



ETHNOBOTANICAL DOCUMENTATION OF WILD EDIBLE FRUITS USED BY *MUTHUVAN* TRIBES OF IDUKKI, KERALA- INDIA

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ABSTRACT

Throughout history, wild edible plants have sustained human populations in each of the inhabited continents. Human consumption of wild plants has been documented from antiquity into the common Era. Dietary use of wild fruits, nuts, seeds, and leaves appear in numerous historical records. Today, most human plant foods are based on a rather limited number of crops. However, it is clear that in many parts of the world, the use of wild plants is not negligible. In India, the indigenous fruits collected from the wild play a significant role in the food and nutrient security of rural poor and tribals. Some wild fruits have been identified to have better nutritional value than cultivated fruits. The present communication deals with the ethnobotanical exploration, identification, concerns and future potentialities of the wild edible fruits consumed by the *Muthuvan* tribes inhabiting the hilly areas of Idukki district of Kerala. Thirty eight species of wild edible fruits belonging to 25 genera and 17 families used by *Muthuvans* were recorded. Due to the climate change, the level of poverty, and environmental degradation, there is a high risk of biodiversity loss at a large scale. Under such circumstances, the knowledge and uses of nutritious, climatically adapted wild edible fruits will be irreversibly lost. Hence, research attention is needed to increase awareness on the use and management of wild edible fruits for their conservation.

KEY WORDS Idukki, Kerala, *Muthuvan* tribe, wild edible fruits



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INTRODUCTION

Forests are the integral part of global sustainable development. Forest related economic activities affect the livelihoods of 1.6 billion people worldwide; they provide socio-cultural benefits and the foundation for indigenous knowledge. As an ecosystem, forests play a crucial role in mitigating the effects of climate change and protecting biodiversity. It is in this context that the need for sustainable forest management arises. This refers to the use and conservation of forest and forest products for the benefit of the present and future generations.

The scientific research conducted inside the forests reported, forest as a natural habitat of the wild edible plants such as cereals, fruits, tubers and vegetables. Wild edible plants play a very important role in the livelihoods of rural communities as being an integral part of the subsistence strategy of people in many developing countries. Locally available wild genetic resources can be used for new crop species development. In many parts of the world, wild plants are obtained from forests or wild areas are designated for extractive resources and managed by local communities.

Food plants serves as alternatives to staple food during periods of food deficit and are the valuable supplements for a nutritional balanced diet one of the primary alternative source of income for many resource poor communities, and the source of species for domestication [1]. Apart from their traditional use of food, potentially these wild plants have many advantages. They are used as medicine, fodder, and for rituals and other functions. The edibles having nutritional food value provide minerals like sodium, potassium, magnesium, iron, calcium, and phosphorus. They are immune to many diseases and often used in different formulations of Indian folk medicine. From the past, wild edible fruits have played a vital role in supplementing the diet of the people. Due to the introduction of exotic varieties, the dependence on wild fruits has

gradually declined. But many people in tribal areas still use them as a supplement of their food. Some of them are preserved for the use in the dry period or sold in the rural market. But the popularity of these wild forms has recently decreased.

Wild fruits are generally used as raw or processed, which help to compensate the day-to-day requirement of calories. Wild fruits play a significant role in human nutrition, especially as sources of carbohydrates, proteins, vitamins [C (ascorbic acid), A, thiamine (B₁), niacin (B₃), pyridoxine (B₆), folacin (also known as folic acid or folate) (B₉), E], minerals, dietary fiber and enormous medicinal potential [2-5] Their contribution as a group is estimated at 91% of vitamin C, 48% of vitamin A, 30% of folacin, 27% of vitamin B₆, 17% of thiamine, and 15% of niacin in the diet. Fruits and vegetables also supply 16% of magnesium, 19% of iron, and 9% of calories. They provide fiber which prevents constipation. The production and consumption of these fruits in arid zones provide dietary supplementation as well as commercial opportunity.

Muthuvans are one of the prominent tribes of Idukki district. They are the major inhabitants of the hilly areas of in Devikulam thaluk. The district lies approximately within 9°20' – 10°20' N latitude and 76°30' to 77°30' E longitude. *Muthuvans* prefer to live on the hill slopes of the high ranges of Idukki. The tribes living in this district have been leading an intricate life depending on wild plants in their daily diet. *Muthuvans* collect and use a number of wild edible species available in the forest which are unknown to the rest of the world.

The present study is considered that special attention should be paid in order to maintain and improve this important source of food supply. In order to find a remedy, a wider and sustained acceptance of wild fruits as important dietary components must be stimulated.

MATERIALS AND METHODS

Intensive field survey with the help of village heads (*Kani*) and the persons who have knowledge of wild fruits (*Vaidya*) were under taken during 2010 December to 2012 February. Survey conducted thrice in every year with duration of 15- 20 days. The wisdom of local guides and informants were taken up to locate and collect the plant species from the premises of settlement and nearby forests. Informations were collected from the womenfolk and children who are largely involved in the collection of wild fruits, rarely men also contributed in collecting information. Collected specimens were identified with the help of various floras [6,7]. Voucher specimens were deposited in the herbarium o Department o Biology, Gandhigram Rural Institute- Deemed University, Gandhigram, Dindigul Tamilnadu. The identified plants are tabulated in table form. Plants are arranged alphabetically with Botanical names followed by family, vernacular name, habit, flowering and fruiting (Table- 1).

RESULTS AND DISCUSSION

The Food and Agricultural Organization estimates around 'one billion people use wild foods in their diet'[8] . Forests provide livelihoods and food for some 300 million people in the form of non-timber forest products. Food security has come to depend on a small handful of widely cultivated species. Over 50 percent of the world's daily requirement of proteins and calories comes from three crops—wheat, maize and rice [9]; 12 species contribute 80 percent of the total

dietary intake. By contrast, 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[10,11].Some indigenous communities use over 200 [12]; in India, 600 plant species are known to have value as food[13] ; Malnutrition is a major health burden in developing countries, and the recognition that nutritional security and biodiversity are linked is fundamental for enlisting policy support to secure wild food use and preserve habitats for wild edible species. Tribals are the custodians of the wild biological resources.

The study focused at the knowledge of wild edible fruits consumed by the *Muthuvan* community in Idukki district. Fruits of 38 plants have been found to be used for edible purposes. The social values held by the community have a significant bearing on the manner in which wild edible plants are consumed and conserved by the community for food needs. Plants are arranged alphabetically with botanical names followed by family, vernacular name habit, and flowering & fruiting (Table- 1). Among the 38 species identified, most widely utilized species are belonged to *Euphorbiaceae*, *Moraceae*, *Solanaceae*, and *Passifloraceae* (4 species) followed by *Annonaceae*, *Rhamnaceae* (3 species), *Myrtaceae*, *Rosaceae*, *Rubiaceae*, *sapotaceae*, *sapindaceae* (2 species) and rest of the families were represented by each species (Fig. I). Out of 38 plants recorded, 50% are trees, 26 % are Shrubs, 16% are climbers and 8 % are herbs (Fig. II). Dietary use of wild fruits in Kerala appear in numerous records [14- 19].

Table 1
List of wild edible fruits used by Muthuvan tribes of Idukki district of Kerala.

Sl. No	Botanic Name	Family	Common name	Habit	Flowering and Fruiting
1	<i>Annona cherimola</i> Mill.	Annonaceae	Seethapalam/ Cherimoya	T	May- Aug.
2	<i>Annona muricata</i> L.	Annonaceae	Mullatha/ Soursop	T	April- Oct.
3	<i>Annona reticulata</i> L.	Annonaceae	Atha/Custard apple	T	Feb- Oct.
4	<i>Aporosa cardiosperma</i> (Gaertn.)Merr.	Euphorbiaceae	Not known	T	Dec -June
5	<i>Artocarpus heterophyllus</i> Lam.	Moraceae	Plavu/ jack tree	T	Nov- April
6	<i>Artocarpus hirsutus</i> Lam.	Moraceae	Anjili/ wild jack tree	T	Dec- Mar.
7	<i>Baccaurea courtallensis</i> (Wight)Muell.-Arg.	Euphorbiaceae	Moottipuli/ Nil	T	Jan- June
8	<i>Canthium coromandelicum</i> (Brum.f.)	Rubiaceae	Kattakara/ Wild jegguby	S	Apr.-June
9	<i>Cyphomandra betaceae</i> (Cav.) Sendtner	Solanaceae	Marathakkali/ Tree tomato	S	Throughout the year
10	<i>Debregeasia longifolia</i> (Burm.f)	Urticaceae	Kattunochi/Nil	S	Dec- Apr.
11	<i>Ficus recemosa</i> L.	Moraceae	Athi-al/cluster fig	T	Feb- May
12	<i>Ficus virence</i> var.virence	Moraceae	Chakkila/Nil	T	Jan- March
13	<i>Glycosmis pentaphylla</i> (Retz.)DC.	Rutaceae	Kuttiapanal/Nil	S	Sept- April
14	<i>Grewia tillifolia</i> vahl.	Tiliaceae	Unnam/Nil	T	Feb.- June
15	<i>Hibiscus hispidissimus</i> Griff.	Malvaceae	Mupparacham/Nil	S	Sept- March
16	<i>Ixora coccinea</i> L.	Rubiaceae	Chethi/Flame of the woods	S	Throughout the year
17	<i>Lantana camara</i> L.	Verbenaceae	Kongini/Wild sage	S	Apr. - June
18	<i>Madhuca longifolia</i> (Koenig) Macbr.	Sapotaceae	Illipa/ S.Indian madhu	T	Throughout the year
19	<i>Mimusops elengi</i> L.	Sapotaceae	Elengi/Spanish cherry	T	Dec.-Aug.
20	<i>Nicandra physalodes</i> (L.)Gaertner.	Solanaceae	Ommathan/ Apple of Peru	H	Oct- Feb.
21	<i>Passiflora leschenaultia</i> D.C.	Passifloraceae	Seemavellari/nil	C	March- May
22	<i>Passiflora edulis</i> Sims.	Passifloraceae	Passion fruit/edible passion flower	C	Throughout the year
23	<i>Passiflora ligularis</i> Juss.	Passifloraceae	Passion fruit/Sweet grandilla	C	Dec -May
24	<i>Passiflora foetida</i> var.foetida L.	Passifloraceae	Passion fruit/fetid passion flower	C	July- Dec.
25	<i>Phyllanthus acidus</i> (L.)Skeels	Euphorbiaceae	Nellipuli/Grosella	T	Dec.- May
26	<i>Phyllanthus emblica</i> L.	Euphorbiaceae	Nelli/Goose berry	T	Feb.- May
27	<i>Physalis angulata</i> L.	Solanaceae	Njottanjodiyan/Sun berry	H	July- Dec.

28	<i>Physalis peruviana</i> L.	Solanaceae	Karimpotti/Cape goose berry	H	Feb.- March
29	<i>Rubus ellipticus</i> Smith.	Rosaceae	Cheemullu/Yellow Himalayan raspberry	C	Nov- March
30	<i>Rubus indicus</i> Thunb.	Rosaceae	Chemullu/Nil	S	Oct - March
31	<i>Sapindus trifoliatu</i> s L.	Sapindaceae	Chavakari/Soap nut tree	T	Dec. -April
32	<i>Schleichera oleosa</i> (Lour.)Oken	Sapindaceae	Poovam/Ceylon oak	T	March- June
33	<i>Spoindias pinnata</i> (L.f) Kurz.	Anacardiaceae	Ambhazham/Indian hog plum	T	March- Dec.
34	<i>Syzhygium densiflorum</i> Wall.	Myrtaceae	Kurunaval/Nil	T	April-June
35	<i>Syzhygium laetum</i> (Buch-Ham)	Myrtaceae	Kollinjaval/Nil	T	Dec.- July
36	<i>Zizipus oenoplia</i> (L.)Miller	Rhamnaceae	Cheruthodali/Jackal jujube	C	Nov –March
37	<i>Zizipus rugosa</i> Lam.	Rhamnaceae	Thodali/Jujube	S	Nov- May
38	<i>Zizipus xylopyrus</i> (Retz.) Willd	Rhamnaceae	Kotta/Nil	S	May- June

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

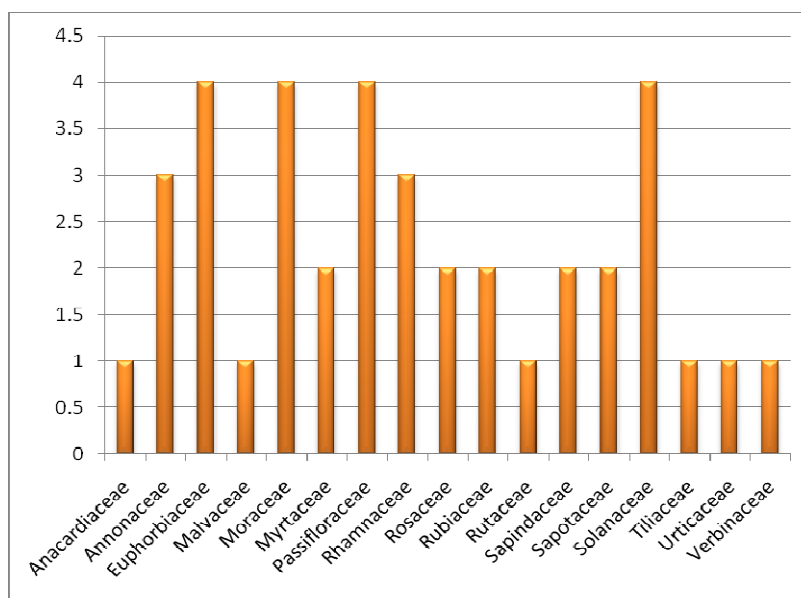


Figure. I
Family wise distribution of wild edible fruits

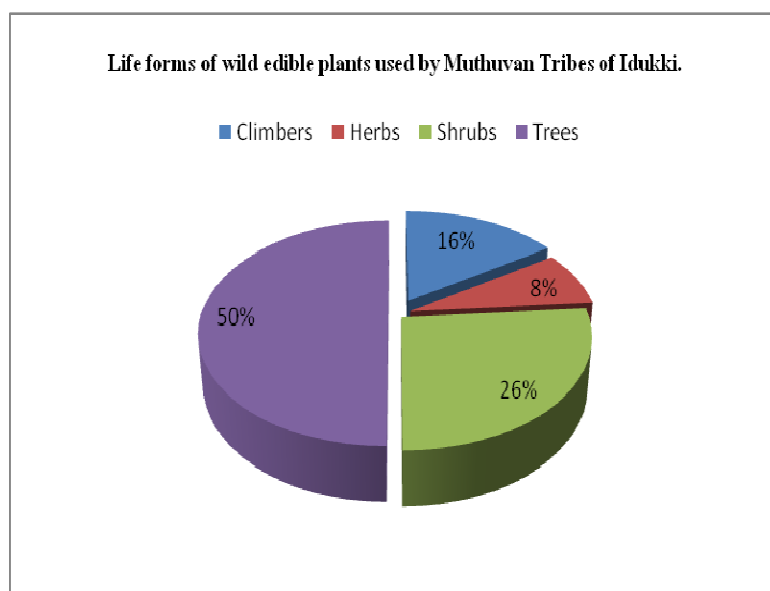


Figure II
Life forms of wild edible fruits used by Muthuvan tribes of Idukki.

In the rural country side of many third world nations, wild fruits are often the only fruits consumed as people cannot afford cultivated commercial fruits such as apple, grape, pomegranate or orange. In India, the indigenous fruits collected from wild play significant role in the food and nutritional security of rural poor and tribes. Some wild fruits have been identified to have better nutritional value than cultivated fruits [20,21]. As a result, in recent years, a growing interest has emerged to evaluate various wild edible plants for their nutritional features [16,22-25].

A comparative nutritional status of most popular and commonly consumed fruits [26,27] with wild edible fruits revealed that most of the wild fruits qualify as high nutrient and mineral content comparable to popular cultivated counter parts such as Banana, Mango, Pomegranate, Sapota, Guava etc. The carbohydrate content for instance in *Mimusops elengi* (18.15%) and *Ziziphus oenoplia* (17.13%) are at par with fruits like mango (17.00%) and pomegranate (17.17%). Similarly, sugar content which characterizes the taste of a fruit was found abundant in *Ziziphus rugosa* (20.70%) which comes second

if compared with cultivated fruits. *Ixora coccinia* (16.2%), *Mimusops elengi* (15.90%) also register high sugar content to cultivated fruits like sapota (21.4%), grapes (16.25%) and pomegranate (16.57%). while *Aporous lindleyana* (5.98%) which is however comparable to the lowest value reported in papaya (7.2%). *Aporus* with minimum reducing sugar (4.9%) and non-reducing sugar (1.06%) while *Mimosops* (6.3%) with high non reducing sugar. *Debregeasia longifolia* (2.09%) *Artocarpus heterophyllus* (1.1%) with high fiber content compared to guava and pomegranate. *Annona* and *Passiflora* are rich source of fiber and phosphors. The comparative study also revealed wild edible fruits to be superior in respect of mineral element composition. High amount of Minerals (N,P,Mg) are registered in *Grewia tilifolia*. *F. resimosa* with high amount of Ca, Na, K while *Physalis minima* is a rich source of Na,Ca,P etc [28]. Among the wild edible fruits *Aporus lindleyana* (0.02%) registered lowest protein value, which is lesser amount compared to the lowest value (0.2%) reported in apples. While *Ixora coccinia* with a minimum fat value (0.01%) [16]. The study shows that all the wild edible fruits under

investigation are good sources of ascorbic acid or vitamin C. *Phyllanthus acidus*, *Phyllanthus emblica*, *Solanum torvum*, *Ziziphus mauritiana* are comparable to contemporary cultivars such as papaya and strawberry and richer in Vit-C content than banana, apple, pomegranate and mango. Iron content of most of the wild edible fruits under investigation was higher than their cultivated counterparts with highest iron content like pomegranate (0.30 mg/100 g), banana (0.26 mg/100 g) and guava (0.26 mg/100 g). The wild edibles as *Mimusops elengi*, *Solanum torvum* and *Glycosmis pentaphylla* showed analogous sodium concentration with strawberry, the fruit with highest sodium content. Calcium, Magnesium and Potassium are essential for making good of worn out cells, building of red blood cells and maintaining body mechanisms [29] Their absence in diet might result in weak, stunted growth and poor bone development [30] They also contain an antioxidant which offers protection against many chronic diseases like heart disease and certain type of cancers[31].

CONCLUSION

This study highlighted the significance of wild fruit species as a source of nutrients for tribals. The food value of many wild fruits compared well with domesticated popular fruits such as

mango, banana, guava, papaya, sapota, etc. in terms of protein, carbohydrate or vitamin content. Wild fruit plants can be included in agro and farm-forestry and reforestation programme, which have so far focused only on timber species. Wild fruit plantation not only improves food base for humans but also helps in sustaining wild animals particularly herbivore and bird population. It was also found that many endemic edible fruits are still unknown which are exploited in the study area. Yet, due to growing population, over exploitation and depletion of biodiversity by natural and artificial hazards, there is a need to collect and conserve those species before the threat of extinction. Multiplication of its population through advanced techniques be tried and introduced in ecologically rich areas and botanical gardens to increase the accessibility of the species.

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