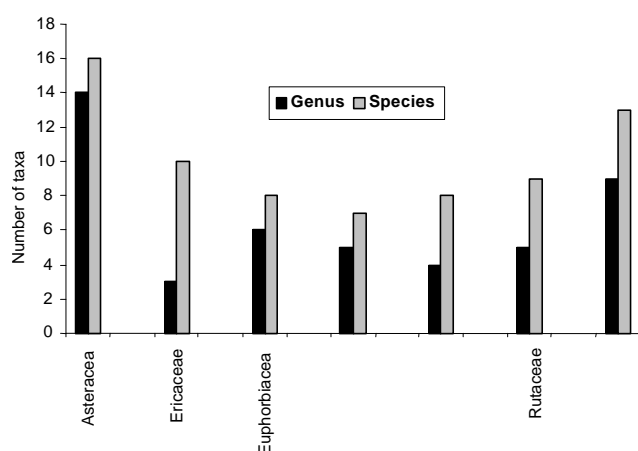


Figure 2. Families with highest representation of ethnomedicinal plants from Darjeeling Himalaya.

the medicinal plant biodiversity, but also in the traditions of folk-medicine. Among the three major traditional medicine systems, the Tibetan system (Aamchi) practised by the Bhutia people is well documented and well established. A medicinal institute teaching this system of medicine (Chagpori Tibetan Medicinal Institute) has also been established at Takdah, Darjeeling district. The Nepali jaributi and the Lepcha herbal system need immediate attention, so that the traditional knowledge of these systems may be preserved. Documentation regarding these systems of medicine is of primary importance. The wide array of haphazard information has to be arranged systematically. The doses of different herbal medicines have to be standardized. The methods for cultivation, collection, processing and preparation of crude drugs have to be established on a scientific basis. This will pave the path for the scientific establishment of these local medicinal systems.

The medicinal plants used in the local health traditions are gradually becoming extinct due to developmental activities, population explosion and other anthropogenic reasons. In order to reverse this trend, domestication of wild medicinal plants is of utmost importance. Farmers should be involved in the cultivation of medicinal plants at least in their barren and fallow land. This would augment their income and in turn help in the conservation of the species. Appropriate research should be carried out in institutions in the hills to develop agro-techniques for the cultivation of medicinal plants on priority basis.

In order to safeguard this knowledge, it should be documented, preserved and patented. Cures for diseases like cancer, AIDS, etc. may lie hidden in the treasure of these Himalayan folklores. A concerted effort by scientists, farmers, financiers and political leaders is called for, to benefit from the knowledge and resources nurtured on the lap of this part of Himalayas, over thousands of years.

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