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## Studies on vegetative characterization of some elite Banana Genotypes (*Musa* spp.)

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**Abstract**

An experiment entitled “Studies on vegetative characterization of some elite Banana Genotypes (*Musa* spp.)” was carried out at the field of the AICRP on Fruits (Banana), at Horticultural Research Station, Orissa University of Agriculture and Technology (OUAT), Bhubaneswar during the year 2017-18. The experiment comprised of five (05) treatments replicated four times and was laid out in a Randomized block design. The 5 varieties of banana viz., BRS selection Popoulu (AAB), Nendran (AAB) as check, Manjari Nendran, NRCB Selection-10 (ABB) and Budubale (ABB) as check. The standard recommended packages of practices were followed in each treatment comprising of 20 plants. Observations in respect to vegetative characters of banana were analysed statistically and the result indicated that among all the genotypes studied, NRCB Selection-10 proved its superiority in terms of pseudostem girth, number of leaves, leaf area and number of suckers. The above genotype also has the least pseudostem height. The traits to earliness in shooting and harvest were more in BRS Selection Popoulu which makes it par with NRCB Selection-10 with respect to bunch weight and yield.

**Keywords:** Banana, vegetative, genotypes, height, girth, leaves

**Introduction**

Banana is the fruit of a plant of the genus *Musa* (family Musaceae), which is cultivated primarily for food and secondarily for the production of fibre used in the textile industry are also cultivated for ornamental purposes. Almost all the modern edible parthenocarpic bananas come from the two wild species – *Musa acuminata* & *Musa balbisiana*. Bananas are vigorously growing, monocotyledonous herbaceous plants. The banana is not a tree but a high herb that can attain up to 15 meters of height. The cultivars vary greatly in plant and fruit size, plant morphology, fruit quality and disease and insect resistance. Most bananas have a sweet flavour when ripe; exceptions to this are cooking bananas and plantains. Plantains are hybrid bananas in which the male flowering axis is either degenerated, lacking, or possess relicts of male flowers. Plantains are always cooked before consumption and are higher in starch than bananas.

India is the largest producer of banana contributing 27% of world production (FAO, 2009) [6]. In India, the total area under banana cultivation is 0.85 mha with the production of 30 MT and productivity is about 34.0 MT/ha (NHB, 2016-17). In Odisha, the total area under banana cultivation is about 24490 ha with the production of around 0.466 MT and productivity is about 19.05 MT/ha (NHB, 2016-17). The banana cultivars like BRS Selection Popoulu, Nendran and Manjeri Nendran which belong to the genomic group AAB and NRCB Selection-10, Budubale which belong to the genomic group ABB are all used for dessert purpose. Besides, BRS Selection Popoulu, Nendran and Manjeri Nendran are good source for making chips and very popular in the district of Kerala.

The present investigation was undertaken to evaluate the new banana genotypes belonging to AAB Plantain type and ABB Karpuravalli type. In AAB plantain type BRS Selection Popoulu, Manjeri Nendran were evaluated against the check Nendran and in ABB Karpuravalli group, NRCB Selection-10 was evaluated against the check Budubale. Their performances were evaluated under the coastal plain zone of Odisha in respect of vegetative growth characters. The objective is to select the elite genotypes so that the genotypes could be commercially grown in the farmer's field. The results obtained in the present investigation were discussed under appropriate headings.

## Materials and methods

An experiment entitled “Studies on vegetative characterization of New Banana Genotypes (*Musa* spp.)” was carried out at the field of the AICRP on Fruits (Banana), at Horticultural Research Station, Orissa University of Agriculture and Technology (OUAT), Bhubaneswar during the year 2017-18. The experiment comprised of five (05) treatments replicated four times and was laid out in a Randomized block design. The 5 varieties of banana viz., BRS selection Popoulu (AAB), Nendran (AAB) as check, Manjeri Nendran, NRCB Selection-10 (ABB) and Budubale (ABB) as check. The standard recommended packages of practices were followed in each treatment comprising of 20 plants.

The length of leaf was measured from the base of leaf petiole to the tip and breadth was measured at the maximum breadth of leaf blade at fifteen day interval from 3 months after planting (MAP) until inflorescence emergence. The leaf area was worked out as the multiplication of the product of length and breadth of the leaf with leaf area factor (0.8) suggested by Summerville, 1939 [17]. The number of leaves per plant which were fully opened were counted per plant and recorded at flowering and harvesting time. The height of pseudostem was measured from soil level to the upper most points of contact of petioles of two youngest leaves as suggested by Lahav, (1972). Observations recorded from 2 MAP up to inflorescence emergence. The circumference of pseudostem was measured at 20 cm above ground level at fortnight interval from 2nd MAP until inflorescence emergence. Planting to shooting was recorded from planting until the emergence of the first bract. The number of days taken for flowering to harvest was recorded and then average was worked out. The number of suckers of ten plants from each treatment was counted four months after planting and the mean was calculated. Phyllochron was measured by the time interval between successive leaf emergences was recorded in days taking into consideration the emergence day of preceding leaf.

## Results and Discussion

### Growth parameters

The growth parameters studied were pseudostem height, pseudostem girth, number of suckers, number of functional leaves at shooting, phyllochron, leaf length, leaf width and leaf area. Significant variation was observed among the five genotypes with respect to these growth characters.

The maximum pseudostem height was observed in Budubale (352.30 cm) and the minimum height was recorded in NRCB Selection-10 (210.30 cm). NRCB Selection-10 recorded maximum pseudostem girth (69.4 cm), whereas, minimum girth was observed in Nendran (50.50 cm). The number of functional leaves at shooting stage was highest in NRCB Selection-10 (14.6) followed by BRS Selection Popoulu (12.7) and Manjeri Nendran (12.1), whereas, lowest in Nendran (9.9). The differences in the plant height, stem, girth and number of leaves of the plants at the time of shooting has been reported earlier by different workers. It may be attributed to the genetic potential of the plants and environmental factors such as climate and nutrient availability. Kavitha *et al.* (2009) [8] studied 12 Nendran ecotypes of banana and recorded the range of the plant height from 264.1- 387.0 cm. Singh (2010) [16] observed plant height (2.16 m) in banana cv. Nendran. Menon *et al.* (2014) [11] recorded pseudostem height of 295.6 cm in Popoulu and 301.0 cm in Nendran. They also observed pseudostem girth of 51.6 cm in Popoulu and 50.6 cm in Nendran. The number of leaves was significantly higher in Popoulu (12.4) as compared to Nendran (9.8). Present findings are also in conformity with the results obtained by Deo *et al.* (1999) [4], Suvittawat *et al.* (2014) [18], Biswal *et al.* (2004) [1], Sarkar *et al.* (2005) [14], Uazire *et al.* (2008) [19] and Kumar *et al.* (2012) [9].

With respect to phyllochron, the highest reading was observed in Nendran followed by Manjeri Nendran and Budubale and minimum in NRCB Selection-10. Among all the treatments, the maximum leaf length was reported in BRS Selection Popoulu (148.00 cm). NRCB Selection-10 (65.00 cm) recorded significantly higher leaf width as compared to rest of the genotypes. The leaf area was found to be highest in NRCB Selection-10 (0.70 m<sup>2</sup>) and least area was found in Manjeri Nendran (0.49 m<sup>2</sup>). Karuna and Rao (2016) [7] reported similar findings in most of the genotypes.

NRCB Selection-10 recorded the maximum number of suckers (8.6), whereas, BRS Selection Popoulu recorded minimum number of suckers (3.4). The number of suckers varied among all the genotypes. The variation in production of sucker was due to varietal characters and production of more suckers absorbs a lot of nutrients from the soil which affects the productivity of the plant. Variability in sucker production among different culinary cultivars was also reported by Biswal *et al.* (2004) and Blomme *et al.* (2000) [1, 2].

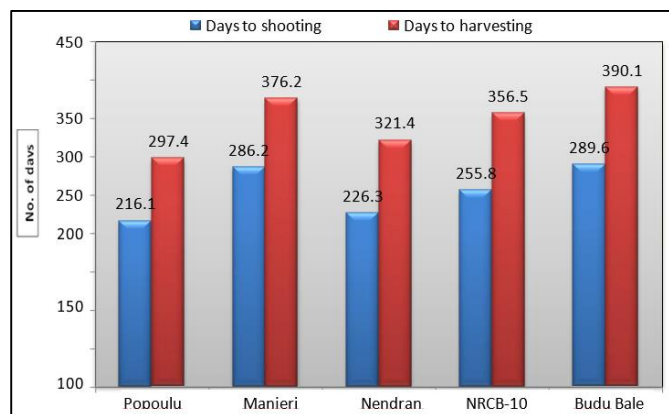
**Table 1:** Shows AAB (Plantain group) and ABB (Pisang Awak/Karpuravalli group)

Treatments	Pseudostem height at shooting (cm)	Pseudostem girth at shooting (cm)	Number of suckers at shooting	Number of functional leaves at shooting	Phyllochron (in days)	Length of leaves at shooting (cm)	Width of leaves at shooting (cm)	Leaf area at shooting (m <sup>2</sup> )
<b>AAB (Plantain group)</b>								
T1- BRS Selection Popoulu	260.6	53.5	3.4	12.7	8.1	148.00	57.60	0.68
T2- Manjeri Nendran	305.4	57.5	4.2	12.1	7.5	116.65	51.59	0.49
T3- Nendran (Check)	297.4	50.5	6.6	9.9	8.2	144.00	54.30	0.62
<b>ABB (Pisang Awak/Karpuravalli group)</b>								
T4- NRCB Selection-10	210.3	69.4	8.6	14.6	7.2	135.00	65.00	0.70
T5- Budubale (Check)	352.3	64.3	5.4	11.2	7.8	123.00	51.00	0.50
SE(m)±	5.33	2.48	0.48	0.96	0.15	3.99	2.29	0.02
C.D. at 5%	16.41	7.63	1.48	2.96	0.47	12.28	7.07	0.07
CV (%)	7.33	8.39	17.09	15.88	3.92	5.98	8.20	7.96

### Days to shooting and harvesting

Among all the treatments, early shooting was observed in BRS Selection Popoulu (216.1 days), whereas, late shooting was recorded in Budubale (289.6 days). The same trend was also observed in days taken to harvest. Von Loesecke (1950) [20], Simmonds (1959) [15] and Sanchez (1971) [13] reported the

influence of varietal characters and growing conditions on the time taken for flowering in banana. Similar variations were also reported by Ram *et al.* (1989) [12], Medhi (1994) [10], Deshmukh *et al.* (2004) [5], Delvadia *et al.* (2008) [3], Kumar *et al.* (2012) [9] and Suvittawat *et al.* (2014) [18].



**Fig 1:** Shows no of days, Days to shooting and Days to harvesting

### Conclusion

The result indicated that among all the genotypes studied, NRCB Selection-10 proved its superiority in terms of pseudostem girth, number of leaves, leaf area and number of suckers but it has the least height. It has the potential to escape the damage due to heavy wind which can be attributed to its short stature and thicker stem girth. Keeping the above points in view, the genotype, NRCB Selection-10 may be recommended for commercial cultivation by the farmers.

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