

Ethnobotanical Documentation of Wild Edible Plants Used by Gujjar Community of Tarai West Forest Division Ramnagar, Nainital, India

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ABSTRACT

The present investigation highlights the identification and documentation of wild edible plants used by Gujjar community in foothills of Shiwalik range of Kumaun Himalaya. Survey method by using semi structured interview schedule with the Gujjar community was used to collect the information. During the survey, a total of 51 plants belong to 33 families and 46 genera were listed as edible, out of which 39% trees, 25% shrubs, 22% herbs and 14% were climbers. Various parts of the plant were used as food, of which fruits and leaves were extensively used. The study also deals with the availability status of listed plants, about 13 plants found abundantly, 09 were common and 29 plants placed in rare category. The results emerge from this study suggested that exploration and documentation of wild edibles plants offer new variety of food to be added in the healthy diet but their survival in near future is threatened due to lack of awareness and documentation. Therefore, both wild edibles plants as well as traditional knowledge need priority action for conservation.

Keywords: Gujjar, Wild edible, Tarai West Forest Division, Ethnobotany.

INTRODUCTION

Uttarakhand, a Himalayan state of India, is known for its biodiversity as well as rich heritage of wild edible plants. Uttarakhand has a total area of 53,483 km² of which 86% is mountainous and 65% is covered by forest¹. Forests play a very important role in the life of tribal as well as communities as they provide significant ecosystem services in the form of food, fodder, fruits, timber and medicine^{2,3,4,5,6,7} etc.

Wild edible plants are the major source of food for the tribal inhabitants and satisfy considerably the food requirements of the economically poor population in rural areas. Edibles parts of these plants (seed, fruits, flowers, leaves, delicate stems, roots and rhizomes) are the nature's gift to human beings. The wild plants are not only delicious and refreshing but also the chief source of vitamins, proteins and minerals⁸. They are easily available

within forest habitat and most of the tribal and rural communities depend on these wild resources to meet their daily food requirements in the period of food scarcity as well as for food supplement⁹. Other than this, in comparison of cultivated crop the taste of wild plants is natural and also free from toxic substances like pesticide and other hazardous chemicals generally used in cultivated crops.

Survey and documentation of wild edible plants and their use have been conducted in several parts of the country by various workers^{10,11,12,13,14} and several others). In Uttarakhand, some attempt has also been done to explore the ethnobotany values of plants and the documentation of wild edibles by various scientist as well as researchers^{15,16,17,18}. However, very little work has been done on wild edible plants used by Gujjar community. Gujjars are the forest dwellers frequently collecting woody and non woody wild products from the forest to

sustain their life. Knowledge of non-domesticated food resources is a part of traditional knowledge and is largely transmitted through socialization and household context. Gujjars are considered as the storehouse of traditional knowledge about uses of plants for various purposes. Mostly the elders of the community have immense knowledge about the use of wild plants as fruits and vegetables but on the other hand, it was noticed that the younger generation showing very little interest in the tradition and culture and thus have a little knowledge about the traditional use of flora and fauna. To keep these things in view, the present study was carried out with the objectives to document the indigenous uses and availability status of wild edible plants used by the Gujjar community and also tries to conserve their traditional knowledge.

MATERIALS AND METHODS

Study area

The study area, Tarai West Forest Division Ramnagar (T.W.F.D.R), is situated in the foothills of Shiwalik Mountains of outer Himalaya near Corbett National Park, Ramnagar, Nainital. This division is sub-divided into seven ranges which include Aampokhra range, North Juspur Range, West

Juspur Range, Kashipur Range, Bannakhera Range, Bailparav Range and Ramnagar Range (Fig.1). The study sites were located within the coordinates of 29° 12' 30" to 20° 23' 20" N and 78° 47' 30" to 79° 19'40"E. Average elevation ranges from 221 to 385 mtrs msl. It covers 34807 hectares and blessed with diverse type of vegetation.

Data Collection

Regular field trips were made during 2015 to 2016 in order to collect the information about wild edible plants and their indigenous uses. Different ranges of the forest division were surveyed extensively in different seasons (i.e. rainy, winter, summer) with Gujjars to know the value of wild edibles. Due to poor literacy only the semi-structured interview were conducted. Photographic documentation was also helpful for long period conservation of knowledge of wild edibles. Members of the different age groups were interviewed. During survey not only plant phenology was studied but also availability status of plants (i.e. abundant, common and rare) also recorded. The plants pointed out by Gujjars were collected, identified botanically with the help of existing literature of T.W.F.D.R. and taxonomic experts of different institutions. To ensure the authenticity and reliability of primary data were

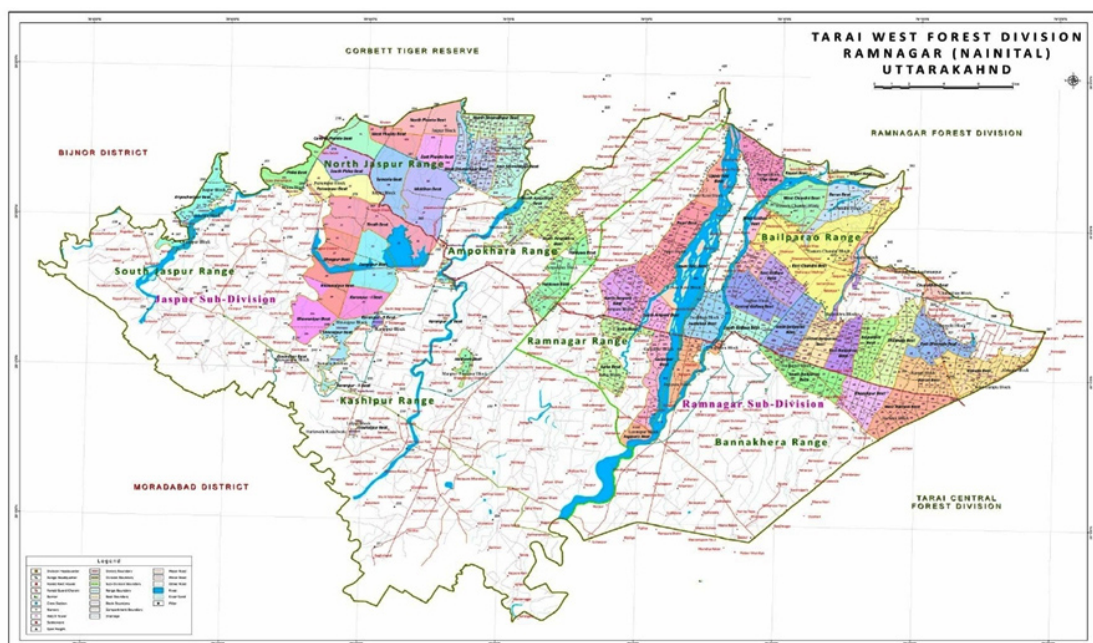


Fig.1: Map of study area

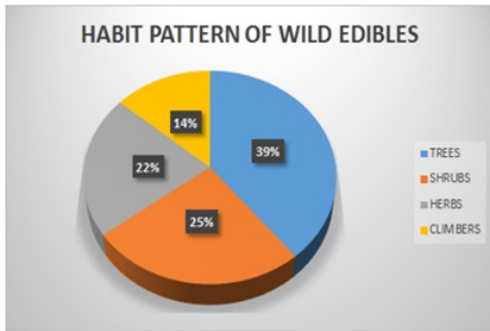


Figure 2.

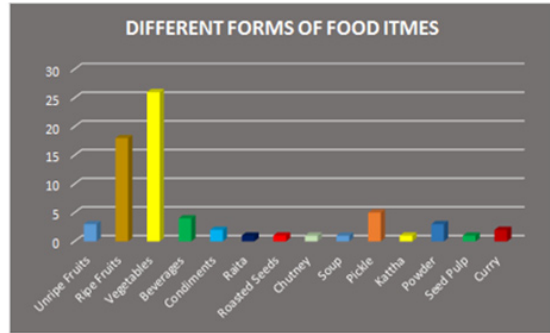


Figure 3.

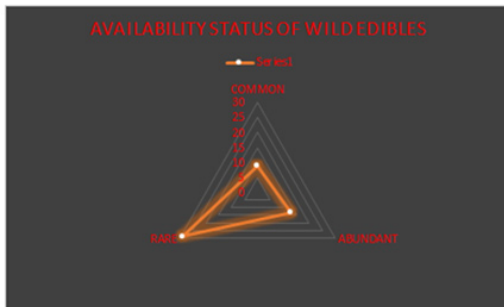


Figure 4.

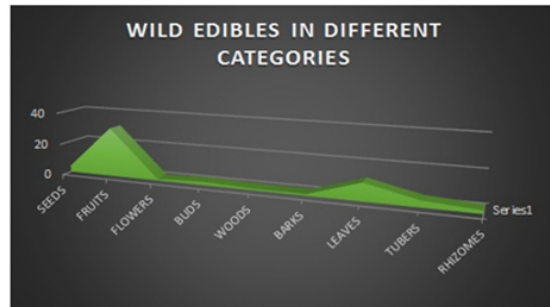


Figure 5.



A- Male Gujjar enlightening about the use of *Melia azadirachta*.
 B- Gujjars collecting *Aegle marmelos*.
 C- Gujjar lady telling about *Terminalia chibula*.
 D- Male Gujjar showing fruit of *Madhuca indica*.

Table 1: List of wild edible plants and their parts used by Gujjars

S. No	Botanical name	Family	Habit	Local Name	Name used By Gujjars	Collection Period	Status	Edible parts and Mode of consumption
1	<i>Aegle marmelos</i> (L.) Correa	Rutaceae	T	Bel	Belu	May-Jun	Co	Ripe fruits are eaten and juice is also made by it.
2	<i>Acacia catechu</i> (L. f.) Willd.	Leguminosaceae	T	Khair	Khair	Round the year	Ab	Kattha is made from wood and used as astringent.
3	<i>Bombax ceiba</i> L.	Malvaceae	T	Semal	Semlu	Dec-JanMar-Apr	Co	Flower and green fruits are cooked and used as vegetable.
4	<i>Bauhinia variegata</i> L.	Leguminosaceae	T	Kachnar	Kurgad	Mar-Apr	Ra	Flower bud is used as vegetable and rayita.
5	<i>Citrus medica</i> L.	Rutaceae	T	Neebu	Limbu	Nov-Jan	Ra	Ripe fruits are eaten and also used as pickle. Fruit juice mixed with salt sugar and water to make shikangi.
6	<i>Cordia dichotoma</i> G. forst.	Boraginaceae	T	Lasoda	Lisoda	Jun-Aug	Ra	Green fruits are cooked for vegetable.
7	<i>Diospyros exsculpta</i> Buch.-Ham.	Ebenaceae	T	Tendu	Kinnu	Apr-June	Co	Ripe fruits are eaten.
8	<i>Phyllanthus emblica</i> L.	Phyllanthaceae	T	Aamla	Amlu	Dec-Mar	Ra	Pickle is made from green fruits. Fruits are also eaten.
9	<i>Ficus racemosa</i> L.	Moraceae	T	Gular	Rumbal	Mar-Jun	Ra	Ripe fruits are eaten.
10	<i>Ficus auriculata</i> Lour.	Moraceae	T	Timil	Timlu	May-Aug	Ra	Ripe fruits are eaten and green fruits are used as vegetable.
11	<i>Ficus palmata</i> Forssk.	Moraceae	T	Bedu	Raggad	May-Aug	Ra	Ripe fruits are eaten.

12	<i>Ceriscoides turgida</i> (Roxb.) Tirveng.	Rubiaceae	T	Thanela	Thanela	Oct-Nov	Ra	Ripe fruits are eaten.
13	<i>Mallotus philippensis</i> (Lam.) Mull. Arg.	Euphorbiaceae	T	Rohni	Kamila	Feb-Apr	Ab	Fruits powder is mixed in curry. Green leaves used in curry.
14	<i>Melia azedarach</i> L.	Meliaceae	T	Bakain	Drankadi	Round the year	Ab	Green fruits used in making pickle. Ripe fruits are eaten. Unripe fruits are used in curry to get a sour taste. Ripe fruits bark is eaten.
15	<i>Mangifera indica</i> L.	Anacardiaceae	T	Aam	Aam	May-Jul	Ra	Ripe fruits are edible.
16	<i>Madhuca longifolia</i> var. <i>latifolia</i> (Roxb.) A. Chev.	Sapotaceae	T	Mahua	Mau	Jun-Jul	Ra	Fruits are used as vegetable. Seed pulp is edible.
17	<i>Syzygium cumini</i> (L.) Skeels	Myrtaceae	T	Jamun	Jamood or Dhal	Jun-Jul	Ab	Vegetable is prepared from fruits. Fruits are used as vegetable. Ripe fruits are eaten.
18	<i>Terminalia chibula</i> Retz.	Combretaceae	T	Harad	Hared	Feb-May	Ra	Fresh bud used as vegetable. Root powder is taken with milk. Shoot bud used as vegetable
19	<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Combretaceae	T	Bheda	Bheda	Feb-May	Ra	Roasted seed powder used as coffee. Roasted seed powder used as coffee.
20	<i>Tamarindus indica</i> L.	Leguminosaceae	T	Imli	Imli	Jul-Aug	Ra	
21	<i>Asparagus racemosus</i> Willd.	Asparagaceae	S	Sataver	Satavri	Apr-June	Ra	
22	<i>Bambusa vulgaris</i> Schrad.	Poaceae	S	Bas	Bas	Jul-Aug	Ra	
23	<i>Senna tora</i> (L.) Roxb.	Leguminosaceae	S	Banad	Paved	Nov-Dec	Ab	
24	<i>Senna occidentalis</i> (L.)	Leguminosaceae	S	Banad	Paved	Nov-Dec	Ab	

25	<i>Cannabis sativa</i> L.	Canabinaceae	S	Bhang	Pang	Sep-Oct	Ra	Roasted seeds used as condiments.
26	<i>Callicarpa macrophylla</i> Vahl	Lamiaceae	S	Daiya	Daiya	Jul-Aug	Ra	Ripe fruits are eaten.
27	<i>Cleome viscosa</i> L.	Cleomaceae	S	Jakhiya	Jadi	Sep-Oct	Ab	Seeds used as condiments.
28	<i>Carissa spinarum</i> L.	Apocynaceae	S	Kroda	Kakru	Sep-Oct	Ra	Ripe fruits are eaten. Pickle is made from green fruits.
29	<i>Hibiscus cannabinus</i> L.	Malvaceae	S	Ban bhindi	Bhindi	Aug-Sep	Ra	Fruits are used as vegetable.
30	<i>Lantana indica</i> Roxb.	Verbenaceae	S	Kuri	Mori	Jun-Jul	Ab	Ripe fruits are eaten.
31	<i>Chamaerops humilis</i> L.	Arecaceae	S	Thakal	Thakol	Jun-Jul	Ra	Unripe fruits are eaten.
32	<i>Urtica ardens</i> Link	Urticaceae	S	Bichhughas	Sadder	Round the year	Ra	Vegetable is made from leaves.
33	<i>Ziziphus jujuba</i> Mill.	Rhamnaceae	S	Ber	Beri	Nov-Feb	Co	Ripe fruits are eaten.
34	<i>Amorphophallus campanulatus</i> Decne.	Araceae	H	Jimikand	Bad aalu	Oct-Nov	Ra	Pickle is prepared from tuber.
35	<i>Dysphania ambrosioides</i> (L.) Schott	Amaranthaceae	H	Jangli bathua	Bathua	Jun-Aug	Co	Vegetable is made from leaves.
36	<i>Colocasia esculenta</i> (L.) Schott	Araceae	H	Arvi	Ghuiya	Oct-Nov	Ra	Rhizome and leaves are cooked for vegetable.
37	<i>Commelina benghalensis</i> L.	Commelinaceae	H	Kanyaghas	Chura	Round the year	Ab	Vegetable is prepared from leaves.
38	<i>Cheilocostus speciosus</i> (J. Koenig) C.D. Specht	Costaceae	H	Kev Kand	Kyola	Oct-Nov	Ra	Rhizome is cooked for vegetable. Soup is also made by it.
39	<i>Diplazium esculentum</i> (Retz.) Sw.	Athyriaceae	H	Lingura	Kashrod	Jul-Dec	Ra	Vegetable prepared from fresh circinate leaves.
40	<i>Euphorbia hirta</i> L.	Euphorbiaceae	H	Dudhi	Dud jadi	May-Jun	Ab	Vegetable prepared from leaves.
41	<i>Mentha arvensis</i> L.	Lamiaceae	H	Pudina	Padina	Round the year	Ra	Leaves used in making chutney.

42	<i>Oxalis corniculata</i> L.	Oxalidaceae	H	Chalmori	Khattu	Round the year	Ab	Fresh leaves are taken orally and also cooked as vegetable. Ripe fruits are edible. Fresh leaves are used as vegetable. Vegetable prepared from leaves.
43	<i>Solanum americanum</i> Mill.	Solanaceae	H	Makoi	Chotikayakhoti	Round the year	Ab	Ripe fruits are edible. Fresh leaves are used as vegetable. Vegetable prepared from leaves.
44	<i>Tribulus terrestris</i> L.	Zygophyllaceae	H	gokhru	Pilijadi	Jul-Aug	Ra	Roasted seeds are edible.
45	<i>Bauhinia vahlii</i> Wight & Arn.	Leguminosaceae	Cl	Malu	Malvad	Nov-Jan	Co	Green fruits used as vegetable. Ripe fruits are eaten.
46	<i>Coccinia grandis</i> (L.)	Cucurbitaceae	Cl	Kundru	Kakru	Jul-Oct	Ab	Tuber and fruits used as vegetable. Ripe fruits are eaten.
47	<i>Senna septemtrionalis</i> (Viv.) H.S.Irwin & Barneby	Leguminosaceae	Cl	Tarod	Tarad	Nov-Feb	Ra	Unripe fruits are eaten. Vegetable is made from tuber.
48	<i>Cucumis melo</i> L.	Cucurbitaceae	Cl	Ban kakdi	Kakru	Aug-Oct	Ra	Vegetable is prepared from fruits.
49	<i>Dioscorea melanophyma</i> Prain & Burkill	Dioscoreaceae	Cl	Ban gethi	Gethu	Nov-Dec	Co	Unripe tuber is edible.
50	<i>Mucuna pruriens</i> (L.) DC.	Leguminosaceae	Cl	Gauchi	Jajudi	Aug-Sep	Co	
51	<i>Pueraria tuberosa</i> (Willd.) DC.	Leguminosaceae	Cl	Vidari Kand	Joojuli	Nov-Jan	Co	

C= climber, H= herb, S= shrub, T= tree, Co=Common, Ab= Abundant, Ra= Rare

Table 2: Comparative study of wild edible used by the various communities

S. N	No of species	Families	No of dominant families	No of genera	Habit(%)			C	Extensively used part	Category	References
					T	S	H				
1	51	Leguminosae and Moraceae	33	46	39	25	22	14	Fruits and leaves	Vegetable (26 species), fruits (21 species)	Present study
2	41	Araceae and Dioscoreaceae	22	36	15	07	54	22	Fruits and whole plants	Fruits (8 species), Vegetable (33 species)	[19]
3	71	Euphorbiaceae and Moraceae	42	61	-	-	-	-	Fruits and leaves	Vegetable (38 species), fruits (31 species)	[20]
4	84	Cucurbitaceae and Araceae	36	-	-	-	-	-	Leaves, tender shoots and fruits	Vegetable and fruits (70 species), spices (13 species)	[21]
5	279	Euphorbiaceae and Araceae	100	-	-	-	-	-	Fruits and leaves	Fruits (78 species), Chutney (21 species), Fried and boiled (131 species), roasted (19 species), spices and condiments (9 species), with flesh (64 species), Flavouring (5 species), masticatory (1 species), cold drinks (2 species), curry (1 species), pickle (2 species),	[22]
6	11	-	11	-	36	64	-	-	Fruits	Fruits (10 species), Vegetables (4 species), chutney (2 species), Pickle (2 species), Vegetable and fruits	[23]
7	38	Euphorbiaceae, Moraceae, Solanaceae, and Passifloraceae	17	25	50	26	8	16	Fruits and leaves	Vegetable and fruits	[24]

8	74	41	Amaranthaceae and Rhamnaceae	58	30	19	26	20	Fruits and leaves	[25]	47% leaves, roots and fruit eaten after cooked and 44% as desserts
9	58	39	Rosaceae, Brassiceae, Moraceae and Poaceae	50	41	21	38	-	Fruits and Leaves	[26]	Fruits (26 species), vegetables (14 species)
10	43	25	Rosaceae, Moraceae and Polygonaceae	33	33	37	30	-	Fruits leaves and roots	[27]	Vegetable, Squash and fruits

also verified by informants (Gujjar) at different ranges of forest division.

RESULTS

In the present study, a total of 51 plant species belongs to 46 genera and 33 families were used by Gujjar community (Table 1). Out of the total plants species 39% trees, 25% shrubs, 22% herbs and 14% were climbers (Fig.2). These plants have been arranged alphabetically and the information collected is divided into botanical name, name used by Gujjar, local name, family, parts used, uses and availability status. Gujjars generally used the fresh plant or plant parts but some time they store them in various forms and use throughout the year at the time of scarcity. Wild edibles diversity was recognised accordingly to their seasons of availability on the way of survey. Leguminoceae and Moraceae are the most dominant families. The different wild edibles are used as in different forms like vegetable (26 plants), condiments (1 plant), roasted seed (1 plant), curries (2 plants), beverages (2 plants), soup (1 plant), raitya (1 plant), chutney (1 plant) pickles (5 plants), ripe fruits (18 plants), unripe fruits (3 plants), seed pulp (1 plant), juice (1 plant), shikanji (1 plant), kathha (1 plant) and powder (3 plants) (Fig.3). It was also found that most of the wild edibles are used as vegetable (51%) and in the form of ripe fruits (35%). On the basis of the investigation made, wild edibles were categorized in abundant, common and rare categories, registering 13, 09 and 29 plants, respectively (Fig.4). During survey it was also noticed that the wild edibles were used in different categories like seeds, fruits, flowers, buds, woods, barks, leaves, tubers and rhizomes, of which fruits and leaves were eaten mostly (Fig.5).

DISCUSSION

The results deal with 51 wild edible plants utilised by the Gujjar community. These wild edibles having natural taste and are free from pesticides. The floristic diversity of the study site offers variety in human diet. A comparative account of wild edibles used by the various communities is given (table 2). Present study have less reported plants as compare to other studies i.e.^{20,21,22,25} while placed higher as reported by^{19,23,24,27} and more or less similar as reported by²⁶. According to the utilization pattern of

the various parts of the plant, fruits and leaves were the extensively used parts, show similarity as early reported.

Indigenous fruits play an important role in the nourishment of rural and ethnic communities from the very beginning. Mostly the elder Gujjars have vast knowledge about these wild plants as meal or food supplements. Moreover, due to over exploitation, the wild flora is declining very sharply. Other than this, unfortunately, the younger generation is also not taking any interest to maintain this traditional knowledge bank, hence resulting in the degradation of folk flora. Introduction of exotic fruit is also a big cause to decline the knowledge of wild edible in between the community. Therefore, it is recommended that specific attention should be paid to these wild edibles. By this study an attempt

was also made to gather knowledge about the conservation status of wild plants. It was suggested by this study, that there are number of plants which are either rare or not abundant hence require significant attention before they become endangered or extinct. For this purpose such studies have always play an important role regarding the cultivation of traditionally used wild plants and also in maintaining the gene pool of rare plants.

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