

[Article ID : 01/XII/04/1221]

SCOPE AND IMPORTANCE OF INDIGENOUS UNDERUTILIZED FRUIT CROPS IN MANIPUR, NORTH EAST INDIA**R.K. Dilip Singh, S. Romen Singh and M. Chanchan**Department of Horticulture, College of Agriculture
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Abstract

Manipur has diverse underexploited fruit crops which play an important role for the income generation for their livelihood as well as medicine to treat different ailments from time immemorial. However, due to rapid human population and deforestation this important novel fruit crops are losing from its native forests area of Manipur which need conservation and eco-restoration for the future mankind. Further, nutrient profiling of this novel fruit crops need to be explored without further delay so that people will aware about its importance for health care.

Introduction

The state of Manipur commonly known as “Jewel of India” is located at 23.80°-25.68°N latitude and 93.03°-94.78°E longitude of the total geographical area (22,327 km²) and located in the North-Eastern Hill Region of India. Manipur, North East India is a part of biodiversity hotspot of Himalaya and Indo-Burma in the world which has diverse indigenous fruit crops both in valley and hill regions which remain unexplored till now. It has diverse agro-climatic zones viz. sub-tropical hill zone, sub-tropical plain zone, mild tropical hill zone, mild tropical plain zone and sub-temperate hill zone growing different kinds of fruit crops from time immemorial. A lot research on ethnobotany was done since 1980s in Manipur and some findings are available on accounts of its folklore (Moa *et al.*, 2009). However, availability of most of these indigenous underexploited fruit crops are now depleting rapidly owing to various factors such as ‘Jhum/shifting cultivation’, forest fire, felling of trees for timber and rapid human population. The underutilized fruit crops need to be rescue and improved through research, conservation efforts, technology and marketing network. Underutilized fruit crops conservation is one among the keen interest taken up by the Consultative Group on International Agricultural Research (CGIAR) which is one of leading international organization in this 21st century (Singh *et al.*, 2014). Minimum research works has been carried out regarding the potential of indigenous underexploited fruit crops found in Manipur and till now no report on identification of superior germplasm of underutilized fruit crops and promotion of for vast cultivation. Considering in view of this idea the present investigation was initiated to provide the information about the important of indigenous underutilized / underexploited fruit crops which are found in Manipur so that people are aware for it conservation for the features.

Table 1: Fruit crop species adapted in sub-temperate hilly tracts in Manipur

Sl. No.	Scientific name	Plant name	Local name	Family	Economic part	Mature period
1	<i>Castanopsis armata</i>	Chinkapin	U-thangjing	Fagaceae	Nuts	Dec-Jan
2	<i>Citrus macroptera</i>	Hatkora	Heiribob	Rutaceae	Fruit peel	Nov-Dec
3	<i>Citrus medica</i>	Citron	Heijang	Rutaceae	Fruit rind	Nov-Dec
4	<i>Doecynia indica</i>	Crab apple	Heitup	Rosaceae	Fruit	Nov-Dec
5	<i>Ficus auriculata</i>	Elephant ear Fig	Heirit	Moraceae	Fruit	June-July

Sl. No.	Scientific name	Plant name	Local name	Family	Economic part	Mature period
6	<i>Ficus palmata</i>	Bedu	Heibam/ Heibala	Moraceae	Fruit and leaves	June-July
7	<i>Myrica esculenta</i>	Bayberry	Nonganghei	Myricaceae	Fruit	Aug-Sept
8	<i>Garcinia penduculata</i>	Sani	Heibung	Guttiferae	Fruit	March-April
9	<i>Juglan regia</i>	Walnut	Heijuga	Juglandicaea	Nut	Aug-Nov
10	<i>Prunus cerasus</i>	Sour cherry	Cherry	Rosaceae	Fruit	May-June
11	<i>Plukenetia volubilis</i>	Mountain pea nut	-----	Euphorbiaceae	Nut	March-April
12	<i>Rhus semialata</i>	Nutgall tree	Heimang	Anacardiaceae	Fruit	Dec-Jan
13	<i>Pyrus pashia</i>	Wild pear	Heiyu	Rosaceae	Fruit and use as rootstock	Nov-Dec

Table 2: Fruit crop species adapted to sub-tropical hill and plain zones of Manipur

Sl. No.	Scientific name	Plant name	Local name	Family	Economic part	Mature period
1	<i>Aegle marmelos</i>	Bael	Heirikhagok	Rutaceae	Fruit, leaves	Jan-Feb
2	<i>Artocarpus heterophyllus</i>	Jackfruit	Theibong	Moraceae	Fruit	May-June
2	<i>Artocarpus lakoocha</i>	Monkey Jack	Harikokthong	Moraceae	Fruit	July-Sept
3	<i>Averrhoa carambola</i>	Carambola	Heinoujom	Oxalidaceae	Fruit	Sept-Oct
4	<i>Dillinea indica</i>	Elephant apple	Heigri	Dilliniaceae	Fruit	Oct-Dec
5	<i>Elaegnus umbellata</i>	Silver fruit	Heiyai	Eleaegnaceae	Fruit	March-April
6	<i>Emblica officinalis</i>	Aonla	Heikru	Euphorbiaceae	Fruit	Nov-Dec
7	<i>Rubus ellipticus</i>	Raspberry	Heijampet	Rosaceae	Fruit	Dec-Jan
8	<i>Olea ferruginea</i>	Indian olive	Chorphon	Oleaceae	Fruit	Jan-Mar

Table 3: Fruit crop species adapted to mild-tropical plain and hill zones of Manipur

Sl. No.	Scientific name	Plant name	Local name	Family	Economic part	Mature period
1	<i>Baccaura sapida</i>	Burmese grape	Motokhei	Euphorbiaceae	Fruit	Aug-Sept
2	<i>Antidesma bunius</i>	Chinese laurel	Heiyen	Phyllanthaceae	Fruit	June-July
3	<i>Flacourtia jangomas</i>	Indian plum	Heitroi	Flacourtiaceae	Fruit	Dec-Jan
4	<i>Tetrastigma bracteolatum</i>	Indian chestnut vine	Monjamhei	Vitaceae	Fruit	Dec-Jan
5	<i>Spondias pinnata</i>	Indian hog plum	Heining	Anacardiaceae	Fruit	Mar-April

Sl. No.	Scientific name	Plant name	Local name	Family	Economic part	Mature period
6	<i>Meyna laxiflora</i>	Moyna	Heibi	Rubiaceae	Fruit and leaves	Nov-Dec
7	<i>Syzygium jumbos</i>	Roseapple	Shileima	Myrtaceae	Fruit	May-July
8	<i>Syzygium cumini</i>	Java plum	Jam/Jamun	Myrtaceae	Fruit and seed	May-July
9	<i>Phyllanthus acidulus</i>	Star gooseberry	Kihori	Euphorbiaceae	Fruit	Jan-Feb

Table 4: Mode of propagation and nature of growing of the indigenous fruit crops in Manipur

Sl. No.	Crops name	Mode of propagation	Wild/Cultivated
1	Chinkapin	Seed	Wild
2	Hatkora	Seed	Wild/ Home stead garden
3	Citron	Seed	Wild/Home stead garden
4	Crab apple	Seed	Wild
5	Elephant ear Fig	Seed	Wild
6	Bedu	Seed	Wild
7	Bayberry	Seed	Wild
8	Sani	Seed	Wild/Home stead garden
9	Walnut	Seed	Wild
10	Sour cherry	Seed	Wild
11	Mountain pea nut	Seed	Wild
12	Nutgall tree	Seed	Wild
13	Wild pear	Seed/cutting	Wild
14	Bael	Seed	Wild/Homestead garden
15	Jackfruit	Seed	Wild/Homestead garden
16	Monkey Jack	Seed	Wild
17	Carambola	Seed/air layering	Wild/Homestead garden
18	Elephant apple	Seed	Wild/Homestead garden
19	Silver fruit	Seed	Wild/Homestead garden
20	Aonla	Seed	Wild/Homestead garden
21	Raspberry	Seed/Cutting	Wild
22	Indian olive	Seed	Wild/Homestead garden
23	Burmese grape	Seed	Wild/Homestead garden
24	Chinese laurel	Seed	Wild/Homestead garden
25	Indian plum	Seed	Wild
26	Indian chestnut vine	Seed	Wild/Homestead garden
27	Indian hog plum	Seed	Wild/Homestead garden
28	Moyna	Seed	Wild/Homestead garden
29	Rose apple	Seed	Wild/Homestead garden
30	Java plum	Seed	Wild/Homestead garden
31	Star gooseberry	Seed	Wild/Homestead garden

Endangered plant of indigenous fruit crops in Manipur

Among the indigenous fruit crops of Manipur, citrus species viz. *Citrus macroptera* (heiribob) and *Citrus medica* (heiyang) are among the endangered plants which need conservation and eco-restoration as well *in situ* conservation are needed. Besides, all this novel fruit crops need conservation since due to rapid deforestation their native place of its growing sites are decreasing day by day which need coordinated efforts among different agencies such as Government, NGOs and research institutional for strengthening the biodiversity conservation system together for the future.

Constraints for cultivation of indigenous fruit crop cultivation in Manipur

1. Lack of quality planting materials
2. Lack of standardization of vegetative propagation methods
3. There is lacking of scientific way of cultivation and agro-techniques
4. Lack of knowledge about the different process products from it
5. Rapid expansion of human population and deforestation in its growing site
6. Poor shelf life under ambient room temperature
7. Poor network for marketing facilities from remote areas to the main market

Importance of indigenous fruit crops in Manipur

1. Provide income generation since there is good demand in the market
2. Good source of nutrients (antioxidant, vitamin and minerals)
3. Value addition and processed products can be prepared
4. Soil erosion can be control by conserving indigenous underutilized fruit crops since they are abundant in the hilly tract of Manipur
5. They are source of medicinal value for the treatments of diseases in remote places like starfruit / carambola for curing jaundice etc.

Future prospects of indigenous fruit crops in Manipur

1. Scope for the expansion of indigenous underutilized fruit crops due to increase in demand of this medicinally importance fruit crops
2. Underutilized fruits are rich source of vitamins and minerals which will be helpful for minimizing malnutrition among the poor people
3. Conservation of indigenous fruit crops will be helpful for eco-restoration of forest in the hills
4. As population increases there will be increase in the demand of this novel fruit crops in the future

Conclusion

The rural people of Manipur are using these plants as traditional medicine as well as income generation for their livelihood. At present scenario, there is lacking of encouraging timely scientific intervention to ensure the ecological aspect of biodiversity conservation thereby increasing the scope for conservation of gene bank for such medicinally important plants which are threaten to be extinct mainly due to rapid population and deforestation. Thus, if this hidden wealth of novel indigenous underutilized fruit species is explored without further delay for eco-restoration by conserving its local indigenous fruit crops, the state like Manipur which is a part of hot spot of biodiversity for maintaining diverse indigenous underutilized fruit crops having medicinal value and rich in nutritive values.

Acknowledgement

Special thanks to Mr. Tombi Longjam in this study for the information and corporation during the survey.

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