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Weed Floral Diversity of Medicinal Value in Terraces of Horticulture Crop Fields in Bharsar, Uttarakhand, India

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An ethnobotanical survey was conducted in order to identify the medicinal weed flora of horticulture crop fields in University Campus, Bharsar, Pauri Garhwal (located at an elevation, of 1950 m in northwest Garhwal Himalaya of Uttarakhand) and to find out the possibilities of utilizing these weeds. The information about the traditional potential uses of species was collected with the help of reference literature of different medicine systems. The study revealed that 117 species of weeds belonging to 98 genera and 43 families in crop fields, possessed medicinal properties. The study suggested a tremendous scope of utilising these weeds to promote additional income to the inhabitants.

Key Words: Biodiversity, Ethnobotany, Garhwal Himalaya, Medicinal plants, Traditional use

Introduction

The Himalaya represents one of the most important mega-centres of the biodiversity, sharing over fifty percent of the vegetational wealth of the Indian subcontinent. In the recent past there has been a deep concern and awareness for the conservation of the fragile Himalayan ecosystem. The diversity, copiousness as well as uniqueness of the plant components in various habitats have retained sound and maintained the aesthetic environment and the serenity of the Himalaya. However, in the recent past couple of years, excessive exploitation of vegetation, unplanned landuse, natural disasters and several developmental processes accelerated deterioration of threatened biodiversity and harmony of the Himalaya ecosystem (Atkinson, 1982; Burkill, 1965; Bisht, 2005).

Garhwal Himalaya possesses luxuriant and varied vegetation within the Himalaya region. Almost every plant has economic value as nutrition, aesthetic or medicine. In fact, a large percentage of crude drugs in the Indian market come from this Himalayan area (Badoni, 1989). According to cumulative evidence, the Garhwal Himalaya has more than 3,500 species of flowering plants, confined to most of which are in forest and alpine meadows. In India out of an estimated 15000-16000 flowering plant species, about 1,500 (10%) have already come under the various categories of threatened plants. The same number of species is used in Indian traditional system of medicine, that is, 600 species with more than 8,000 herbal remedies in Ayurvedic, 500 species in Unani, and 550 species in phyto-pharmaceutical industries. Nearly thirty species from the Garhwal Himalaya have been listed in various categories under threat in the India Red Data Books of which 24 species are from high altitude alpine regions (Rao, 1994; Nautiyal *et al*., 1996; Dhar *et al*., 2002). Several dedicated workers took interest in this region for the collection conservation of medicinal and aromatic plants in past even before 19th century. The ethno-botanical account of Garhwal Himalaya reveals that majority of traders used to collect wild medicinal plants from alpine and sub-alpine zone especially before the onset of seed setting through untrained and unskilled labours and exploited to the plains from higher altitude and export them (Negi *et al.*, 1999). This has led to the unscientific extraction of entire plants. In addition, the over-exploitation changed the environmental conditions and original habitats that have led to gradual loss of plants. In many of the species the exploitation pressure has gone to the extent that these are at the verge of extinction and therefore has been declared as threatened, rare, vulnerable, or endangered depending on the frequency in the nature (Joshi *et al*., 1997).

Plants are rich source of many natural products. From ancient time man has used several plants in attempt to cure diseases and relieve pain. Comparatively few drug plants are cultivated. Most of the supply of

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drugs is obtained from the wild plants. The medicinal value of drug plants is due to the presence of certain chemical substances in plants. In this paper 117 species of weed with medicinal value have been documented based on study undertaken in Bharsar, Pauri Garhwal, Uttarakhand.

Material and Methods

Study Area

The present study was carried out in the temperate regions of Bharsar area (Uttarakhand University of Horticulture and Forestry, covering about 175 hectare areas). Bharsar is situated at about 57 Km from the district Headquarters, Pauri Garhwal on the Pauri-Thalisain-Ram Nagar National Highway 121. The meaning of Bharsar in local dialect is 'Flourished with natural wealth'. Since the ancient time, it is famous for vast biodiversity of temperate vegetation. Owing to favourable environment for horticulture education, Uttarakhand University of Horticulture and Forestry has been established recently (28th April, 2011) here. The district Pauri Garhwal is most fascinating segments of the Himalaya, stretches from the Ram Ganga River that separates Pauri-Kumaon border in the East and to the Ganga demarcating the western border.

Soil

Soil texture, colour and nature represent wide range of variations, depending upon geology, altitude, slope, climate, vegetation and biological and soil chemistry of particular site. In general, the soil is deep clay-loam, slightly acidic and rich in potassium, medium in phosphorous and nitrogen contents, with the exception of some cultivated fields.

Climate

In general, the climate of the Bharsar represents mild summer, higher precipitation and prolonged cold winter season. The climatic factors such as precipitation, temperature, relative humidity and wind, in association with elevation, slope aspects, drainage, vegetation, etc. are responsible for the micro-climate of this area. Generally, days of Bharsar are fairly warm followed by cool nights. The area receives adequate sunshine hours whereas the growing period is shorter due to long winter. The area also receives heavy precipitation during monsoon and occasional snow fall during winter season.

Survey

The present investigation was a result of extensive and intensive field surveys, conducted during November 2013 to April 2015. The specimens were collected by usual methods of collection, preservation and maintenance of specimen in the herbarium with field notes. The collected specimens were identified with the help of recent and relevant floras *i.e* Naithani (1985), Gaur (1999). The specimens deposited at HNB Garhwal University Herbarium (GUH), Srinagar. Information on medicinal properties and qualities of various plant species have been gathered through personnel interview with the local inhabitants and also concern with different literatures. Usually the information collected from the local *vaidyas* or medicinal practitioners; however occasionally the information was also recovered by housewives, rural old folk, and grazers of long experience.

Result and Discussion

The study revealed that out of 169 problematic weeds, 117 weeds were of medicinal importance and used against many diseases. Medicinally important weeds of the study site comprises total 117 species respectively of 43 families, 113 species of dicotyledons (39 families) and 4 species of monocotyledons (4 families) collected during the study period. Out of 43 families, Asteraceae contributed maximum share 17.95 % (21 species), followed by Lamiaceae 9.41 % (11 species), Rosaceae 7.70 % (9 species), and other families make 64.94 % of total flora in study area during study period.

All these weeds are arranged alphabetically by their botanical name, family name; local name and mode of usage (summarized in Table 1). These weeds grow along with the crop plants and are regarded as nuisance for crops, but are the boon to the pharmaceutical industries as these weeds yield chemicals used in formulation of various important drugs. These are also used by *vaidyas* for preparing various herbal formulations (Samant *et al*., 1998, 2001).

Due to lack of awareness about medicinal importance of these weeds they are discarded by the farmers. These weeds can become an additional source of income for the farmers, if they are made aware of the medicinal importance.

The study area is rich in biodiversity corresponds to the climate and topography of temperate vegetation ranging from 1500-2200 m altitude, respectively. Different factors have influenced (lower or exceeded) the normal limit of vegetation type and flowering seasons.

Table 1. Enumeration of Medicinal Weed Flora and Their Traditional Uses

S.No.	Botanical name	Local/ vernacular name	Family	Uses
1	*Achyranthes bidentata* Bl.	Chicheree, Latjira	Amaranthceae	Root infusion taken in malarial fever. Leaf extract supposed to facilitate delivery, used in dropsy and bronchitis.
2.	*Agrimonia pilosa* Ledebour	Lesukuria	Rosaceae	Plant decoction given in cough and diarrhoea, root paste with mustard oil applied round the belly in suppressed urination.
3.	*Ainsliaea latifolia* (D.Don). Schultz.	Kauru	Asteraceae	Decoction of roots given in colic.
4.	*Ajuga bracteosa* Wall. ex Benth.	Neelkanthi	Lamiaceae	Leaf extract used in malarial fever, bitter plant extract is used as a tonic, astringent and febrifuge.
5.	*Anaphalis contorta* (D.Don) Hk.	Bugla	Asteraceae	Paste of heads and leaves applied on cuts wounds.
6.	*Anaphalis adnata* Wallich	Bugla	Asteraceae	Paste of head and leaves applied on cuts, wounds and boils.
7.	*Anemone obtusiloba* D.Don.	Kanchphool, Kakrya	Ranunculaceae	Roots and leaf paste applied externally on ringworm and eczema in folk medicine.
8.	*Anemone rivularis* Buch-Ham.	Mirchilee	Ranunculaceae	Paste of leaves applied externally on forehead in headache. Leaf juice applied on wound, sores, and earache in local therapy.
9	*Artemisia capillaris* Thunb.	Jhirun	Asteraceae	Decoction of leaves taken as a bitter tonic for worms and colic, twigs used as brooms.
10.	*Artemisia roxburghiana* Wall. ex Besser	Kunjaa	Asteraceae	Plant extract antipyretic, tonic and also rubbed on skin allergy.
11.	*Asparagus racemosus* Willd.	Satavari	Liliaceae	Root aphrodisiac, antiseptic, refrigerant often used with fresh water or milk.
12.	*Aster peduncularis* Wall. ex Nees.	Phulyan	Asteraceae	Extract of plant useful to dissolve renal-calculi and root powder as stomachic.
13.	*Astragalus leucocephalus* Graham ex Benth.	Rudravanti	Fabaceae	Roots are used as blood purified and in skin diseases; plant infusion as tonic, leaves used as fodder.
14.	*Barleria cristata* L.	Saundi, Kala-bansa	Acanthaceae	Root decoction used against bronchitis and pneumonia, leaves and root paste applied on wound-swelling, root chips added to local beverages, seeds regarded as antidote to snake bite.
15.	*Begonia picta* Smith	Pattharchatta	Begoniaceae	Decoction of plant in boiled water given in colic and dyspepsia.
16.	*Berberis aristata* DC.	Kingore	Berberidaceae	Juice from bark of stem or root often known as 'Rasaut' often dropped in ophthalmia. Infusion of root given in fever. Fruits edible, bark yields yellow dye.
17.	*Berberis asiatica* Roxb. ex DC.	Kilmora	Berberidaceae	Roots inflammation and stomachache.
18.	*Bergenia ciliata* (Har.) Sternb.	Silpari, Pasanbhed	Saxifragaceae	The leaves and root given to the patient of kidney stone.
19.	*Bidens pilosa* L.	Kumra	Asteraceae	Plant extract with honey used in cough and bronchitis.
20.	*Bistorta amplexicaul* D.Don.	Kutrya	Polygonaceae	Decoction of plant said to cause abortion if taken orally. Leaf paste applied on wounds and extract to relive dysentery
21.	*Boenninghausenia albiflora* (Hk.) Reichb. ex Meisn.	Pissumar, Upanya Ghass	Rutaceae	Leaf paste applied on cuts and wounds, root powder used as antiseptic and juice given in vomiting and dysentery.
22.	*Bupleurum hamiltonii* Balakrishnan	Singu	Apiaceae	Roots used in stomach and liver disorders and plant browsed by cattle.
23.	*Callicarpa macrophylla* Vahl.	Daiya	Verbenaceae	Fruits useful in oral aphthae, leaves after heating applied externally on rheumatic pain

Contd.

S.No.	Botanical name	Local/ vernacular name	Family	Uses
24.	*Chenopodium album* L.	Bathua	Chenopodaceae	Leaves used as pot–vegetable; breads prepared from the grinned grains.
25.	*Clematis barbellata* Edgew	Kanguli, Lagulia	Ranunculaceae	Leaves supposed to be poisonous to cattle, leaf paste externally applied for skin ailments.
26.	*Clematis montana* Buch.-Ham. ex DC	Kujju	Ranunculaceae	Leaf extract given to cure diabetes and urinary troubles.
27.	*Clinopodium umbrosum* (M. Bieb.) C. Koch	Birchee	Lamiaceae	Plant extracts used as an astringent, carminative and as blood purifier, leaves infusion used in gastric troubles and flowers as a source of bee-forage.
28.	*Coccinia grandis* (L.) Voigt	Kaduri	Cucurbitaceae	Leaves and root juice given in diabetes, leaves also supposed to be antiseptic; fruit juice given in gonorrhea.
29.	*Corydalis cornuta* Royle	Indra-Jata	Fumariaceae	Aqueous paste of roots taken to reduce body swelling and inflammations root juice given in fever.
30.	*Cotoneaster microphyllus* Wall. ex Lindley	Bugarchilla	Rosaceae	Leaf extract and fruits given in diarrhoea, root paste applied on cuts and wounds.
31.	*Crotalaria albida* Heyne ex Roth	Chunchuni	Fabaceae	Roasted seed powder taken as blood purifier and roots chewed in constipation.
32.	*Crotalaria medicaginea* Lam.	Ghunghunia	Fabaceae	Leaf juice applied in scabies and urticaria.
33.	*Cucumis hardwickii* Royle.	Elaroo	Cucurbitaceae	Decoction of root barks given and fevers; seeds given in suppressed urination.
34.	*Cyathula tomentosa* (Roth) Moq. in DC.	Lichkura.	Amaranthceae	Leaf extract has emetic properties and given in snakebite.
35	*Cyperus rotundus* L.	Motha	Cyperaceae	Dried underground parts used in perfumes and plant extract used as diaphoretic and astringent.
36.	*Dicliptera bupleuroides* Nees	Kulartore	Acanthaceae	Leaf paste applied on wounds to check bleeding, leaf juice useful in cough and gastro-enteritis.
37.	*Elephantopus scaber* L.	Adhomukha	Asteraceae	Root extract used in intermittent fever and to stop vomiting and leaves as tonic of blood diseases.
38.	*Emilia sonchifolia* (L.) DC.	Hirankuri	Asteraceae	Leaf juice used in eye inflammation and night blindness.
39.	*Erythrina arborescens* Roxb.	Pangara	Fabaceae	Bark used in skin diseases; leaf extract given in suppressed menses, and also for intestinal worms.
40.	*Eupatorium adenophorum* Sprengel	Kharna, Bakura	Asteraceae	Crushed leaves applied on wounds.
41.	*Eurya acuminata* DC.	Deura	Theaceae	Wood used as fuel and for agricultural implements. Green leaves and young twigs lopped for fodder.
42.	*Fagopyrum dibotrys* Wall. ex Meisn.	Banogal, Kanalya	Polygonaceae	Leaf paste rubbed on insect bite.
43.	*Fragaria nubicola* Lindley ex Lacaita	Gand-kaphal	Rosaceae	Leaf juice dropped for relieving earache and fruits also used in local beverages.
44.	*Galium aparine* L.	Khuskusa	Rubiaceae	Extract of leaves used as astringent and plant paste applied on skin diseases.
45.	*Galium asperifolum* Wall.	Liswa kuri	Rubiaceae	Plants paste is use fuel in skin ailments.
46.	*Galium elegans* Wall.	Manjeethee	Rubiaceae	Plant extract given in colic, dyspepsia and as well as in jaundice.
47.	*Geranium nepalense* Sweet	Kaphlya	Geraniaceae	Plant infusion used in fever and renal disorders; roots paste applied externally on itching and eczema or root in tanning industry.
48.	*Geranium wallichianum* D.Don	Ratanjot	Geraniaceae	Root juice used in diarrhoea and ophthalmic.

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S.No.	Botanical name	Local/ vernacular name	Family	Uses
49.	*Gerbera gossypina* (Royle) G. Beauv.	Kapasee	Asteraceae	Leaf juice applied on wounds and cuts and paste plastered on bone fracture.
50.	*Gnaphalium hypoleucum* DC.	Buglya	Asteraceae	Plant extract applied on cuts and wounds
51.	*Gypsophila cerastioides* D.Don.	Bakarchee	Caryophyllaceae	Poultice of plant applied on boils and wounds.
52.	*Hedera nepalensis* K.Koch.	Laguli	Araliaceae	Leaves and fruit paste applied on ulcers and leaf juice given in dyspepsia.
53.	*Hypericum oblongifolium* Choisy	Chitroi, Chaya	Hypericaceae	Roots yield yellow dye, decoction of leaves and stem given to facilitate delivery
54.	*Hypericum uralum* L.	Bhyoul	Hypericaceae	Paste of leaves applied on cuts to check bleeding. Infusion of leaf given in malarial fever. Seed powder against food poisoning and as abortifacient.
55.	*Impatiens thomsonii* Hk.	Balsam	Balsaminaceae	Seed edible powder of roasted seed with honey given to relieve cough and cold.
56.	*Indigofera heterantha* Wall. ex Brandis	Sakina	Fabaceae	Leaf juice taken in diarrhoea, dysentery and cough.
57.	*Inula cappa* (Buch.-Ham. ex D.Don.) DC.	Athhu, Tamagari	Asteraceae	Roots given in suppressed urination.
58.	*Leucas lanata* Benth.	Bis-kapra	Lamiaceae	Plant infusion given with honey in the treatment of whooping cough and young shoots cooked as vegetable.
59.	*Micromeria biflora* (Buch.-Ham. ex D.Don) Benth.	Gorakhopan, Ban-ajwain	Lamiaceae	Flavour of crushed leaves inhaled in cold and sinusitis, extract of leaves with milk given in gastro-enteritis.
60.	*Mukia maderaspatana* L.	Ban kakari	Cucurbitaceae	Fruits cooked as vegetable given in malarial fever and urinary disorders; seed paste with warm water given to relieve in vomiting.
61.	*Nepeta ciliaris* Wall. ex Benth.	Nueet	Lamiaceae	Decoction of leaves and seeds taken in fever. Leaves also yield essential oil.
62.	*Origanum vulgare* L.	Bantulsi	Lamiaceae	Plant extract used in bronchitis, colic and diarrhea.
63.	*Oxalis corniculata* L.	Bhilmori, Khati-Buti	Oxalidaceae	Leaves taken as salad or cooked as vegetable and leaf juice dropped in cataract and conjunctivitis.
64.	*Parnassia nubicola* Wall. ex Royle	Phutkya	Saxifragaceae	Plant extract taken to stimulate vomiting in case of food poisoning, paste from rootstock applied externally as an antidote of snakebite
65.	*Phyllanthus amarus* Schum. & Thonn.	Bumianwala	Euphorbiaceae	Herb as an astringent stomachache diuretic and febrifuge; leaves said to bear antibacterial properties.
66.	*Pimpinella diversifolia* DC.	Teroi	Apiaceae	Plant extract given in digestive disorders and as well as in cold and cough.
67.	*Piptanthus nepalensis* (Hk.) D.Don	Chembera	Fabaceae	Green pods chewed raw, ripe seed coocked as vegetables and extract used as galactagogue.
68	*Plantago depressa* Willd.	Luhurya	Plantaginaceae	Paste from leaves and seeds applied on cuts wounds and piles; plant art or tied around the belly of infant for good health.
69.	*Plantago erosa* Wall.	Lahuriya	Plantaginaceae	Leaves are used as anti-inflammatory agent.
70.	*Pogostemon benghalense* (Burm.f.) Kuntze	Kala-Basingu	Lamiaceae	Leaf extract in water given in colic and fever, flower important source of bee-forage and plant is a good soil binder.
71.	*Polygonum plebeium* R.Br.	Dondya	Polygonaceae	Root extract applied on head to avoid baldness.
72.	*Potentilla gerardiana* Lindl. ex Lehm.	Baradanti	Rosaceae	Root paste applied on wounds.
73.	*Potentilla nepalensis* Hook.	Baradanti	Rosaceae	Root paste applied on wounds; substitute of *P. fulgence*

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S.No.	Botanical name	Local/ vernacular name	Family	Uses
74.	*Primula denticulata* Smith	Jalkutra	Primulaceae	Aqueous paste of flowers used in the treatment of diabetes and urinary ailments and root paste applied to kill lice.
75.	*Prinsepia utilis* Royle	Bhainkal	Rosaceae	Root bark used in diarrhoea, flowers useful in apiculture as bee forage and sometimes plant used as biofence.
76.	*Prunella vulgaris* L.	Ust-khadus	Lamiaceae	Extract of the herb used in gastric and breathing problems.
77.	*Quirivella frutescens* (L.) M.R. and S.M. Almeida	Bel-kami	Apocynaceae	Leaf extract supposed to be used in febrifuge and paste applied in leucoderma.
78.	*Rannunculus hirtellus* Royle	Piryali	Ranunculaceae	Plant paste externally used on deteriorated wound.
79.	*Reinwardtia indica* Dumortier	Phiunli.	Linaceae	Petals chewed as tongue wash, considered sacred.
80.	*Rorippa indica* (L.) Hiern.	Piria	Brassicaceae	Plant juice given in diarrhoea and paste applied on sprains.
81.	*Rosa brunonii* Lindley.	Kunja, Kujju	Rosaceae	Flower paste applied on skin ailments.
82.	*Roscoea purpurea* J.E.Smith	Kakoli	Zingiberaceae	Dried powder of leaves used in wound and plant extract as a tonic.
83.	*Rubia manjith* Roxb. ex Fleming	Majethi	Rubiaceae	Dye commercially known as Manjit, extracted from the root and stem, roots medicinal, as tonic and astringent, stem used as an antidote to snake bite and flower extract in bacillary dysentery.
84.	*Rubus ellipticus* Smith	Hinssar, Hisolu	Rosaceae	Fruits and root extract used in local beverages as intoxicating ingredient.
85.	*Rubus foliosus* D.Don.	Kala hissar	Rosaceae	Young twigs and fruits edible.
86.	*Rumex nepalensis* Spreng.	Almora	Polygonaceae	The sap of leaves and stem is applied on cuts for its astringent powder.
87.	*Rumex hastatus* D.Don.	Almoru	Polygonaceae	Leaf extract applied on cuts and wounds to check bleeding and also believed to relive from of nettle sting inflammation.
88.	*Salvia lanata* Roxb.	Ghanyajhar	Lamiaceae	Leaf infusion given in colic and diarrhea, flower paste used in cold and cough.
89.	*Saussurea heteromalla* (D.Don.) Hand.-Mazz.	Murang	Asteraceae	Leaf paste with mustard oil massaged on leucoderma and wounds and root extract taken in fever and colic.
90.	*Saxifraga diversifolia* Wallich ex Seringe in DC.	Silyans	Saxifragaceae	Root extract used as vermifuge.
91.	*Scrophularia himalensis* Royle ex Benth.	Sikula	Scrophulariaceae	Leaves mixed with stored grains as an insecticide.
92.	*Scutellaria scandens* Buch.-Ham ex D.Don.	Kutlaphul	Lamiaceae	Aqueous extract of leaves and flowers given in dysentery and vomiting.
93.	*Siegesbeckia orientalis* L.	Liskura	Asteraceae	Decoction of plant with boiled rice waters taken in diarrhoea and bowl complaints.
94.	*Smilax aspera* L.	Kukurdara	Smilacaceae	Roots diuretic and diaphoretic. Root paste with mustard oil massaged on rheumatic-arthritis.
95.	*Solanum pseudo-capsicum* L.	Jangli-mirch	Solanaceae	Seeds used in the treatment of boils and gonorrhoea, and tonic and for abdominal pain.
96.	*Solidago virgaurea* L.	Pinja-phool	Asteraceae	Juice of leaves given in kidney troubles, decoction of whole herb used for treatment of asthma, rheumatism and wounds and root chewed in throat irritation.
97.	*Sonchus asper* (L.) Hill.	Pili-dudhi	Asteraceae	The plant used as a tonic to purify blood and in hepatitis and leaf paste applied on wounds.
98.	*Sonchus brachyotus* DC.	Karatu	Asteraceae	Roots used as folk medicine against cough and bronchitis; young shoots and leaves cooked as vegetable during famine.

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S.No.	Botanical name	Local/ vernacular name	Family	Uses
99.	*Stellaria media* (L.) Vill.	Badyalu	Caryophyllaceae	Plant paste externally applied on burns, boils, and wounds.
100.	*Swertia cordata* (D.Don.) C.B. Clarke	Chirata	Gentianaceae	Plant used as substitute for 'Chirayita'.
101.	*Tagetes minuta* L.	Jangli genda	Asteraceae	Anti-microbial, antibiotic, anti-spasmodic, anti-parasitic, antiseptic, sedative.
102.	*Taraxacum officinale* Weber	Kanphuliya	Asteraceae	Root extract used in the treatment of migraine, hepatitis, and headache.
103.	*Teucrium quadrifarium* Buch.-Ham. ex D.Don.	Bilmga	Lamiaceae	Root chewed for sore throat, infusion of leaves used as abortifacient.
104.	*Thalictrum foliolosum* DC.	Pili Jari	Ranunculaceae	Root used in ophthalmia and also in colic and fever.
105.	*Thalictrum secundum* Edgew.	Mamari	Ranunculaceae	Root juice taken to relieve stomach disorders in folk medicine.
106.	*Thlaspi arvense* L.	Maula	Brassicaceae	Poultice of leaves applied on cuts and wound.
107	*Trifolium repens* L.	Tpatiya	Fabaceae	Leaf paste used as an astringent; plant provides good fodder.
108.	*Triumfetta rhomboidea* Jacq.	Liswa kura	Tilliaceae	Root juice applied on the cuts; hot infection of fruits and leaves given to facilitate delivery.
109.	*Urena lobata* L.	Chatkura	Malvaceae	Stem yields a coarse fiber, flower expectorant, root paste applied on body pain and rheumatism.
110.	*Urtica dioica* L.	Kandali	Urticaceae	Rheumatism and several skin ailments; leaf extract to avoid baldness.
111.	*Valeriana hardwickii* Wall.	Somaya	Valerianaceae	Root decoction use in urinary disorders; paste applied externally in joint pains. Dried roots used as an incense and insecticide.
112	*Valeriana jatamansii* Jones	Indian Valerian	Valerianaceae	Roots used as an aphrodisiac and in mental disorders, as well as in local beverage to promote aroma. Dried roots also used as an incense and insecticide.
113.	*Verbascum thapsus* L.	Akulubir	Scrophulariaceae	Plants extract taken in bronchitis and asthma; seeds used as narcotic; plants extract also used in fish poisoning flowers rarely used as dye.
114.	*Vernonia cinerea* (L.) Less.	Kalgira	Asteraceae	Leaf extract used in dysentery and seeds in cough and cold.
115.	*Viola biflora* J. Smith	Banafsa	Violaceae	The whole plant either in the form of extract or powder taken as diaphoretic, useful in skin and blood diseases, flowers and leaves boiled with tea, supposed to be or good for fever and cough.
116.	*Viola pilosa* Bl.	Banafsa	Violaceae	Fresh flower boiled with tea to relieve cough and cold. Flowers eaten raw: leaf paste applied on headache and jaundice.
117.	*Viola tricolor* Wall.	Banafsa	Violaceae	Decoction useful in malarial fever, bronchitis and asthma, root used as an emetic, flower demulcent, sometimes eaten raw and leaf juice applied on cuts and wounds.

Natural vegetation in vicinity of towns and villages in the sub-tropical belt has been subjected to more biotic disturbances as compared to the villages at high elevations. There is abundance of grasses and annuals during monsoon, whereas perennials, shrubs and trees mostly bloom during spring and summer (Bisht *et al.*, 1988; Bisht and Sharma, 2014).

The most significant observation on vegetation in the study area was the presence of numerous medicinal plant species, the fact is generally ignored by scientists. Each

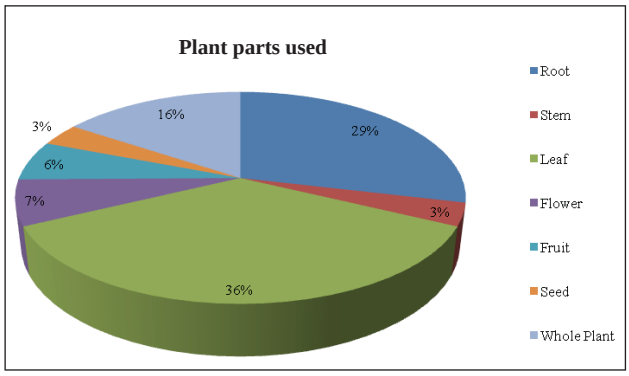

Fig. 1. Percentage of useful parts of plants

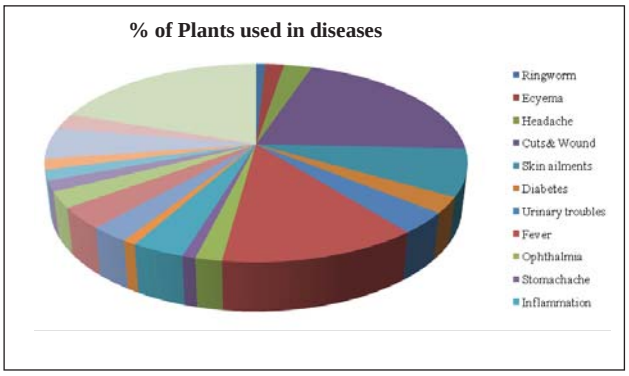

Fig. 2. Percentage of plants parts used in different diseases

plant species has its own value in the form of fodder, and vegetable, flowers as bee forage, resin, tannin, gum, dye, ornamentation, psychomedicine and medicines, etc. Total 117 weed species were also purely medicinal and used in the form of leaves, stem, bark, root, flowers, fruits, seeds, and whole plant (Fig. 1). These plant species are used against dropsy, bronchitis, cut and wounds (total 24 plants are used 20.51%), insect and snake bite, relieve from suffering of nettle sting, malarial and other fever (15 plants are used 12.82%), facilitate delivery, body pain, rheumatism, fever, cold and cough, gonorrhoea, colic and dyspepsia, diarrhea, digestive and respiratory disorders, diabetes and urinary ailments, relieving earache, body swelling and contusions, psycho-medicines, treatments of migraines, hepatitis and headache, dysentery, and 23 plants (19.66%) are used in other diseases by villagers and *Vaidhyas* (Fig 2). *Achyranthus bidentata, Agrimonia pilosa, Anaphalis contorta, A. triplinervis, Aster peduncularis, Anemone vitifolia, Argemone ochroleuca, Asparagus recemosus, Berberis aristata, Barleria cristata, Begonia picta, Bupleurum hamiltonii, Clematis buchananiana, Coccinia grandis, Coelogyne cristata, Cyathula tomentosa, Gerbera gossypina, Gnaphalium hypoleucum, Hedychium spicatum, Inula cappa, Jasminum humile, Leucus lanata, Saussurea heteromalla, Senecio graciliflorus, Siegesbeckia orientalis, Solidago virgaurea, Sonchus asper, Swertia cordata, Taraxacum officinale,* etc. were the medicinally important species; highest contribution of the family Astraceae (21 species) was associated with the horticultural fields.

Out of 117 medicinal weeds some weeds e.g. *Berberis* spp., *Valariaana jatamansii* are presently of high commercial value and used in many pharmaceuticals. Genus *Berberis* is well known for its active compound 'Berberine', which has anti-diabetic, anti-microbial, anti-cancer, anti-lipidemic and anti-oxidant properties (Potdar *et al*., 2012). Due to presence of active principle in roots and rhizomes of *Valeriana* (valepotriates, dihydrovaltrate, antioxidant activity) the plant is very valued for the commercial purpose (Bhatt *et al*., 2012). Except of these two species, *Bergenia ciliate*, *Phyllanthus amarus*, *Rubia manjith*, *Roscoea purpurea* and *Swertia cordata*, have highly market value and also income generating sources for local peoples.

The extinction of these weed flora of medicinal plants, importance from their natural habitat of present study area is a matter of great concern but it has not attracted the attention of naturalists and environmentalists. This is probably because the medicinal wealth of this area is little known and remote locality and changing atmospheric conditions and lack of knowledge, infectious nature of some dominating weeds, e.g. *Eupatorium adenophorum* are among the other factors responsible for the extinction of these important medicinal plant species. These weeds can become an additional source of income for the farmers who generally discard them during weeding. If they are made aware of the medicinal importance of these crop weeds, it can add monetary benefit.

The study illustrated that medicinal weeds in horticulture crop fields, have a tremendous scope of utilizing these weeds, especially to promote additional income to the local peoples.

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