

Ethnobotanical uses of Plants in and Around Kanji Wildlife Sanctuary, North West Himalaya

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Abstract: Ethno botanical enumeration of plants in and around of Kanji Wildlife Sanctuary, Kargil, North West Himalaya revealed 30 non-cultivated plant species belonging to 29 genera and 23 families that are being used by the inhabitants of the area. Plant part used dominantly are 'aerial part' (9 spp.), followed by 'flowers' (4 spp.), 'whole plant' (4 spp.), 'flowers and stem' (2 spp.), 'fruits and stem' (2 spp.) and 'leaves and stem' (2 spp.). Of the 30 species, 12 species are used as fodder, 7 species as fuel, 5 species as vegetable, 15 species for medicinal purpose while 17 species are being used for miscellaneous purposes. Most of the species belonged to Asteraceae (5 spp.) followed by Fabaceae (3 spp.) and Rosaceae (2 spp.). A number of factors like grazing and unscientific exploitation among others have rendered the plants as threatened. The plant resources can be conserved by employing sustainable management practices involving all stakeholders, especially the local communities.

Keywords: Kanji Wildlife Sanctuary, medicinal purpose, grazing, local communities

1. Introduction

Plants provides to mankind enormous economic benefits in the form of timber, food, fibre, medicines, industrial enzymes, food flavours, fragrances, cosmetics, emulsifiers, dyes, plant growth regulators, and pesticides. Until recently, little was known about traditional medicine of the Indian Himalayan Region (IHR) which is one of the richest reservoirs of biological diversity in the world and is considered as a store house of the valuable medicinal plant species [1]. There is a rich wealth of plants having ethnobotanical uses such as crop, medicine, vegetable, ornament etc. Many plant species are used by the locals in curing various ailments. The local system of medicine is known as Sowa Rigpa or Amchi system of medicine in Ladakh [2]. Ladakh is one of the few remaining Himalayan area where the Tibetan system of medicine remains undisturbed for centuries. Within different parts of Ladakh there are different uses of the indigenous plant species other than in medicine.

These indigenous uses play an important role in the life of Ladakhi communities especially farmers.

The unique climatic conditions viz. low temperature, low humidity, high insulation, high wind speed and low precipitation of Ladakh region are manifested by its cold desert area and the presence of low levels of richness, diversity and productivity [3] [4]. The cold desert harbours 967 endemic angiosperm species out of a total of 3054 species belonging to 872 genera, showing a high degree of (31.7%) endemism [5]. These 967 endemic species are further classified as 363 (11.9%) short range and 604 (19.8%) broad range endemics [6].

The western Ladakh, in which the present study has been carried out, is characterised by the presence of lush green fields in the plains on the vicinity of rivers and streams and rangelands in the mountains. However, the accessible part of the mountainous region serves as grazing land for livestock and many of the wild plants found there are utilized by the local people for medicinal purposes [7]. The Kanji Wildlife Sanctuary is one of the lesser-known protected areas in Jammu and Kashmir and is located on the Kargil-Leh highway about 65 km away from the district headquarters of Kargil. It is located at an average height of around 4875 meters above the sea level. The area comes under the administrative subdivision, Chiktan of district Kargil (Fig. 1). There is a small glacier in the area which gives rise to a stream called Kanji Nallah that enters river Indus at village Sanjak after passing about 20 kilometres through various villages of Chiktan valley. As in the rest of Ladakh, the climate of Kanji is alpine and desertic with scanty vegetation, however the area is home to large population of Ibex (*Capre ibex*) and blue sheep/Bharal (*Pseudois nayar*). There are three villages located in the vicinity of the sanctuary viz Khangral, Kanji and Hinaskut. Population of the area is around 1000 with average literacy rate. Economy depends on farming, cattle grazing, tourism and Govt. employment. The population is constituted of both Muslims and Buddhists in equal proportion. The area has not been explored for its floristic elements and its related attributes like ethnobotanical importance. However, few studies have been carried out in other similar regions by number of workers [8] [9] [10] [11] [12] [13]. Therefore, present attempt has been made to explore the plant resources of the study area in terms of their ethno-botanical values.

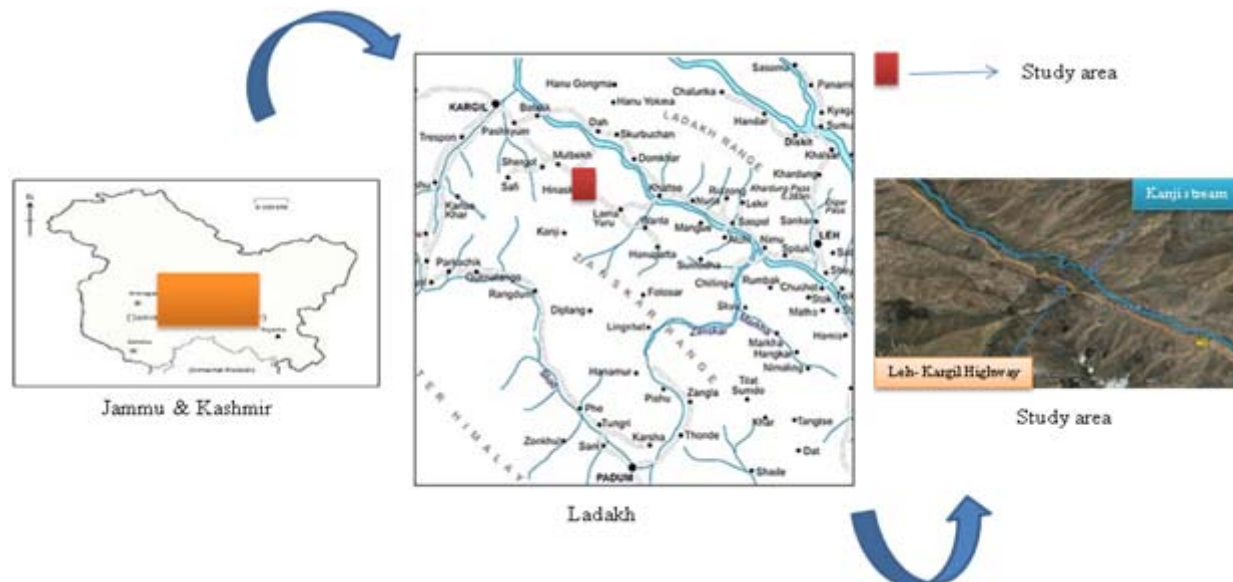


Figure 1: Location map of the study area

2. 2. Methodology

The area has been visited thoroughly in the years 2012 and 2013 from May to August to survey all the possible habitats and plants species were photographed for their identification. Majority of the plants were identified on the spot by their vernacular or common names. For the purpose of identification of plants, various local, regional and national floras were used besides consulting taxonomic experts of the region. To know the local uses of the plants, interviews were conducted among the locals mostly with the village elders. Information about different species was recorded against their local names and further confirmed by showing their photographs. The interviews were cross validated to ascertain the facts about the local uses of the plants.

3. 3. Results and Discussion

The flora of Ladakh comes under the alpine and subalpine zones and is unique due to its peculiar climatic condition. Plants are sparsely distributed and dominated by herbs, shrubs, grasses and bushes [14] which are generally dwarf, stunted, woolly or spiny and develop a mosaic patch of different forms to adapt to the prevailing climatic conditions [15] [16].

The list of the plants of the study area used for various purposes by the inhabitants of the area has been depicted in table 1 and photographs of the plants are presented in Figs. 1-30. Perusal of the table revealed that these 30 species belonged to 29 genera and 23 families. The part of the plant used dominantly is 'aerial part' (9 species), followed by flowers (4 species) and 'whole plant' (4 species), 'flowers and stem' (2 species), 'fruits and stem' (2 species) and 'leaves and stem' (2 species). Most of the species belonged to Asteraceae (5 spp.) followed by Fabaceae (3 spp.) and Rosaceae (2 spp.). Asteraceae was recorded to be the dominant family by some other workers while exploring the medicinal values of plants in other areas having the similar climatic conditions [17] [18].

Of the 30 species that have been enumerated for their ethno botanical uses, 12 species are used as fodder, 7 species as fuel, 5 species as vegetable, 15 species as medicine and 17 species have miscellaneous uses. In similar climatic conditions, a number of other studies have been carried out to explore the various attributes of the wild plant species. Many of these works includes those that have been conducted on the medicinal importance of the plants [19] [20] [21] with few other being on phytofoods [22] [23] and other ethnobotanical values.

In the present study, the plants have been collected from both the plain as well as the mountainous regions of the study area. Plants recorded have been found to be ubiquitous in their uses. However, the same plant species may have different use in different regions of Ladakh. There are some species that are used by the local amchis to cure a wide range of ailments/diseases ranging from fever to cancer. The use of plants in local system of medicines are not so popular in Kanji area as it is in other parts of Ladakh especially Leh city, still some of the plants have unique medicinal as well as other uses which have been a part and parcel of the local people since time immemorial.

The current trend toward increased commercialization has resulted in overharvesting of some economically important and medicinal plants in many parts of the world leading many of them to become threatened. Generally in Ladakh and particularly in the present study area, factors like unscientific exploitation, natural calamities, habitat fragmentation and above all overgrazing have been observed to threaten the survival of the plants [24]. Although going through the IUCN status of these plants, except *Trigonella emodi* which comes under the category of 'least concerned' all other plant species fall under the category of 'not evaluated' but still many of these plant species have been put in different categories of threatened status at local level [25]. As has been suggested by various workers, grazing practices in such fragile alpine communities above 2500 m asl should be very limited and controlled [26] and also medicinal-plant conservation areas should be established in regions which houses endemic medicinal plants in large numbers [27].

In the current study area, the locals although uses many of the plants in the local system of medicines and other uses but knowledge of the mechanism of their uses are limited to very few peoples that too mostly the village elders. In other words the younger generations are losing touch with century old tradition of their forefathers. However, once commercial importance of these plants especially for medicinal value is recognised by the locals, it is very much possible that they may be ruthlessly exploited by them for the short term benefits. Hence, it is imperative on the part of Government and other stakeholders to devise a plan for the sustainable management of these herbs and shrubs in the long run in which the interest of the local population is not compromised.

4. Acknowledgement

The authors are highly thankful to the local people of Chiktan valley especially elders for sharing invaluable information about the various indigenous uses of the plants.

Table 1: Ethnobotanical uses of plants of Kanji Wildlife Sanctuary

S. No.	Species	Family	Vernacular Name	Parts used	Uses
1	<i>Acantholimon lycopodioides</i> (Girard) Boiss.	Plumbaginaceae	Longze	Whole	Fresh plants are used as fodder while dried plants acts as an excellent fuel.
2	<i>Ajania tibetica</i> (Hook.f. & Thomson) Tzvelev	Asteraceae	Phasbursey	Whole	Used as fodder. Left out fodder is mixed with the excreta of the animals and used as manure which is locally called <i>bill</i> .
3	<i>Allium przewalskianum</i> Regel	Alliaceae	skotsay	Aerial part	Used as vegetables. It is also used as an alternate source of onion. Also used as an ingredients in the preparation of local food called <i>gangthor</i> . Medically used in the treatment of dysentery and stomach disorder.
4	<i>Arnebia euchroma</i> (Royle) I.M.Johnst.	Caryophyllaceae	Remok	Roots	Inner parts of the root, red in colour, are peeled and mixed with oil and used for colouring of hairs. The root is used in the treatment of burns.
5	<i>Aster flaccidus</i> Bunge	Asteraceae	Niamentok	Flowers	Used in bronchitis, cramps, common cold and to relieve pains.
6	<i>Capparis spinosa</i> L	Capparaceae	Kraba	Leaves and stem	The young shoots are used as vegetable. Branches are used as bed to dry fresh apricots. Medically used to cure acidity.
7	<i>Chesneya cuneata</i> (Benth.) Ali	Fabaceae	Bigangbo	Root, Fruits	The beans are eaten as vegetables. Roots are used as antiseptic.
8	<i>Cirsium arvense</i> (L.) Scop.	Asteraceae	Zbantser	Aerial part	Used as fodder. Not preferred due to its low quality.
9	<i>Codonopsis clematidea</i> (Schrenk) C.B.Clarke	Campanulaceae	Faq faq	Aerial part	Used as fodder. Also used as vegetable.
10	<i>Dactylorhiza hatagirea</i> (D.Don) Soó	Orchidaceae	Khirmga	Tuber	Used as fodder. Helps in wound healing, cough, cold, cuts and rheumatism. Acts as blood purifier.
11	<i>Echinops cornigerus</i> DC	Asteraceae	Kaqtsaymaq	Aerial part	Used as fodder. In old days the plant was used to ignite fire. It was crushed in pieces called <i>spraw</i> to be kept in a wallet shaped structure made up of leather and fitted with an iron piece. The wallet had also small pieces of shiny smooth and liver colored pebbles. The whole items was called <i>chakmak</i> and used to strike fire. Used to cure fever, cold and cough.
12	<i>Ephedra gerardiana</i> Wall. ex Stapf	Ephedraceae	Chappat	Aerial part	When fresh used as fodder and when dry acts as a fuel. Extract of the plant is given to Yaks as bronchodilator at higher altitudes to relieve them from breathing problems. Used in the treatment of bronchitis, asthma, rheumatism, syphilis and heart ailments. Ash is used to make <i>kheni</i> which is kept in mouth as an alternative of tobacco. Ash is mixed with water to form a paste which is applied on 'boils'.
13	<i>Epilobium latifolium</i> L.	Onagraceae	Shamalolo	Flowers	It is used in the treatment of skin diseases like pimples, inflammations. Also used to cure fever.
14	<i>Geranium wallichianum</i> D.Don ex Sweet	Geraniaceae	Spoldo	Flowers	The floral part of the plant is dried, boiled in water and used to color the local made garment called <i>Goncha</i> .
15	<i>Hippophae rhamnoides</i> L.	Elaeagnaceae	Tsokskure	Fruit and stems	Fruits are used commercially to make juice 'leh berry juice'. When dried the aerial part is used as fuel, for fencing the boundaries of houses and fields and also to guard the sapling of the plants like <i>Salix</i> .
16	<i>Iris lactea</i> Pall	Iridaceae	Tesma	Aerial part	Leaves are used as fodder and also for thatching, matting and basket work.
17	<i>Juniperus macropoda</i> Boiss	Cupressaceae	Shukpa	Leaves and Stems	Used as fuel. Stem is used in construction of traditional houses as pillars to support the roof. The green branches of the plant are used as incense. Also used to cure swelling, tumor, cancer and warts.
18	<i>Marrubium vulgare</i> L.	Lamiaceae	Yakzas	Aerial part	Used as fuel. The above ground dried parts of the plants are used for the roof construction. The plants are spread over the twigs and logs before covering it with mud and soil. Aerial parts of the plant are crushed into pieces and the end product, locally called <i>Brongbo</i> is fed to donkeys in specially made basket called ' <i>Bras</i> '.
19	<i>Melilotus officinalis</i> (L.) Pall.	Fabaceae	Dannga	Whole	The whole plant is crushed and mixed with boiled water which relieves gas, induce urination, improve blood circulation; helps in curing nervous tension, painful menstruation, insomnia and palpitations. Also used in treatment of wounds, cut and bruises.
20	<i>Myricaria germanica</i> (L.) Desv.	Tamaricaceae	Umbu	Stems	The plant is used as fuel and fodder. The above ground dried parts of the plants are used for the roof construction. The plants

					are spread over the twigs and logs before covering it with mud and soil. Used for fencing the fields and also as tree guard for protecting the sapling of <i>Salix</i> from animals like cows and donkeys.
21	<i>Physochlaina praealta</i> (Decne.) Miers	Solanaceae	Lantang	Whole	It is poisonous and when taken accidentally causes mental disturbance in humanbeings. Used for preventing soil erosion and protection of <i>Dangs</i> (wall around the local fields on steep slopes).
22	<i>Ranunculus arvensis</i> L.	Ranunculaceae	Isman	Fruit	The fruits of the plant are mixed with the branches of Juniper plant and used as incense to cure hallucination.
23	<i>Rheum spiciforme</i> Royle	Polygonaceae	Latchu	Leaf	Raw leaves and stem are consumed as vegetable. Plant is also used as source of fodder. Leaves are large in size and are used to make <i>Biri</i> (for smoking). Medicinally used to cure fever.
24	<i>Ribes orientale</i> Desf.	Grossulariaceae	Askuta	Fruits and stem	The above ground dried parts of the plants are used for the roof construction. The plants are spread over the twigs and logs before covering it with mud and soil. Also used as fuel. Fruits edible and are rich in vitamin C.
25	<i>Rosa foetida</i> Herrm.	Rosaceae	Sia sirpo	Flowers and stem	Fruits are eaten by wild bear. Stem is used to make baskets. Every year, during the month of April when the plant bears flowers, a ritual locally called <i>Mindog Takchas</i> takes place in Muslim communities of Kargil, where the flowers are offered on the graveyards to pay respect to the departed souls.
26	<i>Rosa webbiana</i> Wall. ex Royle	Rosaceae	Sia marpo	Flowers and stem	Stem is edible (after peeling the epidermis, young stem is eaten as raw). Fruits are source of food for wild bear. Stem of the plant is used to make baskets. Flowers of this plant are offered on the graveyards to pay respect to the departed souls in the month of April during a ritual of Muslim communities of Kargil, locally called <i>Mindog Takchas</i> .
27	<i>Taraxacum officinale</i> Webb	Asteraceae	Khorkhorma	Leaves and flower	Used as fodder. Leaves sometimes used as vegetable.
28	<i>Trigonella emodi</i> Benth	Fabaceae	Bugsug	Aerial parts	Used as good quality fodder for cows and goats.
29	<i>Urtica dioica</i> L	Urticaceae	Rdoastat	Aerial part	Used to excite activity in paralysed limbs. Also used in rheumatism.
30	<i>Verbascum thapsus</i> L	Scrophulariaceae	Shondok	Flowers	Used to cure chest problems, diarrhea and bleeding.

Plants used by locals in and around Kanji Wildlife sanctuary.



Acantholimon lycopodioides



Ajania tibetica



Allium przewalskianum



Aster flaccidus



Arnebia euchroma



Capparis spinosa



Chesneya cuneata



Cirsium arvense



Codonopsis clematidea



Dactylorhiza hatagirea



Echinops cornigerus



Ephedra gerardiana



Epilobium latifolium



Geranium wallichianum



Hippophae rhamnoides



Iris lactea



Juniperus macropoda



Marrubium vulgare



Melilotus officinalis



Myrecaria germinica



Physochlaina praelata



Ranunculus arvensis



Ribes orientalis



Rheum speciforme

*Rosa foetida**Rosa webbiana**Taraxicum officinale**Trigonella emodi**Urtica dioica**Verbascum thapsus*

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