



Wild Edible Plants Consumed by Rural Communities in District Bilaspur, Himachal Pradesh, India

Sanjeev Kumar

Assistant Professor, Department of Botany, Govt. College Bilaspur (H.P.), INDIA

* Correspondence: E-mail: sanjeev5112@gmail.com

DOI: <http://dx.doi.org/10.33980/jbcc.2019.v05i02.001>

(Received 26 May, 2019; Accepted 09 Jul, 2019; Published 22 Jul, 2019)

ABSTRACT: Plants are gifts of God for mankind and are the basis of life on earth. The tradition of consuming wild plants as a source of food still persists in rural communities, despite their primary reliance on agriculture and animal husbandry. District Bilaspur lies between 31° 12' 30" and 31° 35' 45" N latitude and between 76° 23' 45" and 76° 55' 40" E longitude with an altitude ranging from 300 - 1930 meter in Shivalik hills of the Himalayas in the basin of river satluj. A total of 103 species of wild edible plants belonging to 76 genera and 49 families have been recorded in district Bilaspur. Among the total studied plants, maximum species were used as fruit (40.77%) followed by leaf (17.47%), flower (6.79%), seed (5.82%), shoot (5.82%), root (2.91%), gum (1.94%), bulb (0.97%), leaf and shoot (4.85%), leaf and fruit (3.88%), fruit and flower (1.94%), fruit and stipule, flower and seed, leaf and seed, leaf and bark, leaf and root, wood and gum (0.97% each); flower, fruit and shoot (.97%) were consumed by the inhabitants of the area. According to mode of utilization, plants were eaten as raw, cooked pot-herb "saag/bhujju" and vegetable, pickle, beverages "chatni", "pakoda", "rayata", flavour, additive and special dishes like "be-hadi/patrodu/bharuni/panjeeri". It is evident from the present study that traditional knowledge of wild edible plants is vanishing among modern generations of district Bilaspur, and is at the verge of erosion. So there is an urgent need to recognize, conserve and comprehensively study these wild plants for phytochemical analysis and nutraceutical potential.

Keywords: Wild edible plants; traditional knowledge; mode of utilization; Species; family and Bilaspur.

INTRODUCTION: Plants are gifts of God for mankind and are the basis of life on earth. Humans have relied on plants for their basic needs of food, flavour, shelter, clothing and medicine, since the beginning of human civilization. Among the various types of plants, man has recognized food yielding plants and selected them through trial and error method and subsequently domesticated them. The term "wild food" is referred to explain all non domesticated plant and animal resources which are collected for the human consumption from forest, savannah, bush land, and other waste land areas outside the agricultural areas. Wild edible plants are included into the routine diet and livelihood approaches of many rural people, regular farmers, shifting cultivators, or hunter gatherers.¹ The tradition of consuming wild plants as a source of food still persists in rural communities, despite their primary reliance on agriculture and animal husbandry.² It has been recorded that wild fruits are rich sources of vitamins, minerals like sodium, potassium, magnesium, iron, calcium, phosphorus etc., fibres,

polyphenols and anti-oxidant which are beneficial to health.³⁻⁷ Wild fruits reduce the risk of diseases, like cancer, diabetes, common heart diseases and neurodegenerative disorders.⁸ It has observed that the tribes who still having the traditional food habit of consuming large variety of seasonal foods, are found to be healthy and free from diseases.⁹ Traditional indigenous communities conserve domestic and wild species through sustainable use, which ensure food security, improved livelihoods and incomes.¹⁰ The FAO recognizes that nutrition and biodiversity converge towards a common goal of food safety and sustainable development, and wild species play a key role in global nutrition safety.¹¹ The primitive man through trial and error has selected many wild edible plants for cultivation and they are less susceptible to disease, can be grown easily without the use of pesticides.¹² Vegetables were often consumed due to hunger, medicinal needs, and as source vitamin, fruits tended to be eaten for fun or their taste. Food-insecure household's often collected wild edible plants due to hunger.¹³ Generally

most of the wild edible plants are available seasonally for a short duration with short shelf life and are consumed immediately.

Kallas (2010) defined edible wild plants as “wild plants endowed with one or more parts that can be used for food if gathered at the appropriate stage of growth and properly prepared”.¹⁴ The FAO defines the wild edible plants as “Plants that grow spontaneously in self-maintaining populations in natural or semi-natural ecosystems and can exist independently of direct human action”.¹⁵ Wild edible plants can be used as food sources and are never cultivated and never domesticated, but these can get from their wild habitat. They are locally accessible, low input and cheap source for nutrition and traditional ecological knowledge is considered to be the basis for their utilization. There are about 20,000 edible plants species documented in the world and many more still have to be recorded and about 7000 species of plants have been cultivated or collected for food.^{16,17} Throughout world only 150 plant species are commercially cultivated, of which only four – rice, wheat, maize and potatoes – supply 50 percent of the world’s energy needs, while 30 crops provide 90 percent of the world’s caloric intake, and thousands of species are still marginalized by both agriculture and nutrition researchers.¹⁸ However, the indigenous knowledge of wild edible plants is diminishing rapidly but their use still persists in many parts of the world and it is crucial for their sustainable utilization and conservation of these plant species.^{19, 20}

Himalaya is the major repository of wild edible plant species and is one of the biodiversity hotspot of the world. Out of 1532 wild edible wild plant species reported in India, over 675 species are known from Indian Himalayan region.^{21, 22} The state of Himachal Pradesh located in Western Himalayan region have forest cover of about 26.4% is endowed with rich biodiversity. The state is famous for cultivation of temperate fruits. Besides cultivated fruits, the practice of harvesting and consuming the seasonal wild fruits and vegetable is also common among rural peoples. Various studies have been carried out on ethno-botanical and ethno-medicinal uses of floristic diversity in Himachal Pradesh, but few attentions have been given towards wild edible plants. Literature survey reveals that there are few studies have been done on wild edible plants of Himachal; however such studies are missing from the study area.^{10, 23-28} The objective of the present study was to collect data regarding traditional knowledge, diversity, utilization enumeration of wild food plants in rural peoples of Bilaspur district.

MATERIALS AND METHODS:

Study Area: District Bilaspur lies between 31° 12' 30" and 31° 35' 45" N latitude and between 76° 23' 45" and 76° 55' 40" E longitude with an altitude ranging from 300 - 1930 meter in Shivalik hills of the Himalayas in the basin of river satluj. Geomorphology shows lesser hills and comparatively wider valleys, drained by khadds and nallahs with an average rain fall of 1373 mm. Most of the soil of the Bilaspur district is somewhat sandy and is usually deficient, shallow and at times severely eroded. The hills and valleys along the Khads are quite dry and hot in summer, but are humid and sultry during rainy season. Winters are cold and a thick blanket of fog envelops the valleys in the early hours of the day. The district is one of the treasure houses of biodiversity due to its varied geographical, altitudinal, edaphic and climatic features. According to the classification of Champion and Seth, Bilaspur district have three types of forest namely Northern Tropical Dry Deciduous Forests, Himalayan Sub-Tropical Pine Forest, and Lower Western Himalayan Temperate Forests.²⁹ The 93% population of the district resides in rural areas, with agriculture, animal husbandry and horticulture as their major occupation. People of the area are hardworking, eco-friendly, religious and God fearing. The indigenous knowledge of Bilaspur district has been documented by some workers during last few years, but for complete exploration still comprehensive efforts are required.^{10, 24, 30-32}

To collect first hand information on wild edible plant species and their dietary uses, the extensive exploratory surveys had been carried in 24 villages of district Bilaspur, (H.P.) during 2017-2018. Surveys were planned to include all the seasons of the year and all the agroclimatic zones of the study area. Information was recorded according to the methodology suggested by Jain and Goel (1995) through questionnaires, interviews and discussion among villagers in their local dialect.³³ The informants included were men, women, youths and elders between the ages of 23 and 80 years and most of them were farmers and depend on agriculture and horticulture for their livelihood. The prior consent for the documentation of information was obtained verbally from each of them before the interview conducted. Information on botanical binomial, local name, and plant part/s used, altitudinal range, habit and habitat/s and mode of use were gathered. Fresh samples of the wild edible species were collected, photographed and identified with the help of local and regional floras, books and previous works.^{31, 32, 34-37} The data on wild edible plant species including

family, local name, habit, collection season and mode of utilization is presented in Table 1.

RESULTS AND DISCUSSION: A total of 103 species of wild edible plants belonging to 76 genera and 49 families were recorded. Out of total species, 102 belong to Angiosperm and one belongs to Gymnosperm. According to habit 42 species were trees, 18 shrubs, 7 climbers and 36 herbs. The representation of families was as Moraceae (10 spp.), Papilionaceae (7 spp.), Cucurbitaceae (6 spp), Caesalpiniaceae and Rosaceae (5 spp. each), Rhamnaceae and Amaranthaceae (4 spp. each), Bambusaceae (3 spp.), Anacardi-

aceae, Arecaceae, Berberidaceae, Brassicaceae, Carryophyllaceae, Chenopodiaceae, Combretaceae, Dioscoreaceae, Euphorbiaceae, Lamiaceae, Mimosaceae, Moringaceae, Myrtaceae, Polygonaceae, Rutaceae, Solanaceae and Urticaceae (2 spp. each), Acanthaceae, Agavaceae, Apocyanaceae, Araceae, Asclepiadaceae, Bombaceae, Cactaceae, Cannabaceae, Commelinaceae, Cordiaceae, Flacourtiaceae, Lauraceae, Liliaceae, Lythraceae, Oxalidaceae, Pinaceae, Portulacaceae, Punicaceae, Santalaceae, Sapotaceae, Verbenaceae and Violaceae (1 spp. each) (Figure 1).

Table 1: Wild Edible Plants of Bilaspur.

Sr. No.	Botanical Name	Family	Common Name	PU	Hb	Collection Season	Mode of Utilization
1	<i>Acacia catechu</i> (L. f.) Wild.	Mimosaceae	Khair	W, G	T	W: Oct- Feb, G: April- June	Gum is eaten and heart wood is used to make tea.
2	<i>Acacia nelotica</i> (L.) Willd. ex Delile ssp. <i>indica</i> (Benth.) Brenan	Mimosaceae	Kikar	G	T	March-June	Gum is edible.
3	<i>Adhatoda vasica</i> Nees	Acanthaceae	Basuti	F	S	March-June	Sweet nectar is sucked by children.
4	<i>Aegle marmelos</i> (L.) Correa ex Roxb.	Rutaceae	Bil	F	T	March-June	Ripe fruits are eaten. Fruit pulp is used to prepare "Sharvat" in summers.
5	<i>Agave cantula</i> Roxb.	Agavaceae	Kwarpatha	Sh	H	May-June	Fresh soft peduncle is cooked into vegetable.
6	<i>Amaranthus spinosus</i> L.	Amaranthaceae	Kanta Chulai	L	H	April- July	Traditional dish Bhu-ju/saag is prepared from leaves.
7	<i>Amaranthus viridis</i> L.	Amaranthaceae	Chulai	L	H	April- July	Traditional dish Bhu-ju/saag is prepared from leaves.
8	<i>Bambusa nutans</i> Wall. ex Munro	Bambusaceae	Chaw	Sh	T	July- August	Juvenile shoots ("manu") are used to prepare vegetable and pickle.
9	<i>Bauhinia vahlii</i> Wt. & Ar.	Caesalpinia- ceae	Taur	Sd	C	Dec- May	Seeds are eaten after smoking in fire.
10	<i>Bauhinia variegata</i> L.	Caesalpinia- ceae	Karyalya	Fl	T	March- April	Flower buds are boiled, squeezed and fried to make vegetable and "rayata".
11	<i>Berberis aristata</i> DC.	Berberidaceae	Kashmal	F	S	May-June	Ripe fruits are eaten.
12	<i>Berberis lycium</i> Royle	Berberidaceae	Kashmal	F	S	June-July	Ripe fruits are eaten.
13	<i>Bombax ceiba</i> L.	Bombaceae	Seemal	Fl, Sd	T	Fl: Jan-Feb Sd: May	Immature calyx used to make vegetable. Dry seeds are eaten raw.

14	<i>Butea monosperma</i> (Lam.) Kuntze	Papilionaceae	Plah	G	T	March- May	Gum called as “kamar-kash” is added in traditional sweet “panjeeri” especially given to ladies after delivery.
15	<i>Callicarpa macrophylla</i> Vahl.	Verbenaceae	Dregal	F	S	August- Sept.	Ripe fruits are eaten.
16	<i>Cannabis sativa</i> L.	Cannabinaceae	Bhang	L, Sd	H	Throughout year	Leaves are used to make “pakodas” with gram flour and a drink “Ghoti” along with milk and almond.
17	<i>Carissa opaca</i> Stapf ex Haines	Apocynaceae	Gurnu Karundu	F, Fl, Sh	S	F: Sept.- Nov. Fl: April- May S: March- April	Tender shoots (Kasal), flower and ripe fruits are eaten.
18	<i>Cassia occidentalis</i> L.	Caesalpinia-ceae	Badi Eluan	Sd	H	Sept.- Oct.	Seeds are added in pickles.
19	<i>Cassia tora</i> L.	Caesalpinia-ceae	Chhoti Eluan	Sd	H	Sept.- Oct.	Seeds are added in pickles and also used in tea.
20	<i>Celosia argentea</i> L.	Amaranthaceae		L	H	Sept.- Oct.	Leaves are used to make pot herb named “saag”
21	<i>Ceropegia bulbosa</i> Roxb.	Asclepiadaceae	Galod	R, L	H	July- August	Root tubers and leaves are eaten raw. Outer rind of tuber is removed before eaten.
22	<i>Chenopodium album</i> L.	Chenopodia-ceae	Ghanawan, Bathu	L	H	Feb.- March	Leaves are used to make pot herb named “saag”.
23	<i>Chenopodium murale</i> L.	Chenopodia-ceae	Ghanawan	L	H	Feb.- March	Leaves are used to make pot herb named “saag”
24	<i>Coccinia grandis</i> (L.) Voigt	Cucurbitaceae	Kandiari	F	H	May- August	Unripe fruits are used to make vegetable.
25	<i>Colocasia esculentum</i> L.	Araceae	Ubad Kachalu	L	H	June- July	Leaves are used to make traditional dish “patrodu”.
26	<i>Commelina paludosa</i> Blume	Commelinaceae	Chhura	L	H	July- Sept.	Young leavers are used to make pot herb “Bhujju”.
27	<i>Cordia dichotoma</i> Frost.	Cordiaceae	Lasura	F	T	May- June	Unripe fruits are pickled and ripe fruits are eaten.
28	<i>Cucumis melo var. agrestis</i> Naudin	Cucurbitaceae	Photlu	F	H	Sept.- Oct.	Ripe fruits are eaten.
29	<i>Debregeasia hypoleuca</i> (Hochst.) Wedd.	Urticaceae	shyaru	F	S	May- June	Ripe fruits are eaten.
30	<i>Dendrocalamus hamiltonii</i> Nees & Arn. Ex Munro	Bambusaceae	Magar	Sh	T	July- August	Juvenile shoots (“manu”) are used to prepare vegetable and pickle.
31	<i>Dendrocalamus strictus</i> (Roxb.) Nees.	Bambusaceae	Bainj	Sh	T	July- August	Juvenile shoots (“manu”) are used to prepare vegetable and pickle.
32	<i>Digera muricata</i> (L.) Mart.	Amaranthaceae		L	H	Sept.- Oct.	Leaves are used to make pot herb named “saag”.

33	<i>Dioscorea belophylla</i> Voigt ex Haines	Dioscoreaceae	Taradi	R	C	Oct.- March	Root tubers are used to make vegetable and boiled tubers are stuffed in corn flour to prepare "behadi".
34	<i>Dioscorea pentaphylla</i> L.	Dioscoreaceae	Dregal	R	C	Oct.- March	Root tubers are used to make vegetable.
35	<i>Duchesnea indica</i> Focke	Rosaceae	Akha	F	H	April- June	Ripe fruits are eaten.
36	<i>Euphorbia royleana</i> Boiss.	Euphorbiaceae	Chhur	Sh	S	May- June	Tender fleshy branches of stem are used to make vegetable.
37	<i>Ficus auriculata</i> Lour.	Moraceae	Tryambal	F	T	May- July	Ripe fruits are eaten. Unripe fruits are used to make vegetable.
38	<i>Ficus bengalensis</i> L.	Moraceae	Bar/Bargad	F	T	May- June	Ripe fruits are eaten.
39	<i>Ficus glomerata</i> Roxb.	Moraceae	Ambarya	F	T	May- July	Ripe fruits are eaten.
40	<i>Ficus hispida</i> L.	Moraceae	Dabernya	F	T	May- July	Ripe fruits are eaten.
41	<i>Ficus palmate</i> Frossk.	Moraceae	Dagla	F	T	May- July	Ripe fruits are eaten. Unripe fruits are used to make vegetable called "bhruni"
42	<i>Ficus religiosa</i> L.	Moraceae	Peepal	F, St	T	F: May- June St: April	Ripe fruits are eaten. Stipules are eaten raw by children.
43	<i>Ficus semicordata</i> Buch. – Ham. ex Smith	Moraceae	Khainu	F	T	Sept.- Oct.	Ripe fruits are eaten.
44	<i>Flacourtia indica</i> (Burm. f.) Merr.	Flacourtiaceae	Kangu	F	T	May- June	Ripe fruits are eaten.
45	<i>Grewia asiatica</i> L.Mant.	Tiliaceae	Beuli	F	T	June-July	Ripe fruits are eaten.
46	<i>Indigofera cassioides</i> Rottl. Ex DC.	Papilionaceae	Kathi	Fl	S	March- April	Flower buds are boiled, squeezed and fried to make vegetable. Flower buds are used to make "pakodas" with gram flour.
47	<i>Lathyrus ophaca</i> L.	Papilionaceae	Safa Daroda	L, Sh	H	Feb-March	Leaf and tender shoots are used to make "saag".
48	<i>Litsea monopetala</i> (Roxb.) Pers.	Lauraceae	Guau	F	T	August- Sept.	Ripe fruits are eaten.
49	<i>Luffa acutangula</i> (L.)Roxb.	Cucurbitaceae	Kharad Kandoli	F	C	August- Oct.	Unripe fruits are used to make vegetable.
50	<i>Madhuca longifolia</i> var. <i>latifolia</i> (Roxb.) A.Chev.	Sapotaceae	Mahua/Mokri	F	T	July- August	Ripe fruits are eaten.
51	<i>Mangifera indica</i> L.	Anacardiaceae	Amb	F	T	May- July	Ripe fruits are eaten. Unripe fruits are used to make "chatni", "mhani", pickle and to add sourness in food items.
52	<i>Melilotus idicus</i> (L.) All.	Papilionaceae		L	H	Feb.- March	Leaves are used to make pot herb named "saag".

53	<i>Melothria heterophylla</i> (Lour.) Cogn.	Cucurbitaceae	Van Kakri	F	C	May- August	Unripe fruits are used to make vegetable.
54	<i>Mentha longifolia</i> (L.) Huds.	Lamiaceae	Jangli Pudina	L	H	Throughout year	Leaves are used to make “chatni” and also for flavouring different food dishes.
55	<i>Momordica dioca</i> Roxb. Ex Willd.	Cucurbitaceae	Kakora	F	H	August- Oct.	Unripe fruits are used to make vegetable.
56	<i>Moringa concanensis</i> Nimmo.	Moringaceae	Rasunana	Fl, F	T	March- April	Flower buds are boiled, squeezed and fried to make vegetable and “rayata”. Unripe fruits are also used to make vegetable.
57	<i>Moringa oleifera</i> Geartn.	Moringaceae	Rasunana	Fl, F	T	March- April	Flower buds are boiled, squeezed and fried to make vegetable and “rayata”. Unripe fruits are also used to make vegetable.
58	<i>Morus alba</i> L.	Moraceae	Toot	L, F	T	March-May	Ripe fruits are eaten. Young leaves are used to make “pakodas” with gram flour.
59	<i>Morus macrourea</i> Miq.	Moraceae	Toot	L, F	T	March-May	Ripe fruits are eaten. Young leaves are used to make “pakodas” with gram flour.
60	<i>Morus Serrata</i> Roxb.	Moraceae	Toot	L, F	T	April- June	Ripe fruits are eaten. Young leaves are used to make “pakodas” with gram flour.
61	<i>Murraya koenigii</i> (L.) Spreng.	Rutaceae	Gandela	L,F	S	L: Throughout year F: July-August	Ripe fruits are eaten. Young leaves are used for flavouring curry and to make “pakodas” with gram flour.
62	<i>Nosturtium officinale</i> R. Br.	Brassicaceae	Chhuchh	L, Sh	H	Oct.- March	Leaf and tender shoots are used to make “saag/ bhujju”.
63	<i>Ocimum basilicum</i> L.	Lamiaceae	Bhabri	L	H	July- Oct.	Leaves are used as condiments for flavouring foods.
64	<i>Opuntia dillenii</i> (Ker Gawl.) Haw.	Cactaceae	Nagphani	F	S	May- June	Ripe fruits are edible.
65	<i>Osyris quadripartite</i> Salz. Ex Decne.	Santalaceae	Kaila	B, L	S	Oct- March	Leaves and bark used to make tea.
66	<i>Oxalis corniculata</i> L.	Oxalidaceae	Malori	L	H	March- May	Leaves are used to make “chatni”.
67	<i>Oxalis latifolia</i> Kunth.	Oxalidaceae	Malori	L	H	March- May	Leaves are used to make “chatni”.
68	<i>Phoenix acaulis</i> Roxb.	Arecaceae	Khajoori	F	T	April- May	Ripe fruits are eaten.

69	<i>Phoenix sylvestris</i> Roxb.	Arecaceae	Khajoor	F	T	August- Oct.	Ripe fruits are eaten.
70	<i>Physalis minima</i> L.	Solanaceae	Rashbari	F	H	August- Sept.	Ripe fruits are eaten.
71	<i>Phyllanthus emblica</i> L.	Euphorbiaceae	Ambla	F	T	Oct.- March	Ripe fruits are eaten raw and pickled.
72	<i>Pinus roxburghii</i> Sarg.	Pinaceae	Cheel	Sd	T	May- July	Seeds are eaten.
73	<i>Portulaca oleracea</i> L.	Portulacaceae	Kulfa	L, Sh	H	March- July	Leaves and tender shoots mixed with other leafy vegetables cooked as potherb.
74	<i>Pueraria tuberosa</i> (Roxb. ex Willd.) DC.	Papilionaceae	Saloud	R	C	May- June	Fresh young root tubers are eaten.
75	<i>Punica granatum</i> L.	Punicaceae	Daran/ Daru	Sd	S	July- Sept.	Ripe seeds with flashy testa are eaten and used to make "chatni". Seeds also used to add sourness in food items.
76	<i>Pyrus pashia</i> Buch - Ham. Ex D. Don	Rosaceae	Kainth	F	T	Oct.- Dec.	Ripe fruits are eaten.
77	<i>Rhododendron arboretum</i> Smith.	Ericaceae	Bra	Fl	T	April- May	Flowers are used to make chatani and squash.
78	<i>Rosa brunonii</i> Lindl.	Rosaceae	Kuja	Fl	S	May- July	Flowers used to make squash.
79	<i>Rubus ellipticus</i> Smith.	Rosaceae	Heer, Akhe	F	S	March- May	Ripe fruits are eaten.
80	<i>Rubus niveus</i> Thunb.	Rosaceae	Heer, Akhe	F	S	May- July	Ripe fruits are eaten.
81	<i>Rumex hastatus</i> D. Don	Polygonaceae	Malora	L	H	Throughout year	Leaves are used to make "chatni" and added to remove irritating chemicals of Zimikand cooking.
82	<i>Rumex nepalensis</i> Spreng.	Polygonaceae	Ubad Palak	L	H	Jan.- April	Leaves are used to make pot herb "saag".
83	<i>Silene conoidea</i> L.	Caryophyllaceae	Chhota Takla	L	H	Feb-March	Leaves are used to make pot herb "saag" along with <i>Brassica</i> .
84	<i>Sisymbrium irio</i> L.	Brassicaceae	Ubad Sarson	L	H	Dec- March	Leaves are used to make pot herb "saag" along with <i>Brassica</i> .
85	<i>Solanum nigrum</i> L.	Solanaceae	Cheyin	F	H	April- June	Ripe fruits are eaten.
86	<i>Spondias pinnata</i> (L. f.) Kurz.	Anacardiaceae	Ambara	F	T	Sept.- Oct.	Ripe fruits are eaten.
87	<i>Stellaria media</i> (L.) Vill.	Caryophyllaceae	Badyala	L	H	Feb-March	Leaves are used to make pot herb "saag" along with <i>Brassica</i> .
88	<i>Syzygium caryophyllatum</i> (L.) Alston.	Myrtaceae	Kathamam	F	T	July	Ripe fruits are eaten.
89	<i>Syzygium cumini</i> (L.) Skeels	Myrtaceae	Jamun	F	T	July	Ripe fruits are eaten.

90	<i>Tamarindus indica</i> L.	Caesalpinia- ceae	Imli	F	T	April- May	Fruits are used make chatni and also used to add sourness to food dishes.
91	<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Combretaceae	Bahedi	Sd	T	Nov.- Jan.	Dry seeds are eaten.
92	<i>Terminalia chebula</i> Retz.	Combretaceae	Harar	F	T	June- August	Fruits pickled.
93	<i>Trichosanthes cucumarina</i> var <i>cucumarina</i> L.	Cucurbitaceae	Bhed	F	C	July- August	Unripe fruits are used to make vegetable.
94	<i>Tulipa stellata</i> Hk. f.	Liliaceae	Tulip	B	H	March- April	Bulbs are eaten.
95	<i>Urtica dioica</i> L.	Urticaceae	Bichhu Buti	Sh	S	April- June	Tender branches are boiled squeezed and fried to make vegetable.
96	<i>Vicia hirsuta</i> (L.) S. F. Gray	Papilionaceae	Chhoti Rodi	L, Sh	H	Feb-March	Leaf and tender shoots are used to make "saag".
97	<i>Vicia sativa</i> L.	Papilionaceae	Badi Rodi	L, Sh	H	Feb-March	Leaf and tender shoots are used to make "saag".
98	<i>Viola serpens</i> Wall. Ex Roxb.	Violaceae	Vanksha	Fl	H	March- April	Flowers are added in tea and also eaten raw.
99	<i>Woodfordia fruticosa</i> (L.) S. Kurz	Lythraceae	Dhavi	Fl	S	May- June	Flowers are used to prepare vegetable and "rayata". Necter is sucked by children.
100	<i>Zizyphus hysudrica</i> (Edgew.) Hole.	Rhamnaceae	Baer	F	T	Jan.- March	Ripe fruits are eaten.
101	<i>Zizyphus jujube</i> Mill. Gard.	Rhamnaceae	Baer	F	T	August- Oct.	Ripe fruits are eaten.
102	<i>Zizyphus mauritiana</i> Lam.	Rhamnaceae	Baer	F	T	Nov.- Jan.	Ripe fruits are eaten.
103	<i>Zizyphus nummularia</i> (Burm. f.)Wt. & Arn.	Rhamnaceae	Koklu Baer	F	S	Nov.- Jan.	Ripe fruits are eaten.

Abbreviations Used: Hb- Habit; PU- Part used; T- Tree; H- Herb; S- Shrub; C- Climber; G- Gum; L- Leaf; F- Fruit; R- Root; Fl- Flower; Sh- Shoot; Bl- Bulb; Sd- Seed; St- Stipule; W- Wood.

Among the plant parts, fruits of 49 species, leaves of 30, tender shoots of 12, root tubers of 4, flower of 11, seeds of 8, gum of 3, bark, wood, stipule and bulb of one species each were consumed. Trees (41%) made the highest proportion of the edible species followed by herbs (35%), shrubs (17%) and climbers (7%). Among the total studied plants, maximum species were used as fruit (40.77%) followed by leaf (17.47%), flower (6.79%), seed (5.82%), shoot (5.82%), root (2.91%), gum (1.94%), bulb (.97%), leaf and shoot (4.85%), leaf and fruit (3.88), fruit and flower (1.94%), fruit and stipule, flower and seed, leaf and seed, leaf and bark, leaf and root, wood and gum (.97% each); flower, fruit and shoot (.97%) by the inhabitants of the area. (Figure 2) According to mode of utilization plant eaten raw (53 spp.), pot herb "saag/bhaju" (17 spp.), vegetable, (21 spp.), pickle (9

spp.), beverages "tea/sharvat/squash/mhani/" (8 spp.) "chatni" (8 spp.), "pakoda" (5 spp.), "rayata" (4 spp.), flavour (3 spp.), additive (3 spp.), special dishes "behadi/patrodu/bharuni/panjeeri" (5 spp.) and one species used in removal of grittiness of *Amarphophalus* tuber during cooking. During the survey, it was recorded that the local people of the area are not dependent on wild plant resources for food now but about 35-40 years earlier they were more dependent on wild plants. They collected these food resources during their activities like farming, visit to forest for fuel wood, fodder and grazing their live stocks. The time and frequency of collecting various plants and plant parts varied from plant to plant depending upon their availability. Results revealed maximum consumption of wild edible plant during summer season i.e. April- June when cultivated fruits and vegetable

are less available. Pot herb preparation is more during February and March when winter weeds are in abundance. Some plants were found consumed specially on festivals like *Dioscorea belophylla* tubers on “Shivratri”, Cannabis in form of ‘ghota” on “Holi”. Consumption of wild food plants has considered as preventive and curative medicine for health.

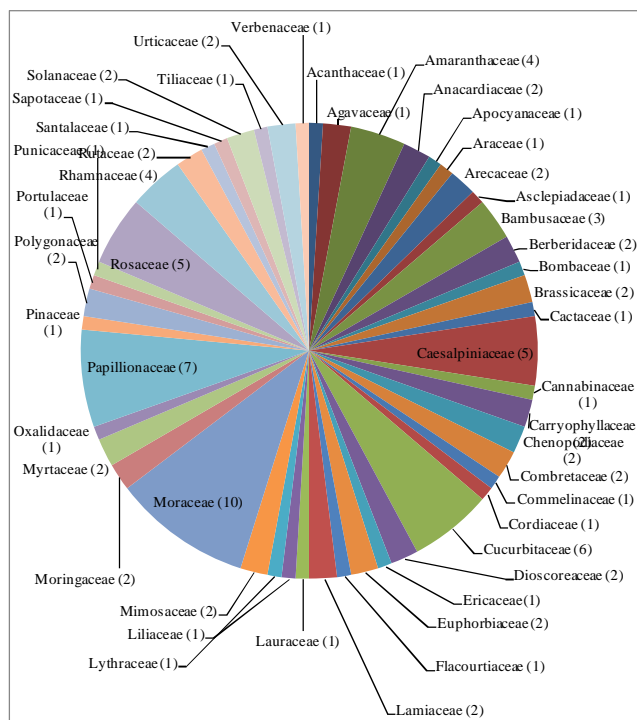


Figure 1: Families-wise distribution of species.

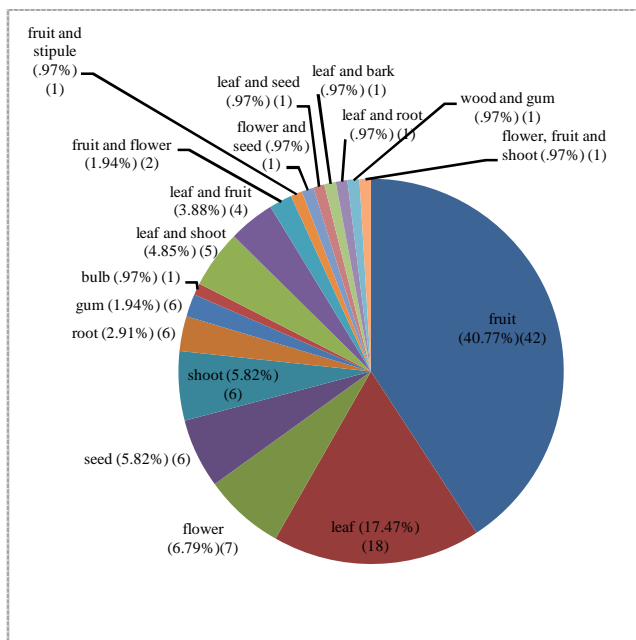


Figure 2: Parts used as food.

Minor wild fruits are mainly consumed by children, where as vegetables are preferred by elders. Children

consume minor fruits in the way during returning home from school and when accompanying the live stocks for grazing in forest. Annual wild edible plants are diminishing due to human agricultural and horticultural activities like clearing of wasteland, forests, spray of herbicides and weedicides. According to informants exotic plants like *Lantana* and *Ageratum* are also the cause of loss of wild edible plants. The inhabitants told that area had rich presence of wild edible species in the past but now restricted to certain patches. Species like *Callicarpa macrophylla*, *Celosia argentea*, *Ceropegia bulbosa*, *Coccinia grandis*, *Cordia dichotoma*, *Momordica dioca*, *Ocimum basilicum*, *Punica granatum*, *Rhododendron arboretum*, *Rubus niveus*, *Rumex nepalensis*, *Spondias pinnata* are very uncommon now.

Study reveals that traditional knowledge of wild plants as food is present only with elder people above 50 years while younger generations are ignorant of their tradition. There is a big communion lapse in exchange of traditional knowledge between older and younger generations. This is due to gradual transformation of socio-cultural environment of society and more dependence on modern market resources. It is evident from the present study that traditional knowledge of wild edible plants is vanishing among modern generations of district Bilaspur, and reached at the verge of its complete erosion.

In the present study, it is observed that uses of some of wild food plants are same as indicated in literature while some of them are new in records. Many edible uses of documented plants has also recorded in studies of surrounding areas.^{10, 23- 27 & 32} The edible uses of *Acacia catechu*, *Adhatoda vasica*, *Callicarpa macrophylla*, *Cassia spp.*, *Cerpegia bulbosa*, *Litsaea monopetalla*, *Osyris quadripartite*, *Pinus roxburghii*, *Viola serpens*, *Woodfordia fruticosa* are reported for first time in the study area. The use of leaves of *Morus* spp. and *Murraya koenigii* for making “pakoda” and stipules of *Ficus religiosa* are reported for first time.

CONCLUSION: The present study provides first-hand information on 103 wild edible plant species and their indigenous uses by the rural communities of district Bilaspur. Results concluded that the area has high diversity of wild edible plant species and rich tradition of their consumption. Wild edible plants play an important role in the nutrition of people and children in rural communities as they are considered as excellent sources of carbohydrates, proteins, fibers, vitamins, minerals and health care medicines. The indigenous uses and availability of wild edible plants is declining gradually due to socio-cultural transfor-

mation of society and more dependence on modern market resources. So there is an urgent need to recognize, conserve and comprehensively study these wild plants for phytochemical analysis and nutraceutical potential. This study is an important effort to document invaluable piece of traditional knowledge on wild edible plants of the area and to pass the information to scientific community for further investigation and preservation.

REFERENCES:

- Bell, J. The hidden harvest. In *Seedling, the Quarterly Newsletter of Genetic Resources Action International* (GRAIN). 1995. www.grain.org.
- Panda, T. Traditional knowledge on wild edible plants as livelihood in Odisha, India. *J Biol Earth Sci.* **2014**, 4(2), 144-159.
- Sankaran, M.; Prakash, J.; Singh, N. P.; Suklabaidya, A. Wild edible fruits of Tripura. *Nat Prod Rad.* **2006**, 5(4), 302-305.
- Deshmukh, S. R.; Rathod, V. Nutritional composition of wild *Ceropegia* tubers. *Adv Appl Sci Res.* **2013**, 4(1), 178-181.
- Saikia, P.; Deka, D. C. Mineral content of some wild leafy vegetables of North- East India. *J Chem Pharm Res.* **2013**, 5(3), 117- 121.
- Leterme, P.; Buldgen, A.; Estrada, F.; Londono, A. M. Mineral content of tropical fruits and unconventional foods of Andes and the rain forests of Colombia. *Food Chem.* **2006**, 95, 644-652.
- Madhukar, S.; Jadhav, V.; Deshmukh, S. Antioxidant activity of some promising wild fruits. *Der Chemica Sinica.* **2013**, 4(3), 165-169.
- Gireesha, J.; Raju, N. S. Ethnobotanical study of medicinal plants in BR region of Western Ghats, Karnataka. *Asian J Plant Sci Res.* **2014**, 3(5), 36-40.
- Anonymous. *Ethnobiology in India: A Status Report*. All India Coordinated Research Project on Ethnobiology, (Ministry of Environment and Forest, Govt. of India, New Delhi), 1995.
- Bhardwaj, J.; Seth, M. K. Edible wild plant resources of Bilaspur, Hamirpur and Una districts of Himachal Pradesh. *Int J Bot Stu.* **2017**, 2(6), 09-17.
- Food and Agriculture Organization of the United Nations (FAO). *The state of food insecurity in the world*, Rome, 2009.
- Niveditha, T. M. A. Wild Edible Plants of India-A Review. *Int J Acad Res.* **2017**, Vol.4, 3(1), 189-198.
- Shumsky, S. A.; Hickey, G. M.; Pelletier, B.; Johns, T. Understanding the contribution of wild edible plants to rural social-ecological resilience in semi-arid Kenya. *Ecology and Society.* **2014**, 19(4), 34. <http://dx.doi.org/10.5751/ES-06924-190434>
- Kallas, J. The Wild Food Adventure Series; Wild Edible Plants, *Wild Foods from Dirt to Plate*. Digital Edition, Gibbs Smith, Layton Utah, 2010.
- Heywood, V. *Use and potential of wild plants in farm households*, FAO Farm Systems Management Series, Food and Agriculture Organisation, Rome, Italy, 1999.
- Abbasi, A. M.; Khan, M. A.; Shah, M. H.; Shah, M. M.; Pervez, A.; Ahmad, A. Ethno botanical appraisal and cultural values of medicinally important wild edible vegetables of lesser Himalayas, Pakistan. *J Ethno biol and Ethno Med.* **2013**, 9, 1-13.
- Khoshbakht, K.; Hammer, K. How many plant species are cultivated? *Genetic Resources and Crop Evolution.* **2008**, 55 (7), 925-928.
- Fanzo, J.; Hunter, D.; Borelli, T.; Mattei, F. *Diversifying Food and Diets Using agricultural biodiversity to improve nutrition and health*. Routledge. 2 Park Square, Milton Park, Abingdon, Oxon, OX14 4RN, 2013 pp 1-15.
- Ali-Shtayeh, M. S.; Jamous, R. M.; Al-Shafie, J. H.; Elgharabah, W. A.; Kherfan, F. A.; et al. A Traditional knowledge of wild edible plants used in Palestine (Northern West Bank): A comparative study. *J Ethnobiology and Ethnomed.* **2008**, 4(13), 1-13.
- Jasmine, T. S.; Jeeva, S.; Febreena, G. L.; Mishra, B. P.; Laloo, R. C. Wild edible plants of Meghalaya, North-east India. *Nat. Prod. Radiance.* **2007**, 6(5), 410-426.
- Reddy, K. N.; Pattanaik, C.; Reddy, C. S.; Raju, V. S. L. Traditional knowledge on wild food plants in Andhra Pradesh, Indian. *J Tradit Knowle.* **2007**, 6(1), 223-229.
- Pal, R. S.; Kumar, R. A.; Kant, L.; Bhatt, J. C. Wild edible potential nutraceutical fruit in Indian Himalayan region. *Popular Kheti.* **2014**, 2(3), 199-203.
- Sharma, P.; Agnihotry, A.; Sharma, P. P.; Sharma, L. Wild edibles of Murari Devi and surrounding areas in Mandi district of Himachal Pradesh, India. *Int J Biod & Cons.* **2013**, 5(9), 592-604.
- Kumar, S. Some wild Plants as food supplements in District Bilaspur of Himachal Pradesh. India. In: *Food Security in India: Challenges and Way*. Edited by Chandel N. & Meera Ahead, Omega Publications, New Delhi 2015, 207-212.

25. Chauhan, P. P.; Nigam, A.; Santvan, V. K. Ethnobotanical study of wild fruits in Pabbar Valley, District Shimla, H.P. *J Med Pl Stud.* **2016**, 4(2), 216-220.
26. Swaran, L.; Seth, M. K.; Kaushal, P. Ethnobotanical Studies on Wild Edible Plants of Tidong Valley of District Kinnaur (H.P). *Int J Sci Res.* **2016**, 5(8), 1790-1792.
27. Chand, R.; Singh, A. N.; Nirmala, C. Ethnoecological Survey of Underutilized Plant Diversity of Hamirpur District, H. P., India: An Edibility Assessment. *Env Eco Res.* **2017**, 5(1), 13-29.
28. Thakur, S. D. Diversity, distribution and utilization pattern of some forestry foods (Wild Edibles) from Tirthan wildlife sanctuary of distt. Kullu, H.P. *Int J Adv Sci Engg & Tech.* **2017**, 5(2), 4-11.
29. Champion, H. G.; Seth, S. K. *A Regional Survey of the Forest Types of India.* Govt. of India, Publication, Delhi, 1968, 404.
30. Gautam, A. K.; Bhatia, M. K.; Bhadauria, R. Diversity and Usage Custom of Plants of South Western Himachal Pradesh, India. Part-I. *J Phyto.* **2011**, 3(2), 24-36.
31. Kumar, M. *Studies on woody plants of District Bilaspur, Himachal Pradesh.* Ph D Thesis, H.P. Univerity Shimla, 2015. - shodhganga.inflibnet.ac.in/handle/10603/127884
32. Kumar, S. Species Diversity and Ethnobotanical Uses of Family Moraceae in District Bilaspur, Himachal Pradesh (India). *Asi J. Adv. Basic Sc.,* **2017**, 5(2), 122-126.
33. Jain, S. K.; Goel, A. K. Workshop Exersize -1 Proforma for field work In: *A Manual of Ethnobotany.* Edited by Jain S K Scientific Publ., Jodhpur, 1995, 142-147.
34. Collet, H. *Flora Simlensis.* Thacker Spink and Co. Calcutta and Shimla, 1902; Reprinted Bishen Singh Mahendera Pal Singh, Dehradun, 1971.
35. Chowdhery, H. J.; Wadhwa, B. M. *Flora of Himachal Pradesh, Analysis, Vols. 1-3.* Botanical Survey of India, Calcutta, 1984.
36. Polunin, O.; Stainton, A. *Flowers of the Himalaya.* Oxford University Press, Delhi, 1984.
37. Sood, S. K.; Thakur, S. *Ethnobotany of Rewalsar Himalaya Dist. Mandi, Himachal Pradesh, India.* Deep Publ., New Delhi, 2004.