Ethnobotanical Survey on Wild Edible Plants Used by Tribals & Rural People of Arjuni/Mor Taluka, Gondia District, Maharashtra State, India

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Abstract The study area is inhabited by Gond tribes. Tribals and most of forest dwellers mainly depend on plants and plant product for their food. This study reveals that the ethnic people and forest dwellers have considerable traditional knowledge of wild edible plants and their utilization. This paper report is based on survey, interview and field work studies on wild edible plants used by tribals and rural people of Arjuni/Mor Taluka, Gondia District, Maharashtra State, India during March 2016 - March 2018. A total of 71 plant species belonging to 63 genera and 39 families have been recorded as wild edibles in the study areas, of which trees are ranked first with 36 species, followed by herbs, climbers and shrubs with 22, 7 and 6 species respectively. Among the 71 species, 43.2% contribute as vegetables by their fruit, 22.22 % by leaf, 12.34% by seed or grain, 8.64% by root or tuber, 6.17% by stem, bark or sap, 6.17% by flower and 1.23% by whole plant. It is evident from the survey that most of the species of wild edibles are used as vegetable/chutney(49.33%), followed by raw/ripe fruits(45.33%), pickles(4%), roasted seeds(1.33%).

Keywords Ethnic People, Traditional Knowledge, Forest Dwellers, Commercial Food

1. Introduction

Ethnobotany encompasses the total, natural and traditional man-plant relationships. It recognizes the important role of the ambient vegetation in the economic life of people. Ethnobotany has now contributions to an understanding of man-plant relationships, as well as for the practical applications of the biological knowledge of aboriginal people in medicine, health, agriculture and industry. [1]

From ancient time plants have been used as a source of

food, shelter, clothing, medicine, fibre, gum, resin, oil, etc. Several wild plants are used as food by tribals and other local people living in and around the forest areas. [2]

Tribal and local people prefer wild vegetables over the cultivated as they grow naturally; provide better taste and good health. By selling these wild edibles to the nearby urban markets could earn them extra income. Aborigines believed that some of the seasonal wild vegetables are good for health and also provide the immunity during the rains which is supposed to be the most suspicious period to become ill by various disorders. [3]

Now the ancient men are thoroughly acquainted with the method of excluding the harmful substances from the wild plants and preparing recipes for their meager meals. [4]

Food plants are not only supplement to the food quantity, but also an important option during starvation for survival and thus makes significant contribution to the human nutrition throughout the year. However, the century old traditional knowledge system for utilization of wild plants is depleting very quickly. Modern scientific researchers are trying to value these traditional food items to fill the gaps between growing population and food production. [5]

The present studies were conducted to explore the knowledge of wild edible plants to meet the increasing demands of the growing population. The diversity of these plant resources needs to be documented and analysis should be done for their nutritional values. Increased use of traditional vegetables can contribute to enhancing people's health and standard living as well as the economic and social status of the food producers themselves.

2. Materials and Methods

2.1. Study Area

This study was conducted in 11 villages in Arjuni/Mor

Taluka of Gondia district, Maharashtra state, India. Gondia district is situated between 20°39' to 21°38' N and 79°27' to 80°42' E (Fig. 1). The district is located in the north-eastern part of the state and is bordered by the states of Chhattisgarh and Madhya Pradesh from east and north respectively and Bhandara district and Chandrapur district of Maharashtra to the west and south.

Gondia district was under the privilege of 'Gond Raja'. The whole area was surrounded by the dense forest. 'Gond' is the main tribe of this area. [6]

Surban, Bondgaon, Gothangaon, Pratapgad, Navegaon, Dewalgaon, Khairi, Sukadi, Dabhana, Tidka, Kesori are the villages in study area. All these 11 villages are surrounded by dense forest.

Study was carried out during the year of March 2016 to March 2018. This Information on wild edible plant species is outcome of ethnobotanical field survey and interviews among old tribal peoples, ethnic men and women based on the standard procedures suggested by. [7] The field survey covered different seasons. Data collection was made in different places i.e. forest, bare lands, playground, roadside, agricultural farms and near localities. Plant specimens were collected and identified with the help of floras. [8-12]

Notes were recorded on local names, useful plant parts and their utilization by showing photographs of some collected specimens to local peoples. The identified plants are arranged alphabetically with family names, local names and parts used (Table 1).

2.2. Data Collection

Figure 1. Showing Study Area in Gondia District Map

Table 1. Wild edible plants used by Local people of study area

S.N	Plant Name	Family	Local Name	Life form	Part(s) used	Mode of utilization
1.	<i>Abelmoschus moschatus</i> Medic.	Malvaceae	Kasthoori bhendi	H	Fruits	Cooked as vegetable
2.	<i>Abrus precatorius</i> L.	Fabaceae	Gomchi, Gunja	C	Leaves	Used as vegetable
3.	<i>Abutilon indicum</i> (L.) Sweet	Malvaceae	Petari	H	Leaves and Flowers	Cooked as vegetable
4.	<i>Acacia catechu</i> (L.f.) Willd	Mimosaceae	Khair	T	Gum	Taken with betel leaf
5.	<i>Acacia nilotica</i> (L.) Willd.	Mimosaceae	Babul	T	Gum and seeds	Seeds roasted with salt and eaten
6.	<i>Aegle marmelos</i> Corr.	Rutaceae	Bel	T	Fruit	Raw fruit pulp is eaten
7.	<i>Alternanthera sessilis</i> DC	Amaranthaceae	Jibhkati	H	Leaves	Cooked as vegetable
8.	<i>Amaranthus spinosus</i> L.	Amaranthaceae	Matbhaji	H	Leaves	Cooked as vegetable
9.	<i>Amaranthus viridis</i> L.	Amaranthaceae	Khedabhaji	H	Leaves	Cooked as vegetable
10.	<i>Amorphophalus paeonifolius</i> Demst.	Araceae	Jimikanda	H	Tender Leaves and Corm	Cooked as vegetable
11.	<i>Annona reticulata</i> L.	Annonaceae	Ramphal	T	Ripe fruits	Eaten raw
12.	<i>Annona squamosa</i> L.	Annonaceae	Sitaphal	T	Ripe fruits	Eaten raw
13.	<i>Artocarpus hetrophyllus</i> Lamk	Moraceae	Phanas	T	Fruits	Cooked as vegetable
14.	<i>Antidesma ghaesembilla</i> Gaertn	Euphorbiaceae	Amti, Jondhurli	T	Ripe fruits	Eaten raw
15.	<i>Averrhoa carambola</i> L.	Oxalidaceae	Aamras	T	Ripe fruits	Eaten raw
16.	<i>Azadirachta indica</i> A.Juss.	Meliaceae	Nim	T	Ripe fruits	Eaten raw
17.	<i>Bacopa monnieri</i> (L.) Penn.	Scrophulariaceae	Brahmi	T	Whole plant	Cooked as vegetable
18.	<i>Bambusa vulgaris</i> Schrad,	Poaceae	Bans, Vadud	T	Tender Shoots	Cooked as vegetable
19.	<i>Bauhinia purpurea</i> L.	Caesalpiniaceae	Koilar	T	Leaves and Flower buds	Cooked as vegetable
20.	<i>Bauhinia vahlii</i> Wight & Arn.	Caesalpiniaceae	Mahulbel	C	Seeds	Cooked as vegetable
21.	<i>Bridelia retusa</i> Spreng	Euphorbiaceae	Kasai	T	Ripe fruits	Eaten raw
22.	<i>Buchanania cochinchinesis</i> (Lour.) Almeida	Anacardiaceae	Sadeka, Char	T	Ripe Fruits and Seeds	Eaten raw
23.	<i>Butea monosperma</i> (Lam.) Taub.	Fabaceae	Parsa, Palas	T	Flower	Cooked as vegetable
24.	<i>Cajanus scarabaeoides</i> (L.) Du Petit- thou	Fabaceae	Ran- tur	H	Seeds	Cooked as vegetable
25.	<i>Cardiospermum helicacabum</i> L.	Sapindaceae	Kaparphuti	H	Ripe fruits	Eaten raw
26.	<i>Cassia fistula</i> L.	Caesalpiniaceae	Bahava	T	Flowers and seeds	Cooked as vegetable
27.	<i>Cassia tora</i> L.	Caesalpiniaceae	Charota, Chirota	H	Leaves	Cooked as vegetable
28.	<i>Chenopodium album</i> L.	Chenopodiaceae	Awadi-dhawadi	H	Leaves	Cooked as vegetable
29.	<i>Cissus quadrangularis</i> L.	Vitaceae	Hadijod	C	Shoot	Cooked as vegetable
30.	<i>Colocasia esculenta</i> (L.) Schott	Araceae	Dhopa, Aaki, Kochaimati,	H	Leaves, petiole & tuber	Cooked as vegetable
31.	<i>Commelina benghalensis</i> L.	Commelinaceae	Telka bhaji	H	Leaves	Cooked as vegetable
32.	<i>Costus speciosus</i> (Koen) Sm.	Zingiberaceae	Kevkanda	H	Leaves, Tuber	Cooked as vegetable
33.	<i>Cryptocoryne retrospiralis</i> (Roxb.) Kunth	Araceae	Pakanbhed	H	Leaves	Cooked as vegetable
34.	<i>Dendrocalamus strictus</i> (Roxb.) Nees	Poaceae	Ranj, bamboo	T	Tender shoots	Cooked as vegetable
35.	<i>Dioscorea bulbifera</i> L.	Dioscoreaceae	Mataru, Dangkanda	C	Tuber, bulbils	Cooked as vegetable
36.	<i>Diospyros melanoxylon</i> Roxb.	Ebenaceae	Tembhrun, Tendu	T	Ripe Fruits	Eaten raw
37.	<i>Ficus racemosa</i> L.	Moraceae	Umbar	T	Ripe Fruits	Eaten raw

Table 1 Continued

38.	<i>Gardenia lattiifolia</i> Ait.	Rubiaceae	Ghogar	T	Ripe Fruits	Eaten raw
39.	<i>Gmelina arborea</i> Roxb	Verbenaceae	Siwan	T	Ripe Fruits	Eaten raw
40.	<i>Grewia hirsuta</i> Vahl.	Tiliaceae	Gaturli/Gautri	S	Ripe Fruits	Eaten raw
41.	<i>Grewia tiliifolia</i> Vahl Fruits	Tiliaceae	Dhaman	T	Ripe Fruits	Eaten raw
42.	<i>Hemidesmus indicus</i> (L.) R. Br.	Periplocaceae	Khaphribela	C	Tuber	Cooked as vegetable
43.	<i>Holarrhena pubescens</i> (Buch-Ham.) Wall.ex. G.Don.	Apocynaceae	Kudva	S	Flower, Fruits	Cooked as vegetable
44.	<i>Ipomoea aquatica</i> Lour	Convolvulaceae	Karmotabhaji	H	Leaves	Cooked as vegetable
45.	<i>Lantana camara</i> L.	Verbenaceae	Bantulsi	S	Ripe Fruits	Eaten raw
46.	<i>Limonia acidissima</i> L.	Rutaceae	Kawath	T	Ripe Fruits	Eaten raw/used in making pickles
47.	<i>Madhuca longifolia</i> (Koen.) Mac. Var.	Sapotaceae	Mahuva, Mahu	T	Ripe Fruits, Petals	Eaten raw/ Cooked as vegetable
48.	<i>Mangifera indica</i> L.	Anacardiaceae	Aamba	T	Ripe Fruits	Eaten raw/used in making pickles
49.	<i>Mimusops elengi</i> L.	Sapotaceae	Massor	T	Ripe Fruits	Eaten raw
50.	<i>Momordica dioica</i> Roxb.ex Willd.	Cucurbitaceae	Katwell	C	Fruits	Cooked as vegetable
51.	<i>Moringa oleifera</i> Lam.	Moringaceae	Mugna	T	Fruits	Eaten raw
52.	<i>Mucuna pruriens</i> (L.) DC	Fabaceae	Kanjhuri, Kavaskuri	C	Seeds	Cooked as vegetable
53.	<i>Nelumbo nucifera</i> Gaertn.	Nelumbonaceae	Kamal, Pavan	H	Seeds, Rhizomes	Eaten raw/ Cooked as vegetable
54.	<i>Nymphaea nouchali</i> Burm. f.	Nymphaeaceae	Kamal	H	Peduncles, Rhizomes	Cooked as vegetable
55.	<i>Nymphaea rubra</i> Roxb.	Nymphaeaceae	Lalkamal	H	Rhizomes	Cooked as vegetable
56.	<i>Olex psittacorum</i> (Willd) Vahl	Olacaceae	Aradphari/Harduli	S	Leaves	Cooked as vegetable
57.	<i>Oryza rufipogon</i> Griff.	Poaceae	Devdhan	H	Ripe fruits	Cooked as food
58.	<i>Oxalis corniculata</i> L	Oxalidaceae	Khatti Bhaji	H	Leaves	Cooked as vegetable
59.	<i>Phoenix sylvestris</i> (L.) Roxb.	Araceae	Sindi	T	Ripe fruits	Eaten raw
60.	<i>Phyllanthus emblica</i> L.	Euphorbiaceae	Amla	T	Ripe fruits	Eaten raw/used in making pickles
61.	<i>Physalis minima</i> L.	Solanaceae	Chirpoti	H	Ripe fruits	Eaten raw
62.	<i>Pithecellobium dulce</i> (Roxb.) Benth.	Mimosaceae	Chichbilai	T	Seeds	Eaten raw
63.	<i>Schleichera oleosa</i> (lour.) O. Ken	Sapindaceae	Kusum	T	Seeds	Eaten raw
64.	<i>Semecarpus anacardium</i> L.f.	Anacardiaceae	Biba/Bhilawa	T	Thalamus	Eaten raw
65.	<i>Solanum nigrum</i> L.	Solanaceae	Kamuni	S	Leaves, fruits	Fruits eaten raw and leaves cooked as vegetable.
66.	<i>Syzygium cumini</i> (L.) Skeels	Myrtaceae	Jambhul	T	Ripe fruits	Eaten raw
67.	<i>Tamarindus indica</i> L	Caesalpiniaceae	Chich, Imli	T	Leaves, fruits	Fruits eaten raw and leaves cooked as vegetable.
68.	<i>Terminalia bellirica</i> Roxb.	Combretaceae	Behda	T	Seeds	Eaten raw
69.	<i>Trapa natans</i> L. var. <i>bispinosa</i> (Roxb.) Makino	Trapaceae	Shingara	H	Fruits	Fruits eaten boiled
70.	<i>Ziziphus mauritiana</i> Lam.	Rhamnaceae	Bair, Ber	T	Ripe fruits	Eaten raw
71.	<i>Ziziphus oenoplia</i> (L.) Mill.	Rhamnaceae	Ironi	S	Ripe fruits	Eaten raw

H- Herbs; C-Climbers; S-Shrubs; T-Trees

Figure 2. Classification on the basis of usage

Figure 3. Classification on the basis of plant parts used

Figure 4. Wild edible plant species in different categories

Figure 5. Flowers of *Holarrhena pubescens* (Buch-Ham.) Wall.ex. G.Don.

Figure 9. Fruits of *Pithecellobium dulce* (Roxb.) Benth.

Figure 6. Fruits of *Cissus quadrangularis* L.

Figure 10. Fruits of *Terminalia bellirica* Roxb.

Figure 7. Fleshy flowers of *Madhuca longifolia* (Koen.) Mac. Var.

Figure 11. Leafy vegetable of *Cryptocoryne retrospiralis* (Roxb.) Kunth

Figure 8. Fruits of *Averrhoa carambola* L.

Figure 12. Leafy vegetable of *Oxalis corniculata* L.

Figure 13. Dried Fruits of *Phoenix sylvestris* (L.) Roxb.

Figure 14. Leafy vegetable of *Colocasia esculenta* (L.) Schott.

Figure 15. Leafy vegetable of *Olax psittacorum* (Willd) Vahl.

Figure 16. Tender Shoots of *Dendrocalamus strictus* (Roxb.) Nees.

3. Results

Table 2. Family wise distribution of the wild edible plants of Study Area

Rank	Family	Genera	Species
1	Fabaceae	4	4
2	Araceae	4	4
3	Caesalpiniaceae	3	5
4	Poaceae	3	3
5	Anacardiaceae	3	3
6	Euphorbiaceae	3	3
7	Mimosaceae	2	3
8	Amaranthaceae	2	3
9	Malvaceae	2	2
10	Rutaceae	2	2
11	Moraceae	2	2
12	Oxalidaceae	2	2
13	Sapindaceae	2	2
14	Verbenaceae	2	2
15	Solanaceae	2	2
16	Sapotaceae	2	2
17	Annonaceae	1	2
18	Nymphaeaceae	1	2
19	Rhamnaceae	1	2
20	Tiliaceae	1	2
21	Dioscoreaceae	1	1
22	Ebenaceae	1	1
23	Rubiaceae	1	1
24	Chenopodiaceae	1	1
25	Vitaceae	1	1
26	Commelinaceae	1	1
27	Zingiberaceae	1	1
28	Meliaceae	1	1
29	Scrophulariaceae	1	1
30	Periplocaceae	1	1
31	Apocynaceae	1	1
32	Convolvulaceae	1	1
33	Cucurbitaceae	1	1
34	Moringaceae	1	1
35	Nelumbonaceae	1	1
36	Myrtaceae	1	1
37	Combretaceae	1	1
38	Trapaceae	1	1
39	Olacaceae	1	1

In the present study there are around 71 species of angiosperms belonging to 63 genera and 39 families have been recorded (Table.1, Figures 5-16). Among the 39-

families, the most widely utilized plant species belong to Caesalpiniaceae (5), Fabaceae (4), Araceae (4), followed by Poaceae (3), Anacardiaceae (3), Euphorbiaceae (3), Mimosaceae (3), Amaranthaceae (3). Malvaceae, Rutaceae, Moraceae, Oxalidaceae, Sapindaceae, Verbenaceae, Solanaceae, Sapotaceae, Annonaceae, Nymphaeaceae, Rhamnaceae, Tiliaceae are with two species each, and the rest of the nineteen families with single species (Table.2). Among the 71 species, 43.2% of plant species contribute as vegetables by their fruit, 22.22 % by leaf, 12.34% by seed or grain, 8.64% by root or tuber, 6.17% by stem, bark or sap, 6.17% by flower and 1.23% by whole plant (Fig.3). While analyzing the life forms of the wild edible vegetable species, it was noticed that 36 (50.70%) species were trees, 22 (30.98%) herbs, 07(9.85%) climbers and the remaining 06 (8.45%) were shrubs (Fig.4).

It is evident from the Fig.2 that most of the wild edible species are used as vegetable/chutney (49.33%), followed by raw/ripe fruits (45.33%), pickles (4%), roasted seeds (1.33%).

This study reveals that tribal and rural people living in particular area depend on wild edible plants and have rich knowledge of their utilization.

4. Discussion

Many rural parts of the world depend on wild edible plants for their food.[13] Several attempts have been made to list out the wild edibles of Vidharbha region of Maharashtra State. [2,3,14]

Vegetable contain large quantity of vitamin C, Vit. A and Vit. B complex as well as good amount of dietary fibers and phytochemicals. The contents of the wild vegetables also protect our body against various malnutrition, and nutrient disorders that is why they are called as protective food. [15] Such unconventional wild edible plants are sources of proteins, fats, rich source of micro-nutrients and trace elements. [16,17,18]

Critical evaluation of the literature reveals that the adequate vegetable consumption can be protective for some chronic diseases such as cancer, obesity, diabetes, cardiovascular diseases, metabolic syndrome, as well as improve risk factors related with these diseases. [19]

In the present study many wild vegetables are also being consumed for various medicinal purposes. *Azadirachta indica*, *Butea monosperma*, *Syzygium cumini* were commonly used to treat deadly disease diabetes. [20] *Cassia fistula*, *Acacia nilotica* and *Mangifera indica* are also used as medicinal plants to cure various women related problem like menstrual disorder, Urinary problems and Leucorrhoea.^[21] The tribal people and other villagers residing study area also uses *Cassia tora*, *Dendrocalamus strictus*, *Grewia tillifolia*, *Hemidesmus indicus*, *Semicarpus anacardium* for the treatment of various diseases. [22]

Ethnobotanical surveys of wild plants indicate that more than 7000 species have been used for human food at some stage in human history. [23] But this important knowledge is slowly diminishing day by day due to invasion of alien cultures. Documentation of wild edible plants from ethnobotanical approach is important for enhancing the understanding of indigenous knowledge system. [24-26]

5. Conclusions

Demand of food and vegetables of increasing population cannot be fulfilled unless we cannot find out the ways and means to increase the production of vegetables and other substitute like wild plants. So it is of the immense need to document the indigenous knowledge of wild edibles for future generations and to encourage the peoples for cultivation of wild edible plants in their home gardens. Further research on cultivation and utilization of wild vegetables would help the tribal and rural people to have better nutrition.

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