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RESEARCH ARTICLE

Ethnobotanical Studies of Weed Flora in Shivalik Hills, Himachal Pradesh (H.P.) - India

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Abstract

Ethnobotanical studies has great value in enhancing our knowledge about plants used by native communities and means adopted by them for its conservation. Wild plants meet most of the requirements for men and his domesticated animals. Weeds are troublesome as they reduce the crop yield and detract from the comfort of life. In spite of all this, some of the weed are highly medicinal, edible and has great ethnobotanical values. Present study includes ethnobotanical importance of 42 weeds (41 dicots and 1 monocot) belonging to 18 families. The leaves and aerial parts of 11 spp, seeds of 5, roots of 4, stem of 3, flowers, roots and fruits of 2 spp each are used while 4 spp are used as whole plant. 30 weeds are medicinally important while 20 are edible, 3 are refrigerant and 6 weeds are used for other purposes.

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1. INTRODUCTION:

Ethnobotany in wider context denotes the entire realm of useful relationship between plants and men. Ethnobotanical studies has great value in enhancing our knowledge about plants used by native communities and means adopted by them for its preservation/conservation (Cohen et al., 1991). It is estimated that about one-third of the about 15,000 plants are used by tribal and poor people (Mittre, 1997). These wild plants meet most of the requirements for men and his domesticated animals. Many of the familiar plants really have the healing powers that tradition attaches to them (Maheshwari, 1980).

A weed is a plant growing where it is not desired (Klingman and Noordhoff, 1961). Weeds compete with crop plants for water, light and nutrition. They tend to persist in spite of man's effort for eradication and interfere with agricultural operations. Weeds reduce the yield and detract from the comfort of life (Craft and Robbins, 1962). In spite of all this, some of the weed are highly medicinal, edible and has great ethnobotanical values.

The state of Himachal Pradesh (H.P.), a green pearl nestled in the North-Western Himalayan mountain ranges (30°-22' and 33°-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 Sirmour. The altitude ranges from 350m to 1,500m above the sea level (Balokhra, 2002). Due to urbanization, modernization, and receding forests, the local communities are falling to the lure of urban life, and hence the wealth of ethnobotanical knowledge is fast depleting; therefore an urgent need was felt to study and document this precious knowledge for posterity. This paper discusses the ethnobotanical values of weeds in shivalik hills.

No efforts have been made to document information related ethnobotany of weeds in the region; however information related to weeds systematic and ethnobotany of Himachal Pradesh and other regions of India is scattered (Ambasta, 1986; Babu, 1977; Chauhan, 1999, 2003; Dhiman, 1976; Jain, 1968; Kala, 2003; Kapur, 1993; Khare et al., 2004; Kirtikar & Basu, 1984; Sachan et al., 2012; Sinha, 1987; Sood et al., 2012; Verdhana, 2007); so present effort has been made to document the ethnobotany of weeds from shivalik hills.

2. MATERIALS AND METHODS

Intensive ethnobotanical exploration were undertaken in the rural pockets of Shivalik hills in five districts of Himachal Pradesh i.e. Bilaspur, Hamirpur, Kangra, Mandi and some area of district Una adjoining to district Hamirpur. The field tours were planned in such a way so as to collect the ethnobotanically interesting species of weeds either in flowering or fruiting stage. Herbarium of collected plants was prepared following Jain & Rao, 1978. For a better understanding of local beliefs, habits and uses of weeds, different categories of people like family heads, healers, 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. Chauhan, 1999; Chowdhery & Wadhwa, 1984; Dhiman, 1976; Hooker, 1872-1897.

For more information three basic approaches were adopted following Phondani et al., 2010:

- **An interview based approach-** Questions from informants on ethnobotanical uses of weeds 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?

While collecting the weeds 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 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). Nomenclature of these taxa was confirmed from Bennet (1986) and Wielgorskaya (1995).

3. OBSERVATIONS:

The local communities of shivalik hills (H.P.) use 42 weeds 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.

4. RESULTS & DISCUSSION:

The study of ethno-medical systems and herbal medicines as therapeutic agents of a paramount importance in addressing health problems of traditional communities and third world countries as well as industrialized societies. The present study yielded interesting data which provides information of the 42 ethnobotanically important plants in shivalik hills. These weeds belong to 18 families (17 dicot and 1 monocot), out of which Asteraceae and Fabaceae with 6 spp and Amaranthaceae with 4 spp are predominant. Out of 42 weeds only one is monocot (*Acorus calamus*). *Ranunculus* (3spp), *Artemisia*, *Cassia* and *Lathyrus* (2spp each) are the predominant genera of weeds. The plants are used in different herbal practices of the region in which these plants are used either singly or in combination. Some of these weeds are edible (20 plant spp) and few of them (6 plant spp i.e. *Lantana camara*, *Mirabilis jalapa*,

Silene conoidea, *Vicia hirsuta*, *Vicia sativa*, *Woodfordia fruticosa*) are used for other ethnobotanical uses. 2 plant spp (*Artemisia scoparia*, *Perilla frutescence*) are used as refrigerant while 3 weeds (*Ageratum conyzoides*, *Bidens biternata* and *Fumaria indica*) are not ethnobotanically important. Most of them (30 weeds) are medicinally important and are used by the local populace of the region against different ailments (Table 1). The leaves and aerial parts of 11 spp, seeds of 5, roots of 4, stem of 3, flowers, roots and fruits of 2 spp each are used while 4 spp are used as whole (Whole plant) (Fig. 1).

ODA (Observed Density Availability) reveals that 25 plant spp are in abundant extent while 15 spp are in considerable extent. Two spp (*Artemesia scoparia* and *Spergula arvensis*) are not common in the study area (Table 2).

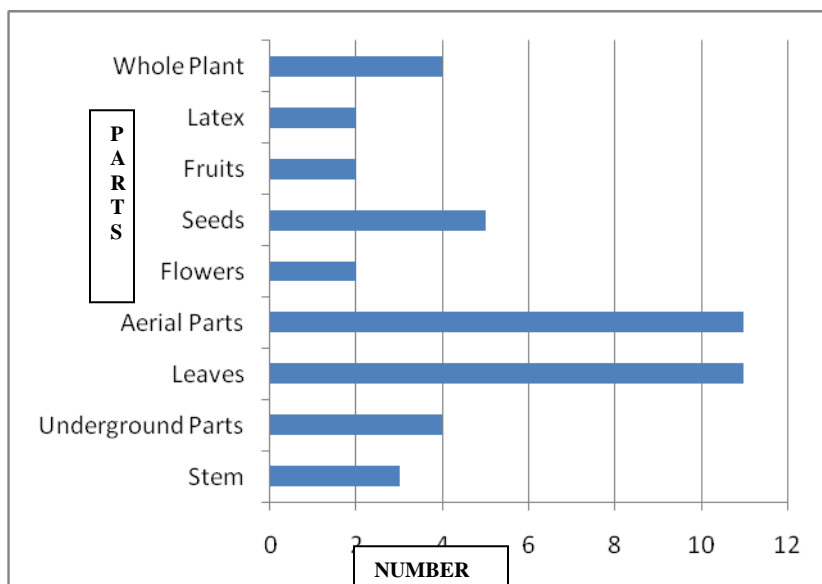


Fig.1. Various parts of different weeds used in shivalik hills (H.P.)

Phenological pattern of plants suggest that most of the plants are in flowering and fruiting stage during rainy and summer seasons (Fig. 2).

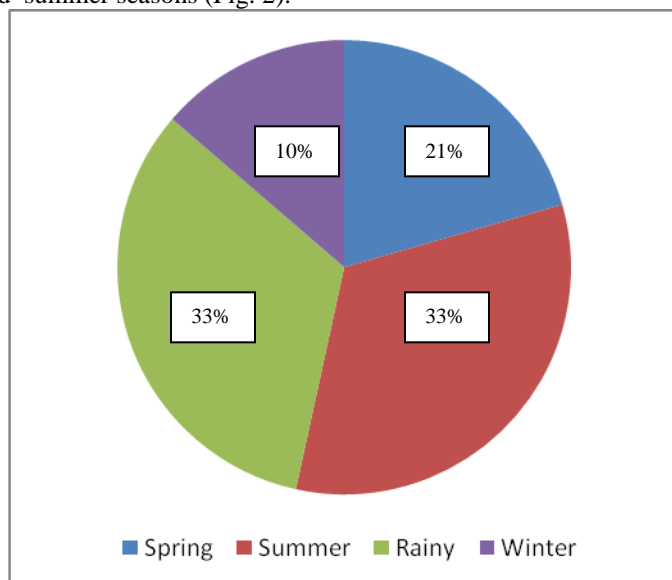


Fig. 2. Phenological pattern of weeds in shivalik hills (H.P.)

Statistically, the total importance value (TIV) reveals that *Solanum nigrum* tops the list with TIV of 60 % while *Amaranthus viridis*, *Artemisia scoparia*, *Chenopodium album*, *Portulaca oleracia*, *Silene conoidea*, *Spergula arvensis*, *Stellaria media*, *Vicia hirsuta*, *Vicia sativa* and *Woodfordia fruticosa* have TIV of 50%. *Ageratum conyzoides*, *Bidens biternata* and *Fumaria indica* have lowest TIV of 20% (Table II)

Weeds are considered troublesome but from the discussion it is clear that most of these have ethnobotanical values and these indigenous herbal practices provide invaluable knowledge and aid in making best use of natural resources as it is dynamic in dissemination and scientific in indigenous experimentation. In the modern days of technological advancement, this knowledge is falling prey to the lure of modernization and urbanization. It is recommended that the documentation of indigenous herbal practices should be included in the curricula of environment and sustainable development as a cross cutting issue.

Table 1: Table Showing the Ethnobotanical Value of Weeds in Shivalik Hills, Himachal Pradesh (H.P.)

S. No.	Local Name/s	Botanical Name	Family	Part/s Used	Ethnobotanical Uses
1.	Puthkanda	<i>Achyranthes bidentatai</i> Blume	Amarathaceae	Stem, Root	Decoction of stem against uric acid and of root against snake bite
2.	Barain	<i>Acorus calamus</i> L.	Liliaceae	Rhizome	Rhizome paste along with warm mustard oil for fever and with honey against cough
3.	Aung	<i>Aerva lanata</i> (L.) Juss. ex Schult	Amaranthaceae	Root	Decoction of root against liver ailments and urinary infection
4.	Phulnu	<i>Ageratum conyzoides</i> L.	Asteraceae	-	Harmful for crops so carefully eradicated
5.	Neelkanth	<i>Ajuga parviflora</i> Benth.	Lamiaceae	Leaves	Leaves paste and poultice against skin diseases in cattles
6.	Rubadi-Khubadi	<i>Alternanthera sessilis</i> (L.) R. Br. ex DC.	Amaranthaceae	Aerial Parts	Aerial parts as vegetable
7.	Chalairi, Chaulai	<i>Amaranthus viridis</i> L.	Amaranthaceae	Aerial Parts, Seeds	Aerial parts as vegetable; Seeds diuretic
8.	Chharmara	<i>Artemisia capillaris</i> Thunb.	Asteraceae	Seeds	Seeds are used for joint pains
9.	Chau	<i>Artemisia scoparia</i> Waldst. & Kit.	Asteraceae	Leaves, Seeds	Leaves and seeds used for flavoring in tea, good for cough and fever
10.	Lumb	<i>Bidens biternata</i> (Lour.) Merr. & Sherff.	Asteraceae	-	Usually eradicated as harmful for crops
11.	Eat-seat	<i>Boerhavia diffusa</i> L.	Nyctaginaceae	Leaves	Leaves relished as vegetable and good for rheumatism (contd.)

12.	Danther	<i>Callicarpa macrophylla</i> Vahl.	Verbenaceae	Fruits	Fruits are used with warm water for mouth ulcers
13.	Aak, Ak	<i>Calotropis procera</i> R.Br.	Asclepiadaceae	Latex	Latex applied for toothache
14.	Allu, Rellu	<i>Cassia obtusifolia</i> L.	Fabaceae	Seeds	Seeds edible and good for lung ailments
15.	Chhota-Rellu	<i>Cassia occidentalis</i> L.	Fabaceae	Fruits	Pods as vegetable and purgative; seeds good for stomachic
16.	Kanah	<i>Chenopodium album</i> L.	Chenopodiaceae	Aerial parts	Aerial parts as vegetable and good for body pains due to 'vaata'
17.	Bhruce	<i>Cirsium arvense</i> (L.) Scop.	Asteraceae	Whole Plant	Given to cattles for enhancing lactation
18.	Doos	<i>Colebrookia oppositifolia</i> Sm.	Lamiaceae	Whole Plant	Poultice applied on cuts to stop bleeding; also good for headache
19.	Dhatura	<i>Datura stramonium</i> Mill.	Solanaceae	Leaves	Leaves used against asthma
20.	Papda	<i>Fumaria indica</i> (Hausskn.) Pugsley	Apiaceae	-	Harmful, usually eradicated
21.	Zahar Buti, Phulanu	<i>Lantana camara</i> L.	Verbenaceae	Leaves	Leaf paste against sprain and has insecticidal properties
22.	Mater-Phali, Khinnu, Sudu	<i>Lathyrus aphaca</i> L.	Fabaceae	Leaves	Tender leaves consumed as vegetable and purgative
23.	Kalan	<i>Lathyrus sativus</i> L.	Fabaceae	Leaves	Tender leaves are used in mixed vegetable; seeds are rarely eaten as 'dal'
24.	Gulbansi	<i>Mirabilis jalapa</i> L.	Nyctaginaceae	Flowers, Seeds	Flowers and seed as offerings for god and root tubers consumed as pickle
25.	Malori	<i>Oxalis corniculata</i> L.	Oxalidaceae	Leaves	Leaves eaten raw, refrigerant
26.	Ban-Ajwain	<i>Perilla frutescens</i> (L.) Britt.	Lamiaceae	Whole Plant	Used in flavoring curries and good for stomach disorders
27.	Kulfa	<i>Portulaca oleracea</i> Hook.	Portulacaceae	Aerial Parts	Aerial parts used in mixed vegetable and is good for relieving body heat
28.	Chitra	<i>Plumbago zeylanica</i> L.	Plumbaginaceae	Root	Root paste against boils
29.	Jaldhar	<i>Ranunculus arvensis</i> L.	Ranunculaceae	Leaves	Leaf paste for boils
30.	Jaldhar	<i>Ranunculus laetus</i> Wall. ex Don	Ranunculaceae	Leaves	Leaf paste for boils
31.	Changer	<i>Ranunculus muricatus</i> L.	Ranunculaceae	Aerial Parts	Aerial parts consumed in mixed vegetable
32.	Aambi	<i>Rumex hastatus</i> Don	Polygonaceae	Stem, Leaves	Stem chewed by children, refrigerant, coolant; leaf decoction for malarial fever (contd.)

33.	Janglee Dhania	<i>Scandix pecten veneris</i> L.	Apiaceae	Aerial Parts	Aerial parts used in mixed vegetable
34.	Dredain	<i>Sida cordifolia</i> L.	Malvaceae	Seeds	Seeds for joint pains
35.	Tokala	<i>Silene conoidea</i> L.	Caryophyllaceae	Aerial parts	Aerial parts used in mixed vegetable and a good fodder
36.	Kwanoo	<i>Solanum nigrum</i> L.	Solanaceae	Whole Plant	Ripe fruits edible; used as antiseptic, diaphoretic, diuretic, expectorant, laxative, stomachic; and for boils, cough, diarrhoea, dysentery, ear complaints, fever, headache, inflammation of scrotum, testicles, kidney, bladder, jaundice, liver complaints, piles, rheumatism, (Contd.) ring worms, skin diseases, sores, sprain, swelling, throat trouble, ulcers in mouth and urinary complaints
37.	Dodak	<i>Sonchus asper</i> Hill.	Asteraceae	Latex	Latex used rarely for skin problems
38.	Pyaazi	<i>Spergula arvensis</i> L.	Caryophyllaceae	Aerial parts	Aerial parts used in mixed vegetable and good for 'vaata'
39.	Khaukhua	<i>Stellaria media</i> (Linn.) Vill.	Caryophyllaceae	Aerial parts	Aerial parts used in mixed vegetable and a good fodder
40.	Choti-Rodi	<i>Vicia hirsuta</i> Koch.	Fabaceae	Aerial parts	Aerial parts used in mixed vegetable and a good fodder
41.	Badi-Rodi	<i>Vicia sativa</i> L.	Fabaceae	Aerial parts	Aerial parts used in mixed vegetable and a good fodder
42.	Dhawain, Dhaun	<i>Woodfordia fruticosa</i> Salisb.	Lythraceae	Flowers, stem	Nectar of flowers consumed by children; also used for making local wine 'sur'; stem poultice good for headache leucorrhoea, dysentery and fever

Phenological pattern (Flowering and fruiting seasons) of the collected weeds 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; has been depicted in table 2.

Table 2: Table Showing the Phenological Pattern, Observed Density Availability (ODA) and Total Importance Value (TIV) of Weeds in Shivalik Hills, Himachal Pradesh (H.P.).

S. No.	Botanical Name	Flowering & Fruiting Season	Observed Density Availability (ODA)	Total Importance Value (TIV %)
1.	<i>Achyranthes bidentata</i> Blume	June-August	+++	40
2.	<i>Acorus calamus</i> L.	June-July	++	40
3.	<i>Aerva lanata</i> (L.) Juss. ex Schult	September-March	+++	30
4.	<i>Ageratum conyzoides</i> L.	March-April	+++	20
5.	<i>Ajuga parviflora</i> Benth.	May-June	++	40
6.	<i>Alternanthera sessilis</i> (L.) R. Br. ex DC.	Throughout the year	++	40
7.	<i>Amaranthus viridis</i> L.	May – June	+++	50
8.	<i>Artemisia capillaris</i> Thunb.	August-September	+++	30
9.	<i>Artemisia scoparia</i> Waldst. & Kit.	August-September	+	50
10.	<i>Bidens biternata</i> (Lour.) Merr. & Sherff.	June-September	+++	20
11.	<i>Boerhavia diffusa</i> L.	June-October	++	40
12.	<i>Callicarpa macrophylla</i> Vahl.	July-September	++	40
13.	<i>Calotropis procera</i> R.Br.	February-May	++	30
14.	<i>Cassia occidentalis</i> L.	May-December	+++	40
15.	<i>Cassia obtusifolia</i> L.	May-October	++	40
16.	<i>Chenopodium album</i> L.	May-October	+++	50
17.	<i>Cirsium arvense</i> (L.) Scop.	May-June	+++	30
18.	<i>Colebrookia oppositifolia</i> Sm.	April-November	+++	40
19.	<i>Datura stramonium</i> Mill.	June-October	++	30
20.	<i>Fumaria indica</i> (Hausskn.) Pugsley	October-March	+++	20
21.	<i>Lantana camara</i> L.	April-June	+++	40
22.	<i>Lathyrus aphaca</i> L.	April-May	+++	40
23.	<i>Lathyrus sativus</i> L.	May-August	+++	40
24.	<i>Mirabilis jalapa</i> L.	June-September	++	40
25.	<i>Oxalis corniculata</i> L.	April-November	+++	30
26.	<i>Perilla frutescens</i> (L.) Britt.	May-August	+++	40
27.	<i>Plumbago zeylanica</i> L.	April-September	++	30
28.	<i>Portulaca oleracea</i> Hook.	July-August	++	50
29.	<i>Ranunculus arvensis</i> L.	April-June	++	30
30.	<i>Ranunculus laetus</i> Wall. ex Don	March-April	++	30 (contd.)

31.	<i>Ranunculus muricatus</i> L.	March-June	++	40
32.	<i>Rumex hastatus</i> Don	November-April	+++	50
33.	<i>Scandix pecten veneris</i> L.	May-September	+++	40
34.	<i>Sida cordifolia</i> L.	July-September	++	30
35.	<i>Silene conoidea</i> L.	March-May	+++	50
36.	<i>Solanum nigrum</i> L.	January-July	+++	60
37.	<i>Sonchus asper</i> Hill.	March - April	+++	30
38.	<i>Spergula arvensis</i> L.	May-Aug.	+	50
39.	<i>Stellaria media</i> (Linn.) Vill.	March-April	+++	50
40.	<i>Vicia hirsuta</i> Koch.	March-April	+++	50
41.	<i>Vicia sativa</i> L.	January-February	+++	50
42.	<i>Woodfordia fruticosa</i> Salisb.	March-June	++	50

ODA - Observed Density Availability

+++ - Abundant

++ - Considerable extent

+ - Not so common

5. ACKNOWLEDGEMENTS

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