Indigenous Wild Edible Plants of Bataw Village, East Jaintia Hills District, Meghalaya

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Abstract
The study was carried out as a kind of documentation of the used of wild edibles plants by the people in Bataw village, East Jaintia Hills. The results show that there are 35edible plants and belonging to 26 families being taken by the people of Bataw village as food. The mode of utilisation of wild edible plant includes 12 plant species used as vegetables, 11 species eaten as raw and 12 species consume as raw and as well as vegetable. The vast overexploitation of these indigenous wild edible plants has led to the over decline of these species. Therefore steps should be taken to protect such resources and further inventories need to undertake to understand their nutritional benefits and their long term sustenance.
Keywords: Documentation, families, utilisation, vegetables, overexploitation, nutritional.

Introduction

Meghalaya virtually which means Adobe of the Clouds describes the environmental condition development that brings torrents of rain to the current region, directly influenced by the South-western monsoon from the Bay of Bengal. Mawsynram is one of the wettest places on earth, which lies on the southern slopes of Khasi hills district of Meghalaya receives the heaviest annual precipitation (1,169 cm) in the world. Meghalaya comprises of South Garo Hills, South West Garo Hills, West Garo Hills, East Garo Hills, North Garo Hills, West Khasi Hills, South West Khasi Hills, East Khasi Hills, Ri-bhoi and West and East Jaintia Hills districts lying between 25°47'-26°10' N latitude and 89°45'-92°45' E longitude, covers an area of 22,549 km^2. It is bounded on the North, East and West by Assam and on the South by Bangladesh. The altitude ranges from 50-1960 m. The state is having an estimated population of about 29, 64,007 with a density of 132 people per sq km^2.

The state has a total forest area of 16,839 km^2 (forest cover 75.08%) and of the total area the tribal communities owned 90%[1]. The main occupants in the state are the Khasi, Garo and Jaintia tribes. The original inhabitants of Jaintia hills district are the Jaintias, which are also known as Pnar or Synteng, and locally known as Ka Ri Ki Khadar Doloi (the land of 12 kingdoms). The language of Jaintia people are spoken in Jaintia or Pnar. Agriculture is the main occupation of the people in this district and some of the people previously also engaged in hunting and gathering of wild edible plants and fruits.

1 Jaiswal V., 2010. "Culture and Ethnobotany of Jaintia tribal community of Meghalaya, Northeast India-A mini-review". Indian J Trad Knowl. 9: 38-44.

As like other people of another district, the staple foods of Jaintia people are also rice and meat and apart from other crops in the region, wild edible plants are also present in large number. These wild edibles not only provide inexpensive food, but they also contribute to the diet of people in this tribal community and as well as in the form of fibre and dyes.

Bataw village is locating in East Jaintia Hills District, with a geographical co-ordinates latitude and longitude of 25º57' and 91º87' respectively. There is 230 households residing in the village, and it has a total population of 1509 of which 739 were males while 770 females as per 2011 census. The main occupation of the people is agriculture. Apart from agriculture, the people also had a common practice of collecting wild edibles, depending on their availability either seasonally or throughout the year. There were many types of wild edibles found in that area which the villagers were fond of utilising. These plants were found across the village forests and some even within the village.

In most of the tribal states, wild edibles have become one of the most significant NTFPs. A report of India State of Forest Report (ISFR) 2015, shows that of the total geographical area, the forest and tree cover constitute of about 24.16 percent which is 79.42 million hectares[2]. According to the 2011 census, the tribal population of India is about 8.6% of the total population. In India, forests play an important role whereby the tribal people depend on the forest for their livelihood and a source of food by consuming of wild plants and plant parts viz. tubers, shoots, leaves, fruits etc. through a traditional hereditary knowledge. For meeting the nutritional meets of most of the tribal population, wild edible plants play an important role and also particularly useful during a famine and similar scarcity situation. In India, the hilly inhabitants often referred as tribals/Adivasis and other less accessible tracts in both developed and developing countries; the wild edible plants provides a crucial nutrition in their diet even during usual times[3]. In India, the tribal people consumed wild edible plants of an estimate about 800 species[4].

Plants which are encountered in large number in the forests of Meghalaya whose shoots, seeds, fruits, tubers, etc. make a crucial contribution particularly those living near forests and other rural areas which provide as a diet to the people[5]. Besides providing inexpensive food, the wild plants also furnish several other useful products like medicine, fibre, fodder, dyes, etc. and useful genes for crop improvement. The study and documentation of wild edible plants forms are significant not only to identify the potential sources but enhancing the understanding of indigenous knowledge systems which could be utilised as alternative food or in times of scarcity but, also these plants resources are genetically crucial for future agricultural research[6]. [7]Jain, emphasises on the role of ethno-botanical studies in trapping the old traditional folk knowledge as well as in searching for new plant sources of food, drugs, etc.

Although these wild edible plants were frequently ignored, despite they play a significant role in food security. The main objective of this study was to assess the presence, to identify the wild edible plant's variety and the utilisation of wild edibles in the village. The study will aim to record the wild edibles found in the area, and it will also act as a source of awareness for people who might lack knowledge about how valuable these resources are for the community.

Materials and Methods

The study was conducted for a period of six months i.e., from the month of November 2018 till April 2019. The methods used for the documentation of the wild edible plants were both qualitative and quantitative methods through a closed and open-ended questionnaire. The interview was carried out among the villagers through household surveys and field surveys.

2 Niveditha, T. M. A., 2017. "Wild edible plants of India - A review". Int J. Acad. Res. 4(3(1)), 189-198.

3 Arora, R. K. And Anjula, P. "Wild edible plants of India: Diversity, Conservation and Use". National Bureau of Plant Genetic Resources. New Delhi, 1996, 1.

4 Singh, H. B. and Arora, R. K. "Wild Edible Plants of India". Indian Council of Agricultural Research (ICAR), New Delhi, 1978.

5 Samati, H., 2004. "Kitchen garden plants of Pnar tribe in Jaintia Hills district, Meghalaya". Ethnobotany. 16 (1 & 2) 125- 130.

6 Kayang, H., 2007. "Tribal knowledge on wild edible plants of Meghalaya, Northeast India". Indian J Trad Knowl. 6(1), 177-181.

7 Jain, S. K., 1987. "A Manual of Ethnobotany". Scientific Publishers, Jodhpur, 16.

The wild edibles plant details was recorded by interviewing and consulting with the village people whereby they provide useful information on the wild edibles plant which includes their common names, and also including the usefulness of different parts of the plants and methodology of the utilisation of wild edible plants. Standard methods of herbarium sheets preparation were adopted according to Jain and Rao[8]. Plant identification were performed and identified with the help of Haridasan and Rao[9]; Balakrishnan[10] and from herbarium collections of Botanical Survey of India, Eastern Circle, Shillong.

8 Jain, S.K. & Rao, R. R. "A handbook of field and herbarium methods." Today and Tomorrow, Printers and Publ., New Delhi. 33-58. 1967.

9 Haridasan, K. & Rao, R. R. Forest Flora of Meghalaya, 2 Vols, Bishen Singh Mahendra Pal Singh, Dehra Dun, India, 1985-1987.

10 Balakrishnan, N. P. Flora of Jowai and Vicinity, Meghalaya, 2 Vols, Botanical Survey of India, Howrah, India. 1981-1983.

Results and Discussion

The number of wild edibles recorded in the study area were 35edible plants and belonging to 26 families being taken by the people of Bataw village as food. The edible plants are arranged alphabetically in scientific names, followed by families, vernacular name(s) and used the plant parts and the season of availability by the local inhabitants (Table 1) (Plate 1-12).

Table 1: Lists of Wild Edible Plants Found in Bataw Village

Plant names	Family	Vernacular/ Local Name	Consumable parts	Season of Availability
Artocarpus integrifolius Linn. f.	Moraceae	Sachram	Tree	February-September
Castanopsis tribuloides (Sm.) A. DC	Fagaceae	Sa ut	Tree	September-February
Curcuma zedoaria (Christm.) Roscoe	Zingiberaceae	SyingKhlo	Herb	-
Crassocephalum crepidioides (Benth.) S. Moore	Asteraceae	Sla Ialieh	Herb	-
Carallia brachiata (Lour.) Merr.	Rhizophoraceae	Sohkhwe	Tree	-
Clerodendrum colebrookianum Walp.	Verbenaceace	Jyrktung	Herb	-
Diplazium esculentum (Retz.) Sw.	Athyraceae	Tyrkhang	Herb	January-May
Dioscorea sp	Dioscoreaceae	Salah Rasu	Climber	April-May
Elaeagnu slatifolia Linn.	Elaeocaspaceae	Sohlyngi	Tree	November-May
Elaeocarpus prunifolius Wall.	Elaeocaspaceae	Syngkiahaitblang	Tree	January-October
Emblica officinalis Gaetn.	Euphorbiaceae	Sohmyrlaiñ	Tree	March-February
Ficus oligodon Miq.	Moraceae	Slaso	Tree	January-December
Flacourtia cataphracta (Lour.)Roxb	Flacourtiaceae	Sohmynloh	Tree	March-January
Fagropyrum dibotrys D. Don	Polygonaceae	Jaraiñ	Herb	-
Ficus clavata Wall. Ex Miq.	Moraceae	Slachiet	Tree	January- December
Gynura sp.	Asteraceae	Sylle	Herb	January- December
Hibiscus sabdariffa Linn.	Malvaceae	Jajewdet	Shrub	-
Houttuynia cordata Thunb.	Saururaceae	Myrdoh	Herb	January- December
Ilex acuminate Benth.	Aquifoliaceae	Jakeiñ	Shrub	-
Mahonia nepalensis Dc. Ex Dippel.	Berberidaceae	Diengstem	Shrub	-
Myrica nagi Thunb.	Myricaceae	Sohslia	Tree	-
Mangifera indica Linn.	Anacardiaceae	Sapeiñ	Tree	Feb-July
Myrica esculenta Buch. Ham	Myricaceae	Saphai	Tree	January-May
Musa sp.	Musaceae	Ladaw	Banana Plant	January- December

Pleurotus ostreotus (Jacq.) P. Kumm.	Pleurotaceae	Tit Lakhar	Oyster Mush-room	April-August
Passiflora edulis Sims.	Passifloraceae	Sohbrap	Climber	January-May
Psiduim guajava Linn.	Lecythidaceae	Sapriam	Tree	October- November
Piper betle Linn.	Piperaceae	Pathi	Climber	January- December
Piper diffusum Vahl.	Piperaceae	Murit	Climber	-
Rubus sp.	Rosaceae	Sohkho	Shrub	March-July
Rubus Khasianus Cordot	Rosaceae	Sohchieh	Shrub	March-July
Smilexperfoliata Lour.	Snulacaceae	Shiahkrot	Shrub	-
Syzygium sp.	Myrtaceae	Sohstyndong	Tree	March-May
Syzygium tetragonum (Wight) Wall. Ex Walp.	Myrtaceae	Smyrleiñ	Tree	-
Trichosanthes sp	Cucurbitaceae	Sohmynkthang	Climber	April-July

Sources: Through consultation with key informants in Bataw village

The mode of utilisation of wild edible plants (Table 2) in Bataw village cooked as vegetables include 12 species which are Artocarpus integrifolius, Diplazium esculentum, Ilex acuminate, Ficus clavata, Curcuma zeodoria, Syzygium sp., Crassocephalum crepidioides, Trichosanthes sp., Hibiscus sabdariffa, Dioscora sp, Ficus oligodon, Pleurotus ostreotus. Eleven species of the wild edibles plants eaten as raw which include Castanopsis tribuloides, Elaeocarpus prunifolius, Flacourtia cataphracta, Passiflora edulis, Rubus khasianus, Piper betle, Rubus sp., Myrica nagi, Syzygium tetragonum, Smilex perfoliata, Carallia brachiate. Twelve of the wild edible species are eaten as raw or cook consist of Elaeagnus latifolia, Mangifera indica, Emblica officinalis, Myrica esculenta, Psiduim guajava, Artocarpus integrifolia, Mahonia nepalensis, Piper diffusum, Fagropyrum dibotrys, Houttuynia cordata, Gynura sp., Musa sp.

In Manipur, a study conducted by Esther et al.[11] reported that the Zou's tribe used36 families of wild edible plants belonging to84 plants. Out of the total plant species, the used as food and vegetables accounted for about 70 species, utilized as condiments and spices include 13 species and as food during outbreak of famine, Dioscorea sp. is used. The ethnic communities of Sikkim viz. Nepali, Bhutia and Lepcha use about 26 species of wild leafy vegetables as reported by Pradhan and Tamang[12] . In the district of Dhemaji, Assam, Saikia[13] described 51 wild vegetable plants used for medicinal purposes. The Konyak tribe in Mon district, Nagaland, Pradeep et al.[14] reported 41 species of wild edible plants which are used by these tribes. Sawian et al.[15] documented about 249 species belonging to 153 genera and 82 families from Meghalaya where they found out that the number of wild edible trees species are markedly more which is followed by shrubs, herbs and climbers, contribution of different plant parts used in percentage depicts that in majority of species fruits are edible (50.2%); followed by leaves (15-3%), seeds (3-6%) and flowers (2.8%), respectively. Singh et al.[16] documented the used of wild edible plants by the Garo tribes in Nokrek Biosphere Reserve, Meghalaya. It consists of 42 families, 61 genera and 71 species, the total recorded plants was found that species used as vegetable and as raw or cooked includes 38 and 33 nos.

11 Esther, G. H., Thoudam, N. S. and Ginzamang, T. Z., 2013. "Wild Edible Plants used by the Zou Tribe in Manipur". India. Int. J. Sci. Res. Publ. 3, 1-8.

12 Esther, G. H., Thoudam, N. S. and Ginzamang, T. Z., 2013. "Wild Edible Plants used by the Zou Tribe in Manipur". India. Int. J. Sci. Res. Publ. 3, 1-8.

13 Saikia, M., 2015. "Wild edible vegetables consumed by Assamese people of Dhemaji District of Assam, NE India and their medicinal values". Arch. Appl. Sci. Res. 7, 102-109.

14 Pradheep, K., Soyimchiten., Pandey, A. and Bhatt, K. C., 2016. "Wild edible plants used by Konyak tribe in Mon district of Nagaland: Survey and inventorisation". Indian J. Nat. Prod. Resour. 7, 74-81.

15 Sawian, J. T., Jeeva, S., Lyndem, F. G., Mishra, B. P., and Laloo, R. C., 2007. "Wild edible plants of Meghalaya, North- East India". N Prod Radiance. 6, 410-426.

16 Singh, H. B. and Arora, R. K. "Wild Edible Plants of India". Indian Council of Agricultural Research (ICAR), New Delhi, 1978

Plate (1) Women folk collection wild edible plants from the forest (2) Person selling edible plants in Bataw village (3) Curcuma zeodaria, (4) Gynura sp (5) Musa sp. (6) Crassocephalum crepidioides (7) Clerodendron colebrookeanum (8) Syzygium sp. (9) Dioscorea sp. (10) Pleurotus ostreotus (11) Ficus oligodon (12) Syzygium tetragonum (Sources: Photos taken during field work in Bataw village)

Table 2 Mode of the Utilisation of Wild Edible Plants

Botanical Name of Wild Edible	Modes of Utilisation
Used as vegetables	
Diplazium esculentum	Usually young leaves are fried
Ilex acuminate	Cooked as vegetables along with fish
Ficus clavata	Young leaves and fruits is cook
Curcuma zeodoria	Its flower is cook as vegetable and can also be boiled to mix as a salad
Syzygium sp.	Its fruits can be eaten raw but it is usually cooked as vegetables along with fish
Crassocephalum crepidioides	Young leaves is cook as vegetables
Trichosanthes sp.	The fruit is bitter, used to cooked as a vegetable and it is also medicinal
Hibiscus sabdariffa	The flower is sour usually cooked with fish or dry fish
Dioscorea sp.	Cooked as vegetables
Ficus oligodon	Young leaves and fruits is cook as vegetables
Pleurotus ostreotus	Cooked as vegetables

Consumed as raw	
Castanopsis tribuloides	It is a fruit in which its seeds is eaten raw
Elaeocarpus prunifolius	It is a fruit consumed in raw form
Flacourtia cataphracta	Tiny salty fruits is consume
Passiflora edulis	It is a fruit having juicy seeds
Rubus khasianus	It is a berry
Piper betle	Leaves is consume
Rubus sp.	Berries which are black is eaten raw when ripe
Myrica nagi	Fruits, which are sour when still young and sweet when ripe, are consumed
Syzygium tetragonum	Tiny reddish-black round fruits
Smilex perfoliata	Fruits is consume
Carallia brachiate	Fruits is eaten raw
Wild edibles plants used for various other purposes	
Elaeagnus latifolia	The fruit is sour; eaten in crude form and used for making pickle
Mangifera indica	The fruit is eaten raw and used for making pickle
Emblica officinalis	The fruits is eaten fresh; making pickle and are medicinal
Myrica esculenta	The fruits is eaten crude; making pickle and which are medicinal
Psidium guajava	Fruits is consumed in raw form, and its young leaves are medicinal
Artocarpus integrifolia	Ripe fruits is eaten; seeds can be boiled to eat, and when the fruit is young it can be cooked as vegetables
Mahonia nepalensis	Its fruits is eaten raw, and its bark is highly medicinal for treating Jaundice
Piper diffusum	It is used as a spice and for medicinal purposes
Fagopyrum dibotrys	Eaten raw or cooked as a vegetable
Houttuynia cordata	Its leaves, roots and stem can be eaten raw in the form of salad, and it is also medicinal
Gynura sp.	The leave is eaten as a salad
Musa sp.	The fruit is consume raw whereas its flower, inflorescence and stem can be cooked as vegetables or boiled to mix as a salad

Sources: Through consultation with key informants in Bataw village.

Conclusion

The diverse species of wild edibles in the study area have helped the people to increase the inexpensive food in their diet, which also supplements for their nutritional requirements. These edible plants have also contributed towards the improvement of their livelihood by generating extra income to the people in this village. But through the vast over-exploitation of these indigenous wild edible plants has to lead to the over the decline of these species. Therefore steps should be taken to protect such resources and further inventories need to undertake to understand their nutritional benefits and their long term sustenance for the future.

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