

## Wild edible plants used by *Garo* tribes of Nokrek Biosphere Reserve in Meghalaya, India

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Received 02.02.11; revised 09.05.11

The paper deals wild edible plants of Nokrek Biosphere Reserve, Meghalaya used by the *Garo* tribes. It comprises of 71 species under 61 genera and 42 families. Of which 38 species are used as vegetable and 33 species edible as raw or cooked. All plants are arranged alphabetically in the tabular form, followed by families, vernacular name(s), plant part(s) used and methodology.

**Keywords:** Wild edible plants, Nokrek Biosphere Reserve, *Garo* tribes, Meghalaya

**IPC Int. Cl.<sup>8</sup>:** A61K 36/00, A01G 1/00, A01G 17/00, A47G 19/00, A23L 1/06, A23L 2/02

The Meghalaya state, approximately 22,429 km<sup>2</sup> in area, 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. It is one of the wettest place on earth, with a total forest area of ca 16,839 km<sup>2</sup> (forest cover 75.08%), and has an estimated population of about 23,57,510 with a density of 104 person per sq km<sup>2</sup>. Ninety percent of the total area of the state is owned by the tribal communities<sup>1,3</sup>. The *Khasi*, *Garo* and *Jaintia* are the three principal tribes reside in the state. *Garo* tribes are the main inhabitant of the Garo districts, believed to be member of Tibet-Burman family. They have two divisions, one inhabits the hilly mountains, and others live in the plain areas. There are 12 main divisions of the hill *Garos* and 6 of the plain *Garos*. Their divisions are made according to certain task assigned to them which distinguished their names such as, the *Abengs* were told to pick cotton, the *Kochus* to prepare dried fish, the *Chiksaks* to collect edible bamboo-shoots and so on. Local tribes within the reserve maintain their terrestrial jurisdiction among the clan *Akhing*. There are all together 26 clans in Garo districts<sup>4</sup>. They are Christian by faith, and their society is matrilineal, inheritance is through the mother.

Besides this tribe, *Koches*, *Rabhas*, *Hajjongs* and *Banars* are also residing in the Garo district.

Nokrek Biosphere Reserve (NBR) was established on 13<sup>th</sup> September, 1988 under the UNESCO's Man and Biosphere (MAB) program, lies between 25°15' N to 25°29' N latitudes and 90°13' E to 90°30' E longitudes, is located in the western parts of the Meghalaya. It comprises of total 820 sq km of which 47.48 sq km is central core zone surrounded by a buffer zone of 772.52 sq km. It is one of the rich hot spot biodiversity area surrounded by Khasi hills (Meghalaya) in the East, Assam in North and West, and Bangladesh in the South.

The extensive ethnobotanical work have been done on various tribes such as *Khasi*, *War Jaintia*, *Adis*, *Karbi*, *Pnar*, *Mikir*, *Apatanis*, *Nyshis*, *Monpas*, *Hill Miris*, *Yobins* and *Khamptis Hill Miris*, *Yobins* and *Khamptis* of North-east India<sup>5-18</sup>, there are very few published records on ethnobotany of *Garo* tribes<sup>28-32</sup>. However, a lot of floristic assessment works have been done in Meghalaya<sup>19-26</sup>. Floristic work in NBR has been carried out by the authors at Botanical Survey of India, Eastern Regional Circle, Shillong, and collected, processed of 1500 different plant samples as per Jain & Rao herbarium technique<sup>27</sup>, and housed at ASSAM herbarium. In this context an attempt has been made to give the information regarding wild food plants used by the *Garos* which is gathered during our survey work.

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## Methodology

General basic informations on *Garo* tribes collected from the State Forests Department, Shillong and from forest officials of the Nokrek Biosphere Reserve. For the ethno-botanical record, discussions were held at Daribokgre, Chokpot, Nabokgre, Chandigre and Williamnagar with the headman's (*Nokma's*) of surrounding villages, medicine man (*Priest, Kobiras*) and head of the family (*Nokni Skotong*). During the meetings, information on wild edible plants, their local names, plant parts used, and methodology were recorded. Nine field trips in different seasons (2007-2010) were undertaken for collection of plant samples along with the photographs and GPS data. Herbarium sheets were prepared following standard methods<sup>27</sup>. The authors of scientific names and abbreviations followed for authors of

plant names<sup>33</sup>. The voucher specimens deposited in ASSAM herbarium, Shillong.

## Results and discussion

The result deals with 71 wild edible plant species under 61 genera and 42 families being taken by *Garo* tribes as food. Of which they consumes rhizomes, corms and tubers of 8 species; barks of 1 species; stem piths, tender shoots and fronds of 9 species; leaves and twigs of 21 species; flowers/ flower-buds and inflorescence of 2 species; fruits/ pods of 25 species; seeds, nuts, skin, kernels of 3 plant species; whole parts of 2 plant species. The all edible plants are arranged alphabetically in the tabular form, followed by families, vernacular name(s) and used the plant part(s), and methodology used by the local inhabitants (Table 1) (Figs. 1-12).

Table 1—Wild edible plants used by *Garo* tribes of Nokrek Biosphere Reserve in Meghalaya, India

Plant name (Family)	<i>Garo</i> name	Parts utilize	Mode of uses
<i>Alpinia malaccensis</i> Rosc. (Zingiberaceae)	<i>Gong</i>	Rhizomes	Cooked as vegetable.
<i>Amblyanthus glandulosus</i> A.DC. (Myrsinaceae)	-	Twigs	Cooked as vegetable.
<i>Amorphophallus bulbifera</i> (Roxb.) Blume (Araceae)	<i>Taa</i>	Corms	Cooked as vegetable.
<i>Aporosa octandra</i> (Buch.-Ham. ex D.Don) A.R.Vickery (Euphorbiaceae)	<i>Chhambolji</i>	Fruits	Ripe yellow fruits are eaten raw.
<i>Ardisia solanacea</i> Roxb. (Myrsinaceae)	<i>Nagri</i>	Fruits	Ripe fruits eaten raw.
<i>Artemisia indica</i> Willd. (Asteraceae)	<i>Phraphrukhubijak</i>	Tender shoots	Fried in oil and taken as vegetable.
<i>Asparagus racemosus</i> Willd. (Liliaceae)	<i>Kizhangu</i>	Tubers	Eaten raw as fruits.
<i>Baccaurea ramiflora</i> Lour. (Euphorbiaceae)	<i>Kojuka</i>	Fruits	Fruit eaten with salt, prickle prepared.
<i>Baliospermum micranthum</i> Muell.-Arg. (Euphorbiaceae)	-	Twigs	Cooked as vegetable.
<i>Bauhinia purpurea</i> L. (Caesalpinaceae)	<i>Bol-Megong</i>	Tender shoots	Cooked as vegetable with potatoes.
<i>Begonia roxburghii</i> (Miq.) A.DC. (Begoniaceae)	<i>Kamchal</i>	Leaves/petioles	Cooked as vegetable, petioles eaten raw by peeling off outer skin.
<i>Briedelia retusa</i> (L.) A.Juss. (Euphorbiaceae)	<i>Mangritchok</i>	Fruits	Ripe fruits eaten raw.
<i>Buddleja asiatica</i> Lour. (Buddlejaceae)	<i>Samma-bat</i>	Barks	Chewed.
<i>Calamus erectus</i> Roxb. (Arecaceae)	<i>Sokmil</i>	Fruits	Ripe fruits eaten raw.
<i>Canthium dicoccum</i> (Gaertn.) Teijsm. & Binn. (Rubiaceae)	<i>Techiek-king</i>	Fruits	Ripe fruits eaten raw.
<i>Canthium parvifolium</i> Roxb. (Rubiaceae)	<i>Bol-thing</i>	Fruits	Ripe fruits eaten raw
<i>Caryota urens</i> L. (Arecaceae)	<i>Chewa gach</i>	Stem pith	Boiled, mixed with rice and cooked.
<i>Chlorophytum arundinaceum</i> Baker (Liliaceae)	<i>Bol kyian</i>	Twigs	Cooked as vegetable.
<i>Chlorophytum khasianum</i> Hook.f. (Liliaceae)	<i>Bol chamkso</i>	Twigs	Cooked as vegetable.
<i>Citrus indica</i> Tanaka (Rutaceae)	<i>Mimang-Narang</i>	Fruits	Ripe fruits are sour, eaten raw with salt.
<i>Clausena excavata</i> Burm.f. (Rutaceae)	<i>Sam-sweg</i>	Leaves	Cooked as vegetable in curries.
<i>Clerodendrum wallichii</i> Merr. (Verbenaceae)	<i>Medongdi</i>	Leaves	Cooked as vegetable.
<i>Commelina benghalensis</i> (L.) Schott (Commelinaceae)	-	Leaves	Cooked as vegetable.
<i>Debregeasia longifolia</i> (Burm.f.) Wedd. (Urticaceae)	<i>Bol-tysim</i>	Fruits	Ripe fruits eaten raw.
<i>Dendrocalamus hamiltonii</i> Nees & Arn. ex Munro (Poaceae)	<i>Wanok</i>	Tender shoots	Local food <i>Me'A</i> prepared, also cooked as vegetable with dry fish.
<i>Dioscorea oppositifolia</i> L. (Dioscoreaceae)	<i>Thabisa</i>	Tubers	Cooked as vegetable.

*Contd.*

Table 1—Wild edible plants used by Garo tribes of Nokrek Biosphere Reserve in Meghalaya, India

Plant name (Family)	Garo name	Parts utilize	Mode of uses
<i>Dioscorea pentaphylla</i> L. (Dioscoreaceae)	<i>Stenz</i>	Tubers	Cooked as vegetable.
<i>Dracaena spicata</i> Roxb. (Agavaceae)	-	Tubers	Cooked as vegetable.
<i>Drymaria cordata</i> (L.) Willd. ex Roem. & Schult. (Caryophyllaceae)	<i>Samsithalap</i>	Whole plant	Eaten raw.
<i>Elaeagnus conferta</i> Roxb. (Elaeagnaceae)	<i>Sukhwa</i>	Fruits	Ripe ones eaten raw, used in making prickles, sold in local market.
<i>Elastostema dissectum</i> Wedd. (Urticaceae)	<i>Khlow</i>	Leaves	Cooked as vegetable.
<i>Entada rheedei</i> Spreng. (Fabaceae)	<i>Bolchhak chhan</i>	Seeds	Boiled, sliced and mixed with gram and eaten as vegetable.
<i>Eurya acuminata</i> DC. (Theaceae)	<i>Murmura</i>	Tender shoots	Cooked in oil and eaten as vegetable.
<i>Fagopyrum dibotrys</i> (D. Don) Hara. (Polygonaceae)	<i>Sambodom bong</i>	Shoots	Tender ones are cooked as vegetable.
<i>Ficus auriculata</i> Lour. (Moraceae)	<i>Kakbal-takukasing</i>	Fruits	Eaten raw.
<i>Ficus hispida</i> L.f. (Moraceae)	<i>Thiwek, Sakhap</i>	Leaves	Cooked as vegetable.
<i>Ficus oligodon</i> Miq. (Moraceae)	<i>Prap</i>	Fruits	Ripe ones eaten raw.
<i>Ficus subincisa</i> Buch.-Ham. ex J.E. Sm. (Moraceae)	<i>Bol matap</i>	Leaves	Cooked as vegetable.
<i>Flemingia vestita</i> Baker (Fabaceae)	<i>Bol phlang</i>	Tubers	Eaten raw.
<i>Garcinia kydia</i> Roxb. (Clusiaceae)	<i>Tekra, Denga duti</i>	Fruits	Eaten raw.
<i>Gmelina arborea</i> Roxb. (Verbenaceae)	<i>Bol-lophiang</i>	Flowers	Cooked as vegetable.
<i>Grewia nervosa</i> (Lour.) Panigr. (Tiliaceae)	<i>Gansari, Prolmango</i>	Fruits	Ripe ones eaten raw.
<i>Hodgsonia macrocarpa</i> (Blume) Cogn. (Cucurbitaceae)	<i>Kagoba, Thibe</i>	Seeds	Cooked and eaten as vegetable.
<i>Houttuynia cordata</i> Thunb. (Saururaceae)	<i>Jamyrdoh</i>	Leaves	Eaten raw, also cooked as vegetable.
<i>Medinilla erythrophylla</i> Lindl. (Melastomaceae)	<i>Megong apha</i>	Leaves	Cooked as vegetable.
<i>Melastoma malabathricum</i> L. (Melastomataceae)	<i>Bol-Kakkhia</i>	Fruits	Ripe fruits eaten raw.
<i>Melodinus monogynus</i> Roxb. (Apocynaceae)	<i>Bakwe</i>	Fruits	Orange coloured ones are eaten.
<i>Meyna spinosa</i> Roxb. ex Link (Rubiaceae)	<i>Thieskine</i>	Fruits	Ripe fruits eaten raw.
<i>Mucuna bracteata</i> DC. ex Kurz (Fabaceae)	<i>Wakmi</i>	Seeds	Cooked and eaten as vegetable.
<i>Murraya koenigii</i> (L.) Spreng. (Rutaceae)	<i>Nolsing, Sam-khatsi</i>	Leaves	Cooked as vegetable.
<i>Mussaenda roxburghii</i> Hook.f. (Rubiaceae)	<i>Gardek</i>	Twigs	Young twigs cooked as vegetable.
<i>Myrica esculenta</i> Buch.-Ham. ex D. Don (Myricaceae)	<i>Bol-sohlia</i>	Fruits	Red to pink ones are sour, eaten with salt, sold in local market.
<i>Neocinnamomum caudatum</i> (Wall. ex Nees) Merr. (Lauraceae)	<i>Makbil Teangk, Sami-jang</i>	Fruits	Red fruits are eaten raw.
<i>Nephrolepis cordifolia</i> (L.) C. Presl (Nephrolepidaceae)	<i>Shusni shak</i>	Tubers	Matured tubers eaten raw.
<i>Oxalis corniculata</i> L. (Oxalidaceae)	<i>Khiakhna</i>	Whole plants	Eaten raw, also cooked as vegetable.
<i>Phlogacanthus thyrsiflorus</i> (Roxb.) Nees (Acanthaceae)	<i>Ellot</i>	Inflorescence	Cooked as vegetable.
<i>Piper thomsonii</i> (C. DC.) Hook.f. (Piperaceae)	<i>Ashira</i>	Leaves	Chewed raw.
<i>Polygonum capitatum</i> Buch.-Ham. ex D. Don (Polygonaceae)	<i>Sambodom-bong</i>	Twigs	Cooked with potato as vegetable.
<i>Polygonum nepalense</i> Meisner (Polygonaceae)	<i>Achiak</i>	Tender shoots	Cooked as vegetable.
<i>Pteridium aquilinum</i> (L.) Kuhn (Pteridaceae)	<i>Shatri</i>	Tender fronds	Cooked in oil, sold in local markets.
<i>Rubus alceifolius</i> Poir. (Rosaceae)	<i>Tikisambak</i>	Fruits	Ripe fruits eaten raw.
<i>Rubus rugosus</i> Sm. (Rosaceae)	<i>Thekhi-sambak</i>	Fruits	Ripe fruits eaten raw.
<i>Sarcochlamys pulcherrima</i> (Roxb.) Gaud. (Urticaceae)	<i>Mechaki</i>	Tender shoots	Cooked with pork meat as vegetable.
<i>Saurauia nepaulensis</i> DC. (Actinidiaceae)	<i>Gungsning</i>	Fruits	Ripe fruits eaten raw.
<i>Sonchus aspera</i> (L.) Hill (Asteraceae)	<i>Thumbai</i>	Leaves	Cooked as vegetable.
<i>Sonchus wightianus</i> DC. (Asteraceae)	<i>Thumbai</i>	Leaves	Young leaves eaten raw.
<i>Stixis suaveolens</i> (Roxb.) Pierre (Capparaceae)	<i>Narangchi</i>	Fruits	Ripe fruits eaten raw.
<i>Syzygium diospyrifolium</i> (Wall. ex Duthie) S.N. Mitra (Myrtaceae)	<i>Panchual</i>	Skins	Skin parts of matured fruits are peeled and eaten.
<i>Syzygium praecox</i> (Roxb.) Rathakr. & N.C. Nair (Myrtaceae)	<i>Jongchatchatbudu</i>	Fruits	Ripe fruits eaten raw
<i>Thunbergia grandiflora</i> Roxb. (Thunbergiaceae)	<i>Khakkhu</i>	Leaves	Cooked as vegetable.
<i>Zanthoxylum rhetsa</i> (Roxb.) DC. (Rutaceae)	<i>Shumiccheng</i>	Leaves	Cooked as vegetable.



Plate: (1) & (2) Local Garo market in NBR, (3) Fruit of *Calamus erectus* Roxb., (4) *Debregeasia longifolia* (Burm.f.) Wedd., (5) *Amblyanthus glandulosus* A.DC., (6) *Syzygium diospyrifolium* (Wall. ex Duthie) S.N.Mitra, (7) *Baccaurea ramiflora* Lour., (8) *Rubus rugosus* Sm., (9) *Begonia roxburghii* (Miq.) A.DC., (10) *Amorphophallus bulbifera* (Roxb.) Blume, (11) *Ficus auriculata* Lour., (12) *Houttuynia cordata* Thunb

For vegetable purpose they are using 38 species, viz. *Alpinia malaccensis*, *Amblyanthus glandulosus*, *Amorphophallus bulbifera*, *Artemisia indica*, *Baliospermum micranthum*, *Bauhinia purpurea*, *Begonia roxburghii*, *Chlorophytum arundinaceum*, *Chlorophytum khasianum*, *Clausena excavata*, *Clerodendrum wallichii*, *Commelina benghalensis*, *Dendrocalamus hamiltonii*, *Dioscorea oppositifolia*, *Dioscorea pentaphylla*, *Dracaena spicata*, *Elastostema dissectum*, *Entada rheedei*, *Eurya acuminata*, *Fagopyrum dibotrys*, *Ficus hispida*, *Ficus subincisa*, *Gmelina arborea*, *Hodgsonia macrocarpa*, *Houttuynia cordata*, *Medinilla erythrophylla*, *Mucuna bracteata*, *Murraya koenigii*, *Mussaenda roxburghii*, *Oxalis corniculata*, *Phlogacanthus thyrsoiflorus*, *Polygonum capitatum*, *Polygonum nepalense*, *Pteridium aquilinum*, *Sarcochlamys pulcherrima*, *Sonchus aspera*, *Thunbergia grandiflora* and *Zanthoxylum rhetsa*. They uses 31 species as fruit plants eaten raw or cooked viz. *Aporosa octandra*, *Ardisia solanacea*, *Asparagus racemosus*, *Baccaurea ramiflora*, *Briedelia retusa*, *Buddleja asiatica*, *Calamus erectus*, *Canthium dicoccum*, *Canthium parvifolium*, *Citrus indica*, *Debregeasia longifolia*, *Drymaria cordata*, *Elaeagnus conferta*, *Ficus auriculata*, *Ficus oligodon*, *Flemingia vestita*, *Garcinia kydia*, *Grewia nervosa*, *Melastoma malabathricum*, *Melodinus monogynus*, *Meyna spinosa*, *Myrica esculenta*, *Neocinnamomum caudatum*, *Nephrolepis cordifolia*, *Piper thomsonii*, *Rubus alceifolius*, *Rubus rugosus*, *Saurauia nepaulensis*, *Stixis suaveolens*, *Syzygium diospyrifolium* and *Syzygium praecox*. Stem pith of 1 species viz. *Caryota urens* is cooked as food along with rice, whereas young leaves of 1 species, viz. *Sonchus wightianus* is eaten raw by *Garo* tribes.

Due to urbanization and fast developmental activities in this area, the traditional knowledge on the use of plants by *Garo* tribals is fast vanishing. Therefore it is an urgent need to document the traditional knowledge, or otherwise it will be lost forever. The conservation efforts of tribals in Nokrek Biosphere Reserve and other regions of *Garo* hills need to be recognized and rewarded suitably. It is hoped that the study will lead to revitalization of the *in-situ* and *ex-situ* conservation of plant species of the study site.

#### Acknowledgement

Authors gratefully acknowledged Ministry of Environment and Forests, Government of India for

providing financial support in the form of fellowship. Authors acknowledge the Director, Botanical Survey of India, Kolkata, for providing facilities. Authors are also thankful (*Methila*) to the *Garo* tribal people of the NBR especially *Nokmas*, *Priests*, *Kobiras*, *Nokni* and *Skotong* for their help and support during the study period.

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