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Survey and assessment of floral diversity on wild edible plants from Senapati district of Manipur, Northeast India

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Abstract

The floristic composition of the state Manipur falls under the Indo-Malayan type ranges from tropical to sub-tropical and temperate deciduous forests. It has rich floral diversity as well as high degree of endemism including a number of valuable medicinal plants. The Nagas and Kukis are the dominant hill tribal communities living in Senapati district. These two communities possessed rich valuable reservoirs of traditional knowledge on plant uses. A wide range of wild plant species are used by both the communities as vegetable food and edible fruit during the growing seasons. The present investigation recorded 89 different species of edible plants and fruits including 3 different species of edible mushroom belonging to 56 families and 75 genera from the district. Of these 23 species (42.59%) of edible plants and 10 species (28.57%) of edible fruits is a new record which has not been reported earlier from the state. A fairly good number of these plants, about 23 species (25.84%) are also used as medicinal food remedy by the local people in the study areas. Further, assessment of overall local availability status of 22 different selected species of edible plants and fruits showed that 12 species (54.55%) are graded to the category of not so common, follow by common and rare or scanty category with 4 species each. Thus, the study provides new records of the edibility of some wild plants into the state ethnobotanical database, assists in understanding the dependency of local community and the role of wild edible plants in the local economy and also provides preliminary information about the local availability status of some selected plants in the study area and the needs for conservation if any of those species.

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Introduction

The use of wild plants as food has been formed an integral part of the culture and tradition of many indigenous communities of the world. It constitutes an essential component in the diet and food security of many tribal communities particularly people living around the forest fringe or in its vicinity. They collect and consumed a wide variety of wild plant leaves and other plant parts as well as edible mushrooms for sustenance their livelihood. Of the Earth's half million plant species, about 3000 species have been used as agricultural crops and of this only 150 species have been cultivated on a large scale (Mohammed *et al*., 2008). Also more than 85-90% of world's caloric intake is contributed by 12 crops (Misra *et al*., 2008). However, of late there has been a renewed and increasing interest in studying the consumption of wild food plants and its importance to conservation and development for sustainable use and management. Millions of people in many developing countries still depend on wild plant resources to meet their food requirements especially during food crisis (FAO, 2004; Balemie and Kebebew, 2006) and plays a vital role in the diets security of many rural communities. Even in our country India, a considerable proportion of rural population and those people living in remote areas do not produce enough food grains to meet yearly food requirement. Therefore, a large share of rural population is meeting their nutritional requirement through unconventional means, by consuming various wild plants and animal resources (Singh and Arora, 1978).

Fig.1. *Emblica officinalis* in fruiting stage Gartn.

Fig.2. *Prunus nepalensis* (Ser.) Steud. fruit in Senapati market.

Fig. 3. *Lentinula edodes* (Berk.)Pegler in Kangpokpi market.

Fig.4. Vegetable sellers in Senapati market.

Fig.5. *Clerodendron colebrookianum* Walp. flowering stage.

Fig.6. *Oroxylon indicum* (Linn.) Vent. fruiting stage.

Also the diversity of wild edible species offers variety in family diet and contributes to household food security as well as increase dietary diversity. Further, it provides rural households with supplemental income opportunities through their sale in the markets (Moreno-Black and Price, 1993). This marketing plays an important role in the socio-economic development of an area as it helps serve the people and the region. Moreover, many traditional leafy vegetables and fruits are rich in nutrient content and formed as good sources of protein, fat, vitamins, sugars and minerals. Analysis of the nutritional value of many traditional leafy vegetables showed that it is higher than several known common cultivated vegetables (Nordeide *et al*., 1996; Sundriyal and Sundriyal, 2001). Therefore, evaluation of the nutritional content of some of the most commonly preferred and consumed wild plants will help to identify and prioritized species that can be included in traditional agriculture system based on their nutritional values. Such study could also form a part of a strategy to be used as sources of supplementary food. Although some studies on ethnomedicinal plants have been conducted in Manipur, however there is paucity of information's on wild edible plants of the state despite their diverse uses. Therefore the objective of the present investigation is to assess and evaluate the diversity of wild food plants used by the tribal communities in Senapati district and also to provide a baseline data that may be helpful for prioritization of conservation through sustainable use and management of the resources.

Materials and methods

Study area

Senapati is one of the 9-districts of Manipur covering an area of 3271 sq. km. or 14.63% out of the total geographical area of 22,356 sq. km. of the state. The district is located in the northern part of the state in between 24°37" and 25° 25″ N latitudes and 93° 45″ and 94° 29″ E longitudes. The present ethnobotanical field investigation covered 14 different villages across the district from two different ethnic communities' viz. the Nagas (Mao and Poumei sub-tribes) and Kukis.

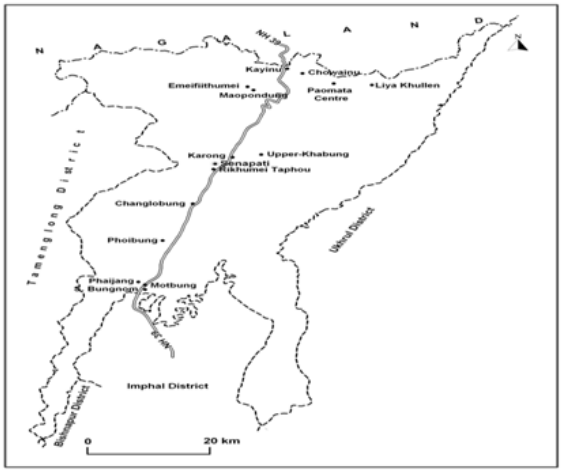

Fig. 9. Map of Senapati district showing location of the different study sites.

Field survey

The ethnobotanical field survey was carried out at interval from July-2008 to January-2011 in Senapati district of Manipur. During this period field tours were conducted seven times in different seasons of the year i.e. July and December-2008; July-August and November -2009; March-April and December-2010 and January-2011**.** During the survey, data on local name, edible parts, available period, habit and habitat, phenology and fruiting period and nature of uses were collected and recorded. Also suitable plant samples were collected, given collection number and herbarium specimens were prepared for identification of the plants.

Informant selection and interview

Interview of the informants on the use of local flora on wild edible plants and fruits was conducted following a modified Jain (1989, 1990) and Martin (1995). A total of 84 elders (64 men and 20 females) from 14 different villages (9 Naga and 5 Kuki villages) were included in the present study (Fig. 9). The age of the informants ranges from 25-78 with an average of 47 years. Most of the selected informants belong to those families who have a strong connection with traditional agriculture for their day-to-day needs. In most cases selection of informants were based on recommendations made by local community members on those elders who were more knowledgeable about the use of local flora including traditional or folk medicine.

Plant collection and identification

Voucher specimens were collected during field survey in different villages, allotted collection numbers, poison with formalin, pressed and processed for future identification. GPS readings of latitudes, longitudes and altitudes were recorded in all the villages where the study was carried out. The collected plants were identified and confirmed by consulting the FFM vol. 1-2: (1985 & 1987); FM vol. 1: (2000); already identified herbarium specimens from BSI herbarium, Eastern Circle, Shillong and from NEHU herbarium. The identified voucher specimens were deposited at the NEHU herbarium**.**

Assessment of local availability status

It is a well known fact that the local people have the best knowledge about the flora in their locality. Preliminary assessment of the local availability status of potential species according to local people's perception is an important tool and should form an integral part for ethnobotanical field investigation. This exercise will be more relevant from the perspective of identification and prioritization of species for conservation and sustainable management of biodiversity resources. Considering this, the following criteria were designed to assess and determine the overall local availability status (village vicinity/forest area) of the selected species (table 3&4) in the study areas based on the informants or collectors perception conducted during the interviews and discussion with the local people.

Abundant: Reported from all the villages under study as abundant or common

Common: Reported from all the villages under study and recorded as common by more than 50% but less than 100% of the villages

Not so common:

(a) Not reported from all the villages under study and recorded as common by less than 50% of the villages.

(b) Reported from all the villages under study but recorded as common by less than 50% of the villages.

Rare: Reported from one third or less from the villages under study and recorded as few plants or less from the locality.

Results

Taxonomic diversity

The present study revealed the rich floral diversity and traditional knowledge of the uses of wild edible plant resources by both the Nagas and Kukis communities in the district. During ethnobotanical field surveys to different villages in the district, about 89 different species of wild edible plants and fruits including 3 species of wild edible mushrooms were recorded to be used for consumption by both the communities. These total edible species reported

were arranged together in the form of tables (1 and 2) for analysis of its taxonomic richness and was found to be distributed in 56 families and 75 genera. Of this about 54 species belong to the category of wild edible plants and 35 species form edible fruits. Three different species viz. *Bryonopsis heterophylla* (Lour.) Cogn., *Morus alba* Linn. and *Rhus semialata* Murry. DC. are used both as edible plants and fruits. Out of the total plants documented from the present work, it was recorded that 73 species belong to dicots, 12 are monocots, 1 fern and 3 edible mushrooms namely *Auricularia delicate* (Fr.) P. Henn., *Lentinula edodes* (Berk.) Pegler and *Schizophyllum commune* Fr. are also popularly consumed by both the communities in the district. The families Rosaceae, Zingiberaceae and Polygonaceae had the highest number of edible plants and fruits each recorded with 11, 5 and 4 species respectively.

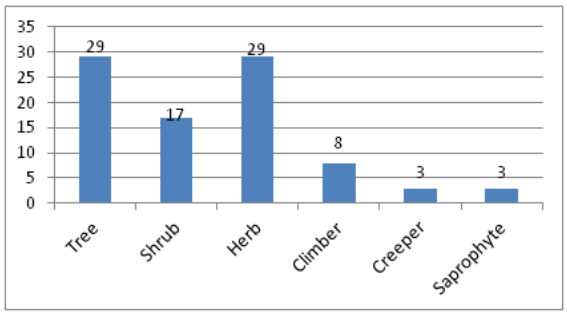

Fig. 7. Habit characteristic of different species of wild edible plant and fruit.

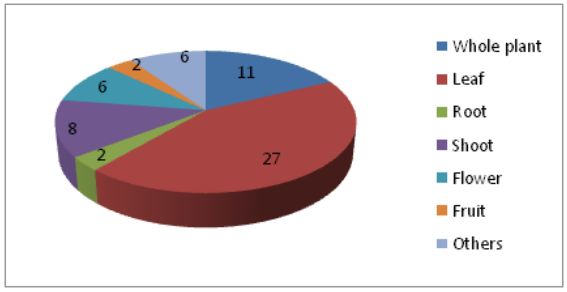

Fig. 8. Distribution of edible parts of the total species documented.

New records from the state

Although most of the edible species recorded in the present study have been reported earlier by other workers from the state (Singh and Singh, 1985; Singh *et al.*, 1988; Elangbam *et al.*, 1989; Devi, 2000; Elangbam, 2002; Devi *et al.*, 2010) however, about 23 species (42.59%) of edible plants and 10 species (28.57%) of edible fruits (mark in*, table 1 and 2) are a new record which has not been reported from the state. Further, similar reports on the use of most of these edible plants recorded in the present investigations are also reported by other workers from different tribal communities in other parts of northeast India (Sundriyal *et al.*, 2004; Gajurel *et al.*, 2006; Angami *et al.*, 2006; Sawian *et al.*, 2007; Kayang 2007).

Growth forms, edible parts and availability status

The growth forms of the plant species include tree, shrub, herb, climber, creeper and saprophytes. Herbs and trees make up the highest proportion of the edible species comprising 29 each (32.58%) from a total of 89 different species (Fig.7). Within the edible parts of the wild food plant, leaves with 27 species (30.34%) follow by whole plant and shoot each with 8 species (8.98%) were the plant parts most widely used (Fig. 8). These edible plant parts were collected from wild and consumed in different times of the year. Also from a total of 89 wild edible plants and fruits recorded, 23 species (25.84%) have been cited to be used as medicinal food remedy. Most of the medicinal food plants are herbs follow by shrubs. List of all the recorded plant species and its uses are presented on table (1 and 2). Further, assessment of the overall local availability status of 22 different species of selected wild edible food plants (11 species of edible plants and 11 species of edible fruits) showed that the maximum number of 12 species (54.55%) is graded to the category of not so common, follow by common and rare or scanty category with 4 species each. The remaining two species namely *Centella asiatica* Linn. and *Rhus semialata* Murry. DC. belongs to the category of abundant (table 3 & 4).

Discussions and conclusion

World over, the tribal population still stores a vast knowledge on utilization of local plants as food material and other specific uses (Sundriyal *et al.*, 1998). The Nagas and the Kukis are also not an exception in storing this rich traditional knowledge

on plant use. These two tribal communities formed the dominant groups that inhabit the district. They possessed rich valuable reservoirs of traditional knowledge on plants used largely due to the prevalence of rich diversity of vegetations as the study area falls in the Indo-Burma global biodiversity hotspot (Myers *et al*., 2000; Mittermeier *et al*., 2004). Consumption of wild food plant resources formed not only an important part of the culture and tradition of these two communities but also contributes a significant amount to the diet and economy of the local people. A wide range of wild plant species are used by local people as green leafy vegetables, roots, shoots, flowers and fruits. Also many of these wild edible plant species are found to be sold in the local markets particularly by poor and economically marginalised families, thereby generating a supplementary income to their household economy. Moreover, a fairly good number of these edible plants are also reported to have both therapeutic and dietary functions and hence are used as medicinal food remedy. But the nutritional values and toxic side effects of these wild edible bio-resources of the region have not yet been investigated. Therefore, some of the recorded wild edible plants may serve as baseline data for future studies on nutritional values and possible side effects. It will also be helpful to identify and prioritise plants that may improve nutritional values and increase dietary diversity. Some of these wild edible plants may have the potential to be valuable food sources if brought into cultivation and could be part of a strategy to be used as sources of supplementary food.

Table 1. List of wild edible plants reported by the Nagas and Kukis from Senapati district, Manipur.

Vernacular name			Botanical name	Family	Habit	Voucher No.	Phenology and fruiting period	Edible part	Nature of use	Locally used as medicine/ new record (Yes/*)
Naga		Kuki								
Mao	Poumei									
Kashapro	Shiraprou	Aigidon	*Alpinia nigra* (Gaertn) Burth.	Zingiberaceae	Herb	113-MPK	May-August	Whole plant	Tender shoot and leaves are eaten as cook vegetable	
Tobophavu	Dalekhao-Khao	Banglache	*Amaranthus viridis* Linn.	Amaranthaceae	Herb	021-MPK	July-October	Leaves	Leaves are eaten cook as vegetable	
Khollomotsii	NR	NR	*Aneilema protensum* Wall	Commelanaceae	Herb	179-M	July-September	Root	Root stock eaten as cooked vegetable	*
Chiteba	Teiba	Leivah	*Arundinaria callosa* Munro.	Bambusoideae	Shrub	128-K	July-September	Tender shoot	Eaten as cooked vegetable	
Ozenabi	Yaonupa	Pachop	*Auricularia delicata* (Fr.) P. Henn.	Auriculariaceae	Saprophyte	127-MPK	April-July	Whole plant	Eaten as cooked vegetable either in fresh or dried forms	
Levosii	Shivapa	Vaibeh	*Bauhinia purpurea* Linn.	Caesalpiniaceae	Tree	118-MPK	March-September	Flower	Eaten as cooked vegetable	Yes/*
Makhrabi	NR	Koltheidon	*Begonia picta* Sm.	Begoniaceae	Herb	025-M	July-September	Leaf petiole	The skin is peeled off and eaten raw	*
Kohrehrechu	NR	Buhtomkolkai	*Bryonopsis heterophylla* (Lour.) Cogn.	Cucurbitaceae	Climber	039-MK	May-September	Tender leaves	Eaten as cooked vegetable	*
Tosanini vu	NR	NR	*Cardamine hirsuta* Linn.	Brassicaceae	Herb	019-M	July-September	Whole plant	Eaten as cooked vegetable	*
Koreio	Reivu	Changkongcha	*Centella asiatica* (Linn.) Urban	Apiaceae	Creeper	133-MPK	March-June	Whole plant	Eaten as cooked vegetable or chopped into pieces for making Sinju or chutney	Yes
Oruo	Haba-vu	Houche	*Chenopodium album* Linn.	Chenopodiaceae	Herb	126-MPK	June-September	Tender leaves	Eaten as cooked vegetable	
Chiteiba	Teiba	Leivah or Vitou	*Chimonobambusa callosa* (Munro) Nakai	Bambusoideae	Shrub	144-MP		Tender shoot	Eaten as cooked vegetable	*
Kokheisii	Siisitou	Thingthal	*Cinnamomum tamala* Fr. Nees.	Lauraceae	Tree	125-MPK		Leaves	Added to curry to give more flavour and test	
Pejii-o	Piduvu	Anphui	*Clerodendrum*	Verbenaceae	Shrub	161-	August-November	Tender leaves		Yes

			colebrookianum Walp.			MPK			Eaten as cooked vegetable	
Letikorei	NR	NR	*Crawfurdia fasciculata* Wall.	Gentianaceae	Climber	173-M	January-April	Leaves and flowers	Cook along with rice and eaten	*
Kodziiapa	Kuturapa	NR	*Curcuma angustifolia* Roxb.	Zingiberaceae	Herb	170-MPK	April-May	Inflorescences	Eaten as cook vegetable	
Kophrehro	NR	NR	*Dioscorea pentaphylla* Linn.	Dioscoreaceae	Climber	026-M	August-November	Bulbils	Roasted bulbils is taken	*
Pfochouchojii	Machuovu	Gamchekoh	*Diplazium esculentum* (Retz.) Sw.	Athyriaceae	Herb	106-MPK	Almost round the year	Leaves	Eaten as cook vegetable	
Edeio	Dai-vu	Solunche	*Elatostema lineolatum* Wight	Urticaceae	Herb	140-MPK	June-October	Leaves	Eaten as cook vegetable	
Burmadonia	Padaiku	NR	*Eryngium foetidum* Linn.	Apiaceae	Herb	192-MPK	June-September	Whole plant	Added to meat curry to give more flavour and test. Also used for making chutney	
Moriisii	NR	Shizou	*Eurya acuminate* DC.	Theaceae	Small tree	106-MK	August-November	Leaves	Eaten as cook vegetable	
Rapro	Raprou	NR	*Globba clarkei* Baker.	Zingiberaceae	Herb	16-MP	July-October	Tender shoot	Eaten as cook vegetable or boiled with rice and eaten	*
Shekra bu	NR	NR	*Hedychium coronarium* Koening	Zingiberaceae	Herb	189-MPK	July-October	Tender shoot	Tender shoot eaten as cook vegetable	
Eshakama	Tuningko	Aithanglou	*Houttuynia cordata* Thumb.	Saururaceae	Herb	035-MPK	July-October	Whole plant	Eaten as cooked vegetable or used for making chutney	
Eshou-vu	Shou-vu	NR	*Impatiens annulifera* Linn.	Balsaminaceae	Herb	018-MP	July-September	Leaves	Boiled with rice and eaten as food	*
Papinii	Veipa	Cipa	*Lentinula edodes* (Berk.) Pegler	Polyporaceae	Saprophyte	141-MPK	February-April	Whole plant	Whole plant body, fresh or dried form is taken as vegetable food	
Shingainisii	NR	Thing-Thing	*Litsea citrata* Bl.	Lauraceae	Tree	064-MPK	November-June	Fruit	Roasted fruits are use in making chutney	Yes
Kohra-o	Hra-vu	NR	*Maesa chisia* (non D. Don) Clarke	Myrsinaceae	Shrub	183-MP	June-October	Tender leaves	Tender leaves is boiled with rice and taken	*
Heimio	Levuyemarai	Anthrulhem	*Momordica dioica* Roxb. ex Willd.	Cucurbitaceae	Climber	024-M	June-September	Tender leaves	Tender fruits and leaves is boiled with rice and taken	*
Huhreshiibu	NR	Thingteimi	*Morus alba* Linn.	Moraceae	Small tree	040-M	March-July	Tender leaves	Leaves are eaten as boiled vegetable	*
Ovii	Vii	Changlou	*Musa sapientum* Linn.	Musaceae	Herb	136-MPK		Tender shoot and pseudostem	Boiled and eaten as vegetable and also use in making chutney	
NR	Thrai-vu	Andum	*Oenanthe javanica* (Blume) DC.	Umbelliferae	Herb	142-PK	July-October	Whole plant	Fresh plant is chops into pieces for making Sinju with chilli powder	
Ekhrou	Tru-vu	Andum	*Oenanthe stolonifera* Wall.	Umbelliferae	Herb	009-MP	July-September	Whole plant	Boiled and eaten as vegetable	Yes
Katheimeidokre	Phasii	Bahlong	*Oroxylum indicum* (Linn.) Vent.	Bignoniaceae	Tree	066-K	June-January	Tender pods	Slices into pieces for making chutney	Yes

Pighiirai/Borei	Shiveirei	Guidup	*Paederia foetida* Linn.	Rubiaceae	Climber	154-MPK	June-October	Leaves	Eaten as cooked vegetable	Yes/*
Totsiipa	Heyavu	Kolhou	*Phlogacanthus curviflorus* Nees.	Acanthaceae	Shrub	056-MPK	February-May	Flowers	Boiled with rice and eaten as cooked vegetable	Yes
Dziipao	Pah-vu	Vobilche	*Plantago erosa* Wall.	Plantaginaceae	Herb	137-MPK	June-September	Whole plant	Boiled and eaten as vegetable	
Phiziio	NR	NR	*Pogostemon elsholtzoides* Benth	Lamiaceae	Shrub	185-MP	November-February	Tender leaves	Boiled with rice and eaten as cooked vegetable	*
Obiovu	Bai-vu	Theidon	*Polygonum chinense* Linn.	Polygonacea e	Herb	178-MPK	July-October	Tender shoot and leaves	Boiled with rice and eaten as cooked vegetable	
Evau	Vah-vu	Anbongalen pa	*Polygonum molle* D. Don	Polygonacea e	Herb	151-MPK	August-February	Tender shoot and leaves	Boiled along with dried meat or fish and taken	
NR	NR	Lingthuh	*Polygonum perfoliatum* Linn.	Polygonacea e	Climber	170-K	June-November	Leaves	Boiled with rice and eaten as cooked vegetable	*
Nobito	Houpei-vu	NR	*Polygonum runcinatum* Ham.	Polygonacea e	Herb	182-MP	June-September	Leaves	Boiled along with dried meat or fish and taken	*
Othukoshi	NR	NR	*Ranunculus sceleratus* Linn.	Ranunculace ae	Herb	006-M	April-October	Root stock	Boiled with rice and eaten as cooked vegetable	Yes/*
Lidainipa	Daipa	Ngeisoh	*Rhododendron arboreum* Sm. Clarke	Ericaceae	Tree	044-MP	March-June	Flowers	Flower petals are eaten raw	Yes
Emoshi	Moushi	Khongma	*Rhus semialata* Murry. DC.	Anacardiace ae	Small tree	023-K	August-December	Tender leaves	Boiled with rice and eaten as cooked vegetable	Yes/*
Kosabio	Theshuvi	Chenkup	*Rhynchotechum ellipticum* (Wall. ex Dietr.) DC.	Gesneriacea e	Herb	175-MPK	June-September	Leaves	Boiled with rice and eaten as cooked vegetable	
Zhokhaikhaima	Khaimasii	Khengthing	*Schima wallichii* (DC.) Korth.	Theaceae	Tree	174-K	February-April	Tender leaves	Boiled with rice and eaten as cooked vegetable	*
	Pa-nghii	Pashi	*Schizophyllum commune* Fr.	Schizophylla ceae	Saprophyte	171-MPK	September-April	Whole plant	Boiled along with dried meat or fish and taken	
Khekhra	Roushu	Kangvah	*Smilax ovalifolia* Roxb.	Smilaxcacea e	Climber	108-MPK		Tender shoot	Half cooked and prepared chutney with dried fish	*
Chiivio	Kuvi-vu	Ansha	*Spilanthes paniculata* Wall. ex DC.	Compositae	Herb	007-MPK	June-October	Leaves	Eaten as cooked vegetable along with dried meat	Yes/*
Ohuphirapro	Humara-soupru	Anjou	*Solanum nigrum* Linn.	Solanaceae	Herb	027-MPK	August-December	Leaves	Eaten as boiled vegetable or along with rice and taken	
Ehiishikhokha	Rakhokha	Khamchok-raling	*Solanum torvum* Swartz.	Solanaceae	Shrub	156-MPK	May-October	Fruit	Roasted fruits are use for making chutney	
Eleo-vu	Loe-vu	Anthurul	*Trichodesma nudiflora* Hinse	Cucurbitace ae	Climber	017-MPK	July-September	Leave	Eaten as boiled vegetable or along with rice and taken as food	
Eveikoreio	NR	NR	*Viola distans* Wall.	Violaceae	Herb	002-M	March-July	Tender leaves	Boiled with rice and eaten as cooked vegetable	*
Houkhusii	NR	Ahthiphung	*Wendlandia glabra* DC	Rubiaceae	Small tree	114-MPK	February-April	Tender inflorescences	Cooked inflorescences is chopped into pieces for making chutney with dried fish	

Khemomou	Khaongashi	Lingnamse	*Zanthoxylum acanthopodium* DC.	Rutaceae	Shrub	116-MP	March-July	Tender leaves and fruit	Fresh or dried fruits are use for making chutney along with dried fish or meat. Leaves eaten as cooked vegetable along with rice	
Oramomoshi	NR	NR	*Zanthoxylum armatum*	Rutaceae	Shrub	123-MP	May-October	Fruit	Dried or powder fruits are used for making chutney with dried fish or meat	Yes

Table 2. List of wild edible fruit plants reported by the Nagas and Kukis from Senapati district of Manipur.

Naga		Kuki	Botanical name	Family	Habit	Voucher No.	Phenology and fruiting period	Nature of use	Locally used as medicine (Yes/No)
Mao	Poumei								
Leribu	Reivii	Aigeju	*Amomum dealbatum* Roxb	Zingiberaceae	Herb	180-MPK	May-September	Eaten raw	
NR	NR	Heipan	*Baccaurea sapida* (Roxb.) Muell.-Arg.	Euphorbiaceae	Tree	199-K	April-July	Ripe fruit eaten raw	
Kohre-hrechu	NR	Buhtomkolkai	*Bryonopsis heterophylla* (Lour.) Cogn.	Cucurbitaceae	Climber	039-MK	May-September	Ripe fruit eaten raw	*
Okhrashi	Khrashi	Ting-ga	*Calamus floribundus* Griff.	Arecaceae	Shrub	115-MPK	August-March	Ripe fruit eaten raw	
Thadziisii	Mabashi	Sega	*Castanopsis hystrix* A. DC.	Fagaceae	Tree	150-MP	June-November	Nut is roasted and eaten	
Madeilo	Kowlousii	Lingsi	*Debregeasia longifolia* (Burm.f.) Wedd.	Urticaceae	Small tree	102-M	June-October	Ripe fruit eaten raw	Yes/*
Shiteishi	Siiteishi	NR	*Diospyros lanceoefolia* Roxb.	Ebenaceae	Tree	147-MP	June-December	Ripe fruit eaten raw	
Khradashi	Khradashi	Theipan	*Diospyros kaki* Linn.	Ebenaceae	Tree	121-MP	April-November	Ripe fruit eaten raw	*
Chipfoshi	Phoshi	Theithup	*Docynia indica* Dcne.	Rosaceae	Tree	135-MPK	March-November	Ripe fruit eaten raw and for making pickles	
Likhodaphrushi	NR	NR	*Duchesnea indica* (And.) Focke	Rosaceae	Creeper	169-MP	April-September	Ripe fruit eaten raw	
Shikeshi	Kieshi	Zonmot	*Elaeocarpus floribundus* Bl.	Elaeocarpaceae	Tree	073-MPK	March-December	Ripe fruit eaten raw	Yes
Chishoshikaji	Shoushi-ajii	Buiehthei	*Elaeagnus latifolia* Linn.	Elaeagnaceae	Shrub	193-MPK	April-September	Ripe fruit eaten raw	
Chishoshikati	Shoushi	Buiehthei	*Elaeagnus pyriformis* Hk. f.	Elaeagnaceae	Shrub	177-MP	April-July	Ripe fruit eaten raw and for making jams	
Chohroshi	Rihaushi	Sohlu	*Emblica officinalis* Gartn.	Euphorbiaceae	Small tree	080-MPK	May-December	Fruit is eaten raw and for making jams or pickles	Yes
Chodoshi	Doshi	Theichang	*Ficus auriculata* Lour.	Moraceae	Tree	082-MPK	May-October	Ripe fruit eaten raw and making jams	
Ovachidoshi	Radoshi	NR	*Ficus hispida* Linn.	Moraceae	Tree	191-MP		Fruit is eaten raw	*
Moboshi	Maboushi	NR	*Ficus roxburghii* Wall.	Moraceae	Tree	181-MP	July-October	Ripe fruit eaten raw	
Likhodaphroshi	NR	NR	*Fragaria indica* Andr.	Rosaceae	Creeper	190-MP	April-August	Ripe fruit eaten raw	
Okhusii	Khushi	Makha	*Juglans regia* Linn.	Juglandaceae	Tree	162-MPK	May-November	Lobed cotyledons are eaten raw	Yes
Shilasii	Lashi	Theikhomchom	*Melia birmanica* Kurz.	Meliaceae	Tree	146-MPK	March-December	Ripe fruit eaten raw	*
Kheloshi	Makaloshi	Thingteimi	*Morus alba* Linn.	Moraceae	Small tree	040-M	March-July	Ripe fruit eaten raw	
Piyeh-shi	Zheashi	Makingat	*Myrica nagi* (Thunb.) Hook.	Myricaceae	Tree	077-MP	February-May	Ripe fruit eaten raw	Yes

Ovopishu	NR	NR	*Ophiopogon wallichianus* Hk. f.	Haemodoriaceae	Herb	124-M	May-September	Ripe fruit eaten raw	*
Chaghashi	Ghashi	Lusu	*Phoenix humilis* Royle.	Arecaceae	Shrub	163-MPK	July-November	Ripe fruit cotyledon is eaten raw	
Korelashii	Khaokhashi	Buhkol	*Physalis peruviane* Linn.	Solanaceae	Herb	041-MPK	April-October	Ripe fruit eaten raw	Yes/*
Mokhoshi	Ngourashi	NR	*Prunus cornuta* (Wallich ex Royle) Steud.	Rosaceae	Tree	149-MP	March-October	Ripe fruit eaten raw	*
Chitishi	Taoshi	Bulthing	*Pyrus pashia* D. Don	Rosaceaae	Tree	25-MP	February-November	Ripe fruit eaten raw	
Pfovashi	Vashi	NR	*Prunus cerasoides* D. Don.	Rosaceae	Tree	185-MP	March-August	Ripe fruit eaten raw	
Mokhoshi	Khashi	NR	*Prunus nepaulensis* (Ser.) Steud.	Rosaceae	Tree	148-M	March-October	Ripe fruit eaten raw	
Mikriashi	Krishi	Vaisohlu	*Prunus persiaca* (Linn.)Batsch	Rosaceae	Small tree	049-MPK	February-August	Ripe fruit eaten raw	Yes
Omosii	Moushi	Khongma	*Rhus semialata* Murry. DC.	Anacardiaceae	Small tree	023-MPK	August-December	Ripe fruit boiled with sugar and drink as herbal tea	Yes
Shiinghoshi	Ngushi	Theimi	*Rubus ellipticus* Smith	Rosaceae	Shrub	034-MPK	February-May	Ripe fruit eaten raw	Yes
Shiingukateishi	Chomoushushi	Theimivom	*Rubus lasiocarpus* Smith.	Rosaceae	Shrub	033-MPK	May-September	Ripe fruit eaten raw	Yes
Shiinghokoghoshi	Kohamoushushi	Naichin	*Rubus rugosus* Smith	Rosaceae	Shrub	032-MPK	May-September	Ripe fruit eaten raw	*
Shikriishi	Khuashi	NR	*Viburnum foetidum* Wall.	Caprifoliaceae	Shrub	050-M	May-September	Ripe fruit eaten raw	*

N.B: NR = Not recorded due to lacks of authentic local name.

Table 3. Assessment of local availability status of selected wild edible plants according to informants or collectors perception.

Village	Name of the species selected										
	Centella asiatica Linn.	*Chimonobambusa callosa* (Munro) Nakai	*Curcuma angustifolia* Roxb.	*Elatostema sessile* Forst.	*Houttuynia cordata* Thumb.	*Impatiens annulifera* Linn.	*Musa sapientum* Linn.	*Oenanthe stolonifera* Wall.	*Rhychotechum ellipticum* (Wall. ex Dietr.) DC.	*Solanum torvum* Sw.	*Trichodesma nudiflora* Hinse
Changloubung	Co	Nr	Nc	Nr	Nc	Nr	Nc	Nc	Ra	Nc	Ra
Chowainu	Ab	Nr	Co	Nr	Co	Nc	Nc	Co	Nr	Nc	Nc
Emeifiithumei	Ab	Ab	Co	Co	Ab	Co	Co	Ab	Nc	Nc	Co
Karong	Co	Nr	Co	Nc	Ra	Ra	Ra	Ra	Nc	Nc	Nr
Kayinu	Ab	Co	Nc	Co	Ab	Co	Co	Ab	Nr	Ra	Co
Liyai Khullen	Ab	Ab	Nc	Ab	Ab	Co	Co	Ab	Co	Nc	Co
Maopondung	Ab	Ab	Co	Co	Ab	Co	Co	Ab	Nc	Nc	Co
Motbung	Co	Nr	Co	Nr	Nc	Nr	Ra	Ra	Nr	Nc	Nr
Paomata Centre	Ab	Co	Co	Nc	Co	Nc	Co	Co	Nc	Nc	Co
Phaijang	Co	Nc	Co	Nr	Nc	Nc	Nc	Nc	Nc	Nc	Nc
Phoibung	Co	Nc	Co	Nc	Co	Nc	Co	Nc	Co	Nc	Co
Rikhumei Taphou	Co	Nr	Nc	Nr	Nc	Nr	Nc	Ra	Nr	Nc	Ra
Upper Khabung	Co	Nc	Ab	Nc	Nc	Nc	Nc	Co	Co	Nc	Nc
Status	**Ab**	**Nc**	**Co**	**Nc**	**Co**	**Nc**	**Nc**	**Co**	**Nc**	**Nc**	**Nc**

NB: Ab = Abundant, Co = Common, Nc = Not so common, Ra = Rare or scanty, Nr = Not reported.

Table 4. Assessment of local availability status of selected wild edible fruit plants according to informants or collectors perception.

Village	Name of the species selected										
	Baccuria sapida (Roxb.) Muell.	*Castanopsis tribuloides* A. DC.	*Docynia indica* Dcne.	*Elaeocarpus floribundus* Bl.	*Emblica officinalis* Gartn.	*Ficus auriculata* Lour.	*Juglans regia* Linn.	*Melia birmanica Kurz.*	*Prunus nepaulensis* (Ser.) Steud.	*Prunus persica* (Linn.) Batsch	*Rhus semialata* Murry. DC.
Changloubung	Ra	Nr	Ra	Nr	Nc	Nc	Ra	Nr	Nr	Nc	Co
Chowainu	Nr	Co	Co	Ra	Co	Co	Ra	Nc	Nr	Co	Co
Emeifiithumei	Nr	Nc	Co	Ra	Nc	Nc	Ra	Nc	Nr	Co	Ab
Karong	Nr	Nc	Ra	Nr	Co	Co	Ra	Nr	Nr	Nc	Co
Kayinu	Nr	Co	Co	Ra	Nr	Ra	Nr	Nc	Nr	Co	Co
Liyai Khullen	Nr	Nc	Nc	Ra	Co	Nc	Nr	Nc	Nc	Co	Ab
Maopondung	Nr	Nc	Co	Ra	Nc	Nc	Ra	Nc	Nr	Co	Ab
Motbung	Nr	Nr	Nr	Nr	Nc	Nc	Nc	Nr	Nr	Nc	Co
Paomata Centre	Nr	Co	Co	Nc	Co	Co	Ra	Nc	Nc	Co	Co
Phaijang	Ra	Ra	Nr	Nr	Co	Co	Ra	Ra	Nr	Nc	Co
Phoibung	Nc	Nc	Nc	Nr	Co	Co	Nc	Ra	Nr	Nc	Co
Rikhumei Taphou	Nr	Nr	Ra	Nr	Nc	Nc	Nr	Nr	Nr	Nc	Co
Upper Khabung	Ra	Co	Nc	Ra	Co	Co	Ra	Nc	Nc	Nc	Co
Status	**Ra**	**Nc**	**Nc**	**Ra**	**Co**	**Nc**	**Ra**	**Nc**	**Ra**	**Nc**	**Ab**

NB: Ab = Abundant, Co = Common, Nc = Not so common, Ra = Rare or scanty, Nr = Not reported.

FM = Flora of Manipur; FFM = Forest Flora of Meghalaya; BSI = Botanical Survey of India; M = Mao; P = Poumei; K = Kuki.

The present study further revealed that many of these edible plants are under tremendous pressure from various anthropogenic activities and lack of sustainable harvesting practices such as agricultural land expansion, practise of traditional shifting cultivation, forest fires and excessive extraction of some plants both for household consumption or sale in the local markets for income generation. Therefore, proper and organized documentation of local plants used, identification of potential species for prioritization of conservation through sustainable management so that the resources and knowledge can be preserved, managed and utilized. In other words, conservation and management of wild edible plants and fruits will help to enhance and maintain the regional biodiversity with minimal adverse impact on the biodiversity.

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