

## Diversity of *Musa* Genetic Resources Explored Through Rural Weekly Markets of Meghalaya

Rajappa J Joga\*, Emanuel Sangma and Bappa Karmakar

Division of Natural Resource Management (Agroforestry), ICAR Research Complex for NEH Region, Umiam, Meghalaya, India

**\*Corresponding Author:** Rajappa J Joga, Division of Natural Resource Management (Agroforestry), ICAR Research Complex for NEH Region, Umiam, Meghalaya, India.

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### Abstract

Banana is an important commercial crop in the state, it has multiple uses as a food source, dessert fruit, snack, as a packaging and wrapping material, culinary use of pseudo-stem and inflorescence, fodder, medicinal uses, etc. A survey was conducted in Ri-bhoi district, and two markets of Garo hills on the varieties that are sold in the markets of Meghalaya. Many cultivars like Jahaji, Cheini Champa, Malbhog, and indigenous varieties were found in the markets where the survey was conducted. In the survey, we find that in-situ conservation and planting of wild bananas is limited to a few households. Banana is an important cash crop in Meghalaya but proper implementation for its commercial production is yet to be adopted. Better infrastructure, marketing conditions like market sheds, transport facilities, market price information system, etc. would help boost up the market efficiency within the State.

**Keywords:** Banana; Indigenous; Meghalaya; *Musa*; Traditional Markets

### Introduction

Meghalaya is a landlocked state in Northeast India, with the state of Assam to its north and the country of Bangladesh to its southern border. Meghalaya lies between 24° 58' N to 26° 07' N latitudes and 89° 48' E to 92° 51' E longitudes. Meghalaya has dense forest cover with undulating terrain, rivers, gorges and small valleys. Agriculture is the main economic activity of many people in rural areas. For small marginal farmers much of the marketing of local produce is dependent on Traditional markets located in many villages and towns of the state.

Markets are generally referred to an area where exchange takes place. It is also referred to as a social mechanism for economic growth, or a mechanism for efficient allocation of resources by economists [1]. The system of markets have existed even before the invention of currencies in the form of barter system [2]. Traditional rural markets have survived with age old traditions and are still in existence today even with the advent of modern marketing systems. These markets provide the weekly needs of the rural folks in different areas of the state. A day of the week is usually kept in a village for shopping household needs which varied from place to place. Businessmen/merchants of various goods, vendors, rural folks selling their agricultural produce, traditional healers, etc. from

far and wide come to offer their products. The variety of products in these markets range from day to day groceries, fruits, vegetables and herbs of all sorts, meat, fish, utensils, medicines, electronics, etc. all fulfil the basic needs of the rural people. During market day the village serves not only as a commercial centre but also as a place for socio-cultural and political exchange of ideas among the locals. In bordering village areas, a market serves as a centre for cultural exchange among other ethnic groups, thus contributing to the cultural harmony in the area. Even to this day many rural farmers depend on this weekly market for marketing their farm products and also for the procurement of non-agricultural goods which are not available locally. Saxena [3], observed that the participation of female traders in tribal rural markets is more than the non-tribal markets. Market studies are necessary in understanding the social interaction, caste and occupational relationship, specialised locale of the area and trend of cultural change, etc. [4,5].

Banana (*Musa* spp.) is one of the most important commercial crops in Meghalaya, it is found abundantly in almost all areas of Meghalaya. Banana is important economically and is mostly grown in low hill areas of the state. It has many uses as a food source, dessert fruit, snack, as a packaging and wrapping material, culinary use of pseudo-stem and inflorescence, fodder, medicinal uses, etc.

Medicinal applications are associated with almost all parts of the banana plant: the flowers in bronchitis, dysentery, diabetes and ulcers; sap is used in cases of hysteria, epilepsy, leprosy, fevers, haemorrhages, acute dysentery and diarrhoea, insect bites and stings; young leaves are used on burns and skin rashes [6]. Ripe banana fruit is used in gastric problems, its alkaline nature neutralizes the acid conditions and helps in formation of thick protective mucus layer [7]. Banana fruits are recommended for patients suffering for anaemia since it is rich in iron [8]. Banana leaves not only give a good aroma to hot foods but are also a good source of antioxidants such as epigallocatechin gallate [9]. So, it is a plant with multiple uses and importance. The study aims to document the importance and variation of banana and its products in the traditional/rural markets of Meghalaya.

## Materials and Methods

The investigation was carried out in Ri-Bhoi district and one market each from North Garo hills District and East Garo Hills District (Figure 1 and 2). The information regarding the market days was obtained by referring the market calendar in the Meghalaya State Agricultural Marketing Portal (megamb.gov.in) it was also verified by asking locals prior to the visit. The visit was planned specifically during market days. The information related to the banana products sold was obtained through questioning and personal interview of the vendors, key focus was given to obtaining the local and indigenous knowledge of the banana products sold by them.

**Figure 1:** Map of market visited.

**Figure 2:** Vendors selling bananas in market.

## Results and Discussion

During investigation the markets visited are shown in Table 1. It was observed that the highest diversity of banana and its products were found in Umroi and Umsning areas. Common cultivars like

Chenichampa (New Poovan), Jahaji (Dwarf Cavendish), Malabuk (Malbhog), Athia (*Musa balbasiana*), etc. were found. The local names of the bananas as well as the plants sold were noted down and their culinary uses were noted down and represented in the Table 2.

Sl. No.	Date	Place	<i>Musa</i> spp sold	
			Local Name	Parts Sold
1	17/3/2018	Williamnagar	Malabuk (Malbhog/Rasthali) Chenichampa (New Poovan) <i>Athia</i> ( <i>Musa balbasiana</i> ) Monua (Bharat Moni)	Banana Fruits, Inflorescence (wild and cultivars) Pseudostem (wild and cultivars) Leaf (wild)
2	19/7/2018	Mawkyrwat	Kait Jahaji (Dwarf Cavendish) Kait Syiem (New Poovan) Kait Ja Kait Khlaw	Banana Fruits, Inflorescence (wild and cultivars) Pseudostem
3	1/6/18	Umroi	Kait Ja Kait Syiem (New Poovan), Kait Khlow (Wild) Kait Klong Kait shyieng ( <i>Musa balbasiana</i> ) Kait Jahaji (Dwarf Cavendish)	Banana Fruits, Inflorescence (wild and cultivars) Pseudostem
4	2/7/18	Smit	Kait Jahaji (Dwarf Cavendish) Kait Syiem (New Poovan) Kait Ja Kait Khlaw (Wild)	Banana Fruits, Inflorescence (wild and cultivars)
5	21/7/18	Umsning	Kait Jahaji (Dwarf Cavendish) Kait Ja Kait Khlaw (Wild flowers) Kait Klong Kait Syiem (New Poovan)	Banana Fruits, Inflorescence (wild and cultivars) Pseudostem
6	23/7/18	Mawhati	Kait Jahaji (Dwarf Cavendish) Kait Ja Kait shyieng ( <i>Musa balbasiana</i> ) Kait Syiem (New Poovan)	Banana Fruits, Pseudostem
7	26/7/18	Mawlasnai	Kait Jahaji (Dwarf Cavendish) Kait Syiem (New Poovan)	Banana Fruits, Inflorescence (wild and cultivars) Pseudostem
8	28/7/18	Tyrso	Kait Jahaji (Dwarf Cavendish) Kait Syiem (New Poovan)	Banana Fruits, Inflorescence (wild and cultivars) Pseudostem
9	18/8/18	Resubelpara	Malabuk (Malbhog) Cheni champa (New Poovan) <i>Athia</i> ( <i>Musa balbasiana</i> )	Banana Fruits, Inflorescence (wild and cultivars) Pseudostem Leaf (wild)

Table 1: Markets Visited and *Musa* products sold.

Local Name	Suspected Variety	Comments
Malabuk (Garo)	Malbhog	Medium sized fruits, very popular in Garo Hills region. It known also as Rasthali (Tamil Nadu) and Mantaman (West Bengal). Fruits are yellow in colour with freckles, flesh is firm having a sweet taste and a pleasant aroma.
Kait Syiem (Khasi) Chenichampa (Garo)	New Poovan	A common household variety found in many areas of Meghalaya. Fruits are described as tasty, sweet, and firm. It has a good shelf life. Fruits which were dark green turn yellow when ripe.
Kait Shyieng (Khasi) Athia (Garo)	<i>Musa balbasiana</i>	Sold in the markets of Garo Hills, Khasi Hills and nearby areas of Assam. The bananas are usually large and contain some seeds, it is also used as a baby food and taken during the time of upset stomach. Pseudo stem is used to prepare alkali known as Kalchi(Garo), Kolkhar(Assamese) used in cooking. Flowers are also consumed which is believed to have antidiabetic properties.
Manua	Bharat Moni	An indigenous variety of Assam, this banana is gaining popularity in nearby states due to its pleasant taste and aroma, the fruits are short and peel is yellow when ripe, the flesh is also yellowish. The fruits have a mild sweet taste.
Kait Jahaji (Khasi) Jhaji	Dwarf Cavendish	It is a popular commercial variety found in many markets of Meghalaya. The plant is known to be of dwarf stature hence its name.
Kait Klong	Unidentified	Large unseeded bananas that were grown commonly in most kitchen gardens in Ri-bhoi area, it has a sweet taste and smooth texture. The flowers are consumed as well.
Kait Ja	Unidentified	Flowers/inflorescence were sold in the market, the locals consume it for diabetes and blood pressure problems. It is a good source for baby food in rural areas. It is very similar to the cultivar Bharat moni.
Kait Khlaw	<i>Musa spp.</i> (Wild)	Wild varieties of <i>Musa</i> usually collected from forests or grown locally, fruits are inedible due to presence of large number of seeds. Leaves are very robust and strong and considerably flexible so it is suitable to be used as a packaging material, and as a natural plate for having food. In Garo hills people use it traditionally for packing food and curries so it can be found in most markets of Garo hills. The flowers of these wild bananas are also sold in the market and it is believed to aid in controlling blood pressure and diabetes. The pseudo stem is also sold in the market, it is used for culinary purposes.

**Table 2:** Local Names and its description by the Locals.

Many popular cultivars like Malbhog/ Rasthali, Dwarf Cavendish and New Poovan are commonly available in the markets. It has become common household varieties and they are grown commonly by many farmers of Meghalaya. Kait Shyieng or Athia Kol or commonly Athia (Garo) is a seeded variety that are sold in the markets, they are commonly used as baby food, an alkali is also prepared from the pseudostems of Athia kol. Kait Klong is also a banana that is popular in various regions of Meghalaya, the large fruits (but smaller than Athia banana) and flowers are also sold in the market, the fruits are usually sold when they are green as they ripen quickly. In many rural areas of Meghalaya Kait Ja and Kait Shyieng (Athia Kol) are commonly used to feed babies by mashing them into a pulp. It is easily digestible and available so they become a good substitute for processed baby foods. Malbhog/ Rasthali is considered to be high in iron content and children and

elders are encouraged to have this banana as it is believed to help in strengthening bones.

Wild bananas have found wide usage among the communities of Meghalaya, they grow freely in kitchen gardens or are harvested for its flowers which are described to taste better than the flowers of cultivars. The fruits of wild bananas have no economic value as they are seeded and hardly contain any flesh. They are also sought for their leaves which are more hardy and thicker than leaves of cultivars, wild bananas have a natural disease and pest resistance that makes their leaves blemish free and due to its flexible nature, it can be folded without breaking apart. Its leaves are an excellent wrapping and packaging material, the people of Garo Hills use it as a natural plate to have their meals and during festivals and special occasions banana leaves are used for serving food. Keeping food

in banana leaves helps in keeping it fresh. Rice cakes in Khasi and Garo Hills region are also packed in banana leaves and kept or sold in the market. Wild bananas also find wide usage as a vegetable, its tender inner pseudo stems can be cooked and it is used to make various dishes and chutneys by the people of Meghalaya. The banana's outer pseudo stems are also not wasted they are dried in the sun and then burnt, the ash is collected and water is strained through the ash to get an alkali liquid. This liquid is also sold in markets of Garo hills or is made locally by Garo families, it is called Kalchi in Garo. This liquid finds use in many culinary preparation as a substitute to soda powder. Similar preparations are also made by the Assamese, Boro and Rabha people, it is known as Kolkhar in Assam. Banana pseudo-stem is also used as animal feed, they are boiled with vegetables and are used as fodder for pigs.

Banana flowers fetches good value in the markets, they are used in preparations of many different types of dishes and chutneys. In most markets they have been seen to sell very quickly and their demand is high. Flowers of wild and cultivars are found in the markets. They seem to be believed to possess medicinal properties, as the sellers describe them to ease diarrhoea, control blood pressure, diabetes and as aiding in digestion.

For people living in rural areas *Musa* species and its products have become an indispensable plant. Its utility is tightly interwoven in their culture and traditions, species like *Musa balbasiana* and Kait Ja serve as a source of baby food for the rural folks where the accessibility and availability of processed food is limited and is weighed by economic constraints. These bananas have been used since time immemorial as baby food even before modern processed foods were available. A mashed ripe banana is a simple and healthy baby food, nutrients contained in it are Potassium, Fibre, Calcium, Magnesium, Phosphorus, Selenium, Iron, Vitamins A, B2, B6, C, E, Niacin, Folate, and Pantothenic Acid [6]. Varieties like New povan, Dwarf Cavendish and Malbhog have found to be very popular in the markets and their cultivation have also been increased in the past years. Popular varieties like these along with indigenous varieties like kait klong, kait ja and kait shiyeng provide a good source of income to farmers as they are highly marketable and have a potential to be sold in markets outside of the state. The merchants and traders also buy these bananas in bulk from the farmers to be sold in neighbouring states, this ensures good marketability even though local sales are low during certain times. Local varieties like Kait klong, kait Ja and Kait shiyeng are well sought after and highly favourable in terms of texture and aroma but are yet to be scientifically documented and classified.

The wild banana species are also of immense importance, though their fruits are inedible but all of its parts are utilized in various ways. The leaves are used for packaging and traditionally used as plates, its flowers are highly marketable, and its pseudo stems are used for culinary purposes and also to make cooking agent (alkali). However, with increased deforestation and human habitation the presence of wild banana is being threatened. Though they are having very high utility but they are often overlooked and villagers often depend on foraging in the nearby jungles to find their plants. In-situ conservation and planting of wild bananas is limited to a few households. The maximum genetic variability of *Musa acuminata* and *M. balbisiana* occurs in the NE India [10]. The indigenous knowledge of wild bananas can be viewed as a treasure of knowledge but due to lack of information regarding the methodology and protocol, its meaningful utility is still lacking [11].

## Conclusion

The agricultural produce sold in weekly markets of Meghalaya are very helpful to the farmers as they function without middlemen. Banana is an important cash crop in Meghalaya but proper implementation for its commercial production is yet to be adopted. Better marketing conditions like better roads, market sheds, transport facilities, market price information system, etc. would help boost up the market efficiency within the State. With favourable climatic conditions and arable lands, Meghalaya has a huge potential in setting up large scale banana plantations in the near future. The state also has a good number of wild bananas in rural which is found to be very useful to the local community and whose documentation has not been done thoroughly. The utilization of wild bananas will form an important factor in conservation of these plants in the state as the importance of wild *Musa* is usually overlooked.

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