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Forest Foods of Northern Western Ghats: Mode of Consumption, Nutrition, and Availability

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Abstract

Forest foods or wild edible plants are a traditional source of daily nutrition in addition to regular diet. Local people and tribals of northern Western Ghats of Maharashtra, India utilize large number of wild edible plants sustainably. A comprehensive checklist of 159 wild edible plants belonging to 70 families was prepared to document this traditional knowledge. Data gathered indicate that leaves, fruits, seeds, tubers, and stems are an integral and essential element in the diet of the local people. Plants are consumed either raw or cooked as vegetable, or stored in dried or other form. Trees are consumed most when compared to other habit groups. Several studies conducted earlier on wild edible plants of small regions of Northern Western Ghats of Maharashtra suggest that these plants play an important role in the livelihoods of rural and local communities of the region.

Plants are the gift to humans by nature and have been used as an important source of food. Many plant species are domesticated by humans for their daily requirement of food. In addition to several of these domesticated crops, many wild plants not cultivated by humans have been used as a source of food. Wild edible plants can be defined as those plants which grow in the wild and various parts of these plants can be safely consumed. Wild edible plants serve not only as an alternative to staple food deficit but also as a valuable supplement for nutritionally balanced diet of rural and tribal communities. Such plants are naturally resistant and adaptive to microclimate change such as low rainfall, high temperature, etc. especially in comparison to introduced or exotic plant species. The knowledge of consumption of wild edible plants by rural and tribal communities has been transferred from one generation to another traditionally. This traditional knowledge is useful to widen food sources. The use of wild edible plants as food is an integral part of the culture and tradition of many indigenous communities of India in various regions.

The Western Ghats or the Sahyadri are a mountain range along the western side of India. The area is one of the thirty-four biodiversity hotspots of the world (Roach, 2005; Synge, 2005) owing to high levels of species endemism and anthropocentric pressures on them. There

is topographic and climatic heterogeneity in the Western Ghats which support diverse vegetation types and distinct fauna. The complex topography, high rainfall, relative inaccessibility, and biogeographic isolation have been responsible for the Western Ghats to retain their rich biodiversity (Gadgil *et al*., 2011). Although the total area is less than 6% of the land area of India, the Western Ghats contain more than 30% of all plant species found in India. The region has numerous medicinal plants and important genetic resources such as the wild relatives of grain crops.

The northern sector of the Western Ghats of Maharashtra lies between 15° and 21° N latitude. It is about one-third of the total length of Western Ghats and covers an area of 52,000 km^2 (Gadgil *et al*., 2011). The northern ranges of Western Ghats comprise the districts Nandurbar, Dhule, Nashik, Ahmednagar, Pune, Satara, Sangli, Kolhapur, Thane, Raigad, Ratnagiri, and Sindhudurg. The local and rural communities of these districts utilize wild edible plants in their day-to-day consumption. Several studies have been done on exploring the consumption of wild edible plants by local people in the Northern Western Ghats of Maharashtra (Datar and Vartak, 1975; Vartak, 1981; Gunjatkar and Vartak, 1982; Gunjatkar, 1985; Vartak and Suryanarayana, 1995; Patil and Patil, 2000; Khyade *et al*., 2009; Kshirsagar *et al.,* 2012; Mahadkar and Jadhav, 2013; Chothe *et al*., 2014; Mulay and Sharma, 2014). Datar and Vartak (1975) enumerated wild edible plants from Karnala Bird Sanctuary in Maharashtra. Gunjatkar and Vartak (1982) documented only the wild edible legumes from Pune district. Vartak and Kulkarni (1987) and Salave and Reddy (2012) concentrated on some less known wild leafy vegetables of Pune and Ahmednagar districts respectively. Deshmukh and Shinde (2010) and Kshirsagar *et al*. (2012) listed wild edible fruits which are underutilized from Kalsubai-Harishchandragad wildlife sanctuary and North Maharashtra respectively while Chothe *et al*. (2014) described the processing of unconventional wild fruits of tribal areas of Thane district. Mahadkar and Jadhav (2013) enumerated traditional uses of wild edible plants of Kolhapur district. Vartak and Ghate (1994) focused only on *Meyna laxiflora,* which is a promising wild edible fruit from tribal areas of Western Maharashtra.

All these works are restricted to smaller geographical areas and there is no document available giving wild edible plants of Northern Western Ghats as a single unit with details of botanical name, important synonym, vernacular name, family, habit, edible part, mode of consumption, flowering and fruiting season, nutritional analysis, and habitat. This present checklist is an attempt to bridge the gap between wild edible plants enumerated and those consumed by the local and rural communities of Northern Western Ghats of Maharashtra.

Methodology

A checklist of 159 wild edible plant species from Northern Western Ghats of Maharashtra was compiled based on literature survey and herbarium consultation at the Herbarium of Agharkar

Research Institute, Pune, Maharashtra. Literature of various sources including Datar and Vartak (1975), Gunjatkar (1985), Nilegoankar *et al*. (1985), Vartak and Kulkarni (1987), Khyade *et al.* (2009), Kshirsagar *et al.* (2012), Salave and Reddy (2012), Mahadkar and Jadhav (2013), and Mulay and Sharma (2014) was consulted for checklist of wild edible plants. In addition to literature survey, herbarium specimens deposited in the Herbarium of Agharkar Research Institute were consulted for additional data. Information on herbarium sheets was referred and the utility of the plant species was listed with botanical name, important synonym, if any, vernacular names, habit, edible parts, mode of consumption, flowering and fruiting season, and nutritional content. Synonyms were updated as given in The Plant List (2014), Version 1.1 (http://www.theplantlist.org/). Flowering and fruiting season was compiled by using state floras (Sharma *et al*., 1996; Almeida, 1996–2009; Singh *et al.*, 2000, 2001). Nutritional composition was compiled using "Glossary of Indian Medicinal Plants with Active Principles" (Asolkar *et al*., 1981).

Results and discussion

A comprehensive checklist of all the 159 plant species of wild edible plants from Northern Western Ghats of Maharashtra belonging to 70 families was prepared. Amongst dominant families of wild edible plants, Apocynaceae (12 species) followed by Leguminosae (10 species), Vitaceae (7 species), and Asteraceae (6 species) topped the list. Fruits and leaves are the most edible parts of plants than the other edible parts like flowers, seeds, tubers, roots, shoots, stem, inflorescence, and rhizome (Table 1). Leaves are available throughout the year but mostly consumed when they are tender; other parts are consumed seasonally.

Wild edible plants can be defined as those plants which grow in the wild and various parts of these plants can be safely consumed. Wild edible plants serve not only as an alternative to staple food deficit but also as a valuable supplement for nutritionally balanced diet of rural and tribal communities.

Table 1. Edible parts of wild plant species.

Edible part	No. of plant species
Flowers	10
Fruits	77
Leaves	60
Seeds	17
Roots	6
Tubers	10
Thalamus	1
Peduncle	1
Shoots	10
Rhizome	1
Inflorescence	1
Stem	4
Whole plant	4
Kernel	1
Gum	1
Fleshy receptacle of fruits	1

Plants are consumed either raw or as various preparations such as vegetable, pickle, etc. Parts of 90 plant species are cooked as vegetable while parts of 79 plant species are eaten raw (Table 2). Edible plants are either consumed when they are available or they are stored and consumed throughout the year. Edible parts of plants need to be dried for storage and for making pickles, syrup, *ladoos* (sweetmeat), etc.

Single part of some species is used for edible purpose. Thalamus of only one species *Nelumbo nucifera* is eaten as vegetable. Roots of plant species like *Sterculia urens* and *Sterculia villosa* are eaten roasted while those of *Hemidesmus indicus* and *Leea indica* are used as vegetable. Rhizomes of *Ensete superbum*

Table 2. Mode of consumption of wild edible plants.

Mode of consumption	No. of plant species
Vegetable	90
Eaten raw	79
Roasted	9
Boiled	5
As health drink	3
Pickle	4
Curry	2
Ladoos	1
Syrup	1
Chutney	1
Salad	1
Fried	1
Soft drink	1
Drinkable water	1
Tea	1

The Western Ghats or the Sahyadri are a mountain range along the western side of India. The area is one of the thirty-four biodiversity hotspots of the world.

are edible; they are boiled and consumed while the inflorescence is used for vegetable preparation. There are many plant species whose edible leaves are made into vegetable preparations such as *Cissus adnata*, *Cissus quadrangularis*, *Glossocordia bosvallia*, *Acmella paniculata*, *Vernonia cinerea*, *Amaranthus spinosus*, and *Amaranthus viridis* (Table 3). The plant species whose leaves and fruits are edible show some variation in their mode of consumption. Leaves of *Ocimum tenuiflorum* are used in preparation of tea while those of *Ocimum americanum* are prepared as chutney. Fruits of several plants are eaten raw. The fruits of *Garcinia indica* are made into syrup while the fruits of *Aegle marmelos* are used in preparation of soft drinks (Table 3).

There are in all 47 plant species which have more than one edible part. Leaves and fruits of *Capparis spinosa* and *Senna occidentalis* are edible while fruits and seeds of *Nymphaea pubescens* and *Spondias pinnata* are consumed. *Maesa indica*, *Ficus hispida*, *Ficus religiosa*, *Physalis minima*, *Leea asiatica*, and *Leea macrophylla* are edible plants whose leaves are made into vegetable and fruits are eaten raw. The whole plant of *Mollugo pentaphylla*, *Centella asiatica*, *Portulaca*

oleracea, and *Viscum nepalense* is edible (Table 3).

Among the wild edible plants there are 51 trees, 34 shrubs, 47 herbs, 22 climbers, and 5 aquatic herbs (Fig. 1). Within habit groups, trees are consumed more by the local people owing to their availability during the monsoon. Fruits are consumed more during January–July because of their availability while resources like leaves are consumed in monsoon during July–October.

Conclusion

It is predicted that the world population will reach 9 billion by the end of 2050. To feed the population, conventional food sources should be supplemented with traditional food sources. Although staple foods in the form of cereals provide calories, for micronutrient requirements which is termed as 'hidden hunger', people have to depend on other resources. Forest foods can provide the best supplements of micronutrients. The wild edible plants play an important role in day-to-day life of rural and tribal communities of Northern Western Ghats of Maharashtra. They also fulfill their nutritional requirements from these wild resources. Traditional knowledge of consuming the wild edible plants will help in developing new food sources, which will further help during food scarcity.

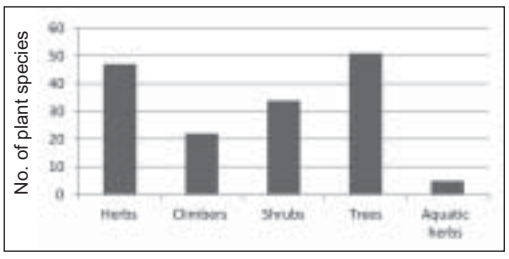

Figure 1. Habit groups of wild edible plants in the study area.

Local people residing in Northern Western Ghats have good knowledge of edible plants of surrounding forests and know how to eat the edible part and discard the other parts. This traditional knowledge of consuming wild edible plants is passed on orally from one generation to another and needs to be safeguarded. Thus these wild edible plants can act as a link between habitat, people, and culture.

There are various edible parts of wild plants like roots, inflorescence, tubers, and shoots, but mostly leaves and fruits are consumed by the people. There are also various ways of consuming leaves and fruits. Leaves of some plants are used in preparation of tea and chutney while fruits of some plants are used as vegetable or they are dried and used in pickles or for making syrup. Gum of a plant is also useful in making sweet preparation. Edible parts of some plants are available throughout the year. These various ways of consuming edible parts of a wild plant can be an addition to the daily diet.

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Table 3. Wild edible plants of different families consumed in Northern Western Ghats.

Botanical name	Vernacular name(s)	Habit
Agavaceae		
Agave americana L.	*Ghyapat*	Shrub
Alangiaceae		
Alangium salvifolium (L. f.) Wangerin	*Ankul, ankwal, ansaroli*	Shrub
Amaranthaceae		
Amaranthus spinosus L.	*Katemath*	Herb
Amaranthus viridis L.	*Math*	Herb
Celosia argentea L.	*Kurdu, silgizara*	Herb
Digera muricata (L.) Mart.	*Kunzru, kunzar, tanduljira chenchali koora, aghada*	Herb
Anacardiaceae		
Buchanania cochinchinensis (Lour.) M.R. Almeida	*Char, charoli, piyal*	Tree
Lannea coromandelica (Houtt.) Merr.	*Moin, mangi*	Tree
Rhus mysorensis G. Don	*Amani, amboni*	Shrub
Semecarpus anacardium L.	*Bhilava, bibba*	Tree
Spondias pinnata (L. f.) Kurz.	*Ambada*	Tree
Annonaceae		
Annona reticulata L.	*Ramphal*	Tree
Miliusa tomentosa (Roxb.) Sinclair	*Hoom, humb, minmara, thoska*	Tree
Apiaceae		
Centella asiatica (L.) Urban.	*Brahami, mandukaparni*	Herb
Apocynaceae		
Caralluma adscendens var. *fimbriata* (Wall.) Gravely & Mayur	*Makaadsing, shingoli, shindamakad*	Herb
Ceropegia attenuata Hook.	*Tilori*	Herb
Ceropegia bulbosa Roxb.	*Khapparkadu, dadmudale*	Climber
Ceropegia hirsuta Wight & Arn.	*Haamana*	Climber
Ceropegia lawii Hook.	*Kharpudi, tilori*	Herb
Ceropegia oculata Hook.		Climber
Frerea indica Dalz.	*Shindal-makudi*	Herb
Hemidesmus indicus (L.) Schult.	*Anantvel, uparsul*	Climber

Edible part	Mode of consumption	Season	Nutritional content[1]
Flower	As vegetable	Oct–Dec	
Fruit	Eaten raw	Feb–Apr	Alkaloids, alangimarine
Leaf	As vegetable	July–Feb	
Leaf	As vegetable	Sep–Dec	
Leaf	As vegetable	Aug–Feb	
Leaf, shoot	As vegetable	Jul–Dec	
Fruit	Eaten raw	Jan–May	Tannins, saponins, alkaloids, lipids (kernel)
Leaf, fruit	Fruits pickled; leaves as vegetable	Jan–Jul	Flavonoids, alkaloids
Fruit	Eaten raw	Aug–Dec	
Fleshy receptacle of the fruit	Eaten raw	Jan–Sep	Bhilawanol
Fruit, seed	Eaten raw	Dec–Jul	Tannins, saponins, flavonoids, β-amyrin
Fruit	Eaten raw	Jul–Nov	
Fruit	Eaten raw	Feb–Apr	
Whole plant	As health drink	May–Nov	
Shoot	As vegetable	Jun–Sep	
Tuber	Eaten raw or roasted	Jul–Oct	
Tuber, leaf	Eaten raw or as vegetable	Jul–Oct	
Tuber	Eaten raw or roasted	Jul–Nov	
Tuber	Eaten raw or roasted	Aug–Sep	
Tuber	Eaten raw or roasted	Jul–Oct	
Succulent stem	As vegetable	Sep–Jan	
Root, leaf	As vegetable	Jul–May	Tannins, saponins, flavonoids, alkaloids, phytosterols, glycosides

continued

Table 3. *continued*

Botanical name	Vernacular name(s)	Habit
Holarrhena pubescens (Buch-Ham.) Wall.	*Kuda, pandhara kuda*	Shrub
Holostemma annulare (Roxb.) K. Schum. (syn. *Holostemma ada-kodien* Schult.)	*Shidodi, tultuli*	Climber
Wrightia tinctoria R.Br.	*Kala kuda*	Tree
Wrightia tomentosa (Roxb.) Roem. & Schult. [syn. *Wrightia arborea* (Dennst.) Mabb.]	*Buralicode*	Tree
Arecaceae		
Phoenix sylvestris (L.) Roxb.	*Tadi, shindi, shindoli*	Tree
Asparagaceae		
Asparagus racemosus Willd.	*Shatavari*	Herb
Chlorophytum tuberosum (Roxb.) Baker	*Safed musali, turshi, kolu, kuli*	Herb
Drimia indica (Roxb.) Joseph [syn. *Urginea indica* (Roxb.) Kunth.]	*Jangli-kand, jangli-piaz*	Herb
Asteraceae		
Acmella paniculata (Wall. ex DC.) R.K. Jansen. (syn. *Spilanthes calva* DC.)	*Akkalkara*	Herb
Emilia sonchifolia (L.) DC.	*Sadmandi, makka, dhamapan*	Herb
Glossocordia bosvallia (L. f.) DC.	*Jangli shepu, mirg, phattarsuva, pipada*	Herb
Sonchus oleraceus L.	*Mhatara*	Herb
Vernonia cinerea L. [syn. *Cyanthillium cinereum* (L.) H. Rob.]	*Sahadevi*	Herb
Xanthium indicum Koen. (syn. *Xanthium strumarium* L.)	*Shankeshvar*	Herb
Balsaminaceae		
Impatiens balsamina L.	*Terda*	Herb
Impatiens inconspicua Bth.	*Gulabi terda*	Herb
Begoniaceae		
Begonia crenata Drynad.	*Ambadi, mutia*	Herb

Edible part	Mode of consumption	Season	Nutritional content[1]
Tender fruit	As vegetable	Feb–June	
Flower, fruit	As vegetable	Jun–Oct	
Leaf, fruit, seed	Leaves and pods (fruits) as vegetable; seeds eaten raw	Mar–May	β-sitosterol
Leaf, fruit	Leaves as vegetable; fruits eaten raw	Apr–Jun	
Fruit	Eaten raw	Jan–Oct	
Root	Eaten boiled	Jun–Oct	
Tuber, leaf	Tubers eaten raw; leaves as vegetable	Jun–Sep	
Tuber	Eaten raw or used in vegetable preparation	Feb–May	Flavonoids, kaempferol, quercetin, glycosides
Leaf	As vegetable	Sep–Jan	Tannins, saponins, quercetin, glycosides
Leaf	As vegetable	Aug–Dec	Kaempferol, quercetin, ursolic acid
Leaf	As vegetable	Aug–Dec	Flavonoids, glycosides, ursolic acid
Leaf, tender shoot	Leaves as vegetable; shoots as a salad	Sep–May	Flavonoids, alkaloids, glycosides, ursolic acid
Leaf	As vegetable	Jul–Feb	Tannins, saponins, flavonoids, glycosides
Shoot	As vegetable	Jan–May	Alkaloids
Seed, leaf	Seeds eaten raw; leaves as vegetable	Jul–Sep	Tannins, saponins, flavonoids, alkaloids, kaempferol, glycosides
Seed, leaf	Seeds eaten raw; leaves as vegetable	Aug–Oct	Flavonoids, alkaloids
Leaf	Eaten raw	Sep–Oct	

continued

Table 3. *continued*

Botanical name	Vernacular name(s)	Habit
Bignoniaceae		
Oroxylum indicum (L.) Vent.	*Tetu, phalga, tutumba*	Tree
Bombacaceae		
Bombax ceiba L.	*Katesawar*	Tree
Boraginaceae		
Cordia dichotoma Forst. f.	*Bhokar*	Tree
Cordia gharaf (Forssk.) Ehrenb. & Asch. (syn. *Cordia sinesis* Lam.)	*Gondani*	Tree
Brassicaceae		
Capsella bursa-pastoris (L.) Medik.		Herb
Burseraceae		
Boswellia serrata Roxb. ex Colebr.	*Salai, kadhai*	Tree
Garuga pinnata Roxb.	*Kakkad*	Tree
Cactaceae		
Opuntia elatior Mill.	*Nivdung, nagphani, fanta*	Shrub
Capparaceae		
Capparis spinosa L.	*Kabra, kalavri*	Shrub
Capparis zeylanica L.	*Waghati, govind-phal, toratti*	Shrub
Caryophyllaceae		
Stellaria media (L.) Vill.		Herb
Celastraceae		
Celastrus paniculatus Willd.	*Dhimar-bel, jyotishmati, kangli, kangun, karkanganvel, kiri*	Shrub
Cleomaceae		
Cleome gynandra L.	*Pandri-tilwan*	Herb
Cleome viscosa L.	*Pivli-tilwan*	Herb
Clusiaceae		
Garcinia indica (Du Petit-Thou.) Choisy	*Amsol, kokam, bhinda, komkabi, ratamba, bhiran*	Tree
Garcinia spicata (Wight & Arn.) Hook.	*Jangli-ramphal, tavir*	Tree
Garcinia xanthochymus Hook.	*Dharamba, jhrambi, ota*	Tree
Mammea suriga (Buch-Ham. ex Roxb.) Kosterm.	*Nagkesar, punnag, surang suringi, tambra*	Tree

Edible part	Mode of consumption	Season	Nutritional content[1]
Flower, fruit	Flowers as vegetable; fruits pickled	Jun–Dec	Tannins
Flower	As vegetable	Feb–Jun	
Fruit	As vegetable	Feb–Jun	
Fruit	As vegetable	Apr–Oct	Aspartic acid
Leaf	As vegetable	Jan–Feb	
Fruit	Fruits pickled	Feb–Jun	
Fruit	Eaten raw	Feb–Aug	
Fruit	Eaten raw	Jan–Jul	Tannins, flavonoids
Leaf, fruit	As vegetable	Jan–Mar	
Fruit	As vegetable	Feb–Apr	
Leaf	As vegetable	Mar–Apr	Tannins, kaempferol
Fruit	Eaten raw	Jun–Dec	
Leaf	As vegetable	Jun–Mar	Linoleic acid, myristic acid
Seed	As vegetable	Mostly throughout the year	
Fruit	As syrup	Nov–Feb	Garcinol, garcinenone
Fruit	Eaten raw	Mar–May	Garcinol, garcinenone
Fruit	Eaten raw	Feb–May	Glycosides, garcinol, garcinenone
Fruit	Eaten raw	Feb–Mar	

continued

Table 3. *continued*

Botanical name	Vernacular name(s)	Habit
Cochlospermaceae		
Cochlospermum religiosum (L.) Alston.	*Chaor, ganeri, gogal*	Tree
Combretaceae		
Anogeissus latifolia (Roxb. ex DC.) Wall. ex Guillem. & Perr.	*Dhamada*	Tree
Commelinaceae		
Commelina benghalesis L.	*Kena, kolar*	Herb
Commelina diffusa Burm. f.	*Gandologi*	Herb
Convolvulaceae		
Ipomoea aquatica Forssk.	*Nelichi bhaji, bhui koohala, panbhaji*	Aquatic herb
Ipomoea batatas (L.) Lam.	*Ratale*	Herb
Ipomoea mauritiana Jacq.	*Bhui khola*	Climber
Ipomoea nil (L.) Roth.	*Nalichi bhaji*	Climber
Ipomoea turbinata Lag.	*Kantel phool*	Climber
Cucurbitaceae		
Coccinia grandis (L.) Voigt	*Tondali, jangli kundru*	Climber
Diplocyclos palmatus (L.) C. Jeffrey	*Kavdoli, shanker-vel, sivalingi*	Climber
Momordica dioica Roxb. ex Willd.	*Kartoli, katwal, kartule*	Climber
Dilleniaceae		
Dillenia indica L.	*Mota-karmal*	Tree
Dillenia pentagyna Roxb.	*Chota-karmal*	Tree
Dioscoreaceae		
Dioscorea bulbifera L.	*Kadu-kand, mataru, karanda*	Climber
Ebenaceae		
Diospyros melanoxylon Roxb.	*Tembhurni, temru*	Tree
Elaeagnaceae		
Elaeagnus conferta Roxb.	*Ambgul, nurgi*	Shrub
Euphorbiaceae		
Bridelia retusa (L.) Spreng.	*Asana, kakai, ashind*	Tree

Edible part	Mode of consumption	Season	Nutritional content[1]
Seed	As vegetable	Feb–Apr	
Gum	Used in preparation of *ladoos*	Mar–Sep	
Leaf	As vegetable	Jun–Dec	
Leaf	As vegetable	Jul–Feb	
Leaf	As vegetable	Throughout the year	
Fruit	Eaten raw or boiled	Rare and irregular	
Tuber	As vegetable	Oct–Jan	
Leaf	As vegetable	Aug–Nov	
Peduncle	As vegetable	Jan–Mar	
Fruit	As vegetable or eaten raw	Mar–Dec	
Leaf	As vegetable	Dec–Jan	
Fruit	As vegetable	Jun–Oct	
Fruit	Eaten raw	Jun–Sep	Kaempferol, β-sitosterol, rhamnetin, dillenetin
Fruit	Eaten raw	Mar–Jun	Kaempferol, β-sitosterol, rhamnetin, dillenetin
Tuber	Eaten raw, roasted, or boiled	Jul–Mar	
Fruit	Eaten raw	Feb–Apr	
Fruit	Eaten raw	Nov–May	
Fruit	Eaten raw	Jun–Dec	

continued

Table 3. *continued*

Botanical name	Vernacular name(s)	Habit
Securinega virosa (Roxb. ex Willd.) Baill. [syn. *Flueggea virosa* (Roxb. ex Willd.) Royle]	*Pisrungi, pithoni, petuni*	Shrub
Flacourtiaceae		
Flacourtia indica (Burm. f.) Merr.	*Karai, galguggar, bhenkal*	Shrub
Flacourtia latifolia (Hook. f. & Thomson) Cook.	*Tambat*	Tree
Flacourtia montana Grah.	*Champari, chapar, chaprin, tar-bor*	Tree
Lamiaceae		
Ocimum americanum L.	*Rantulshi*	Herb
Ocimum tenuiflorum L.	*Kalitulshi*	Herb
Lecythidaceae		
Careya arborea Roxb.	*Kumbhi*	Tree
Leeaceae		
Leea asiatica (L.) Ridsdale	*Gharbanda, dinda*	Shrub
Leea indica (Burm. f.) Merr.	*Dinda, karkani*	Shrub
Leea macrophylla Roxb.	*Anderpod, bendar, dinda*	Shrub
Leguminosae		
Abrus precatorius L.	*Gunj*	Climber
Alysicarpus heyneanus Wight & Arn.		Herb
Bauhinia racemosa Lam.	*Kondal, shid, bhosa, apta*	Tree
Bauhinia purpurea L.	*Kachnar, koilari*	Tree
Cassia fistula L.	*Rela, bana, bhungadu, bahava*	Tree
Canavalia gladiata (Jacq.) DC.	*Chemma kaaya, abai, ghevada*	Climber
Erythrina variegata L.	*Pangara*	Tree
Mucuna pruriens (L.) DC.	*Khajol, khajkuari, khaj-kuilee*	Climber
Senna occidentalis (L.) Link. (syn. *Cassia occidentalis* L.)	*Morha bacca, rantakala*	Shrub
Senna tora (L.) Roxb. (syn. *Cassia tora* L.)	*Torota, torthan, takla*	Herb

Edible part	Mode of consumption	Season	Nutritional content[1]
Fruit	Eaten raw	Apr–Oct	Tannins, saponins, flavonoids, alkaloids, glycosides
Fruit	Eaten raw	Jan–Jul	
Fruit	Eaten raw	Mar–Jul	
Fruit	Eaten raw	Nov–Apr	
Leaf	As chutney	Sep–Feb	
Leaf	In preparation of tea	Sep–Feb	
Flower, fruit	Flowers as vegetable; fruits pickled	Mar–Apr	
Leaf, fruit	Leaves as vegetable; fruits eaten raw	May–Nov	Palmitic acid
Root	As vegetable	Aug–Mar	Palmitic acid
Leaf, fruit	Leaves as vegetable; fruits eaten raw	Jul–Oct	
Leaf	Eaten raw or as vegetable	Aug–Mar	
Seed	As vegetable	Aug–Dec	
Flower, leaf	As vegetable	Apr–Oct	
Flower	As vegetable	Oct–Jan	
Flower, leaf	As vegetable	Apr–Oct	
Fruit	As vegetable	Oct–Mar	
Leaf, shoot, seed	Leaves and shoots as vegetable; seeds eaten raw	Jan–Jun	Coumarin
Leaf	As vegetable	Aug–Jan	
Leaf, fruit	As vegetable	Aug–Dec	
Leaf, seed	Leaves as vegetable; seeds are used in curry	Aug–Feb	

continued

Table 3. *continued*

Botanical name	Vernacular name(s)	Habit
Loranthaceae		
Viscum nepalense Spreng. (syn. *Viscum articulatum* Burm. f.)	*Kawarka*	Shrub
Lythraceae		
Woodfordia fruticosa (L.) Kurz.	*Dhauri, dhayati*	Shrub
Malvaceae		
Abelmoschus crinitus Wall.	*Pahadi-bendi*	Herb
Hibiscus furcatus Roxb. (syn. *Hibiscus surattensis* L.)		Shrub
Hibiscus sabdariffa L.	*Lal ambadi*	Herb
Malva parviflora L.	*Gogi-sag, narr*	Herb
Meliaceae		
Melia dubia Cav. (syn. *Melia azedarach* L.)	*Kadu khajur, kala khajur, maha-neem*	Tree
Menispermaceae		
Cocculus hirsutus (L.) Theob.	*Jaljamni, karrom, para-vel, vasan-vel*	Climber
Molluginaceae		
Mollugo pentaphylla L.	*Jharasi*	Herb
Moraceae		
Ficus hispida L. f.	*Bhui umbar, bhuty umbar, jangli umbar, jangli aanjir*	Tree
Ficus religiosa L.	*Pimpal, pipri, rai, ali*	Tree
Musaceae		
Ensete superbum (Roxb.) Cheesman	*Janglikela, rankela, chowani*	Shrub
Myrsinaceae		
Embelia drupacea (Dennst.) M.R. & S.M. Almeida	*Ambati, ambat*	Shrub
Maesa indica (Roxb.) A. DC.	*Atki*	Shrub
Nelumbonaceae		
Nelumbo nucifera Gaertn.	*Kamal, kankadi*	Aquatic herb

Edible part	Mode of consumption	Season	Nutritional content[1]
Whole plant	Eaten roasted	Jul–Dec	Saponins, flavonoids, alkaloids, glycosides
Flower	As vegetable	May–Jun	Tannins, flavonoids, kaempferol, aspartic acid, polyphenols
Fruit	As vegetable	Aug–Dec	
Leaf, tender shoot	As vegetable	Sep–Feb	
Leaf	As vegetable	Oct–Dec	Flavonoids
Leaf, fruit	Leaves as vegetable; fruits eaten raw	Oct–Mar	
Fruit	Eaten raw	Apr–Jul	Linoleic acid, palmitic acid
Leaf	As curry	Jan–Mar	β-sitosterol
Whole plant	As vegetable	Jul–Dec	β-sitosterol
Leaf, fruit	Fruits eaten raw; leaves as vegetable	Jan–Jul	β-sitosterol
Leaf, fruit	Fruits eaten raw; leaves as vegetable	Mar–Aug	
Rhizome, inflorescence	Rhizomes are boiled and eaten; inflorescence as vegetable	Jul–Jan	
Leaf	As vegetable	Jan–Jun	
Leaf, fruit	Leaves as vegetable; fruits eaten raw	Throughout the year	
Thalamus	As vegetable	Jul–Oct	

continued

Table 3. *continued*

Botanical name	Vernacular name(s)	Habit
Nymphaeaceae		
Nymphaea nouchali Burm. f.	*Uplia kamal*	Aquatic herb
Nymphaea pubescens Willd.	*Kamal*	Aquatic herb
Olacaceae		
Olax scandens Roxb.		Shrub
Oleaceae		
Schrebera swietenioides Roxb.	*Goki, makiri, mokha*	Tree
Oxalidaceae		
Oxalis corniculata L.	*Tipani, ambushi, khatti bhaji*	Herb
Papaveraceae		
Argemone mexicana L.	*Bilayat*	Herb
Poaceae		
Dendrocalamus strictus (Roxb.) Nees.	*Kavil, basa, velu, keltha*	Tree
Portulacaceae		
Portulaca oleracea L.	*Ghol bhaji, mhotighol*	Herb
Portulaca quadrifida (L.) Mant.	*Bhuichauli, khatechan val, ranghol*	Herb
Rhamnaceae		
Ziziphus mauritiana Lam. (syn. *Ziziphus jujuba* Mill.)	*Ber, bor*	Tree
Ziziphus oenopolia (L.) Mill.	*Burgi, yeruni*	Shrub
Ziziphus rugosa Lam.	*Churan, poran*	Shrub
Ziziphus xylopyrus (Retz.) Willd.	*Hadkibor, ghatbor, gora*	Tree
Rubiaceae		
Meyna laxiflora Robyns	*Alu, helu*	Shrub
Pavetta indica L.	*Asaval, papat, papti*	Shrub
Rutaceae		
Aegle marmelos (L.) Corr.	*Bel*	Tree

Edible part	Mode of consumption	Season	Nutritional content[1]
Unripe fruits; seed	Fruits eaten raw; seeds as vegetable	Almost throughout the year	Tannins, saponins, flavonoids, alkaloids, glycosides
Fruit, seed	Fruits eaten raw; seeds as vegetable	Throughout the year	Tannins, saponins, flavonoids
Fruit	Eaten raw	Aug–Apr	
Leaf	As vegetable	Apr–Jun	
Leaf, seed	Eaten raw or as vegetable	Almost throughout the year	
Stem	As vegetable	Throughout the year	
Shoot	As vegetable	Oct–Mar	
Leaf, whole plant	As vegetable	Throughout the year	Oleracein A, B, E
Leaf, young shoot	As vegetable	Throughout the year	Linoleic acid, oxalic acid
Fruit	Eaten raw	Sep–Oct	
Fruit	Eaten raw	Aug–Sep	
Fruit	Eaten raw	Dec–Feb	Tannins, flavonoids, quercetin
Fruit	Eaten raw	Apr–Jul	Tannins, flavonoids, quercetin
Fruit	As vegetable	Mar–Jun	
Fruit	Eaten raw	Mar–Nov	Saponins, flavonoids, alkaloids, phytosterols, glycosides, linoleic acid
Fruit	Eaten raw or used in soft drinks	Apr–Nov	

continued

Table 3. *continued*

Botanical name	Vernacular name(s)	Habit
Glycosmis pentaphylla (Retz.) DC.	*Kirmira*	Shrub
Limonia acidissma L.	*Kavath*	Tree
Sapindaceae		
Dimocarpus longan Lour.	*Umb, vumb*	Tree
Schleichera oleosa (Lour.) Oken	*Kosab, koshimb, kusum*	Tree
Sapotaceae		
Madhuca longifolia (Koen.) Macbr.	*Moha*	Tree
Mimusops elengi L.	*Bacul*	Tree
Scrophulariaceae		
Bacopa monnieri (L.) Penn.	*Nir-brahami*	Aquatic herb
Smilacaceae		
Smilax zeylanica L.	*Gotvel*	Climber
Solanaceae		
Physalis minima L.	*Chirboti, ran popati*	Herb
Solanum anguivi Lam.	*Ranavangi, mothiringani*	Herb
Solanum nigrum L. (syn. *Solanum americanum* Mill.)	*Kamuni, kanguni*	Shrub
Sterculiaceae		
Firmiana colorata (Roxb.) R.Br.	*Bhaikoi, bharkoi, kaushil, supli*	Tree
Melochia corchorifolia L.		Herb
Sterculia guttata Roxb.	*Golder, kukar, vandri*	Tree
Sterculia urens Roxb.	*Kad, kadai, kandol,*	Tree
Sterculia villosa Roxb.	*Kudal, kuthada, sardol*	Tree
Taccaceae		
Tacca leontopetaloides (L.) O. Kuntz.	*Dev kanda, jatashanker*	Herb
Tiliaceae		
Corcohorus olitorius L.	*Banpat, chichuria*	Herb
Grewia abutilifolia Vent ex A. Juss.	*Chikna, sitagathalu, kharata*	Shrub

Edible part	Mode of consumption	Season	Nutritional content[1]
Fruit	Eaten raw	Feb–Mar	
Fruit	Eaten raw	Mar–Aug	
Seed, fruit	Eaten raw	Feb–May	
Fruit, young shoot	Fruits eaten raw; shoots as vegetable	Mar–May	
Flower (fresh/dried)	Eaten raw	Nov–Jan	Tannins, linoleic acid, palmitic acid
Fruit	Eaten raw	Jan–Mar	
Leaf	As health drink	Almost throughout the year	
Leaf	As vegetable	Jun–Feb	Tannins, flavonoids, alkaloids, smilagenin, glycosides, β-sitosterol
Leaf, fruit	Leaves as vegetable; fruits eaten raw	Jul–Apr	Tannins
Fruit	As vegetable	Jul–Feb	Quercetin
Fruit	As vegetable	May–Jun	Saponins, alkaloids, quercetin, coumarin
Seed	Eaten raw	Feb–May	
Leaf	As vegetable	Apr–Nov	
Seed	Eaten fried or roasted	Jan–Jun	
Seed, kernel, root	Eaten roasted	Dec–May	
Seed, tender root	Eaten roasted	Jan–May	
Tuber	Eaten boiled	Jul–Oct	Saponins
Leaf	As vegetable	Sep–Dec	Corchogenin
Fruit	Eaten raw	Feb–Nov	β-sitosterol

continued

Table 3. *continued*

Botanical name	Vernacular name(s)	Habit
Grewia asiatica L.	*Phalsa*	Tree
Grewia sclerophylla Roxb. ex G. Don.	*Dhaman, sithagathalu, pandi*	Shrub
Grewia tiliifolia Vahl.	*Dhaman, dhamasi, khesla rodgi*	Tree
Trapaceae		
Trapa natans L. var. *bispinosa* (Roxb.) Makino	*Shingada*	Herb
Verbenaceae		
Lantana camara var. *aculeata* (L.) Moldenke	*Ghaneri, gangutri, kamuni*	Shrub
Lantana salviifolia Jacq.	*Tantani*	Shrub
Vitaceae		
Ampelocissus latifolia (Roxb.) Planch.	*Dokela, nadena*	Climber
Cayratia trifolia (L.) Domin	*Ambat-vel, dhavri*	Climber
Cissus adnata Roxb.		Climber
Cissus quadrangularis L.	*Khandvel, harsankar*	Shrub
Cissus repanda Vahl.	*Gendal*	Shrub
Cissus repens Lam.		Climber
Tetrastigma leucostaphylum (Dennst.) Alston	*Khajorlicha vel*	Climber
Zygophyllaceae		
Tribulus terrestris L.	*Gokhru, sarata*	Herb

1. Vitamins A, B (all types), C, E, and K; micronutrients – calcium, phosphorus, iron, manganese, magnesium, zinc, copper, and sulfur; and macronutrients – sodium and potassium are present in all or most species.

References

Almeida MR. 1996–2009. Flora of Maharashtra. Vols. I–V. Blatter Herbarium, Mumbai, India.

Asolkar LV, Kakkar KK, and **Chakre OJ.** 1981. Glossary of Indian Medicinal Plants with Active Principles. Part-I. Publications and Information Directorate CSIR, New Delhi, India.

Chothe A, Patil S, and **Kulkarni DK.** 2014. Unconventional wild fruits and processing in tribal area of Jawhar, Thane District. Bioscience Discovery 5(1):19–23.

Edible part	Mode of consumption	Season	Nutritional content[1]
Fruit	Eaten raw	Apr–Jun	
Fruit	Eaten raw	Jul–Nov	Alkaloids
Fruit	Eaten raw	Apr–Sep	Quercetin, glycosides
Fruit	Eaten raw	Jul–Nov	
Fruit	Eaten raw	Throughout the year	Tannins, saponins, flavonoids, glycosides
Fruit	Eaten raw	Throughout the year	
Leaf, stem	Fruits eaten raw; stem yields drinkable water	Jun–Oct	Tannins, saponins, alkaloids, phytosterols
Fruit	Eaten raw	May–Oct	Tannins, saponins, flavonoids, alkaloids
Leaf, fruit	Leaves as vegetable; fruits eaten raw	Dec–Mar	
Leaf, fruit	Leaves as vegetable; fruits eaten raw	Jan–Jun	
Stem	As health drink	Mar–Jun	
Leaf, fruit	Leaves as vegetable; fruits eaten raw	Feb–Jun	
Fruit	Eaten raw	Jan–May	Saponins, alkaloids, phytosterols, glycosides
Shoot, leaf	Shoots as vegetable; fruits eaten raw	Almost throughout the year	Tannins, saponins, flavonoids, alkaloids, glycosides

Datar R and **Vartak VD.** 1975. Enumeration of wild edible plants from Karnala Bird Sanctuary, Maharashtra State. Biovigyanam 1:123–129.

Deshmukh BS and **Shinde V.** 2010. Fruits in the wilderness: A potential of local food resource. International Journal of Pharma and Bio-sciences 12:1–5.

Gadgil M, Vijayan VS, Borges R, Sukumar R, Noronha L, Nayak VS, and **Subramaniam DK.** 2011. Report of the Western Ghats Ecology Expert Panel. Part I. The Ministry of Environment and Forests, Government of India, New Delhi, India.

Gunjatkar N. 1985. Studies on wild edible plants from Western Maharashtra and Goa. PhD thesis, University of Pune, India.

Gunjatkar N and **Vartak VD.** 1982. Enumeration of wild edible legumes from Pune District, Maharashtra State. Journal of Economic and Taxonomic Botany 3:1–9.

Khyade MS, Kolhe SR, and **Deshmukh BS.** 2009. Wild edible plants used by the tribes of Akole Tahasil of Ahmednagar District (MS), India. Ethnobotanical Leaflets 13:28–36.

Kshirsagar PP, Bhogaonkar PY, and **Marathe VR.** 2012. Underutilized wild fruits of North Maharashtra. Journal of Research in Plant Sciences 1:71–76.

Mahadkar SD and **Jadhav V.** 2013. Traditional uses of some edible plants from Kolhapur District. Life Sciences Leaflets 5:19–26.

Mulay JR and **Sharma PP.** 2014. Some underutilised plant resources as a source of food from Ahmednagar District, Maharashtra, India. Discovery 9(23):58–64.

Nilegoankar S, Vartak VD, and **Chitre RG.** 1985. Nutritional evaluation of some wild edible plants from Pune and neighbouring districts, Maharashtra State: Part I. Journal of Economic Botany 6(3):629–635.

Patil MV and **Patil DA.** 2000. Some more wild edible plants of Nasik District (Maharashtra). Ancient Science of Life, Vol. XIX (3&4), pp. 102–104.

Roach J. 2005. Conservationists name nine new "biodiversity hotspots". National Geographic News, February 2, 2005.

Salave A and **Reddy PG.** 2012. Some less known wild vegetables from the Garbhagiri Hills in Ahmednagar District (M.S.), India. Journal of Pharmaceutical Research and Opinion 2(1):9–11.

Sharma BD, Karthikeyan S, and **Singh NP.** 1996. Flora of Maharashtra State. Monocotyledons. Botanical Survey of India, Calcutta, India. 794 pp.

Singh NP, Lakshminarasimhan P, Karthikeyan S, and **Prasanna PV.** 2000. Flora of Maharashtra State. Dicotyledons. Vol. 1. Botanical Survey of India, Calcutta, India.

Singh NP, Lakshminarasimhan P, Karthikeyan S, and **Prasanna PV.** 2001. Flora of Maharashtra State. Dicotyledons. Vol. 2. Botanical Survey of India, Calcutta, India.

Synge H. 2005. Biodiversity hotspots revisited. Plant Talk 40:33–36.

Vartak VD. 1981. Observations on Wild Edible Plants from Hilly Regions of Maharashtra and Goa. In: Glimpses of Indian Ethnobotany (Jain SK, ed.). Oxford and IBH Publ. Co., New Delhi, India. pp. 261–271.

Vartak VD and **Ghate VS.** 1994. *Alu*: *Meyna laxiflora* Robyns., a less-known but promising wild fruit tree for tribal areas of Western Maharashtra. Higher Plants of Indian Subcontinent. Vol III (Gupta BD, ed.). Bishen Singh Mahendrapal Singh, Dehradun, India. pp. 99–103.

Vartak VD and **Kulkarni DK.** 1987. Monsoon wild leafy vegetables from hilly regions of Pune and neighbouring districts, Maharashtra State. Journal of Economic and Taxonomic Botany 11(2):331–335.

Vartak VD and **Suryanarayana MC.** 1995. Enumeration of wild edible plants from Susala Island, Mulshi, Reservoir, Pune District. Journal of Economic and Taxonomic Botany 19(3):555–569.