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Documentation of wild edible fruits (WEFs) from mon District of Nagaland, India

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Abstract

Mon District of Nagaland, India has tremendous potential in providing valuable Wild edible Fruits (WEFs) and very few works has been done on it. This paper deals with documentation of 65 species of WEFs belonging to 36 families and 51 genera. An attempt has been made to record the use of fruits and its treatment in various ailments. Besides medicinal values it also has high market values.

Keywords: Wild edible fruits, mon, Ethno medicine

1. Introduction

Wild edible fruits are highly valued fruit crops for their unique flavors, textures, and colors. In recent years, wild edible fruits have been shown to provide significant health benefits because of their high antioxidant content, vitamins, minerals and fibers (Saka J *et al.* 1994) ^[11]. Some WEFs also possess medicinal properties (Deshmuk & Shinde 2010) ^[5]. In addition to fresh consumption, wild edibles fruits are widely used in beverages, ice cream, yogurt, jams, jellies and many other food products (Ercisli & Sagbas 2017) ^[6]. Feeding undernourished people does not only depend upon increasing productivity of domesticated crops but also using underutilized Wild edible Plants WEPs (Farooq and Azam 2002) ^[7]. A number of WEFs are used by rural and tribal people and significantly contribute to their livelihood (Ajay & Pratap 2012) ^[1]. The majority of tribal communities in India live nearby forest and depend on wild products for food and energy (Bahugana 2000, Mohapatra & Sahoo 2010, Mahapatra & Mitvhell 1997) ^[2, 10, 9].

In India, there are around 800 species of wild edible crops where about 300 species are used by the people of North-East India; this region is the reservoir of WEFs. (Hazarika & Pongener 2017). North-Eastern region comprises of eight states *viz.* Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura which has a total geographical area of 262180km². Northeast region has been identified as one of the biodiversity hotspot in India. In this region, there are approximately about 225 tribes of people living, out of 450 tribes in India (Chatterjee *et al.* 2006) ^[3]. In North-East India, Nagaland is one among the richest biodiversity state and has forest cover of 75.31% per India State Forest Report 2019. Mon is one of the biggest districts in Nagaland and as per India state forest report 2017, Mon has a forest cover of about 67.58%. There has been very few documentation on wild edible fruits from Mon district as the traditional knowledge is passed down to generation verbally by the ancestors and thus, information regarding various valuable ethno-botanical plants is forgotten. Keeping this information in mind the present study was done to document edible fruits with ethno-medicinal value from Mon district in Nagaland.

2. Materials and Methods

2.1 Study site

The study was done in two areas i.e. Tizit area and Longching area of Mon district. Tizit area lies on the coordinates 26°54'11"N 95°4'57"E and is bordered with Arunachal Pradesh on Northeast side, Sivasagar district of Assam in Northwest, and on the East with Myanmar. Longching area lies on the coordinates 26°31'4"N 94°56'5"E and is bordered with Myanmar on the East, Longleng district on the West. Mon district lies at the altitude of 897.64 meters above sea level.

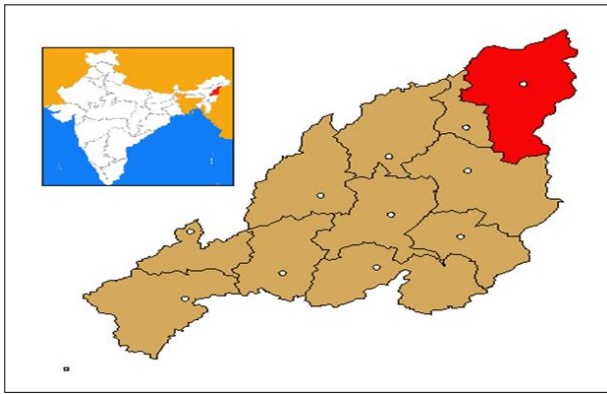


Fig 1: Location of Mon District, Nagaland, India

2.2 Method

Field trips were done from the month of November 2019 to September 2020 and were able to visit 5 villages in Tizit area viz. Nangtan, Tizit Village, Jaboka, Shangsa, Yannu and another 5 villages Angphang, Changlang, Jakphang, Longching and Angjangyang from Longching area. Some information was collected through interviews with the villagers and was documented.

3. Results and Discussion

A total of 65 species of wild edible fruits (WEFs) belonging to 36 families and 51 genera were recorded. List of Wild Edible Fruits Botanical names, Local names, Family, Habit and its Uses are tabulated and arranged alphabetically (Table 1).

Table 1: List of wild edible fruits found in Mon district

Botanical Name	Local name	Family	Habit	Uses
<i>Amomum subulatum</i> Roxb.	Ilachi (Common) Cardamom(Eng)	Zingiberaceae	Herb	Fruits are used to treat Dyspnoea, thirst, nausea, itching, inflammations of the eyelids.
<i>Areca catechu</i> L.	Kovei(Konyak) Tamul (Nagamese)	Arecaceae	Tree	Pericarp is chewed raw to treat flatulence. Nuts are consumed against dysentery and also used to treat malaria.
<i>Artocarpus heterophyllus</i> Lamk.	Peyong(Konyak) Jackfruit (Eng)	Moraceae	Tree	Ripe fruits consumed for constipation.
<i>Artocarpus chaplasha</i> Roxb.	Kheangkhak-peyong (Konyak)	Moraceae	Tree	Fruits used for constipation.
<i>Artocarpus lakoocha</i> Roxb.	Monkey fruit(Eng) Hoipahsho Ulikh (Konyak)	Moraceae	Tree	Fruits are edible.
<i>Averrhoa carambola</i> L.	Starfruit(Eng) Etang-peluk/Pansi-latlo (Konyak)	Oxalidaceae	Tree	Fruits are crushed and the extracted juice is drunk against jaundice.
<i>Baccaurea ramiflora</i> Lour.	Burmese grape (Common) awyu (Konyak)	Meliaceae	Tree	Fruits used to treat skin diseases and its juice is used for the treatment of arthritis.
<i>Calamus erectus</i> Roxb.	Cane(Common) Veilikh (Konyak)	Arecaceae	Shrub	Ripe fruits are eaten raw and powdered seed used for indigestion and gastrointestinal problems.
<i>Calamus tenuis</i> Roxb.	Cane(Common) Veinyu likh (Konyak)	Arecaceae	Shrub	Fruits are edible.
<i>Canarium strictum</i> Roxb.	Raal(Common) Kong likh (Konyak)	Burseraceae	Tree	Fruits used for inflammatory, antibacterial, antifungal and anti-diabetic.
<i>Caryota urens</i>	Jaggary palm(Common) Loklikh (Konyak)	Arecaceae	Tree	Powdered nuts are used as a tonic to strengthen vigor and vitality.
<i>Castanopsis tribuloides</i> (Smith) A. DC	Chinkapin(Common) Lahkhao likh(Konyak)	Fagaceae	Tree	Seeds are eaten raw or cooked.
<i>Carallia brachiata</i> (Lour.) Merr.	Freshwater-mangrove (Common) yongkeih-luk(Konyak)	Rhizophoraceae	Tree	Ripe fruits are eaten raw.
<i>Citrus grandis</i> L.	Pomelo(Eng) Tanyen-nyennyu (Konyak)	Rutaceae	Tree	Fruits juice used against jaundice.
<i>Citrus medica</i> L.	Citron(Eng) Maikoh-tanyen (Konyak)	Rutaceae	Tree	Fruits juice used for kidney problems and urinary complains.
<i>Citrus limon</i> L.	Lemon(Common) Neimpu-tahnyei (Konyak)	Rutaceae	Tree	Fruits juice used for preventing gastrointestinal problems, and also to improve appetite.
<i>Citrus indica</i> L.	Wild Orange(Common) Chong chengpe(Konyak)	Rutaceae	Tree	Fruit juice helps in gaining appetite,
<i>Choerospondias axillaris</i> (Roxb.) B.L Burt & A.W	Hill-hog Plum(Eng) Kosheang likh(Konyak)	Anacardiaceae	Tree	Fruit is used medicinally to promote the flow of blood.
<i>Cordia dichotoma</i> G.Forst	Glue berry(Eng) Chumpu luk (Konyak)	Boraginaceae	Tree	Fruits used as fodder, Medicinal properties
<i>Cucumis hystrix</i> Chakrav.	Cucumber(Eng) Aoha maikoh (Konyak)	Cucurbitaceae	Creepers	Fruits eaten either raw or cooked.
<i>Debregeasia longifolia</i> Wedd	Orange wild rhea(Eng) Visha likh(Konyak)	Urticaceae	Shrub	Fruits help in Digestion.
<i>Dillenia indica</i> Linn.	Elephant apple(eng) Makummashi(ao) Nyeishah likh (Konyak)	Dilleniaceae	Tree	Fruit are used as tonic, used in chest pain, cholera, dysentery and fever.
<i>Docynia indica</i> (Wall.) Decne	Wild apple(Eng) Shangpai likh (Konyak)	Rosaceae	Tree	Fruits used to treat digestive problems.
<i>Elaeagnus conferta</i> Roxb	Wild olive(Eng) Phang likh (Konyak)	Elaeagnaceae	Shrub	Fruits are used to treat Sores and ulcer.
<i>Emblica officinalis</i> Gaertn	Goose berry(Eng) Phangluk/Phang (Konyak)	Euphorbiaceae	Tree	Dry fruit is used for treating hemorrhage, and diarrhea.
<i>Ficus auriculata</i> Lour	Fig(Common) Phuk likh (Konyak)	Moraceae	Tree	Fruits are eaten raw.

<i>Ficus hispida</i> L.	Fig(Common) Poksok (Ao) Khab-likh (Konyak)	Moraceae	Tree	Fruits are good for liver.
<i>Ficus semicordata</i> Buch.-Ham ex J.E. Smith	Fig(Common) Koro nem (Ao) Sathalikh(Konyak)	Moraceae	Tree	Fruits are eaten raw.
<i>Fragaria indica</i> L.	Wild strawberry (Eng), Bhuin (Hindi)	Rosaceae	Herb	Fruit is good for liver and used as tonic.
<i>Garcinia pedunculata</i> G. Don.	Bor Thekera(Assamese) Bhunk (Konyak)	Clusiaceae	Tree	Fruit extract are used for cardiac problems and as diuretic.
<i>Gynocardia odorata</i>	Chhal mogra(Common) Baikhah likh(Konyak)	Achariaceae	Tree	Medicinal potential.
<i>Hodgsonia macrocarpa</i> (Bl.) Cogn.	Pig Fruit(Common) Bai (Konyak)	Cucurbitaceae	Climber	Fruit pulp used as skin infections.
<i>Juglans regia</i> L.	Walnut (Eng), Vuhlikh(Konyak)	Juglandaceae	Tree	Fruits are edible.
<i>Livistona jenkinsiana</i> Griff	Fan palm (Eng) Luluk(Konyak)	Arecaceae	Tree	Fruits are consumed raw to prevent stomach ailments like indigestion and gastritis problems.
<i>Maesa indica</i> (Roxb.) A. DC.	Wild berry (Eng) Penyakha (Konyak)	Primulaceae	Shrub	Fruits are eaten raw.
<i>Mangifera andamanica</i> L.	Mango(Common), Aam (Hindi), Aotoi(Konyak)	Anacardiaceae	Tree	Ripe fruits are edible.
<i>Morus alba</i> L.	Mulberry (Eng) Lihlikh (Konyak)	Moraceae	Tree	Fruits are edible.
<i>Morus nigra</i> Linn	Blackberry (Eng) Lihlikh (Konyak)	Moraceae	Tree	Fruits have tonic effect on kidney.
<i>Musa balbisiana</i> Colla.	Wild banana (Eng), Gnu-cho (Konyak)	Musaceae	Herb	Fruits are eaten raw or cooked..
<i>Myrica esculenta</i> ex D. Don	Bayberry (Eng) Yin (Konyak)	Myricaceae	Tree	Fruits are consumed fresh for indigestion.
<i>Nephelium lappaceum</i>	Rambutan (Eng) Yalikh (Konyak)	Sapindaceae	Tree	Green fruit is said to be astringent, stomachache, and anthelmintic.
<i>Oxalis corniculata</i> Linn	Sleeping beauty (Eng) Awahmeishung (Konyak)	Oxalidaceae	Herb	Fruits are edible.
<i>Trichosanthes Wallichiana</i>	Trichosanthes (Common name), Oyohpong (Konyak)	Cucurbitaceae	Climber	Fruits edible and also used as a bird trap.
<i>Parthenocissus semicordata</i>	Himalayan Woodbine (Common) Ahley-yuhet (Konyak)	Vitaceae	Creepers	Fruits are edible and are used in making desserts, smoothie etc.
<i>Prunus nepaulensis</i> (Ser.) Steud	Bird cherry (Eng) Keanglang (Konyak)	Rosaceae	Tree	The fruit is consumed fresh which reduces the incidence of cancer.
<i>Passiflora edulis</i> Sim.	Passion fruit (Eng), Hoikhah likh (Konyak)	Passifloraceae	Climber	Fruits are eaten raw.
<i>Phoebe cooperiana</i>	Kuh (Konyak)	Lauraceae	Tree	Fruits are eaten raw.
<i>Phyllanthus acidus</i> (Linn.) Skeels	Star gooseberry (Eng), Phang(Konyak)	Euphorbiaceae	Tree	Fruits are taken raw for dyspepsia and jaundice.
<i>Phyllanthus emblica</i> Linn.	Goose berry(Eng), Phang likh (Konyak).	Euphorbiaceae	Tree	Dry fruit is useful in diarrhea and dysentery.
<i>Piper nigrum</i> Linn.	Black pepper(Eng), Gol morich (Nagamese)	Piperaceae	Climber	Dried fruits are good for Stomachache, diarrhea, toothache.
<i>Pratia begonifolia</i> Linds.	Fruiting plant (Eng), Mengling maikoh (konyak)	Lobeliaceae	Creepers	Fruits are edible.
<i>Prunus salicina</i> (L.)	Plum (Eng)	Rosaceae	Tree	Fruits are taken as a source of antioxidants.
<i>Prunus persica</i> (L.) Batsch	Peach (Eng), Shongshangpai (Konyak)	Rosaceae	Tree	Fruits are eaten raw, cooked, or dried and has good source of vitamin A
<i>Punica granatum</i> L.	Pomegranate (Eng), Jarem (Ao)	Punicaceae	Tree	Fruits along with its rind are consumed for cardiac disorders.
<i>Rhus semialata</i> Murr.	Nutgall tree (Eng), Aomah(Konyak)	Anacardiaceae	Tree	Fruit is good for gastric problems and stomachache.
<i>Rubus ellipticus</i> Sm.	Golden Raspberry (Eng), Aoweilikh (konyak)	Rosaceae	Shrub	Fruits are used to treat indigestion
<i>Rubus idaeus</i> L.	Red raspberry (Eng) Aoweilikh (Konyak),	Rosaceae	Shrub	Red raspberry have antioxidant effects in killing stomach colon cancer cells.
<i>Rubus moluccanus</i>	Broad-leaf bramble (English), Takkok/ Aoweilikh (Konyak)	Rosaceae	Shrub	Fruits are commercially extent in jams and sauces.
<i>Saurauia macrotricha</i> Kurt ex Dyer	Saurauia (Common), Oteyluk (Konyak)	Actinidiaceae	Tree	Folk medicine.
<i>Spondias pinnata</i> (L.f.) Kurz	Ambara (Hindi), Yamyao (Konyak)	Anacardiaceae	Tree	Fruits are consumed against dysentery, gastric burns and are diuretic.
<i>Sterculia villosa</i> Roxb. ex. Sm.	Hairy Sterculia (Common), Yemhaluk (Konyak)	Sterculiaceae	Tree	Seeds are edible.
<i>Stixis suaveolens</i> (Roxb.) Bail	Fragrant caper vine (Eng), Songtan luk (Konyak)	Capparaceae	Climber	Fresh fruit is consumed to cure dizziness, fever and headache
<i>Syzygium jambos</i> Linn. Alston	Rose apple (Eng) Runyu (Angami)	Myrtaceae	Tree	Fruits are edible
<i>Terminalia chebula</i>	Balliric myrobalan (Eng), Hinglei(Konyak)	Combretaceae	Tree	Fruit used as purgative.
<i>Ziziphus Mauritian</i> Lam.	Indian jujube(Eng)	Rhamnaceae	Shrub	Fruits are cooling, tonic, laxative, and useful in blood disease.



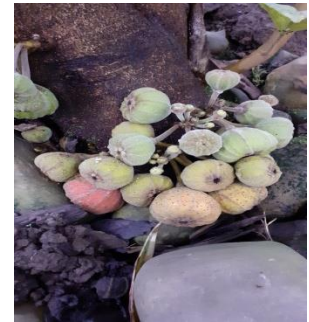
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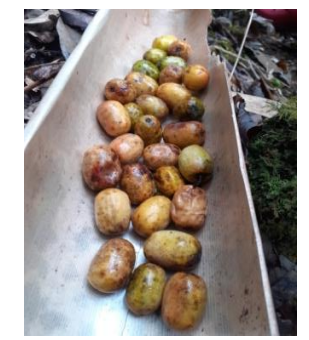
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Fig 2: some of the collected WEFs. **A.** *Rhus semialata* Murr. **B.** *Hodgsonia macrocarpa* Bl. Cogn. **C.** *Calamus erectus* Roxb. **D.** *Ficus hispida* L. **E.** *Canarium strictum* Roxb. **F.** *Livistona jenkinsiana* **G.** *Phoebe cooperiana* **H.** *Terminalia chebula* **I.** *Baccaurea ramiflora* Lour. **J.** *Debregeasia longifolia* Wedd **K.** *Juglans regia* L **L.** *Choerospondias axillaris* Roxb. **M.** *Gynocardia odorata* **N.** *Myrica esculenta* ex D. Don **O.** *Maesa indica* (Roxb.) A. DC **P.** *Phyllanthus acidus* Linn.

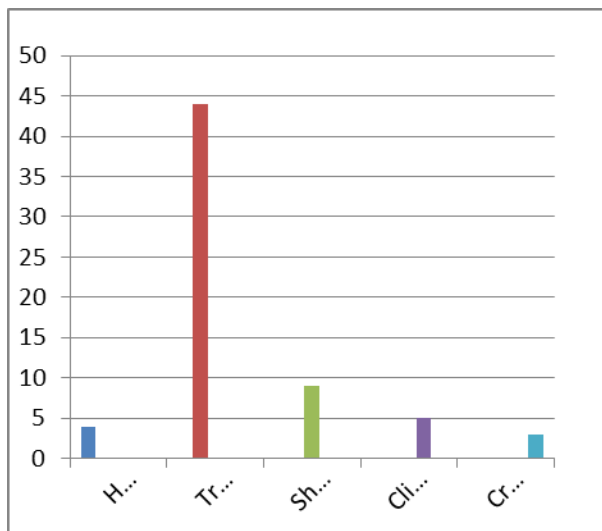


Fig 3: Bar diagram showing WEFs plant Habits

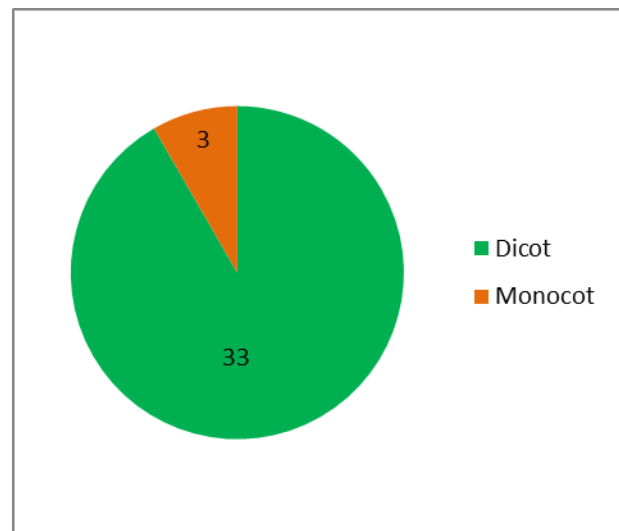


Fig 4: Number of Dicot & Monocot WEFs.

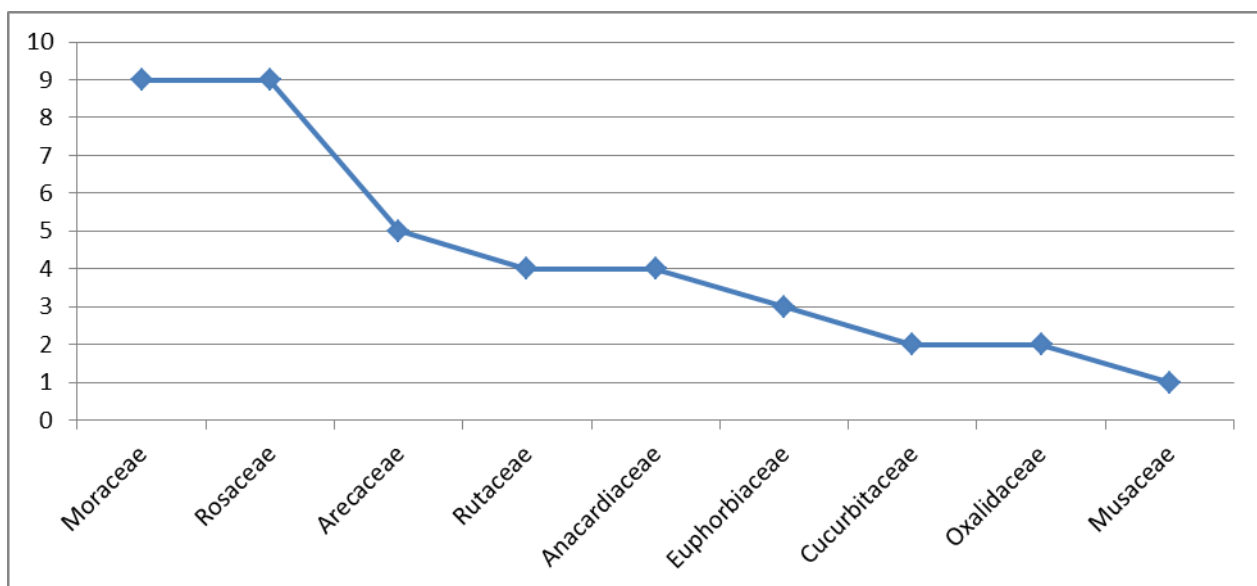


Fig 5: Families having highest number of WEFs species

It is interesting that the tribal people knows and have in-depth knowledge about the uses of fruits to cure various diseases including plants (Sangtam T. *et al.* 2012) ^[8].

Majority of the documented Wild Edible Fruits plant habit was trees with 44 species, followed by shrubs 9 species, climbers 5 species, herbs 4 species and creepers with 3 species (Fig 3). Out of 36 collected families, 33 families of WEFs were Dicot (Moraceae, Oxalidaceae, Rutaceae, Phyllanthaceae, Burseraceae, Fagaceae, Rhizophoraceae, Anacardiaceae, Boraginaceae, Cucurbitaceae, Urticaceae, Rosaceae, Elaeagnaceae, Vitaceae, Myricaceae, Sapindaceae, Sterculiaceae, Capparaceae, Passifloraceae, Primulaceae, Punicaceae, Juglandaceae, Euphorbiaceae, Lobeliaceae, Actinidiaceae, Clusiaceae, Dilleniaceae, Piperaceae, Myrtaceae, Combretaceae, Rhamnaceae, Lauraceae, Achariaceae) and 3 Families were Monocot (Zingiberaceae, Arecaceae, Musaceae). Out of 36 families, the dominant family was Moraceae and Rosaceae each with 9 species followed by Arecaceae with 5 species, Rutaceae and Anacardiaceae with 4 species, Euphorbiaceae with 3 species, Cucurbitaceae and Oxalidaceae with 2 species each and the rest families with 1 species each (Fig 5). Generally ripe fruits of *Artocarpus* spp, *Averrhoa carambola*, *Calamus* spp, *Canarium strictum*, *Citrus* spp, *Castanopsis tribuloides*,

Choerospondias axillaris, *Ficus* spp, etc are eaten raw, whereas fruits like *Hodgsonia macrocarpa*, *Livistona jenkinsiana*, *Docynia indica* are cooked and eaten. Wild edible fruits like *Rhus semialata*, *Embllica officinalis* are used to treat against stomach ache, fever and diarrhea (SC Deorani and GD Sharma 2007) ^[4]. Fruits like *Artocarpus heterophyllus*, *Morus alba*, *Docynia indica*, *Myrica esculenta*, *Pyrus communis* are commonly used by the local people to prepare wines. There were various fruits which were exotic even within Mon district. Some fruits like *Gynocardia odorata* (Fig 2, M) were found in lower region of the district. Interestingly this fruit is poisonous and are used as insects repellent, but are edible as well. Species like *Debregeasia longifolia* Wedd, *Maesa indica* (Roxb.) A. DC (Fig 2, J, O) are found in upper region of the district. *Ammomum subulatum* (Cardamom) is widely cultivated across the hilly regions whereas *Areca catechu* (Tamul) is widely cultivated in lower hills of the district, this is because of its high market value and potential for income generation to the locals.

3. Conclusion

The present study of wild edible fruits is an approach made to enlist the numbers of fruits available in Mon district of Nagaland and to study its uses for various purposes. From the

documentation, it is observed that WEFs can contribute to the income generations of the local people and also depend on it as a source of food and medicine. From the study, it is evident that further studies to find more underutilized fruits are an urgent necessity which will definitely enrich the fruit basket.

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