



## Ethnobotanical study on wild edible fruits, spices and aquatic plants traditionally used by the Garo tribe of Meghalaya

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*Received 17 September 2019; revised 08 October 2020*

An ethnobotanical study was carried out in the West Garo Hills situated in the north-eastern hilly region of India during 2015-2017 to identify and document the wild edible fruits, spices and aquatic plants used by the Garo tribe for their nutraceutical properties. The study area is situated between the latitude 90°30' and 89°40'E and the longitude 26° and 25° 20' N. It was found that there were 43 wild edible fruit species belonging to 25 families were ethnobotanically significant for the Garo tribes. Of these wild edible fruits, 36 species were trees followed by the five shrubs and two creepers/climbers. It was also observed that the Garo tribe used 19 species of wild edible plants belonging to nine families as spices to enrich their food. Most of the spice plants used by the Garo tribe belong to Zingiberaceae and Rutaceae family. They were grouped under herbs (10 species), shrubs (6 species), trees (2 species) and creepers (1 species). Rhizomes, leaves and flowers/inflorescence were commonly used plant parts. Among the aquatic plants five species were used by the Garo tribe as vegetable, spices and medicines.

**Keywords:** Ethnobotany, Garo tribe, Nutraceutical, Traditional food, Wild edible fruits

**IPC Code:** Int. Cl.<sup>21</sup>: A61K 36/185, A61K 9/00, A23L 5/40, A23B 9/00

Wild plants were domesticated for food and nutrition since time immemorial. Wild edible plants (WEP) are substantiating food reserves for mankind. The knowledge of WEP still exists among the tribal communities across the world. The WEP act as subsidiary food sources during adverse environmental conditions like drought, flood, severe pest infestation which may leading to acute shortage of common food and food products. These plants provide nutrition to the tribal communities inhabiting the hilly tracts and other less accessible areas. They consume various plant parts as food or medicine. Most of these are consumed as direct food sources or as appetizer. Occasionally, some of these plants are also used as indirect food in the form of spices and condiments. The wild edible plants serve not only as a source of food but also have multifaceted uses. Many of them have medicinal properties, some are decorative, some yield timber and some others provide non timber forest products which have direct economic value. It is reported that about 75,000 plant species available in

this world are edible<sup>8</sup>. Out of the 9.5 thousand wild plant species recorded in India, about 3.9 thousand are edible<sup>1</sup>. More than 675 wild edible plant species were reported from the Great Himalayan range of India<sup>6,7</sup>.

West Garo Hills is an integral part of the biodiversity hot spot in the north-eastern region of India which is rich in diverse floral and faunal population. The huge reserve of diverse plant species has significant role in the lives of the native people living in the region. Many of these plants are not known to other parts of the country. References to wild edible plants in Garo language are found in old literatures that are not readily available in public domain. Besides that, very few articles or books were published having information on the usage of wild edible plants by the Garo tribe. Non-availability of detailed description of ethnobotanically important plant species poses great difficulty in proper identification and scientific use of these plants. Local names were often misleading, as in many cases the same local name was used for more than one species. Therefore, a scientific investigation was necessary to identify and document the ethnobotanically important

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plant species being utilized by the Garo tribe of Meghalaya.

### Materials and Methods

A study was carried out in the West Garo Hills situated in the north-eastern hilly region of India during 2015 to 2017 to identify and document the wild edible fruits, spices and aquatic plants used by the Garo tribe for their nutraceutical properties. West Garo Hills is located in the western most part of the State between the latitude 90° 30' and 89° 40'E and the longitude 26° and 25° 20' N. The Garo tribe predominantly inhabits the district. The Hajongs, Koch, Rajbangshi, Mechis, Kachari and Dalu are the minor tribes of the district. The district enjoys sub-tropical climate with an average rainfall ranging between 2000 mm to 4000 mm. The economy of the Garo Hills districts is basically agrarian and rural based. The study was carried out by several field visits to different villages of the Garo tribes in the district. Initial visits were essentially for rapport building as well as pre-testing the interview schedule. Subsequent visits were made to interview the village elders using pre-tested interview schedule and to list out various wild edible plants, spices and aquatic plants being used by the Garo tribe. Systematic collection of primary data was carried out following standard methods<sup>5</sup>. Survey of wild habitats, local vegetable markets, weekly markets etc. was also done to list out the wild edible plants. Interview of traditional healthcare practitioners (*i.e.*, *Ojha*) were also carried out to collect ethnobotanical information on wild edible plant species. Information was also

collected from secondary sources like published articles, books, booklets, magazines, newspapers etc. The collected information of plant species were documented and carefully identified with the help of herbariums available in the Botanical Survey of India, Shillong and tabulated citing the common name, scientific name, family, plant parts used etc.

### Results and Discussion

The present investigation revealed that 43 wild edible fruit species belonging to 25 families were extensively used by the Garo tribes as food (Table 1). Of these wild edible fruits, 36 species were trees followed by 5 shrubs and 2 creepers/climbers. In most of the cases, plant parts used for food and nutrition were fruit. Although few species like guava, passion fruits, plum, fig etc. are commercial fruits in other parts of the world, but these plant species were listed in this paper as WEP because in the West Garo Hills, they grow in the wild and unprotected conditions.

Plants listed in Table 2 revealed that 19 species of wild edible plants belonging to 9 families were used as spices by the Garo community to enrich their food. Most of the spice plants used by the Garo tribe belong to Zingiberaceae and Rutaceae family. They were grouped under herbs (10 species), shrubs (6 species), trees (2 species) and creepers (1 species). Rhizomes, leaves and flowers/inflorescence were commonly used plant parts. Among the aquatic plants only 5 herbaceous plant species were used by the Garo tribe as vegetable, spices and medicines (Table 3) as per the current study.

Table 1 — Wild edible fruits used by the Garo tribe of West Garo Hills, Meghalaya

Sl. No.	Botanical Name	Common Name (English/Hindi)	Vernacular Name (Garo)	Family	Habit
1	<i>Aegle marmelos</i> (L.) Corr.	Bael tree/ Wood apple (E)	Simpru/ bell	Rutaceae	Tree
2	<i>Averrhoa carambola</i> L.	Carambola (E)	Amlenga	Averrhoaceae	Tree
3	<i>Baccaurea sapida</i> (Roxb.) Muell. Arg.	Burmese grapes (E)	Gasambe	Euphorbeaceae	Tree
4	<i>Calamus tenuis</i> Roxb.	Cane palm (E)	Sokmil	Arecaceae	Shrub
5	<i>Castanopsis indica</i> (Roxb.ex.Lindl.) A. DC.	Indian chestnut tree (E) /Chinkapin oak	Chhakkukhokrol	Fagaceae	Tree
6	<i>Cucumis melo</i> L.	Melon (E)	Teraja	Cucurbitaceae	Creeper
7	<i>Citrus maxima</i> (Burm. f.) Osbek	Pumelo/ Shaddock (E)	Jambura	Rutaceae	Tree
8	<i>Citrus hystrix</i> DC.	Kaffir lime (E)	Chinara	Rutaceae	Tree
9	<i>Citrus indica</i> Tanaka.	Indian Wild Orange (E)	Memang narang	Rutaceae	Shrub
10	<i>Croton tiglium</i> L.	Purging Croton (E)/Jamal gota (H)	Runibeh	Euphorbeaceae	Tree
11	<i>Cyathocalyx martabanicus</i> Hook. f. & Thomson	Not available	Bolong	Anonaceae	Shrub
12	<i>Elaeagnus umbellata</i> Thunb.	Japanese silverberry (E)	Sokua	Elaeagnaceae	Shrub

(Contd.)

Table 1 — Wild edible fruits used by the Garo tribe of West Garo Hills, Meghalaya (Contd.)

Sl. No.	Botanical Name	Common Name (English/Hindi)	Vernacular Name (Garo)	Family	Habit
13	<i>Elaeocarpus floribundus</i> Bl.	Indian Olive (E). Jalpai (H), Jolphai (A)	Jorphoi	Elaeocarpaceae	Tree
14	<i>Ficus cunia</i> Ham. ex. Roxb.	Fig (E)	The-bol	Moraceae	Tree
15	<i>Ficus auriculata</i> Lour.	Roxburg Fig (E)' Atha-dimoru (A)	The-bol	Moraceae	Tree
16	<i>Ficus glomerata</i> Roxb.	Cluster fig (E), Goolar (H)	The-bol	Moraceae	Tree
17	<i>Ficus hispida</i> L. f.	Hairy fig (E), Kagsha/Katgularia (H), Dimoru (A)	Sakap	Moraceae	Tree
18	<i>Flacourtia cataphracta</i> Roxb.	Indian plum (E)	Darichik	Saliaceae	Tree
19	<i>Garcinia pedunculata</i> D.Don.	Malabar tamarind/ Mangosteen (E)	Thizou	Clusiaceae	Tree
20	<i>Meyna laxiflora</i> Robyns.	Muyna (H)	Soh-mon/ Thitching	Rubiaceae	Tree
21	<i>Meyna spinosa</i> Roxb. ex Link	Muyna (H), Maiyan/Kotkora (A)	Thitchkeng	Rubiaceae	Tree
22	<i>Microcos paniculata</i> L.	Shiral (H), Pisoli (A)	Bolchu-pret	Tiliaceae	Tree
23	<i>Morus laevigata</i> L.	Mulberry (E)	Miskuri	Moraceae	Tree
24	<i>Morus nigra</i> L.	Black mulberry (E)	Miskuri	Moraceae	Tree
25	<i>Myrica esculenta</i> Buch.-Ham. ex. D. Don	Box myrtle (E), Noga tenga (A)	Soh-phi (khasi)	Myricaceae	Tree
26	<i>Myrica nagi</i> Thunb.	Sweet gale (E), Katphal (H)	Bar thekera	Myricaceae	Tree
27	<i>Olea europea</i> L.	European Olive Tree (E)	Jolpai	Oleaceae	Tree
28	<i>Parkia roxburgii</i> G.Don.	Tree bean (E)	Sim/ Youngchak	Mimosaceae	Tree
29	<i>Phoenix dactylifera</i> L.	Date palm (E)	Date	Arecaceae	Tree
30	<i>Phoenix loureiroi</i> Kunth.	Dwarf date palm/ Hill date palm (E)	Date	Arecaceae	Shrub
31	<i>Phyllanthus acidus</i> (L.) Skeel.	Star gooseberry (E)	Ambari raja/ Mimangambari	Euphorbeaceae	Tree
32	<i>Phyllanthus emblica</i> L.	Gooseberry (E)	Ambari	Euphorbeaceae	Tree
33	<i>Passiflora edulis</i> L.	Passion fruit (E)	ChotaBel	Passifloraceae	Climber
34	<i>Prunus domestica</i> L.	Plum (E),	Plum	Rosaceae	Tree
35	<i>Prunus crasoides</i> D. Don.	Indian wild cherry (E)	Pispol	Rosaceae	Tree
36	<i>Psidium guyava</i> L.	Guava (E), Amrood (H)	Komperam	Myrtaceae	Tree
37	<i>Pyrus communis</i> L.	Pear (E), Nachpati (A)	Naspati	Rosaceae	Tree
38	<i>Rhus hookeri</i> Sahni & Bahadur	Japanese wax tree (E)	Khitma	Anacardiaceae	Tree
39	<i>Spondias mangifera</i> Willd	Hog plum (E)	Ambela Tong	Anacardiaceae	Tree
40	<i>Syzygium cuminii</i> (L.) Skeels.	Java plum (E)	Jam	Myrtaceae	Tree
41	<i>Tamarindus indica</i> L.	Tamarind (E)	Che.eng or Kentili	Caesalpinaceae	Tree
42	<i>Terminalia belerica</i> Roxb.	Baheda (H)	Not available	Combretaceae	Tree
43	<i>Zizyphus mauritiana</i> Lamk.	Jujube (E)	Unkel	Rhamnaceae	Tree

(E= English; H=Hindi; A=Assamese)

Table 2 — Wild edible plants used as spices and condiments by the Garo tribe of West Garo Hills, Meghalaya.

Sl. No.	Botanical Name	Common Name	Vernacular name (Garo)	Family	Type of Plant	Part used
1	<i>Alpinia nigra</i> (Gaertn.) Burtt.	Bamboo leaved galangal/ Shell ginger (E; Tora (A)	E'ching	Zingiberaceae	Herb	Rhizome
2	<i>Cinnamomum tamala</i> Nees & Eberm.	Indian bay leaf (E); Tejpat/Tej-patta (H)	Chapat	Lauraceae	Tree	Leaves
3	<i>Citrus hystrix</i> D.C.	Kaffir lime (E)	Chinara	Rutaceae	Tree	Outer cover of fruit
4	<i>Chorchorus capsularis</i> L.	Jute (E)	Sag	Tiliaceae	Shrub	Leaves
5	<i>Curcuma angustifolia</i> Roxb.	East Indian arrow root (E)	Kala holdi	Zingiberaceae	Herb	Rhizome
6	<i>Curcuma caesia</i> L.	Black turmeric (E)	Haldigisin	Zingiberaceae	Herb	Rhizome
7	<i>Curcuma zedoaria</i> Rosc.	Indian arrow root (E)	Dikke	Zingiberaceae	Herb	Flowers
8	<i>Hedychium coronarium</i> Koen.	Ginger lily (E)	E' Ching	Zingiberaceae	Herb	Rhizome
9	<i>Hedychium spicatum</i> Buch	Yellow ginger lily (E)	E'ching	Zingiberaceae	Herb	Rhizome
10	<i>Hibiscus cannabinus</i> L.	Decan hemp (E), Patsan (H)	Galda	Malvaceae	Shrub	Leaves

(Contd.)

Table 2 — Wild edible plants used as spices and condiments by the Garo tribe of West Garo Hills, Meghalaya. (Contd.)

Sl. No.	Botanical Name	Common Name	Vernacular name (Garo)	Family	Type of Plant	Part used	
11	<i>Hibiscus subdariffa</i> L.	Roselle (E), Lal Ambari (H)	Gasakgalda	Malvaceae	Shrub	Leaves, epicarp of fruit	
12	<i>Houttuynia cordata</i> Thunb.	Chameleon plant (E); Simdalu (H)	Matchaduri	Saururaceae	Creepers	Root, Shoot	
13	<i>Mentha arvensis</i> L.	Field mint (E)	Pudina	Lamiaceae	Herb	Young shoots	
14	<i>Murraya koenigii</i> Spreng.	Curry leaf plant (E)	Curry patta	Rutaceae	Herb	Leaves	
15	<i>Oenanthe javanica</i> (Blume) D.C.	Indian pennywort	Drop wort (E)	Not Available	Umbelliferae	Herb	Young stem
16	<i>Spinacia oleracea</i> L.	Spinach (E)	Palak/Mithapata	Chenopodiaceae	Herb	Whole plant	
17	<i>Zanthoxylum acanthopodium</i> D.C.	Prickly ash (E), Nepalidhaniya (H)	Me.cheng	Rutaceae	Shrub	Leaves, inflorescence	
18	<i>Zanthoxylum limonella</i> Dennst.	Prickly ash (E)	Me.cheng	Rutaceae	Shrub	Fruit leave,	
19	<i>Zanthoxylum budrunge</i> Wall.Ex. D.C.	Winged prickly ash (E)	Me.cheng	Rutaceae	Shrub	Leaves inflorescence	

(E= English; H=Hindi; A=Assamese)

Table 3 — Wild edible aquatic plants used by the Garo tribe of West Garo Hills, Meghalaya.

Sl. No.	Botanical Name	Common Name	Vernacular Name (Garo)	Family	Habit	Part used
1	<i>Alocasia cucullata</i> (Lour.) G.Don..	Chinese taro/Buddha's hand (E), Boga kachu (A)	Ta raja	Araceae	Herb	Rhizome is used as vegetable and also cooked with fishes
2	<i>Eichhornia crassipes</i> (Mart.) Solms.	Water hyacinth (E), Pani-meteka (A)	Gasali	Pontederiaceae	Herb	The aerial vegetative shoots used as vegetable
3	<i>Hedychium Spicatum</i> Sm.	Spiked ginger lily (E), Kapur kachi (H)	E. cheng	Zingiberaceae	Herb	Rhizome and young shoots are used as condiment
4	<i>Ipomoea aquatica</i> Forsskal.	Swamp cabbage (E), Kalmi (H), Kolmi Sak (A)	Kolomi	Convolvulaceae	Herb	Tender stem as vegetable
5	<i>Oenanthe javanica</i> (Blume.) D.C	Java water dropwort/ Indian pennywort (E)	Komprek	Umbelliferae	Herb	Tender shoots are used as vegetable

(E=English; H=Hindi; A= Assamese)

In the current study, it was observed that the WEP play a vital role as an important source of nutrition especially among the economically poorer population of the Garo tribe living in the rural and remote localities of West Garo Hills district. The WEP not only act as a source of nutrition but also used for their medicinal properties. The importance of these plants is more prominent during adverse climatic conditions when the major source of food remains scarce for the rural poor. Several scientists in the past opined that due to lack of knowledge regarding the multifaceted uses of the WEP as a source of nutrition and medicine, they are not getting adequate attention for conservation and protection<sup>2-4</sup>. As a result, many of these plants are in the verge of extinction. Besides, extensive deforestation and exploitation has led to rapid destruction of these valuable plants. Therefore, awareness generation and popularization of these

plants to the new generation is necessary. This paper highlights the availability of various WEP in this region and opens up room for further scientific and analytical research.

### Acknowledgement

The authors acknowledge with gratitude, the active participation and cooperation of the Garo community and sharing their ethnobotanical knowledge for the accomplishment of the present study.

### Conflict of Interest

Authors have no conflict of interest.

### Author Contributions

KDS: Conducted field survey, collected and compiled data.

BM: Conceptualized and supervised the research study, analyzed, prepared and edited the manuscript.

**References**

- 1 AICRPE, Status Reports: All India coordinated Research Project on Ethnobiology, Department of Environment and Forest Govt. of India, New Delhi, (1994).
- 2 Benz B, Cevallos J, Santana F, Rosales J & Graf S, Losing knowledge's about plant use in the Sierra de Manantlan Biosphere Reserve, Mexico, *Econ Bot*, 54 (2000) 183-191.
- 3 Byg A & Balslev H, Traditional knowledge of *Dyopsis fibrosa* (Arecaceae) in Eastern Madagascar, *Econ Bot*, 55 (2001) 263-275.
- 4 Ladio A H & Lozada M, Comparison of wild edible plant diversity and foraging strategies in two aboriginal communities of Northwestern Patagonia, *Biodivers Conserv*, 12 (2003) 937-951.
- 5 Martin G J, *Ethnobotany, A people and plants conservation manual*, (Chapman and Hall, London, New York, Tokyo), 1995, p. 23-29.
- 6 Samant S S, Dhar U & Rawal R S, Diversity and distribution of wild edible plants of Indian Himalaya, In: *Plant Diversity of the Himalaya*, edited by P C Pande & S S Samant, (Gyanodaya Prakashan, Nainital), 2001, p. 421-482.
- 7 Samant S S & Dhar U, Diversity, endemism and economic potential of wild edible plants of Indian Himalaya, *Int J Sustain Dev World Ecol*, 4 (1997) 179-191.
- 8 Walter M & Hamilton A, *The vital wealth of plants: WWF and the conservation of plants*, (Gland, Switzerland: WWF) 1993.