

# PERFORMANCE OF BANANA CULTIVARS UNDER INDIAN WEST COAST CONDITIONS

**B.C. Uthaiyah, K.M. Indires, M. Jayarama Reddy and K. Balakrishna Rao**

Regional Research Station (UAS), Mudigere 577 132, Karnataka

**Abstract:** The growth characters of eight banana cultivars were studied to assess their performance under west coast conditions. The cultivars, Boodibale (ABB), Karibale (ABB) and Rasthali (AAB) were found to be taller and more vigorous than the others, whereas the cultivar Robusta (AAA) was the dwarfest. The crop duration was more in the tall varieties and the least in the medium tall cultivar, Nendran. The highest yield of 66.45 t/ha was recorded by the cultivar Robusta (AAA) and the lowest yield by Ney Poovan (AB) (28.42 t/ha). The cultivar Poovan (AAB) registered the maximum number of fruits per bunch (140.9), whereas it was the least in Nendran (47.8). Each fruit in Nendran weighed on an average 268.9 g. The total soluble solids of ripe fruit pulp was the maximum in Ney Poovan (AB) (30.33%) and the least in Robusta (AAA) (20.09%). Edible to non-edible ratio of fruit was the highest in Rasthali (AAB) (5.22) and least in High Gate (AA) (1.79). The cultivar Robusta (AAA) is heavy yielder; but with regard to quality and other characters Rasthali (AAB) appeared to be superior.

## INTRODUCTION

Banana is a commercial fruit crop of India, grown in an area of 2.4 lakh hectares (Rao, 1984). With its ability to yield high tonnage and fairly good margin of profit and because of the availability of the fruit with pleasant aroma and characteristic taste throughout the year at moderate price, the crop has earned the status of the most popular fruit among the growers as well as the consumers, in large part of the country. It is estimated that more than 300 cultivars are available in India. It is well established that the performance of a clone in a locality is a function of its genotype and the environment. Therefore, the performance will vary under different agroclimatic situations. Nair and Nair (1969) opined that among the introduced banana cultivars, Bodler Alta Frot and Giant Governor were the most suitable ones for the coastal belt of Kerala. Though several banana cultivars are available now, a systematic evaluation of these and of their yield potentialities have not been done under the coastal conditions. Therefore, an attempt was made to find out the suitability of some of them to the west coast conditions.

## MATERIALS AND METHODS

A field investigation was conducted at the Regional Research Station, Brahmavar, Dakshina Kannada, Karnataka, during 1988-89. The experiment was laid out in completely randomised block design with eight cultivars viz., Ney Poovan (Syn. Puttabale) (AB), Robusta (AAA), High Gate (AAA), Rasthali (AAB), Poovan (Syn. Mysore) (AAB), Nendran (AAB), Boodibale (ABB) and Karibale (ABB). Of these, Robusta and High Gate are the introduced cultivars and the others are local ones. There were three replications in the trial with four plants per replication. The crop was planted giving a spacing of 2 m both ways. Regular cultivation practices suggested for the coastal region were adopted. Observations on vegetative growth parameters, yield and bunch characters were recorded. The number of days taken from bunching to colour break in one or two fingers was taken as the duration for bunch maturity. One ripe fruit from each hand of the bunch constituted the sample for recording total soluble solids (TSS) and pH. The pulp from the fruits was pooled and blended using a blender. Determination of total soluble solids of the pulp was

done using a hand refractometer. Three samples from single bunch formed three replications. The data were statistically analysed.

## RESULTS AND DISCUSSION

Significant differences were noticed in several characters (Table 1) among the eight cultivars. Out of these, Boodibale with the maximum height of 397.8 cm differed significantly from the others, followed by Rasthali (356.3 cm) and karibale (354.9 cm) which were on par. The dwarfest was Robusta (244 cm). In general, the relative differences in the height of the pseudostem are in agreement with those noticed by Jacob (1952), except in Rasthali, which was found to grow tall under west coast situations. With regard to pseudostem girth at base too, maximum value was seen in Boodibale (85.3 cm), followed by High Gate (79.4 cm). However, the difference between them was not significant. Ney Poovan had a girth of 77.4 cm. Karibale showed the least value of 59.2 cm. These variations are also in conformity with the observations of Jacob (1952), except in Boodibale and Karibale.

Normally, the tall varieties are known to be susceptible for wind damages. But in the present study, the tallest cultivar, viz., Boodibale, has not been affected due to normal seasonal winds, whereas the medium tall varieties Ney Poovan and Nendran with fairly good stem girth suffered more due to such winds.

The crop duration was less in Robusta (399 days), Nendran (343 days) and High Gate (351 days). But, the cultivars Boodibale and Karibale took 433 and 405 days, respectively to attain maturity. It appears that the tall cultivars take longer duration. In most of them except in Rasthali, the crop dura-

tion was found to be in conformity with the earlier findings (Jacob, 1952). The observations on varietal differences in sucker production revealed that Boodibale is more prolific (7.70 suckers/plant), closely followed by High Gate (7.07 suckers/plant). Poovan, Robusta and Rasthali showed low values in this regard (3.17, 4.00 and 4.17/plant respectively).

The yield and bunch characters of eight banana cultivars under study are presented in Table 2. The bunch weight or yield per hectare indicated that the heaviest bunch was produced by Robusta (26.75 kg), followed by High Gate. The yield from Robusta recorded in the present study is in agreement with the earlier report (Rao, 1984). The cultivar Karibale ranked third in bunch weight. The smallest bunch was in Ney Poovan (11.39 kg). However, it was on par with Poovan and Nendran. The comparatively higher yield recorded in Rasthali, Boodibale and Karibale can be attributed to better vegetative growth in terms of plant height noticed under west coast conditions.

The number of hands per bunches was the maximum in Ney Poovan (10.60), closely followed by Poovan (10.03), and was the least in Nendran (5.10). It was 9.17 in Robusta. The number of fruits per bunch ranged from 47.8 in Nendran to 140.9 in Poovan. It was 137.7 and 134.8 in Ney Poovan and Karibale respectively. In Rasthali, it was 92.2. In general, the variation observed in the number of fruits per bunch is in conformity with the varietal description (Jacob, 1952 and Rao, 1984). However, Boodibale, Karibale and Rasthali are on the higher side. The average fresh weight and volume of the fruit were maximum in Nendran. Robusta and High Gate ranked next in this respect. Least was in Ney Poovan (74.9 g). The differences in all other cultivars

Table 1. Vegetative growth characters of banana cultivars

Cultivar		Pseudostem		Crop duration (days)	Suckers/plant	Plants damaged by wind (%)
Name	Group	Height (cm)	Girth at base (cm)			
Ney Poovan	AA	332.9	77.4	378.2	5.83	33.3
Robusta	AAA	244.0	73.7	339.3	4.00	16.6
High Gate	AAA	313.3	79.4	351.0	7.67	8.3
Poovan	AAB	294.7	61.0	373.1	3.17	16.6
Rasthali	AAB	356.3	70.8	379.7	4.17	16.6
Nendran	AAB	302.9	70.8	342.9	3.58	33.3
Boodibale	ABB	397.8	85.3	433.0	7.70	0.0
Karibale	ABB	354.9	59.2	404.7	4.42	8.3
SEm±		8.13	2.81	9.57	0.42	
CD (0.05)		24.65	7.63	28.83	1.28	
CV (%)		4.24	6.03	4.39	5.60	

Table 2. Yield and bunch characters of banana cultivars

Cultivar	Bunch weight (kg)	Yield t/ha	Duration for bunch maturity (days)	Hands/bunch	Fruits/bunch	Fresh fruit				
						Weight (g)	Volume (ml)	Length (cm)	Circumference (cm)	Peduncle weight (kg)
Ney Poovan	11.39	28.42	94.4	10.60	137	74.9	68.3	10.5	10.3	1.34
Robusta	26.75	66.45	85.5	9.17	127	185.8	170.7	20.9	13.5	2.19
High Gate	18.82	47.00	101.7	7.83	101	183.0	158.5	10.6	13.0	1.40
Poovan	12.51	31.25	83.7	10.03	140	100.0	78.6	11.2	11.1	2.32
Rasthali	14.66	36.60	86.7	7.53	92	137.8	117.2	14.7	13.8	1.63
Nendran	12.91	31.90	80.3	5.10	47	268.9	241.8	15.9	29.1	1.76
Boodibale	15.68	39.20	131.9	9.57	134	99.7	88.5	10.9	15.0	1.30
Karibale	16.58	41.40	141.2	8.27	114	167.3	136.6	15.5	13.3	1.97
SEm ±	0.81	1.96	2.51	0.22	3.67	2.48	0.94	0.57	0.48	0.21
CD (0.05)	2.46	6.02	7.62	0.68	11.13	7.51	2.84	1.72	1.45	0.63
CV (%)	8.72	8.53	4.32	4.51	5.67	2.83	1.22	6.60	6.21	20.90

Table 3. Fruit characters of banana cultivars

Cultivar	Fresh fruit					Ripe fruit	
	Specific gravity	Pulp weight (g)	Skin weight (g)	Pulp to skin ratio (w/w)	Pedicel weight (g)	TSS	pH
Ney Poovan	1.097	52.3	13.36	3.91	9.21	30.33	4.63
Robusta	1.088	114.7	60.67	1.89	10.60	20.07	5.00
High Gate	1.154	109.2	60.97	1.79	12.73	23.67	3.20
Poovan	1.272	58.0	17.47	3.32	24.53	21.67	4.67
Rasthali	1.176	106.8	20.47	5.22	10.47	28.67	5.17
Nendran	1.114	170.6	83.83	2.04	14.43	29.17	5.10
Boodibale	1.126	64.3	26.17	2.46	9.27	28.27	4.67
Karibale	1.225	95.4	33.43	2.48	2.48	22.37	4.70
SEm $\pm$		0.43	0.43	-	0.32	1.09	0.11
CD (0.05)		1.30	1.31	-	0.96	3.31	0.33
CV (%)		0.77	1.86	-	3.66	7.28	4.02

were significant. The length of fruit was the maximum in Robusta (20.97 cm) whereas the circumference was highest in Nendran (15.95 cm). The fruit length was the least in cv. Ney Poovan. Unlike in the case of length, the range of the variations with regard to circumference of fruit was not large, among the cultivars. The bunch peduncle weighed maximum in Poovan (2.371 kg) followed by Robusta (21.9 kg). Though bunches of Robusta weighed more than double of those of Poovan, the peduncle weight was less in the latter.

The number of days required for the fruit bunch to reach maturity ranged from 80.3 in Nendran to 141.2 days in Karibale. The bunches of long duration cultivars take more number of days for attaining maturity. But this norm appears to be not valid in some cultivars included in this investigation. For example, Karibale, with a crop duration of 404.7 days exhibited a vegetative period of 263.5 days and a long bunch development period of 141.2 days. But in case of High Gate, the vegetative growth period is only 249.3 days. The varietal differences in bunch maturity period have also been reported earlier (Jacob, 1952; Rao, 1984). In the present study, fruit cracking was noticed in most of the bunches in Ney Poovan and some bunches in Rasthali. Fruit cracking in Ney Poovan has been reported by Jacob (1952).

The quality attributes and other fruit characters are presented in Table 3. Specific gravity of fresh fruits ranged from 1.088 in Robusta to 1.272 in Poovan. This was 1.114 in Nendran. There was wide variation in respect of fresh fruit pulp weight and skin weight, among the cultivars. Fresh pulp weight was the maximum in Nendran (170.63 g) which differed significantly from all others. It was least in Ney Poovan (52.33 g). It was more than 100 g in

Robusta, High Gate and Rasthali. Skin weight was the maximum in Nendran (83.83%) which differed significantly from the others. High Gate and Robusta were next in order and were on par with each other. There was wide variation in fruit pulp and skin weight among the cultivars. But pulp to skin ratio was the highest in Rasthali (5.22), and the least in High Gate (1.79). Robusta also recorded low value (1.89) of the same. Pedicel weight was maximum in Karibale (28.57 g).

The highest TSS was noticed in Ney Poovan (30.33) followed by Nendran (29.17). The value for Rasthali and Boodibale were on par with that of Nendran. The lowest value was observed in Robusta (20.07). The values for pH of the ripe pulp of the different cultivars ranged from 3.20 in High Gate to 5.17 in Rasthali.

The cultivar Robusta has the ability to give high tonnage even under west coast conditions. However, due to better TSS, high pulp skin ratio and fairly high yielding and other qualities, Rasthali appears to be superior and promising.

#### ACKNOWLEDGEMENT

The authors are grateful to Dr. A.S. Shirwal, Associate Professor of Soil Science for the help rendered in carrying out the experiment.

#### REFERENCES

- Jacob, K.C. 1952. *Madras Banana Monograph*, Govt. Press, Madras
- Nair, P.C.S. and Nair, M.K.C. 1969. The performance of some introduced varieties of banana in Kerala. *Agric. Res. J. Kerala* 7 : 48
- Rao, V.N.M. 1984. *Banana*. ICAR, New Delhi