

## An ethno-botanical study of wild plants in Garo Hills region of Meghalaya and their usage

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### ABSTRACT

The state of Meghalaya, also known as the 'Abode of clouds' has a rich reservoir of genetic variability of horticultural crops including fruits, vegetables, flowers, plantation crops, spices, medicinal and aromatic plants. The state of Meghalaya covers an approximate area of 22,429 km<sup>2</sup> and lies between the latitudes of 25°47'N to 26°10'N and the longitudes of 89°45'E to 92°45'E, with an altitude ranging from 100-1,965 m above sea level<sup>1</sup>. Meghalaya is largely dominated by three main tribes viz. Khasi, Jaintia and Garo and they depend largely on the forest wealth for their livelihood and have also acquired a vast knowledge about plant wealth and utilization of forests products. A vast diversity in geographical and climatic conditions provides a repository of valuable wild edible and medicinal plants of the region. These plants have a great importance in the indigenous system of medicine as well as tribal dietary requirements. Ethno-botanical studies reveal that how people of a particular culture and religion make use of indigenous plants and how they classify and identify them. Some edible plants have great economic value and are highly linked with socio economic development of the tribal communities of the state. Indigenous fruits like *Baccaurea ramiflora*, *Calamus erectus*, *Elaeagnus conferta*, *Flacourtie indica*, *Ziziphus mauritiana*, *Haematoxylum validus*, *Spondias pinnata*, *Grewia nervosa*, etc. are consumed fresh. For vegetable purpose, species like viz. *Amorphophallus paeoniifolius*, *Bauhinia purpurea*, *Clerodendrum glandulosum*, *Dendrocalamus hamiltonii*, *Houttuynia cordata*, *Phlogacanthus thyrsiformis*, *Zanthoxylum oxyphyllum*, etc. are being largely used by the Garo tribes of the state. The present study aims to create inventory of the usage of some wild plants of the Garo Hills region of the state which assists in understanding the dependency of local community and the role of wild edible plants in the local economy.

**Key words:** ethnobotany, Garo tribe, Meghalaya, wild edible plants

### INTRODUCTION

The state of Meghalaya is located in the North East India and is dominated by three distinct tribes viz. Khasi, Garo and Jaintia. Garo tribe comprises the second largest population of tribes after Khasi and belongs to Tibeto-Myanmar sub family of Tibet Chinese linguistic group (Sharma *et al.*, 2013). Garos are very closely associated with nature, and with their ethno-biological knowledge about the plants available around them, they use them as food and also can easily avert and cure themselves from several disease complications. The favourable tropical monsoonal climate of Meghalaya is believed to be responsible for adaptation and the growth of various plants ranging from herbs, shrubs to trees (Sawain *et al.*, 2007).

A total of 105 plants used for food and medicine by Khasis and Garos have been identified by various researchers. Indigenous knowledge of wild edible plant is important for sustaining utilization of those plant species (Sawain *et al.*, 2007). Wild foods are of particular value for tiding over lean periods when resources from agriculture are scarce, especially

for the poorer sections of the society. The importance of recording the use of plants in this region is important because of rapid loss of flora and fauna. Currently, there is a renewed interest among the researchers in documenting the ethno-botanical information regarding the indigenous wild edible plants (Bharucha and Pretty, 2010). Since the traditional knowledge on wild edible plants is being eroded through acculturation and loss of plant biodiversity through extensive deforestation and *jhum* cultivation, hence promoting research on wild edible plants is crucial in order to safeguard this information for future societies for their wise use and conservation. The importance of wild edible plants is being realized as they provide all the essential minerals, fibre, vitamins and can also be used to prevent chronic diseases among the general population. It is important for people to know the prevailing traditional food plants in their areas and how they can be improved for sustainable food security/nutrition (Jeeva, 2009).

## MATERIALS AND METHODS

The research was carried out through field surveys and careful documentation of ethnobotanically significant plants, which are traditionally used by the Garo tribes. The whole of Garo Hills region forms a sort of undulating plateau with plenty of flat lands and valleys with altitudes varying from 100-1400 m above sea level, Nokrek being the highest point (1418m). Garo hills comprises of five districts viz. West Garo Hills, East Garo Hills, South Garo Hills, North Garo Hills and South West Garo Hills. Garo tribes form the predominant one in these districts, along with other indigenous habitants like Rabhas, Koch, Hajong, Rajbongshi and Kacharis. These five districts have a rich and unique flora and are supposed to be the original home of the *Citrus*. The rich biodiversity pockets of Garo hills are located at Nokrek Biosphere Reserve in West Garo Hills, Balpakram National Park in South Garo Hills and Baghmara Sanctuary which is considered the home of *Nepenthes khasiana* (Kar et al., 2012). The vegetation of Garo Hills can be broadly classified into those belonging to tropical and sub-tropical zones based on altitude. The tropical vegetation covers areas upto an elevation of about 1000. It embraces evergreen, semi-evergreen and deciduous forests, bamboo thickets and grasslands including riparian forests and swamps. The sub-tropical vegetation occurs at elevations above 1200 m from sea level and this type of forest is restricted in Tura Peak, Nokrek Peak etc. These are mainly evergreen forests but a few elements of deciduous forests are also seen. Information on the traditional uses of plants was collected through direct field interviews with a number of elderly people who have a rich traditional knowledge on usage of the local plants. Besides these sources, secondary data were gathered from published literature in books, magazines, booklets, newspapers, journals, etc. Various wild plants found in the study area are listed in Table 1 along with their vernacular names, family, habitat, plant parts used and their mode of usage.

## RESULTS AND DISCUSSION

The indigenous plant species are the most commonly sold items at the weekly markets in Garo Hills. The local tribals are the main consumers of these wild edible plants and they either consume fresh or preserve them or process them into pickles. The

ethno-botanical description of the plants have been listed in Table 1 including the botanical name, local name, family, habit, parts used and its usage.

In this paper, 36 wild edible plant species which are commonly consumed by the 'Garo' tribes as food and medicine have been identified. Most of the plants (30 species) are found in the wild followed by 6 species which grows in the wild as well as cultivated areas. Out of these, the plant parts mostly used and consumed by the tribal include fruits of 20 species, leaves of 13 species, tender shoots of 3 species, flowers and inflorescence of 4 species, seeds and barks of 2 species, corms, root, stem and stem-pith of 1 species. Rutaceae was found to be the most common family with 4 species of edible importance. For vegetable purposes, species like *Paederia foetida*, *Bauhinia purpurea*, *Dendrocalamus hamiltonii*, *Zanthoxylum oxyphyllum*, *Z. rhetsum*, *Hibiscus sabdariffa*, *Solanum violaceum*, *Phlogacanthus thyrsiformis*, *Houttuynia cordata*, *Clerodendrum glandulosum*, *Lasia spinosa*, *Dillenia scabrella*, *Rumex acetosa*, *Amorphophallus paeoniifolius*, *Musa flaviflora*, *Rhynchotechum ellipticum*, *Polygonum chinense*, *Diplazium esculentum*, *Amaranthus dubius*, *Oroxylum indicum* and *Momordica subangulata* subsp. *renigera* are commonly used. Most of these plants are cooked as a vegetable and along with dry fish or meat items. A popular fermented product 'me.a meseng' is prepared from the young shoots of *Dendrocalamus hamiltonii*. Besides these, leaves of *Zanthoxylum oxyphyllum*, *Hibiscus safdariffa* and flowers of *Phlogacanthus thyrsiformis* are preserved in the dried form known as 'gran'. Pickles made from young shoots of *Dendrocalamus hamiltonii* and leaves of *Hibiscus sabdariffa* are also common in the local markets. Garos use a kind of potash in curries, which they obtain by burning dry pieces of stems of *Musa flaviflora* or young bamboos locally known as *Kalchi*. Fruits like *Baccaurea ramiflora*, *Calamus erectus*, *Grewia nervosa*, *Elaeagnus conferta*, *Eugenia claviflora*, *Ficus auriculata*, *Ziziphus mauritiana*, *Flacourzia indica*, *Terminalia bellerica*, *Haematoxylum validus*, *Musa flaviflora*, *Protium serratum*, *Elaeocarpus floribundus*, *Spondias pinnata* and *Citrus macroptera* are either consumed fresh or cooked as vegetable, mixed with curry, dry fish and meat items. A fruit of *Citrus indica* commonly known as 'Me.mang Narang' is solely used for medicinal purpose to treat jaundice and stomach problems. Fruits of *Ziziphus mauritiana*, *Elaeocarpus*

*floribundus*, *Spondia spinnata*, *Citrus macroptera* and *Protium serratum* are processed into pickles by the local people. *Citrus macroptera* fruits are also preserved in the dried form by adding salt and its fruit peel and juice is used for cooking purposes.

The local people usually collect these fruits and vegetables from forest and wild sources and directly sell in the market or to the middlemen and are mostly sold during the weekly markets. The price of the vegetables ranges from Rs 20 to 30 and fruits ranges from Rs 50 to 100 depending on the variety. However, the prices of rare species of fruits like *Calamus erectus*, *Haematoxylum validus*, and *Citrus macroptera* are comparatively high in the market. The availability of the fruits and vegetables is not consistent and depends mostly on the season. However, plants like *Houttuynia cordata*, *Clerodendrum glandulosum*, *Musa flaviflora* and *Polygonum chinense* are available round the year. The people of Garo Hills are very fond of wild edible plants and their use is widespread usually among the elderly people who have been using these plants since time immemorial. Younger generation mainly relies

on the modern day vegetables like pumpkin, carrot, cabbage, cauliflower, tomato, gourds, etc. However, the use and conservation of these plants is not seriously thought for by the people. The use of wild edible plants plays an important role in the diet of the local people besides being an important source of income generation. Due to the rapid urbanization, fast developmental activities, practice of *jhum* cultivation and deforestation, a lot of useful plants have been lost and their population is decreasing day by day. There is an urgent need to document the traditional knowledge on the useful wild edible plants or otherwise they may become extinct with time. Further investigation is also required regarding their nutritional values, method of cultivation including their habitats and uses, possibility of processing and finally their conservation studies.

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**Table 1. Wild plants used by Garo tribes of Meghalaya**

Scientific Name	Local Name	Family	Habit	Parts Used	Usage
<i>Amaranthus dubius</i> Mart. ex. Thell	Dangasak	Amaranthaceae	Shrub	Leaf	Leaves cooked as vegetable
<i>Amorphophallus paeoniifolius</i> Dennst.	Songru	Araceae	Tuber s	Leaf, stem and corm	Cooked as a vegetable
<i>Baccaurea ramiflora</i> Lour.	Gasampe	Euphorbiaceae	Tree	Fruit	Ripe fruits eaten raw and also used medicinally to treat skin diseases
<i>Bauhinia purpurea</i> Linn.	Bol Me.gong	Fabaceae	Tree	Leaf and flower	Cooked as vegetable and as medicine for blood pressure
<i>Calamus erectus</i> Roxb.	Sokmil	Arecaceae	Tree	Fruit	Fruits eaten raw and used for decoration purpose
<i>Citrus indica</i> Tanaka	Me.mang narang	Rutaceae	Tree	Fruit	Used for medicinal and spiritual purposes by the Garo people. The fruit is used to treat jaundice and stomach conditions in humans and animals, and it is used to treat smallpox.
<i>Citrus macroptera</i> Montrouz.	Chambil	Rutaceae	Tree	Fruit	Fruit juice is extracted and used for cooking and raw fruits are preserved
<i>Clerodendrum glandulosum</i> L.	Dongam	Verbenaceae	Shrub	Leaf	Cooked as a vegetable and used as a medicine for blood pressure
<i>Dendrocalamus hamiltonii</i> Nees&Arn. ex. Munro	Wa.nok	Poaceae	Tree	Tender shoot	Cooked as a vegetable and local fermented bamboo (Me.a) prepared
<i>Dillenia scabrella</i> Roxb. ex. Wall	Agatchi	Dilleniaceae	Shrub	Bark and fruits	Fruits cooked as vegetables and bark is used for snake bites
<i>Diplazium esculentum</i> (Retz) Swartz.	Me.konchek/Gonginjak	Athyriaceae	Fern	Leaf	Cooked as a vegetable
<i>Elaeagnus conferta</i> Roxb.	Sokkua	Elaeagnaceae	Shrub	Fruit	Ripe fruits eaten raw and has antioxidant properties effective against cancer
<i>Elaeocarpus floribundus</i> Blume	Jolpai	Elaeocarpaceae	Tree	Fruit	Fruits are edible and used for making pickle
<i>Eugenia claviflora</i> Roxb.	Chambu	Myrtaceae	Tree	Fruit	Ripe fruits are eaten raw and used as medicine for diabetic patients
<i>Ficus auriculata</i> Lour	Te.bil	Moraceae	Tree	Fruit	Ripe fruits eaten raw and leaves are used for packing rice during occasions

**Table 1. Wild plants used by Garo tribes of Meghalaya**

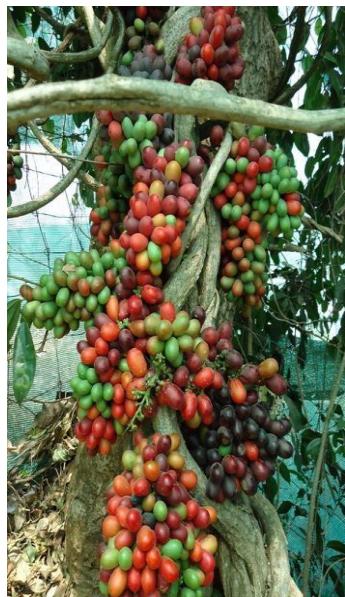
Scientific Name	Local Name	Family	Habit	Parts Used	Usage
<i>Flacourzia indica</i> (Burm. f.) Merr.	Ponial	Salicaceae	Tree	Fruit	Ripe fruits eaten raw and as a medicine for diuretic, digestive, in jaundice and enlarged spleen.
<i>Grewia nervosa</i> (Lour.) Panigrahi	Bolchupret	Malvaceae	Tree	Fruit	Ripe fruits eaten raw
<i>Haematocarpus validus</i> Bakb.f.ex Forman	Te.pattang	Menispermaceae	Climber	Fruits	Ripe fruits eaten raw and also used as medicine for blood purification
<i>Hibiscus sabdariffa</i> L.	Gal.da	Malvaceae	Shrub	Leaf, fruit flower	Cooked as vegetable, made into pickle and fruits used for making jam
<i>Houttuynia cordata</i> Thunb.	Matchaduri	Saururaceae	Herb	Shoot	Shoots used as vegetable and as herbal medicine for antiviral, antibacterial and anti-leukemic activities
<i>Lasia spinosa</i> L. Thwaites	Chongibiret	Araceae	Herb	Shoot	Young leaves are cooked as vegetable
<i>Momordica subangulata</i> L. subsp. <i>renigera</i>	Apolka	Cucurbitaceae	Climber	Fruit	Fruits are cooked as vegetable
<i>Musa flaviflora</i> Simmonds	Fruits-Te.rik Inflorescence -Sobok	Musaceae	Tree	Fruit, inflorescence and stem-pith	Fruits consumed fresh, inflorescence used as a vegetable and stem-pith used for making local 'kalchi' (alkaline additive)
<i>Oroxylum indicum</i> L. Benth ex. Kurz	Khering	Bignoniaceae	Tree	Leaf	Leaves are used as boiled vegetable and as medicine for jaundice
<i>Paederia foetida</i> Linn.	Pasim	Rubiaceae	Climber	Leaves	Leaves are used as vegetable
<i>Phlogacanthus thyrsiformis</i> Nees	Allot	Acanthaceae	Shrub	Flower	Cooked as vegetable, fruits used as a medicine for diabetes
<i>Polygonum chinense</i> L.	Me.kri do.nok	Polygonaceae	Shrub	Shoot	Shoot are used as vegetable
<i>Proteum serratum</i> Wall ex. Colebr.	Te.kring	Burseraceae	Tree	Fruit	Ripe fruits eaten raw and processed into pickles
<i>Rhynchosciadium ellipticum</i> A.DC	Me.bitchi	Gesneriaceae	Shrub	Leaf	Leaves are cooked along with dry fish and eaten
<i>Rumex acetosa</i> L.	Chuka	Polygonaceae	Herb	Leaf	Leaves cooked as vegetable
<i>Solanum kurzii</i> L.	Kimka	Solanaceae	Shrub	Fruit	Cooked as vegetable, fruits used as a medicine for diabetes
<i>Spondias spinosa</i> L.f. Kurz.	Ambalelong	Anacardiaceae	Tree	Fruit	Fruits eaten raw and made into pickles
<i>Terminalia bellerica</i> Roxb.	Chirore	Combretaceae	Tree	Bark, fruit, root, seed	Kernels are eaten by locals and used as a medicine for headache, jaundice and gastric problem
<i>Zanthoxylum rhetsum</i> DC.	Smitcheng	Rutaceae	Tree	Leaf	Leaves as vegetable, fruits aromatic, gives a tingling sensation and usually used for chutney /spice
<i>Zanthoxylum oxyphyllum</i> Edgew.	Me.cheng	Rutaceae	Shrub	Leaf, seed	Cooked as vegetable and seed used as a spice
<i>Ziziphus mauritiana</i> Lam.	Kangkil	Rhamnaceae	Tree	Fruit	Ripe fruits eaten raw and made into pickles

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*Phlogacanthus thyrsiformis*



*Haematocarpus validus*



*Diplazium esculentum*



*Hibiscus sabdariffa*



*Dendrocalamus hamiltonii*



*Solanum kurzii*



*Polygonum chinense*



*Rumex acetosa*



*Zanthoxylum oxyphyllum*



*Houttuynia cordata*



*Clerodendron glandulosum*



*Amorphophallus paeoniifolius*



*Bauhinia alba*



*Amaranthus dubius*



*Baccaurea ramiflora*



*Grewia nervosa*



*Flacourtie indica*



*Citrus indica*



**Figure 1. Fruits and different parts of wild plants being used by Garo tribes of Meghalaya**