Evaluation of performance for the quantitative traits in tomato (*Solanum lycopersicon* L.) over seasons

Abstract

Present investigations were carried out in tomato assess the mean performance, general mean and range for nineteen quantitative characters. Forty-five tomato hybrids generated by crossing ten parents in randomized complete block design with three replications at the Main Experiment Station, Department of Vegetable Science, ANDUA&T, Kumarganj, Ayodhya, during *Rabi* season 2020-2021 and 2021-2022.The pooled estimates of mean performance for total fruit yield per plant varied from 2.35 to 3.24 kg for parents and 1.87 to 3.43 kg fruit for hybrids. The mean values over the parents and F_1 hybrids were 2.51 and 2.68 kg, respectively. The highest mean performance for most desirable traits fruit yield per plant was exhibited by P_6(3.24 kg) followed by P_9 (3.23 kg), P_{10} (3.09 kg), P_5(2.99) and P_4(2.81) for parent. Among the hybrids, the highest fruit yield per plant was exhibited by $P_2\times P_5$(3.43 kg) followed by $P_4\times P_9$(3.41 kg), $P_4\times P_7$(3.30 kg), $P_1\times P_5$(3.22 kg) and $P_4\times P_8$(3.20 kg) in descending order.

Keywords: Mean performance, mean value, tomato.

Introduction - A significant impact of globalization on horticulture has been an increasing demand for quality improvement and the wider adoption of quality standards for fruit, vegetable and salad commodities. Tomato is used as vegetable worldwide. It is a very popular and important vegetable in the world. Tomato (*Solanum lycopersicum* L.) is a member of Solanaceae family. Its chromosome no is 2n=2x=24. It is grown worldwide under outdoor and indoor conditions. It has become an important commercial crop so far as the area, production, industrial values and its contribution to human nutrition is concerned. Tomato is known as protective food because of its special nutritive value and also for its high level of antioxidant. Tomatoes contain many health-promoting compounds and are easily integrated as a nutritious part of a balanced diet (Martí *et al.*, 2016). Tomato is one of the most popular and widely grown vegetable crops of the world next to potato. The genus

Solanum consists of annual or short lived perennial herbaceous, typical day neutral plant and warm season crops. Tomato fruit are eaten raw or cooked called as "Protective Food" is being extensively grown as annual plant all over the world. Tomato in large quantities is used to produce several items like, juice, ketchup, paste, syrup, puree and drinks etc. It is rich in beta-carotene, folate, vitamin A, vitamin C, vitamin E, flavonoids, potassium and other minerals. Overall, tomatoes provide approximately 20 mg of vitamin 'C' per 100 grams of edible part. Vitamin C is considered as an excellent antioxidant because it donates electrons for enzymes or other compounds that are oxidants. Red colour of tomato is due to the presence of lycopene. India ranks second in terms of production of tomato after China . In India the leading tomato growing states are, Andhra Pradesh, Madhya Pradesh, Karnataka, West Bengal, Maharashtra, U.P., Haryana, Punjab, Gujarat and Bihar. The total area covered under tomato cultivation is 0.85 Mha with production of 21.001 MT and its productivity is 25.34 tonnes per ha (NHB database, 2020). The mean performance of genotypes may be used as donor parents in hybridization programme for developing high yielding varieties of respective groups. Some other genotypes exhibiting very high mean performance for characters other than fruit yield per plant may also be used for transferring these traits. These lines merits due consideration as promising parents for hybridization programme for bringing overall improvement in plant genetic architecture in a component breeding approach ultimately leading to high yielding and high quality bottle gourd genotypes even if they have moderate or low fruit yield. Keeping in view the above facts the present investigation was conducted to find out stable genotype of bottle gourd for improvement in future.

Materials and Methods

The present research work was conducted during *Rabi* seasons of 2020 (Y_1) and 2021 (Y_2) to study the mean performance, general mean and range for nineteen characters using diallel mating design at the Main Experiment Station (MES) of the Department of Vegetable Science, Acharya Narendra Deva University of Agriculture and Technology, Narendra Nagar, Kumarganj, Ayodhya (U.P.) India. The observations were recorded on nineteen characters. The experimental materials for the present investigation comprised of nineteen promising and diverse inbred lines/varieties of

tomato selected on the basis of genetic variability from the germplasm stock maintained in the Department of Vegetable Science, Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya (U.P.) India. The selected parental lines *i.e.*; 2013/TODVAR-2, NDT-2, NDT-Sel-1, NDT-5, NDT-7, NDT-4, NDT-P-1, NDT-6, NDT-6-2-1, NDT-Sel-2. to get 45 F_1 seed. Each hybrids and parents were grown in rows spaced at 0.60 meters apart with a plant to plant spacing of 0.50 meter. All the recommended agronomic package of practices and protection measures were followed to raise good crops. Observations were recorded on days to 50% flowering, days to first fruit harvest, plant height (cm), number of primary branches per plant, number of fruits per cluster, number of fruits per plant, average fruit weight (g), pericarp thickness (mm), number of locules per fruit, polar diameter (cm), equitorial diameter (cm), marketable fruit yield per plant (kg), total soluble solids (TSS), titrable acidity (%), ascorbic acid content (mg/100g) Reducing sugar (mg/100g). none - reducing sugar (mg/100g). total sugar (mg/100g) and total fruit yield per plant (kg).

Result and Discussion

Mean performance, general mean, range, coefficient of variation, critical difference and standard error for nineteen characters 45 F_1's and their 10 parents (Y_1=2020 and Y_2=2021) and pooled had been presented in Table-1.The highest mean performance for most desirable traits fruit yield per plant was exhibited by P_4(3.01 kg) followed by P_9(2.84 kg), P_7(2.83 kg), P_3(2.80) and P_{10}(2.62 kg) in Y_1, P_4(3.45 kg) exhibited highest fruit yield per plant followed by P_3(2.97 kg), P_9(2.89 kg), P_1(2.86) and P_7(2.83 kg) in Y_2 and P_6(3.24 kg) exhibited highest fruit yield per plant followed by P_9(3.23 kg), P_{10}(3.09 kg), P_5(2.99 kg) and P_4(2.81 kg) in pooled.

The above mentioned genotypes may be used as donor parents in hybridization programme for developing high yielding varieties of respective groups. Some other genotypes exhibiting very high mean performance for characters other than fruit yield per plant are also listed in Table-1. These lines merits due consideration as promising parents for hybridization programme for bringing overall improvement in plant genetic architecture in a component breeding approach ultimately leading to high yielding and high quality tomato genotypes even if they have moderate or low fruit

yield. In this context, the most desirable parents were P_6(31.66 days) which showed earliness for days to fifty present flowering among the parents which was followed by P_{10} (34.66 days), P_1(35.00 days), P_5(38.66 days) and P_3(39.00 days) in Y_1, Parent P_6(31.33 days) followed by P_4(34.00 days), P_{10}(35.78 days) and P_1(36.12days) in Y_2 and Parent P_6(31.11 days) followed by P_5(31.77 days), P_4(32.00 days) and P_3(33.60 days) in pooled. Among the parents days to first fruit harvest was observed in P_6(83.00 days) followed by P_5(84.66 days), P_7(87.33 days) and P_4(89.66 days) in Y_1, P_6(80.00 days) followed by P_5 (82.67), P_7(89.67 days) and P_9(90.62 days) in Y_2 and P_6(78.98 days) followed by and P_7(79.66 days), P_8(82.06 days) and P_2(83.32days) in pooled; highest plant hight (cm) was recorded in parent P_{10}(119.58cm) followed by P_3(114.84 cm), P_7(113.73cm) , P_3(114.84 cm)and P_7(113.73cm) in Y_1, P_7(120.65 cm) followed by P_3(115.67 cm), P_6(113.87cm), P_{10}(111.12cm)and P_{10}(110.00 cm) in Y_2 and P_7(120.09 cm) followed by P_6 (116.80cm) ,P_3(114.35 cm), P_4(114.29 cm) and P_{10}(112.77 cm) in pooled.

highest primary branches per plant among the parents was recorded in P_5 (6.36 branches) followed by P_7(6.15 branches) ,P_2(5.36 branches), P_9(5.28 branches) And P_6(5.22 branches) in Y_1, P_5(6.98 branches) branches) followed by P_7(6.89 branches), P_2(6.67 branches) P_9(6.33 branches) inY_2 and P_5(6.67branches) followed by P_4(6.60 branches),P_3(6.58branches)andP_6

(6.45 branches) in pooled; maximum number of fruit per cluster among the parents was observed in P_3(5.16) followed by(4.45), P_{10}(4.19), P_4(3.97) and P_2(3.81) in Y_1, P_3(5.67) followed by P_5(5.00), P_1(4.69), P_{10}(4.32) and P_4 (4.12) in Y_2 and P_5 (4.90) followed by P_3 (4.56), P_6 (4.34) and P_9(4.20 m) in pooled; maximum number of fruit per plant was found in P_9(35.30), followed by P_4(33.62), P_6(31.26),P_{10} (30.33), and P_5(28.62) in Y_1, P_9(36.34) followed by P_4 (35.89), P_3(33.87), P_7(32.78) and P_6(32.67) in Y_2 and P_6(36.52)was found for maximum number of fruit per plant among the parents which was followed by P_9(36.28), P_3(33.68), P_4(32.63) and P_{10} (30.03)in pooled; maximum average fruit weight was observed in parent P_1 (79.02g) followed by (76.13g), P_4 (75.01g),P_6 (73.16g) and P_{10} (71.54 g) in Y1, P_1(85.40g) followed by P_9(81.67g),P_3 (78.86 g),P_4 (75.45g) and P_6 (74.76g) in Y_2 and P_6(78.41g) followed by P_3(77.89 g),P_1 (76.09g), P_9(76.75g) and P_{10}(73.04g)in

pooled; parental line P_9(5.25mm) was found for maximum pericarp thickness followed by P_4 (5.09 mm), P_5(4.72 mm), P_6(4.67 mm) and P_1(4.63 mm) in Y_1, P_4(5.67 mm) followed by P_9(5.66 mm),P_8(4.83mm), P_1(4.78mm) and P_6(4.77 mm) in Y_2 and P_4(5.49 mm) exhibited maximum pericarp thickness among the parents which was followed by P_9(4.93 mm), P_{10}(4.96 mm), P_9(4.93mm) and P_6(4.72 mm) in pooled.

Maximum number of locules per fruit among the parents was observed in P_7(6.19) followed by P_4(6.06), P_2 (5.43) , P_{10}(5.05) and P_6(4.51) in Y_1, P_7(6.34) followed by P_6(6.14), P_{10}(5.67), P_4(4.97) and P_9 (4.67) in Y_2 and P_4 (5.74) followed by P_7 (5.42), P_3 (5.19) and P_{10}(5.01) in pooled; maximum polar diameter of fruit (cm) was recorded in P_8(6.34) followed by P_3(6.31), P_5 (5.55), P_6 (5.45) and P_2(5.25), Y_1, P_5(6.39) followed by P_8(6.79), P_9(5.87), P_2(5.75) and P(4.96) in Y_2 and P_9 (6.49) followed by P_6 (6.16), P_3 (6.00), P_1(5.14) and P_7 (5.08) in pooled; maximum Equatorial diameter (cm) of fruit was recorded in P_5(9.48cm) followed by P_8(9.47 cm), P_7 (8.35 cm) , P_2 (7.96 cm) and P_9(7.70 cm), in Y_1, P_7(9.76 cm) followed by P_8(9.49 cm), P_5(8.09 cm), P_6(8.45 cm) and P_2 (7.99 cm) in Y_2 and P_5 (9.17 cm) followed by P_6 (8.97 cm), P_7 (8.66 cm) P_9(8.28 cm) and P_1 (7.83 cm) in pooled; maximum marketable fruit yield per plant (kg)was recorded in P_3(2.53 kg) followed by P_1(2.51kg), P_9 (2.43kg) , P_3(2.61kg) and P_1 (2.34kg)) in Y_1, P_4(2.88 kg) followed by P3(2.877 kg), P_7(2.78 kg), P_1 (2.73kg) and P_{10}(2.70kg)) in Y_2 and P_9 (2.97 kg) followed by P_6 (2.91kg), P_{10} (2.86 kg), P1(2.34kg) and P_2 (2.27kg) in pooled; parents P_1(5.68) contain highest total soluble solids followed by P_8(5.62 ^oB), P_5 (5.47 ^oB) , P_7(5.01 ^oB) and P_6 (4.93 ^oB)), in Y_1, P_1(5.70 ^oB) followed by P_6(5.33 ^oB), P_9(5.47 ^oB), P_1 (5.31 ^oB) and P_8(5.24 ^oB)) in Y_2 and P_7 (5.49 ^oB) followed by P_6 (5.33 ^oB), P_1 (5.31), P_{10} (5.10 ^oB) and P_4(5.09 ^oB) in pooled;

maximum titrable acidity was recorded in p1(0.46%) followed by P_7(0.45%), P_6 (0.40%) , P_8(0.43%) and P_{10} (0.37%) in Y_1, P_1(0.43%)followed by P_7(0.42%), P_4(0.38 %), P_3(0.37 %) and P_2 (0.35%) in Y_2 and P_1 (0.43 %) followed by P_2 (0.41%), P_7 (0.40 %) , P_4(0.36%) and P_8 (0.37%) in pooled; parents P_3(24.57mg/100g) contain highest Ascorbic acid content followed by P_7(23.54 mg/100g), P_6 (22.10 mg/100g) , P_2(21.77 mg/100g) and P_{10} (21.38 mg/100g)), in Y_1 P_3 (24.59 mg/100g) followed by P_8(23.14 mg/100g), P_7(22.07 mg/100g),

P_1(21.53 mg/100g) and P_2(21.85 mg/100g)) in Y_2 and P_3 (24.06 mg/100g) followed by P_7 (22.07 mg/100g), P_9(21.73 mg/100g), P_1 (21.53 mg/100g)) and P_4 (21.34 mg/100g) in pooled; maximum reducing sugar was recorded in P_7(1.66%) followed by P_9(1.39%), P_{10} (1.61 %) , P_5(1.54%) and in Y_1, P_9(1.76%) followed by P_7(1.65 %), P_6(1.50%), P_3(1.54 %) and P_1 (1.43%) in Y_2 and P_2 (01.57%) followed by P_{10}(1.51%) , P_5 (1.47%), P_7 (1.44%) and P_8 (1.43%) in pooled; maximum non-reducing sugar(mg/100g) was recorded in P_9(2.78%) followed by p4(2.77%), p1 (2.68%)), P_2(2.67%) and P_{10}(2.60%) in Y_1, P_8(2.94%) followed by P_1(2.76%), $P_1$0(2.75 %), P_2(2.68 %) and P_5 (2.64%) in Y_2 and P_8 (2.80%) followed by P_2(2.75 %),P_4(2.71%),P_9(2.56%)and P_{10} (2.54%) in pooled; maximum total sugar(mg/100g) was recorded in P_{10}(4.21%) followed by P_9(4.16%), P_5 (4.07%) , P_8(4.05%) and P_2(3.98%) in Y_1, P_8(4.59 %) followed by P_{10}(4.51%), P_5 (4.39%) , P_5(4.07%) and P_6(3.88 %) in Y_2 and P_2 (4.33%) followed by P_8(4.06%), P_{10} (4.02%), P_9 (3.83%) and P_6 (3.80%) in pooled. Among the hybrids, the highest fruit yield per plant was exhibited by $P_2\times P_4$(3.94 kg) followed by $p_6\times p_9$(3.67 kg), $p_5\times P_{10}$(3.59 kg), $P_4\times P_8$(3.56 kg) and $P_9\times P_{10}$(5.13 kg) in Y_1 and $P_5\times P_{10}$(4.23 kg) followed by $P_2\times P_4$(4.12 kg), $P_1\times P_4$(3.89 kg), $P_4\times P_8$(3.93 kg) and $P_4\times P_{10}$(3.76 kg) in y_2, $P_2\times P_5$(3.43 kg) followed by $P_4\times P_9$(3.41 kg), $P_7\times P_9$ (3.30 kg), $P_1\times P_5$(3.22 kg) and $P_4\times P_4\times P_8$(3.20 kg) in pooled descending order.

Thus there was significant differences for all the traits over seasons and pooled among the parents and F_1. This might be due to influence of the environment. Similar observations in tomato were also reported by Joshi & Kohli (2005), Jogi *et al.* (2008), Mohammed *et al.* (2012), Narolia *et al.* (2012), kerketta *et a*l. (2018) Prakash et *al.* (2019) and Anuradha *et al.* (2021) in tomat.

Table 1: Mean performance, general mean, range, coefficient of variation, critical difference and standard error for nineteen characters of diallel set of 45 F_1's and their 10 parents (Y1=2020 -2021and Y2=2021-2022) and pooled.

Table 1: Mean performance, general mean, range, coefficient of variation, critical difference and standard error for nineteen characters of diallel set of 45 F_1's and their 10 parents (Y1=2020 -2021and Y2=2021-2022) and pooled.

Genotypes	Days to 50% flowering			Days to first fruit harvest			Plant height (cm)			Primary branches per plant		
	Y_1	Y_2	Pooled	Y_1	Y_2	Pooled	Y_1	Y_2	Pooled	Y_1	Y_2	Pooled
P_1	35.00	36.12	33.33	90.67	91.07	86.83	81.13	82.77	95.03	4.74	5.56	4.98
P_2	41.33	42.00	37.50	93.00	94.23	83.32	94.78	95.78	105.27	5.36	6.67	6.12
P_3	39.33	40.23	33.60	89.00	90.00	86.66	114.84	115.67	114.35	6.04	7.07	6.58
P_4	33.00	34.00	32.00	89.66	89.13	83.83	108.03	110.03	114.29	5.23	5.44	6.49
P_5	38.66	40.44	31.77	84.66	82.67	83.10	73.09	74.87	96.76	6.36	6.98	6.67
P_6	31.66	31.36	31.11	83.66	80.54	78.98	108.93	113.87	116.80	5.22	6.79	6.45
P_7	40.33	41.56	41.16	87.33	89.01	79.66	113.73	120.65	120.05	6.15	6.89	5.91
P_8	38.00	39.00	40.39	87.33	89.00	82.06	91.56	90.77	93.50	4.97	5.89	4.94
P_9	40.33	41.76	41.61	89.00	90.62	87.98	86.87	90.53	102.21	5.28	6.33	5.92
P_{10}	34.66	35.78	38.77	90.33	92.67	102.21	119.5	111.67	112.77	4.78	5.69	5.48
$P_1 \times P_2$	32.00	34.00	34.06	84.00	85.90	87.53	86.01	87.67	84.39	5.10	6.90	5.33
$P_1 \times P_3$	31.00	32.56	32.50	72.00	70.67	78.95	95.97	96.79	91.81	5.60	6.75	6.24
$P_1 \times P_4$	29.33	31.78	30.94	81.00	78.78	75.83	104.37	110.78	100.58	4.38	5.98	5.56
$P_1 \times P_5$	35.33	36.56	33.55	84.67	85.89	81.72	100.34	103.85	105.55	6.45	7.65	6.21
$P_1 \times P_6$	33.33	35.00	34.94	75.33	76.56	80.61	114.74	117.89	109.29	5.12	5.56	6.38
$P_1 \times P_7$	30.00	28.56	32.50	87.33	88.45	81.94	107.75	108.89	112.82	4.27	5.87	4.91
$P_1 \times P_8$	33.33	34.67	30.94	75.33	78.45	81.89	84.90	82.90	96.89	5.58	6.70	5.72
$P_1 \times P_9$	28.00	26.21	31.33	87.00	87.85	82.72	91.64	90.67	87.26	6.48	7.45	6.59
$P_1 \times P_{10}$	31.33	33.67	28.77	71.67	73.65	79.75	114.42	115.76	102.54	5.28	6.89	6.36
$P_2 \times P_3$	30.33	31.97	36.16	88.00	98.45	91.11	115.06	116.76	105.42	6.07	6.66	6.37
$P_2 \times P_4$	30.00	31.89	30.98	83.33	76.98	90.89	104.35	108.56	110.55	7.12	8.56	6.89
$P_2 \times P_5$	30.00	32.87	30.94	74.00	75.67	75.49	93.33	93.98	100.94	5.00	6.07	6.78
$P_2 \times P_6$	26.33	24.87	29.60	72.00	68.11	73.83	109.77	110.67	101.87	5.13	5.87	5.60
$P_2 \times P_7$	25.00	25.78	24.93	74.33	75.78	71.22	111.04	112.56	110.85	6.22	6.54	6.04
$P_2 \times P_8$	34.67	35.00	30.22	86.00	80.67	80.89	86.35	85.98	99.45	5.96	6.32	6.25
$P_2 \times P_9$	30.67	31.78	32.83	90.00	93.89	85.33	91.27	92.76	88.62	7.30	7.86	6.81
$P_2 \times P_{10}$	26.00	27.87	28.89	82.67	84.34	88.27	112.08	113.86	102.42	6.40	7.12	7.13

$P_3 \times P_4$	24.00	22.89	32.11	81.67	83.89	85.83	117.30	120.67	116.48	5.63	6.32	6.35
$P_3 \times P_5$	28.00	27.13	25.44	85.33	79.67	84.61	118.52	125.78	119.59	6.27	7.59	6.29
$P_3 \times P_6$	31.67	32.97	29.39	85.33	81.87	82.50	117.78	121.65	121.77	5.41	5.98	6.50
$P_3 \times P_7$	32.00	33.67	32.48	84.67	80.54	83.26	129.30	130.45	125.47	5.56	5.43	5.77
$P_3 \times P_8$	31.33	32.00	32.50	87.33	84.56	83.93	123.20	128.67	126.82	7.12	8.56	6.27
$P_3 \times P_9$	27.00	28.57	29.50	86.67	79.78	85.61	106.25	108.45	117.45	5.55	6.57	7.05
$P_3 \times P_{10}$	30.00	31.00	29.28	75.00	78.01	77.39	124.71	120.56	116.57	6.63	7.76	6.60
$P_4 \times P_5$	26.33	28.78	30.16	85.33	86.98	87.23	116.00	117.56	113.00	4.67	6.56	5.06
$P_4 \times P_6$	25.33	26.89	27.05	72.33	72.89	79.65	118.08	119.56	117.82	4.61	4.99	5.58
$P_4 \times P_7$	28.00	29.00	27.44	88.00	89.45	80.44	116.30	117.56	117.93	4.74	5.87	4.86
$P_4 \times P_8$	41.00	42.76	35.00	84.67	84.78	87.05	105.78	108.53	111.66	5.15	7.56	5.51
$P_4 \times P_9$	37.67	38.56	40.21	90.33	91.52	87.55	90.20	95.45	99.36	5.42	7.67	6.48
$P_4 \times P_{10}$	27.33	24.89	32.94	86.00	81.54	88.76	118.86	120.45	107.15	4.48	6.98	6.07
$P_5 \times P_6$	31.67	32.21	36.05	91.00	92.56	86.83	115.44	117.56	95.15	4.51	4.99	5.75
$P_5 \times P_7$	28.00	29.56	30.10	88.00	89.56	90.28	105.39	105.96	111.47	4.34	4.98	4.66
$P_5 \times P_8$	40.67	42.67	35.11	86.67	87.46	88.11	84.64	90.34	95.30	4.48	4.43	4.73
$P_5 \times P_9$	29.00	32.56	35.83	87.00	88.76	87.22	89.08	90.67	89.70	7.26	7.67	5.84
$P_5 \times P_{10}$	32.67	30.56	32.61	73.33	74.97	81.04	118.19	124.67	104.42	6.71	7.69	7.18
$P_6 \times P_7$	33.00	33.67	32.16	73.00	68.78	76.77	117.45	118.34	115.66	5.60	6.98	6.19
$P_6 \times P_8$	37.00	37.89	35.33	94.33	95.78	81.55	114.12	115.47	116.22	5.97	6.97	6.47
$P_6 \times P_9$	36.67	37.35	37.27	81.00	82.67	88.39	83.75	84.45	99.61	6.54	7.98	6.75
$P_6 \times P_{10}$	41.00	42.00	39.17	71.67	72.00	77.16	123.60	126.45	104.02	4.52	5.67	6.25
$P_7 \times P_8$	40.33	25.90	34.44	88.67	89.47	88.84	109.41	117.56	115.03	5.56	6.98	6.22
$P_7 \times P_9$	29.00	30.67	27.45	72.33	73.67	80.90	111.67	108.53	114.61	6.26	7.56	6.62
$P_7 \times P_{10}$	41.00	42.78	35.83	75.33	76.79	74.50	116.82	95.45	112.67	5.62	4.89	6.59
$P_8 \times P_9$	39.33	40.14	39.16	87.00	88.62	88.00	85.19	120.45	87.98	6.48	6.50	6.18
$P_8 \times P_{10}$	41.33	42.89	40.73	91.66	86.98	90.14	114.77	117.56	117.61	5.96	6.56	6.23
$P_9 \times P_{10}$	41.00	42.89	41.38	87.00	88.56	88.81	110.03	105.96	100.28	6.16	6.18	6.25
Mean	**32.86**	**33.82**	**33.30**	**83.51**	**83.66**	**83.49**	**105.77**	**107.85**	**106.78**	**5.61**	**6.58**	**6.09**
C.V.	7.73	6.49	12.65	6.59	5.47	8.41	6.55	5.12	10.50	11.54	8.76	14.43

S.E.±M		1.46	1.27	1.72	3.17	2.64	2.86	4.01	3.19	4.58	0.37	0.33	0.35
C.D. 5%		4.10	3.55	4.79	8.91	7.41	7.98	11.23	8.93	12.753	1.05	0.93	0.99
Range	**Lowest**	**24.00**	**22.89**	**24.93**	**71.66**	**68.11**	**71.22**	**74.87**	**74.87**	**84.39**	**4.43**	**4.43**	**4.66**
	highest	**41.33**	**42.89**	**41.61**	**94.33**	**98.45**	**91.11**	**130.45**	**130.45**	**126.82**	**8.56**	**8.55**	**7.18**

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Genotypes	**Fruit per cluster**			**No: of fruit per plant**			**Average fruit weight (g)**			**Pericarp thickness (mm)**		
	Y_1	**Y_2**	**Pooled**	**Y_1**	**Y_2**	**Pooled**	**Y_1**	**Y_2**	**Pooled**	**Y_1**	**Y_2**	**Pooled**
P_1	4.55	4.69	4.23	26.44	27.78	28.85	79.02	85.40	76.09	4.63	4.78	4.65
P_2	3.81	3.87	3.91	24.81	26.56	27.39	68.25	70.67	71.01	3.78	3.86	3.82
P_3	5.16	5.67	4.56	32.59	33.87	33.68	76.13	78.86	77.89	4.59	4.87	4.58
P_4	3.97	4.12	3.48	33.62	35.89	32.63	75.01	75.45	71.28	5.09	5.67	5.49
P_5	4.13	5.03	4.90	28.59	29.98	32.02	60.58	64.35	68.67	4.72	4.32	4.23
P_6	3.91	4.12	4.34	31.26	32.77	36.52	73.16	74.67	78.41	4.67	4.77	4.72
P_7	3.88	3.88	3.80	20.83	32.78	27.25	64.93	68.90	74.90	3.81	3.97	4.28
P_8	3.91	3.91	3.75	27.37	28.98	29.02	78.54	79.33	76.75	4.81	4.83	4.31
P_9	3.53	3.66	4.20	35.03	38.34	36.28	67.36	81.67	70.03	5.25	5.67	4.93
P_{10}	4.19	4.32	3.93	30.33	22.86	30.00	71.54	74.87	73.04	4.58	4.45	4.96
$P_1 \times P_2$	4.52	4.78	4.61	34.04	37.45	30.91	64.84	69.97	75.12	4.44	4.78	4.60
$P_1 \times P_3$	3.39	3.67	4.08	27.23	31.78	32.34	66.27	71.97	68.11	4.64	4.83	4.71
$P_1 \times P_4$	3.71	4.72	3.68	26.78	34.23	29.28	72.85	77.34	72.41	4.53	4.59	4.68
$P_1 \times P_5$	4.29	4.29	4.50	25.29	29.00	29.75	82.74	85.76	80.03	4.80	4.98	4.69
$P_1 \times P_6$	4.27	4.76	4.27	25.60	27.89	27.30	81.33	84.87	83.54	5.27	5.55	5.12
$P_1 \times P_7$	4.67	4.65	4.71	35.79	32.89	31.83	75.01	76.54	79.93	4.85	4.87	5.20
$P_1 \times P_8$	3.69	3.98	4.17	30.47	35.89	31.68	78.33	82.76	77.43	3.63	4.12	4.24
$P_1 \times P_9$	4.54	4.87	4.26	31.78	33.87	33.83	82.46	85.76	82.61	4.58	4.56	4.35
$P_1 \times P_{10}$	3.89	3.99	4.38	26.93	29.98	30.40	72.83	73.78	79.29	3.68	3.87	4.12
$P_2 \times P_3$	4.59	4.76	4.23	25.49	28.12	26.02	82.49	80.56	76.58	4.75	4.97	4.30
$P_2 \times P_4$	3.57	4.56	4.16	29.49	33.45	28.80	75.90	80.56	78.23	4.67	4.77	4.82
$P_2 \times P_5$	3.60	3.60	4.08	26.91	28.65	30.18	77.47	79.54	79.01	4.67	4.65	4.72

$P_2 \times P_6$	3.74	3.86	3.67	26.59	29.56	27.61	76.24	76.32	77.89	3.83	4.56	4.23
$P_2 \times P_7$	3.62	3.56	3.73	32.93	27.45	31.24	69.87	70.54	73.09	4.53	4.68	4.54
$P_2 \times P_8$	3.37	3.65	3.46	28.89	30.34	28.17	83.60	87.56	77.06	4.66	4.88	4.67
$P_2 \times P_9$	4.63	4.76	4.13	29.52	31.56	29.93	71.49	76.43	79.52	4.83	4.97	4.85
$P_2 \times P_{10}$	3.96	3.97	4.36	33.52	34.78	32.54	76.85	79.65	76.64	4.48	4.58	4.72
$P_3 \times P_4$	4.49	4.50	5.08	32.37	33.78	33.12	66.17	69.54	72.51	4.65	4.65	4.76
$P_3 \times P_5$	3.45	4.87	3.97	33.42	39.67	33.60	65.56	71.87	67.55	3.83	3.95	4.24
$P_3 \times P_6$	3.70	4.12	4.28	31.23	34.67	35.45	63.52	66.56	67.69	4.67	4.78	4.31
$P_3 \times P_7$	3.67	3.65	3.89	27.93	29.56	31.29	67.52	70.67	67.03	4.83	4.83	4.80
$P_3 \times P_8$	3.86	4.65	3.75	31.03	34.67	30.29	83.33	85.45	77.00	5.46	5.76	5.14
$P_3 \times P_9$	4.52	4.57	4.58	32.90	35.54	33.78	82.83	83.43	84.14	5.60	5.87	5.68
$P_3 \times P_{10}$	2.67	2.99	3.62	28.49	31.65	32.01	64.85	67.56	74.14	4.45	5.89	5.16
$P_4 \times P_5$	3.56	3.87	3.84	27.51	29.67	31.70	79.36	83.32	77.40	4.40	4.56	5.03
$P_4 \times P_6$	3.72	3.79	3.79	35.46	37.45	32.56	74.26	75.78	78.78	4.82	4.34	4.68
$P_4 \times P_7$	3.60	3.87	3.69	28.15	30.56	32.80	75.02	77.56	75.40	3.68	3.35	4.01
$P_4 \times P_8$	3.64	4.34	3.75	29.28	37.56	29.92	74.90	79.76	76.23	4.53	4.42	3.93
$P_4 \times P_9$	3.63	4.53	3.98	26.18	31.87	31.87	76.04	78.56	77.90	4.50	4.32	4.46
$P_4 \times P_{10}$	4.59	5.67	4.56	30.97	35.45	31.41	73.92	76.76	76.24	3.59	3.76	3.95
$P_5 \times P_6$	4.14	4.87	4.57	25.23	29.56	27.60	71.98	73.89	68.16	4.90	4.83	4.61
$P_5 \times P_7$	4.65	4.48	4.76	30.60	32.45	30.07	71.30	71.98	72.59	5.13	5.65	4.97
$P_5 \times P_8$	5.29	5.23	4.88	26.74	30.56	29.59	75.00	76.67	73.49	3.85	3.92	4.75
$P_5 \times P_9$	4.74	4.78	4.98	31.89	27.56	31.22	80.92	84.65	78.79	4.68	4.76	4.29
$P_5 \times P_{10}$	4.71	4.78	4.74	34.45	41.78	31.00	78.04	83.67	81.34	4.66	4.78	4.71
$P_6 \times P_7$	3.78	3.97	3.94	31.41	34.67	32.09	78.90	80.08	76.78	5.16	5.69	4.96
$P_6 \times P_8$	4.25	4.35	4.11	33.49	35.67	34.07	82.81	84.78	81.44	4.77	4.81	5.23
$P_6 \times P_9$	3.67	3.67	4.01	34.34	36.56	35.00	73.14	74.84	78.96	3.77	3.89	4.28
$P_6 \times P_{10}$	3.65	3.73	3.66	31.60	33.67	34.07	80.73	84.87	77.78	4.59	4.75	4.24
$P_7 \times P_8$	4.61	4.65	4.25	32.93	30.56	32.85	72.70	75.87	70.84	4.93	4.94	4.45
$P_7 \times P_9$	3.44	4.21	4.04	33.20	33.67	31.88	70.96	73.98	73.41	4.76	4.87	4.85
$P_7 \times P_{10}$	3.59	3.60	3.90	29.67	30.67	31.68	71.90	74.98	72.94	3.70	3.83	4.28
$P_8 \times P_9$	4.37	4.67	4.14	30.48	30.56	29.73	73.65	77.85	76.49	4.67	4.78	4.75

$P_8 \times P_{10}$		4.40	4.87	4.5367	32.86	37.56	31.71	68.35	72.65	73.10	4.63	4.62	4.70
$P_9 \times P_{10}$		3.96	3.67	3.8133	27.36	29.67	32.85	75.90	74.56	78.63	5.15	5.35	5.41
Mean		**4.02**	**4.30**	**4.1613**	**29.98**	**32.44**	**31.28**	**74.15**	**77.21**	**75.66**	**4.56**	**4.72**	**4.64**
C.V.		8.51	7.48	11.75	7.11	6.20	10.32	6.42	5.64	7.89	7.33	8.39	10.74
S.E.±M		0.19	0.19	0.199	1.23	1.16	1.31	2.75	2.51	2.43	0.19	0.23	0.20
C.D. 5%		0.55	0.52	0.55	3.45	3.25	3.67	7.71	7.04	6.78	0.54	0.64	0.56
Range	**Lowest**	**2.99**	**2.99**	**3.46**	**22.87**	**22.86**	**26.02**	**64.35**	**64.35**	**67.03**	**3.35**	**3.35**	**3.82**
	highest	**5.67**	**5.67**	**5.08**	**41.78**	**41.78**	**36.52**	**87.56**	**87.56**	**84.14**	**5.89**	**5.88**	**5.68**

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Genotypes	**Locules per fruit**			**Poler diameter of fruit (cm)**			**Equitorial diameter of fruit (cm)**			**Marketable fruit yields per plant (kg)**		
	Y_1	**Y_2**	**Pooled**	**Y_1**	**Y_2**	**Pooled**	**Y_1**	**Y_2**	**Pooled**	**Y_1**	**Y_2**	**Pooled**
P_1	4.63	4.64	4.57	4. 83	4.96	5.14	7.57	7.76	7.83	2.53	2.73	2.34
P_2	5.43	5.43	5.15	5.25	5.75	4.97	7.96	7.99	7.70	1.88	2.35	2.27
P_3	3.74	3.77	5.19	6.31	5.48	6.0	6.44	6.67	6.94	2.53	2.87	2.61
P_4	6.06	4.97	5.74	4.80	4.82	4.47	6.47	6.70	6.71	2.08	2.88	2.25
P_5	4.54	4.67	4.60	5.55	6.38	4.71	9.48	8.09	9.17	1.65	2.34	2.47
P_6	4.51	6.14	4.69	5.45	5.55	6.16	8.06	8.45	8.97	2.16	2.29	2.91
P_7	6.19	6.34	5.42	4.40	4.48	5.08	8.35	9.76	8.66	2.41	2.78	2.30
P_8	2.98	3.34	3.91	6.34	6.78	5.61	9.48	9.49	8.67	1.65	1.30	2.15
P_9	4.60	4.67	4.19	5.51	5.87	6.49	7.7	7.78	8.28	2.43	2.67	2.97
P_{10}	5.05	5.67	5.01	3.99	4.23	5.22	5.40	5.36	6.58	2.24	2.70	2.86
$P_1 \times P_2$	4.50	4.70	4.57	4.67	4.84	4.81	7.33	7.87	7.54	2.15	2.40	2.44
$P_1 \times P_3$	4.75	4.73	4.72	5.64	5.70	5.23	7.46	7.46	7.66	2.13	2.43	2.26
$P_1 \times P_4$	4.67	4.87	4.70	6.31	6.34	6.00	8.31	8.45	7.88	2.14	3.70	2.28
$P_1 \times P_5$	6.67	6.67	5.76	5.25	4.89	5.79	9.43	8.90	8.94	1.46	1.89	2.58
$P_1 \times P_6$	4.60	4.98	5.63	4.86	4.86	4.87	6.71	6.87	7.80	1.16	1.65	1.52
$P_1 \times P_7$	5.05	5.45	5.01	5.81	5.87	5.33	8.12	8.78	7.49	2.86	2.21	2.25
$P_1 \times P_8$	5.68	5.32	5.56	6.48	6.48	6.17	7.08	7.87	7.93	1.62	2.45	1.91

$P_1 \times P_9$	4.66	4.64	4.99	5.75	5.83	6.11	6.78	6.65	7.32	2.56	2.77	2.50
$P_1 \times P_{10}$	4.66	4.87	4.65	4.63	4.70	5.23	7.79	7.45	7.22	1.94	2.67	2.35
$P_2 \times P_3$	4.56	4.76	4.99	5.49	5.75	5.62	7.31	7.76	7.64	1.54	1.87	1.94
$P_2 \times P_4$	3.75	3.87	4.25	3.86	3.97	4.80	6.85	6.97	7.30	2.36	3.89	2.11
$P_2 \times P_5$	4.64	4.98	4.25	6.41	6.48	5.18	8.19	8.23	7.57	1.55	2.45	2.72
$P_2 \times P_6$	4.71	4.81	4.84	5.71	5.77	6.09	7.57	7.23	7.89	2.52	3.34	2.48
$P_2 \times P_7$	5.42	5.67	5.11	5.74	5.34	5.75	7.50	7.55	7.36	2.57	2.21	2.95
$P_2 \times P_8$	4.74	4.89	5.20	4.94	5.12	5.13	6.53	6.54	7.04	1.98	2.15	2.09
$P_2 \times P_9$	4.52	4.61	4.70	6.66	6.69	5.88	7.52	7.65	7.03	2.69	2.70	2.42
$P_2 \times P_{10}$	6.52	6.65	5.56	5.64	5.70	6.16	7.63	7.45	7.63	2.51	2.70	2.60
$P_3 \times P_4$	4.55	4.87	4.16	5.58	5.87	5.52	8.84	8.86	7.75	1.86	2.43	2.36
$P_3 \times P_5$	4.62	4.32	4.74	4.53	4.59	5.20	8.50	8.87	8.68	2.82	2.90	2.62
$P_3 \times P_6$	4.47	4.75	4.39	5.60	5.68	5.09	8.59	8.72	8.73	2.29	2.21	2.59
$P_3 \times P_7$	3.49	3.54	4.12	5.54	5.97	5.61	7.60	7.70	8.16	1.43	1.56	1.82
$P_3 \times P_8$	4.57	4.21	4.05	4.90	4.97	5.43	7.56	7.78	7.63	2.87	3.43	2.21
$P_3 \times P_9$	4.57	4.65	4.39	5.67	5.78	5.31	7.50	7.78	7.64	2.43	2.56	2.92
$P_3 \times P_{10}$	5.29	5.43	4.97	3.74	4.14	4.76	6.60	6.95	7.19	1.96	2.43	2.26
$P_4 \times P_5$	3.51	3.64	4.24	5.58	5.72	5.20	9.43	9.49	8.06	2.67	2.50	2.77
$P_4 \times P_6$	3.80	3.89	3.71	6.77	6.89	6.24	9.44	9.34	9.46	2.93	3.56	2.71
$P_4 \times P_7$	4.67	4.84	4.28	5.79	5.46	6.33	9.38	9.45	9.35	2.76	2.76	3.16
$P_4 \times P_8$	4.41	4.53	4.62	4.72	4.96	5.08	8.51	8.67	8.98	2.93	4.24	2.84
$P_4 \times P_9$	5.34	5.75	4.93	5.44	5.44	5.19	9.01	9.34	8.83	2.84	3.12	3.53
$P_4 \times P_{10}$	4.61	4.67	5.18	3.56	3.87	4.50	8.68	8.87	9.01	2.95	3.30	3.03
$P_5 \times P_6$	3.58	3.76	4.12	4.56	4.64	5.47	8.38	8.56	8.23	1.48	2.31	1.91
$P_5 \times P_7$	5.52	5.34	4.64	5.50	5.89	5.06	8.96	8.45	8.76	1.48	1.48	1.89
$P_5 \times P_8$	3.72	3.56	4.52	4.53	4.58	5.21	6.38	6.79	7.41	2.21	2.41	1.84
$P_5 \times P_9$	4.70	4.79	4.13	5.64	5.87	5.10	8.62	8.87	7.70	1.80	1.80	2.10
$P_5 \times P_{10}$	4.74	4.87	4.76	6.26	6.87	6.06	9.66	9.87	9.26	2.96	3.65	2.38
$P_6 \times P_7$	6.34	6.38	6.24	5.64	5.85	5.59	8.18	8.97	8.31	2.60	2.70	2.44
$P_6 \times P_8$	4.44	4.65	5.41	4.51	4.98	5.18	7.54	7.87	8.25	1.78	2.30	2.23
$P_6 \times P_9$	5.31	5.75	4.97	5.57	5.60	5.27	7.48	7.87	7.67	2.83	3.32	2.56

$P_6 \times P_{10}$		4.52	4.65	5.13	5.48	5.78	5.54	8.57	8.97	8.22	1.66	2.21	2.48
$P_7 \times P_8$		4.55	4.21	5.44	4.61	4.87	4.54	7.98	7.34	8.87	2.54	3.45	2.65
$P_7 \times P_9$		6.61	6.76	5.41	4.63	4.87	4.75	6.86	7.23	7.10	2.44	2.22	2.94
$P_7 \times P_{10}$		4.43	4.84	5.59	4.56	4.89	4.71	7.53	7.86	7.38	2.73	2.65	2.47
$P_8 \times P_9$		4.46	4.32	3.90	5.83	5.97	6.30	7.44	7.97	8.47	2.43	2.80	1.86
$P_8 \times P_{10}$		3.67	3.78	3.99	7.03	7.48	6.50	8.48	8.87	8.22	3.32	3.51	3.06
$P_9 \times P_{10}$		4.67	4.98	4.67	5.90	6.45	5.88	7.39	7.76	7.58	2.95	3.48	2.81
Mean		**4.74**	**4.87**	**4.79**	**5.34**	**5.50**	**5.43**	**7.89**	**8.05**	**7.99**	**2.27**	**2.65**	**2.45**
C.V.		8.23	8.09	14.86	6.44	7.67	12.75	6.26	6.17	9.48	11.24	10.96	21.02
S.E.±M		0.22	0.23	0.29	0.19	0.24	0.28	0.28	0.29	0.30	0.14	0.17	0.21
C.D. 5%		0.63	0.64	0.81	0.55	0.68	0.78	0.79	0.80	0.86	0.41	0.47	0.58
Range	**Lowest**	**2.98**	**3.34**	**3.71**	**3.56**	**3.87**	**4.47**	**5.40**	**5.33**	**6.58**	**1.15**	**1.30**	**1.52**
	highest	**6.66**	**6.76**	**6.24**	**7.03**	**7.48**	**6.50**	**9.65**	**9.86**	**9.46**	**3.32**	**4.24**	**3.53**

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Genotypes	**TSS**			**Titrable acidity %**			**Ascorbic acid content**			**Reducing sugar**		
	Y_1	**Y_2**	**Pooled**	**Y_1**	**Y_2**	**Pooled**	**Y_1**	**Y_2**	**Pooled**	**Y_1**	**Y_2**	**Pooled**
P_1	5.69	5.70	5.31	0.46	0.42	0.43	20.50	20.53	21.29	1.11	1.43	1.18
P_2	4.83	4.83	4.76	0.36	0.35	0.42	21.77	21.85	19.25	1.31	1.33	1.57
P_3	4.78	4.79	5.10	0.34	0.37	0.31	24.56	24.59	24.06	0.97	1.54	1.15
P_4	4.84	5.62	5.09	0.38	0.38	0.36	19.79	19.96	21.34	1.10	1.76	1.13
P_5	5.25	4.96	5.11	0.37	0.35	0.40	20.54	20.87	20.15	1.54	1.11	1.47
P_6	4.93	4.85	5.33	0.40	0.34	0.38	22.10	22.56	23.31	1.24	1.50	1.29
P_7	5.01	5.05	5.49	0.45	0.42	0.42	23.54	23.95	23.49	1.66	1.65	1.44
P_8	5.62	4.97	5.24	0.43	0.40	0.37	21.99	22.32	20.38	1.52	1.40	1.43
P_9	5.47	5.47	5.12	0.35	0.30	0.34	19.49	19.64	21.73	1.39	1.76	1.27
P_{10}	4.76	4.90	5.05	0.37	0.35	0.35	21.38	21.85	20.80	1.61	0.49	1.51
$P_1 \times P_2$	5.03	5.12	5.36	0.40	0.37	0.4083	22.15	22.78	21.3417	1.24	1.34	1.33
$P_1 \times P_3$	4.60	4.60	4.86	0.38	0.32	0.3750	23.59	23.65	23.1867	1.74	1.84	1.54
$P_1 \times P_4$	4.49	4.50	4.54	0.42	0.40	0.3700	19.57	19.87	21.6117	1.34	1.72	1.59
$P_1 \times P_5$	5.11	5.43	4.80	0.36	0.36	0.3783	20.59	20.78	20.2300	1.24	1.54	1.47
$P_1 \times P_6$	5.22	5.12	5.32	0.38	0.39	0.3683	22.33	21.66	21.5533	1.46	1.56	1.50
$P_1 \times P_7$	5.07	5.07	5.09	0.39	0.35	0.39	23.71	23.97	22.68	1.11	1.75	1.33

$P_1 \times P_8$	5.18	5.87	5.12	0.42	0.45	0.38	24.59	24.67	24.27	1.55	1.70	1.65
$P_1 \times P_9$	4.80	4.80	5.33	0.36	0.32	0.40	21.25	21.45	22.96	1.39	1.40	1.54
$P_1 \times P_{10}$	4.69	4.70	4.74	0.45	0.48	0.38	16.41	16.74	18.93	1.83	1.84	1.61
$P_2 \times P_3$	4.67	4.69	4.75	0.44	0.41	0.39	22.24	22.12	22.04	1.08	1.23	1.20
$P_2 \times P_4$	4.70	4.71	4.69	0.43	0.38	0.42	23.56	23.76	22.84	1.24	1.32	1.23
$P_2 \times P_5$	5.63	5.69	5.16	0.35	0.35	0.36	24.44	24.87	24.10	1.22	1.28	1.27
$P_2 \times P_6$	5.01	5.02	5.35	0.48	0.42	0.41	22.80	22.65	23.83	1.53	1.48	1.40
$P_2 \times P_7$	5.05	5.07	5.03	0.43	0.47	0.42	19.66	19.98	21.15	1.17	1.21	1.32
$P_2 \times P_8$	5.47	5.34	5.27	0.35	0.35	0.40	23.44	23.74	21.71	1.17	1.20	1.19
$P_2 \times P_9$	5.09	5.06	5.21	0.36	0.33	0.35	23.87	23.95	23.80	1.84	1.87	1.52
$P_2 \times P_{10}$	5.21	5.43	5.13	0.35	0.29	0.34	23.07	23.56	23.51	1.30	1.33	1.58
$P_3 \times P_4$	4.83	5.21	4.80	0.45	0.44	0.41	23.19	23.65	23.89	1.21	1.25	1.37
$P_3 \times P_5$	4.59	4.50	4.89	0.34	0.35	0.39	20.49	20.64	22.07	1.26	1.29	1.25
$P_3 \times P_6$	4.70	4.78	4.60	0.51	0.55	0.43	23.08	23.32	21.85	1.36	1.39	1.32
$P_3 \times P_7$	5.33	5.54	5.05	0.43	0.44	0.49	18.99	19.43	21.15	1.34	1.37	1.36
$P_3 \times P_8$	5.81	5.89	5.67	0.47	0.39	0.45	19.71	20.23	19.56	1.45	1.49	1.40
$P_3 \times P_9$	4.58	4.79	5.23	0.39	0.33	0.39	20.64	21.23	20.43	1.32	1.37	1.40
$P_3 \times P_{10}$	4.83	5.34	4.80	0.38	0.34	0.35	22.50	22.90	21.86	1.13	1.17	1.25
$P_4 \times P_5$	4.66	4.97	5.14	0.33	0.28	0.35	19.68	19.87	19.82	1.21	1.20	1.48
$P_4 \times P_6$	5.71	5.78	5.33	0.43	0.41	0.35	24.88	24.98	22.37	1.39	1.14	1.29
$P_4 \times P_7$	5.11	5.23	5.44	0.35	0.35	0.37	23.18	23.78	24.08	1.45	1.47	1.29
$P_4 \times P_8$	5.09	5.67	5.15	0.43	0.46	0.39	21.71	21.75	22.74	1.20	1.22	1.33
$P_4 \times P_9$	4.53	4.53	5.10	0.51	0.54	0.48	22.99	23.45	22.37	1.50	1.47	1.36
$P_4 \times P_{10}$	5.06	4.98	4.79	0.41	0.44	0.47	19.63	19.76	21.54	1.39	1.41	1.42
$P_5 \times P_6$	4.98	5.54	4.97	0.39	0.35	0.36	24.76	25.21	22.81	1.16	1.12	1.13
$P_5 \times P_7$	5.18	5.86	5.36	0.41	0.38	0.38	23.84	23.98	24.52	1.39	1.42	1.25
$P_5 \times P_8$	4.61	4.79	5.23	0.36	0.34	0.37	18.88	19.45	21.43	1.41	1.44	1.41
$P_5 \times P_9$	4.58	4.65	4.68	0.48	0.45	0.41	20.53	21.43	19.99	1.72	1.75	1.58
$P_5 \times P_{10}$	5.21	5.73	4.92	0.41	0.36	0.42	23.83	24.53	22.63	1.33	1.34	1.54
$P_6 \times P_7$	4.40	4.65	4.62	0.53	0.50	0.43	25.03	25.87	23.79	1.88	1.89	1.69
$P_6 \times P_8$	4.69	4.73	4.66	0.37	0.37	0.43	24.77	24.83	25.31	1.12	1.15	1.50

$P_6 \times P_9$		4.46	4.75	4.59	0.42	0.41	0.39	21.10	21.45	22.96	1.28	1.30	1.21
$P_6 \times P_{10}$		5.32	5.97	5.03	0.42	0.39	0.41	23.10	23.45	22.27	1.18	1.22	1.24
$P_7 \times P_8$		5.26	5.76	5.15	0.38	0.35	0.40	25.21	25.76	24.57	1.11	1.15	1.38
$P_7 \times P_9$		4.58	5.76	5.17	0.36	0.37	0.35	21.21	21.45	23.48	1.12	1.15	1.13
$P_7 \times P_{10}$		4.74	4.87	5.25	0.38	0.32	0.37	18.56	18.78	20.00	1.32	1.35	1.23
$P_8 \times P_9$		5.13	5.65	5.05	0.40	0.37	0.40	20.61	21.21	21.46	1.02	1.05	1.21
$P_8 \times P_{10}$		4.68	4.78	5.17	0.38	0.34	0.37	23.81	23.97	22.51	1.11	1.16	1.08
$P_9 \times P_{10}$		5.13	5.35	5.30	0.37	0.35	0.33	19.58	20.23	19.61	1.31	1.42	1.53
Mean		**4.98**	**5.15**	**5.06**	**0.40**	**0.38**	**0.39**	**21.97**	**22.27**	**22.12**	**1.33**	**1.40**	**1.37**
C.V.		8.36	7.16	9.45	7.70	8.07	12.77	7.16	7.63	9.25	10.67	11.05	15.83
S.E.±M		0.24	0.21	0.19	0.17	0.02	0.02	0.90	0.98	0.83	0.08	0.09	0.08
C.D. 5%		0.67	0.60	0.54	0.05	0.05	0.05	2.54	2.75	2.32	0.23	0.25	0.24
Range	**Lowest**	**4.40**	**4.50**	**4.54**	**0.33**	**0.28**	**0.31**	**16.41**	**16.74**	**18.93**	**0.97**	**0.50**	**1.08**
	highest	**5.80**	**5.97**	**5.67**	**0.52**	**0.55**	**0.49**	**25.20**	**25.87**	**25.31**	**1.88**	**1.89**	**1.69**

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Genotypes	**Non - reducing sugar**			**Total sugar**			**Total fruit yields per plant (kg)**		
	Y_1	**Y_2**	**Pooled**	**Y_1**	**Y_2**	**Pooled**	**Y_1**	**Y_2**	**Pooled**
P_1	2.68	2.76	2.57	3.51	4.08		2.67	2.86	2.46
P_2	2.67	2.68	2.75	3.98	4.12	3.61	1.94	2.32	2.35
P_3	2.49	2.17	2.36	3.45	3.2	4.33	2.80	2.97	2.78
P_4	2.77	2.23	2.71	3.79	3.73	3.51	3.01	3.45	2.81
P_5	2.54	2.64	2.37	4.07	4.39	3.80	2.22	2.54	2.99
P_6	2.46	2.55	2.50	3.70	3.88	3.85	2.25	2.36	3.24
P_7	2.43	2.54	2.34	4.08	4.08	3.80	2.83	2.83	2.64
P_8	2.88	2.94	2.80	4.05	4.59	3.81	1.88	1.90	2.28
P_9	2.78	2.16	2.56	4.16	3.56	4.06	2.84	2.89	3.25
P_{10}	2.60	2.75	2.54	4.21	4.51	3.83	2.62	2.75	3.09
$P_1 \times P_2$	2.44	2.25	2.60	3.68	3.59	3.88	2.32	2.56	2.59

$P_1 \times P_3$	2.38	2.56	2.31	4.12	4.40	3.85	2.15	2.22	2.35
$P_1 \times P_4$	2.64	2.65	2.59	3.98	4.28	4.19	3.18	3.89	2.70
$P_1 \times P_5$	2.69	2.19	2.67	3.93	3.73	4.10	2.56	2.56	3.22
$P_1 \times P_6$	2.29	2.57	2.23	3.75	4.13	3.73	1.19	1.78	1.87
$P_1 \times P_7$	2.59	2.22	2.58	3.70	3.97	3.91	2.86	2.35	2.32
$P_1 \times P_8$	2.37	2.28	2.29	3.92	3.98	3.94	1.96	2.67	2.15
$P_1 \times P_9$	2.33	2.84	2.30	4.98	3.98	4.47	2.77	2.87	2.71
$P_1 \times P_{10}$	3.15	2.84	2.99	3.40	4.68	3.69	2.52	2.76	2.69
$P_2 \times P_3$	2.32	2.54	2.50	4.38	3.77	4.24	1.86	1.87	2.09
$P_2 \times P_4$	3.14	2.78	2.83	4.13	4.12	3.95	3.94	4.12	2.90
$P_2 \times P_5$	2.91	2.86	2.84	3.70	4.14	3.91	2.74	2.97	3.43
$P_2 \times P_6$	2.17	2.45	2.51	3.70	3.93	3.92	2.95	3.45	2.96
$P_2 \times P_7$	2.22	2.32	2.33	3.39	3.53	3.65	2.62	2.34	3.03
$P_2 \times P_8$	2.82	2.21	2.56	4.02	3.41	3.77	2.26	2.23	2.29
$P_2 \times P_9$	2.24	2.28	2.22	4.08	4.15	3.74	2.69	2.87	2.46
$P_2 \times P_{10}$	2.37	2.24	2.32	3.67	3.57	3.91	2.54	2.76	2.70
$P_3 \times P_4$	2.48	2.50	2.32	3.69	3.75	3.48	1.86	2.43	2.41
$P_3 \times P_5$	2.32	2.38	2.40	3.58	3.67	3.66	2.87	2.97	2.65
$P_3 \times P_6$	2.96	2.49	2.67	4.32	3.88	3.99	2.81	2.80	2.89
$P_3 \times P_7$	2.15	2.23	2.31	3.49	3.60	3.68	1.76	1.97	2.28
$P_3 \times P_8$	2.74	2.36	2.48	4.19	3.85	3.89	2.93	3.54	2.44
$P_3 \times P_9$	2.36	2.76	2.36	3.68	4.13	3.76	2.45	2.75	2.99
$P_3 \times P_{10}$	3.14	2.65	2.95	4.27	3.82	4.20	2.18	2.61	2.46
$P_4 \times P_5$	2.35	2.64	2.28	3.56	3.84	3.64	2.77	2.62	3.10
$P_4 \times P_6$	2.85	2.93	2.74	4.24	4.07	4.04	3.42	3.82	3.02
$P_4 \times P_7$	2.24	2.55	2.58	3.69	4.02	3.88	2.79	2.85	3.30
$P_4 \times P_8$	2.37	2.37	2.46	3.57	3.59	3.79	3.56	3.93	3.20
$P_4 \times P_9$	2.93	2.26	2.65	4.43	3.73	4.01	2.90	3.33	3.41
$P_4 \times P_{10}$	2.26	2.21	2.26	3.65	3.62	3.69	3.02	3.76	3.17
$P_5 \times P_6$	2.30	2.56	2.47	3.46	3.68	3.92	2.52	2.54	2.52
$P_5 \times P_7$	2.96	2.62	2.75	4.35	4.04	4.01	1.67	1.63	2.10
$P_5 \times P_8$	2.51	2.52	2.56	3.92	3.96	3.98	2.50	2.53	2.06

$P_5 \times P_9$		2.45	2.36	2.48	4.17	4.11	4.06	1.88	1.93	2.20
$P_5 \times P_{10}$		2.39	2.55	2.37	3.72	3.89	3.91	3.59	4.23	2.75
$P_6 \times P_7$		2.61	2.92	2.58	4.74	4.81	4.31	2.66	2.72	2.51
$P_6 \times P_8$		2.36	2.55	2.64	3.48	3.70	4.14	1.99	2.45	2.35
$P_6 \times P_9$		2.28	2.25	2.41	3.56	3.55	3.63	3.67	3.53	3.06
$P_6 \times P_{10}$		2.21	2.25	2.22	3.39	3.54	3.47	1.88	2.45	2.70
$P_7 \times P_8$		2.38	2.40	2.46	3.56	3.55	3.82	2.88	3.56	2.85
$P_7 \times P_9$		2.35	2.32	2.37	3.47	3.47	3.51	2.84	2.32	3.20
$P_7 \times P_{10}$		2.40	2.73	2.36	3.73	4.08	3.60	2.83	2.67	2.57
$P_8 \times P_9$		2.50	2.31	2.72	3.52	3.30	4.05	2.57	2.86	2.2
$P_8 \times P_{10}$		2.48	2.35	2.39	3.59	3.51	3.44	3.41	3.63	3.13
$P_9 \times P_{10}$		2.42	2.48	2.29	3.73	3.83	3.64	3.20	3.56	3.04
Mean		**2.52**	**2.49**	**2.50**	**3.86**	**3.89**	**3.87**	**2.61**	**2.82**	**2.71**
C.V.		10.67	9.70	11.2394	7.64	10.80	11.07	10.75	11.31	20.34
S.E.±M		0.15	0.14	0.1150	0.17	0.24	0.17	0.16	0.18	0.22
C.D. 5%		0.97	0.39	0.3203	0.47	0.68	0.48	0.45	0.52	0.62
Range	**Lowest**	**2.14**	**2.16**	**2.22**	**3.39**	**3.28**	**3.44**	**1.18**	**1.63**	**1.87**
	highest	**3.14**	**2.94**	**2.99**	**4.98**	**4.81**	**4.47**	**3.94**	**4.23**	**3.43**

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