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Documentation of wild edible fruits of nagapattinam district of Tamil Nadu, India

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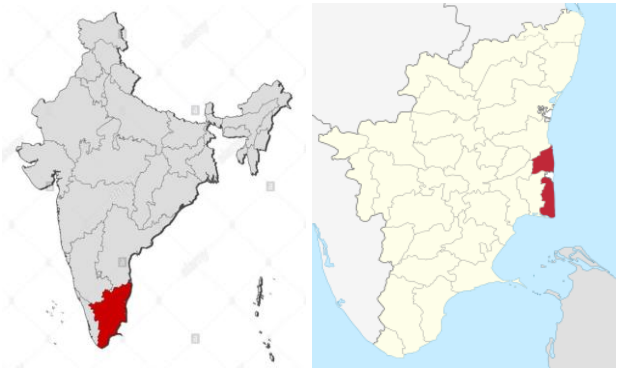
Abstract
The present study deals with the documentation and study of food potential of some traditional wild edible fruits, consumed by tribal communities and village peoples of Nagapattinam district of Tamil nadu, India. Numbers of plant species were documented as wild plants used for food purposes along with their nutritional food value and medicine from the study area. It has been observed that the traditional knowledge is sharp and valuable. The fruits are rich in minerals and carbohydrates. They provide the minerals like sodium, potassium, magnesium, iron, calcium, phosphorus etc. They can be used as remedy for various diseases. This type of study could contribute to educate the younger generation about the importance of wild edible fruits. These wild edible fruit plants can be incorporated as border plants or fence crop along with the commercial crop plants. This will improve planting pattern, food scarcity, economical wealth in villages and tribal areas and also helps in regeneration of barren waste lands.

Keywords: tribal communities, nagapattinam, nutrition, wild edible fruits

Introduction
During early days, man lived by hunting and fruit gathering collected from the wild (Tomar *et al*., 2015) [13]. Since, wild edible plants are freely accessible within natural habitats; indigenous people have more knowledge in gathering and preparing food items from these wild plant resources (Somnasang & MorenoBlack, 2000) [11]. Fruits being a major forest product, supplement human diet as they provide essential vitamins, minerals and fiber required for maintaining health (Kumari, 2008). From the past, wild edible fruits have played a vital role in supplementing the diet of the people. The dependence of these fruits has gradually decline as more exotic fruits have been introduced. But many peoples in villages and tribal areas still use them as a supplement of their basic need of food. Some of them are sold in local market. But the popularity of these wild forms has decreased recently.

Apart from their traditional use of food, potentially they have many advantages. They are edible and having nutritional value, which provides the minerals like sodium, potassium, magnesium, iron, calcium, phosphorus etc. They are immune to many diseases and often used in different formulation of medicine preparations in villages. In order to remedy, a wider and sustained acceptance of wild fruits as important dietary components must be stimulated. Dietary use of wild fruits appear in numerous records from Rajasthan (Katewa. 2003) [6], Andhra Pradesh (Reddy *et. al*. 2006) [9], Nagaland (Deb *et al.*, 2016) [3], Himalaya (Bhatt *et al*., 2017) [2]. Similar reports was recorded in various countries earlier in Thailand (Somnasang and Moreno Black, 2000) [11], Ethiopia (Asfaw and Tadesse, 2001) [1] and Bosnia (Redzic, 2007) [10]. However there is no perfect report about the usage and nutritional potential of wild edible fruits from the study area. Hence the study was undertaken.

Materials & Methods
Study Area
Nagapattinam District is located in Tamil Nadu, India, between 10.79 Northern latitude and 79.84 eastern longitudes. This district covers a total area of 2716 km^2 of which 60% area is agricultural land, urban areas 5% forest area 15% and the remaining 20% is coastal areas. Nagapattinam district lies North in Cuddalore district, West in Thanjavur district, South in Thiruvarur district and East in the Bay of Bengal (Map-1).



(a) (b)

Map 1a: India b) Tamil nadu c) Nagapattinam

Field Study & Data Anayalsis
The study was conducted in April 2018 to March 2019. The information's including Botanical name, Vernacular name, Family name, Useful part and mode of use was obtained through a structured oral interviews. More than 120 village elders were interviewed who have used wild plants. The taxonomic determination of the plant material was carried according to Gamble flora (1936).

Results and Discussion

Indigenous people living in particular areas depend on the use of wild plants or plant parts to fulfill their needs and often have considerable knowledge on their uses. The people generally depend on nearby forest areas to supply their needs. The biological resources are used in many ways. Such as timber, fuel wood, food, wild vegetable, spices, wild fruits and often important medicines. Among them, wild edible plants play a major role in supplying food for poor communities are common by used to day as a supplement for healthy diets in even the most developed regions of the world (Redzic, 2006) [10]. Approximately 75,000 species of plants worldwide are believed to be edible (Walters and Hamilton, 1993). Over the centuries, people have been dependent on these resources for their subsistence as they are efficient and cheap sources of several important micro nutrients (Ali and Tsou, 1997). It has even been suggested that wild food plants are nutritionally superior to some of the cultivated ones (Burlingame, 2000). However these plant resources and their indigenous use are in danger of being lost in areas where environmental and cultural transformations have led to changes in feeding practices. Many indigenous communities change their traditional customs and there by lose their plant knowledge over time (Benz *et al.,* 2000; Byg and Balslav, 2001; Ladio and Lozada, 2003).

Indigenous fruits play very prominent role in the nutrition of peoples in rural and tribal areas. The wild edible fruits are excellent sources of vitamins, carbohydrates, proteins, fibers, minerals and medicinal potential. The production and consumption of these fruits in arid zones provides dietary supplement as well as commercial opportunity. The growing of trees for fruit production encourages the prevention of more or less permanent stands in barren land.

The wild edible fruit plants reported during the study period have been enumerated in Table- 1 with their botanical name arranged alphabetically along with family, local name, parts used and mode of uses. The present investigation includes 48 plant species belonging to 22 families. Out of the 48 plants comprising of 45 Dicotyledons and remaining three are monocotyledons (Fig-1). Among the families, Rutaceae (05 species) occupies the dominant position followed by Cucurbitaceae and Nymphaeceae (04 species).

Table 1: Wild Edible Fruits of Nagapattinam district of Tamil nadu.

S.no	Botanical Name	Vernacular Name	Part Used	Occur Rence	Habit	Mode of use
1	Alangiaceae *Alangium salvifolium.*Lamark	Azingil	Fruit	Rare	Tree	Ripened fruit is eatable
2	Annonaceae *Annona squamosa*.L	Ramar seetha	Fruit	Frequent	Tree	Ripened fruit is eatable
3	*Annona reticulataa*.L	Seemai seetha	Fruit	Frequent	Tree	Ripened fruit is eatable
4	Apocynaceae *Carrisa spinarum*.L	Kalakkaai	Fruit	Frequent	Shrub	Eaten raw or made Pickle
5	Arecaceae(Palmae) *Borrasus flabellifer*.L	Panai	Fruit	Frequent	Tree	Tender fruit is eaten. Ripened fruit also consumed.
6	*Phoenix pusila.*Roxb.	Eaccham	Fruit	Frequent	Tree	Ripened fruits are eaten
7	Bombacaceae *Bombax ceiba*.L	Ilavampanchu	Seed	Frequent	Tree	Roasted seeds are eaten.
8	Boraginaceae *Ehretia microphylla.*Lam	Pakkuvetti	Fruit	Rare	Herb	Ripened fruit is edible
9	*Cordia obliqua.*Willd	Naruvilli	Fruit	Rare	Tree	Ripened fruits are eaten
10	Cactaceae *Opuntia dilini*.L.D.Benson	Chappathikkalli	Fruit	Frequent	Herb	Ripened fruit is edible
11	Capparidaceae *Cleome viscosa*.L	Naikkadugu	Seed	Frequent	Herb	Roasted seeds is used to make Chutney
12	*Capparis spinosus*.L	Aadhalandankaai	Fruit	Rare	Climber	Used as vegetable
13	*Cesalpinaceae Pithocellobium dulce* (Roxb)	Kodukkapuli	Fruit	Rare	Tree	Ripened fruit is edible
14	Combretaceae *Terminalia catappa*.L	Vadha maram	Fruit & Seed	Frequent	Tree	Seed nut is eaten raw
15	Cucurbitaceae *Memordica dioica*.Roxb.	Pazhu pagal	Fruit	Rare	Climber	Used as vegetable
16	*Memordica charantia*.L	Midhi pagal	Fruit	Frequent	Climber	Used as vegetable
17	*Coccinia indica*(L).Voigt	Kovakkai	Fruit	Frequent	Climber	Used as vegetable
18	*Cucumis trigonous.*Roxb	Sukkan kaai	Fruit	Frequent	Climber	Used as vegetable
19	Euphorbiaceae *Averrhoea bilimbi.*L	Pullichakkaai	Fruit	Frequent	Tree	Used to make pickles
20	*Ricinus communis*.L	Aamanakku	Seed	Frequent	Shrub	Oil is used as cooking purposes
21	*Sauropus androgynous*(L)	Poola	Fruit	Frequent	Shrub	Ripened fruit is edible
22	Fabaceae *Mucuna pruriens.*(L).DC	Poonaikkaali	Seed	Frequent	Climber	Boiled seeds are consumed
23	*Canavalia virosa.*Adans	Valaran kaai	Fruit	Rare	Climber	Used as Green vegetable
24	*Phaseolus trilobus.*Ait	Narippayaru	Seed	Rare	Herb	Boiled seeds are consumed
25	Flacourtiaceae *Flacourtia sepiaria.*Ruxb	Kodumundi	Fruit	Rare	Shrub	Ripened fruit is eatable
26	Moraceae *Ficus glomorata.*Roxb	Athi	Fruit	Frequent	Tree	Ripened fruit is edible
27	Nympheaceae *Nymphaea nouchali.*Burm.f.	Alli	Seed	Frequent	Hydrophytes	Rhizome is consumed when boiling Seed flour is used to make Petty
28	*Nymphaea caerulea* .Sav	Chitthalli	Seed	Rare	Hydrophytes	Rhizome is consumed when boiling. Seed flour is used to make Petty
29	*Nymphaea pubecense.*Willd	Sevvalli	Seed	Rare	Hydrophytes	Rhizome is consumed when boiling. Seed flour is used to make Petty
30	*Nelumbo nucifera.*Gaertn	Thamarai	Seed	Frequent	Hydrophytes	Rhizome is consumed when boiling. Seed eaten when roasted
31	Poaceae *Echinocloa frumentacea.*L	Kuthurai vali	Seed	Frequent	Herb	Grain is eatable
32	Rhamnaceae *Zizipus oenoplia*(L).Mill	Soorai	Fruit	Frequent	Shrub	Ripened fruit is edible
33	*Zizipus jujuba.*Mill	Ilanthai	Fruit	Frequent	Tree	Ripened fruit is edible
34	*Scutia myrtina.*Burm.F	Tuvadi	Fruit	Rare	Shrub	Ripened fruit is edible
35	Rubiaceae *Plectronia parviflora*(Lam)Bedd	Kaarai	Fruit	Frequent	Shrub	Ripened fruit is edible
36	*Morinda tinctoria.*Roxb	Nuna	Fruit	Frequent	Tree	Ripened fruit is edible
37	*Morinda umbellata.*L	Manchanathi	Fruit	Rare	Tree	Ripened fruit is eatable
38	Rutaceae *Glycosmis cochinchinensis.*L	Konji	Fruit	Rare	Herb	Ripened fruit is edible
39	*Feronia elephantum.*L	Vila	Fruit	Frequent	Tree	Ripened fruit is edible
40	*Aegle marmelos.*(L).Correa	Vilvam	Fruit	Frequent	Tree	Ripened fruit is edible
41	*Toddalia asiatica.*(L).Lam	Milaharanai	Fruit	Rare	Tree	Ripened fruit is edible

42	*Atlandia monophylla*(L).Correa	Kattu naratthai	Fruit	Rare	Tree	Ripened fruit is edible
43	Sapotaceae *Mimusops elenji.*L	Mahizham	Fruit	Frequent	Tree	Ripened fruit is edible
44	*Madhuca indica*...J.F.Gmel	Iluppai	Fruit & Seed	Rare	Tree	Dried flower is used as an ingredient in food. Dried seed oil is edible
45	*Manilkara hexandra*.(Roxb)Dubard	Ulakkaipalai	Fruit	Rare	Tree	Ripened fruit is edible
46	Solanaceae *Physalis maxima.*Mill	Sodakkut thakkali	Fruit	Frequent	Herb	Ripened fruit is edible
47	*Solanum nigrum.*L	Manitthakkali	Fruit	Frequent	Herb	Used as Green vegetable Ripened fruit is edible
48	*Solanum torvum.*S &W	Sundaikkaai	Fruit	Frequent	Tree	Ripened fruit is edible

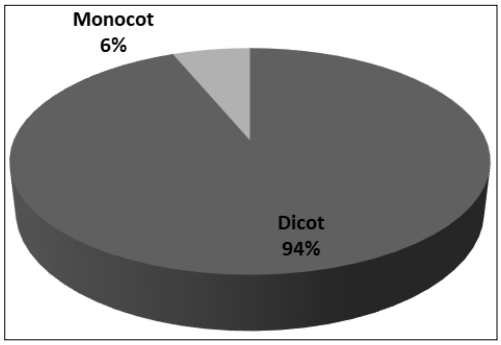


Fig 1

Similarly 18 plant species are rare in study area while others are frequently occurred. Among the study plants Tree occupies the dominant position (22 species) followed by Heb (08 species), Shrub (07 species), Climber (07 species) and Hydrophytes (04 species).

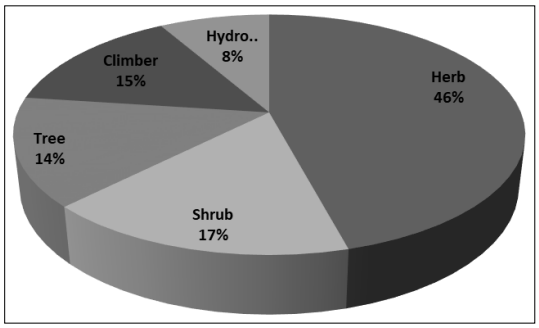


Fig 2: Growth forms of wild edible fruits

Some wild plants and edible fruits are important constituents of biodiversity and their exploitation has become a valuable livelihood strategy and fall back option for rural households during periods of nutritional stress (Bell 1995). A number of recent studies have indicated that the dietary use of wild fruits appears in numerous records especially in underdeveloped countries and some botanical studies and publications have emphasized on the diversity and food value of wild edible fruit plants (Sundriyal *et al*., 2004; Mishra *et al.*, 2007; Deshmukh and Shinde, 2010, Deshmukh and Waghmode, 2011, Chakraborty and Chadurvedi, 2014, Tomar *et al*., 2015, Pradeep *et al.*, 2016, Biswas, *et al*., 2018, Khruomo and Deb, 2018) [12, 13, 7, 4, 5, 3]. Forty eight wild fruiting plant species belonging to 41 genera and 22 families were harvested from natural stands and their habit, local names, parts used and mode of consumption are presented in Table 1. The Rutaceae (10.41 %) and Cucurbitaceae and Nympheaceae (8.33 %) were the families with the highest numbers of edible fruit species. Among the genera, *Nymphaea* were the most highly represented with three species followed by *Annona*, *Solanum* and *Memordica* with two species. Herbs and shrubs made up the highest proportion of edible wild fruit species —46 % herb, 17 % shrub and 15 % climbers. The majority of species (94.6 %) have only edible fruits, while both flower and fruits of *Madhuca indica* and leaves and fruits of are eaten by locals. Many of the species have other uses, satisfying the communities' needs for timber (*Morinda tinctoria*, *Madhuca indica*, *Syzigium cumini*), fuelwood (Neonauclea cadamba), medicine (*Aegle marmelos*, *S. cumini*, *Solanum torvum*, *Solanum nigrum*) and cooking oil (*Ricinus communis*, *Madhuca indica*). Major uses were as food, food adjuncts, and vegetables, beverages, cooking oils (from seed), spices and condiments, medicine and industrial products.

Conclusion

Wild edible fruits play an important role in the nutrition of peoples in rural and tribal communities. The wild fruits are excellent sources of vitamins, carbohydrates, proteins, fibers and minerals and enormous medicinal potential. They can eat raw or processed. These fruits from forests are rich source of protein and energy. The production and consumption of these fruits in arid zones provides dietary supplement as well as commercial opportunity. The growing of trees for fruit production encourages the prevention of more or less permanent stands in bares land. Such trees are often a feature of desert landscapes and form the basis of traditional agro forestry land use system.

Acknowledgement

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