

RESEARCH ARTICLE

Ethnobotany of wild edible plants used by *Rabha* community of Goalpara district in Assam, India

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Abstract

The *Rabha* community of Assam is known to have a close association with nature since time immemorial. They mostly dwell in the periphery of forests and utilize natural resources in the form of various provisioning services such as food, fuel, medicine etc. Locally available vegetation is an integral part of their regular diet and traditional dishes. Although extensive studies on wild edible plants (WEPs) consumed by various tribes from different parts of the state have been previously accomplished by several authors, there is a meagre information on the WEPs consumed by the *Rabha* community. The present study documented WEPs from the selected region of *Rabha* in Goalpara district of Assam, based on standard ethnobotanical field method and literature review. The study recorded 51 species of WEP belonging to 45 genera and 30 families. Plant parts such as fruit, leaf, seed, tuber, flower, rhizome, shoot, stem, root or the entire plant are consumed. The most widely consumed plant parts harvested were noted to be fruit (17 species) and the least was stem and frond (1/each). WEPs are consumed in different modes such as vegetables, fruits and other forms such as spices, condiments, nuts etc. The plants are mainly consumed either cooked (55%) or raw (14%), while others are traditionally processed (10%). A few species (2-10%) had a bi or tri-modal form of consumption. The findings emphasized the significance of reinforcement to food security and conservation of the plant-based knowledge of the *Rabha* community for ensuring a sustainable diet source from the wild botanicals.

Keywords: Goalpara; *Rabha*; Wild Edible Plants; Traditional Uses; Assam

1. Introduction

Wild edible plants (WEPs) can act as a substitute to conventional food at the time of scarcity. They contribute not only to community food diversity but also enhance the food value in terms of cultural and nutritional perspectives. WEPs are source of health promoting compounds and bear high importance mainly in rural and sub-urban areas and also regarded as emergency food (Jain and Tiwari, 2012; Pinela et al., 2017). Extensive studies on WEPs consumed by various tribes have been accomplished by several authors from time to time from the Northeast India (Angami et al., 2006; Kar and Borthakur, 2007; Kayang, 2007; Patiri and Borah, 2007; Sawain et al., 2007; Kar et al., 2008; Kar and Borthakur, 2008; Medhi and Borthakur, 2012, Medhi and Borthakur, 2013; Brahma et al., 2013; Dutta and Sharma, 2013; Kar et al., 2013; Narzary et al., 2013; Medhi et al., 2014; Baro et al., 2015; Deka and Devi, 2015; Nath, 2015; Pradheep et al., 2016; Mao and Roy, 2016; Biswas et al., 2018; Taram et al., 2018). The relevance of WEPs has been gaining momentum in recent decades due to their food, nutritional and livelihood potential. Borelli et al (2020) reviewed the possible prospects to support local food system transformation and has the potential to contribute to global food production and supply chain at a critical juncture. Around 821 million of world population has insufficient food to lead a healthy life (Behera et al., 2019). Traditional systems of agriculture have been abandoned due to modernization of agriculture sector to complement the ever-increasing demand of food and compete with the global market. The modern agriculture practice is centered to a handful of commodities, viz., wheat, rice, maize etc. However, these crops alone are unable to support healthy and balanced diets (Borelli et al., 2020). As per the global agricultural production report, our diets are dominated by energy rich food, especially sugars, cereals, oils and insufficient of protein, vegetables and fruits (Krishna et al., 2018).

Biodiversity International has come up with programme for mainstreaming food security under its “Healthy Diets from Sustainable Food Systems Initiative”. The targeted nations are India, Brazil, Guatemala, Kenya, Mali, Sri Lanka and Turkey, owing to prevalence of a wide diversity of food, culture and natural landscapes (Borelli et al., 2020). Consumption of wild plants in rural India is well-established practice. A plethora of literatures on WEPs is available, dealing with various aspects i.e., from documentation to molecular study (Kar and Borthakur, 2007; Saikia et al., 2007; Kar and Borthakur 2008; Brahma et al., 2013; Medhi and Borthakur 2013; Baro et al., 2015; Deka and Devi 2015; Dutta et al., 2017; Biswas et al., 2018; Ray et al., 2020).

Assam, the largest populated state of Northeast India has a rich diversity of tribal communities. They are enriched with indigenous knowledge, reflected from their food habits, health care systems, rituals and traditional attires. Mao and Roy (2016) carried out an extensive review of research reports on plant-based traditional knowledge published during the period from 1956 to 2015 from NE India. They categorized the reports into 13 different groups based on their utility. Among these, ethnomedicine represents maximum number of works (243), while a very few reports of wild food plants (84) were recorded. From Assam, out of 156 publications reviewed, only 24 reports have been found to be wild edible plants. However, systematic documentation of the vast ethno-botanical knowledge of the study area, Goalpara district in Western Assam is still in a nascent stage though it has a vast expanse of forest coverage endowed with

rich cultural heritage of the tribal communities. The local communities are mostly forest fringe dwellers and forest resources are integral part of their livelihood security. Few reports from Western Assam revealed uses of wild plants as food, ethno-medicine, beverage etc. (Basumatary et al., 2004; Deka and Nath 2014; Nath, 2015). Goalpara district is a home to many tribal communities and one of the major tribes reported is the 'Rabha'. The Rabhas also dwell in Kamrup and Darrang, Udalguri and Baksa district. They are well known for the art of utilizing wild plants for their livelihood, though this ethnic knowledge has not been received much scientific attention (Das and Teron 2014). Hence, there is an urgent call for scientific investigation to explore and conserve the traditional knowledge for a sustainable utilization of wild food plant resources. Considering this aspect, endeavour was made to inventorize the WEPs used by the Rabha community from the forest landscape of Goalpara district, Assam.

2. Materials and methods

2.1. Study site

The ethnobotanical study was conducted in five selected sites of Goalpara district, namely Dahikata, Ghagrapahar (Ranjuli), Pancharatna pahar, Dhanubhanga saljhar and Kahibari saljhar during the period from September 2019 to September 2020 (Figure 1). The district is situated in the western part of Assam lying between 25° 53' & 26° 15' North latitude and 90°07' & 91°05' East longitude (Deka et al., 2019). The district covers total geographical area of 1,824 km², with total forest coverage of 395.74 km² accounting to 21.70% of the total land area (ISFR, 2019).

2.2. Field method

Ethnobotanical field method suggested by Jain and Rao (1976) were followed during field survey conducted in Rabha dominated villages of Goalpara district Assam. The information on harvesting and mode of preparation of wild edible plants were collected from the knowledgeable local informants. Among the 30 informants, 12 were male and 18 were female, comprised of the housewives, elderly people, traditional healers and local market vendors using semi-structured questionnaire, personal interview, focused group discussion and transect walk with key informants in the community forest area. Based on the information provided by the local informants, the food and economic uses of wild edible plant species were prioritized and checklist were prepared. Subsequently, the relevant ethnobotanical information like local name, edible parts, mode of uses and other services provided by the wild edible plant species were recorded in field notebook and digital photographs of each species were taken using Digital Camera (Model: Nikon D5300 Make: Nikon Corp. Japan). The ethnobotanical information of WEPs generated from field studies were substantiated by consulting published literatures. The plant species were identified by consultation of relevant taxonomic literatures (Flora of Assam). The accepted scientific names of each species were verified in 2023 at POWO [Plants of the World Online, <https://powo.science.kew.org/>] hosted by Royal Botanic Garden, Kew UK. Scientific databases (Scopus, Web of Science, JSTOR, PubMed, ScienceDirect), academic search engine (Google scholar), and relevant journals were accessed and cross checked for taxonomic identity, ethnobotanical and food value information. Both primary and secondary data were used during compilation of the WEPs of the study area.

3. Result and discussion

3.1. Diversity of WEPs

Ethnobotanical study in Rabha dominated region of Goalpara district of Assam has revealed rich diversity of the WEPs and associated traditional knowledge. Present study recorded a total of 51 species belonging to 45 genera and 30 plant families which were found to be used by the Rabha community as food plants (Table 1). These species were found to be mainly harvested from the community forest area. It was observed that most of the plant species were also reported to be used by other tribal communities as food and medicines or other uses (Saikia et al., 2007; Kar and Borthakur, 2008; Medhi and Borthakur, 2012; Brahma et al., 2013; Dutta and Sharma, 2013; Dutta et al., 2017; Narzary et al., 2013; Mipun et al., 2019; Borah et al., 2020). Literature corroboration revealed that the documentation of wild edible plants used among the Rabha community has not been

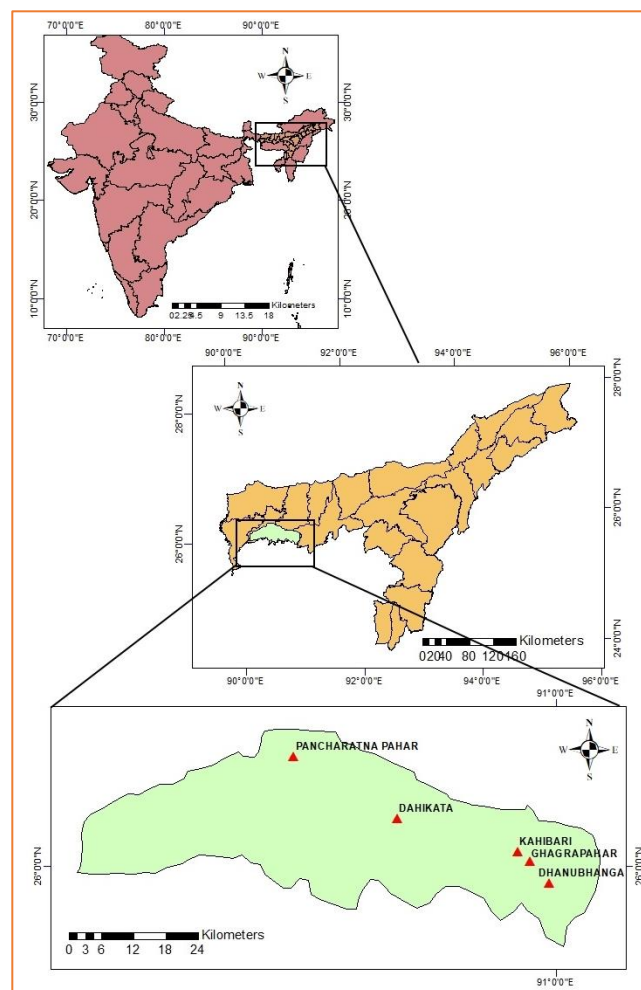


Figure 1. Map showing the study sites and Rabha settlement area in Goalpara district of Assam, India

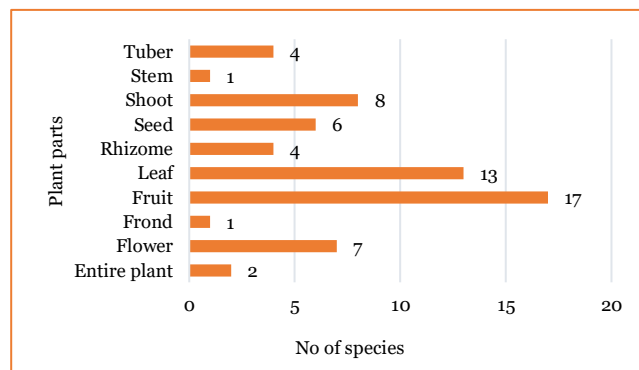


Figure 2. Wild edible plant parts used as food by Rabha community

done systematically which underlined the gap and scopes for further ethnobotanical research in the region (Mao and Roy 2016). In the present study, Zingiberaceae was recorded as the most dominant plant family represented by four species, viz., *Alpinia nigra*, *Curcuma amada*, *Kaempferia galanga* and *Zingiber zerumbet*. This was followed by Araceae, Asteraceae, Fabaceae, Malvaceae, Moraceae and Solanaceae families, with three species each. The rest of the families were consisting of either one or two species. Among the total 51 plant taxa reported from community forest of Rabha, 14 species were found belonging to monocot, 36 species of dicot, and 01 species of pteridophyte was also reported. Plant species recorded under the Zingiberaceae family were found to be widely consumed by the Rabha people which is in contrast to earlier report (Bora and Das 2015),

wherein Lamiaceae family was reported to be most widely used among the Rabha household. The Rabha also use large number of traditional herbs in the preparation of rice beer (Deka and Sharma 2010). No literature information is available on edibility status of seven species viz., *Ampelocissus latifolia*, *Chlorophytum arundinaceum*, *Mallotus philippensis*, *Nervelia aragona*, *Shorea robusta*, *Sterculia urens* and *Urena lobata* from Assam. Thus, ethnobotanical uses of these 07 species were found to be novel and exclusive among the Rabha community.

3.2. Edible plant parts

Edible parts of plant include flower, fruit, leaf, seed, frond, root, rhizome, shoot, stem, tuber or the entire plant (Table 1, Figure 2). It was observed that the most widely consumed part was reported to be fruit (17 sp.), followed by leaf (13 sp.), shoot (8 sp.) and flower (7 sp.). These findings are in agreement with the earlier findings of Ashagre et al (2016). *Amorphophalus paeoniifolius* and *Colocasia esculenta* were only the plants, whose entire parts have been reported to be edible. Among all the plant parts reported, frond and stem were recorded to be the least consumed (1 sp.).

3.3. Mode of traditional uses

As regards to mode of traditional use of wild food plant species, it varies from place to place, and within the community members. This is mainly due to differences in their habitat and forest types, local culture and food habit, and availability of the plant species in their community forest area. The findings related to mode of consumption of wild edibles are shown in Table 1 (Figure 3). They have been reported to be consumed in either raw (R) or cooked (C) form. Some of them were reported to be traditionally processed, while few others were found to be preserved and stored for future use (O). The present study reported 28 species (55%) of the WEPs documented from Rabha community consumed after necessary cooking processes, 7 species (14%) was consumed in fresh or raw form, and 5 species (10%) were found to be consumed as spice and condiments, nuts, jam, jelly, juice etc. A few WEP species had bimodal or tri-modal means of consumption (RC/ RO/ RCO). *Ampelocissus latifolia* and *Entada phaseoloides* were exclusively consumed after processing.

4. Conclusion

The present study unveiled the plant based traditional knowledge focused on wild edible plants and mode of utilization among the Rabha community inhabiting in Goalpara district of Assam. The finding of this study also revealed that some wild edible plants, popular among the Rabha community as food, have not been documented by earlier workers from the state of Assam with scientific rigor. Hence, it has become an urgent need to document this orally inherited traditional knowledge of the wild food plants for conservation and sustainable utilization. Conservation of these nutritionally and commercially viable WEPs is essential, as wild edible plants possess multi-dimensional health and economic benefits which includes provision of food and nutrients in the society and play a crucial role in sustenance of rural livelihoods. Furthermore, the ethnobotanical information of present study confers prospect for nutritional study of selected unexplored wild edible plants to establish scientific validity of the traditional claims made by the local informants of the Rabha Community.

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Author(s) contribution

SD: carried out the field survey and structured the original draft of the manuscript. JD, AB and OPT: supervised the research work. JD: reviewed the manuscript. RA and ND: assisted in manuscript preparation.

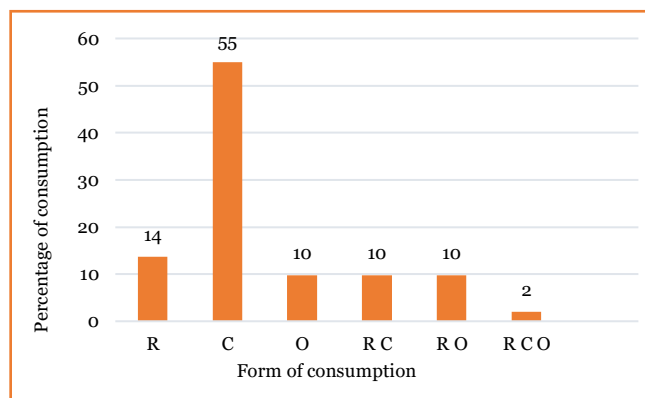


Figure 3. Form of consumption of wild edible plants among the Rabha. (R-Raw; C-Cooked; O-Others; RC-Raw & cooked; RO-Raw and Others; RCO-Raw, Cooked and Others)

Conflict of interest

All authors declare that there is no conflict of interest.

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Table 1. Wild edible plant species and their parts used by Rabha Community of Goalpara district in Assam, India.

| Species | Local name | Family | Edible parts | Mode of usage | Form |
|---|---------------------------------|------------------|--------------|--|------|
| | | | | | |
| <i>Abelmoschus manihot</i> (L.) Medik. | Usipek/ Jongholi bhendi | Malvaceae | Sh | Young shoots are eaten as vegetables. | C |
| <i>Abutilon indicum</i> (L.) Sweet | Jopa bondha | Malvaceae | Fl | Flower buds are cooked and consumed. | C |
| <i>Acacia farnesiana</i> (L.) Willd. | Toruwa kodom | Mimosaceae | Fr | Fresh fruits are fried and consumed. | C |
| <i>Acmella paniculata</i> (Wall.ex DC.) R.K. Jansen | Bon narji | Asteraceae | Lf, Fl | Tender leaves eaten after boiling, fresh flowers chewed. | RC |
| <i>Alpinia nigra</i> (Gaertn) Burt | Tora | Zingiberaceae | Sh, Rh | Young shoots and rhizomes are eaten either raw or cooked. | RC |
| <i>Amorphophalus paeoniifolius</i> (Dennst.) Nicolson | Ol kochu | Araceae | Ep | Corm, peduncle and inflorescence eaten cooked as vegetables. | C |
| <i>Ampelocissus latifolia</i> (Roxb.) Planch. | Bon angur | Vitaceae | Fr | Fruits are edible | R |
| <i>Annona squamosa</i> L. | Ata phol, Atlas | Annonaceae | Fr | Ripe fruits are consumed in raw form. | R |
| <i>Blumea lanceolaria</i> (Roxb.) Druce | * | Asteraceae | Lf | Leaves eaten after boiling. | C |
| <i>Calamus erectus</i> Roxb. | Bet | Arecaceae | Fr, St | Fruits and young stem are consumed. | RC |
| <i>Cheilocostus speciosus</i> (J.Konig) C. D. Specht | Jom lakhuti | Costaceae | Sh | Tender shoot is used as vegetable. | C |
| <i>Chlorophytum arundinaceum</i> Baker | * | Asparagaceae | Sh | Shoots cooked as vegetables. | C |
| <i>Cinnamomum tamala</i> (Buch.-Ham.) T.Nees | Tejpat | Lauraceae | Lf | Leaves are used as spice. | O |
| <i>Cissus quadrangularis</i> L. | Harjura | Vitaceae | Sh | Young shoots are eaten as vegetables. | C |
| <i>Colocasia esculenta</i> (L.) Schott | Kola kosu | Araceae | Ep | Entire plant parts are consumed. | C |
| <i>Curcuma amada</i> Roxb. | Aam ada | Zingiberaceae | Rh | Rhizome are eaten cooked or raw. | RC |
| <i>Dillenia indica</i> L. | Ou tenga | Dilleniaceae | Fl | Fleshy calyx eaten raw, cooked & processes as jam jelly etc. | RCO |
| <i>Dillenia pentagyna</i> Roxb. | Oxi-tenga | Dilleniaceae | Fl, Fr | Flowers and fruits eaten cooked; | C |
| <i>Dioscorea alata</i> L. | Kath alu | Dioscoreaceae | Tu | Tubers are edible | C |
| <i>Dioscorea bulbifera</i> L. | Bon alu/ Goch alu | Dioscoreaceae | Tu | Tubers are suitable for consumption. | C |
| <i>Diplazium esculentum</i> (Retz.) Sw. | Dhekia sak | Athyriaceae | Fd | Fronde eaten as vegetables. | C |
| <i>Eclipta prostrata</i> (L.) L. | Kehraj | Asteraceae | Sh | Young shoots are eaten as vegetable. | C |
| <i>Entada phaseoloides</i> (L.) Merr. | Ghila | Fabaceae | Se | Kernal eaten after processing. | O |
| <i>Euphorbia hirta</i> L. | Gakhiroti bon | Euphorbiaceae | Lf | Leaves are eaten as mixed vegetables. | C |
| <i>Ficus auriculata</i> Lour. | Atha dimoru | Moraceae | Fr | Ripe fruits eaten raw. | R |
| <i>Justicia adhatoda</i> L. | Baheka | Acanthaceae | Fl | Flowers are eaten after cooking. | C |
| <i>Kaempferia galanga</i> L. | Gathiyon | Zingiberaceae | Rh | Rhizomes are used as spice and beverage for aroma and flavour. | R |
| <i>Mallotus philippensis</i> (Lam.) Müll.Arg. | Jorat | Euphorbiaceae | Fr | Fruits eaten raw. | R |
| <i>Melastoma malabathricum</i> (L.) | Phutki/ Phutkola/ Phutuka | Melastomaceae | Fr | Fruits are edible. | R |
| <i>Morus alba</i> L. | Nuni | Moraceae | Fr | Fruit consumed fresh and processed products. | RO |
| <i>Mucuna pruriens</i> (L.) DC. | Bandar kekuwa | Fabaceae | Se | Seeds are edible.** | C |
| <i>Nervilia aragoana</i> Gaudich. | * | Orchidaceae | Tu | Tubers are edible. | RO |
| <i>Ocimum basilicum</i> L. | Ram tulsi | Lamiaceae | Lf | Leaves consumed as spice. | O |
| <i>Oroxylum indicum</i> (L.) Kurz | Bhat ghila | Bigoniaceae | Fl | Flowers eaten boiled or fried. | C |
| <i>Sarcochlamys pulcherrima</i> Gaudich. | Mesaki | Urticaceae | Sh, Lf, Fr | Young shoots, leaves and fruits cooked as vegetables. | C |
| <i>Semecarpus anacardium</i> L.f. | Bhala | Anacardiaceae | Se | Dried seeds are eaten directly or in semi-processed form** | RO |
| <i>Senna tora</i> (L.) Roxb. | Soru-medelua | Fabaceae | Lf | Young leaves are eaten cooked. | C |
| <i>Shorea robusta</i> Gaertn. | Sal | Dipterocarpaceae | Se | Boiled seeds are eaten with salt. | C |
| <i>Smilax zeylanica</i> L. | Tikoni borual | Smilacaceae | Lf | Leaves are edible. | C |
| <i>Solanum nigrum</i> L. | Pokmou | Solanaceae | Fr, Lf | Fruits and leaves are consumed as vegetables. | C |
| <i>Solanum spirale</i> Roxb. | Nara tita | Solanaceae | Sh, Fr | Young shoots and fruits are edible as vegetables. | C |
| <i>Solanum viarum</i> Dunal | Tit vekuri/ Hati vekuri | Solanaceae | Lf, Fr | Leaves and fruits used as vegetables. | C |
| <i>Sterculia urens</i> Roxb. | Odal | Sterculiaceae | Se | Seeds are used as substitute of coffee. | O |
| <i>Sterculia villosa</i> Roxb. | Jari odal | Sterculiaceae | Se | Seed are roasted and eaten. | C |
| <i>Streblus asper</i> Lour. | Soura gos | Moraceae | Fr | Ripe fruits are eaten raw. | R |
| <i>Syzygium cumini</i> (L.) Skeels | Jamun | Myrtaceae | Fr | Fruits are eaten fresh. | R |
| <i>Typhonium trilobatum</i> (L.) Schott | Sam kochu | Araceae | Lf, Tu | Leaves and tubers are consumed after boiling. | C |
| <i>Urena lobata</i> L. | Bon agara | Malvaceae | Lf | Leaves are eaten as mixed vegetables. | C |
| <i>Zingiber zerumbet</i> (L.) Roscoe ex Sm. | Barahu ada | Zingiberaceae | Rh, Fl | Rhizomes eaten as chutney and flowers fried as vegetables. | RC |
| <i>Ziziphus mauritiana</i> Lam. | Bogori | Rhamnaceae | Fr | Fruits are eaten raw and prepared chutney, pickles etc. | RO |
| <i>Ziziphus rugosa</i> Lam. | Bhoot Bogori | Rhamnaceae | Fr | Fruits are eaten raw and prepared pickles. | RO |

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