International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Varietal Wealth and Documentation of Indigenous Dessert Banana Varieties (*Musa spp*.) Of Vaishali District, Bihar, India

Aman Kumar Jha[1], Surendra Kumar Prasad[2]

Department of Botany, Faculty of Science, Patna University, Patna-800005, Bihar,India.

ABSTRACT

Banana is an important horticultural fruit crop of the world. It provides nutritional, economical and cultural benefits.The present study aimed to document and characterise the indigenous dessert banana varieties of Vaishali district,Bihar to assess morphological traits and varietal wealth. Field surveys, interaction with the farmers, traders and systematic observations were conducted in major banana growing areas of the district. Result showed the rich diversity of indigenous dessert banana varieties namely, Malbhog, Chinia, Alpan,Kothia and Barhari exhibiting significant variations in plant height, bunch characteristics,thickness of skin and shelf life.The study also revealed that some local varieties are on the verge of genetic erosion due to the adoption of high yielding commercial hybrids.Indigenous varieties with unique morphological traits emphasize their agronomic and economical potential. Conservation of these indigenous varieties are essential to safeguard these genetic resources.Documentation provides baseline data for further research and is essential step in conservation of plant varieties.

Keywords: Indigenous varieties, documentation,dessert varieties, Vaishali district characterisation.

Introduction

Banana is a giant, perennial, monocotyledonous herb belonging to the family *Musaceae*.Farmers favour this crop for cultivation in upland and lowland areas due to its profitability(Issac and Podikunj, 2012). It is cultivated in both tropical and sub- tropical regions of the world. Banana serves as an export crop and is consumed in fresh or cooked form, in both ripe and raw stages.

Carbohydrates,Minerals,Potassium,Phosphorus and other nutritional elements are found in edible parts of banana(Ashok kumar *et.al*.,2018).The banana is thought to have originated in Malaysia as a result of complex hybridization events(Novak,1992).Modern cultivated forms of banana and plantain are the result of intra and inter specific crosses between two wild species, *Musa acuminata colla*. that originates from Malaysia and *Musa balbisiana colla*. which originates from Indo-china(Vuylsteke *et.al*., 1997).

Banana, following Mango, is the second leading fruit crop in Bihar, is grown over 31,900 hectares with a production of 1,517, 000 metric tonnes(Mistry *et.al*.,2012).

Banana is grown predominantly in two separate belts in Bihar namely Vaishali region which includes districts like Vaishali,Muzaffarpur and Samastipur while the other is new North-Eastern Koshi region which includes district like Bhagalpur, Katihar,Saharsa and Purnea.Both regions are enriched with favourable agro- climatic conditions conducive for banana cultivation.

The area of Vaishali,specially Gangetic belt, is famous for its robust agricultural yields.Among the various types of banana varieties grown in Vaishali region of Bihar, dessert bananas are highly preferred due to their prized value, unique flavour, nutritional qualities and local consumption.Bihar with its fertile alluvial soils and favourable agro-climatic conditions support the cultivation of a rich diversity of indigenous banana varieties.These traditional varieties are maintained by farmers, serve as an important genetic resource and adaptability to local conditions resistance to biotic and abiotic stresses.Many indigenous banana varieties are under threat due to climate change, problems in irrigation, lack of scientific cultivation techniques,replacement by high yielding commercial cultivars and lack of crop rotation also.This leads to potential loss of genetic diversity.Despite their significance, systematic documentation and characterisation of these varieties remain limited. Documentation provides base line data for further research.Documentation of the variety is the initial step toward effective conservation(Dinesh and Vasugil,2002; Pandit *et.al*.,2007; Rajan *et.al*.,1999).

Materials and Methods:

Study area**:** The study was conducted in different areas of Vaishali district.The district lies between North latitude $25^0$28’0” to $26^0$5’0” and East longitude $85^0$5’00” to$85^0$40’00”.

Field survey and data collection:

Frequent field survey was conducted to identify and document the indigenous banana varieties across different areas of Vaishali district.Information was collected through interaction with farmers and direct observation.

Photography:

Photographs were taken during field visits.

Morphological characterisation:

The collected indigenous banana varieties were characterised based on several morphological parameters as described below:

Malbhog(AAB)

Plant height:--14 ft.,Thickness of Pseudostem—70 cm.,Colour of pseudostem—green with red streak at the base of pseudostem, Flowering time:--one year after plantation, Time of plantation:-- throughout the year but preferably during monsoon,Total number of hands in one bunch:--10, Total number of fingers in one hand:--12-14, Ripening period :-- after 4-5 months of flowering, thickness of skin:- thin, Colour of the pulp unripe:- white, Colour of the pulp ripe:--cream colour, Taste of the pulp:-- sweet with pleasant aroma, Fruit shape:-- slightly curved, Fruit peel colour before ripening:-- green, Fruit peel colour after ripening:-- bright yellow, Cracks in fruit peel:-- fruit cracking occurs, Fruit fall from hands :-- finger drop occurs, Fruit apex:-- round, Bunch position:-- vertical, Bunch shape :-- cylindrical, Bunch appearance:-- loose Yield :--13-14 kgs/bunch, Shelf life :-- 5 days.

Chinia(AAB)

Plant height:--13ft.,Thickness of Pseudostem—60 cm.,Colour of pseudostem— yellowish green at the base of pseudostem, Flowering time:--one year after plantation, Time of plantation:-- throughout the year but preferably during monsoon,Total number of hands in one bunch:--12, Total number of fingers in one hand:--12-14, Ripening period :-- after 4-5 months of flowering, thickness of skin:- thin, Colour of the pulp unripe:- white, Colour of the pulp ripe:--cream colour , Taste of the pulp:-- sweet, Fruit shape:--

slightly curved, Fruit peel colour before ripening:-- green, Fruit peel colour after ripening:-- bright yellow, Cracks in fruit peel:-- no fruit cracking occurs, fruit fall from hands :-- no finger drop occurs, Fruit apex:-- bottle necked, Bunch position:-- vertical, Bunch shape :-- cylindrical, Bunch appearance:-- compact ,Yield :--16-18 kgs/bunch, Shelf life:-- 6 days.

Alpan (AAB)

Plant height:--15 ft.,Thickness of Pseudostem—72 cm.,Colour of pseudostem— red-green at the base of pseudostem, Flowering time:--one year after plantation, Time of plantation:-- throughout the year but preferably during monsoon,Total number of hands in one bunch:--20, Total number of fingers in one hand:--18-22, Ripening period :-- after 4-5 months of flowering, thickness of skin:- thin, Colour of the pulp unripe:- white, Colour of the pulp ripe:--cream colour , Taste of the pulp:-- sweet with aroma, Fruit shape:-- slightly curved, Fruit peel colour before ripening:-- green, Fruit peel colour after ripening:-- golden yellow, Cracks in fruit peel:-- no fruit cracking occurs, Fruit fall from hands :-- No finger drop occurs, Fruit apex:-- pointed, Bunch position:-- generally at 45^0, Bunch shape :-- cylindrical, Bunch appearance:-- very compact Yield :--13-16 kgs/bunch, Shelf life:-- 5 days

Barhari (AAB)

Plant height:--12 ft.,Thickness of Pseudostem—56 cm.,Colour of pseudostem—green at the base of pseudostem, Flowering time:--one year after plantation, Time of plantation:-- throughout the year but preferably during monsoon,Total number of hands in one bunch:--09, Total number of fingers in one hand:--12-13, Ripening period :-- after 4-5 months of flowering, thickness of skin:- thin, Colour of the pulp unripe:- white, Colour of the pulp ripe:--cream colour , Taste of the pulp:-- sweet, Fruit shape:-- straight, Fruit peel colour before ripening:-- green, Fruit peel colour after ripening:-- yellow, Cracks in fruit peel:-- fruit cracking occurs, Fruit fall from hands :-- No finger drop occurs, Fruit apex:-- round, Bunch position:-- vertical, Bunch shape :-- cylindrical, Bunch appearance:-- loose, Yield :--11-14 kgs/bunch, Shelf life:-- 4 days.

Kothia(ABB)

Plant height:--13.5ft.,Thickness of Pseudostem—74 cm.,Colour of pseudostem—green at the base of pseudostem, Flowering time:--one year after plantation, Time of plantation:-- throughout the year but preferably during monsoon,Total number of hands in one bunch:--10, Total number of fingers in one hand:--12-13, Ripening period :-- after 4-5 months of flowering, thickness of skin:- thick, Colour of the pulp unripe:- white, Colour of the pulp ripe:--creamy white, Taste of the pulp:-- sweet, Fruit shape:-- straight, Fruit peel colour before ripening:-- green, Fruit peel colour after ripening:-- yellow, Cracks in fruit peel:-- no fruit cracking occurs, Fruit fall from hands :-- No finger drop occurs, Fruit apex:-- pointed, Bunch position:-- vertical, Bunch shape :-- cylindrical, Bunch appearance:-- loose, Yield :--16-20 kgs/bunch, Shelf life:-- 5 days.

Results and Discussion

The field survey conducted in major banana growing areas of Vaishali district showed substantial indigenous varietal wealth of dessert bananas.Documentation through field visits, interaction with farmers and traders and systematic observation led to the identification of important indigenous varieties of dessert bananas like Malbog,Chinia,Alpan,Kothia and Barhari.Among these varieties Alpan and Kothia found to

be the most extensively cultivated varieties in the areas.Malbhog and Chinia were moderatively distributed while the remaining Barhari was rare indicating their gradual decline.

Among the observed varieties maximum pseudostem height was recorded in Alpan(15ft.) while minimum pseudostem height was recorded in Barhari(12ft.)Similar variations were observed by different authors(Kavitha *et.al*.,2008 and Sagar *et.al*.,2014).

Thickness of pseudostem was maximum in Kothia(74cm.) and Alpan(72cm.) whereas it was minimum in Barhari(56cm.) and Chinia(60cm.).This variations among banana varieties could be attributed to the genetic potential of different genotypes,influence of genotype and environmental interactions or variations in their ability to absorb and utilize nutrients efficiently from the soil(Kavitha *et.al*.,2008).

Fruit crackings were observed in Malbhog and Barhari varieties while finger drop was only observed in Malbhog which is characteristic features of Malbhog variety.Thickness of fruit peel was thick in Kothia variety while rest varieties had thin peel.Shelf life varied among different genotypes.Chinia resulted the maximum shelf life(6 days) while it was minimum in Barhari(4 days).The shelf life of banana fruits varies among genotypes and is closely linked to peel thickness and the sugar acid balance of the pulp(Sarkar *et.al*.,2005).

Number of hands in one bunch and number of fingers in one hand was different among different cultivars.Highest number of hands per bunch was maximum in Alpan(20) and it was minimum in Barhari(9). Number of fingers differed among different cultivars.These findings are in line with other scholars(Medhi *et.al*.,1994 and Biswal *et.al*.,2004).

Conclusion

The present study highlights the varietal wealth of indigenous dessert bananas in Vaishali district of Bihar.The survey revealed that indigenous dessert banana varieties possess unique qualities such as fruit size, aroma,taste and other post- harvest attributes Many of these traits hold potential nutritional, economical and cultural values especially in meeting local consumption and contribute to food security.These varieties are not only adapted to the region's agro-climatic conditions but also contribute to dietary diversity and local livelihoods.

This study also reveals that several local dessert varieties are under threat due to replacement by dominant commercial cultivars and changing agricultural practices. Preserving this varietal wealth requires urgent conservation strategies.The present study also expands the baseline data needed for future breeding programmes and cultivar improvement.

Chinia

Kothia

Malbhog Alpan

Barhari.

References

1. Biswal, M.K., Lenka, P.C. and Dash, P.K.(2004).Evaluation of culinary banana genotypes. *The Orissa Journal Of Horticulture*.,32(1):63-65.
2. Dinesh, M.R. and Vasugil, C.(2002).Catalogue of Mango Germplasm,IIHR, Bangalore,pp.-160
3. Issac, S.R. and Podikunj, B.(2012). Biomass recycling and integrated nutrient management in banana-A farmer participatory research. *Indian Research Journal Of Extension Education*.,12(4) (Special issue,vol-1):288-290.
4. Kavitha, P.S., Balamohan, T.N., Kumar, N. and Veeraragavathatham, D.(2008). Genetic variability studies in banana hybrids, *The Asian Journal of Horticulture*.,3(2):265-269.
5. Kumar, Ashok, Elayabalan, KS., Shobana, V.G., Sivakumar, P. and Pandiyan, M.(2018).Nutritional value of cultivars of banana(Musa spp.) and its future prospects.*Journal Of Pharmacognosy and.Phytochemistry*,7(3):2972-2977.
6. Medhi, G.(1994).Performance of some cultivars of banana in Assam, *Haryana Journal Of Horticultural Science*.,23(3):181-185.
7. Mistry, N.C., Singh, B. and Gandhi, C.P.(2012). Indian Horticulture Database-2011, National Horticulture Board,Ministry of Agriculture.Govt. of India.Gurgaon.
8. Novak, F.J.(1992).Musa(Bananas and Plantains) In: Hammerschlag, F.A., Litz, R.E.,(eds). Biotechnology of perennial Fruit crops, CAB International, University Press, Cambridge UK,pp,449-488.
9. Pandit, S.S., Mitra, S., Giri, A.P., Pujari, K.H., Patil, B.P., Jambhale, N.D. and Gupta, V.S.(2007).Genetic diversity analysis of Mango cultivars using inter simple sequence repeat markers. *Current Science*, 93:1135-41.
10. Rajan, S., Negi, S.S. and Kumar, Ram(1999).Catalogue of Mango Germplasm,Central Institute Of Subtropical Horticulture,Lucknow.
11. Sagar, B.S.,Raju, B., Hipparagi, K.,Patil, S.N. and Sahithya, B.R.(2014). Evaluation of banana genotypes for growth and yield under Northern dry zone of Karnataka, The Biscon.,9(4):1773-1775.
12. Sarkar, S.K., Bauri, F.K., Misra, D.K. and Bandyopadhyay, B.(2005). Varietal evaluation of silk Mysore and pome sub group bananas for yield and post- harvest attributes including diseases and pests.*The Orissa Journal Of Horticulture*, 33(2):20-24.
13. Vuylsteke, D., Ortiz, R., Shaun, B.F. and Crouch, J.H.(1997). Plantain improvement,*Plant Breeding.Review*., 14:267-320.