Advanced Agricultural Research & Technology Journal ▪ Vol. IV ▪ Issue 1 ▪ JANUARY 2020 ISSN: 2581-3749 (online)

Special Issue

Wild Fruit Resources: Potential in Coastal Ecosystems of Konkan, Maharashtra

S. S. Narkhede*[1], A. K. Handa[2], K. S. Verma[3] and S. G. Bhave[1]

[1]Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Ratnagiri, Maharashtra - 415712 (India)
[2]ICAR-National Research Centre for Agroforestry (NRCAF), Jhansi, Madhya Pradesh - 284 003 (India)
[3]Dr. Yashwant Singh Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh - 173230 (India)

Abstract

Forest plays an important role in improving the tribal food security. Wild edible fruits are the important source of nutrition in the livelihood strategies of forest dwellers. India has a vast area of forest and tribal population of more than 4 millions depends on wild edible plants. A survey was carried out in coastal ecosystems of Konkan to identify the wild edible plants and their uses. During the study it was noted that the existing species belong to 115 families constituting of 256 species. The dominant species identified were *Mangifera indica*, *Lannea coromandelica, Bridelia retusa, Holarrhena pubescens*, *Leea indica*, *Ixora coccinea*, *Carissa congesta*, *Ziziphus rugosa*, *Geissaspis tenella*, *Senecio bombayensis*, *Rostellularia procumbens*, *Eranthemum roseum*, *Triumfetta rhomboidea*, *Rungia pectinata*, *Coldenia procumbens*, *Vigna sublobata*, *Dioscorea bulbifera*, *Smilax ovalifolia*, *Jasminum malabaricum*, *Hemidesmus indicus*. Amongst these, 42 species representing 23 families were identified as wild fruits with potential for commercial utilization.

Keywords: Wild fruits, ethno-botanical, costal agro-ecosystems.

Forest ecosystems 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. Forest ecosystems play a crucial role in mitigating the effects of climate change and protecting biodiversity. This refers to the use and conservation of forest and forest products for the benefit of the present and future generations. Documentation of various natural resources in the forest ecosystems habitat of the wild edible plants such as cereals, fruits, tubers and vegetables 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. India has a vast area of forest and more than 4 million tribal populations depend on these wild edible plants. The survey was carried out in Konkan to identify the uses of wild edible plants and to document their etho-botanical importance (Kumbhojkar and Vartak 1988). 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 (Jain 1995).

From the past, edible wild fruits have played a very vital part in supplementing the diet of the people. The dependence on these fruits has gradually declined in the recent times as exotic fruits were introduced which were more economical to the farmers. However, in tribal areas many people still use them as a supplement of their basic food. Some of them are preserved for consumption during dry period or sold in rural market. The popularity of these wild forms has recently decreased, due to non-availability and lack of knowledge. Apart from traditional use in food, these wild forms possess potential for use in pharmaceuticals as medicines for curing certain diseases. They are gifted with remarkable nutritional food value, and caterto the minerals like sodium, potassium, magnesium, iron, calcium, and phosphorus. They are immune to many diseases and often used in different formulation of ayurvedic, unani and siddha Indian folk- medicine system (Kumbhojkar and Vartak 1988). Wild fruits supply fibres and mineral nutrition, which prevent constipation. Hence a special attention should be paid to maintain and improve this

Corresponding author: ssn_forest@rediffmail.com
Received Date: 12.10.2019; Accepted Date: 24.12.2019

important source of food supply by accepting wild fruits as important dietary components.

Dietary use of wild fruits appear in numerous records from Andhra Pradesh (Reddy *et al.* 2006), Maharashtra and the Himalayas (Sundriyal 2001, Nararajan and paulsen 2000). However, there is no concrete report about the nutritional potential, production, and collection statistics of wild edible fruits.

Maharashtra state has a long coastal zone which represents the costal agro-ecosystem. This coastal zone has large biodiversity of fruit trees with great potential. These wild resources are being utilised by the tribal and local population for various purposes.

A study of flora was conducted in the Rajapur taluka of Ratnagiri district in Maharashtra. In this study total 571 species (including 6 subspecies and 19 varieties) belonging to 379 genera under 115 families have been recorded (Table 1). Of the 115 families, the first ten families constitute 256 species (46%). Amongst these, Fabaceae is the most dominant family, comprising of 58 species, followed by Euphorbiaceae (33 sp.), Poaceae (30 sp.), Acanthaceae (26 sp.), Convolvulaceae (23 sp.), Asteraceae (21 sp.), Rubiaceae (19 sp.), Cyperaceae (16sp.), Caesalpinaceae (16 sp.), and Malvaceae (14 sp.). The other major families recorded were Anacardiaceae, Moraceae and Rubiaceae (Singh *et al.* 2000a). The dominant tree species observed were *Mangifera indica, Lannea coromandelica, Bridelia retusa, Holarrhena pubescens, Leea indica, Ixora coccinea, Carissa congesta, Ziziphus rugosa, Geissaspis tenella, Senecio bombayensis, Rostellularia procumbens, Eranthemum roseum, Triumfetta rhomboidea, Rungia pectinata, Coldenia procumbens, Vigna sublobata, Dioscorea bulbifera, Smilax ovalifolia, Jasminum malabaricum,* and *Hemidesmus indicus.* Among the mangrove species highest frequency was calculated in *Avicennia officinalis* (70 %) and *Rhizophora mucronata* (70%) followed by *Sonneratia caseolaris* (60%) (Almeida 2003). Indigenous knowledge of wild edible plant is important for sustaining utilization of those plant species. There has been a revival of interest in medicinal and wild food plants during the last few decades among the ethnobotanists. Thus the 42 species belonging to 23 families were identified. The list of species with its part used and other uses is provided (Table 2 and Figure 1). The plant species depict that the number of wild edible tree species was markedly less as compared to all recorded species. The most frequently used wild fruits belong to Moraceae (6 species), Anacardiaceae (5 species) and Rubiaceae (3 species). The families were

Table 1. Floristic analysis of the study area

Group	Families	Genera	Species	Infra specific taxa	
					var.
Angiosperms	106	369	561	6	19
Pteridophytes	9	10	10	-	-
Total	115	379	571	6	19

Source: Almeida 2003

Dioscoreaceae, Ebenaceae, Euphorbiaceae, Malvaceae and Rhamnaceae (Singh *et al.* 2000b)

The knowledge of traditional food plant is important to promote the wild edible fruits in a more sustainable way. This will enable for better food security/nutrition at household level in the tribal communities. The tribal people have indirectly nurtured many of the plants and some have been largely domesticated in home gardens and in the fields together with farmers' cultivated food and cash crops. Nevertheless, the term 'wild-food' is used to describe all plant resources outside of agricultural areas that are harvested or collected for the purpose of human consumption in forests areas. Similar botanical exploration and publications have emphasized on the diversity and food value of wild edible fruit plants (Datar and Vartak 1975, Mishra *et al.* 2007, Deshmukh and Waghmode 2007, Vartak 1959, Maikhuri *et al.* 2000, Battacharjee *et al.* 2008). The retention of knowledge by both young and aged people on the uses of the wild edible fruits attests to the continuing importance of these natural resources for subsistence and as a part of the cultural heritage of the costal agro-ecological region. In general, people of this region are well versed in the vernacular names of ethno-botanical plants. Evaluation of the nature and the potential of these plants should proceed from a broad perspective. First, all ethno-botanical and indigenous plants of this area require greater evaluation of nutritional, pharmacological, and toxicological properties.

Conclusion

Indigenous wild fruits play an important role in the nutrition of people and children in rural and tribal communities. These can be consumed raw or may be processed. The wild fruits are excellent sources of vitamins, carbohydrates, proteins, fibres and minerals and enormous medicinal potential. These fruits from forests are rich source of protein and energy and very useful in treating protein energy deficiency. The production and consumption of these fruits in coastal zone of

Table 2. List of wild fruit plants and their ethno-botanical importance.

Botanical Name	Vernacular name	Family	Local traditional use	Fruit ripening period	Additional use(s)
Buchanania latifolia	Char, charoli	Anacardiaceae	Young shoots, fruits edible	May-June	Leaves used as fodder.
Lannea coromandelica	*Moi*	Anacardiaceae	Fruits edible	July-October	Leaf juice used in cuts.
Rhus mysorensis	*Amboni*	Anacardiaceae	Fruits eaten as raw or roasted	July- Sept	Fruits used in ayurvedic medicine
Semecarpus anacardium	*Bhillava, bibba*	Anacardiaceae	Fruits consumable	November-March	Seeds used to cure cut and wounds.
Spondias pinnata	*Ambada*	Anacardiaceae	Fruits edible, pickled	November-March	Seeds used as detergent
Carissa carandas	*Karonda*	Apocynaceae	Fruits edible	June-July	Value added products of fruits, Root juice used in abortion. Good live fence orchard.
Cordia dichotoma	*Bhokar,*	Boraginaceae	Fruits edible	March-May	Fruits pulp as adhesive, Bark as disinfectant
Tamarindus indica	*Chinch*	Caesalpinaceae	Ripe Fruits used as spice in day to day cooking.		Fruits used for value added products
Capparis zeylanica	*Wagati*	Capparaceae	Unripe fruits consumable		good for stomach relief
Garcinia indica	*Kokum*	Clusiaceae	Used in lies of tamarind	April-May	Excellent value added products from fruit
Dillenia indica	*piwalakarmal*	Dilleniaceae	Raw fruits eaten	July-Aug	Bark as preservative
Dioscorea bulbifera	*Kadu-karanda*	Dioscoreaceae	Fruits used as vegetable tuber.	November-December	Value added products from tubers
Diospyros malabarica	*Lohari*	Ebenaceae	Fruits edible.	April-May	Leaves used to make cigarettes "*Bidi"*
Elaeagnus conferta	*Ambgul, Amguli*	Elaginaceae	Fresh fruits consumable	April-May	Used in juice, sarbat and in preparation of syrup
Securinega virosa	*Pithwan, kodarsi*	Euphorbiacea	Fruits consumed as raw	October-December	very good feed for wild birds
Phyllanthus emblica	*Amala*	Euphorbiaceae	Fruits eaten fresh or used to make pickle.	October-December	Fruit paste used as fish poisoning. Fruits used in cough and cold, value addition
Caesalpinia decapetala	*Chilar*	Leguminosae	Fruits edible.	April-September	Live fence, Fodder for animals

Table 2. Contd.

Botanical Name	Vernacular name	Family	Local traditional use	Fruit ripening period	Additional use(s)
Strychnos nux-vomica	*Kuchala*	Loganiaceae	Ripe fruits edible	November-January	Fruit juice is healing tonic and appetite stimulant
Sterculia villosa	*Sardol, kardul, gulkhandar*	Malvaceae	Fruits consumable	June-August	Bark fibre used to make ropes. Root power used as soda powder
Artocarpus lakoocha	*Badahar*	Moraceae	Ripe fruits eaten fresh. Young shoots cooked as vegetable	June-August	Leaf juice used to make fermenting material
Artocarpus heterophyllus	*Phanas*	Moraceae	Carpels and seed edible, variety of value added products	March-June	Leaves and fruits biomass used for cattle feed
Ficus hispida	*Bokeda*	Moraceae	Ripe figs eaten	June-July	Leaves and twigs used as fodder
Ficus benghalensis	*Wad*	Moraceae	Ripe figs consumable	April-June	Milky latex used in scabies. Plant used as fodder, fuel-wood, and in religious functions.
Ficus racemosa	*Umber*	Moraceae	Ripe figs edible	July-September	Leaves and twigs used as fodder
Morus alba	*Mulberry*	Moraceae	Fruits edible	May-July	Ripe fruits eaten, used for jam making
Syzygium cumini	*Jamun*	Myrtaceae	Ripe fruits edible	May-August	Bark juice used in abdominal pain, diarrhoea and as fish poison. Fruits used for value addition, in ayurvedic seeds in ayurvedic medicine
Phoenix sylvestris	*Shindi*	Palmae	Ripe fruits edible. Tuberous roots eaten as vegetable	February-May	Leaves used as thatching material and as brooms. Fruits used in local liquor preparation
Piper longum	*Pimpli*	Piperaceae	Fruits consumable	November-December	Fruit powder used to treat cough and cold, Ayurvedic medicines

Table 2. Contd.

Botanical Name	Vernacular name	Family	Local traditional use	Fruit ripening period	Additional use(s)
Zizyphus curacutta	*Toran*	Rhamnaceae	Fruits eaten raw or used to make pickle.	October-March	Bark juice and stem nodule used in dysentery. Roots used to make fermenting material. Fruit paste used as fish poisoning
Gardenia gummifera	*Dikamali*	Rubiaceae	Ripe fruits edible		Gum used in treating digestive problems and teetheing
Meyna laxiflora	*Allu*	Rubiaceae	Fruits edible	April-May	Fruits pickled, dried
Morinda citrifolia	*Noni*	Rubiaceae	Fruits edible	March-May	Fruits used for value added products, pharmaceuticals
Aegle marmelos	*Bel*	Rutaceae	Pulp of ripe fruits consumed fresh and syrup is prepared	March-June	Plant of ritual importance Fruit juice used as fish poisoning. Unripe fruits used to cure diarrhoea
Bridelia retusa	*Asana*	Rutaceae	Fruits consumable	April-May	Root and bark are valuable astringents
Citrus decumana	*Papnus*	Rutaceae	Fresh Fruits eaten	May-Sept	Fruit syrup and Jam
Limonia acidissma	*Kawath*	Rutaceae	Fruits consumed raw	March-May	Fruits are useful for various diseases like Jaundice, Colitis
Schleichera oleosa	*Kusum*	Sapindaceae	Pulp of ripe fruits edible	June-August	Twigs used as fodder. Leaves used as fertilizer
Mimusops elengi	*Bakul*	Sapotaceae	Fruits eaten	Feb-April	flowers used for garlands
Madhuca longifolia	*Mahuwa*	Sapotaceae	Succulent flowers eaten fresh, fruits edible	March-July	Seed cake used as fish poisoning. Flower used to make local liquor. Leaves used as plates
Manilkara hexandra	*Khirni*	Sapotaceae	Ripe fruits consumed	February-April	Seeds used for rootstock of sapota
Grewia abutilifolia	*Kirmith*	Tiliaceae	Raw fruit consumable	February-May	good feed for wild animals and birds

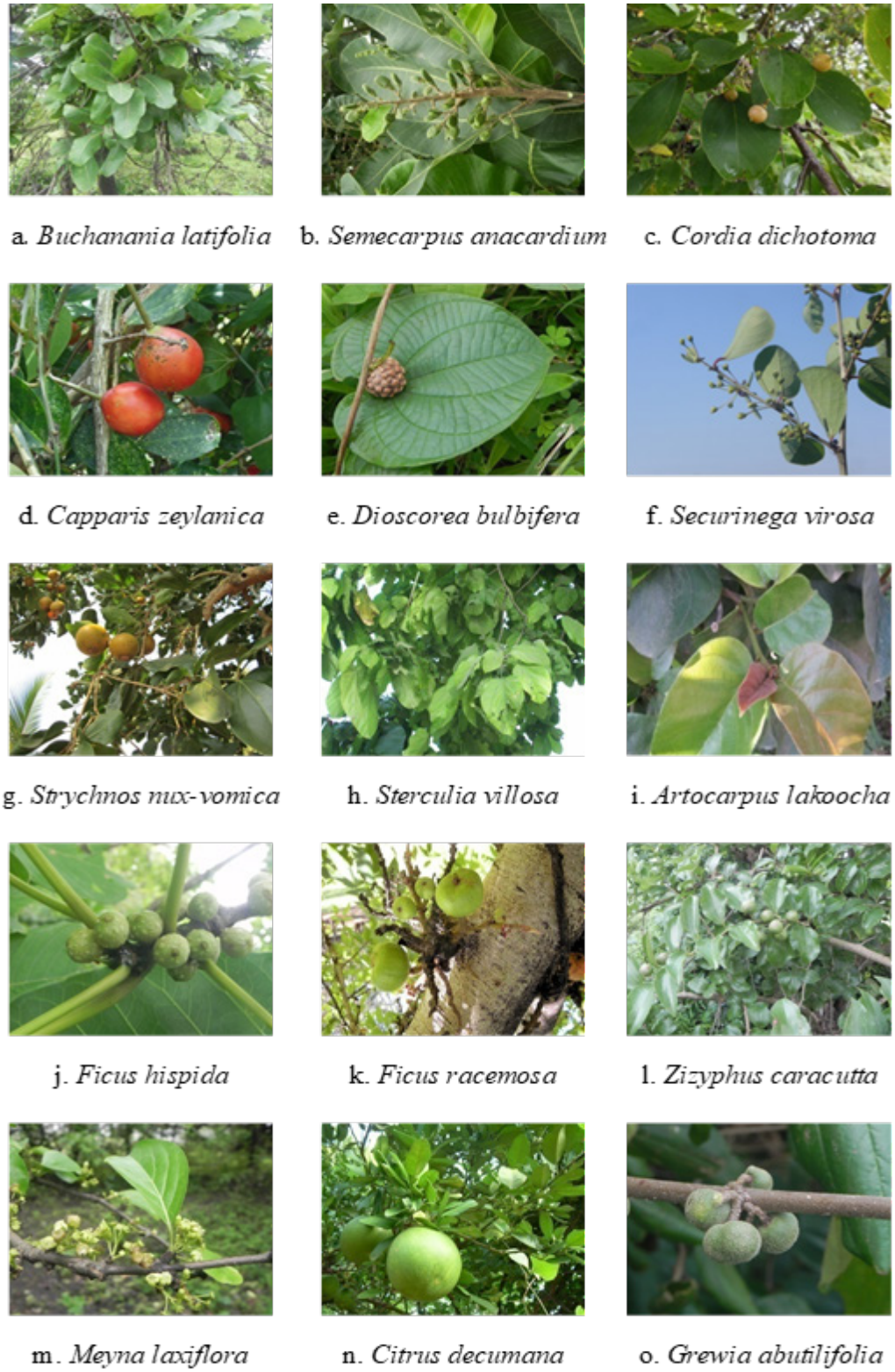

Fig. 1. Some wild edible fruit plants of costal agro-ecosystem (Also see Table 2).

Maharashtra could provide better dietary supplement and additional means of income generation. These fruit crops can be commercially cultivated if managed properly. The growing of trees for fruit production encourages the prevention of more or less permanent stands in bare land. Such trees are often a feature of desert landscapes and form the basis of traditional agro forestry land use systems. These multi-valued wild fruit resources are threatened by several anthropogenic and natural causes such as land-use change, habitat destruction, over-harvesting, over-grazing, and invasive species. Sustainable management of these resources for the well-being of the local communities as well as to conserve biodiversity is of utmost importance and could also contribute to preserve cultural and genetic diversity. Inclusion of such wild fruit resources in community/ joint forest management plans would be the most realistic conservation and livelihood approach for the coastal zone forests, which are managed by villages and local groups.

Acknowledgement

The study was conducted with the financial support provided by NPCIL (Nuclear Power Corporation of India), Mumbai. The assistance rendered is duly acknowledged. The facilities received from DBSKKV, Dapoli, Maharashtra are also gratefully acknowledged.

References

Almeida M. R. 2003. Flora of Maharashtra. Vol. IV. Orient Press, Mumbai.

Bhattacharjee P. K., Das D. and Bhattacharjee S. 2008. Underexploited Wild Plants of Tripura: Edible Fruits. Ad. Plant Sci. 21: 355-357.

Datar R. and Vartak V. D. 1975. Enumeration of wild edible plants from Karnala Bird Sanctuary, Maharashtra state. Biovigyana 1:123-129.

Deshmukh B. S. and Waghmode A. 2011. Role of wild edible fruits as a food resource: Traditional knowledge. Int. J. Pharm. Life Sci. 2: 919-924.

Jain S. K. 1995. A manual of Ethno-botany, 2nd edn. Scientific Publishers, Jodhpur, India.

Kumbhojkar M. S. and Vartak V. D. 1988. Ethno botanical studies on wild edible grapes from sacred groves in Western Maharashtra. J. Econ. Tax. Bot. 12: 257-263.

Maikhuri R. K., Nautiyal S., Rao K. S. and Semwal R. L. 2000. Indigenous knowledge of medicinal plants and wild edibles among three tribal sub communities of the central Himalayas, India. Indigenous Knowledge Development Monitor 8: 7-13.

Mishra S. N., Tomar P. C. and Lakra N. 2007. Medicinal food Value of Capparis sp. I. J. Traditional Knowledge 6: 232-237.

Natarajan B. and Paulsen B. S. 2000. An Ethnopharmacological Study from Thane district, Maharashtra, India: Traditional Knowledge Compared With Modern Biological Science. Pharm. Biol. 38: 139–151.

Singh N. P. and Karthikeyan S. 2000a. Flora of Maharashtra State–Dicotyledons, Vol. I, Botanical Survey of India (BSI), Calcutta, India.

Singh N. P., Lakshminarasimhan P., Karthikeyan S. and Prasanna P. V. 2000b. Flora of Maharashtra State–Dicotyledons, Vol. II, Botanical Survey of India (BSI), Calcutta, India.

Reddy K. N., Chiranjibi P., Reddy C. S. and Raju V. S. 2006. Traditional Knowledge on wild food plants in Andhra Pradesh. I. J. Traditional Knowledge. 6:223-229.

Sundriyal M. and Sundriyal R. C. 2001. Wild edible plants of the Sikkim Himalaya: Nutritive values of selected species. Econ. Bot. 55: 377-390.

Vartak V. D. 1959. Some wild edible plants from the hilly region of Poona District, Bombay state. J. Bomb. Nat. His. Soc. 56: 8-25.