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INDIGENOUS TRADITIONAL KNOWLEDGE OF WILD EDIBLE NTFPS PLANT IN ARJUNI MOR TEHSIL OF GONDIA DISTRICT (MS), INDIA

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ABSTRACT:
A study was undertaken to assess Indigenous traditional knowledge (ITK) of non-timber forest products (NTFPS) used as edible purpose in selected sites of Arjuni Mor tehsil of Gondia District, Maharashtra. In view of this, the present work was undertaken which documents as many as 60 plant species belonging to 55 genera and 41families. Survey of wild edible plants has been carried out in 10 villages of Arjuni Mor tehsil of Gondia district, Maharashtra, India. The study showed that the plants used are either eaten raw, cooked by boiling in water, frying in oil or baked to be served as dishes such as stew, salad as hot drink.

Keywords: Wild edible plant, NTFPs, ITK and forest dwellers.

INTRODUCTION:

Non-timber forest products (NTFPs) are an integral part of development and survival of people living in and around forests and depending on them. One of the most important of NTFPs used as edible purpose (Shackleton *et al.*, 2002a). Millions of people in many developing countries depend on wild resources including wild edible plants to meet their food needs especially in periods of food crisis (Balemie and Kebebew 2006). Many wild edible plants are nutritionally rich (Ogle and Grivetti 1985) and can supplement nutritional requirements, especially vitamins and micronutrients. Usage of wild edible plants as a nutrition is well documented among inhabitants of South America, where several hundred species have been recorded (Ladio & Lozada, 2004). Kaur *et al.*, (2011) studied on nutritional aspects of unconventional food consumed by gond and korku tribes inhabiting in Vidarbha. Realizing this fact, the use and conservation of wild edible plants in India has been emphasized by Arora and Pandey (1996).In Maharashtra, Susala Island of Pune district studied by Vartak and Suryanarayana (1995) have reported 130 wild edible plants, which provide food during food scarcity and famine. Zode *et al.* (2016) reported the forest products in the form of NTFPs in Nagbhir tehsil of Chandrapur district (MS) and stated the importance in the socio-economic security net on the forest dwellers. Similarly Zode *et al.* (2014) estimated that, total 45 plants used in various waywere identified as NTFPs in Tirora tehsil of Gondia district. Zode et al. (2015) studied in few villages of Gondia district and observed that, the people of the region are living in remote area which is covered by large forest and therefore they are more dependent on the NTFPs.

In view of this, the present authors felt the urgency of documenting the indigenous traditional knowledge from the local inhabitants the edible use of wild plants growing in their ambience.

METHOD AND MATERIAL:

Study area

The study was carried out in the 10 forest villages of Arjuni Mor tehsil of Gondia district (Figure 1 & 2) where majority of the tribal gather wild edible plant NTFPs products from forest area.

The Primary data was collected through Participatory Rural Appraisal (PRA), group discussion, semi-structured interviews and household survey (Martin, 1995; Pretty *et al.*, 1995).

Questionnaire interviews were conducted in selected villages. Questions were asked in local language i.e. in Marathi and Hindi.

RESULTS AND DISCUSSION

An analysis of the wild edible species concerned with the documented ITK and dependence of the forest dwellers residing in study areas shows that angiosperms have major contribution in the "non-timber forest products" used in edible purpose. There are total 60 NTFPs species of 55 genera representing 41 families used in edible purpose. Of these, 45 species of 41 genera belong to 30 families of Dicotyledons. The Monocotyledons on the other hand contribute to NTFPs in the form of 11 species; belong to 10 genera of 7 families. Thus the dicots appear to be more used than monocots, the ratio at the level of families, genera and species being 4:2, 4:3 and 4:5, respectively (Table 1). Therefore, it concludes that greater dependency of the forest dwellers is on dicots than monocots (Fig. 3).This might lead to their depletion if the consumption is ruthless and irrational. As such there should be a periodic investigation of the flora of the place together with the assessment of their exploitation.

In addition to the angiosperms, the documented NTFPs include two family, genus and species of Pteridophyte, the name of the species being *Marsilea quadrifolia* and *Lygodium flexuosum* whereas two family, genus and species of fungi, the name of the species is *Termitomyces* species and *Agaricus* species.

Mostly used family from Dicot is Caesalpinaceae, contributing 4 species towards NTFPs followed by Anacardiaceae, Rhamnaceae, each of which contribute 3 species each. Among monocots the mostly used families are Araceae, Dioscoriaceae, Poaceae which contribute two species in use as NTFPs in the study area (Fig. 4).

An analysis of habit of the NTFPs generating species reveals that out of 60 NTFPs edible species 28 (46 %) are trees, 10 (17 %) shrubs, 16 (27 %) herbs and 4 (7 %) climbers and remaining 2 (3 %) are fungi (Figure 1.5). Tree species are exploited more than others i.e. shrubs, herbs and climbers. A good number of species of herbs is used in contrast to shrubs and climbers. This observation is rather encouraging from conservational purview, since the indigenous traditional knowledge was found to spare trees from felling.

Furthermore, the heterogeneity as observed in the plant habit based vertical stratification of the forest community seems to have been maintained by the forest dwellers. Use of a few species of herbs and low number of shrubs means lesser interference with and exploitation of the forest floor. Maintenance of this kind of vertical stratification is of prime importance in rendering stability to the forest ecosystem.

So far the local status of total 60 NTFPs wild edible species is concerned, 13 % were found to be rare and less common categories. The remaining species were observed to belong to "very common" (30 species i.e. 50 %), "common" (14 species i.e. 23 %) (Fig. 6).

The taxa names of plant food resources and the parts used are enumerated in the table 3. There were found that near about 13 plant parts used for edible purpose. Among them mostly utilized edible part were found ripe fruits, collected from 30 species (Fig. 7). Which are used to cater nutritional requirements of various forest dwellers of Arjuni Mor tehsil of Gondia district. According to local tradition, wild edible plants are consumed in many different such as ways 24 species are eaten raw, 24 species only cooked, 3 species are raw and cooked, 4 species are raw and pickled and 4 species are used as flavoring agents. Cooked and raw recipes constitute similar percentage i.e. 39% of the modes of consumption while other edibles follow with the relatively less percentage (Fig. 8).

The result shows that 72 plant parts were used out of the 60 edible plants recorded in the study area. This means that more than one part of the species was consumed by forest dwellers. The result

indicates that 12 number of plant parts exceeds the number of available plants in the study area. The highest consumption of edible plant part comes from fruits followed by the unripe fruits. The study also revealed that tree species provide highest edible part for consumption.

The threat perception was analyzed by segregating the documented plants on the basis of their parts consumed and it was found that the species whose ripe and unripe fruits, seed, flowers, rhizome, tubers, stem bark, and fruiting body are consumed are exposed to high threat perception, whereas, the plant species whose leafy twig, young leaves, leaves, young stem and young inflorescences are consumed face low threat perception (Table 2).

In the present study medicinal wild vegetable species reported. Many wild vegetables are also being consumed for various medicinal purposes. The demarcation line between food and medicine may not always be clear. For example, *Achyranthes aspera*, leaf juice is used against cough, *Alteranthera sessilis* is against jaundice; *Boerhavia diffusa*, is against liver diseases (Jain, 2010).Such unconventional wild edible plants are sources of fats, proteins, rich source of micro-nutrients and trace elements (Kulkarni, 2006). According to Guptha et al., (2010) *Boerhavia diffusa* are used against urinary disorders. Tuber of *Dioscorea bulbifera* is used to avoid intestinal worms (Tayade and Patil, 2006). According to Etkin, (1994) wild foods are consumed not only for caloric value, but also for other nutrient and pharmacologic potential. Zode et al. (2017) studied in Salekasa tehsil of Gondia district and observed that, 85 NTFPs species used as wild edible plants by the forest dwellers.

CONCLUSION:

As most of the indigenous people live in forests and live mostly below poverty level, they have to depend on the forest flora for food purpose and easily accessible even during adverse conditions like drought and famine. As many as 60NTFPs species of food plants are recorded to use as edible plant but they have been under going shrinkage mainly due to habitat depletion. Forest ecosystem is likely to be damage if over – exploitation of these species. In view of these, the forests need to and be saved and strategically restored collaterally with economic welfare of the associated people and these species should be sustained as such. Such wild edible species are selected from the wildness for their large scale cultivation to address the issue of food security for the future generations.

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Fig. 1: Map showing Maharashtra state in India

Fig. 2: Map showing Gondia district.

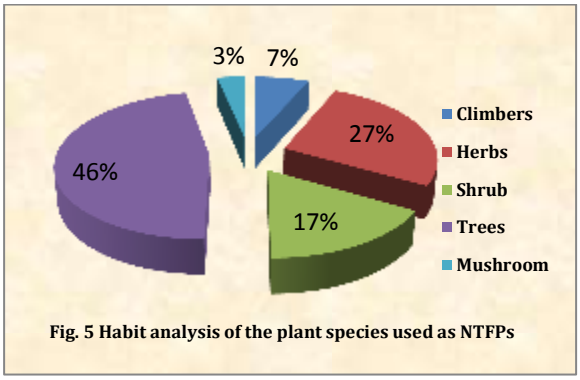

Fig. 5 Habit analysis of the plant species used as NTFPs

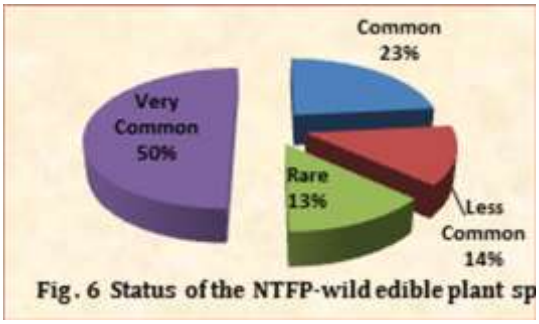

Fig. 6 Status of the NTFP-wild edible plant sp

Table 1 Taxonomic analysis of Angiosperm (Dicots & Monocots), Pteridophyte& Fungi concerned with the indigenous traditional knowledge about wild edible NTFPs

Taxa	Total	Dicot	Monocot	Pteridophyte	Fungi	Ratio (Dicot: Monocot)
Species	60	45	11	2	2	4.09
Genus	55	41	10	2	2	4.1
Family	41	30	7	2	2	4.2

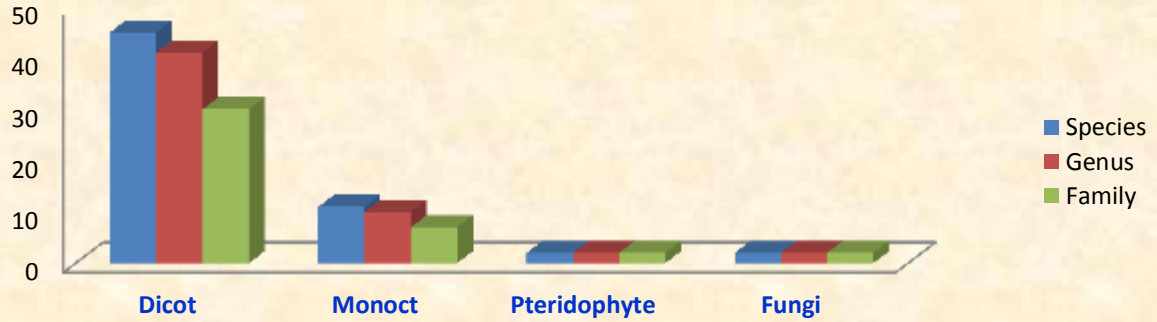

Fig. 3 Taxonomic analysis of wild edible plant associated with forest under study

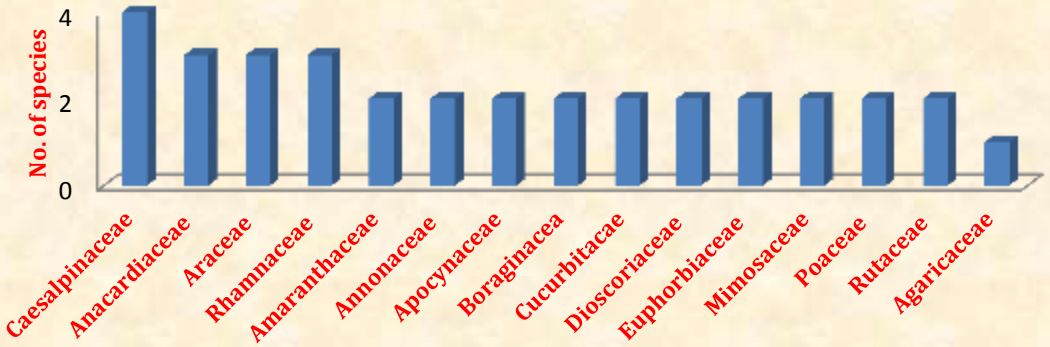

Fig .4 A Glimpse of dominating Dicot & Monocot families

Fig. 7 Analysis of usable parts of edible wild plants of the study area

species used as wild edible plants by the forest dwellers.

Table 2 An analysis of the number of parts used per species and their threat perception

Plant parts	Number of species	Threat perception
Ripe fruit	30	High
Unripe fruit	10	High
Flower	6	High
Seeds	3	High
Leafy twig	3	Low
Rhizome	3	High
Young leaves	3	Low
Tubers	2	High
Leaves	7	Low
stem bark	1	High
Young stem	1	Low
Young inflorescence	1	Low
Fruiting body	2	High

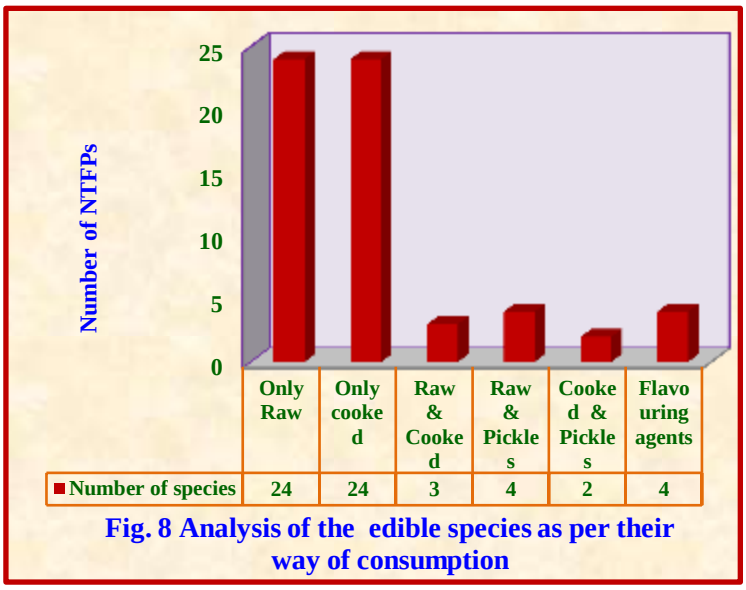

Fig. 8 Analysis of the edible species as per their way of consumption

Table 3 An account of Edible wild plants documented from forest dwellers settled in study area.

S. N.	Plant species	Family	Habit	Status	Local name	Edible parts	Way of Consumption/ Dish prepared
1	*Acacia catechu*	Mimosaceae	Trees	C	Khair	Stem bark	Stem bark used as dye .it is also Katha, one of the ingredients of Pan (Flavouring agents).
2	*Achyranthes aspera*	Amaranthaceae	Herbs	VC	Chilati	Seeds	Dry seeds are Eaten as raw.
3	*Aeglemarmelos*	Rutaceae	Trees	C	Bel	Ripe Fruits	Ripe fruits are eaten as raw.
4	*Agaricus* sp.	Agaricaceae	Fungi	C	Yerusatya	Fruiting body	Fruiting bodies are eaten as vegetables (Cooked).
5	*Alangiumsalvifolium*	Alangiaceae	Trees	VC	Akawal	Ripe Fruits	Ripe fruits are eaten as vegetables (Cooked).
6	*Aloe vera*	Liliaceae	Herbs	VC	Korphad	Leafy twig	Leaf twig are eaten as raw.
7	*Alternanthera sessile*	Amaranthaceae	Herbs	VC	Galighosh	Leafy twig	Leafy shoots are eaten as vegetables (Cooked).
8	*Amorphophallusc ampanulatus*	Araceae	Herbs	VC	Suran	Rhizome	Rhizomes are eaten as a vegetable (Cooked).
9	*Annonareticulata*	Annonaceae	Trees	LC	Ramfal	Ripe Fruits	Ripe fruits are eaten as raw.
10	*Annonasquamosa*	Annonaceae	Trees	VC	Sitaphal	Ripe Fruits	Ripe fruits are eaten as raw.
11	*Azadirachta indica*	Meliaceae	Trees	C	Kadunimb	Ripe Fruits, Young leaves	Frequently ripe fruits are eaten as raw.
12	*Bauhinia purpurea*	Caesalpiniaceae	Trees	C	Kanchanvrush	Flowers, Ripe Fruits	Flowers are eaten as vegetables in the form of "Bhaje" (Cooked) & Fruits are eaten as vegetables (CooKed).
13	*Boerhaviarepens var. diffusa*	Nyctaginaceae	Herbs	LC	Khaparkuti	Leaves	Leaves are eaten as Vegetables - *KhaparkhutichiBhaji*(Cooked).
14	*Buchananiacochinchinensis*	Anacardiaceae	Trees	VC	Charoli	Ripe Fruits, Seeds	Ripe fruits are eaten as raw.
15	*Careyaarborea*	Lecythidaceae	Trees	LC	Kumbhi	Ripe fruit	Ripe fruits are eaten as raw.

16	*Carissa carandus*	Apocynaceae	Shrubs	C	Karvanda	Unripe Fruits	Unripe fruits are eaten as raw and also used in the preparation of pickles.
17	*Cassia fistula*	Caesalpinaceae	Trees	C	Bahawa	Flowers	Flowers are eaten as vegetables (Cooked).
18	*Cassia tora*	Caesalpiniaceae	Herbs	VC	Tarota	Young leaves	Young leaves are eaten as vegetables (Cooked).
19	*Cocciniagrandis*	Cucurbitacae	Climbers	VC	Jungalikundru	Unripe fruits	Unripe Fruits are eaten as vegetables (Cooked).
20	*Colocasia esculenta*	Araceae	Herbs	LC	Dhopa	Leaves	Leaves are eaten as Vegetable (Cooked) i. e. Called as Pan wadi
21	*Commelinabengh alensis*	Commelinaceae	Herbs	VC	Kena	Leafy twig	Young plant eaten as Vegetable (Cooked).
22	*Cordiadichotoma*	Boraginacea	Trees	C	Shelwat, Bhokar	Ripe & Unripe Fruits	Unripe Fruits are eaten as vegetables (Cooked) and also used in the preparation of pickles. Ripe fruits are eaten as raw.
23	*Cordiagharaf*	Boraginacea	Trees	C	Shelwat, Gondani	Ripe & Unripe Fruits	Unripe Fruits are eaten as vegetables (Cooked). Ripe fruits are eaten as raw.
24	*Curcuma longa*	Zingiberaceae	Herbs	LC	Halad	Rhizome	Rhizome is taken as edible wild when it fresh and Powder of rhizome used as spice (Cooked) &flavouring agent.
25	*Cymbopogon nardus*	Poaceae	Herbs	C	Gawatichaha	Leaves	Whole plants used as flavouring agent during making Tea (Cooked).
26	*Dendrocalamusstrictus*	Poaceae	Shrubs	VC	Bamboo	Young stem	Base of stem (Young stem bud) are eaten as a vegetables (Vaste), Pakoda (Cooked).
27	*Dioscoreaalata*	Dioscoriaceae	Climbers	R	Matalu	Tubers	Tubers are eaten as a vegetables (Cooked).Tuberous root are used to prepare the stir-fried chips and are eaten during religious fasting.
28	*Dioscorea bulbifera*	Dioscoriaceae	Climbers	R	Matalu	Tubers	Tubers are eaten as a vegetable (Cooked).
29	*Diospyrosmelanoxylon*	Ebenaceae	Trees	VC	Tendupata	Ripe fruits	Ripe fruits are eaten as raw.
30	*Embilcaofficinalis*	Euphorbiaceae	Trees	VC	Awala	Ripe & Unripe Fruits	Unripe fruits are eaten as raw and also used in the preparation of pickles.
31	*Ficus racemosa*	Moraceae	Trees	VC	Umber	Ripe fruits	Ripe fruits are eaten as raw.
32	*Grewiaasiatica*	Tiliaceae	Shrubs	R	Phaalsa	Ripe fruits	Ripe fruits are eaten as raw.
33	*Holarrhena pubescens*	Apocynaceae	Trees	VC	Pandharakuda	Flowers, Unripe fruits	Flowers are eaten as vegetables (Cooked).
34	*Lantana camera*	Verbenaceae	Shrubs	VC	Ghaneri	Ripe fruits	Ripe fruits are eaten as raw.
35	*Limonia acidissima*	Rutaceae	Trees	R	Kawath	Ripe fruits	Ripe fruits are eaten as raw and used to make the chatney (Pickles).
36	*Lygodium flexuosum*	Polypodiaceae	Herbs	C	Jatashankar	Leaves	Young leaves are fried with oil and used as vegetable (Cooked).
37	*Madhuca longifolia*	Sapotaceae	Trees	VC	Mahua	Ripe Fruits, Flower	Ripe fruits are eaten as raw.
38	*Mallotus philippensis*	Euphorbiaceae	Trees	C	Shendi	Ripe fruits	Ripe Fruits are eaten as raw.
39	*Mangifera indica*	Annacardiaceae	Trees	VC	Aam	Ripe & Unripe Fruits	Unripe fruits are eaten as raw and also used in the preparation of pickles.

40	*Marsilea quadrifolia*	Marsileaceae	Herbs	R	-	Leaves	Leaves are eaten as Vegetables (Cooked).
41	*Maytenuss enegalensis*	Celastraceae	Shrubs	VC	Bharati	Inflorescences	Young inflorescences are eaten as vegetables (Cooked).
42	*Momordica dioica*	Cucurbitacae	Climbers	LC	Katwel	Unripe fruits	Unripe Fruits are eaten as vegetables (Cooked).
43	*Moringa oleifera*	Moringaceae	Trees	VC	Shevaga	Unripe fruits	Unripe Fruits are eaten as vegetables (Cooked).
44	*Musa paradisiaca*	Musaceae	Shrub	C	Kela	Ripe fruits	Ripe fruits are eaten as raw.
45	*Nymphaea pubescens*	Nymphaeceae	Herbs	VC	Kamal	Fruits, Flower, Rhizome	Ripe fruits and Flowers are eaten as raw and Rhizome is eaten as vegetables (Cooked).
46	*Ocimum tenuiflorum*	Lamiaceae	Herbs	VC	Tulas	Leaves	Younge leaves are as a raw. Fresh leaves are used to make a Tea for of good flavour (Cooked)
47	*Olax psittacorum*	Olacacea	Shrubs	VC	Hartfari	Young leaves	Young leaves are eaten as vegetables (Cooked).
48	*Oroxylum indicum*	Bignoniaceae	Trees	R	Tetu	Flower & Unripe fruit	Flowers are eaten as vegetables (Cooked) and Unripe fruits are used in the preparation of pickles.
49	*Phoenix sylvestris*	Palmae	Trees	VC	Sindi	Ripe fruits	Ripe fruits are eaten as raw (Shindoli).
50	*Pithecellobiumdulce*	Mimosaceae	Trees	VC	Chichbili	Ripe fruits	Ripe fruits are eaten as raw.
51	*Semecarpus anacardium*	Anacardiaceae	Trees	VC	Bhelau, Bibba	Ripe fruits	Young cups (Receptacle) are used eaten as vegetables (Cooked). Ripe yellow fleshy cups (Receptacle) commonly used eaten as raw.
52	*Syzygium cumini*	Myrtaceae	Trees	VC	Jambhul	Ripe fruits	Ripe fruits are eaten as raw.
53	*Tamarindus indica*	Caesalpiniaceae	Trees	LC	Chinch	Ripe & Unripe Fruits	Ripe and unripe fruits are eaten as raw.
54	*Terminalia bellerica*	Combretaceae	Trees	C	Behada	Seeds	Ripe and unripe fruits are eaten as raw.
55	*Termitomyces* sp.	Trichlomataceae		R	Bhombodi	Fruting body	Fruiting bodies are eaten as vegetables (Cooked).
56	*Theriophonum indicum*	Araceae	Herbs	VC	Undirkan	Leaves	Leaves are eaten as Vegetables (Cooked).
57	*Trapanatans*	Trapaceae	Herbs	LC	Shingada	Ripe fruits	Fruits are eaten as raw (Cooked), Young fruits are crushed with water and make Khir (Juice).
58	*Ziziphus caracutta*	Rhamnaceae	Shrubs	R	Katbor	Ripe fruits	Ripe fruits are eaten as raw.
59	*Ziziphus mauritiana*	Rhamnaceae	Shrubs	VC	Ber	Ripe fruits	Ripe fruits are eaten as raw. Dry fruits boiled with water and sugar and eaten as *Borkutkatli (Cooked).*
60	*Ziziphus oenoplea*	Rhamnaceae	Shrubs	VC	Aeroni	Ripe fruits	Ripe fruits are eaten as raw.