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DIVERSITY OF WILD FRUITS IN NILGIRI HILLS OF THE SOUTHERN WESTERN GHATS- ETHNOBOTANICAL ASPECTS

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ABSTRACT: Nilgiri Hills are situated in the Western Ghats of India, one of the eight hottest hotspot of the world is known for its rich biodiversity. In view of the rich plant diversity in areas with a predominantly tribal population. Ethnobotany is an important tool to assess the wild edible species in plant genetic resources. The present survey resulted in the collection of 70- species belonging to 48 genera comes under 27- families. The present ethnobotanical aspects on wild and less- known plants of the Nilgiri region can be used to determine collection priorities and conservation strategies.

Key words: Wild fruits, Diversity, Nilgiris, Southern Western Ghats, Conservation.

INTRODUCTION

Indian region has long been recognized as a centre of agro- diversity (Vavilo, 1951; Zeven and de Wet, 1982). It contains over 5% of the world's diversity though it covers only 2% of the earth's surface but it is one of the biodiversity hotspots of the richest and highly endangered eco- regions of the world (Mayers, 2000). Over 160 species of crop plants, including native species, others with a broad region of origin/ domestication, encompassing the Indian region, and introduced ones with secondary centers of diversity (Arora, 1991; Nayar *et al*., 2003) have been identified. Over 320 species of crop wild relatives out of over 1300 species belonging to 116- genera (Arora and Nayar, 1984& 1999; Nayar, 2006) are a priority for collection, use and conservation.

India had 45,000 plant species and 550 tribal communities. The tribals belong to 227 linguistic groups and they inhabit varied geographic and climatic zones with diversified plant species, varied culture, rich traditional knowledge and wisdom. Indigenous communities by virtue of their dependence on species gathered from the wild and maintenance of useful species under shifting cultivation, subsistence farming and backyard collection, are a rich source of useful wild species. 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).

Wild edible plants not only food quantity but also make significant contribution to the population's nutrition throughout the year (Katewa, 2003; Slikkerveer, 1994; Grivetti & Ogle Britta, 2000; Sundriyal *et al*., 1998; Arora and Pandey Anjula, 1996; FAO, 1999). Sometimes the nutritional value of traditional wild plants is higher than several known common vegetables and fruits (Nordeide *et al*., 1996; Sundriyal and Sundriyal, 2001; Orech *et al*., 2007). In addition to providing food directly, uncultivated plants provide an opportunity for cash generation (Harris & Mohammed, 2003).Many plants used in industrialized countries today were originally identified and developed through indigenous knowledge (Nadanakunjidam, 2003).

Unfortunately, utilization of indigenous food plants has steadily declined mainly due to lack of Knowledge on their nutrient value resulting from limited research done (Kiremire *et al*., 2001). Ethnobotanical studies consider the entire gamut of feature contributing concrete/ abstract data related to plant use, and its impact on social, cultural and environmental aspects.

Collections of material/ information on useful species from all sources forms the basis of collection, comparative evaluation, bioprospecting and conservation procedures (Paroda and Arora, 1991). Parnwell and Taylor (1996). One mechanism that potentially has held the key to preserving both household dietary diversity and wild species diversity has been called the "capture-to-culture" response, whereby gatherers of edible wild plants incorporate scarce forest species in their home gardens.

Study area:

Nilgiri Hills means blue hills (Neelam- blue and Giri- hill or mountain) is one of the most spectacular natural mountains ranges in South India; the Nilgiris are situated at the confluence of the Western and Eastern Ghats as the Sahayadri Hills, comes under Nilgiri Biosphere Reserve. Western Ghats of India, one of the eight hottest hot spots of the world is known for its rich biodiversity. Nilgiris at an elevation of 900 to 2636 meters above MSL. Its latitudinal and longitudinal dimensions being 130 KM (Latitude: 76.0 E to 77. 15 E). The region generally receives 2000- 7000 mm of rainfall and is rich in natural resources. The Nilgiri district in Tamil Nadu is a central focal point and is termed as the manipulation zone in the overall bioregion. Nature has bestowed Nilgiris with magnificent forests with varied and colourful plants and animal life.

There are six major primitive tribes in Nilgiri districts are Todas, Kotas, Kurumbas, Paniyas, Irulas and Kattunayakas. ***Todas*** or Tudas, to whom the most sacred objects on this earth are a holy dairy-man are pastoral people and to a certain extent, nomadic, bred buffaloes that supplied the milk, ***Kotas*** generally known as Kotagiri or Kokkal were potters, ironsmiths and carpenters, ***Kurumbas*** were the `people of the jungle' and lived in caves inside thick forests were the magico-religious sorcerers, ***Irulas*** have been derived from the word "Irul" (Darkness), the dwellers of the jungle hence the name "People of the darkness". Irulas were herbal doctors and the ***Paniyas*** literally means "workers" were slaves and bonded labourers, ***Kattunayakas*** literally means `kadu' (forests) & nayakan (leader/chief) were hunting and gathering, especially honey.

RESULTS AND DISCUSSION

Wild fruits gathering and exploitation of fruits is a common activity of the indigenous people in Nilgiri districts. A total of 70 species of fruits belonging to 47 genera listed in 27 families (Table. 1) were collected from the six major primitive tribes *viz*., Todas, Kotas, Kurumbas, Paniyas, Irulas and Kattunayakas . It shows that the indigenous people will collects wild fruits and maintains the area where it grows. These would not be the supplement for the food but also it contributes the necessary nutrient requirements of the aboriginal people.

Out of 27 families identified the widely utilized species belonged to Solanaceae (7- species) followed by Euphorbiaceae and Myrtaceae (6- species), Rosacae and Rutaceae (5- species), Moracae, Passifloraceae, Rhamnacae and Tiliaceae (4- species), Elaeagnaceae (3- species), Convolvulaceae, Elaeocarpaceae and Mimosaceae (2- species) and rest of the families were represented by each species. Tradationally wild edible species have been meeting the protein, carbohydrate, fat, vitamin and mineral requirements of the local residents to a greater extent (Sebastin and Bhandari, 1990; Omo Ohiokpehai, 2003). They also contain antioxidant which offer protection against many chronic diseases like heart disease and certain type of cancers (Saxena, 1999).

Regular consumption of fruits like *Alangium salvifolium*, *Berberis tinctoria*, *Coccinia grandis*, *Elaeocarpus tuberculatus*, *Embelia ribes*, *Euphorbia hirta*, *Ficus racemosa*, *Mahonia leschenaultii*, *Maesa indica*, *Moringa oleifera*, *Opuntia dillenii*, *Passiflora edulis*, *Phyllanthus emblica*, *Phyllanthus indofischeri*, *Pithecellobium dulce*, *Rubus ellipticus* and *Syzygium cumini* were observed from the tribes. Regular consumption of fruit is associated with reduced risks of cancer, cardiovascular diseases (especially coronary heart disease), stroke, Alzheimer disease, cataracts and some of the functional diseases associated with aging (Liu, 2003).

Table- 1 List of Wild Edible fruits used by the tribes of the Nilgiri Hills

S. No.	Plant Name	Family	Habit	Method of usage
1	*Alangium salvifolium (L. f.) Wang.*	*Alangiaceae*	*Shrub*	*Raw*
2	*Argyeria elliptica (Roth) Choisy*	*Convolvulaceae*	*Climber*	*Raw*
3	*Artocarpus heterophyllus Lam.*	*Moraceae*	*Tree*	*Raw*
4	*Artocarpus hirsutus Lam.*	*Moraceae*	*Tree*	*Raw*
5	*Berberis tinctoria Lesch.*	*Berberidaceae*	*Shrub*	*Raw*
6	*Bridelia retusa (L.) Spreng.*	*Euphorbiaceae*	*Tree*	*Raw*
7	*Capsicum frutescens Clarke*	*Solanaceae*	*Herb*	*Cooked*
8	*Carissa paucinervia A. DC.*	*Apocynacea*	*Shrub*	*Raw*
9	*Clausena dentata (Willd.) Roem.*	*Rutaceae*	*Tree*	*Raw*
10	*Coccinia grandis (L.) Voight.*	*Cucurbitaceae*	*Climber*	*Cooked / Raw*
11	*Elaeagnus conferta Roxb.*	*Elaeagnaceae*	*Shrub*	*Raw*
12	*Elaeagnus indica Serv.*	*Elaeagnaceae*	*Shrub*	*Raw*
13	*Elaeagnus kologa Schult.*	*Elaeagnaceae*	*Shrub*	*Raw*
14	*Elaeocarpus tectorius (Lour.) Poir.*	*Elaeocarpaceae*	*Tree*	*Raw*
15	*Elaeocarpus tuberculatus Roxb.*	*Elaeocarpaceae*	*Tree*	*Raw*
16	*Embelia ribes Burm. f.*	*Euphorbiaceae*	*Shrub*	*Raw*
17	*Eugenia cotinifolia Jacq.*	*Myrtaceae*	*Tree*	*Raw*
18	*Euphorbia hirta L.*	*Euphorbiaceae*	*Herb*	*Raw*
19	*Ficus racemosa L.*	*Moraceae*	*Tree*	*Cooked*
20	*Flueggea leucophyrus Willd.*	*Euphorbiaceae*	*Shrub*	*Raw*
21	*Fragaria elatior Wight & Arn.*	*Rosaceae*	*Herb*	*Raw*
22	*Gaultheria fragrantissima Wall.*	*Ericaceae*	*Tree*	*Raw*
23	*Glycosmis pentaphylla (Retz.) DC.*	*Rutaceae*	*Tree*	*Raw*
24	*Grewia hirsuta Vahl.*	*Tiliaceae*	*Shrub*	*Raw*
25	*Grewia obtusa Wall. ex Dunn.*	*Tiliaceae*	*Shrub*	*Raw*
26	*Grewia villosa Willd.*	*Tiliaceae*	*Shrub*	*Raw*
27	*Lantana camara L. var. aculeata (L.) Moldenke*	*Verbenaceae*	*Shrub*	*Raw*
28	*Mahonia leschenaultii (Wall. ex Wight & Arn.) Takeda*	*Berberidaceae*	*Shrub*	*Raw*
29	*Mangifera indica L.*	*Anacardiaceae*	*Tree*	*Raw*
30	*Maesa indica (Roxb.) DC.*	*Myrsinaceae*	*Shrub*	*Raw*
31	*Moringa oleífera Bedd.*	*Rutaceae*	*Tree*	*Cooked*
32	*Morus alba L.*	*Moraceae*	*Tree*	*Raw*
33	*Murraya koenigii (L.) Spreng.*	*Rutaceae*	*Tree*	*Cooked/ Raw*
34	*Opuntia dillenii (Ker- Gawl.) L.*	*Cactaceae*	*Shrub*	*Raw*
35	*Oxalis corniculata L.*	*Oxalidaceae*	*Herb*	*Cooked*
36	*Passiflora edulis Sims.*	*Passifloraceae*	*Climber*	*Raw*
37	*Passiflora foetida L.*	*Passifloraceae*	*Climber*	*Raw*
38	*Passiflora leschenaultii DC.*	*Passifloraceae*	*Climber*	*Raw*
39	*Passiflora mollisima (H. B.K.) L. Bailey*	*Passifloraceae*	*Climber*	*Raw*
40	*Phoenix loureirii Kunth.*	*Palmaceae*	*Tree*	*Raw*
41	*Phyllanthus emblica L.*	*Euphorbiaceae*	*Tree*	*Cooked/ Raw*
42	*Phyllanthus indofischeri Bennet*	*Euphorbiaceae*	*Tree*	*Cooked/Raw*
43	*Physalis minima L.*	*Solanaceae*	*Herb*	*Raw*

44	*Physalis peruviana* L.	Solanaceae	Herb	Raw
45	*Picris hieracioides* L.	Asteraceae	Herb	Raw
46	*Piper nigrum* L.	Piperaceae	Climber	Raw
47	*Pithecellobium dulce* (Roxb.) Benth.	Mimosaceae	Tree	Raw
48	*Potentilla indica* (Andrews) Th. Wolf.	Rosaceae	Herb	Raw
49	*Prosopis juliflora* (Sw.) DC.	Mimosaceae	Shrub	Raw
50	*Psidium guajava* L.	Myrtaceae	Tree	Raw
51	*Rhodomyrtus tomentosa* (Ait.) Hassk.	Myrtaceae	Tree	Raw
52	*Rivea hypocrateriformis* (Desr.) Choisy	Convolvulaceae	Climber	Cooked
53	*Rubus ellipticus* Smith	Rosaceae	Shrub	Raw
54	*Rubus leucocarpus* Arn.	Rosaceae	Shrub	Raw
55	*Rubus rugosus* non Smith	Rosaceae	Shrub	Raw
56	*Scutia myrtina* (Burm.) Kurz.	Rhamnaceae	Tree	Raw
57	*Solanum nigrum* non. L.	Solanaceae	Herb	Raw
58	*Solanum surattense* Burm. f.	Solanaceae	Herb	Raw
59	*Solanum sisymbrifolium* Lam.	Solanaceae	Herb	Cooked
60	*Solanum torvum* Sw.	Solanaceae	Shrub	Cooked/Raw
61	*Syzygium arnottianum* Walp.	Myrtaceae	Tree	Raw
62	*Syzygium calophyllifolium* non Gaertn.	Myrtaceae	Tree	Raw
63	*Syzygium cumini* (L.) Skeels var. *cumini*	Myrtaceae	Tree	Raw
64	*Tamarindus indica* L.	Mimosaceae	Tree	Raw
65	*Toddalia asiática* (L.) Lam.	Rutaceae	Shrub	Raw
66	*Vaccinium leschenaultii* Wight	Vaccinaceae	Tree	Raw
67	*Vaccinium neilgherrensis*	Vaccinaceae	Tree	
68	*Zizyphus oenoplia* (L.) Milll.	Rhamnaceae	Shrub	Raw
69	*Zizyphus mauritiana* Lam.	Rhamnaceae	Shrub	Raw
70	*Zizyphus rugosa* Lam.	Rhamnaceae	Shrub	Raw

The fruits of *Artocarpus heterophyllus*, *Capsicum frutescens*, *Elaeocarpus tectorius*, *Elaeocarpus tuberculatus*, *Mangifera indica*, *Moringa oleífera*, *Murraya koenigii*, *Pithecellobium dulce* , *Psidium guajava* , *Solanum nigrum* , *Solanum torvum* , *Syzygium cumini* , *Tamarindus indica* were collected by the local population for selling to urban areas for income generation. Ambe (2001) in overview of their nutritional value, the preservation of these fruits also has economical advantages, as there is a significant trade in some if these wild edible fruits.

The wild fruits of *Capsicum frutescens*, *Mangifera indica*, *Solanum nigrum* , *Solanum torvum*, *Tamarindus indica*, *Vaccinium leschenaultii*, *Zizyphus mauritiana* is said to be used for ingredients for local traditional breweries. Mothanka *et al*., (2008) have reported that some fruits served as ingredients for local traditional breweries. The fruits of *Phoenix loureirii* were collected and approximately preserved for consumption during times of food scarcity. Wild species with localized distribution/ endemic species such as *Artocarpus hirsutus*, *Elaeagnus indica*, *Elaeagnus kologa*, *Mahonia leschenaultii*, *Phyllanthus* indofischeri, *Syzygium arnottianum*, *Syzygium calophyllifolium* , *Vaccinium leschenaultia* and *Vaccinium neilgherrensis* also used by tribes for edible and medicinal purposes.

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 conserved 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.

The wild fruits of *Artocarpus heterophyllus*, *Capsicum* frutescens, *Mangifera indica*, *Moringa oleifera*, *Morus alba, Murraya koenigii*, *Pithecellobium dulce* , *Psidium guajava* , *Solanum nigrum* , *Solanum torvum* , *Syzygium cumini*, *Tamarindus indica* were collected for domestication. Domestication grew out of food gathering almost imperceptibly led to cultivation (FAO, 1999).

CONCLUSION

Wild fruits are always available both in drought and non- drought years. But the use of wild edible plant is still continued when they are available. Useful wild plants in ethnic ecosystems shows a trend of utilization of locally available resources, both in areas with high plant diversity and marginal habitats. The oral transferrable of the indigenous knowledge of conventional uses of wild plants between elder and younger generation is not always ensured. Now-a-days the traditional knowledge is declining due to lack of interest in the present generation and also absence of records about the useful plants. Hence, the truthful indigenous knowledge is immediately required to be documented and validated for serving future generations and their nutritional values should be analyzed.

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