RESPONSE OF DIFFERENT SELECTIONS AND VARIETY ON GROWTH, FLOWERING, YIELD AND QUALITY IN PAPAYA

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ABSTRACT

An experiment was conducted to evaluate the different selections along with Pusa Dwarf as a check for growth, flowering, yield and quality traits in papaya. The experiment was conducted at Fruit Research Station, Madhadi bag farm, Department of Horticulture, College of Agriculture, JAU, Junagadh (Gujarat). The results revealed that the maximum number of fruits per plant (36.38) and fruit yield (33.81 kg/plant & 84.52 ton/ha) were noted in Selection-4 (GJP-1). The bearing height is good shine and the check variety Pusa Dwarf performed with lowest bearing height, but was found at par with Selection-4 (GJP-1). Variation in growth parameters was found significant and the lowest plant height and the maximum number of leaves/plant were recorded in Pusa Dwarf, while the highest stem girth was noted in Selection-6, but they were observed at par with Selection-4 (GJP-1). Flowering is the main object of plant to target the yield. Significantly the lowest days to flowering was noted in Selection-1 but maturity in Selection-4. The maximum number of female flower/node was registered in Selection-3, whereas the highest length of pistillate flower, staminate flower and male flower stalk were noted in Selection-6, however, all were found at par with Selection-4(GJP-1). Among the various physical parameters studied, the highest fruit length & weight (25.02 cm & 1832 g) were noted in Selection-6, whereas the highest fruit girth (47.3 cm) was noted in Pusa Dwarf, but was observed at par with Selection-4 (GJP-1). It was also performed better for highest pulp weight (1327.93 g) and pulp seed ratio (1230.56). Likewise, the highest pulp-peel ratio (5.74) was noted in Selection-8, but the lowest peel weight (166.10 g) and seed weight (63.63 g) were registered in Selection-2 & 7. In the present study, Selection-6 & 4 (GJP-1) established its supremacy in quality parameters viz., TSS, total sugars, reducing sugar, non-reducing sugar over other selections. The organolaptic parameters have also great significant to judge the preferability of the variety. The highest score of pulp color and taste were noted in Selection-6 & 5, respectively, whereas the highest flavour, texture and over all acceptability were registered in Selection-2, however it was found at par with Selection-4 (GJP-1). Fruit firmness and shelf life of the fruit is also an important feature which enhances the more market prices for longer period due to good keeping quality. The highest fruit firmness and shelf life were noted in Selection-7. Papaya Ring Spot Virus (PRSV) is the major devastating disease of papaya. The result was also observed significant and the lowest PRSV infestation was noted in Selection-4 (GJP-1).

KEY WORDS: Organolaptic parameters, Papaya, Papaya Ring Spot Virus, Shelf life, TSS

INTRODUCTION

Papaya is one of the important fruit crops of tropical and sub-tropical region of the country. It produces fruits throughout the year. It is easy to cultivate and more remunerative due to higher income per unit area. It ranked second and next to banana. It has a high nutritive and medicinal value especially vitamin A (2020 IU/l00g) (Azad *et al*., 2012). It also possesses vitamin B, folate

and pantothenic acid besides minerals like potassium and magnesium (Popenoe, 1974). It is an excellent source of beta carotene which may prevent cancer, diabetes and heart disease (Aravind *et al.*, 2013) and it is also utilized in the pharmaceutical and cosmetic industries. Papain prepared from dried latex of its immature fruits is used in meat tenderizing, manufacture of chewing gum, cosmetics, degumming, and to give shrink resistance to wool. Besides, it is also used in pharmaceutical industries, textile & garment, cleaning paper, adhesive manufacture, sewage disposal, *etc.*

It is quick growing, typically single-stemmed, short-lived, large perennial herb. It is a highly problematic, complicated and interesting fruit crop from botanical, genetically, cytogenetically and horticultural points of view. In India, it is cultivated commercially in 1.33 lakh ha area with 56.39 lakh tones production and 42.30 t/ha productivity (Anon., 2010). The crop is also highly acclimatized in Gujarat with 5th important fruit crop of Gujarat after mango, pomegranate, sapota and acid lime. Gujarat is the second largest in area & production and fourth in productivity contributing 0.20 lakh ha, 11.85 lakh tonnes and 60.5 t/ha, respectively (Anon., 2010). Hybrids or varieties are the important tools to achieve higher yield and quality. At present, large numbers of varieties of papaya are cultivated in India. Commercially papaya varieties are grouped in two groups *viz.*, dioecious and gynodioecious. The hybrids/varieties like Pusa Majesty, Pusa Delicious, Pusa Dwarf, Pusa Nanha, Surya, Coorge Honey Dew, Co-1, Co-2, Co-3, Co-4, Co-5, Co-6, Pink Fleshed sweet, Sunrise Solo, Arka Surya, Arka Prabhat etc. as well as some private sector varieties are commercially cultivated in the country.

Selection is the tools which have a great significant role to crop improvement work which depends on the evaluation of various varieties or selections. Crop improvement work through sib mating & selection was started earlier and identified promising selection known as Local which was commercially cultivated in the state (Gujarat). There is no public variety in Gujarat. Taiwan varieties like Red Leady, 786, Sweet Charley, *etc.* are from private sectors under cultivation in Gujarat. Some drawbacks in these varieties with higher price of planting materials were observed from the farmers' feedback. Considering the above facts, the work was started under Crop Improvement Project in papaya at Department of Horticulture, College of Agriculture, JAU, Junagadh to develop the variety.

MATERIALS AND METHODS

The experiment was conducted at Fruit Research Station, Madhadi bag farm**,** Department of Horticulture, College of Agriculture, Junagadh Agricultural University, Junagadh. Nine different selections & cultivar, *viz.*, Selection-1 to 8 and Pusha Dwarf (check) were evaluated in Randomized Block Design (RBD) with three replications. The orchard was laid out in square system with 1.8 x 1.8 m spacing. Seedlings of different selections and cultivar were raised in nursery. The uniform planting materials i.e. seedlings were used for the present study. All plants were given uniform cultural operation as per the recommended package and practices. The soil of experimental field was sandy loam to alluvial type. The selected plants were marked with metal tag for recording observation. The observations like plant height (cm), bearing height (cm), number of leaves/plant, stem girth (cm); flowering parameters like days to flowering, fruit maturity (days), number of flower bud / node (female), number of nodes per plant, length of internode (cm), length of pistillete flower bud (cm), length of staminate flower bud (cm length of male flower stalk (cm); physical parameters like fruit length, fruit girth, fruit weight, pulp weight (g/fruit), Peel weight (g/fruit), seed weight (g/fruit), Pulp-peel ratio, Pulp-seed ratio; Yield parameters like, number of fruits/plant, fruit yield (kg/plant & t/ha); biochemical parameters like TSS (^{0}B), reducing sugar (%), non reducing sugar (%), total sugar (%); organoleptic parameters like colour, flavour, texture, taste and overall acceptability of pulp, shelf life of fruit, fruit firmness; and Papaya Ring Spot

Virus (PRSV) Infestation (%) were recorded with standard procedure/methods. The data was statistically analyzed by method of analysis of variance using RBD as described by Panse and Sukhatme (1985).

RESULTS AND DISCUSSION

Fruit yield is the most important and polygenic character. Besides, better management of orchard, genetic diversity i.e. variety is another important factor influencing the yield. The results revealed that, the highest number of fruit per plant (36.38) was recorded in Selection-4 (GJP-1) during all three years as well as pooled, but was observed at par with Selection-6 & 8 in pooled results. Similar trend was observed for fruit yield and the highest fruit yield (33.81 kg/plant & 84.52 t/ha) were noted in Selection-4 (GJP-1) during all three years and pooled (Table 1). However, which was noted at par with Selection-6 & 8. The variations in yield and yield attributes might be due to different genetic sources with respect to their genetic makeup. It might be also due to various physiological phenomenon, *viz*., photosynthetic efficiency, rate of translocation of photosynthates from source to sink and photo-respiration that took place in the plant body and different genetic constitution of varieties, which are responsible for expression of genetic characters under a particular set of environment. This is in conformity with the findings of Anh *et al.* (2011), Meena *et al.* (2012), Kumar *et al.* (2015) and Tyagi *et al.* (2015) in papaya.

The bearing height of plant is good shine for the economic value of crop and the check variety Pusa Dwarf performed with the lowest bearing height during three years and pooled, but was found at par with Selection-4 (GJP-1) (Table 2). Variation in growth parameters like plant height and number of leaves per plant due to different varieties was found significant (Table 2) and the lowest plant height (148.16 cm) and the maximum number of leaves per plant (41.44) was recorded in Pusa Dwarf. However, it was found at par with Selection-2, Selectio-4 (GJP-1) & Selectio-5 in pooled results.

Number of nodes per plant and length of internode are also important traits influencing the number of fruits per plant. Similarly, the stem girth also affecting the lodging of plant. The minimum number of nodes per plant (18.44), length of internode (3.63 cm) and the highest stem girth (38.40 cm) were recorded in Selection-4 (GJP-1), Selection-5 and Selection-6, respectively (Table 3). Several workers hither to have compared varieties by Narasing *et al.* (1958), Nakasone *et al.* (1972), Selvaraj *et al.* (1975) and Ito *et al.* (1977) in papaya.

Flowering is the main object of plant to target the yield. Significantly the lowest days to flowering (87.03) was noted in Selection-1, but the lowest days to fruit maturity (232.33) was noted in Selection-4 (GJP-1) (Table 4). The ancillary observations on flowering were also found significant and the maximum number of female flower bud/node (5.84) was registered in Selection-3, but was found at par with Selection-4, 5 & 8 (Table 4). Similarly, the highest length of pistilate flower bud (4.48 cm), staminate flower bud (1.89 cm) and male flower stalk (33.40 cm) were noted in Selection-6, however, it was found at par with Selection-4 (GJP-1) during all years and pooled (Table 5).

Length, girth and weight of fruits were the major components of fruit size under the present study (Table 6). The results were also found significant and the highest fruit length & weight (25.02 cm & 1832 g, respectively) were noted in Selection-6, but was found at par with Selection-4 (GJP-1) and selection-7. Whereas, the highest fruit girth (47.30 cm) was noted in Pusa Dwarf and was observed at par with Selection-2 & 4 (GJP-1), 5, 6 & 8. The variation in fruit length, girth and weight might be based on the fact that every genotype has its own nature in development of fruits. It also might be attributed to genetic constitution of the plants. It may also be due to phenotypic and genotypic interactions among the selections. Similar findings were reported by Goenaga *et al.*, (2001), Das (2013), Das and Dinesh (2014), Kumar *et al.* (2015), Tyagi *et al.* (2015) and Chalak *et al.* (2016) in papaya.

Likewise, the highest pulp weight (1327.93 g) (Table 7) and pulp seed ratio (1230.56) (Table 8) were noted in Selection-4

(GJP-1) and was observed at par with Selection-6, 7 & 8. The lowest peel weight (166.10 g) and seed weight (63.63 g) were registered in Selection-2 and Selection-7, respectively (Table 7). However, the highest pulp-peel ratio (5.74) was noted in Selection-8 and which was found at par with Selection-4 (GJP-1), Selection-2, 5 & 6 (Table 8). Such variation among the selections in pulp, peel & seed characters may be attributed to genetic makeup of the plants. Seed weight might be due to pollen availability, stigmatic fertility and effective fertilization. Variations in those characters in papaya fruit were also observed in by Nakasone *et al.* (1972), Selvaraj *et al.* (1975), Sulikeri *et al.* (1977), Pal *et al.* (1980), Allan (1981) and Sundarrajan and Krishnan (1984).

The various bio-chemical components are of utmost important to assess the fruits either for dessert purpose or for processing. Total soluble solids indicates higher sugar content in the fruits and is considered as one of the important criterion for dessert quality, whereas caracaxenthin content which causes yellowish orange coloration is important determinant of processing quality. In the present study, Selection-6 and Selection-4 (GJP-1) established its supremacy in quality parameters *viz*., total soluble solids (14.52 & 11.92 ^{0}B), total sugars (8.58 & 7.95%), reducing sugar (6.03 & 5.54%), non-reducing sugar (2.55 & 2.41%), respectively, over the other varieties (Table 8 and 9). It may be due to phenotypic and genetic constitution among the selections which might necessitated consumption of nutrients and sinking more carbohydrates into the fruits, thus producing larger fruits with more TSS. This is in conformity with the findings of Sulikeri *et al.* (1977), Pal *et al.* (1980), Allan (1981), Sundarrajan and Krishnan (1984) and Tyagi *et al.* (2015).

The sugars present in the fruit impart the sweetness while sugars and organic acids present in the fruit influence its taste and flavour. This is in conformity with the findings of Nakasone *et al.* (1972), Selvaraj *et al.* (1975) and Sundarrajan and Krishnan (1984). The organolaptic parameters (Table 10, 11 and 12) have also great significant to judge the preferability of the variety. Significantly the highest score of pulp color and taste (7.67 & 7.24) were noted in Selection-6 & 5, respectively. Whereas, the highest flavour, texture and overall acceptability (7.23, 7.54 & 7.40) were registered in Selection-2, however, it was found at par with Selection-4 (GJP-1) for all cases. These results are in contrast with Meena *et al.* (2012). Fruit firmness and shelf life of the fruit is also an important feature which enhances the more market price for longer period due to good keeping quality. The highest fruit firmness and shelf life (14.17 kg/cm^2 and 4.20 days) were noted in Selection-7 which was observed at par with Selection-3. The shelf life of variety is long mainly due to shininess of fruit.

Papaya Ring Spot Virus (PRSV) is the major devastating disease of papaya. The result was also observed significant and the lowest PRSV (15.49%) was noted in Selection-4 (GJP-1) followed by Selection-1 (Table 12).

CONCLUSION

On the bases of above study and observations, it is concluded that the Selection-4 is performing better and possessed more number of fruits per plant, higher fruit yield having medium fruit size with good attractive shape, higher pulp to seed & peel ratio; and quality traits like TSS, reducing & total sugar with better organoleptic characters. The fruit with yellowish orange colored, soft palatable pulp of Selection-4 (released as variety GJP 1), which are the most preferable traits in people resulted in market price.

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Table 1: Evaluation of different selections and cultivar on number of fruits per plant and fruit yield (kg/plant and t/ha)

Selections	Number of Fruits/Plant				Fruit Yield (kg/plant)				Fruit Yield (t/ha)			
	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled
Selection-1	31.00	30.80	27.67	29.82	26.20	24.09	16.18	22.16	65.51	60.22	40.45	55.39
Selection-2	32.33	31.87	30.33	31.51	29.04	21.51	17.49	22.68	72.60	53.78	43.73	56.70
Selection-3	33.33	30.97	29.55	31.28	21.27	15.36	20.27	18.97	53.17	38.40	50.68	47.42
Selection-4	38.33	37.03	33.77	36.38	37.08	34.39	29.96	33.81	92.69	85.97	74.89	84.52
Selection-5	29.33	29.53	27.92	28.93	31.13	18.85	21.06	23.68	77.83	47.13	52.66	59.21
Selection-6	30.67	33.20	33.67	32.51	30.39	23.36	25.70	26.49	75.98	58.41	64.25	66.21
Selection-7	22.00	20.67	24.55	22.41	16.77	18.80	22.00	19.19	41.92	46.99	54.99	47.97
Selection-8	37.00	32.27	28.00	32.42	31.39	26.99	23.26	27.21	78.48	67.48	58.14	68.03
Pusa Dwarf	35.40	33.13	26.17	31.56	27.90	20.02	15.84	21.25	69.75	50.04	39.59	53.13
S. Em.±	1.678	1.385	1.279	1.605	1.643	1.185	0.785	2.498	4.106	2.963	1.963	6.246
C. D. at 5%	5.03	4.15	3.84	4.81	4.92	3.55	2.35	7.49	12.31	8.88	5.88	18.73
Y x T /S. Em.±	-	-	-	1.457	-	-	-	1.844	-	-	-	3.135
C. D. at 5%	-	-	-	4.15	-	-	-	5.25	-	-	-	8.92
C. V. %	9.04	7.72	7.62	8.21	10.19	9.08	6.38	9.08	10.19	9.08	6.38	9.08

Table 2: Evaluation of different selections and cultivar on plant height (cm), bearing habit (cm) and number of leaves per plant

Selections	Plant Height (cm)				Bearing Height (cm)				Number of Leaves / Plant			
	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled
Selection-1	184.00	166.00	181.33	177.11	68.40	64.57	75.53	69.50	28.53	26.40	36.21	30.38
Selection-2	181.67	151.53	163.00	165.40	77.33	69.27	57.60	68.07	29.53	23.53	36.67	29.91
Selection-3	189.00	164.67	175.67	176.44	82.67	62.97	61.67	69.10	32.00	25.67	35.00	30.89
Selection-4	185.00	159.17	172.67	172.28	75.67	66.03	56.80	66.17	38.60	28.53	42.02	36.38
Selection-5	187.33	149.40	184.33	173.69	66.67	61.30	68.13	65.37	31.20	29.87	44.33	35.13
Selection-6	241.33	179.60	254.00	224.98	86.93	88.00	83.47	86.13	32.40	31.60	50.42	38.14
Selection-7	210.33	157.37	205.67	191.12	107.60	74.03	82.53	88.06	30.60	34.53	50.30	38.48
Selection-8	199.00	167.97	163.33	176.77	94.13	71.13	59.57	74.94	33.27	37.60	37.33	36.07
Pusa Dwarf	158.00	137.13	149.33	148.16	63.87	60.47	53.93	59.42	48.33	33.20	42.78	41.44
S.Em.±	8.312	6.505	8.056	9.150	2.216	2.325	2.921	5.708	1.541	1.642	2.266	3.026
C. D. at 5%	24.92	19.50	24.15	27.43	6.64	6.97	8.76	17.11	4.62	4.92	6.79	9.07
Y x T/ S.Em.±	-	-	-	7.617	-	-	-	1.844	-	-	-	1.844
C. D. at 5%	-	-	-	21.68	-	-	-	5.25	-	-	-	5.25
C. V. %	7.46	7.08	7.61	9.33	4.78	5.87	7.60	7.63	7.89	9.45	9.42	12.01

Table 3: Evaluation of different selections and cultivar on number of nodes per plant, length of internode (cm) and stem girth (cm)

Selections	Number of Nodes / Plant				Length of Internode (cm)				Stem Girth (cm)			
	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled
Selection-1	32.00	27.33	28.67	29.33	5.27	4.80	5.10	5.06	31.80	25.22	24.63	27.21
Selection-2	21.17	18.50	19.50	19.72	4.33	4.17	4.62	4.37	35.90	27.13	25.22	29.42
Selection-3	22.33	19.33	20.33	20.67	5.43	4.97	4.03	4.81	38.00	26.88	31.78	32.22
Selection-4	19.33	17.67	18.33	18.44	4.27	4.13	5.03	4.48	36.13	27.12	31.42	31.56
Selection-5	20.33	21.33	23.33	21.67	3.53	3.62	3.74	3.63	36.07	27.35	31.22	31.55
Selection-6	27.33	23.50	24.50	25.11	7.30	7.02	7.49	7.27	45.93	32.60	36.66	38.40
Selection-7	24.00	21.17	22.17	22.44	6.77	6.22	7.10	6.69	40.60	35.44	37.67	37.90
Selection-8	22.17	19.83	20.83	20.94	4.17	4.27	4.17	4.20	37.67	29.52	28.00	31.73
Pusa Dwarf	22.33	21.33	23.00	22.22	3.50	3.58	4.18	3.76	40.07	26.88	30.58	32.51
S.Em.±	0.931	0.978	1.152	0.592	0.167	0.177	0.101	0.215	1.611	1.538	1.373	2.313
C. D. at 5%	2.79	2.93	3.45	1.68	0.50	0.53	0.30	0.64	4.83	4.61	4.12	6.94
Y x T /S.Em.±	-	-	-	1.025	-	-	-	0.152	-	-	-	1.510
C. D. at 5%	-	-	-	NS	-	-	-	0.433	-	-	-	NS
C. V. %	6.88	8.03	8.95	10.15	5.85	6.44	3.47	6.53	7.34	9.29	7.72	8.05

Table 4: Evaluation of different selections and cultivar on days to flowering, fruit maturity (days) and number of flower bud / node (female)

Selections	Days to Flowering				Fruit Maturity (Days)				Number of Flower Bud / Node (Female)			
	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled
Selection-1	92.77	86.33	82.00	87.03	239.27	234.33	233.67	235.76	4.70	4.50	5.03	4.74
Selection-2	92.00	97.60	84.67	91.42	238.67	234.00	229.33	234.00	4.47	3.83	4.57	4.29
Selection-3	97.07	93.73	89.67	93.49	243.33	238.53	235.67	239.18	5.67	5.47	6.40	5.84
Selection-4	94.83	92.53	92.00	93.12	235.00	232.33	229.67	232.33	5.93	5.50	5.77	5.73
Selection-5	98.67	97.80	91.67	96.04	239.67	243.33	239.33	240.78	5.50	5.43	6.20	5.71
Selection-6	107.83	105.27	100.67	104.59	250.67	250.33	256.00	252.33	3.93	4.33	3.57	3.94
Selection-7	112.83	108.67	95.67	105.72	259.00	258.33	264.67	260.67	4.10	3.90	6.00	4.67
Selection-8	94.83	91.87	85.33	90.68	240.00	236.67	234.33	237.00	5.57	5.20	5.30	5.36
Pusa Dwarf	110.83	107.73	102.00	106.86	255.33	253.00	256.67	255.00	4.53	4.23	4.70	4.49
S.Em.±	2.276	2.217	1.530	2.336	4.987	5.575	3.244	2.718	0.215	0.265	0.258	0.264
C. D. at 5%	6.82	6.65	4.59	7.00	14.95	16.71	9.73	7.74	0.64	0.79	0.77	0.79
Y x T /S.Em.±	-	-	-	2.036	-	-	-	4.707	-	-	-	0.247
C. D. at 5%	-	-	-	NS	-	-	-	NS	-	-	-	0.703
C. V. %	3.94	3.92	2.90	3.65	3.53	3.98	2.32	3.36	7.55	9.73	8.47	8.60

Table 5: Evaluation of different selections and cultivar on length of pistillate flower bud (cm), length of staminate flower bud (cm) and length of male flower stalk (cm)

Selections	Length of Pistillate Flower Bud (cm)				Length of Staminate Flower Bud (cm)				Length of Male Flower Stalk (cm)			
	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled
Selection-1	3.70	3.57	3.67	3.64	1.82	1.72	1.83	1.79	20.67	17.83	19.33	19.28
Selection-2	3.44	3.34	3.42	3.40	1.63	1.54	1.52	1.56	25.17	23.83	24.53	24.51
Selection-3	3.53	3.36	3.43	3.44	1.55	1.47	1.50	1.51	26.67	23.00	25.20	24.96
Selection-4	4.20	4.03	4.30	4.18	2.07	1.81	1.89	1.92	32.33	31.00	31.03	31.46
Selection-5	3.92	3.64	4.19	3.92	1.65	1.53	1.72	1.63	29.83	30.17	33.13	31.04
Selection-6	4.60	4.33	4.50	4.48	2.20	1.88	1.89	1.99	34.83	32.83	32.53	33.40
Selection-7	4.10	4.03	4.47	4.20	1.68	1.63	1.63	1.65	26.33	24.83	26.00	25.72
Selection-8	4.05	3.60	3.73	3.79	1.77	1.70	1.67	1.71	23.67	24.33	20.17	22.72
Pusa Dwarf	4.15	3.94	3.98	4.02	1.82	1.72	1.83	1.64	26.60	23.67	25.47	25.24
S.Em.±	0.206	0.179	0.151	0.104	0.043	0.044	0.033	0.044	1.038	0.707	0.723	0.783
C. D. at 5%	0.62	0.54	0.45	0.30	0.13	0.13	0.10	0.13	3.11	2.12	2.17	2.35
Y x T /S.Em.±	-	-	-	0.180	-	-	-	0.041	-	-	-	0.837
C. D. at 5%	-	-	-	NS	-	-	-	0.12	-	-	-	2.38
C. V. %	9.00	8.26	6.58	8.00	4.21	4.61	3.39	4.10	6.57	4.76	4.75	5.47

Table 6: Evaluation of different selections and cultivar on fruit length (cm), fruit girth (cm) and fruit weight (kg)

Selections	Fruit Length (cm)				Fruit Girth (cm)				Fruit Weight (kg)			
	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled
Selection-1	26.27	19.98	23.83	23.36	43.17	32.73	39.33	38.41	1269.07	1126.53	1454.67	1283.42
Selection-2	20.60	19.53	14.70	18.28	47.20	45.71	47.93	46.95	1317.20	1060.60	1248.33	1208.71
Selection-3	24.27	18.88	16.79	19.98	44.80	38.83	44.17	42.60	1174.60	797.93	1455.00	1142.51
Selection-4	24.23	23.71	20.95	22.97	46.23	42.61	45.10	44.65	1810.40	1384.03	1744.33	1646.26
Selection-5	21.27	17.49	16.45	18.40	47.60	45.71	44.77	46.03	1297.70	916.53	1220.33	1144.86
Selection-6	28.00	24.61	22.45	25.02	45.93	45.17	46.12	45.74	1686.40	1444.80	1832.00	1654.40
Selection-7	23.07	21.22	20.60	21.63	37.13	39.20	44.57	40.30	1528.33	1325.87	1717.67	1523.96
Selection-8	23.50	20.30	19.49	21.10	45.60	43.73	43.37	44.23	1620.80	1369.13	1268.33	1419.42
Pusa Dwarf	18.67	20.15	18.82	19.21	44.73	46.20	50.96	47.30	1164.00	1045.00	1536.67	1248.56
S.Em.±	0.830	0.620	0.771	1.103	0.938	1.025	1.058	1.505	69.998	55.495	64.031	94.162
C. D. at 5%	2.49	1.86	2.39	3.31	2.81	3.07	3.17	4.51	209.86	166.38	191.97	282.31
Y x T /S.Em.±	-	-	-	0.745	-	-	-	1.008	-	-	-	0.063
C. D. at 5%	-	-	-	2.12	-	-	-	2.87	-	-	-	0.18
C. V. %	6.16	5.20	6.90	6.12	3.63	4.20	4.06	3.97	8.48	8.26	7.41	8.06

Table 7: Evaluation of different selections and cultivar on pulp weight (g/fruit), peel weight (g/fruit) and seed weight (g/fruit)

Selections	Pulp Weight (g/fruit)				Peel Weight (g/fruit)				Seed Weight (g/fruit)			
	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled
Selection-1	938.83	831.07	1122.33	964.08	221.33	224.00	292.00	245.78	98.23	106.00	106.93	103.72
Selection-2	1056.67	799.93	951.67	936.09	148.27	189.67	160.37	166.10	100.07	88.05	96.38	94.83
Selection-3	917.20	552.87	1141.93	870.67	141.87	140.93	247.60	176.80	98.40	87.85	109.18	98.47
Selection-4	1448.47	1131.53	1403.80	1327.93	251.73	226.23	282.51	253.49	79.20	103.90	109.01	97.37
Selection-5	1104.00	666.67	1043.73	938.13	231.67	152.43	195.92	193.34	72.67	69.10	71.05	70.94
Selection-6	1392.87	1077.00	1492.74	1320.87	279.13	272.27	294.10	281.83	82.83	110.85	125.33	106.34
Selection-7	1160.67	979.60	1394.25	1178.17	158.67	275.00	308.13	247.27	49.53	60.51	80.83	63.63
Selection-8	1331.73	1074.60	1053.33	1153.22	203.20	191.83	215.25	203.43	82.27	72.44	79.04	77.92
Pusa Dwarf	861.00	804.33	1080.70	915.34	221.33	224.00	292.00	259.40	98.23	106.00	106.93	94.18
S.Em.±	39.904	33.021	46.502	79.918	8.515	10.987	14.823	24.543	1.601	2.957	3.343	6.923
C. D. at 5%	119.64	99.00	139.42	239.61	25.53	32.94	44.44	73.58	4.80	8.87	10.02	20.76
Y x T /S.Em.±	-	-	-	40.188	-	-	-	6.981	3.36	5.86	5.83	6.72
C. D. at 5%	-	-	-	114.38	-	-	-	19.87	-	-	-	8.04
C. V. %	6.09	6.50	6.78	6.52	6.28	4.74	5.03	5.40	4.08	5.86	5.83	5.40

Table 8: Evaluation of different selections and cultivar on pulp peel ratio, pulp seed ratio and TSS (^{0}B)

Selections	Pulp Peel Ratio				Pulp Seed ratio				TSS (^{0}B)			
	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled
Selection-1	4.25	3.71	3.85	3.94	840.61	725.07	1015.40	860.36	10.17	12.00	11.33	11.17
Selection-2	6.45	4.21	4.96	5.21	956.60	711.89	855.28	841.26	10.00	12.53	11.59	11.37
Selection-3	5.18	3.67	6.01	4.96	818.80	465.02	1032.75	772.19	10.17	10.00	14.56	11.58
Selection-4	5.81	5.01	5.93	5.58	1369.27	1027.63	1294.79	1230.56	10.33	12.27	13.15	11.92
Selection-5	6.97	4.37	5.74	5.69	1031.33	597.57	972.68	867.19	11.00	11.67	14.36	12.34
Selection-6	5.00	3.96	5.08	4.68	1310.03	966.15	1367.41	1214.53	12.43	14.13	17.01	14.52
Selection-7	4.26	3.57	5.43	4.42	1111.13	919.09	1313.42	1114.55	11.67	13.40	16.22	13.76
Selection-8	6.57	5.75	4.90	5.74	1249.47	1002.16	974.29	1075.31	10.27	11.23	14.98	12.16
Pusa Dwarf	3.32	4.07	3.37	3.58	782.07	716.41	965.03	821.17	10.43	11.73	12.83	11.67
S.Em.±	0.265	0.226	0.237	0.402	39.834	33.543	45.371	77.066	0.298	0.247	0.348	0.882
C. D. at 5%	0.79	0.68	0.71	1.21	119.43	100.57	136.03	231.05	0.89	0.74	1.04	2.64
Y x T /S.Em.±	-	-	-	0.243	-	-	-	39.876	-	-	-	0.300
C. D. at 5%	-	-	-	0.69	-	-	-	113.50	-	-	-	0.86
C. V. %	8.63	9.18	8.16	8.64	6.56	7.33	7.22	7.07	4.81	3.53	4.31	4.24

Table 9: Evaluation of different selections and cultivar on reducing sugar (%), non reducing sugar (%) and total sugar (%)

Selections	Reducing Sugar (%)				Non Reducing Sugar (%)				Total Sugar (%)			
	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled
Selection-1	5.91	5.87	4.80	5.53	1.32	1.45	1.82	1.53	7.23	7.28	6.62	7.04
Selection-2	6.50	6.30	4.94	5.91	1.45	2.00	1.78	1.74	7.95	8.30	6.72	7.66
Selection-3	5.39	5.63	4.98	5.33	1.68	2.24	2.04	1.98	7.07	7.87	7.01	7.32
Selection-4	5.61	5.76	5.24	5.54	2.14	2.66	2.43	2.41	7.76	8.42	7.67	7.95
Selection-5	5.75	6.00	5.77	5.84	2.20	2.35	1.93	2.16	7.95	8.35	7.70	8.00
Selection-6	6.18	6.40	5.52	6.03	2.38	2.70	2.57	2.55	8.56	9.10	8.09	8.58
Selection-7	5.23	5.44	4.90	5.19	2.18	2.72	2.42	2.44	7.40	8.16	7.32	7.63
Selection-8	5.44	5.58	4.50	5.17	1.39	1.78	2.18	1.78	6.83	7.35	6.67	6.95
Pusa Dwarf	5.26	5.24	5.04	5.18	1.38	2.24	1.42	1.68	6.65	7.47	6.45	6.86
S.Em.±	0.219	0.138	0.100	0.212	0.068	0.098	0.085	0.159	0.167	0.180	0.149	0.214
C. D. at 5%	0.66	0.41	0.30	0.64	0.20	0.29	0.25	0.48	0.50	0.54	0.45	0.64
Y x T /S.Em.±	-	-	-	0.160	-	-	-	0.084	-	-	-	0.166
C. D. at 5%	-	-	-	0.46	-	-	-	0.24	-	-	-	NS
C. V. %	6.64	4.13	3.40	5.02	6.53	7.60	7.13	7.20	3.85	3.88	3.61	3.80

Table 10: Evaluation of different selections and cultivar on organoleptic score (Colour of pulp, flavour and texture)

Selections	Colour of Pulp (score)				Flavour (score)				Texture (score)			
	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled
Selection-1	5.89	6.56	6.53	6.33	5.67	6.40	6.50	6.19	5.78	6.37	6.13	6.09
Selection-2	7.11	7.27	7.67	7.35	7.00	7.02	7.67	7.23	7.00	7.54	8.08	7.54
Selection-3	6.33	6.25	6.58	6.39	6.00	5.97	6.08	6.02	6.67	6.29	6.33	6.43
Selection-4	7.30	7.05	7.52	7.29	6.89	7.08	6.83	6.93	6.51	7.06	7.58	7.05
Selection-5	6.87	6.92	7.17	6.99	7.67	7.28	6.75	7.23	8.11	7.09	6.92	7.37
Selection-6	7.67	7.23	8.12	7.67	6.78	7.33	6.75	6.95	7.00	6.77	7.00	6.92
Selection-7	7.44	6.47	7.23	7.05	6.55	6.29	6.83	6.56	6.78	6.33	6.75	6.62
Selection-8	7.00	7.07	8.00	7.36	6.89	7.61	6.33	6.94	7.44	7.68	6.29	7.14
Pusa Dwarf	6.89	6.04	5.75	6.23	6.44	5.98	6.42	6.28	6.44	6.45	6.92	6.60
S.Em.±	0.185	0.170	0.202	0.222	0.185	0.186	0.189	0.225	0.144	0.176	0.182	0.272
C. D. at 5%	0.56	0.51	0.60	0.66	0.55	0.56	0.57	0.67	0.43	0.53	0.55	0.82
Y x T /S.Em.±	-	-	-	0.186	-	-	-	0.186	-	-	-	0.168
C. D. at 5%	-	-	-	0.53	-	-	-	0.53	-	-	-	0.48
C. V. %	4.62	4.36	4.87	4.63	4.81	4.75	4.89	4.82	3.63	4.45	4.58	4.24

Table 11: Evaluation of different selections and cultivar on organoleptic score (taste and overall acceptability) and shelf life of fruits (days)

Selections	Taste (score)				Overall Acceptability (Score)				Shelf Life of Fruits (Days)			
	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled	2013-14	2014-15	2015-16	Pooled
Selection-1	5.55	6.05	6.20	5.93	6.08	6.13	6.13	6.12	3.02	2.95	3.28	3.09
Selection-2	7.11	7.39	7.83	7.45	7.33	7.54	7.33	7.40	3.44	3.31	3.26	3.34
Selection-3	5.78	5.91	6.67	6.12	6.00	6.25	6.00	6.08	3.85	3.88	3.95	3.89
Selection-4	7.11	7.68	7.17	7.32	6.92	7.11	7.33	7.12	3.04	2.97	2.95	2.99
Selection-5	7.29	7.51	6.92	7.24	7.72	7.09	6.89	7.23	3.37	3.48	3.54	3.46
Selection-6	7.17	6.86	7.67	7.23	6.93	6.78	7.00	6.90	3.30	3.63	3.97	3.63
Selection-7	6.56	5.98	7.00	6.51	6.42	6.43	6.72	6.52	4.21	4.24	4.14	4.20
Selection-8	7.22	7.49	6.42	7.04	7.18	7.15	6.67	7.00	3.06	3.12	3.12	3.10
Pusa Dwarf	5.55	6.05	6.20	6.36	6.30	6.45	6.17	6.31	3.19	3.23	3.14	3.19
S.Em.±	0.149	0.170	0.190	0.238	0.158	0.153	0.181	0.131	0.167	0.231	0.117	0.103
C. D. at 5%	0.45	0.51	0.57	0.72	0.47	0.46	0.54	0.39	0.50	0.69	0.35	0.29
Y x T /S.Em.±	-	-	-	0.170	-	-	-	0.164	-	-	-	0.181
C. D. at 5%	-	-	-	0.48	-	-	-	NS	-	-	-	NS
C. V. %	3.82	4.36	4.74	4.33	4.03	3.91	4.69	4.22	8.54	11.66	5.79	9.25

Table 12: Evaluation of different selections and cultivar on organoleptic score (fruit firmness, kg/cm^2) and PRSV infection (%)

Selections	Fruit Firmness (kg/cm^2)			Papaya Ring Spot Virus (PRSV) Infestation (%)			
	1st days	2nd days	3rd days	2013-14	2014-15	2015-16	Pooled
Selection-1	13.67	6.47	4.73	8.93	12.00	27.48	16.14
Selection-2	15.00	11.97	7.30	10.00	12.53	46.50	23.01
Selection-3	15.00	15.00	13.83	6.60	9.33	60.83	25.59
Selection-4	15.00	9.43	5.23	10.33	12.27	23.87	15.49
Selection-5	15.00	14.30	8.77	9.17	11.67	48.73	23.19
Selection-6	15.00	13.03	8.03	10.43	14.47	27.07	17.32
Selection-7	15.00	14.20	14.17	10.67	13.40	33.01	19.03
Selection-8	15.00	6.97	3.53	7.67	11.23	39.72	19.54
Pusa Dwarf	15.00	10.23	6.10	10.50	12.40	25.57	16.16
S.Em.±	0.444	0.393	0.275	0.435	0.558	1.230	7.135
C. D. at 5%	NS	1.18	0.82	1.30	1.67	3.69	21.39
Y x T /S.Em.±	-	-	-	8.04	7.96	5.76	9.14
C. D. at 5%	-	-	-	-	-	-	1.98
C. V. %	5.18	6.03	5.98	5.84	5.78	6.15	6.87

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