International Journal of Herbal Medicine
Available online at www.florajournal.com

E-ISSN: 2321-2187
P-ISSN: 2394-0514
IJHM 2017; 5(1): 46-49
Received: 10-11-2016
Accepted: 11-12-2016

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Ethno-botanical important climbers and lianas of Shivalik hills, Himachal Pradesh (India)

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Abstract
Plants are the basis of life on earth and are central to people's livelihood. Glimpses of our knowledge in ethno-medicine are available to Vedic text and there is an inextricable link between indigenous culture and biodiversity as areas of high biodiversity are often found on indigenous community's lands. Ethno botany involves the reciprocal and dynamic aspect of the interaction of indigenous people with plants. This precious knowledge needs to be properly documented and conserved for the benefit of the present and future generations. North-Western Himalayas in India are well-known for their rich floral diversity, traditionally used as home remedies and form and important part of Himalayan folk medicine. The local communities and rural populace of Shivalik hills use 12 climbers and 4 lianas (13 dicots and 3 monocots) belonging to 9 families for their ethno-medicinal importance. Local communities not only use these climbers and lianas but also care for their conservation and protection; thus contributing towards sustainable development.

Keywords: Ethnobotany, Ethno-medicine Biodiversity, Shivalik, Climbers, Lainas, ODA (Observed density & availability), TIV (Total importance value)

1. Introduction
The term ethnobotany was coined by J.W. Harshberger in 1895 to "the study of plants used by primitive and aboriginal people" [1]. Since then, the subject has been variously defined and interpreted by different workers as its discipline began to follow multidisciplinary approach combining a diversity of knowledge bases and methods through the use of anthropological methods [2]. Plants are the basis of life on earth and are central to people's livelihood. Glimpses of our knowledge in ethno- medicine are available to Vedic text and there is an inextricable link between indigenous culture and biodiversity as areas of high biodiversity are often found on indigenous community's lands. In wider context, it involves the reciprocal and dynamic aspect of the interaction of indigenous people with plants [3]. Unfortunately, traditions and practices are now under assault everywhere in the world under the impact of industrialization and changes in sustenance economy, and needs to be properly documented and conserved for the benefit of the present and future generations [4].
North-Western Himalayas in India are well-known for their rich floral diversity, traditionally used as home remedies and form and important part of Himalayan folk medicine· The state of Himachal Pradesh (H.P.), a green pearl nestled in the North-Western Himalayan mountain ranges (30º-22' and 33º-12' North latitudes, 75°-47' and 79°-04' east longitudes) is known for the natural beauty of its forests, rivers, valleys, hills and dales, which are rich in material resources as in cultural and human values. Shivalik hills or the lower hills of Himachal Pradesh in ancient times were known as 'Manak Parbat'. It literally means the "tresses of Shiva". Shivalik hills in Himachal Pradesh includes districts *i.e.* Kangra, Hamirpur, Una, Bilaspur and the lower parts of Mandi, Solan and Sirmaur. The altitude ranges from 350m to 1,500m above the sea level [5].
The information on floristic and ethnobotanical studies in India is scattered and meager [6-11]. Ethno-medicinal information in Himachal Pradesh (H.P.) and particularly, in shivalik hills is meagre in literature [12-17]. Keeping this in mind, the present study has been undertaken.

2. Materials and Methods
Intensive ethno botanical exploration were undertaken in the rural pockets of Shivalik hills in district Hamirpur, Bilaspur and Sarkaghat tehsil of district Mandi. The field tours were planned in such a way so as to collect the ethno botanically interesting species of climbers and lianas either in flowering or fruiting stage.

For a better understanding of local beliefs, habits and uses, different categories of people like family heads, healers, and old experienced and knowledgeable informants were repeatedly interviewed. Botanical identification of the selected species was first done with the help of regional floras *i.e.* [12, 18, 19]. For more information three basic approaches were adopted following Phondani *et al.*, 2010 [20].

- An interview based approach- Questions from informants on ethnobotanical uses mainly from old experienced people.
- An inventory based approach- An inventory based approach is followed on following questions:
- Whether whole plant or plant parts are used?
- The season of flowering and fruiting
- TIV (Total importance value) of these plants
- The density of plants in the region
- Whether the plant is used for one disease or for more than one disease?
- An interactive discussions approach with communities-
- How to use plants?
- Are they used singly or in combination?

The local names were also ascertained and recorded carefully in the field notebook with the assistance of local informants. The data were verified in different regions among the interviewers and showing the same plant sample, and even with the same informants on different occasions. Ethnobotanical lore was considered valid if at least three informants made similar comments.

Phenological pattern of the plants were observed to find out the seasonal variation while ODA (Observed density availability) was observed according to Sood *et al*., 2012 [21] in which plants were classified into abundant, considerable and rare extent. Economic valuation of all the presently recorded ethnobotanical species was also carried out to calculate the total importance values (TIV) on the sum basis of parameters like life cycle strategy, seasonal variation, abundance, season as per detailed methodology outlined by Belal & Springuel (1996) [22]. Nomenclature of these taxa was confirmed from Bennet (1986) [23] and Wielgorskaya (1995) [24].

3. Observations

The local communities of Shivalik hills (H.P.) use 15 (climbers & Lianas) in different types of herbal practices. These local communities are a rich depository of traditional knowledge, so a sincere effort has been made to get the information on these herbal practices which are depicted in Table 1.

Table 1: Ethno-botanically important climbers and lianas of Shivalik hills

S. No	Botanical Name	Family	Local Name	Part/s Used	Status	Uses
1	*Abrus precatorus* L.	Fabaceae	Rati	Seeds	L	Paste of seeds used against skin eruptions, snake bite in animals and seeds are used to weigh gold [4, 6, 8, 12, 16, 17, 19].
2	*Basella alba* L.	Chenopodiaceae	Poi	Leaves	C	Leaves are cooked as "saag" and is good for digestive disorders and "vaata" [15, 21].
3	*Bauhinia vahlii* Wight & Arn.	Fabaceae	Taur	Stem, Seeds	L	Stem juice is used for killing ticks and mites in domestic animals and roasted seeds are eaten as aphrodisiac [4, 6, 8, 13, 14, 17, 19].
4	*Celastrus paniculatus* Willd.	Celastraceae	Sankheeru	Seeds	L	Oil from the seeds is highly recommended for massage in paralytic cases. It is also very good for joint pains and backache [14, 15, 18, 19]. (contd.)
5	*Cissampelos parriera* L.	Menispermaceae	Bhatindu	Leaves, Roots	C	Paste of leaves and roots is used for rheumatism. Leaves and roots are also used as purgative and diuretic [14-20].
6	*Clematis gouriana* Roxb. Ex DC.	Ranunculaceae	Gudbel	Leaves	C	Leaves are chewed as such for reducing the blood sugar value. Leaves are also used as insect repellent. Extract of leaves is considered anti-fungal [12, 18, 19].
7	*Cuscuta reflexa* Roxb.	Convolvulaceae	Akashbel	Stem	C	Crushed stem juice boiled in water is very good for rheumatism, nervine weakness, sprain and stomachache [4, 6, 8, 12, 16, 17, 19].
8	*Dioscorea bellophylla* Voight	Dioscoreaceae	Tardi	Tuber	C	Vegetable from cooked tubers is good for bleeding piles, leucoderma and tonic [12, 15, 21].
9	*Dioscorea bulbifera* L.	Dioscoreaceae	Gangardi	Tuber	C	Vegetable from cooked tubers is good for abdominal pain, rheumatism, gout and tonic [12, 15, 21].
10	*Dioscorea oppositifolia* L.	Dioscoreaceae	Dregal	Tuber	C	Vegetable from cooked tubers is good for weakness and "vaata" [12, 15, 21].
11	*Ipomoea turbinata* Lag.	Convolvulaceae	Ghondali	Pedicels	C	Edible pedicels are used as purgative [4, 6, 8, 12, 19].
12	*Luffa acutangula* (L.) Roxb.	Cucurbitaceae	Jangli-Gangher	Fruits	C	Aq. extract of fruits is used as emetic, purgative, flatulence and also cooked as vegetable [15, 17, 21].
13	*Mucuna pruriens* (L.) DC.	Fabaceae	Draugal	Seeds	C	Roasted seeds are eaten to check post-delivery stress, seminal weakness, and (contd). Impotency and even in some urinary complaints [4, 6, 16, 17, 19].
14	*Stephania glabra* (Roxb.) Miers	Bish-Khapar	Menispermaceae	Root Tubers	C	Root tubers are given raw to the animals mixed with jaggery, wheat straw or with

						other fodder leaves to cure skin problems (Bashar) [14-20].
15	*Tinospora cordifolia* Miers	Menispermaceae	Gulja	Stem	L	Aq. Extract of stem is used against viral fever, diarrohoea, dyspepsia and also recommended for diabetes. In some parts it is also used for leucorrhoea [4, 6, 8, 12, 16, 17, 19].
16	*Vitis rependa* Wt. & Arn.	Vitaceae	Maraingu	Fruits	C	Ripe fruits edible; extract of fruits considered refrigerant. Fruits are also considered good for minor ulceration problems [14, 15, 21].

Phenological pattern (Flowering and fruiting seasons) of the collected plants and ODA (Observed density and availability) which were recorded in field note-book and TIV (Total importance value) which is calculated following Belal & Springuel, 1996 [22] has been depicted in table 2.

Table 2: Ecological & economical information of climbers and lianas of Shivalik hills

S. No	Botanical Name	Flowering &Fruiting Season	ODA	TIV (%)	Habitat
	Abrus precatorius L.	May-August	+ +	50	In forests.
	Basella alba L.	March-December.	+	45	Moist places; also cultivated
	Bauhinia vahlii Wight & Arn.	April-June	+ +	50	Steep shady slopes of forest
	Celastrus paniculatus Willd.	April-December	+	60	Forests
	Cissampelos parriera L.	August - September	+ + +	50	Common
	Clematis gouriana Roxb. Ex DC.	November-March	+ + +	55	Field borders, Forests
	Cuscuta reflexa Roxb.	July-October	+ + +	65	Field borders
	Dioscorea bellophylla Voight	September-November.	+ +	55	Field borders, Forests
	Dioscorea bulbifera L.	June - August	+ +	55	Field borders, Forests
	Dioscorea oppositifolia L.	August - September	+	50	Field borders, Forests
	Ipomoea turbinata Lag.	July-September	+ +	40	Maize fields
	Luffa acatangula (L.) Roxb.	May-September	+ + +	45	Agricultural fields
	Mucuna pruriens (L.) DC.	July-September	+ +	35	On slopes among grasses
	Stephania glabra (Roxb.) Miers	June -August	+ + +	55	Shady places
	Tinospora cordifolia Miers	June - July	+ + +	60	On slopes in forests, Hedges
	Vitis rependa Wt. & Arn.	April-June	+ +	45	Along Agricultural fields

Note: All the plant species are evaluated as per the metholodology available in literature [15, 21, 22].

Abbreviations

ODA - Observed Density Availability
+ + + - Abundant
+ + - Considerable extent
+ - Not so common

4. Results & Discussion

The study of ethno-medical systems and herbal medicines as therapeutic agents of a paramount importance. The present study yielded interesting data which provides information of the 16 (13dicots and 3 monocots) ethnobotanically important plants (12 climbers & 4 lianas) in Shivalik hills. These plants belong to 9 families (8 dicot and 1 monocot), out of which Fabaceae, Menispermaceae (Dicots) and Dioscoreaceae (Monocot) with 3 spp each are predominant. *Dioscorea* is the most predominant genus amongst these plants (Table 1). ODA (Observed Density Availability) reveals that 13 plant spp are in abundant and considerable extent; while three spp (Basella alba, Celastrus paniculatus and *Dioscorea oppositifolia*) are not common in the study area (Table 2). Phenological pattern of plants suggest that most of the plants are in flowering and fruiting stage during rainy and summer seasons.

Statistically, the total importance value (TIV) reveals that *Cuscuta reflexa* tops the list with TIV of 65 % while *Celastrus paniculatus* and Tinospora cordifolia have TIV of 60%. *Ipomaea turbinata* and *Mucuna pruriens* have lowest TIV (40% & 35%, respectively), (Table II).

5. Acknowledgements

Authors are thankful to the rural populace of Shivalik hills for their valuable guidance.

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