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Research article

PRELIMINARY STUDY ON THE UTILIZATION OF WILD VEGETABLES BY MUTHUVAN TRIBES OF IDUKKI DISTRICT OF KERALA, INDIA

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ABSTRACT: The tribal communities from different parts of the world depend on the wild plants and plant parts to fulfill their dietary needs. They have developed a unique knowledge of plant utilization. The present study aims to document the information about wild vegetables used by *Muthuvan* tribes of Idukki district of Kerala state. The information was gathered through intensive field surveys conducted during 2010 December to 2012 February. Around 40 plant species belonging to 32 genera and 19 families were recorded. Among them 70% species contribute to vegetables by their leaf and stem, 18 % by fruit, 8% by tubers, 2% by corm and 2% by calyx. Documented wild plants are also reported to be in existence even during adverse conditions like drought. The report of this study would help to preserve the indigenous knowledge on wild vegetables used by *Muthuvans* for their sustainable utilization and conservation.

Key words: Wild vegetables, *Muthuvan* tribe, Idukki, Ethnobotany, Kerala

INTRODUCTION

India is a treasure house of rich genetic diversity of tropical fruits and vegetables. Many of these have got due attention since time immemorial and become popularised due to their larger appeal and ethos. These fruits and vegetables species are being grown as commercial crops in organized way in orchards and prospered continuously due to their economic, social and religious importance. There are 3000 edible plant species known to mankind, and only 30 species alone are contributing to more than 90 percent of the world's calorie intake and 120 species are economically important at the national scale (FAO, 1993). This shows that several hundreds of species remain discarded or unnoticed by various human societies. A number of little known crops and edible species found in the wild are not getting recognition, though they play a crucial role in the food security of tribal and rural families. For instance, various wild species of *Dioscorea*, *Colocasia*, and *Amaranthus*, are the source of vitamins and nutrients, and they supplement the food needs of a multitude of families live in forests (Roy et al., 1998). Many tribal communities are consuming wild plant, as the part of their regular diet and also during periods of drought, food scarcity (Narayanan and Anilkumar, 2007).

India has a tribal population of 42- million, of whom 60- percent live in forest areas and depend on various edible forest products (Jain and Chauhan, 1998). Though the tribal population of India is 8.2 percent Kerala has 1.14 percent of the tribal population. Kerala is the home of 36 different tribal communities and in terms of concentration of tribal population Idukki is the second largest district next to Wayanad. With most of its areas under forest cover. Around eight tribal communities are inhabiting in this district; *Muthuvans* are the one among the largest tribes. These tribes are inhabiting in the premises of Eravikulam National Park, Pampadum shola National Park, Mathikettan shola National Park and the Chinnar wildlife Sanctuary. The present study has been undertaken with the aim of recording the details of various wild vegetables used by the *Muthuvan* tribals of Idukki district of Kerala.

MATERIALS AND METHODS

Field work was conducted during 2010 December to 2012 February. Intensive field surveys with the help of village heads (*Kani*) and persons who have knowledge of wild vegetables (*Vaidya*) were undertaken for collection and documentation. The data were collected according to the methodology suggested by Jain (1964).

Local guides and informants were consulted to locate and collect the plant species from the premises of settlements and nearby forest. Women folk are largely involved in the collection of wild vegetables and men rarely do contribute. Collected specimens were identified with the help of the *Flora of The Presidency of Madras* (Gamble, 1915- 1935), *Flora of British India* (Hooker, 1875 – 2006). The voucher specimens were deposited in the herbarium of Department of Biology, Gandhigram Rural Institute Deemed University, Gandhigram Dindigul, Tamil Nadu. The identified plants are presented in the table form. Plants are arranged alphabetically with Botanical names followed by family, vernacular name in English and Malayalam, habit, part(s) used, and flowering and fruiting. (Table-1).

Table 1: List of wild vegetables used by Muthuvan tribes of Idukki.

Sl. No.	Botanical Name	Family	Vernacular Name (English/ Malayalam)	Habit	Parts used	Flowering and Fruiting.
1	<i>Achyranthes bidentata</i> Blume	Amaranthaceae	Nil/ Cherukadalady	Herb	Leaves and tender stem	Sept- Dec
2	<i>Alternanthera sessilis</i> (L.)R. Br .ex DC.	Amaranthaceae	Sessile joy weed/ Kozhuppacheera	Herb	Stem	Through out
3	<i>Amaranthus tricolor</i> L.	Amaranthaceae	Chinees amaranth/ Cheera	Herb	Tender leaves & Stem	July- Dec
4	<i>Amaranthus viridis</i> L.	Amaranthaceae	Slender amaranth/ Kuppacheera	Herb	Tender leaves & stem	July- Dec.
5	<i>Amorphophallus bulbifer</i> (Roxb.)Blume	Areaceae	Nil/ Kattuchena	Herb	Tender stem	May- july
6	<i>Basella alba</i> L.	Basellaceae	Indian spinach/ pasalicheera	Climber	Stem and leaves	Dec. –feb
7	<i>Begonia floccifera</i> Bedd.	Begoniaceae	Nil/Kalthamara	Herb	Leaf and stem	Nov- June
8	<i>Boerhavia chinensis</i> (L.)Asch. & Schweinf.	Nyctaginaceae	Hog weed/Nil	Herb	Tender leaf & stem	Feb- Dec.
9	<i>Boerhavia diffusa</i> L.	Nyctaginaceae	Hog weed/ Thazuthama	Herb	Tender leaf & stem	Aug.- Dec
10	<i>Celosia argentea</i> L. var. <i>argentea</i>	Amaranthaceae	Quill grass/Cheruchiira	Herb	Tender leaf & stem	Nov- Dec
11	<i>Cissus quadrangularis</i> L.	Vitaceae	Adament creeper/ Changalamparanda	Climber	Leaf and tender stem	June- jan
12	<i>Cleome monophylla</i> L.	Capparidaceae	Nil/ Kattukaduku	Herb	Tender leaves& stem	Feb-Aug.
13	<i>Cleome viscosa</i> L.	Capparidaceae	Wild Mustard/ Aryaval	Herb	Tender leaves & Stem	Mar- July
14	<i>Dioscorea bulbifera</i> L.	Dioscoreaceae	Air potato/ vallikizangu	Climber	tuber	Sept- Oct.
15	<i>Dioscorea pentaphylla</i> L.	Dioscoreaceae	Fiji yam/ Nooran	Climber	Tuber	Sept- Dec
16	<i>Hibiscus sabdariffa</i> L.	Malvaceae	Redsorrel/ Mathipuli	Shrub	Persistent calyx	Dec- Feb
17	<i>Ipomea deccana</i> Austin.	Convolvulaceae	Nil	Runner	fruit	Aug.- Jan.
18	<i>Ipomea muricata</i> (L) Jacq.	Convolvulaceae	Gaint potato Muthalakizhangu	Runner	Tuber	July- Nov.
19	<i>Justicia betonica</i> var. <i>betonica</i> L. Hook.	Acanthaceae	White shrimp plant/vellakurinji	Shrub	Leaf and stem	Nov- Jan.
20	<i>Kedrostis courtallensis</i> Arn.	Cucurbitaceae	Nil	Climber	Tender leaves & stem	Aug- sept
21	<i>Luffa cylindrica</i> (L.) M.Roemer	Cucurbitaceae	Sponge gourd/ Kattu peechil	Climber	fruit	Feb- dec.
22	<i>Lycianthes laevis</i> (Dunal) Bitter	Solanaceae	Nil	Herb	Leaf and petiole	Dec –May
23	<i>Momordica charantia</i> L. var. <i>muricata</i>	cucurbitaceae	Bitter gourd/paval	Climber	Fruit	June- sept.
24	<i>Oxalis corniculata</i> L.	Oxalidaceae	Indian sorrel/ Puliyaarila	Herb	Tender leaf & stem	March- Dec.
25	<i>Oxalis dehradunensis</i> Raiz.	Oxalidaceae	Nil	Herb	Leaf & petiole	May- Nov

26	<i>Persicaria chinensis</i> L.	Polygonaceae	Nil/ Mudanthi	Shrub	Tender leaf & stem	Through out
27	<i>Persicaria nepalense</i> (Meissner) Gross	Polygonaceae	Nil/ Cherumukkala	Herb	Tender leaf & stem	Oct- dec.
28	<i>Physalis peruviana</i> L.	Solanaceae	Cape gooseberry/ Pottapalachedy	Herb	Tender leaf & stem	Feb- May
29	<i>Rungia wightiana</i> Nees	Acanthaceae	Nil	Shrub	Tenser leaves and stem	Dec- Jan.
30	<i>Sauropus androgynus</i> (L.) Merr.	Euphorbiaceae	Chikurumanis/ elacheera	Shrub	Tender leaf & stem	Aug- Dec.
31	<i>Sechium edule</i> (Jacq.)Sw.	Cucurbitaceae	Chow-chow/ Sochakka	Climber	Fruit	Feb.- July
32	<i>Senna occidentalis</i> (L.) Link	Fabaceae	Coffee- senna/ Osithakara	Herb	Tender leaf & stem	July- Dec.
33	<i>Senna tora</i> (L.) Roxb.	Fabaceae	Fetid cassia/ Thakara	Herb	Tender leaf & stem	Aug.- Dec
34	<i>Solanum americanum</i> Miller.	Solanaceae	Apple of Sodom/ Eradakukker	Herb	Tenser leaves & Stem	March- Nov.
35	<i>Solanum pseudocapsicum</i> L.	Solanaceae	Jerusalem berry/ Undamulaku	Shrub	Fruit	Through out
36	<i>Solanum torvum</i> Sw.	Solanaceae	Turkey berry/Aanacunda	Shrub	Tender leaf & stem	July- Mar.
37	<i>Talinum portulacifolium</i> (Forssk)	Portulacaceae	Water leaf/ badalacheera	Herb	Leaf and stem	Feb.- Aug
38	<i>Trianthema portulacastum</i> L.	Aizoaceae	Nil/ Pasalicheera	Herb	Stem and leaf	Apr.- June
39	<i>Trichosanthes cucumerina</i> L.	Cucurbitaceae	Snake gourd/ Kattupadavalam	Climber	Fruit	Dec.- May
40	<i>Zeheneria maysorensis</i> (Whit & Arn.)	Cucurbitaceae	Nil	Climber	Fruit & Leaf	Oct.- Dec.

RESULTS AND DISCUSSION

Forest resources, mainly plants and plant products, have an important place in the daily life of tribals and other forest dwellers. The tribal communities are largely dependent on the forest produce for their sustenance. Forest provides them wood, food, fuel, fodder, medicine and wide range of other Non - Timber Forest products (NTFPS), that are essential not only for meeting their own requirements, but these are also a potential source of their income for livelihood.

Wild foods provide a greater dietary diversity to those who rely on them. Ethnobotanical surveys of wild plants indicate that more than 7000 species have been used for human food at some stage in human history (Grivetti and Ogle 2000; MEA, 2005). The wild plants from forest provide many essential nutrients which help to improve both the physical and mental well-being of tribals. In remote, the tribal areas where vegetable cultivation is not practiced and market is not available tribals depend on locally available plants which can be used as vegetables. At present ethnic people from various tribes have started domesticating wild edible and useful plants by trial and error method and that formed the base for modern agriculture. (Prescott & Prescott, 1990; Scherreh et al, 2005 and Bussmann et al, 2006).

In the present study there are around 40 species of angiosperms belonging to 32 genera and 19 families have been recorded. Among the 19- families, the most widely utilized plant species belong to Cucurbitaceae (6) followed by Solanaceae (5), Amaranthaceae (5) Nyctaginaceae (2), Capparidaceae (2), Convolvulaceae (2), Acanthaceae (2), Dioscoreaceae (2) Oxalidaceae (2), Polygonaceae (2) and Fabaceae (2) and the rest of the nine families with single species (Fig. 1). Among the 40 species, 70% of plant species contribute as vegetables by their leaf and stem, 18% by fruit, 8% by tubers, 2% by corm and 2% by Calyx. (Fig.3) While analyzing the life forms of the wild edible vegetable species, it was noticed that, 52% were herbs, 25% climbers, 18% shrubs and the remaining 5% runners (Fig.2).

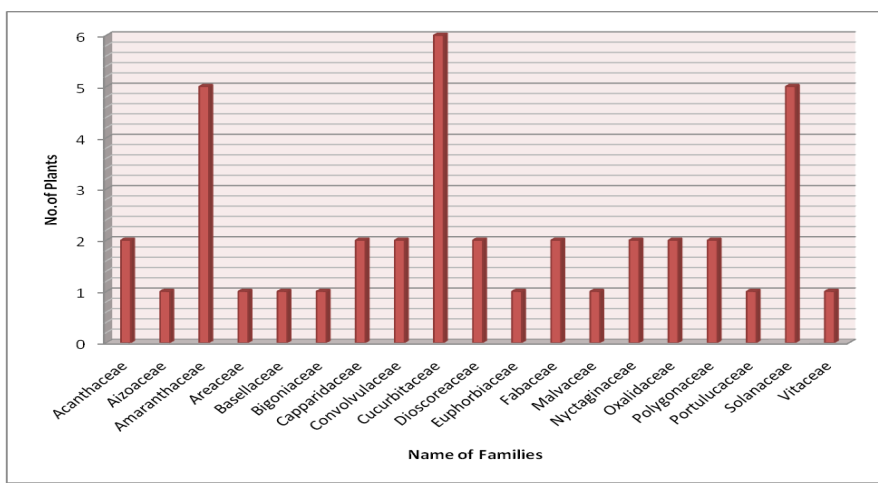


Fig.1 Family wise distribution of wild vegetables.

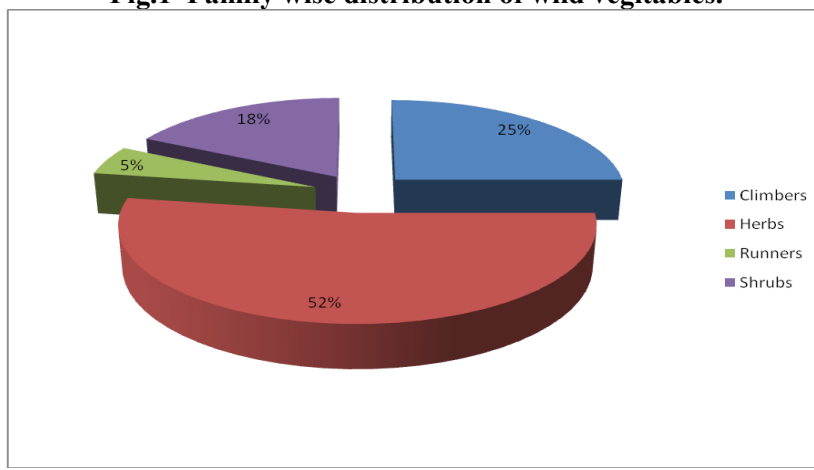


Fig. 2 Life forms of wild vegetables.

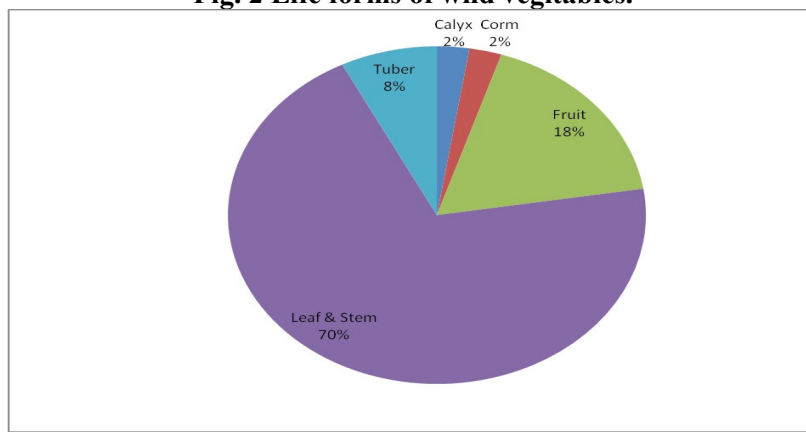


Fig. 3 Percentage distribution of plant parts used as vegetables

This study reveals that tribal people of *Muthuvan* community living in particular area depends wild plants and plant parts as vegetable sources and they have considerable knowledge on their use. Wild edible plants are reported to play a vital role in supplying food for poor communities in many rural parts of the world (Sundriyal et al.,2003).

Vegetables play a crucial role to meet the nutritional needs of the people in remote areas. The term 'wild' indicates the non cultivated plants gathered in the field. They were eaten most often with rice or other cereals either raw or cooked to compensate their day to day calories requirements. They are the rich source of carbohydrates, vitamins, minerals but are low in fat and protein. Many have high moisture and low dry matter. Most of them have potential medicinal values too. Major constituents of vegetables to human health care are the large quantity of vitamin C, Vit. A and Vit. B complex as well as good amount of dietary fibers and phytochemicals. That is why they are called as *protective food* (Rai et al., 2004).

Some documented vegetables analyses report that wild plants like *Amaranthus viridis* and *Amaranthus tricolor* are rich in proteins, Vit C. and essential amino acids; *Oxalis corniculata*, with high amount of crude protein and lipids (Jain et al., 2010); *Hibiscus sabdaraffa* with carbohydrates, crude lipids and antioxidants such as flavanoids(Adanlawo and Ajibade, 2006) ; *Basella alba*, rich in Vit.C, Vit.A and amino acids; *Boerhavia diffusa* with high amount of saponin, alkaloids- hypocholostrolic effect and also a potential source of Vit.B₃ (nicotinamide); *Talium* and *Celocia* as source of Vit C; *Cissus quadrangularis*, *Kedrostis sp.*, *Dioscorea pentaphylla* and *D.bulbifera*, with rich crude fiber; Cleome with high amount of β- carotene, Vit .C and micronutrients like Fe (Prince et al.,1987).

Critical evaluation of the literature reveals that the leafy vegetable with high amount of folic acid promotes the multiplication and maturation of cell, and avoid anemia. Fiber cleanses the digestive tract, by removing potential carcinogens from the body and prevents the absorption of excess cholesterol and prevents the intake of excess starchy food and may therefore guard against metabolic conditions such as hypercholesterolemia and diabetes mellitus. The tubers, rhizome, corm, roots and stems contain high carbohydrates or Nitrogen Free Extractives (NFE). The presence of relatively high contents of total crude fat and NFE were found to be responsible as a good source of energy. Ascorbic acid (vitamin C), flavanoids are antioxidants which help to protect the body against cancer and other degenerative diseases such as arthritis type II diabetes mellitus and also strengthen the immune system. (Narasinga Rao et al.,1989).

In the present study medicinal wild vegetable species reported by Muthuvans are *Boerhavia diffusa*, *Momordica charantia*, *Oxalis corniculata*, *Oxalis dehradunensis*, *Persicaria chinensis* and *Solanum torvum*. 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 bidentata* leaf juice is used against cough, *Alteranthera sessilis* is against jaundice; *Boerhavia diffusa*, *B.chinensis*, *Luffa cylendrica* are against liver diseases (Jain,2004).

According to Gupth et al.,(2010) *Cleome viscosa* is used against skin disease, *Persicaria chinensis* used as antiseptic. Plants like *Amaranthus viridis* and *Boerhavia diffusa* are used against urinary disorders. *Celosia argentea* is used to clean the uterus after delivery. Leaves of *Solanum americanum* is administrated to cure arthritis.(Meena and Rao,2010). Tuber of *Dioscorea bulbifera* is used to avoid intestinal worms while calyx of *Hibiscus sabdaraffa* used against poisoning (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.

The contents of the wild vegetables also protect our body against various malnutrition, and nutrient disorders. Furthermore, in a study conducted by FAO,(1999) it has been reported that wild foods are the parts of rural people diet not only during the periods of food shortage but also on the daily basis. The daily conception of wild products contributes to overall nutritional well being of the tribes.

CONCLUSION

Wild plants are reported to be edible and easily accessible even during adverse conditions like drought and famine. Such wild species are accepted like other cultivated species and they play an important role in solving the various food problems of the world. India is in the second position in population as well as vegetable production.

However it cannot meet the recommended requirement of 300g/ Capita/day of vegetables for a balanced diet. Although, 175 vegetables are grown in India, there is a big challenge to achieve the target of 160million tons of vegetables to fulfill the requirement by 2020 (Rai, 2006). In order to meet the demand of increasing population, it is important to find out the ways and means to increase the production of vegetables and other substitute like wild plants. Hence knowledge on the wild vegetables would help to meet the demands.

Domesticated vegetables have been selectively bred for look, production quality, taste, length of storage, and qualities other than nutrition and these vegetables sold in the market are exposed to various pesticides, herbicides, and variety of other chemicals and they have been genetically modified or irradiated. At this context safety of eating is a general concern. Wild foods don't have these problems. Further research on nutrition and cultivation of wild vegetables used by the *Muthuvans* would help in the sustainable utilization of wild plant resources to have better nutrition.

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