

Performance of papaya (*Carica papaya* L.) cultivars under Nagaland foot hill conditions

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Abstract

Performance of twelve papaya varieties were tested during the years 1998-99 and 1999-2000. Results showed that the fruit set, number of fruits per plant, pulp and pulp/ peel ratio were significantly more in 'Pusa Delicious' while the fruit length, width and weight were highest in 'Pusa Giant' followed by 'Pusa Dwarf'. Seed and peel percentage were significantly lowest with 'Pusa Majesty' and 'Co-4', respectively. Plant height was significantly more in 'Pusa Giant' and yield in 'Coorg Honey Dew' (41.07 kg/ plant) followed by 'Pusa Majesty'. The highest total carotenoids, total sugars, sugar-acid ratio, ascorbic acid and TSS were found in 'Pusa Dwarf', 'Honey Dew', 'Co-5' and 'Pusa Delicious', respectively. Acidity in fruit pulp varied from 0.10 to 0.21 percent in different varieties.

Key words: Performance, foot- hills, papaya cultivars, yield and quality.

Introduction

Papaya (*Carica papaya* L.) fruit is highly nutritious, rich in vitamins and minerals, besides being delicious (Auxilia and Sathiamoorthy, 1984). It occupies an important place among the cultivated fruits of the north-eastern region. The fruits are highly valued as a table fruit when ripe and as a vegetable in the unripe condition (Babu, 2000). It is a quick- growing fruit plant, and gives quick returns to the growers. The choice of suitable cultivars is of paramount importance of successful commercial cultivation of papaya. Various cultivars which have given better performance in one locality may not necessarily behave in a similar way under different agro-climatic conditions. Several experiments have so far been carried out in different parts of the country to find out the suitable variety for a particular locality. But limited information is available about the performance of papaya cultivars under Nagaland conditions. Considering this in view, twelve cultivars of papaya, which gave better performance under different parts of the country were collected and studied to find out their potential in terms of growth, yield and quality under Nagaland foot hill condions.

Materials and methods

The experiment was conducted at ICAR Research Complex for NEH Region, Nagaland Centre, Jharnapani during the years 1998-99 and 1999-2000. A total number of twelve cultivars of papaya were included for the study and were laid out in randomized block design with three replications. The recommended package of practices was adopted to raise the crop. Observations on plant height and fruit characteristics were made on plants as per standard procedures. Biochemical traits such as acidity, total and reducing sugars were determined by the method of A.O.A.C. (1960). Total carotenoids and ascorbic acid were estimated by the method of Roy (1973) and Rosenberg (1945), respectively.

Results and discussion

Plant height, yield and fruit characters: The data (Table 1) revealed that there were varietal differences in respect of plant height, yield, and fruit characters of papaya. The plants of 'Pusa Giant' were the most vigorous (243.30 cm) in growth among the

Table 1. Plant height and fruit characteristics of different papaya cultivars (average data of two years)

Cultivars	Plant height (cm)	Fruit set (%)	No.of fruits/ plant	Size of fruits		Weight (g)	Seed (%)	Pulp (%)	Peel (%)	Pulp/ Peel ratio	Yield/ Plant (kg)
				Length (cm)	Width (cm)						
Co-1	197.560	53.030	20.070	23.610	37.340	1138.540	2.540	87.30	10.160	8.610	18.840
Co-2	173.640	50.410	16.610	22.800	22.200	926.400	1.260	90.04	8.700	10.380	14.360
Co-3	186.300	54.310	21.320	25.930	30.540	1344.090	3.650	89.58	6.770	13.200	28.660
Co-4	196.730	50.150	30.460	26.200	26.340	1204.420	1.690	91.75	6.560	12.580	28.230
Co-5	208.420	56.070	23.400	29.700	36.400	1634.650	3.790	85.16	11.050	7.510	26.550
Co-6	184.310	51.870	24.000	26.600	33.600	1523.820	2.840	87.66	9.500	9.230	24.570
Pusa Dwarf	167.810	46.320	29.430	34.560	37.350	1307.640	2.500	86.18	11.320	7.610	37.480
Pusa Delicious	225.460	55.400	31.100	33.160	36.770	1217.100	2.160	89.70	8.140	11.100	37.890
Pusa Giant	243.300	43.840	13.740	38.840	43.800	2445.780	1.760	87.30	10.940	7.980	33.610
Pusa Majesty	216.090	50.630	32.540	29.800	33.450	1226.540	0.970	91.74	7.290	14.000	39.920
Coorg Honey Dew	224.150	34.020	24.160	32.460	29.360	1462.810	1.210	91.17	7.620	11.960	41.070
Honey Dew	237.420	33.560	22.780	30.650	28.450	1370.230	1.550	90.07	8.380	10.750	34.210
C.D. ($\rho=0.05$)	6.810	6.520	4.390	5.620	4.760	334.810	0.240	4.02	2.440	2.100	4.810

Table 2. Fruit quality of different papaya cultivars (average data of two years)

Cultivars	Total carotenoids (mg/100g)	Total suger (%)	Reducing suger (%)	Non-reducing suger (%)	Acidity (%)	TSS (%)	Sugar/acid ratio	Ascorbic acid (mg/100g)
Co-1	5.210	10.960	10.080	0.880	0.210	13.60	52.190	62.520
Co-2	6.800	11.500	10.430	1.070	0.130	14.51	88.460	47.500
Co-3	7.390	10.160	9.800	0.360	0.160	13.50	63.500	41.860
Co-4	5.790	8.020	7.320	0.700	0.110	10.90	72.910	55.320
Co-5	4.520	10.120	9.150	0.970	0.170	13.70	59.530	71.860
Co-6	3.850	11.610	10.430	1.180	0.180	11.55	64.500	28.370
Pusa Dwarf	7.730	10.400	9.380	1.020	0.160	13.26	65.000	37.750
Pusa Delicious	5.630	9.860	8.460	1.400	0.130	14.08	75.850	56.860
Pusa Giant	3.380	10.260	9.150	1.110	0.170	9.14	60.350	71.460
Pusa Majesty	7.510	10.960	9.870	1.080	0.190	9.58	57.630	56.910
Coorg Honey Dew	6.850	11.400	10.230	1.170	0.210	10.90	54.300	47.290
Honey Dew	5.620	12.450	11.570	0.880	0.100	10.61	124.500	41.890
C.D. ($p=0.05$)	1.820	2.100	1.340	0.090	0.040	2.55	6.830	4.560

twelve cultivars as revealed by their height followed by 'Honey Dew' and 'Pusa Delicious'. Cultivar 'Co- 5' produced maximum fruit set (56.07%) followed by 'Pusa Delicious' (55.40%). While in 'Honey Dew', 'Coorg Honey Dew' and 'Pusa Giant' fruit set was low. The size of fruits in terms of length, width and weight of fruit was maximum (38.84, 43.80 cm and 2445.78g, respectively) under 'Pusa Giant' whereas, the minimum values (22.80, 22.20 cm and 926.40g, respectively) of these parameters was found under 'Co-2'. Observations indicated that the seed percentage was significantly lowest (0.97%) in 'Pusa Majesty' while the peel percentage was found significantly lowest (6.56%) under 'Co- 4' followed by 'Co- 3'. The highest pulp and pulp-peel ratio of fruits (91.74 and 14.02, respectively) were obtained under 'Co- 4', whereas the lowest values (85.16 and 7.51, respectively) of these attributes were recorded in 'Co- 5'. It has been observed that there were significant variations in fruit yield among the twelve cultivars. The cultivar 'Pusa Majesty' recorded the highest number (32.54/ plant) of fruits, whereas, the fruit yield in terms of weight was highest (41.07 kg/ plant) in 'Coorg Honey Dew'. The cultivars 'Pusa Dwarf', 'Pusa Delicious' and 'Pusa Majesty' yielded fruits weighing more than 35 kg per plant. The possible reason for the variations of these characters genotype x environment interaction. Similarly, significant variations in the fruit characters of different varieties of papaya have been observed by Mansha Ram (1982) and Auxilia and Sathiamoorthy (1984).

Quality parameters: From quality point of view, eight biochemical constituents of pulp viz., carotenoids, total, reducing and non-reducing sugars, acidity, sugar-acid ratio, ascorbic acid content and TSS in the fruit had been studied (Table 2). The data revealed that the 'Pusa Dwarf' had the maximum (7.73 mg/100g) carotenoids followed by the 'Pusa Majesty' (7.51 mg/100g), whereas the lowest (3.85 mg/100 g) was recorded under 'Co- 6'. 'Honey Dew' was the sweetest among the twelve cultivars due to its highest percentage of total sugar (12.45) and reducing sugar (11.57) and the lowest amount of non-reducing sugar and acidity

(0.88 and 0.10%, respectively) in the fruits. Hence the sugar: acid ratio under 'Honey Dew' was found to be the highest (124.50). Ascorbic acid content was maximum with the cultivar 'Co- 5' (71.86 mg/ 100g) followed by 'Pusa Giant' (71.46 mg/ 100g) whereas, the lowest was recorded under 'Co- 6' (28.37 mg/ 100g). The highest total soluble solids (TSS) content (14.08 percent) was recorded in 'Pusa Delicious', whereas Mansha Ram (1982) recorded 13.00 percent in the same variety under Pusa, Bihar condition. Within a location season alters the TSS (Anonymous, 1957). Pal *et al.* (1980) recorded TSS of 12.00 percent in 'Coorg Honey Dew' under Bangalore condition. While in the present study, it had 10.90 percent, indicating the influence of eco-geographical variations.

On the basis of yield and quality observed under Nagaland condition, cultivation of 'Pusa Delicious', 'Pusa Majesty', 'Honey Dew', 'Coorg Honey Dew', 'Co- 2' and 'Co- 5' cultivars is recommended for the foot hills of Nagaland.

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