

Wild Edible Fruits of Western Ghats for Future Nutritional Security

The Western Ghats is recognised as one of the biodiversity hotspots in the world and has abundance of underutilised wild fruit species, with great nutritional, medicinal and cultural value. These species are high in vitamins, minerals, dietary fibre and bioactive antioxidants, which can also provide food security and livelihoods for indigenous peoples of rainforests. These native species which are widely adaptable, pest-resistant and provide benefits for sustainable agriculture practices are being rapidly lost due to habitat loss, climate change, exotic species introduction and socio-economic shifts. In this article 38 wild fruit species represented by 23 families have been documented from various locations of Western Ghats in which Rhamnaceae, Rosaceae, Rutaceae family represent the highest with 3 species. The common and vernacular name, flowering and fruiting period have also been given. The article will also provide information on the timing of availability of wild edible fruit species.

Keywords: Food security, Nutritional security, Underutilised wild fruits, Western ghats

INDIA is one of the world's most biodiverse countries, rich in flora and fauna due to its diverse variety of climates, geographies and ecosystems. It is also home to four biodiversity hotspots, one of which is the Western Ghats. The Western Ghats, a UNESCO World Heritage site that lies on the East Coast of the Arabian Sea and stretches along the western coast of India and renowned for its rich biodiversity, many of which are endemic to this region. This mountain range spans more than 1,600 km across several Indian states, including Gujarat, Maharashtra, Goa, Karnataka, Kerala and Tamil Nadu. This region is home to 7,402 species of flowering plants, of which 5,588 are native or indigenous and over 500 species of medicinal plants, including wild edible fruit plants, growing wild in the forest, road side and in almost every backyard. It has been reported that the wild edible fruits belong to 25 families, 38 genera and 50 species, although many more are yet to be identified. The agro-climatic conditions, soil health and rainfall pattern create a congenial environment that makes it a genetic reservoir that contributes to ecological conservation and agricultural sustainability.

Wild fruits are those which are less known, often edible, underutilised or neglected species. These fruit species are indigenous and regarded for their cultural, medicinal and nutritional value. They play a crucial role in maintaining the ecological stability of the region and serve as vital resources for local communities. The wild underutilised fruit crops hold significant potential in improving livelihood, nutrition, health, income generation, biodiversity conservation and combat hidden hunger

caused by micronutrient deficiencies. The wild fruits play an important role in food and nutrient security as they have better nutritive value than the cultivated fruits. They are typically consumed fresh/raw or processed and helps to fulfill daily caloric needs. These fruits are a source of carbohydrates, proteins, vitamins (C, A, B1, B3, B6, B9, E), minerals like sodium, potassium, magnesium, iron, calcium and phosphorus, dietary fiber and possess significant medicinal properties which are essential for overall well being and maintaining good health. Wild edible fruits act as staple food for many tribal communities during food deficit. Recent studies of the phytochemical composition of fruits have attracted much interest in terms of their antiproliferative and antioxidant properties which can help to combat malnutrition. They are also hardy in nature, widely adaptable, resistant to pest and diseases and can be utilised in crop improvement programs.

The wild fruits are consumed only in smaller amounts due to less availability, being less palatable and have lesser demand in the market since they are found to a limited extent. The fruiting season as well as the shelf life of these wild fruits are limited to a very short span. In the Western Ghats of India, the underutilised wild fruits are an integral part of the traditional diet of several communities. The introduction of exotic fruit varieties has led to a gradual decline in the reliance on wild fruits in urban areas. However, many tribal communities continue to use them as a dietary supplement. Indigenous people of these areas play a major role in identifying the nutritional and medicinal value of wild fruit species and still have knowledge on almost all the wild fruit species as a source

of food, fodder, medicine and timber. The fruits are often preserved for consumption during dry seasons or sold in rural markets.

Consumption of wild fruits is reported from ancient times to the present era. These fruits have historically been used as a medicinal agent, as these are rich in biologically active compounds, along with essential vitamins, minerals and other nutrients, but they are greeted with skepticism. There are records mentioning the use of the wild fruits, nuts, seeds, leaves and roots. Many of the wild underutilised edible fruit species are not known to present society but mostly known to local folks and tribes as they are found only in their natural habitat. Some of the wild fruit species have promising ornamental properties that can be used in beautification of gardens and avenues. Some of such species are *Flacourtia montana*, *Garcinia morella* and *G. indica*. These species also contribute to biocultural diversity and traditional festivals; one such species is *Artocarpus hirsutus*, used as an offering to god in the southern part of the Western Ghats.

Although the Western Ghats region is rich in wild fruits, there is a high risk of biodiversity loss due to climate change, cultivation of exotic fruits, deforestation, low rainfall, elephant damage, encroachment, poverty, migration of tribes and as their use is lesser-known, local communities sometimes clear wild areas to make way for cultivation. In such conditions, the knowledge on such fruits and their uses are lost. There is a lack of organised efforts in prospecting, exploration, collection, evaluation, characterisation, conservation, documentation and improvement to identify superior genotypes for developing agro-techniques. Therefore, greater emphasis is needed to explore and create awareness and to manage the genetic resource efficiently which will encourage cultivation on

a large scale, along with research into nutritional and antioxidant properties, product development, marketing and documenting the knowledge, all of which will help to improve their economic standing in the near future. The first step for this process can be done by integrating wild fruit plants as intercrops with commercial crops. This may help to combat food scarcity, support economic development in tribal regions and aid in restoring degraded lands.

To preserve and enhance this resource, greater focus should be placed on promoting these underutilised fruits. Despite being frequently disregarded, they hold immense potential in addressing nutritional deficiencies and enhancing food security for an immensely growing population. They are perfect for sustainable agriculture because of their low cultivation requirements, resistance to pests and diseases and ability to adapt to local conditions. Moreover, their natural abundance in forested and tribal regions makes them accessible and affordable for marginalised communities. The information on flowering and fruiting period of these wild fruit species were not documented as compared to major fruits, which has led to a lack of knowledge and awareness about the availability of the fruits. The time of flowering, fruiting and maturity varies depending on the region, season and other environmental factors like soil, temperature, photoperiod, rainfall and various other endogenous genetic components. In this article, the diversification of underutilised wild fruits of the Western Ghats of India was documented.

A total of 38 wild fruit species were collected, their common name, vernacular name, the time of flowering and fruiting period of each species along with their photographs are given below in the table.

List of wild fruits in Western Ghats region

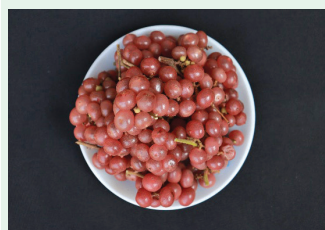
Image of the fruit	Name of fruit species	Image of the fruit	Name of fruit species
	<i>Uvaria narum</i> Common name: South Indian Uvaria Family: Annonaceae Vernacular name: Kodambale hannu (Kannada) Time of Flowering: June–July Time of fruit availability: September–October		<i>Rourea minor</i> Common name: Big-leaved Rourea Family: Connaraceae Vernacular name: Huli hannu (Kannada) Time of Flowering: January–February Time of fruit availability: May–June
	<i>Alangium salviifolium</i> Common name: Sage leaved alangium Family: Cornaceae Vernacular name: Ankole hannu Time of Flowering: April–May Time of fruit availability: July–August		<i>Elaeagnus conferta</i> Common name: Silverberry Family: Elaeagnaceae Vernacular name: Beeruguli hannu Time of Flowering: October–November Time of fruit availability: February–March
	<i>Syzygium caryophyllatum</i> Common name: South Indian Plum Family: Myrtaceae Vernacular name: Kunta Nerale Time of Flowering: May–June Time of fruit availability: June–September		<i>Securinega leucopyrus</i> Common name: Indian Snowberry Family: Phyllanthaceae Vernacular name: Bili Sooli gida (Kannada), More pann (Kodava) Time of Flowering: April–July Time of fruit availability: September–October.



Ziziphus rugosa
Common name: Wild Jujube
Family: Rhamnaceae
Vernacular name: Kotte hannu (Kannada), Kotte Pann (Kodava)
Time of Flowering: December-January
Time of fruit availability: February-March



Scutia myrtina
Common name: Cat Thorn
Family: Rhamnaceae
Vernacular name: Kurudi hannu (Kannada)
Time of Flowering: March-April
Time of fruit availability: June-August



Glycosmis mauritiana
Common name: Ash Sheora
Family: Rutaceae
Vernacular name: Somari hannu (Kannada), Kurmana pann (Kodava)
Time of Flowering: October-December
Time of fruit availability: March-April



Toddalia asiatica
Common name: Orange Climber
Family: Rutaceae
Vernacular name: Gonne hannu (Kannada)
Time of Flowering: July-October
Time of fruit availability: August-September



Clausena indica
Common name: Indian Wampi
Family: Rutaceae
Vernacular name: Majjige hannu (Kannada)
Time of Flowering: February-April
Time of fruit availability: May-July



Zizipus oenopolia
Common name: Jackal jujube
Family: Rhamnaceae
Vernacular name: Choori hannu (Kannada)
Time of Flowering: Sep-Oct
Time of fruit availability: December-February



Rubus niveus (BLACK)
Common name: Mysore Rapberry
Family: Rosaceae
Vernacular name: Nuchate hannu
Time of Flowering: February-March
Time of fruit availability: June-July



Rubus elepticus
Common name: Golden Himalayan Raspberry
Family: Rosaceae
Vernacular name: Nuchate hannu
Time of Flowering: February-March
Time of fruit availability: June-July



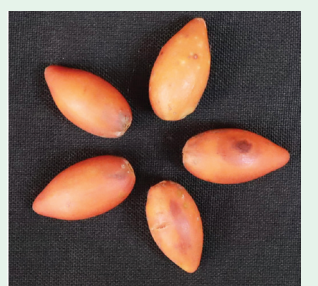
Canthium coromandelicum
Common name: Coromandel Canthium
Family: Rubiaceae
Vernacular name: Kare hannu, Karemullu (Kannada)
Time of Flowering: May-June
Time of fruit availability: July-August



Flacourtia indica
Common name: Governor's plum
Family: Saliaceae
Vernacular name: Kakkade hannu (Kannada), Kothri pann (Kodava)
Time of Flowering: December-January
Time of fruit availability: March-April



Chrysophyllum lanceolatum/
Chrysophyllum roxburghii
Common name: Indian Star Apple
Family: Sapotaceae
Vernacular name: Pale hannu (Kannada)
Time of Flowering: January-February
Time of fruit availability: April-May



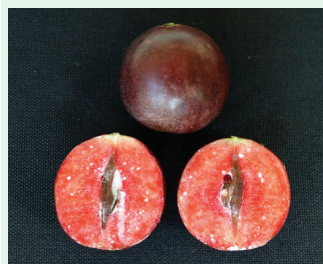
Mimusops elengi
Common name: Bullet Wood Tree
Family: Sapotaceae
Vernacular name: Ranjala hannu (Kannada)
Time of Flowering: November-February
Time of fruit availability: March-May



Debregeasia longifolia
Common name: Orange Wild Rhea
Family: Urticaceae
Vernacular name: Keppasi, Kurigele (Kannada)
Time of Flowering: December-January
Time of fruit availability: March-April



Aporosa lindleyana
Common name: Lindley's Aporosa
Family: Euphorbiaceae
Vernacular name: Yechi pann (Kodava)
Time of Flowering: September-December
Time of fruit availability: February-April



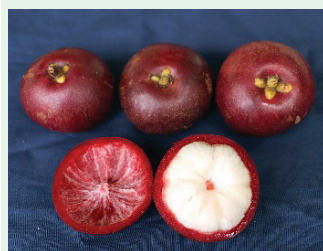
Carissa gangetica /
Carissa carandas
Common name: Karonda
Family: Apocynaceae
Vernacular name: Karmanji
pann (Kodava)
Time of Flowering: January–
March
Time of fruit availability:
April–July



Margaritaria indica
Common name: Airy Shaw
Family: Euphorbiaceae
Vernacular name: Uppalli pann
(Kodava)
Time of Flowering: April–June
Time of fruit availability:
September–November



Elaeocarpus munronii
Common name: Nilgiri Marble
Tree
Family: Elaeocarpaceae
Vernacular name: Edanji pann
(Kodava)
Time of Flowering: November–
January
Time of fruit availability:
March–April



Garcinia indica
Common name: Kokum
Family: Clusiaceae
Vernacular name: Punarpuli
(Kokum)
Time of Flowering: December–
January
Time of fruit availability:
April–May



Garcinia xanthochymus
Common name: Yellow
Mangosteen
Family: Clusiaceae
Vernacular name: Benakepuli
(Kodava)
Time of Flowering: April–June
Time of fruit availability:
August–October



Artocarpus hirsutus
Common name: Wild Jack Tree
Family: Moraceae
Vernacular name: Hebbalasuv,
Aajin chekke (Kodava)
Time of Flowering: January–
March
Time of fruit availability:
May–June



Bridelia spicularis
Common name: Climbing
Bridelia
Family: Phyllanthaceae
Vernacular name: Akshathe
balli (Kannnda)
Time of Flowering: November–
February
Time of fruit availability:
December–April



Grewia tillifolia
Common name: Dhaman
Family: Tiliaceae
Vernacular name: Thadachi
pann (Kodava)
Time of Flowering: February–
April
Time of fruit availability:
May–June



Elaeocarpus tuberculatus
Common name: Warty Marble
Tree
Family: Elaeocarpaceae
Vernacular name: Koome Pann
(Kodava)
Time of Flowering: February–
March
Time of fruit availability:
July–August



Physalis peruviana
Common name: Cape
Gooseberry
Family: Solanaceae
Vernacular name: Goomatte
pann (Kodava)
Time of Flowering: May–July
Time of fruit availability:
July–September



Garcinia gummigatta
Common name: Malabar
tamarind
Family: Clusiaceae
Vernacular name: Kachampuli
(Kodava)
Time of Flowering: February–
April
Time of fruit availability:
June–August



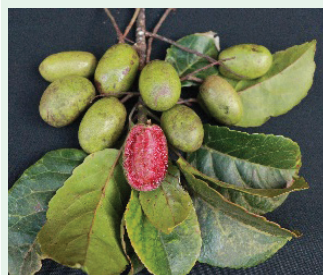
Canthium diocuum
Common name: Ceylon
Boxwood
Family: Rubiaceae
Vernacular name: Amme pann
(Kodava)
Time of Flowering: December–
February
Time of fruit availability:
March–May



Solanum nigrum
Common name: Black Night
Shade
Family: Solanaceae
Vernacular name: Ganike
hannu, Kake pann (Kodava)
Time of Flowering: March–
April
Time of fruit availability:
May–July



Persicaria chinensis
Common name: Chinese
Knotweed
Family: Polygonaceae
Vernacular name: Sorale hannu
(Kannnda)
Time of Flowering: year-round
Time of fruit availability:
throughout year



Eleocarpus variabilis
Common name: South Indian Marble Tree
Family: Elaeocarpaceae
Vernacular name: Kume hannu (Kannada)
Time of Flowering: May–June
Time of fruit availability: September–October



Cordia dichotoma
Common name: Lasoda
Family: Boraginaceae
Vernacular name: Challe hannu (Kannada)
Time of Flowering: December–February
Time of fruit availability: March–May



Rubus rugosa
Common name: Wild Raspberry
Family: Rosaceae
Vernacular name: Nuchate hannu
Time of Flowering: February–March
Time of fruit availability: May–June



Salacia wayanadica
Common name: Wayanad Salacia
Family: Celastraceae
Vernacular name: Madike hannu
Time of Flowering: February–April
Time of fruit availability: May–July

SUMMARY

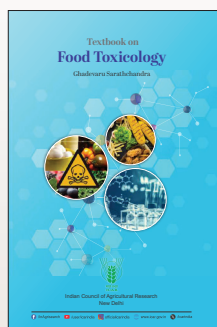
Documenting indigenous knowledge about their use, cultivation and preservation is crucial to maximising their value. By developing agro-techniques specific to these species, along with proper post-harvest handling and value addition strategies, can boost their market appeal. Promoting awareness through community involvement, educational initiatives and inclusion in public nutrition policies will encourage wider acceptance. In summary, the conservation and scientific exploration of wild fruits should be prioritised, not only to safeguard biodiversity but also to offer viable solutions for nutritional

improvement, economic upliftment and ecological sustainability.

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