

BANANA
Less Exploited Landraces
in India

S. Uma
M.S. Saraswathi
S. Backiyarani
P. Durai
M.M. Mustaffa



Protection of Plant Varieties and Farmers' Rights Authority

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अध्यक्ष

पौधा किस्म और कृषक अधिकार संरक्षण

प्राधिकरण, भारत सरकार

एन.ए.एस.सी. कॉम्प्लेक्स, डीपीएस मार्ग,

नई दिल्ली - 110012



Prof. R.R. Hanchinal

CHAIRPERSON

Protection of Plant Varieties and Farmers' Rights

Authority, Government of India

NASC Complex, DPS Marg, New Delhi-110012

दूरभाष/Telex: 011-25848127 फ़ैक्स/Fax: 011-25840478

Website : www.plantauthority.gov.in

E-mail : Chairperson-ppvfra@nic.in

E-mail : rhanchinal@rediffmail.com



Foreword

Banana is one of the earliest crops domesticated by man and this has led to the evolution of few hundreds of varieties which are under cultivation. However, only 20 - 30 varieties have gained commercial importance and currently the banana trade is dominated by Grand Naine, one of the most popular Cavendish clones (AAA). This is mainly because of its amenability to tissue culture, hi-tech cultivation practices like high density planting, fertigation etc. This has led to the enhanced production and productivity. But in some southern parts of India, polyclonal system of cultivation is still in vogue with varied seasons of cultivation ultimately leading to the year around availability of one or the other varieties of banana. These less exploited landraces are known to be rich in nutrients and possess therapeutic values. Despite their cultivation, commercialization and sustenance, they are being threatened by a number of biotic and abiotic stresses. The menace of pests and diseases is further aggravated by the perennial system of cultivation of many of the landraces with limited resources.

India is a pioneer country in the world that effectively enacted a "sui generis" plant variety protection and farmers' rights system in 2001. Plant breeders in public and private sector in India have introduced several new varieties in crops that have increased productivity and farm income considerably. Protection of Plant Varieties & Farmers' Rights Act, 2001 provides for legal protection of varieties of crop plants of economic importance and it is expected that the revenue earned through commercial exploitation of these varieties will be ploughed back to strengthen the research & development system.

Under IPR regime, it is essential to safeguard the genetic wealth of India through proper documentation. Local custodians will also be benefitted by

commercial exploitation of these landraces for their special attributes like fragrance, therapeutic, ornamental values etc. through benefit sharing which is very much in place in India. Hence systematic identification, collection, conservation, characterization and their documentation become priority activities.

In this document '*Banana - Less Exploited Landraces in India*' authors have made an appreciable effort to document the distribution, description, ethnobotanical values, possible utilities of different landraces spread in various agro-ecologies of the country. This document also highlights the ethnic groups involved in conserving these valuable landraces. The production constraints for each landrace and their possible utility either directly or in the banana improvement programs are also listed in detail. This document would be valuable not only for banana researchers and farming community as a whole but also in identifying the important varieties of banana for seeking registration under Protection of Plant Varieties and Farmers' Rights Act 2001.


(R.R. Hanchinal)

डा. एन.के. कृष्ण कुमार

उप महानिदेशक (बागवानी)

Dr. N.K. Krishna Kumar

DEPUTY DIRECTOR GENERAL (Horticulture)



भारतीय कृषि अनुसंधान परिषद
कृषि अनुसंधान भवन-II,
पूसा, नई दिल्ली 110 012
INDIAN COUNCIL OF AGRICULTURAL RESEARCH
KRISHI ANUSANDHAN BHAVAN-II,
PUSA, NEW DELHI 110 012

Foreword

It is widely known that banana has originated and diversified in the North Eastern regions and also parts of Western Ghats in South India. Bananas are grown for local consumption as dessert and also for cooking in the tropical regions in India. Even though India is having vast diversity for banana and plantains, only few are cultivated commercially in many states of India and banana trade is dominated by one to two cultivars especially Cavendish type. In addition, some 15-20 cultivars are grown based upon the location and consumer preferences. In spite of those traditional cultivars, India is bestowed with numerous less known landraces which can be fully exploited for their unique characters like colour and flavor and also for nutraceutical values. The less known landraces are facing the threat of extinction due to the urbanization, change in the land - utility pattern and genetic erosion at the centers of diversity. These landraces need to be conserved for posterity for their uniqueness and also for conserving diversity in banana. There is a need to do systematic surveys, documentation and creation of database which will provide information for future use in utilization of these germplasm in breeding and for their niche quality. Unfortunately, only limited efforts have been made to collect the information on these less known landraces and utilize them for future needs.

In this book, the authors have collected the information on banana landraces which are present mostly in south India and also in North Eastern regions. The authors have made an attempt to collect various information on these less known landraces available in India and documented based on agroecological locations. I am sure, this book will be useful to the banana researchers, farming community, policy makers and students who are directly involved with banana.


(N.K. Krishna Kumar)

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Banana cultivation dating back to 120 B.C, with the existence of dwarf statured bananas and bananas with reddish sap has been quoted in Tamil literature which is a prelude for its existence since time immemorial. Further is quite evident from its mention in the epics like Ramayana (2020 B.C.), Kautilya's Arthasastra (300-400 B.C.) and its presence in paintings and sculptures of Ajantha and Ellora (600 B.C.) caves of Maharashtra.

Bananas are inseparable from our heritage and culture and therefore have been accepted as the symbol of prosperity and fertility and nurtured within the sacred precincts. In addition, they have great socio-economic significance owing to its multifaceted uses for the benefit of mankind and thus rightly referred to as 'Kalpatharu' (a plant of all virtues).

For most of the developed economies, bananas represent only dessert fruits while in India and other parts of the world where bananas have originated, it comprises of a large group of fruits with diverse utilities starting from a popular common fruit with nutritive and therapeutic values, popular vegetable (not only the fruits but other parts like, pseudostem sheath, inner core, flower buds etc.), to a staple food and commercial applications like in fibre and floriculture industry.

Bananas are grown in more than 150 countries over an area of 5.14 million ha contributing to the production of 105.32 million tonnes. India has been the largest producer of bananas with an annual production of 28.45 million tonnes from an area of 0.8 million ha and accounts for nearly 26.6 percent of the global production (FAO, 2012).

India, being one of the places of origin, antiquity and long history of domestication, has been endowed with a great diversity for dessert and other bananas with varied genomic status namely AA, AAA, AB, AAB, ABB and BB. The rich genetic diversity is an irreplaceable resource, providing materials for introduction, domestication and improvement programmes as well as opportunities for the search and selection of *Musa* genotypes resistant to pests and diseases.

There are about hundred named cultivars and landraces in India which are being cultivated across the country in conventional banana growing regions. Although the invasion of Grand Naine has revolutionized the banana industry

in India, it has inadvertently led to the slow decline of area under many indigenous landraces. Despite their cultivation, commercialization and sustenance of landraces in the ecosystem, they are being threatened by a number of biotic and abiotic stresses. They include fungal diseases like, Fusarium wilt (*Fusarium oxysporum* f.sp. *cubense*) and leaf spot diseases (*Mycosphaerella* spp.), viral diseases like Banana Bunchy Top, Banana Bract Mosaic, Banana Streak, Cucumber Mosaic, Mild Mosaic and others. The pests include weevils and borers, aphids, nematodes etc. The menace of pests and diseases is further aggravated by the perennial system of cultivation of many of the landraces with limited resources.

The indigenous knowledge on *Musa* landraces is a treasure, on which very little information has been documented. The decline in the number and area under landraces is so alarming that they may face extinction even before their systematic identification, collection, conservation, documentation and let alone its commercial exploitation. Sterility, polyploidy and clonal propagation have led to the narrow genetic base in banana thus making them vulnerable to large number of pests and diseases. This could also be attributed for their limited success in improvement through conventional breeding. The banana landraces along with their wild relatives are a store house of many resistant genes for biotic and abiotic stresses. These parthenocarpic landraces also have the ability to set seeds under controlled conditions and the hybrids of which can be used directly for commercial utilization or as a base material (synthetic/improved diploids) for use in breeding programs. The distribution, description, ethnobotanical values, possible utilities of the lesser exploited landraces are detailed in this book.

MATTI

Name	Matti
Synonyms	
Genome	AA
Sub group	
Distribution	Southern parts of Tamil Nadu and Kerala (commonly maintained in the backyards by Kothaiyar tribes around Kothaiyar and Pechipparai dam in southern tips of Tamil Nadu)
Description	
Stature	Medium (8-10 ft), yellowish green pseudostem with dark purple blotches on the petiole base
Leaves	Erect and light green in color
Bunch	Slightly angular, very compact, closely packed hands and fingers
Yield	12-13 kgs with a potential of 15 kgs
Fruit	Curved, lengthily pointed tip, light green at maturity and pale yellow upon ripening. 40-60 g fruit with a thin skin
Pulp	Juicy, very sweet with a pleasant aroma
Duration	11-12 months
Utility	Dessert
Special uses	Used as infant food, having therapeutic values Used in gene pyramiding programmes
Problems	Susceptible to Cordona leaf spot disease
Special features	Resistant to Fusarium wilt (race 1) disease Plants can be used in breeding programme both as male and female parent, fruits are resistant to shattering at ripeness



NAMARAI

Name	Namarai
Synonyms	
Genome	AA
Sub group	
Distribution	Southern parts of Tamil Nadu and Kerala. (commonly maintained in the backyards by Kothaiyar tribes around Kothaiyar and Pechipparai dam in southern tips of Tamil Nadu)
Description	
Stature	Small and slender with a maximum height of 5.0-6.0 ft
Leaves	Erect and light green
Bunch	Small, slightly angular, 4-5 hands, loosely packed
Yield	3-4 kgs with a maximum of 5 kgs
Fruit	10-12 fruits per hand, small in size, dull yellow upon ripening. 7-8 cm in length
Pulp	Juicy, slightly acidic with good aroma and taste
Duration	9-10 months
Utility	Dessert
Special uses	Plants exhibit short duration, suitable for perennial system of cultivation, maintained as mats for regular supply of bunches. Suitable for marginal and water deficit environments. Also used in banana breeding programmes for development of synthetic diploids with short duration
Special features	Short duration No report of Fusarium wilt incidence in the field
Problems	Susceptible to leaf spot diseases. (<i>Mycosphaerella eumusae</i>)



SANNA CHENKADALI

Name	Sanna Chenkadali
Synonyms	Semmatti, Cheriya, Chenkadali
Genome	AA
Sub group	
Distribution	Maintained as backyard crop in villages around Nagarkoil and Kanyakumari areas of Tamil Nadu
Description	
Stature	Slender, pseudostem is light reddish with dark blotches below the petiole base
Leaves	Medium, narrow, green and slightly pink on lower side of the leaf
Bunch	Slightly angular, very compact, closely arranged hands
Yield	10-12 kgs with a potential of 15 kgs
Fruit	Red colored and very attractive with a pointed tip
Pulp	Juicy, slightly acidic in taste, soft in texture and with good aroma
Utility	Dessert
Special uses	Fruits are considered to have therapeutic values and rich in carotenoids. Used in breeding programme, to induce tolerance to leaf spot diseases (<i>Mycosphaerella eumusae</i>), Red skin color and resistance to fruit shattering



KADALI

Name	Kadali
Synonyms	Neyvediya Kadali, Ney Kadali, Devan Kadali, Surya Kadali
Genome	AA
Sub group	
Distribution	Southern parts of Tamil Nadu and Kerala Revered as sacred fruit, this variety is mainly nurtured in sacred grooves and village temples
Description	
Stature	Medium, yellowish green pseudostem
Leaves	Erect
Bunch	Small with 5-6 loosely packed hands
Yield	4-5 kgs with a potential of 10 kgs
Fruit	Tapering tip, persistent and predominant style, green at maturity and yellow upon ripening
Pulp	Cream colored, sweet and highly aromatic
Duration	9-11 months
Utility	Dessert
Special uses	Considered sacred and offered specially in temples to Lord Ayyappan. Also used for the preparation of Panchamritham (a sacred concoction of 5 ingredients namely honey, jaggery, dates, sugar candy and raisins)
Problems	Fruits fall off at full maturity

ANAIKOMBAN

Name	Anaikomban
Synonyms	Attukomban
Genome	AA
Sub group	
Distribution	Tamil Nadu, Kerala
Description	
Stature	Pale green, wax coated petiole margins outwardly curved and shaded by very attractive pink
Leaves	Erect, green
Bunch	Medium 6-8 hands, loosely packed
Yield	8-10 kgs with a maximum of 15 kgs
Fruit	Long, straight, greenish at maturity and greenish yellow upon ripening
Pulp	Juicy, sweet with slightly acidic taste
Duration	10-11 months
Utility	Dessert
Special uses	Utilized in banana breeding programmes for nematode resistance (<i>Pratylenchus coffeae</i>) and better fruit quality
Special features	Resistant to nematode (<i>Pratylenchus coffeae</i>) and suitable for cultivation at higher altitudes No incidence of Fusarium wilt (race 1 and 2). Exhibits high female fertility with good seed set and hence could be used as female parent in banana breeding programme
Problems	Susceptible to Sigatoka leaf spot diseases



KANAI BANSI

Name	Kanai Bansi
Synonyms	Hatidat, Mohan Bansi, Hathi Kela
Genome	AA
Sub group	
Distribution	North eastern India, Orissa, West Bengal
Description	
<i>Stature</i>	Medium
<i>Leaves</i>	Green, erect
<i>Bunch</i>	Medium, 6-7 loosely packed hands
<i>Yield</i>	9-10 kgs with a potential of 15 kgs
<i>Fruit</i>	Very long, straight without any curvature, 20 - 21cm, smooth with blunt tip, green at maturity and greenish yellow upon ripening
<i>Pulp</i>	Juicy, cream colored, sweet with acidic taste
<i>Duration</i>	11-12 months
<i>Utility</i>	Dessert
Special uses	Used in breeding programmes to improve fruit quality Because of its cold tolerance, it is being grown in higher altitudes of North Eastern India Also has potential for cultivation in high altitudes of southern India.
Problems	Susceptible to Sigatoka leaf spot diseases



KARUVAZHAI

Name	Karuvazhai
Synonyms	Kari Vazhai, Pacha, Manoranjitham
Genome	AAA
Sub group	
Distribution	Endemic to Kolli Hills of Namakkal district of Tamil Nadu, nurtured by Malyali tribes, in the sacred grooves
Description	
<i>Stature</i>	Medium, dark green pseudostem with black blotches
<i>Leaves</i>	Normal, dark green
<i>Bunch</i>	Pendulous, 5-7 hands, loosely packed
<i>Yield</i>	8-10 kgs with a potential of 12-15 kgs
<i>Fruit</i>	Bold, 13 - 15 cm length with 10 cm circumference, dark green, blunt tip, pale green upon ripening, with a thin fruit skin
<i>Pulp</i>	Juicy, sweet with intense aroma, the flavor is comparable with the fragrance of Manoranjitham (<i>Artabotrys odoratissimus</i>) flower. Skin is more fragrant than pulp
<i>Duration</i>	11-12 months
<i>Utility</i>	Dessert
Special uses	Considered highly sacred and hence offered to the goddess "Kongai Amman" at Kolli Hills and in all other social occasions like marriage, festivals etc.,
Special features	Immune to leaf spot diseases, female fertile, highly fragrant
Problems	Highly susceptible to Fusarium wilt (race 1), corm weevil and pseudostem borer



AMRITSAGAR

Name	Amritsagar
Synonyms	Mizo Cavendish
Genome	AAA
Sub group	
Distribution	Restricted to North Eastern India
Description	
Stature	Medium, pseudostem is green with brown black blotches
Leaves	Dull, erect, watery green on both sides
Bunch	Slightly angular, 5-6 hands, irregularly arranged and loosely packed, fruits completely turn towards the stalk
Yield	8-10 kgs
Fruit	Long, green and change into golden yellow upon ripening. Base of the style remains persistent at the tip, fruit skin is thick.
Pulp	Firm, orange yellow, sweet tasty with good aroma
Duration	11-12 months
Utility	Dessert Because of its fragrance and excellent fruit quality, it has been elevated from backyard crop to commercial variety in Mizoram. It is slowly becoming popular in other states.
Problems	Susceptible to Sigatoka leaf spot diseases and scarring beetle



BHARATH MONI

Name	Bharath Moni
Synonyms	Thella Chakkarakeli, Rajavazhai, Thenvazhai
Genome	AAA
Sub group	
Distribution	Tamil Nadu, Kerala, Andhra Pradesh, West Bengal and North Eastern India
Description	
Stature	Medium, growing upto a height of 2.0-2.3 m, pseudostem is watery green and the petiole margins are outwardly curling
Leaves	Green in color and erect
Bunch	6-8 hands loosely packed, angular in position
Yield	10-11 kgs
Fruit	Watery green at maturity, change into pale yellow upon ripening, Fruit peel is thick
Pulp	Unique taste, orange yellow in colour, sweet pulp with excellent aroma
Duration	11-12 months
Utility	Dessert
Special uses	Since it has a thick peel and the pulp is juicy, the fruits are just crushed with hand and sipped off Orange yellow pulp is rich in carotenoids (Pro Vitamin - A) Fruits do not shatter at full ripeness
Problems	Susceptible to Fusarium (race 1) wilt and Sigatoka leaf spot diseases



POOVILLA CHUNDAN



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Name	Poovilla Chundan
Synonyms	Thattilla Kunnan, Kodappanilla Kunnan, Koombilla Kunnan
Genome	AB
Sub group	Kunnan
Distribution	Tamil Nadu and Kerala
Description	Originally a backyard variety, now under commercial cultivation in Tuticorin and Tirunelveli district of Tamil Nadu
Stature	Medium in size and sturdy
Leaves	Dark green, erect with strong petiole
Bunch	Slightly angular
Fruit	Fruit tapers towards apex and has lengthily pointed tip
Pulp	Ivory white, very sweet, soft, mealy in texture and tasty
Duration	14-15 months
Utility	Dessert
Special uses	Exclusively used for the preparation of infant food. Maintained as backyard crop in households of rural Kerala and Tamil Nadu. Normally maintained in perennial clumps for year round supply of fruits
Special features	Immune to leaf spot diseases
Problems	Ripe fruits easily drop off from the pedicel

POOMGALLI

Name	Poomgalli
Synonyms	Valiya Kunnan
Genome	AB
Sub group	Kunnan
Distribution	Tamil Nadu and Kerala
Description	
Stature	Medium, pseudostem is yellowish green with dark blotches
Leaves	Erect, dark green, leathery and wax coated on the lower surface
Bunch	Bunch is truncated cone shaped and the hands are compactly packed
Yield	Exhibits extended female phase and attractive fruits
Fruit	10-12 kgs with a potential of 20 kgs
Pulp	Long with 12-14 cm tapers towards the apex. Starchy and used as infant food
Duration	Firm, starchy, moderately sweet in taste
Utility	14 - 15 months
Special uses	Dessert
Special features	Used in the preparation of infant food
Problems	Tolerance to leaf spot diseases and suitability to marginal conditions, has made it popular in homestead gardens



ADEKKA KUNNAN

Name	Adekka Kunnan
Synonyms	Adukka Kunnan, Octoman
Genome	AB
Sub group	Kunnan
Distribution	Kerala and Tamil Nadu
Description	
<i>Stature</i>	Medium
<i>Leaves</i>	Neither erect nor droopy, green and shiny, broader than in other Kunnan varieties
<i>Bunch</i>	Medium with 7-8 hands, very compactly arranged (hence could be the name Adekka)
<i>Yield</i>	7-8 kgs
<i>Fruit</i>	Small, short, smooth without any ridges, ashy green at maturity and ashy yellow upon ripening
<i>Pulp</i>	Cream in colour, firm, sweet with good aroma
<i>Duration</i>	11-12 months
<i>Utility</i>	Dessert
Special uses	Used for making banana powder/ flour
Special features	Fruits are persistent and do not shatter at ripeness, immune to leaf spot diseases. Occasionally set seeds and hence used in breeding programmes as female parent
Problems	Male sterile



Adekka Kunnan

PADALI MOONGIL

Name	Padali Moongil
Synonyms	
Genome	AB
Sub group	Kunnan
Distribution	Southern Tamil Nadu and Kerala. Cultivated in backyard gardens
Description	
<i>Stature</i>	Medium in size and sturdy
<i>Leaves</i>	Dark green and erect. Petioles are sturdy and strong
<i>Bunch</i>	Horizontal or slightly angular. It is a stable mutant without male bud. Normally 4-5 hands with 8-10 fruits per hand
<i>Yield</i>	5-6 kgs
<i>Fruit</i>	Fruits are long compared to other AB diploids (25 to 28cm) tapering towards apex with a lengthily pointed fruit tip
<i>Pulp</i>	Ivory white, very sweet, less acidic, soft, mealy in texture and tasty
<i>Duration</i>	13-14 months
<i>Utility</i>	Dessert
Special uses	Used for the preparation of infant food like other Kunnan (AB) varieties
Special features	Ripe fruits easily drop off from the pedicel



CHINGAN

Name	Chingan
Synonyms	Pacha Chingan, Chinga Bale
Genome	AAB
Sub group	Nendra Padathi
Distribution	Southern tips of Tamil Nadu and Kerala
Description	
Stature	Medium size, light green pseudostem with large dark brown blotches Withered bract and male flowers are persistent below the bunch
Leaves	Either erect or droopy, green on upper surface and slightly wax coated on lower surface
Bunch	4-8 hands and loosely packed fruits
Yield	8-10 kgs
Fruit	Angular and more flattened, fruit tip is blunt with persistent stylar base, thick fruit skin, remains light green even after ripening
Pulp	Light cream, soft and sweet
Duration	12-13 months
Utility	Dessert
Special uses	Suitable for higher altitudes
Special features	Has good keeping quality and fruits do not easily drop off at ripeness



NUMARAN

Name	Numaran
Synonyms	Ladan, Malaivazhai, Malai Kali
Genome	AAB
Sub group	Pome
Distribution	Endemic to Kolli Hills of Tamil Nadu. Nurtured by Malyali tribes
Description	
Stature	Medium, pseudostem is tall with 3.5 - 4.0 m height
Leaves	Leaves are normal and the petiole margins are pink shaded
Bunch	Horizontal, 7-8 hands and are loosely packed
Yield	8-9 kgs
Fruit	Angular and tapering towards the apex. Fruit skin turns pale yellow upon ripening
Pulp	Cream in colour, very sweet and highly fragrant
Duration	11-13 months
Utility	Dessert
Special uses	Pulp is preferable for making Panchamritham
Special features	Suitable for cultivation at higher altitudes
Problems	Susceptible to Fusarium wilt (race 1), pseudostem borer and corm weevil



KULLAN

Name	Kullan
Synonyms	Jawari Bale, Wather
Genome	AAB
Sub group	Pome
Distribution	TamilNadu and Karnataka Originally it is one of the a backyard varieties, now under commercial cultivation in Belgaum and Uttar Kannada districts of Karnataka
Description	
Stature	Very short with 1.6-1.8 m height. Withered bract and male flowers are persistent below the bunch
Leaves	Leaves are normal and the petiole bases are tightly clasped as in ABB cultivars
Bunch	Horizontal, 6-7 hands and are loosely packed
Yield	6-7 kgs
Fruit	Short with 8-9 cm length, angular, green at maturity and turns yellow upon ripening
Pulp	Cream in colour, very sweet and highly fragrant
Duration	10-11 months
Utility	Dessert
Special uses	
Special features	Highly suitable for high density planting, perennial system and for cultivation at higher altitudes
Problems	Ripened fruits easily drop off from the pedicel



BORCHAMPA

Name	Borchampa
Synonyms	
Genome	AAB
Sub group	Mysore
Distribution	Assam
Description	
Stature	Short with 2.0-2.3 m height, green with large brown block blotches on the pseudostem
Leaves	Dark green, dull, droopy
Bunch	Slightly angular, small with 4-6 hands, fruits, loosely packed
Yield	6-7 kgs with a potential of 12 kgs
Fruit	Short and very stout, bold (120-140 g) unusually plumpy fruits with a blunt tip
Pulp	Cream in colour, juicy, sweet with aromatic flavor
Duration	12-13 months
Utility	Dessert Natural mutant of Mysore (Champa) which is nurtured by few households in Assam inspite of its low yield
Special uses	Most fragrant among Mysore group
Problems	Poor yielder



MOTTA POOVAN

Name	Motta Poovan
Synonyms	
Genome	AAB
Sub group	Mysore
Distribution	Southern states of India, especially Kerala
Description	
Stature	Medium
Leaves	Dark green and dull
Bunch	Medium size with 12-13 hands of fruits as in Poovan
Yield	10-12 kgs which can go upto 15 kgs
Fruit	Dark green, smooth, golden yellow upon ripening, unusually blunt tip and lacks conspicuous bottle neck as in Poovan
Pulp	Cream in colour, with a good sweet-acidic blend
Utility	Dessert
Special uses	Another natural and stable mutant of Mysore sub group (Poovan) with short, blunt fruits. They resemble miniature form of Maia Popuolu. Maintained in few households Kerala for its uniqueness
Special features	Specially offered in temples Immune to Fusarium wilt disease (race 1)
Problems	Susceptible to Sigatoka leaf spot disease and carries Banana streak virus



THIRUVANANTHAPURAM

Name	Thiruvananthapuram
Synonyms	Kurangu Vazhai, Pisang Kelat
Genome	AAB
Sub group	
Distribution	Kerala, Andaman and Nicobar Islands
Description	
Stature	Medium size, pseudostem is yellowish green, Male bud is unusually large and light purple in colour
Leaves	Green, broad, leathery and droopy
Bunch	Slightly angular, 5-6 hands, loosely packed
Yield	6-8 kgs with a potential of 12 kgs
Fruit	Light green at maturity and golden yellow upon ripening, thick fruit skin
Pulp	Orange in colour, with granular texture, sweet with mild aroma
Duration	12-13 months
Utility	Dessert
Special uses	Used in Siddha medicine, nutritional banana with good carotenoid content
Special features	Immune to leaf spot diseases, excellent fruit retention even at full ripeness



DUDHSAGAR

Name	Dudhsagar
Synonyms	Kalibow, Pisang Raja
Genome	AAB
Sub group	
Distribution	Karnataka and Kerala
Description	
Stature	Medium
Leaves	Dark green, but not shiny
Bunch	Slightly angular, 6-7 hands of loosely packed fruits, cylindrical in shape
Yield	10-12 kgs
Fruit	Bold, dark green at maturity, flattened, attractive yellow upon ripening, fruit skin is very thick
Pulp	Juicy, firm, sweet with good milky aroma
Duration	12-13 months
Utility	Dessert
	Maintained in backyard for its quality fruits and freeness from major biotic and abiotic stresses
Special features	Immune to both Fusarium wilt (race 1) and Sigatoka leaf spot diseases
Problems	Poor yielder



Dr. Uma Subbaraya
NRCB, India.



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NRCB, India.



Dr. Uma Subbaraya
NRCB, India.

CHINALI

Name	Chinali
Synonyms	Chinari
Genome	AAB
Sub group	
Distribution	Tamil Nadu and Kerala
	House hold cultivar which has almost gone out of cultivation
Description	
Stature	Medium, pseudostem is greenish yellow with pink tinges all along, withered bracts and flowers persistent on the male axis
Leaves	Light green, tender in appearance, petiole margins are pink shaded
Bunch	Pendulous, 5-6 hands, hands are loosely packed, fruit hands completely turn towards the peduncle
Yield	6-8 kgs
Fruit	Bold, dark green, golden yellow upon ripening, slightly ridged
Pulp	Juicy, orange yellow, very sweet in taste with good aroma
Duration	12-13 months
Utility	Dual, suitable for dessert and cooking purposes
Special uses	Suitable for making chips
Special features	Carotene rich pulp
Problems	Poor yielder



MYSORE EATHEN

Name	Mysore Eathen
Synonyms	
Genome	AAB
Sub group	Plantain
Distribution	Western coastal belts of Kerala, Maharashtra and Goa
Description	
Stature	Medium in stature, 2-2.25 m height, Pink tinged pseudostem
Leaves	Normal, green and thin texture.
Bunch	Medium size with 5-6 hands, loosely packed fruits, slightly angular in position
Yield	9-10 kgs
Fruit	Long with 18-20 cm like a small plantain, pointed tip, dark green at maturity and turns to yellow upon ripening, fruit skin is thick with persistent stigma
Pulp	Cream in color, soft, sweet
Duration	11-12 months
Utility	Dual purpose
Special uses	Fruits are more suitable for making banana chips
Special features	Used for making banana figs
Problems	Susceptible to nematodes and leaf spot diseases



Uma Subbaraya
NICB, India



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BARGI BALE

Name	Bargi Bale
Synonyms	
Genome	AAB
Sub group	Pome
Distribution	Tamil Nadu and Karnataka (especially in North Karnataka).
Description	
Stature	Pseudostem is tall with 4-4.5 m height
Leaves	Leaves are normal and the petiole margins are pink shaded.
Bunch	Slightly angular in position, 7-8 hands and are loosely packed
Yield	12-14 kgs
Fruit	Fruits completely turn towards the peduncle, angular and tapering towards the apex. Fruit skin turns yellow upon ripening
Pulp	Cream in colour, slightly acidic in taste
Duration	12-13 months
Utility	Dessert
Special uses	
Special features	Suitable for cultivation at higher altitudes and intercropping in coconut plantation
Problems	Susceptible to Fusarium wilt (race 1), pseudostem borer and corm weevil



KRISHNA VAZHAI

Name	Krishna Vazhai
Synonyms	Kalibow, Pisang Raja
Genome	AAB
Sub group	Pome
Distribution	Tamil Nadu
Description	
<i>Stature</i>	Medium tall with 2.5 to 3.0 m height. Pseudostem is completely covered by black pigments which extend up to the underside of the midrib. Pseudostem looks black hence the name Krishna Vazhai
<i>Leaves</i>	Leaves are normal and the petiole margins are pink shaded
<i>Bunch</i>	Horizontal with 6-7 loosely packed hands.
<i>Yield</i>	8-10 kgs
<i>Fruit</i>	Angular and tapering towards the apex. Fruit skin turns yellow upon ripening
<i>Pulp</i>	Cream in colour, very sweet and highly fragrant.
<i>Duration</i>	11-13 months
<i>Utility</i>	Dessert
Special uses	Pulp is preferable for making Panchamirtham (a delicacy).
Special features	Suitable for cultivation at higher altitudes
Problems	Susceptible to Fusarium wilt (race 1), pseudostem borer and rhizome weevil

NENDRA PADATHI

Name	Nendra Padathi
Synonyms	Kuthiraival Chingan
Genome	AAB
Sub group	Nendrapadathi
Distribution	Southern tips of Tamil Nadu and Kerala
Description	
<i>Stature</i>	Medium size with light green pseudostem with large dark brown blotches, withered bract and male flowers are persistent all along the male phase
<i>Leaves</i>	Either erect or droopy, green on upper surface and slightly wax coated on lower surface
<i>Bunch</i>	7-8 hands and loosely packed fruits
<i>Yield</i>	6-7 kgs
<i>Fruit</i>	Angular and flattened, fruit tip is blunt with persistent stylar base, thick fruit skin, remains light green even after ripening
<i>Pulp</i>	Cream in colour, very sweet and highly fragrant
<i>Duration</i>	10-11 months
<i>Utility</i>	Dessert
Special uses	
Special features	Suitable as an inter crop in coconut and arecanut plantations under perennial system and for cultivation at higher altitudes
Problems	Ripe fruits easily drop off from the pedicel



KECHULEPA

Name	Kechulepa
Synonyms	
Genome	ABB
Sub Group	
Distribution	North Eastern India, popular in homestead gardens of Assam
Description	
Stature	Very tall, about 3.5 m height and robust, green pseudostem with pink tinges
Leaves	Dark green, droopy
Bunch	Huge, pendulous, 10-11 hands with loosely packed fruits
Yield	15- 20 kgs with a potential of 25 kgs
Fruit	Bold, pointed tip and thick fruit skin
Pulp	Juicy, very sweet (>31°B)
Duration	12-13 months
Utility	Dessert
Special uses	Suitable for making value added products like banana wine, juice and figs
Special features	Droopy leaves, no need for propping, resistant to shattering even at full ripeness
Problems	Susceptible to Fusarium wilt (race 1) and tall stature



PEYAN

Name	Peyan
Synonyms	Mada Vazhai, Sapota aratti, Nukkala Bontha, Ney Vannan
Genome	ABB
Sub Group	Peyan
Distribution	Tamil Nadu, Kerala, Andhra Pradesh and Karnataka
Description	
Stature	Tall (3.2-2.5 m) and robust, pseudostem is green, ash coated and with dark brown black blotches
Leaves	Very long with 2.4 m length and dark green, dull
Bunch	Medium 5-7 hands with loosely packed fruits
Yield	8-10 kgs
Fruit	Short, stout, flattened, ashy green at maturity and turns ashy yellow upon ripening, fruit skin is very thick
Pulp	Juicy, sticky, orange yellow, rich in carotenoid, granular and fibrous, good aroma and pleasant flavor similar to Sapota (<i>Achras zapota</i>)
Duration	15-16 months
Utility	Dessert
Special uses	Used in Siddha medicine as laxative, highly valued for its therapeutic uses
Special features	Immune to leaf spot disease and Fusarium wilt (race 1 and 2), fruits remain persistent even at full ripeness, suitable for perennial cultivation
Problems	Long duration



BOOTHI BALE

Name	Boothi Bale
Synonyms	Gobra Bale, Bontha Bale, Boodhi Bale
Genome	ABB
Sub group	Peyan
Distribution	Tamil Nadu, Kerala, Karnataka
Description	
Stature	Medium and stout, greenish yellow pseudostem with pink tinges. It differs from Peyan by droopy leaves
Leaves	Very long with (2-3 m) length and droopy, dark green and shiny
Bunch	Pendulous, 8-10 hands, compactly packed
Yield	12-13 kgs
Fruit	Short, stout, angular, ashy green at maturity, pale yellow upon ripening, fruits do not easily drop off
Pulp	Creamy in color, slightly hardy, juicy, less sweet
Duration	16-17 months
Utility	Dessert
Special uses	Laxative, used in Siddha medicine for piles treatment
Special features	Immune to leaf spot diseases and needs no propping
Problems	Long duration

VAYAL VAZHAI

Name	Vayal Vazhai
Synonyms	Naadu, Ney Vannan, Nattu Pazham
Genome	ABB
Sub group	Bontha
Distribution	Tamil Nadu, Kerala and Karnataka. But a popular landrace in Madurai district of Tamil Nadu.
Description	
Stature	Medium in stature, green colour pseudostem with pink tinges
Leaves	Normal, green and shiny
Bunch	Medium with 7-8 hands, loosely packed fruits
Yield	10-12 kgs
Fruit	Short with blunt tip, green at maturity and turns to golden yellow upon ripening, fruit skin is very thick
Pulp	Cream in color, soft, sweet, juicy
Duration	12-13 months
Utility	Dual purpose (as vegetable and dessert fruit)
Special uses	Specially offered to God Azhagar of Madurai in Tamil Nadu. Because of good fruit quality and better yield potential, it has been elevated from homestead cultivation to a commercial cultivar
Problems	Susceptible to Fusarium wilt (race 2)



NUTEPONG

Name	Nutepong
Synonyms	
Genome	ABB
Sub group	
Distribution	North Eastern India (grown in most backyards of Meghalaya)
Description	
Stature	Tall (3.2-3.5 m) and robust
Leaves	Dark green on both surfaces
Bunch	Huge, pendulous, truncated cone shaped, 10-11 hands, loosely packed fruits
Yeild	25-30 kgs
Fruit	Bold, ridged, tip is neither pointed nor bottle necked, starchy
Pulp	White at unripe condition but cream upon ripening
Duraion	11-12 months
Utility	Dual purpose mainly as dessert when no other banana fruits are available in the market
Special uses	Suitable for making bajji (a special snack in South India)
Special features	Suitable for marginal cultivation No incidence of Fusarium wilt is recorded in field till date

PACHA BONTHA BATHEESA

Name	Pacha Bontha Batheesa
Synonyms	Batheesa, Hazaria, Ayirangai
Genome	ABB
Sub group	Monthan
Distribution	Tamil Nadu, Kerala, Andhra Pradesh, Karnataka, Bihar, West Bengal and North Eastern India
Description	
Stature	Tall and robust, green pseudostem and shiny
Leaves	Dark green, shiny
Bunch	Bunch is long and truncated cone in shape with 20- 23 hands of fruits and pendulous in position. Fruits are compactly packed, male phase is more or less absent
Yield	25-27 kgs
Fruit	Green in colour, fruits end with conspicuous cap, fruit skin is very thick
Pulp	Pulp is starchy, creamy and mucilaginous, fruits turn yellow upon ripening
Duration	12-13 months
Utility	Mainly for culinary purposes, but as dessert in North East India
Special uses	Suitable for making Bajji (special snack in South India)
Special features	High yielding
Problems	Susceptible to Fusarium wilt (race 2), sensitive to abiotic stresses



KARTHOBIUMTHAM

Name	Karthobiumtham
Synonyms	Pordue
Genome	ABB
Sub group	unique
Distribution	North Eastern India with restricted distribution
Description	
Stature	Medium in size, pseudostem and sparingly wax coated
Leaves	Dark green on upper side and shiny
Bunch	Small, horizontal or slightly angular, 4-5 hands of loosely packed fruits. Plant is an unstable mutant for male bud absence
Yeild	7-10 kgs
Fruit	Ashy green, long with 20-2 cm in length and slightly pointed tip, ashy yellow upon ripening
Pulp	Cream in color and very sweet in taste
Duraion	12-13 months
Utility	Dessert
Special uses	Suitable for making banana figs and wine
Special features	Resistant to root lesion nematode (<i>Pratylenchus coffeae</i>) and being used for gene expression studies. When male bud is absent fruits are long like Plantain and has potential for use in breeding against Xanthomonas wilt
Problems	Smaller bunch size and occasional reversions to produce male bud



PAGAR BANANA

Name	Pagar Banana
Synonyms	Sagar Kol, Rigitchi
Genome	ABB
Sub group	Unique
Distribution	North Eastern India with restricted distribution around Namsai Forest area
Description	
Stature	Medium in size, Pale green pseudostem with large brown blotches
Leaves	Green and dull in appearance
Bunch	Small and slightly angular in position, 5-6 hands, 12-14 fruits per hand which are moderately packed
Yield	8-10 kgs
Fruit	Pale green, long with 14-16cm length, angular/flattened with a blunt tip, pale yellow upon ripening
Pulp	Cream in color and starchy (tasteless)
Duration	12 13 months
Utility	Dual
Special uses	
Special features	Being starchy, used for cooking apart from its dessert utility
Problems	Smaller bunch



JILLEGUDEM COLLECTION

Name	Jillegudem collection
Synonyms	
Genome	ABB
Sub group	Bontha
Distribution	East Godavari district of Andhra Pradesh
Description	
Stature	Medium in stature, 2.5-3 m, height, pseudostem is green with pink tinge
Leaves	Normal and green
Bunch	Medium with 10-11 hands, loosely packed fruits. Slightly angular in position.
Yield	12-15 kgs
Fruit	Short with 11-13 cm length, gradual tip, dull green at maturity and turns to yellow upon ripening
Pulp	Cream in color, soft, starchy and juicy
Duration	11-12 months
Utility	Dual purpose
Special uses	Unripe fruits are used as vegetable for cooking
Special features	
Problems	Susceptible to Fusarium wilt race 2



NEY VANNAN

Name	Ney Vannan
Synonyms	
Genome	ABB
Sub group	Bontha
Distribution	Tamil Nadu and Kerala
Description	
Stature	Medium in stature, 2-2.25 m height, green coloured pseudostem with pink tinges
Leaves	Normal, green and shiny
Bunch	Medium with 5-6 hands, loosely packed fruits
Yield	10-11 kgs
Fruit	Short with 9-10 cm lengths, blunt tip, green at maturity and turns to yellow upon ripening, fruit skin is very thick
Pulp	Cream in color, soft, sweet, juicy
Duration	11-12 months
Utility	Dual purpose
Special uses	
Special features	Medium stature
Problems	Susceptible to Fusarium wilt race 2



GINDE

Name	Ginde
Synonyms	
Genome	ABB
Sub group	
Distribution	North Eastern India with restricted distribution
Description	
Stature	Medium in size, yellow green pseudostem
Leaves	Normal, dark on upper side and shiny
Bunch	Small, 5-6 hands with loosely packed fruits
Yield	5-6 kgs
Fruit	Ash coated, short and slightly rounded, blunt tip, ashy yellow upon ripening
Pulp	Orange color, dull sweet, carotene rich
Duration	12-13 months
Utility	Dessert
Special uses	Suitable for making chips and with low TSS (24°B)
Special features	Carotene rich pulp
Problems	Smaller bunches, less number of fruits in a bunch

VENNUTU MANNAN

Name	Vennutu Mannan
Synonyms	
Genome	ABB
Sub group	Bontha
Distribution	Tamil Nadu and Kerala
Description	
Stature	Medium in stature, 2- 2.20m height, pseudostem is green with pink tinges. Profusely wax coated on the petiolar bases
Leaves	Normal, green and shiny
Bunch	Medium with 7-9 hands, loosely packed fruits. Slightly angular in position
Yield	12-15 kgs
Fruit	Short with 10-12 cm length, highly wax coated, blunt tip, ashy green at maturity and turns to ashy yellow upon ripening
Pulp	Cream in color, soft, starchy, juicy
Duration	11-12 months
Utility	Dual purpose
Special uses	
Special features	Medium stature
Problems	Susceptible to Fusarium wilt race 2



BIRUBUTIA

Name	Birubutia
Synonyms	Cherapadathi, Ashy Chakkia
Genome	ABB
Sub group	Bluggoe
Distribution	Bihar, Tamil Nadu and Kerala
Description	
Stature	Tall with 3.2 -3.5m height and robust stature
Leaves	Dark green on either surface and shiny on upper
Bunch	Huge, pendulous, cylindrical shaped, 11-12 hands compactly packed fruits
Yield	15-18 kgs
Fruit	Highly ash coated, bold, flattened, ridged, tip is pointed. Ashy yellow upon ripening
Pulp	White at unripe but cream upon ripening
Duration	11-12 months
Utility	Dual purpose
Special uses	Suitable for making bajji (a special snack)
Special features	Suitable for marginal cultivation. No report of field incidence of Fusarium wilt race 2
Problems	

ANKUR II

Name	Ankur II
Synonyms	
Genome	ABB
Sub group	Pisang Awak
Distribution	North Eastern India, popular in homestead gardens of Assam
Description	
Stature	Tall with about 3.5 m height and robust, reddish colored pseudostem
Leaves	Dark green and shiny
Bunch	Medium size, pendulous, with loosely packed fruits, 9-10 hands
Yield	10-15 kg
Fruit	Green, smooth surface and not as much ash coating like other Pisang Awak members. Turns yellow upon ripening
Pulp	Juicy and sweet with 30°B
Duration	12-13 months
Utility	Dessert
Special uses	Suitable for making value added products like banana wine, juice and figs
Special features	Pseudostem is very attractive with red pigmentation
Problems	Susceptible for Fusarium wilt (race 1) and tall stature



ASHY BATHEESA

Name	Ashy Batheesa
Synonyms	
Genome	ABB
Sub group	Mothan
Distribution	Tamil Nadu, Kerala, Andhra Pradesh, Karnataka, Bihar, West Bengal and North Eastern India
Description	
<i>Stature</i>	Tall and robust, green pseudostem and shiny
<i>Leaves</i>	Dark green and shiny
<i>Bunch</i>	Bunch is long and truncated cone in shape with 20-23 hands of fruits and pendulous in position. Fruits are compactly packed, male phase is more or less absent.
<i>Yield</i>	20-25 kgs
<i>Fruit</i>	Ash coated, fruits end with conspicuous cap, fruit skin is very thick
<i>Pulp</i>	Pulp is starchy, creamy and mucilaginous, fruits turn ashy yellow upon ripening
<i>Duration</i>	12-13 months
<i>Utility</i>	Mainly for culinary purposes, but as dessert in North East India
<i>Special uses</i>	Suitable for making Bajji
<i>Special features</i>	High yielding
<i>Problems</i>	Susceptible to Fusarium wilt (race 2), sensitive to abiotic stresses



MANGUTHAMANG

Name	Manguthamang
Synonyms	Borkal Baista
Genome	ABB
Sub group	
Distribution	North Eastern India
Description	
<i>Stature</i>	Tall (3.5-3.8m) and robust, shiny pseudostem
<i>Leaves</i>	Dark green, shiny and droopy
<i>Bunch</i>	Huge 10-12 hands in a bunch, loosely packed fruits with a huge male bud growing almost upto ground level
<i>Yield</i>	15-16 kgs and with a potential of 20-22 kgs
<i>Fruit</i>	Ashy green, very long pedicel
<i>Pulp</i>	Cream in colour, hard but juicy and slightly acidic
<i>Duration</i>	16-17 months
<i>Utility</i>	Dessert
Special uses	Valued for therapeutic uses by North Eastern Indian tribes as coolant, flower bud is popularly used as vegetable
Problems	Long duration



BHAT MANOHAR

Name	Bhat Manohar - A natural tetraploid
Synonyms	
Genome	ABBB
Sub group	Pisang Awak
Distribution	North Eastern India, a common homestead cultivar in Assam
Description	
<i>Stature</i>	Very robust , green pseudostem with pink tinge
<i>Leaves</i>	Green, highly droopy
<i>Bunch</i>	Huge, cylindrical in shape, 10-12 hands, compactly arranged
<i>Yield</i>	15-16 kgs
<i>Fruit</i>	12- 13 cm long, fruits are do not easily drop off at ripeness
<i>Pulp</i>	Cream in color, sugary in taste (32°B)
<i>Duration</i>	15-16 months
<i>Utility</i>	Dessert
<i>Special uses</i>	Resistant to leaf spot diseases, female fertile, used in banana improvement programme. Flower bud is used as vegetable and used in the preparation of pickles
Problems	Long duration



BHIMKOL

Name	Bhimkol
Synonyms	
Genome	BB
Sub group	Bhimkol
Distribution	North Eastern India and an integral part of all households in Assam, Meghalaya and southern Arunachal Pradesh
Description	
<i>Stature</i>	Very tall and robust, dark green pseudostem, highly wax coated at the petiole bases
<i>Leaves</i>	Dark green, shiny, droopy
<i>Bunch</i>	Huge, pendulous, hands very compactly arranged
<i>Fruit</i>	Bold, ashy green, turns brown on ripening
<i>Pulp</i>	White in color, mucilaginous pulp, very sweet (32°B)
<i>Duration</i>	20-22 months
<i>Utility</i>	Dessert
Special uses	Valued for therapeutic uses, coolant, ash from burnt pseudostem is used as detergent and for stomach ailments, calcium rich, dried powdered pulp used as infant food
Problems	Long duration
Seeds	200-240 seeds per fruit which are very soft in nature like those in pomegranate



Bhimkol

ELAVAZHAI

Name	Elavazhai
Synonyms	
Genome	BB
Sub group	
Distribution	Western ghats of Tamil Nadu, Kerala and Karnataka
Description	
<i>Stature</i>	Very tall and robust, green pseudostem, slightly wax coated at the petiole bases
<i>Leaves</i>	Green and erect
<i>Bunch</i>	Medium, pendulous, hands are very compactly arranged
<i>Yield</i>	16-18 kgs
<i>Fruit</i>	Ashy green, turns ashy yellow on ripening
<i>Pulp</i>	White in color, mucilaginous pulp, very sweet (30°B)
<i>Duration</i>	22-24 months
Utility	Dessert
Special uses	Valued for therapeutic uses, calcium rich, dried powdered pulp used as infant food. Leaves are more suitable for leaf industries
Problems	Long duration

Ethnobotany of wild species and landraces of banana

S I. No.	Tribe	Location	Clone or type used	Plant part used	Methodology	Form used	Properties
1	Tagins and Nitshi	Subansiri district of Arunachal Pradesh	<i>M. balbisiana</i> (w)	Pseudostem sap	Collected from the wedge shaped cut on the pseudostem	Used for drink	Good for diabetes and stomach ailments
2	Ahoms, Bodo, Hajong, Garo, Mikir	Assam	Bhimkol, Athiakol	Inner core of pseudostem and fruit peel	Cut into small pieces, sun dried and burnt to get ash.	Called 'khar' drink Additive to meat	Drink as antacid, colic and for heart burn
3	Ahoms, Garo, Karbi, Bodo, Koch tribes, Khasi	Assam, West Bengal, Meghalaya	Bhimkol, Athiakol	Pseudostem	Juice extracts by crushing pseudostem is filtered and consumed orally	Drink	To dissolve kidney stones, reduce stomach ulcers and for better bowel movement
4	Kuki	Themenglong, Imphal, Noney, Irang areas of Manipur	<i>M. balbisiana</i> , <i>M. actuminata</i>	Shoots	Fibreless inner shoots of young suckers	Salad and vegetables	

5	Mizo tribes Diphu tribes	Mizoram Assam	<i>Ensete glaucum</i>	Leaf sheath	Cut into small pieces	Salad or vegetable	Source of fibre in daily diet.
6	All tribes of Tirap, Lohit districts	Arunachal Pradesh	<i>Musa balbisiana</i> and edible clones	Young meristem of suckers	Chopped into pieces and added into curry	Vegetable	To remove in advertent addition of excess salt while cooking
7	All tribes	North-Eastern region	<i>M. balbisiana</i>	1 ft. long bits of leaf sheath on the pseudostem	-	Coolant	For wrapping betel leaves and long distance transportation.
8	All tribes	North-Eastern region	<i>M. balbisiana</i>	1ft. of long bits of leaf sheath on the pseudostem	-	-	Sunshade for young transplants and seedlings
9	Village folks	Assam	Bhimkol	Pseudostem	4-5 stems are tied parallel	As a raft to cross rivers and a mode of transportation during floods	-

10	Apatani, Adi, Nitshi	Subansiri & Siang districts of Arunachal Pradesh	<i>M. balbisiana</i> Bhimkol	Young leaves	Fibreless young and unopened leaves are ground to paste	Poultice against burns	Cooling and early healing effect
11	Irulas	Kerala	<i>Ensete glaucum</i>	Leaves	Ash obtained by burning leaves	Inhaled by asthma patients	For relief from wheezing
12	T a n g a m, Sherdukpens, Mishmi Bodo, Lalung, Garo of Assam.	Dirang, West Siang, Upper Siang districts of Arunachal Pradesh.	<i>M. balbisiana</i> Bhimkol	Leaves	Water proof banana leaves after scorching are used as inner lining for	Lining for the wooden barrels	Adds flavour to the beer.
13	All tribes	Arunachal Pradesh, Meghalaya, Tripura, Manipur	Bhimkol, Athiakol	Mature leaves	Dried leaves	As roofing material for preparing temporary sheds and animal sheds	Cheap source of roofing material
14	All tribes	Assam, Arunachal Pradesh, Meghalaya, Manipur and Tripura	<i>M. acuminata</i> , <i>M. balbisiana</i>	Flower buds	Cooked with pulses and cereals	Vegetable	As an alternate vegetable source during dry periods.

15	All tribes of Lohit and Tirap district	Arunachal Pradesh	<i>M. balbisiana</i> , <i>M. acuminata</i>	Yet to emerge in maturity inflorescence	Cooked with pulses	Vegetable	Alternate source of vegetable during periods of dry lseason and hunger
16	Adi, Mishmi, Sherdukpens etc.	Arunachal Pradesh	<i>M. acuminata</i> <i>M. balbisiana</i>	Flowers	Boiled	Eaten with salt and oill	For relief from joint pains and for better blood circulation.
17	Ahoms, Garo, Karbi, Bodo, Koch tribes Khasi,	Assam, West Bengal, Meghalaya	<i>M. acuminata</i> <i>M. balbisiana</i>	Root	Not revealed	In ayurvedic preparations for herbal medicines	Antihelmentic and tonic
18	All tribes	North-Eastern India	All wild types of <i>M. acuminata</i> , <i>M. balbisiana</i> and all other <i>lantraces</i>	Rhizome	Chopped and cooked with pulses	Cattle and pig feed	Cheap source of animal feed
19	All tribes of	Assam, Meghalaya and Lower Arunachal Pradesh	Bhimkol Athiakol	Underground rhizomes	Cut into small pieces, sun dried and burnt to get ash	Detergent	For washing clothes

20	Ahoms, Garo, Khasi, Karbi, Bodo, Koch tribes	Assam	Bhimkol	Ripe fruit pulp	Pulp is mashed with water and sieved to remove seeds and mucilaginous pulp is collected	Additive to cereal beer made of rice, sorghum etc	For better fermenting of beer with fruity flavour.
21	Ahoms, Garo, Karbi, Bodo, Koch tribes Khasi	Assam, West Bengal, Meghalaya	Bhimkol, Athiakol	Mucilaginous pulp of fruits	Pulp is mashed with water and sieved to remove seeds. Pulp is collected, dried as flakes and powdered	Baby food with rice or milk	Easily digestible for infants
22	Ahoms, Garo, Karbi, Bodo, Koch tribes Khasi,	Assam, West Bengal, Meghalaya	<i>M. acuminata</i> , <i>M. balbisiana</i> , and all other <i>lantraces</i>	Whole plant	Finely chopped and mixed with soil. allowed to feed on plant waste and its excreta is collected for manuring	Vermicompost	Vermicompost used as a biological manure for growth of crop plants.