The Pharma Innovation Journal 2021; 10(7): 1124-1132

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2021; 10(7): 1124-1132
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www.thepharmajournal.com
Received: 09-05-2021
Accepted: 15-06-2021

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Estimates of heterosis for yield and its attributing traits in tomato (*Solanum lycopersicum* L.) crop

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Abstract
The investigations were carried out to evaluate the heterotic performance of 35 F_1's in tomato (*Solanum lycopersicum* L.) at Main Experimental Station, Department of Vegetable Science, A.N.D. University of Agriculture and Technology, Kumarganj, Ayodhya (U.P.) during *Rabi* 2019-20 and 2020-2021. The experiments were laid out in a Randomized Complete Block Design with three replications. The data were recorded for 17 characters including total fruit yield per plant and its component traits. The analysis of variance indicated significant differences among parents and hybrids for majority of the characters reflecting the presence of adequate genetic diversity in the materials studied. Based on estimates of heterosis, the hybrids 2012/TLCVRes-1-2 × NDT-4 and 2013/TODVAR-2-2 × NDT-2-2 in Y_1, Y_2 and pooled showed significant and positive heterobeltiosis while, NDT-6 × Arka Vikas, NDTH-11W-9-1-1-1 × NDT-4, 2013/TODVAR-2-2 × NDT-2-2, 2013/TODVAR-2-2 × NDT-5 and S_5 × NDT-3-2-1-1 × NDT-2-2) in Y_1, Y_2 and pooled showed significant standard heterosis in positive direction for total fruit yield per plant and its other component traits hence, could be utilize in future breeding program as hybrid or to obtain most desirable segregants for the development of superior genotypes.

Keywords: Tomato, *Solanum lycopersicon* L., heterobeltiosis and standard heterosis

Introduction

Tomato (*Solanum lycopersicon* L.) is one of the most important fruit vegetable and second most important vegetable crop after potato grown widely and consumed all over the world. It is a member of the family Solanaceae and the genus *Solanum* having chromosome number of 2n=2x=24. It is grown as an annual and herbaceous plant, typically growing up to 1-3 meter tall, with a weak woody stem that usually scrambles over other plants. It is a sexually propagated crop plant with tap root, complete or perfect and hypogynous flowers. It is a day neutral plant and bears compound inflorescence having four to eight flowers in each cluster. The stigma surrounded by a light protective anther cone leading to self-pollination or autogamy, but it require certain isolation to avoid chance of contamination through cross pollination. Tomatoes are commonly classified as determinate or indeterminate types. Determinate type bear a full crop all at once and stop off at a specific height while, indeterminate types develop into vines that never stop off and continue producing flower and fruits.

In India, total area was 0.781 million hectares with production 19.007 million tonnes and 24.34 tonnes per hectare productivity (Anonymous, 2019) [3] with the leading tomato growing states *viz.*, Karnataka, West Bengal, Maharashtra, Uttar Pradesh, Haryana, Punjab, Gujarat and Bihar. Hence, a study was initiated to elicit information on the nature and magnitude of heterosis for yield and its component characters.

Material and Methods

The experimental materials comprised of 35 crosses developed by crossing 7 lines of tomato *viz.* NDT-6, 2012/TLCVRes-1-2, NDTH-11W-9-1-1-1, 2013/TODVAR-2-2, 2015/TODHyb-6-5-1, S_5 × NDT-3-2-1-1, S_5 × NDT-3-2-2-2 with 5 testers *viz.* NDT-2-2, NDT-7, NDT-4, NDT-5 and Arka Vikas using line × tester mating design. The 12 parental lines (including one check) and their 35 hybrids were grown in a Randomized Complete Block Design (RBD) with three replications during *Rabi* 2019-20 and 2020-2021 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. Each hybrids and parents were grown in rows spaced at 0.60 meters apart with a plant to plant spacing of 0.50 meter.

Thus, there were 10 plants in each entry per replication in both the years and all the cultural practices regarding tomatoes were followed as recommended. The data were recorded on 5 randomly selected healthy plants from each plot on seventeen characters, *viz*., 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), total fruit yield per plant (kg), marketable fruit yield per plant (kg), total soluble solids (TSS), titrable acidity (%), ascorbic acid content (mg/100g) and total sugar (mg/100g). The data were recorded from 35 F_1's and 12 parental lines on seventeen characters were subjected to analysis of variance (Kempthorne, 1957) [10], nature and magnitude of heterosis (Hayes and Jones 1917) [7].

Result and Discussion

The goal of estimation of heterosis in the present investigations was to recognize the superior F_1 hybrids giving high magnitude of heterosis in desirable direction and characterization of parents for their further uses in breeding programme. Though, heterosis is also an important tool to decide the direction of future breeding programme and to identify the cross combinations which are promising in conventional breeding programme. In the present study, heterosis effects over better parent and standard variety (Arka Vikas) for seventeen characters in Y_1, Y_2 and pooled had given in Table-1.

Perusal of Table-1 revealed that nature and magnitude of heterosis differed for different characters and over seasons in various cross combinations. In case of total fruit yield per plant, the magnitude of heterobeltiosis and standard heterosis ranged from -47.76 to 35.79 per cent and -21.04 to 47.47 per cent in Y_1, from -40.95 to 36.32 per cent and -16.59 to 49.03 per cent in Y_2, and from -44.09 to 32.22 per cent and -18.55 to 42.25 per cent in pooled. Out of thirty five F_1 hybrids, two crosses (2012/TLCVRes-1-2 × NDT-4 and 2013/TODVAR-2-2 × NDT-2-2) in Y_1, Y_2 and pooled showed significant and positive heterosis over better parent while, five crosses (NDT-6 × Arka Vikas, NDTH-11W-9-1-1-1 × NDT-4, 2013/TODVAR-2-2 × NDT-2-2, 2013/TODVAR-2-2 × NDT-5 and S_5 × NDT-3-2-1-1 × NDT-2-2) in Y_1, Y_2 and pooled showed significant heterosis in positive direction over standard variety.

A perusal of Table-1 also revealed that crosses exhibiting significant and negative estimates of heterosis for one or both types of heterosis for total fruit yield also exhibited significant and positive estimates heterosis for other important yield attributing traits. The above results are in conformity with the findings of Angadi *et al.* (2012) [2], Yadav *et al.* (2013) [22], Agarwal *et al.* (2014) [1], Chauhan *et al.* (2014) [4], Mali and Patel (2014) [17], Jose *et al.* (2016) [9] and Khar and Arti (2019) [11].

For earliness negative heterosis is desirable to select superior hybrids. Since F_1 hybrids with heterosis for days to 50% flowering and days to first fruit harvest earlier as compared to parents, thereby increasing their productivity per day per unit area and as a consequence fetch good prices in the present market by early supply of produce. A close examination of heterosis value of total fruit yield per plant revealed that one hybrids (2013/TODVAR-2-2 × NDT-5) in Y_1, two hybrids (NDT-6 × Arka Vikas and 2013/TODVAR-2-2 × NDT-2-2) in Y_2 and three hybrids (NDTH-11W-9-1-1-1 × NDT-4, 2013/TODVAR-2-2 × NDT-2-2 and 2013/TODVAR-2-2 × NDT-5) in pooled exhibited significant and desirable heterosis in respect to better parent and standard variety with days to 50% flowering. These all hybrids also exhibited significant and desirable heterosis in respect to better parent and standard variety with days to first fruit harvest except NDT-6 × Arka Vikas in Y_2. The present observations are in agreement with the findings of Kumar *et al.*, 2012 [15] and Tamta and Singh (2017) [21].

Out of significant crosses for total fruit yield per plant, only one hybrids (2013/TODVAR-2-2 × NDT-5) showed positive and significant heterosis over standard parent for titrable acidity in both the years as well as in pooled while, two hybrids (2013/TODVAR-2-2 × NDT-2-2 and 2013/TODVAR-2-2 × NDT-5) in Y_1 and pooled whereas one hybrids (2013/TODVAR-2-2 × NDT-2-2) in Y_2 showed positive and significant heterosis over standard parent for ascorbic acid content and one hybrids (2013/TODVAR-2-2 × NDT-5) in both the years and pooled showed positive and significant heterosis over standard parent for total sugar. Similar results have also been proposed by Kumar *et al.*, 2013 [14]; Kumar *et al.*, 2016 [12] and Kumar *et al.*, 2018 [13].

Total fruit yield per plant being complex character is a multiplicative product of several other basic component traits of yield. The improvement in heterosis for yield component may not necessarily be reflected in increased yield. Whereas, the increased fruit yield will definitely be cause of increase in one or more component traits. In the present study, the best performing heterobeltiotic F_1 (2013/TODVAR-2-2 × NDT-2-2) for yield common over seasons also showed significant heterobeltiosis for number of fruits per cluster, number of fruits per plant and average fruit weight in both the seasons and pooled. The hybrid 2013/TODVAR-2-2 × NDT-5 showed significant heterobeltiosis for pericarp thickness in Y_2 and pooled. This hybrid also exhibited significant heterobeltiosis for polar diameter and equitorial diameter in both the seasons and pooled except equitorial diameter in Y_2.

Besides total fruit yield per plant, substantial heterosis over better-parent and standard variety was also observed in negative as well as positive direction for remaining characters in both the years (Table-1). However, the number of crosses showing significant estimates and the range of heterosis varied from one character to another. In general, some crosses showed appreciable and high heterosis for various traits under study. The existence of wide spectrum of heterosis in either direction with expression of high degree of desirable heterosis by some crosses for number of traits observed in present study is in conformity with the earlier reports of high heterosis for such characters in tomato (Gul *et al.*, 2010; Kumari and Sharma, 2011; Islam *et al.*, 2012; Garg *et al.*, 2013; Singh *et al.*, 2013; Yadav *et al.*, 2013, Rehana *et al.*, 2019) [6, 16, 8, 5, 22, 22, 18].

Table 1: Estimates of heterosis (%) over better parent (BP) and standard variety (SV) Arka Vikas over two years (Y_1, Y_2) and pooled.

S. No.	Crosses	Days to 50% flowering						Days to first fruit harvest					
		Y_1		Y_2		Pooled		Y_1		Y_2		Pooled	
		BP	SV	BP	SV	BP	SV	BP	SV	BP	SV	BP	SV
1	NDT-6 × NDT-2-2	3.66	3.66	3.45	7.14	3.55	5.42	9.64**	2.63	10.00**	4.96*	9.82**	3.79**

2	NDT-6 × NDT-7	-12.77**	0.00	-8.42	3.57	-10.58**	1.81	-16.99**	-9.17**	-7.66**	-8.02**	-12.31**	-3.64**
3	NDT-6 × NDT-4	1.18	4.88	1.11	8.33	1.14	6.63	-2.29	-3.76	2.38	-1.53	0.00	-2.65*
4	NDT-6 × NDT-5	-2.33	2.44	-2.20	5.95	-2.26	4.22	-2.31	-4.51*	-18.22**	-9.47**	-0.23**	-1.93**
5	NDT-6 × A. Vikas	8.54	8.54	11.90*	11.90*	10.24**	10.24**	5.26*	5.26*	7.63**	7.63**	6.44**	6.44**
6	2012/TLCVRes-1-2 × NDT-2-2	4.88	4.88	4.60	8.33	4.73	6.63	9.64**	2.63	10.00**	4.96*	9.82**	3.79**
7	2012/TLCVRes-1-2 × NDT-7	-5.32	8.54	-1.05	11.90*	-3.17	10.24**	6.56**	3.76	6.51**	6.11**	6.54**	4.92**
8	2012/TLCVRes-1-2 × NDT-4	2.35	6.10	2.22	9.52	2.29	7.83*	6.49**	4.89*	11.51**	7.25**	8.95**	6.06**
9	2012/TLCVRes-1-2 × NDT-5	4.65	9.76*	4.40	13.10*	4.52	11.45**	5.00*	2.63	-0.78	-2.29	2.12	0.19
10	2012/TLCVRes-1-2 × A. Vikas	-20.73**	-20.73**	-5.95	-5.95	-13.25**	-13.25**	-19.55**	-19.55**	6.11**	6.11**	-6.82**	-6.82**
11	NDTH-11W-9-1-1-1 × NDT-2-2	3.66	3.66	3.45	7.14	3.55	5.42	4.82*	-1.88	5.20*	0.38	5.01**	-0.76
12	NDTH-11W-9-1-1-1 × NDT-7	5.62	14.63**	5.32	17.86**	5.46	16.27**	6.56**	3.76	6.51**	6.11**	6.54**	4.92**
13	NDTH-11W-9-1-1-1 × NDT-4	-22.35**	-19.51**	-14.44**	-8.33	-18.29**	-13.86**	-19.08**	-0.30**	-6.75**	-0.31**	-3.04**	-5.34**
14	NDTH-11W-9-1-1-1 × NDT-5	0.00	4.88	0.00	8.33	0.00	6.63	1.54	-0.75	1.16	-0.38	1.35	-0.57
15	NDTH-11W-9-1-1-1 × A. Vikas	-4.88	-4.88	-1.19	-1.19	-3.01	-3.01	-19.17**	-9.17**	-8.02**	-8.02**	-3.64**	-3.64**
16	2013/TODVAR-2-2×NDT-2-2	0.00	0.00	-24.14**	-21.43**	-12.43**	-10.84**	-3.61	-9.77**	-15.20**	-9.08**	-9.42**	-4.39**
17	2013/TODVAR-2-2×NDT-7	1.12	9.76*	3.26	13.10*	2.21	11.45**	9.65**	6.77**	9.58**	9.16**	9.62**	7.95**
18	2013/TODVAR-2-2 × NDT-4	0.00	3.66	0.00	7.14	0.00	5.42	5.34*	3.76	10.32**	6.11**	7.78**	4.92**
19	2013/TODVAR-2-2 × NDT-5	-16.28**	-12.20*	-25.27**	-19.05**	-20.90**	-15.66**	-7.69**	-9.77**	-17.83**	-9.08**	-2.74**	-4.39**
20	2013/TODVAR-2-2 × A. Vikas	6.10	6.10	9.52	9.52	7.83*	7.83*	4.14*	4.14*	6.49**	6.49**	5.30**	5.30**
21	2015/TODHyb-6-5-1 × NDT-2-2	3.66	3.66	-26.44**	-23.81**	-11.83**	-10.24**	12.05**	4.89*	1.60	-3.05	6.81**	0.95
22	2015/TODHyb-6-5-1 × NDT-7	-4.26	9.76*	0.00	13.10*	-2.12	11.45**	4.25*	1.50	4.21*	3.82	4.23**	2.65*
23	2015/TODHyb-6-5-1 × NDT-4	8.24	12.20*	7.78	15.48**	8.00*	13.86**	1.53	0.00	6.35**	2.29	3.89**	1.14
24	2015/TODHyb-6-5-1 × NDT-5	6.98	12.20*	6.59	15.48**	6.78*	13.86**	3.85	1.50	5.43**	3.82	4.63**	2.65*
25	2015/TODHyb-6-5-1 × A. Vikas	6.10	6.10	9.52	9.52	7.83*	7.83*	3.01	3.01	5.34**	5.34**	4.17**	4.17**
26	S_5 × NDT-3-2-1-1 × NDT-2-2	-23.17**	-23.17**	-10.34*	-7.14	-16.57**	-15.06**	-14.86**	-0.30**	-3.6	-8.02**	-9.22**	-4.20**
27	S_5 × NDT-3-2-1-1 × NDT-7	11.70**	28.05**	15.79**	30.95**	13.76**	29.52**	6.95**	4.14*	8.81**	8.40**	7.88**	6.25**
28	S_5 × NDT-3-2-1-1 × NDT-4	24.71**	29.27**	23.33**	32.14**	24.00**	30.72**	1.91	0.38	6.75**	2.67	4.28**	1.52
29	S_5 × NDT-3-2-1-1 × NDT-5	20.93**	26.83**	19.78**	29.76**	20.34**	28.31**	7.31**	4.89*	8.91**	7.25**	8.11**	6.06**
30	S_5 × NDT-3-2-1-1 × A. Vikas	-2.44	-2.44	-20.24**	-20.24**	-11.45**	-11.45**	-6.02**	-6.02**	-18.70**	-8.70**	-2.31**	-2.31**
31	S_5 × NDT-3-2-2-2 × NDT-2-2	8.54	8.54	-25.29**	-22.62**	-8.88*	-7.23*	8.84**	1.88	9.20**	4.20*	9.02**	3.03*
32	S_5 × NDT-3-2-2-2 × NDT-7	9.76*	9.76*	9.20	13.10*	9.47**	11.45**	2.79	-3.01	-1.19	-4.58*	0.79	-3.79**
33	S_5 × NDT-3-2-2-2 × NDT-4	-20.73**	-20.73**	-10.34*	-7.14	-15.38**	-13.86**	5.18*	-0.75	5.56**	1.53	5.16**	0.38
34	S_5 × NDT-3-2-2-2 × NDT-5	3.66	3.66	3.45	7.14	3.55	5.42	-1.2	-6.77**	-3.16	-6.49**	-2.18	-6.63**
35	S_5 × NDT-3-2-2-2 × A. Vikas	8.54	8.54	11.90*	11.90*	10.24**	10.24**	3.98	-1.88	3.95	0.38	3.97**	-0.76
No of crosses with significant +ve heterosis		4	10	5	13	10	16	17	7	20	14	21	15
No. of crosses with significant -ve heterosis		6	5	8	5	10	9	7	10	7	9	9	11
Range of heterosis		-23.17 to 24.71	-23.17 to 29.27	-26.44 to 23.33	-23.81 to 32.14	-20.90 to 24.00	-15.66 to 30.72	-19.55 to 12.05	-20.30 to 6.77	-18.70 to 11.51	-19.47 to 9.16	-13.64 to 9.82	-15.34 to 7.95

, * Significant at 5 per cent and 1 per cent probability levels, respectively.

Table 1: Contd….

S. No.	Crosses	Plant height (cm)						Number of primary branches per plant					
		Y_1		Y_2		Pooled		Y_1		Y_2		Pooled	
		BP	SV	BP	SV	BP	SV	BP	SV	BP	SV	BP	SV
1	NDT-6 × NDT-2-2	48.51**	28.60**	-0.16	-5.75**	23.76**	5.76	-2.00	7.10	-1.78	9.41	-1.88	8.31
2	NDT-6 × NDT-7	-12.24	-4.11**	-11.80*	-5.73**	-2.01**	-4.94**	-4.30	-2.73	-3.79	0.5	-4.03	-1.04
3	NDT-6 × NDT-4	-2.62	14.04*	-2.53	10.25*	-2.58	12.09**	-5.10	1.64	-4.52	4.46	-4.80	3.12
4	NDT-6 × NDT-5	-1.21	16.51**	-1.15	12.57**	-1.18	14.48**	3.78	4.92	3.33	7.43	3.54	6.23
5	NDT-6 × A. Vikas	-0.41	-0.41	-3.39	-3.39	-1.95	-1.95	-9.29	-9.29	21.29**	21.29**	6.75	6.75
6	2012/TLCVRes-1-2 × NDT-2-2	-2.42	-5.50**	-2.32	-7.57**	-2.37	-6.57**	-10.50	-2.19	-9.33	0.99	-9.88*	-0.52
7	2012/TLCVRes-1-2 × NDT-7	-13.59*	-5.28**	-13.08*	-6.80**	-3.33**	-6.06**	-7.53	-6.01	-6.64	-2.48	-7.05	-4.16
8	2012/TLCVRes-1-2 × NDT-4	6.34	24.54**	6.19	20.12**	6.27*	22.26**	-3.06	3.83	-2.71	6.44	-2.88	5.19
9	2012/TLCVRes-1-2 × NDT-5	-5.19**	0.03	-4.82**	-2.99	-5.00**	-1.52	-3.24	-2.19	-2.86	0.99	-3.04	-0.52
10	2012/TLCVRes-1-2 × A. Vikas	18.31**	18.31**	14.19**	14.19**	16.19**	16.19**	-1.64	-1.64	1.49	1.49	0.00	0.00
11	NDTH-11W-9-1-1-1 × NDT-2-2	1.43	19.76**	1.39	15.61**	1.41	17.62**	-14.50*	-2.35	-12.95*	0.84	-3.68**	-0.68
12	NDTH-11W-9-1-1-1 × NDT-7	-5.47**	-0.18	-5.10**	-3.19	-5.28**	-1.73	11.96	27.87**	-11.54	2.48	-0.45	14.55**
13	NDTH-11W-9-1-1-1 × NDT-4	-9.70**	-6.99**	-2.16**	-4.05**	-6.00**	-5.77**	9.57	25.14**	-7.69	6.93	0.45	15.58**
14	NDTH-11W-9-1-1-1 × NDT-5	8.20	27.76**	17.45**	33.92**	12.88**	30.93**	0.00	14.21	6.84	23.76**	3.61	19.22**
15	NDTH-11W-9-1-1-1 × A. Vikas	1.93	20.36**	1.92	16.21**	1.92	18.22**	-17.70*	-6.01	-5.81**	-2.48	-6.70**	-4.16
16	2013/TODVAR-2-2×NDT-2-2	-2.55**	-2.94**	-4.03	-9.02**	-3.13**	-5.77**	21.00**	32.24**	14.44*	27.48**	17.53**	29.74**
17	2013/TODVAR-2-2×NDT-7	39.92**	20.99**	38.60**	16.72**	39.25**	18.79**	13.98	15.85*	18.01**	23.27**	16.12**	19.74**
18	2013/TODVAR-2-2 × NDT-4	0.02	17.14**	0.00	13.11**	0.01	15.06**	6.12	13.66	5.43	15.35*	5.76	14.55**
19	2013/TODVAR-2-2 × NDT-5	1.53	19.74**	7.52	22.46**	4.56	21.14**	26.49**	27.87**	12.38	16.83*	18.99**	22.08**
20	2013/TODVAR-2-2 × A. Vikas	-0.50	-0.50	-3.46	-3.46	-2.02	-2.02	2.73	2.73	31.68**	31.68**	17.92**	17.92**
21	2015/TODHyb-6-5-1 × NDT-2-2	-4.53**	-0.58	-4.20**	-3.56	-4.37**	-2.12	10.89	22.40**	0.44	12.87	5.36	17.40**
22	2015/TODHyb-6-5-1 × NDT-7	8.42	26.11**	0.99	13.52**	4.66	19.63**	0.99	11.48	0.88	13.37	0.93	12.47*
23	2015/TODHyb-6-5-1 × NDT-4	17.95**	38.13**	17.51**	32.92**	17.73**	35.45**	1.98	12.57	1.76	14.36*	1.86	13.51**
24	2015/TODHyb-6-5-1 × NDT-5	10.99*	30.91**	2.25	16.45**	6.57*	23.46**	2.97	13.66	16.30**	30.69**	10.02*	22.60**
25	2015/TODHyb-6-5-1 × A. Vikas	1.82	18.43**	1.74	14.36**	1.78	16.34**	-4.95	4.92	-4.41	7.43	-4.66	6.23
26	S_5 × NDT-3-2-1-1 × NDT-2-2	-2.17**	-4.62	-1.65**	-7.33	-1.90**	-6.02	-2.50	6.56	-2.22	8.91	-2.35	7.79
27	S_5 × NDT-3-2-1-1 × NDT-7	-2.43	19.57**	15.67**	36.79**	6.73*	28.44**	21.51**	23.50**	14.69*	19.80**	17.88**	21.56**

28	S_5 × NDT-3-2-1-1 × NDT-4	-3.98	17.67**	-3.90	13.65**	-3.94	15.60**	3.57	10.93	-5.43	3.47	-1.20	7.01
29	S_5 × NDT-3-2-1-1 × NDT-5	-2.90	19.00**	-2.88	14.87**	-2.89	16.87**	-0.54	0.55	15.24*	19.80**	7.85	10.65*
30	S_5 × NDT-3-2-1-1 × A. Vikas	-1.91	20.21**	-1.91	16.01**	-1.91	18.05**	12.50	13.11	27.27**	31.68**	20.36**	22.86**
31	S_5 × NDT-3-2-2-2 × NDT-2-2	-5.66	21.86**	-5.50	17.59**	-5.58*	19.66**	-5.00**	-18.03*	-2.22**	-13.37	-3.53**	-5.58**
32	S_5 × NDT-3-2-2-2 × NDT-7	-5.32**	-3.54	-4.72**	-6.32	-5.02**	-4.97	12.37	14.21	10.9	15.84*	11.59*	15.06**
33	S_5 × NDT-3-2-2-2 × NDT-4	-5.19	22.47**	-5.04	18.17**	-5.11	20.25**	14.80*	22.95**	13.12*	23.76**	13.91**	23.38**
34	S_5 × NDT-3-2-2-2 × NDT-5	1.12	30.62**	-2.14	21.77**	-0.53	26.06**	12.43	13.66	10.95	15.35*	11.65*	14.55**
35	S_5 × NDT-3-2-2-2 × A. Vikas	11.91**	44.56**	-4.87	18.37**	3.42	31.07**	13.04	13.66	11.48	15.35*	12.21*	14.55**
No. of crosses with significant +ve heterosis		6	23	5	22	8	22	4	7	9	14	11	19
No. of crosses with significant -ve heterosis		8	5	8	6	10	5	3	1	3	0	4	1
Range of heterosis		-29.70 to 48.51	-32.94 to 44.56	-42.16 to 38.60	-34.05 to 36.79	-36.00 to 39.25	-26.06 to 35.45	-25.00 to 26.49	-18.03 to 32.24	-22.22 to 31.68	-13.37 to 31.68	-25.53 to 20.36	-15.58 to 29.74

, * Significant at 5 per cent and 1 per cent probability levels, respectively.

Table 1: Contd….

S. No.	Crosses	Number of fruits per cluster						Number of fruits per plant					
		Y_1		Y_2		Pooled		Y_1		Y_2		Pooled	
		BP	SV	BP	SV	BP	SV	BP	SV	BP	SV	BP	SV
1	NDT-6 × NDT-2-2	-6.25	12.90*	4.55	7.98	-0.50	10.28**	8.11	29.03**	-6.84	5.83	0.44	16.84**
2	NDT-6 × NDT-7	-30.36**	-16.13**	-19.34**	-17.37**	-24.92**	-16.79**	-16.22**	0.00	-11.97	0.00	-14.04**	0.00
3	NDT-6 × NDT-4	-9.82*	8.60	1.74	4.23	-4.12	6.27	-24.32**	-9.68	-19.66**	-8.74	-21.93**	-9.18
4	NDT-6 × NDT-5	2.68	23.66**	5.41	7.98	4.03	15.29**	-5.41	12.90	-6.84	5.83	-6.14	9.18
5	NDT-6 × A. Vikas	-30.36**	-16.13**	-19.34**	-17.37**	-24.92**	-16.79**	-0.90	18.28**	7.69	22.33**	3.51	20.41**
6	2012/TLCVRes-1-2 × NDT-2-2	-1.92	9.68	11.21**	16.43**	4.87	13.28**	3.19	4.30	4.90	3.88	4.08	4.08
7	2012/TLCVRes-1-2 × NDT-7	-13.46**	-3.23	-10.31*	-6.1	-11.83**	-4.76	-1.06	0.00	0.98	0.00	0.00	0.00
8	2012/TLCVRes-1-2 × NDT-4	-11.54*	-1.08	-8.52*	-4.23	-9.98**	-2.76	10.64	11.83	23.53**	22.33**	17.35**	17.35**
9	2012/TLCVRes-1-2 × NDT-5	14.23**	27.74**	7.62	12.68**	10.81**	19.70**	4.26	5.38	5.88	4.85	5.10	5.10
10	2012/TLCVRes-1-2 × A. Vikas	-3.85	7.53	-1.35	3.29	-2.55	5.26	21.28**	22.58**	13.59	13.59	17.86**	17.86**
11	NDTH-11W-9-1-1-1 × NDT-2-2	-3.00	4.30	-2.73	0.47	-2.86	2.26	-5.68	-10.75	-5.10	-9.71	-5.38	-10.20*
12	NDTH-11W-9-1-1-1 × NDT-7	15.66**	23.12**	8.26	10.80*	11.78**	16.54**	10.23	4.30	31.63**	25.24**	21.51**	15.31**
13	NDTH-11W-9-1-1-1 × NDT-4	-15.15**	-9.68	-13.76**	-11.74**	-14.42**	-10.78**	5.68	0.00	5.10	0.00	5.38	0.00
14	NDTH-11W-9-1-1-1 × NDT-5	-5.05	1.08	-4.59	-2.35	-4.81	-0.75	6.67	3.23	6.00	2.91	6.32	3.06
15	NDTH-11W-9-1-1-1 × A. Vikas	7.07	13.98*	14.95**	17.65**	11.20**	15.94**	-7.53	-7.53	-6.80	-6.80	-7.14	-7.14
16	2013/TODVAR-2-2×NDT-2-2	28.00**	37.63**	6.36	9.86*	16.67**	22.81**	36.78**	27.96**	20.62*	13.59	28.26**	20.41**
17	2013/TODVAR-2-2×NDT-7	-9.38	-6.45	-8.49	-8.92*	-8.91**	-7.77*	8.14	0.00	7.29	0.00	7.69	0.00
18	2013/TODVAR-2-2 × NDT-4	-3.13	0.00	-2.83	-3.29	-2.97	-1.75	-1.16	-8.60	-1.04	-7.77	-1.10	-8.16
19	2013/TODVAR-2-2 × NDT-5	-19.19**	-13.98*	-17.43**	-15.49**	-18.27**	-14.79**	32.22**	27.96**	2.00	-0.97	16.32**	12.76**
20	2013/TODVAR-2-2 × A. Vikas	-2.08	1.08	-2.35	-2.35	-1.98	-0.75	-3.23	-3.23	-2.91	-2.91	-3.06	-3.06
21	2015/TODHyb-6-5-1 × NDT-2-2	-14.00**	-7.53	-12.73**	-9.86*	-13.33**	-8.77*	-1.04	2.15	25.74**	23.30**	12.69**	13.27**
22	2015/TODHyb-6-5-1 × NDT-7	-1.00	6.45	14.27**	18.03**	7.00*	12.63**	-22.92**	-20.43**	-16.83*	-18.45*	-19.80**	-19.39**
23	2015/TODHyb-6-5-1 × NDT-4	-12.00*	-5.38	-10.91*	-7.98	-11.43**	-6.77	-3.13	0.00	1.98	0.00	-0.51	0.00
24	2015/TODHyb-6-5-1 × NDT-5	-10.00*	-3.23	-9.09*	-6.10	-9.52**	-4.76	-6.25	-3.23	-0.99	-2.91	-3.55	-3.06
25	2015/TODHyb-6-5-1 × A. Vikas	-4.00	3.23	-3.64	-0.47	-3.81	1.25	-3.13	0.00	0.00	0.00	-0.51	0.00
26	S_5 × NDT-3-2-1-1 × NDT-2-2	-17.05**	-3.23	-13.04**	-6.1	-14.99**	-4.76	6.90	33.33**	-4.03	15.53*	1.25	23.98**
27	S_5 × NDT-3-2-1-1 × NDT-7	-30.88**	-19.35**	-26.09**	-20.19**	-28.41**	-19.80**	-18.10**	2.15	-15.32*	1.94	-16.67**	2.04
28	S_5 × NDT-3-2-1-1 × NDT-4	-20.74**	-7.53	-16.52**	-9.86*	-18.57**	-8.77*	-14.66**	6.45	6.45	28.16**	-3.75	17.86**
29	S_5 × NDT-3-2-1-1 × NDT-5	4.15	21.51**	0.00	7.98	2.01	14.29**	-14.66**	6.45	5.65	27.18**	-4.17	17.35**
30	S_5 × NDT-3-2-1-1 × A. Vikas	-17.05**	-3.23	-13.04**	-6.10	-14.99**	-4.76	-27.59**	-9.68	-24.19**	-8.74	-25.83**	-9.18
31	S_5 × NDT-3-2-2-2 × NDT-2-2	-3.00	4.30	-2.73	0.47	-2.86	2.26	2.20	0.00	-2.97	-4.85	-0.52	-2.55
32	S_5 × NDT-3-2-2-2 × NDT-7	9.57	10.75*	20.67**	17.84**	15.40**	14.54**	2.20	0.00	1.98	0.00	2.08	0.00
33	S_5 × NDT-3-2-2-2 × NDT-4	-1.06	0.00	-0.96	-3.29	-1.01	-1.75	1.10	-1.08	0.99	-0.97	1.04	-1.02
34	S_5 × NDT-3-2-2-2 × NDT-5	1.01	7.53	0.92	3.29	0.96	5.26	-7.69	-9.68	-6.93	-8.74	-7.29	-9.18
35	S_5 × NDT-3-2-2-2 × A. Vikas	22.34**	23.66**	15.96**	15.96**	19.55**	19.55**	22.58**	22.58**	-5.83	-5.83	7.65	7.65
No of crosses with significant +ve heterosis		4	9	5	8	7	11	4	7	4	7	6	11
No. of crosses with significant -ve heterosis		14	4	13	7	14	8	7	1	4	1	5	2
Range of heterosis		-30.88 to 28.00	-19.35 to 37.63	-26.09 to 20.67	-20.19 to 18.03	-28.41 to 19.55	-19.80 to 22.81	-27.59 to 36.78	-20.43 to 33.33	-24.19 to 31.63	-18.45 to 28.16	-25.83 to 28.26	-19.39 to 23.98

, * Significant at 5 per cent and 1 per cent probability levels, respectively.

Table 1: Contd….

S. No.	Crosses	Average fruit weight (g)						Pericarp thickness (mm)					
		Y_1		Y_2		Pooled		Y_1		Y_2		Pooled	
		BP	SV	BP	SV	BP	SV	BP	SV	BP	SV	BP	SV
1	NDT-6 × NDT-2-2	-5.86	-1.93	-5.58	-0.49	-5.72*	-1.20	-14.74**	2.38	-11.63**	3.26	-13.21**	2.82
2	NDT-6 × NDT-7	-13.84**	1.98	-6.04	3.27	-10.01**	2.64	-7.72	2.46	-6.59	3.66	-7.16*	3.06
3	NDT-6 × NDT-4	-5.83	-3.87	-5.54	-2.36	-5.69 *	-3.10	-5.06	-4.76	-2.78	-2.54	-3.92	-3.65
4	NDT-6 × NDT-5	-24.01**	-10.99*	-14.34**	-9.21*	-19.32**	-10.08**	0.29	9.52	2.21	10.49*	1.24	10.01**
5	NDT-6 × A. Vikas	-3.22	-3.22	-1.72	-1.72	-2.46	-2.46	-7.86	-7.86	-9.46*	-9.46*	-8.66*	-8.66*
6	2012/TLCVRes-1-2 × NDT-2-2	-14.73**	-11.17*	-14.01**	-9.38*	-14.37**	-10.26**	-17.82**	12.70*	-14.84**	12.64**	-16.36**	12.67**
7	2012/TLCVRes-1-2 × NDT-7	-16.75**	-1.46	-9.05*	-0.04	-12.97**	-0.73	-28.82**	-2.38	-26.02**	-2.15	-27.45**	-2.26
8	2012/TLCVRes-1-2 × NDT-4	-2.80	-0.77	-2.66	0.63	-2.73	-0.06	-20.60**	8.89	-17.49**	9.14*	-19.07**	9.02*

9	2012/TLCVRes-1-2 × NDT-5	-16.98**	-2.76	-6.86	-1.28	-12.07**	-2.00	-35.65**	-11.75	-31.61**	-9.54*	-33.67**	-10.64**
10	2012/TLCVRes-1-2 × A. Vikas	-8.59	-8.59	-6.89	-6.89	-7.72**	-7.72**	-26.50**	0.79	-20.25**	5.48	-23.44**	3.14
11	NDTH-11W-9-1-1-1 × NDT-2-2	-3.22	2.49	15.04**	21.24**	6.92*	12.05**	-20.69**	-4.76	-16.60**	-2.54	-18.67**	-3.65
12	NDTH-11W-9-1-1-1 × NDT-7	-6.98	10.11*	1.08	11.09*	-3.02	10.61**	-7.22	3.02	-2.79	7.87	-5.01	5.44
13	NDTH-11W-9-1-1-1 × NDT-4	9.88*	16.37**	13.30**	17.12**	13.10**	16.76**	-14.54*	-11.83	-18.71**	-11.92**	-16.67**	-11.87**
14	NDTH-11W-9-1-1-1 × NDT-5	-17.80**	-3.72	-7.74	-2.21	-12.92**	-2.95	-6.98	1.59	-4.33	3.66	-5.56	2.62
15	NDTH-11W-9-1-1-1 × A. Vikas	-2.11	3.67	4.21	4.90	1.03	4.30	-0.69	2.46	-5.87	1.99	-3.34	2.22
16	2013/TODVAR-2-2×NDT-2-2	31.55**	51.09**	30.15**	50.53**	30.83**	50.80**	-11.63*	6.11	-4.08	12.08**	-7.91*	9.09*
17	2013/TODVAR-2-2×NDT-7	-15.39**	0.14	-12.24**	1.51	-12.52**	0.84	-14.15*	-4.68	-15.40**	-6.12	-14.78**	-5.4
18	2013/TODVAR-2-2 × NDT-4	-5.37	8.68*	-5.13	9.72*	-5.25*	9.21**	11.57	12.46*	7.9	15.10**	9.69**	13.78**
19	2013/TODVAR-2-2 × NDT-5	19.64**	40.14**	21.03**	39.99**	21.51**	40.06**	9.30	19.37**	11.84**	20.91**	10.56**	20.14**
20	2013/TODVAR-2-2 × A. Vikas	-23.64**	-12.30**	-22.58**	-10.46*	-23.10**	-11.36**	-4.33	-3.57	-8.05	-1.91	-6.24	-2.74
21	2015/TODHyb-6-5-1 × NDT-2-2	1.91	24.83**	20.59**	27.09**	10.82**	25.98**	-20.03**	-3.97	-15.17**	-0.87	-17.63**	-2.42
22	2015/TODHyb-6-5-1 × NDT-7	-19.41**	-1.29	-8.90*	0.13	-12.82**	-0.57	-28.88**	-21.03**	-25.57**	-17.41**	-27.23**	-19.22**
23	2015/TODHyb-6-5-1 × NDT-4	-26.26**	-9.68*	-12.51**	-7.94	-19.77**	-8.79**	2.38	9.29	13.19**	19.40**	7.75*	14.34**
24	2015/TODHyb-6-5-1 × NDT-5	-20.55**	-2.68	-6.79	-1.21	-13.74**	-1.93	-23.40**	-16.35**	-22.57**	-16.30**	-22.99**	-16.32**
25	2015/TODHyb-6-5-1 × A. Vikas	-18.59**	-0.28	-3.91	1.10	-11.67**	0.42	-0.59	6.11	2.19	7.79	0.79	6.95
26	S_5 × NDT-3-2-1-1 × NDT-2-2	-23.91**	4.33	0.14	5.54	-11.72**	4.95	-30.73**	-16.83**	-27.41**	-15.18**	-29.10**	-16.00**
27	S_5 × NDT-3-2-1-1 × NDT-7	-32.89**	-7.98	-14.76**	-6.31	-21.88**	-7.13*	-14.44*	-5.00	-12.89**	-3.34	-13.67**	-4.17
28	S_5 × NDT-3-2-1-1 × NDT-4	-31.32**	-5.82	-7.36	-4.23	-20.10**	-5.01	0.86	2.70	1.81	2.78	1.33	2.74
29	S_5 × NDT-3-2-1-1 × NDT-5	-29.23**	-2.95	-7.03	-1.47	-17.73**	-2.20	-11.19	-3.02	-10.81*	-3.58	-11.00**	-3.30
30	S_5 × NDT-3-2-1-1 × A. Vikas	-26.74**	0.46	0.47	1.82	-14.92**	1.15	1.56	3.41	1.73	2.70	1.65	3.06
31	S_5 × NDT-3-2-2-2 × NDT-2-2	-42.50**	-5.60	-8.92*	-4.02	-28.88**	-4.79	-28.82**	-14.52*	-25.44**	-12.88**	-27.15**	-13.70**
32	S_5 × NDT-3-2-2-2 × NDT-7	-40.11**	-1.67	-9.23*	-0.24	-26.01**	-0.94	-1.22	9.68	-0.86	10.02*	-1.04	9.85**
33	S_5 × NDT-3-2-2-2 × NDT-4	-33.44**	9.27*	5.32	10.29*	-17.99**	9.79**	16.14*	16.51**	18.95**	19.24**	17.54**	17.87**
34	S_5 × NDT-3-2-2-2 × NDT-5	-43.02**	-6.44	-10.21*	-4.83	-29.50**	-5.62	-18.31**	-10.79	-15.96**	-9.14*	-17.14**	-9.97**
35	S_5 × NDT-3-2-2-2 × A. Vikas	-42.50**	-5.59	-8.34*	-4.01	-28.88**	-4.79	7.94	7.94	9.62*	9.62*	8.78*	8.78*
No. of crosses with significant +ve heterosis		3	7	5	8	5	8	1	4	4	10	5	**9**
No. of crosses with significant -ve heterosis		22	4	11	3	25	6	17	4	18	8	20	**8**
Range of heterosis		-43.02 to 31.55	-12.30 to 51.09	-22.58 to 30.15	-10.46 to 50.53	-29.50 to 30.83	-11.36 to 50.80	-35.65 to 16.14	-21.03 to 19.37	-31.61 to 18.95	-17.41 to 20.91	-33.67 to 17.54	-19.22 to 20.14

, * Significant at 5 per cent and 1 per cent probability levels, respectively.

Table 1: Contd….

S. No.	Crosses	Number of locules per fruit						Polar diameter (cm)					
		Y_1		Y_2		Pooled		Y_1		Y_2		Pooled	
		BP	SV	BP	SV	BP	SV	BP	SV	BP	SV	BP	SV
1	NDT-6 × NDT-2-2	24.87**	23.81**	20.48**	33.33**	22.58**	28.52**	-0.4	5.62	-3.20	2.42	-1.82	3.99
2	NDT-6 × NDT-7	-2.77**	-12.62	-6.68	-1.33	-5.08**	-7.03	0.4	6.45	20.98**	28.01**	10.87**	17.43**
3	NDT-6 × NDT-4	-10.71	1.37	-5.21**	-6.27	-8.25**	-2.41	5.45	11.82*	2.44	8.39	3.92	10.07**
4	NDT-6 × NDT-5	-8.15**	-1.50	-2.71	10.00	-0.75**	4.19	-4.25	3.94	-6.86	0.81	-5.58	2.34
5	NDT-6 × A. Vikas	-11.97	-11.97	-0.67	-0.67	-6.37	-6.37	-8.77	-3.27	-11.29*	-6.13	-0.05**	-4.73
6	2012/TLCVRes-1-2 × NDT-2-2	15.44*	14.45*	-6.51	3.47	3.97	9.01*	9.47	12.41*	6.22	8.96	7.81*	10.65**
7	2012/TLCVRes-1-2 × NDT-7	-1.62	11.31	19.80**	26.67**	8.62*	18.92**	9.71	12.6*	6.45	9.20	8.05*	10.90**
8	2012/TLCVRes-1-2 × NDT-4	-10.60	1.50	-6.91	16.67*	-8.68*	9.01*	9.88	12.82*	7.47	10.25	8.65*	11.51**
9	2012/TLCVRes-1-2 × NDT-5	-5.11**	2.16	3.77	17.33**	-6.05	9.67*	-2.08	6.29	-7.68	-0.08	-4.93	3.04
10	2012/TLCVRes-1-2 × A. Vikas	4.12	4.12	15.48*	19.33**	11.65**	11.65**	-3.92	-1.34	-7.79	-5.41	-5.89	-3.41
11	NDTH-11W-9-1-1-1 × NDT-2-2	-7.50**	-13.67*	-2.41**	-5.20**	-3.11**	-9.38**	-8.24	21.37**	-3.57	26.39**	-5.87*	23.93**
12	NDTH-11W-9-1-1-1 × NDT-7	-4.62	7.91	-8.45	-3.20	-6.45	2.41	-7.1	22.88**	-11.39*	16.14**	-9.28**	19.45**
13	NDTH-11W-9-1-1-1 × NDT-4	-9.03**	-9.42**	-3.94**	-4.67	-6.38**	-2.12**	-2.81**	2.1	-5.17	24.29**	-3.87**	13.40**
14	NDTH-11W-9-1-1-1 × NDT-5	-8.53**	-14.00*	-0.99**	-10.67	-4.92**	-2.35**	-0.42**	-7.96	-2.76**	-11.86*	-1.61**	-9.95**
15	NDTH-11W-9-1-1-1 × A. Vikas	-6.13	-1.77	13.33*	13.33*	5.26	5.71	-9.28**	-6.45	-4.36**	-13.96*	-1.86**	-0.28**
16	2013/TODVAR-2-2×NDT-2-2	-7.23**	-6.34	-1.81	8.67	-7.27	1.09	6.82	22.05**	0.85	14.69*	3.79	18.30**
17	2013/TODVAR-2-2×NDT-7	-7.40	4.77	13.49*	20.00**	2.59	12.31**	1.61	16.09**	-0.99	12.59*	0.29	14.31**
18	2013/TODVAR-2-2 × NDT-4	2.07	15.89*	4.79	31.33**	3.48	23.54**	-3.87**	-1.59	-5.97**	-4.44	-4.94**	-3.04
19	2013/TODVAR-2-2 × NDT-5	2.72	23.61**	-0.24	12.80*	1.30	18.26**	16.65**	33.28**	12.14*	27.52**	14.36**	30.35**
20	2013/TODVAR-2-2 × A. Vikas	10.98	25.57**	6.42	11.53	8.81*	18.62**	3.08	17.77**	13.48*	29.06**	8.37*	23.52**
21	2015/TODHyb-6-5-1 × NDT-2-2	0.26	-0.59	-3.31**	-15.13*	-2.06**	-7.79	21.52**	31.10**	11.25*	19.69**	16.30**	25.29**
22	2015/TODHyb-6-5-1 × NDT-7	-7.05**	-1.41**	-7.58**	-4.00**	-7.74**	-2.79**	6.84	15.26*	14.40**	23.08**	10.69**	19.24**
23	2015/TODHyb-6-5-1 × NDT-4	-4.94**	-14.78*	-7.55**	3.33	-1.10**	-5.81	5.52	13.83*	2.63	10.41	4.05	12.09**
24	2015/TODHyb-6-5-1 × NDT-5	2.17	22.96**	22.88**	38.93**	12.10**	30.87**	1.78	10.48	-0.97	7.18	0.38	8.80*
25	2015/TODHyb-6-5-1 × A. Vikas	-8.33**	-8.33**	-3.23**	-0.67**	-9.58**	-9.58**	22.14**	31.77**	10.80*	19.21**	16.37**	25.37**
26	S_5 × NDT-3-2-1-1 × NDT-2-2	-5.47	-6.28	1.20	12.00	-1.98	2.77	49.83**	47.95**	7.35	6.05	28.18**	26.60**
27	S_5 × NDT-3-2-1-1 × NDT-7	-2.95**	-4.13**	-2.43**	-9.13**	-7.48**	-1.56**	7.44	8.97	-2.23	-0.89	2.51	3.95
28	S_5 × NDT-3-2-1-1 × NDT-4	-15.32*	-3.86	-4.95**	-8.47**	-5.53**	-11.09*	10.73	13.33*	45.78**	49.07**	28.58**	31.54**
29	S_5 × NDT-3-2-1-1 × NDT-5	-2.17	17.72*	-8.43	3.53	-5.18	10.70*	36.83**	48.53**	9.84	18.89**	23.10**	33.43**
30	S_5 × NDT-3-2-1-1 × A. Vikas	-8.38**	-8.38**	-10.53	-10.53	-9.54**	-9.54**	11.65	11.65	10.25	10.25	10.94**	10.94**
31	S_5 × NDT-3-2-2-2 × NDT-2-2	2.37	1.5	7.72	19.93**	5.31	10.63*	20.46**	18.94**	18.14**	16.71**	19.28**	17.80**
32	S_5 × NDT-3-2-2-2 × NDT-7	-6.01	6.34	12.16*	24.87**	5.52	15.52**	11.16	12.74*	32.25**	34.06**	21.90**	23.60**
33	S_5 × NDT-3-2-2-2 × NDT-4	7.89	22.50**	12.77*	41.33**	10.43**	31.83**	9.09	11.65	32.12**	35.11**	20.82**	23.60**
34	S_5 × NDT-3-2-2-2 × NDT-5	-13.04*	4.64	-0.22**	-9.80	-6.49**	-2.51	-2.08	6.29	-0.60	7.59	-1.33	6.95

35	S5 × NDT-3-2-2-2 × A. Vikas	-11.12	-11.12	-3.83	7.07	-6.82	-2.11	20.20**	20.20**	43.83**	43.83**	32.24**	32.24**
No. of crosses with significant +ve heterosis		2	8	8	13	6	15	7	20	11	17	17	25
No. of crosses with significant -ve heterosis		14	8	11	6	15	7	4	0	5	2	7	2
Range of heterosis		-57.05 to 24.87	-51.41 to 25.57	-42.43 to 22.88	-39.13 to 41.33	-47.74 to 22.58	-42.79 to 31.83	-30.42 to 49.83	-7.96 to 48.53	-34.36 to 45.78	-13.96 to 49.07	-31.86 to 32.24	-10.28 to 33.43

, * Significant at 5 per cent and 1 per cent probability levels, respectively.

Table 1: Contd….

S. No.	Crosses	Equitorial diameter (cm)						Total fruit yield per plant (kg)					
		Y1		Y2		Pooled		Y1		Y2		Pooled	
		BP	SV	BP	SV	BP	SV	BP	SV	BP	SV	BP	SV
1	NDT-6 × NDT-2-2	6.13	4.11	4.24	9.40	5.15	6.77*	2.20	14.29	1.77	11.26	1.96	12.59**
2	NDT-6 × NDT-7	-5.24	-3.92	16.49**	22.26**	5.89	9.23**	-12.91	-2.61	-10.41	-2.06	-11.53**	-2.30
3	NDT-6 × NDT-4	7.29	5.25	3.11	8.21	5.12	6.74*	-22.12**	-12.9	-17.83**	-10.17	-19.74**	-11.37*
4	NDT-6 × NDT-5	0.36	7.09	-0.51	9.28	-0.09	8.19*	-10.26	0.77	-8.28	0.61	-9.16*	0.68
5	NDT-6 × A. Vikas	-0.06	-0.06	-2.63	2.19	-0.47	1.07	4.95	17.36*	36.32**	49.03**	22.32**	35.07**
6	2012/TLCVRes-1-2 × NDT-2-2	8.12	5.38	6.52	7.59	7.30*	6.49*	6.29	1.23	4.91	0.97	5.51	1.08
7	2012/TLCVRes-1-2 × NDT-7	-6.37	-5.06	-7.29	-2.76	-6.84*	-3.91	2.51	-5.84	1.94	-4.60	2.19	-5.15
8	2012/TLCVRes-1-2 × NDT-4	22.60**	14.68**	16.29**	16.80**	19.32**	15.75**	21.64*	11.37	16.73*	8.96	18.87**	10.02*
9	2012/TLCVRes-1-2 × NDT-5	-3.14	3.35	-3.88	5.58	-3.52	4.47	-8.76	2.46	-7.06	1.94	-7.82	2.17
10	2012/TLCVRes-1-2 × A. Vikas	8.61	8.61	28.90**	29.47**	19.09**	19.09**	5.53	5.53	4.36	4.36	4.87	4.87
11	NDTH-11W-9-1-1-1 × NDT-2-2	27.79**	24.56**	19.83**	22.38**	24.40**	23.46**	-15.17*	-9.83	-12.11	-7.75	-13.47**	-8.67
12	NDTH-11W-9-1-1-1 × NDT-7	19.04**	20.70**	8.91	14.23**	13.86**	17.45**	5.92	12.6	4.73	9.93	5.26	11.10*
13	NDTH-11W-9-1-1-1 × NDT-4	-1.33	-6.01	18.60**	21.13**	9.03**	7.62*	11.71	18.74*	16.26*	22.03**	14.24**	20.58**
14	NDTH-11W-9-1-1-1 × NDT-5	-23.37**	-18.23**	-22.77**	-15.17**	-23.07**	-16.69**	-10.94	0.00	-8.83	0.00	-9.77*	0.00
15	NDTH-11W-9-1-1-1 × A. Vikas	-20.38**	-20.38**	-19.03**	-17.30**	-18.83**	-18.83**	-18.21*	-13.06	-14.53*	-10.29	-16.16**	-11.51*
16	2013/TODVAR-2-2×NDT-2-2	19.25**	23.10**	-6.64	-0.38	6.03	11.31**	35.79**	47.47**	29.37 **	38.14**	32.22**	42.25**
17	2013/TODVAR-2-2×NDT-7	-4.84	-1.77	-5.23	1.13	-5.04	-0.31	-10.18	-2.46	-8.16	-1.94	-9.06*	-2.17
18	2013/TODVAR-2-2 × NDT-4	-1.35	1.84	-1.88	4.70	-1.62	3.28	-10.47	-2.76	-8.39	-2.18	-9.31*	-2.44
19	2013/TODVAR-2-2 × NDT-5	16.43**	24.24**	0.8	10.72*	8.46**	17.45**	24.08**	39.32**	10.71	21.43**	16.68**	29.32**
20	2013/TODVAR-2-2 × A. Vikas	8.34	11.84*	15.45**	23.20**	11.97**	17.54**	-17.11*	-9.98	-13.72*	-7.87	-15.23**	-8.80
21	2015/TODHyb-6-5-1 × NDT-2-2	21.65**	25.19**	9.61	16.61**	15.50**	20.88**	-7.7	25.19**	-21.74**	0.24	-15.35**	11.24*
22	2015/TODHyb-6-5-1 × NDT-7	0.55	3.48	-0.06	6.33	0.24	4.91	-41.79**	-21.04**	-34.88**	-16.59*	-38.02**	-18.55**
23	2015/TODHyb-6-5-1 × NDT-4	5.54	8.61	1.59	8.09	3.52	8.35*	-33.18**	-9.37	-27.69**	-7.38	-30.19**	-8.26
24	2015/TODHyb-6-5-1 × NDT-5	7.47	14.68**	3.88	14.11**	5.64	14.39**	-30.92**	-6.3	-25.80**	-4.96	-28.13**	-5.55
25	2015/TODHyb-6-5-1 × A. Vikas	17.84**	21.27**	7.72	14.61**	12.67**	17.92**	-28.99**	-3.69	-24.20**	-2.91	-26.38**	-3.25
26	S5 × NDT-3-2-1-1 × NDT-2-2	23.60**	25.32**	-3.53	1.19	9.74**	13.20**	-29.61**	20.89**	-17.87**	28.57**	-23.31**	25.19**
27	S5 × NDT-3-2-1-1 × NDT-7	23.91**	25.63**	19.13**	24.95**	21.47**	25.29**	-45.17**	-5.84	-39.06**	-4.60	-41.89**	-5.15
28	S5 × NDT-3-2-1-1 × NDT-4	25.91**	27.66**	21.04**	26.96**	23.42**	27.31**	-41.68**	0.15	-36.04**	0.12	-38.66**	0.14
29	S5 × NDT-3-2-1-1 × NDT-5	19.40**	27.41**	3.08	13.23*	11.08**	20.28**	-39.71**	3.53	-34.34**	2.78	-36.83**	3.11
30	S5 × NDT-3-2-1-1 × A. Vikas	-10.05*	-8.80	-13.39**	-9.15	-11.76**	-8.98**	-47.23**	-9.37	-40.84**	-7.38	-43.80**	-8.26
31	S5 × NDT-3-2-2-2 × NDT-2-2	42.49**	41.14**	14.98**	17.93**	28.43**	29.48**	-41.48**	-5.53	-35.56**	-4.36	-38.30**	-4.87
32	S5 × NDT-3-2-2-2 × NDT-7	12.36**	13.92**	21.94**	27.90**	17.25**	20.94**	-42.53**	-7.22	-36.46**	-5.69	-39.26**	-6.36
33	S5 × NDT-3-2-2-2 × NDT-4	9.01	7.97	22.74**	25.89**	16.03**	16.98**	-31.49**	10.6	-27.00**	8.35	-29.07**	9.34
34	S5 × NDT-3-2-2-2 × NDT-5	-17.67**	-12.15**	-20.66**	-12.85*	-19.20**	-12.50**	-47.76**	-15.67*	-40.95**	-12.35	-44.09**	-13.81**
35	S5 × NDT-3-2-2-2 × A. Vikas	25.06**	25.06**	20.90**	24.01**	23.52**	24.54**	-29.40**	13.98	-15.17**	25.91**	-21.74**	20.65**
No. of crosses with significant +ve heterosis		14	16	12	18	18	25	3	6	4	6	5	**10**
No. of crosses with significant -ve heterosis		4	3	4	3	5	4	18	2	18	1	24	**3**
Range of heterosis		-23.37 to 42.49	-20.38 to 41.14	-22.77 to 28.90	-17.30 to 29.47	-23.07 to 28.43	-18.83 to 29.48	-47.76 to 35.79	-21.04 to 47.47	-40.95 to 36.32	-16.59 to 49.03	-44.09 to 32.22	**-18.55 to 42.25**

, * Significant at 5 per cent and 1 per cent probability levels, respectively.

Table 1: Contd….

S. No.	Crosses	Marketable fruit yield per plant (kg)						Total soluble solids (%)					
		Y1		Y2		Pooled		Y1		Y2		Pooled	
		BP	SV	BP	SV	BP	SV	BP	SV	BP	SV	BP	SV
1	NDT-6 × NDT-2-2	0.00	12.7	-1.45	12.37	-0.81	12.52**	1.51	3.74	-2.02	0.97	-0.25	2.36
2	NDT-6 × NDT-7	-14.08*	-3.17	-9.51	3.19	-11.53**	0.35	-6.37	-4.32	-6.36	-3.51	-6.37	-3.91
3	NDT-6 × NDT-4	-21.13**	-11.11	-20.47**	-9.31	-20.76**	-10.11*	-11.67	-6.89	-11.67	-6.10	-11.67*	-6.50
4	NDT-6 × NDT-5	-9.72	1.75	-12.64	-0.38	-11.35**	0.57	-8.58	-6.57	-8.57	-5.78	-8.57	-6.18
5	NDT-6 × A. Vikas	3.38	16.51*	17.45*	33.93**	11.22**	26.17**	6.56	8.89	11.53	14.94*	9.05	11.90*
6	2012/TLCVRes-1-2 × NDT-2-2	7.53	2.06	5.23	2.68	6.24	2.40	2.37	0.00	2.37	0.84	2.37	0.42
7	2012/TLCVRes-1-2 × NDT-7	1.01	-4.76	4.10	0.51	2.97	-1.84	-9.30	-11.40	-9.29	-10.65	-9.3	-11.03*
8	2012/TLCVRes-1-2 × NDT-4	19.12*	11.75	11.89	8.04	15.06**	9.69*	-7.70	-2.71	-7.70	-1.88	-7.70	-2.30
9	2012/TLCVRes-1-2 × NDT-5	-6.81	2.06	-8.35	3.57	-7.68	2.90	3.56	1.16	3.56	2.01	3.56	1.58
10	2012/TLCVRes-1-2 × A. Vikas	3.49	3.49	8.04	8.04	6.01	6.01	12.11	12.11	19.55*	19.55*	15.82**	15.82**
11	NDTH-11W-9-1-1-1 × NDT-2-2	-16.79*	-10.32	-12.32	-5.61	-14.31**	-7.71	-4.79	2.45	-4.79	3.31	-4.79	2.88
12	NDTH-11W-9-1-1-1 × NDT-7	4.57	12.7	2.13	9.95	3.22	11.17*	-6.41	0.71	-2.39	5.91	-4.40	3.30
13	NDTH-11W-9-1-1-1 × NDT-4	5.01	13.17	4.03	11.99	4.46	12.52**	-6.11	1.03	-6.10	1.88	-6.11	1.46
14	NDTH-11W-9-1-1-1 × NDT-5	-10.29	-1.75	-10.38	1.28	-10.34*	-0.07	5.39	13.40	5.39	14.35	5.39	13.87**
15	NDTH-11W-9-1-1-1 × A. Vikas	-17.23*	-10.79	-14.45*	-7.91	-15.69**	-9.19*	-10.00	-3.16	-9.99	-2.34	-10.00*	-2.75

16	2013/TODVAR-2-2×NDT-2-2	29.60**	39.68**	33.45**	42.98**	31.73**	41.51**	2.41	1.35	2.41	2.21	2.41	1.78
17	2013/TODVAR-2-2×NDT-7	-10.16	-3.17	-9.05	-2.55	-9.55*	-2.83	3.58	2.51	3.58	3.38	3.58	2.94
18	2013/TODVAR-2-2 × NDT-4	-7.07	0.16	-7.14	-0.51	-7.11	-0.21	-5.68	-0.58	-5.68	0.26	-5.68	-0.16
19	2013/TODVAR-2-2 × NDT-5	-5.51	3.49	-6.32	5.87	-5.96	4.81	8.72	7.60	11.58	11.36	10.15*	9.48
20	2013/TODVAR-2-2 × A. Vikas	-15.91*	-9.37	-10.48	-4.08	-12.90**	-6.44	-5.80	-5.80	-3.05	-3.05	-4.43	-4.43
21	2015/TODHyb-6-5-1 × NDT-2-2	-17.22**	2.22	-21.63**	3.06	-19.73**	2.69	-7.14	0.52	-7.14	1.36	-7.14	0.94
22	2015/TODHyb-6-5-1 × NDT-7	-35.48**	-20.32*	-36.18**	-16.07*	-35.88**	-17.96**	-19.05**	-12.37	-19.04**	-11.62	-19.04**	-12.00*
23	2015/TODHyb-6-5-1 × NDT-4	-26.74**	-9.52	-28.71**	-6.25	-27.86**	-7.71	-14.40*	-7.35	-14.40*	-6.56	-14.40**	-6.95
24	2015/TODHyb-6-5-1 × NDT-5	-22.49**	-4.29	-27.35**	-4.46	-25.26**	-4.38	-15.71*	-8.76	-15.70*	-7.99	-15.71**	-8.38
25	2015/TODHyb-6-5-1 × A. Vikas	-24.16**	-6.35	-26.29**	-3.06	-25.37**	-4.53	4.17	12.76	4.16	13.70	4.17	13.23*
26	S_5 × NDT-3-2-1-1 × NDT-2-2	-8.74	17.62*	-4.55	31.25**	-6.35	25.18**	0.36	9.28	0.35	10.19	0.35	9.73
27	S_5 × NDT-3-2-1-1 × NDT-7	-26.23**	-4.92	-32.37**	-7.02	-29.74**	-6.08	-8.88	-0.77	-8.87	0.06	-8.87	-0.36
28	S_5 × NDT-3-2-1-1 × NDT-4	-22.17**	0.32	-26.72**	0.77	-24.76**	0.57	-9.47	-1.42	-9.46	-0.58	-9.46*	-1.00
29	S_5 × NDT-3-2-1-1 × NDT-5	-19.70**	3.49	-25.70**	2.17	-23.12**	2.76	-8.28	-0.13	-8.28	0.71	-8.28	0.29
30	S_5 × NDT-3-2-1-1 × A. Vikas	-30.30**	-10.16	-32.75**	-7.53	-31.69**	-8.70	-10.06	-2.06	-10.05	-1.23	-10.06*	-1.65
31	S_5 × NDT-3-2-2-2 × NDT-2-2	-31.46**	-3.17	-37.74**	-4.46	-35.07**	-3.89	-3.18	-5.93	-3.18	-5.13	-3.18	-5.53
32	S_5 × NDT-3-2-2-2 × NDT-7	-32.47**	-4.6	-36.91**	-3.19	-35.02**	-3.82	3.65	0.71	3.64	1.56	3.65	1.13
33	S_5 × NDT-3-2-2-2 × NDT-4	-24.38**	6.83	-25.60**	14.16	-25.08**	10.89*	-1.41	3.93	-1.41	4.81	-1.41	4.37
34	S_5 × NDT-3-2-2-2 × NDT-5	-38.43**	-13.02	-43.56**	-13.39	-41.38**	-13.22**	4.77	1.80	4.77	2.66	4.77	2.23
35	S_5 × NDT-3-2-2-2 × A. Vikas	-19.66**	13.49	-15.79**	29.21**	-17.44**	22.21**	14.05	14.05	15.00*	15.00*	14.52**	14.52**
No. of crosses with significant +ve heterosis		2	3	2	4	3	9	0	0	2	3	3	5
No. of crosses with significant -ve heterosis		19	1	16	1	21	4	3	0	3	0	6	2
Range of heterosis		-38.43 to 29.60	-20.32 to 39.68	-43.56 to 33.45	-16.07 to 42.98	-41.38 to 31.73	-17.96 to 41.51	-19.05 to 14.05	-11.40 to 14.05	-19.04 to 19.55	-11.62 to 19.55	-19.04 to 15.82	-12.00 to 15.82

, * Significant at 5 per cent and 1 per cent probability levels, respectively.

Table 1: Contd….

S. No.	Crosses	Titrable acidity (%)						Ascorbic acid content (mg/100g)					
		Y_1		Y_2		Pooled		Y_1		Y_2		Pooled	
		BP	SV	BP	SV	BP	SV	BP	SV	BP	SV	BP	SV
1	NDT-6 × NDT-2-2	3.01	14.17*	3.36	16.04*	3.17	15.04**	-4.11	3.73	-8.87	-3.18	-6.50	0.22
2	NDT-6 × NDT-7	0.00	9.17	0.00	10.38	0.00	9.73	3.84	12.33*	3.79	10.27	3.82	11.29*
3	NDT-6 × NDT-4	18.32**	29.17**	20.51**	33.02**	19.35**	30.97**	5.02	15.35**	4.97	13.20	5.00	14.25**
4	NDT-6 × NDT-5	-10.69	-2.50	-11.97	-2.83	-11.29*	-2.65	-1.45	16.61**	-1.44	14.42*	-1.44	15.50**
5	NDT-6 × A. Vikas	-10.69	-2.50	-11.97	-2.83	-11.29*	-2.65	-3.11	4.82	-3.07	2.98	-3.09	3.88
6	2012/TLCVRes-1-2 × NDT-2-2	7.04	26.67**	7.81	30.19**	7.41	28.32**	2.49	11.63*	2.46	9.59	2.48	10.60*
7	2012/TLCVRes-1-2 × NDT-7	-6.34	10.83	-7.03	12.26	-6.67	11.50*	3.94	13.21*	3.90	11.12	3.92	12.15*
8	2012/TLCVRes-1-2 × NDT-4	-0.42**	-5.83	-2.66**	-6.60	-1.48**	-6.19	6.57	17.05**	6.50	14.84*	6.53	15.93**
9	2012/TLCVRes-1-2 × NDT-5	4.23	23.33**	4.69	26.42**	4.44	24.78**	-0.62	17.59**	-0.62	15.37*	-0.62	16.46**
10	2012/TLCVRes-1-2 × A. Vikas	0.70	19.17**	0.78	21.70**	0.74	20.35**	-7.75	0.47	-7.66	-1.24	-7.71	-0.40
11	NDTH-11W-9-1-1-1 × NDT-2-2	3.55	21.67**	3.94	24.53**	3.73	23.01**	-4.84	7.87	-4.78	5.93	-4.81	6.89
12	NDTH-11W-9-1-1-1 × NDT-7	-9.15**	-5.00	-1.26**	-5.66	-0.15**	-5.31	-8.83	3.35	-8.73	1.55	-8.78*	2.43
13	NDTH-11W-9-1-1-1 × NDT-4	-9.15**	-5.00	-1.26**	-5.66	-0.15**	-5.31	-11.34*	0.49	-11.22	-1.22	-1.28**	-0.38
14	NDTH-11W-9-1-1-1 × NDT-5	-15.60*	-0.83	-17.32*	-0.94	-6.42**	-0.88	-6.26	10.91	-6.20	8.89	-6.23	9.89*
15	NDTH-11W-9-1-1-1 × A. Vikas	-6.31**	-1.67	-8.11**	-1.89	-7.16**	-1.77	-7.02	5.40	-6.94	3.54	-6.98	4.45
16	2013/TODVAR-2-2×NDT-2-2	-4.44**	-15.00*	-7.27**	-16.98*	-5.78**	-5.93**	8.62	20.53**	8.52	18.23*	8.57*	19.36**
17	2013/TODVAR-2-2×NDT-7	-7.04**	-6.67	-9.01**	-7.55	-7.97**	-7.08	-11.27*	-1.54	-11.14	-3.20	-11.21*	-2.38
18	2013/TODVAR-2-2 × NDT-4	2.22	15.00*	2.48	16.98*	2.34	15.93**	-2.86	7.80	-2.83	5.87	-2.84	6.82
19	2013/TODVAR-2-2 × NDT-5	5.93	19.17**	6.61	21.70**	6.25	20.35**	-2.59	15.26**	-2.56	13.11	-2.58	14.17**
20	2013/TODVAR-2-2 × A. Vikas	-14.07*	-3.33	-15.70*	-3.77	-4.84**	-3.54	-1.56	9.23	-1.55	7.26	-1.55	8.23
21	2015/TODHyb-6-5-1 × NDT-2-2	-13.53*	-4.17	-15.13*	-4.72	-4.29**	-4.42	-0.16	18.66**	-0.16	16.41*	-0.16	17.52**
22	2015/TODHyb-6-5-1 × NDT-7	-13.08*	-5.83	-14.66*	-6.60	-3.82**	-6.19	-12.19*	4.36	-12.06*	2.53	-2.13**	3.43
23	2015/TODHyb-6-5-1 × NDT-4	22.13**	24.17**	25.00**	27.36**	23.48**	25.66**	-11.63*	5.03	-11.51	3.18	-1.57**	4.09
24	2015/TODHyb-6-5-1 × NDT-5	0.00	1.67	0.00	1.89	0.00	1.77	-11.34*	5.38	-11.21	3.52	-1.27**	4.44
25	2015/TODHyb-6-5-1 × A. Vikas	-7.38	-5.83	-8.33	-6.60	-7.83	-6.19	-5.40	12.44*	-5.34	10.37	-5.37	11.39*
26	S_5 × NDT-3-2-1-1 × NDT-2-2	-15.71*	-1.67	-17.46*	-1.89	-6.54**	-1.77	12.10*	19.01**	11.95	16.75*	12.02**	17.86**
27	S_5 × NDT-3-2-1-1 × NDT-7	-9.29	5.83	-10.32	6.60	-9.77*	6.19	0.45	4.61	0.45	2.77	0.45	3.68
28	S_5 × NDT-3-2-1-1 × NDT-4	4.29	21.67**	4.76	24.53**	4.51	23.01**	2.95	13.07*	2.92	10.98	2.93	12.01*
29	S_5 × NDT-3-2-1-1 × NDT-5	-9.29	5.83	-10.32	6.60	-9.77*	6.19	-2.83	14.98**	-2.80	12.84	-2.81	13.89**
30	S_5 × NDT-3-2-1-1 × A. Vikas	-7.14**	-3.33	-9.05**	-3.77	-8.05**	-3.54	3.99	8.29	3.94	6.34	3.96	7.30
31	S_5 × NDT-3-2-2-2 × NDT-2-2	0.00	10.83	0.00	12.26	0.00	11.50*	-3.12	15.28**	-3.09	13.13	-3.10	14.19**
32	S_5 × NDT-3-2-2-2 × NDT-7	-18.80**	-10.00	-21.01**	-11.32	-19.84**	-10.62*	-11.63*	5.15	-8.79**	-5.20	-5.23**	-0.10
33	S_5 × NDT-3-2-2-2 × NDT-4	15.04*	27.50**	16.81*	31.13**	15.87**	29.20**	-0.63	18.24**	-0.63	16.00*	-0.63	17.10**
34	S_5 × NDT-3-2-2-2 × NDT-5	9.02	20.83**	10.08	23.58**	9.52*	22.12**	-3.47	14.86**	-15.09*	-0.88	-9.31*	6.87
35	S_5 × NDT-3-2-2-2 × A. Vikas	0.00	10.83	0.00	12.26	0.00	11.50*	-15.19**	0.91	-15.03*	-0.82	-15.11**	0.03
No. of crosses with significant +ve heterosis		3	11	3	12	4	15	1	17	0	7	2	17
No. of crosses with significant -ve heterosis		13	1	13	1	17	2	7	0	4	0	9	0
Range of heterosis		-24.44 to 22.13	-15.00 to 29.17	-27.27 to 25.00	-16.98 to 33.02	-25.78 to 23.48	-15.93 to 30.97	-15.19 to 12.10	-1.54 to 20.53	-18.79 to11.95	-5.20 to18.23	-15.23 to 12.02	-2.38 to 19.36

, * Significant at 5 per cent and 1 per cent probability levels, respectively.

Table 1: Contd….

S. No.	Crosses	Total sugar (mg/100g)					
		Y_1		Y_2		Pooled	
		BP	SV	BP	SV	BP	SV
1	NDT-6 × NDT-2-2	-7.59	-1.52	-7.48	-1.30	-7.53*	-1.41
2	NDT-6 × NDT-7	4.27	11.12*	4.21	11.17*	4.24	11.14**
3	NDT-6 × NDT-4	-12.94**	-0.71	-12.76**	-0.50	-12.85**	-0.60
4	NDT-6 × NDT-5	-4.17	4.45	-4.11	4.59	-4.14	4.52
5	NDT-6 × A. Vikas	-3.03	0.30	-2.98	0.50	-3.01	0.40
6	2012/TLCVRes-1-2 × NDT-2-2	-15.38**	2.93	-15.18**	3.09	-15.28**	3.01
7	2012/TLCVRes-1-2 × NDT-7	-14.63**	3.84	-14.44**	3.99	-14.53**	3.92
8	2012/TLCVRes-1-2 × NDT-4	-17.87**	-0.10	-17.64**	0.10	-17.75**	0.00
9	2012/TLCVRes-1-2 × NDT-5	-8.89*	10.82*	-8.78*	10.87*	-8.84**	10.84**
10	2012/TLCVRes-1-2 × A. Vikas	-19.95**	-2.63	-19.69**	-2.39	-19.82**	-2.51
11	NDTH-11W-9-1-1-1 × NDT-2-2	3.89	10.72*	3.83	10.77*	3.86	10.74**
12	NDTH-11W-9-1-1-1 × NDT-7	-6.36	-0.20	-6.26	0.00	-6.31*	-0.10
13	NDTH-11W-9-1-1-1 × NDT-4	-10.82**	1.72	-10.66*	1.89	-10.74**	1.81
14	NDTH-11W-9-1-1-1 × NDT-5	-10.30*	-2.22	-10.15*	-1.99	-10.22**	-2.11
15	NDTH-11W-9-1-1-1 × A. Vikas	-6.21	-2.22	-6.11	-1.99	-6.16	-2.11
16	2013/TODVAR-2-2×NDT-2-2	-5.03	1.21	-4.95	1.40	-4.99	1.31
17	2013/TODVAR-2-2×NDT-7	0.85	7.48	0.84	7.58	0.85	7.53*
18	2013/TODVAR-2-2 × NDT-4	-9.75*	2.93	-9.62*	3.09	-9.68**	3.01
19	2013/TODVAR-2-2 × NDT-5	2.50	11.73*	2.47	11.76*	2.49	11.75**
20	2013/TODVAR-2-2 × A. Vikas	15.03**	16.08**	14.79**	16.05**	14.91**	16.06**
21	2015/TODHyb-6-5-1 × NDT-2-2	-0.47	6.07	-0.47	6.18	-0.47	6.12
22	2015/TODHyb-6-5-1 × NDT-7	-5.12	1.11	-5.05	1.30	-5.08	1.20
23	2015/TODHyb-6-5-1 × NDT-4	-9.66*	3.03	-9.53*	3.19	-9.60**	3.11
24	2015/TODHyb-6-5-1 × NDT-5	-4.08	4.55	-4.02	4.69	-4.05	4.62
25	2015/TODHyb-6-5-1 × A. Vikas	-5.65	-3.84	-5.57	-3.59	-5.61	-3.71
26	S_5 × NDT-3-2-1-1 × NDT-2-2	-3.70	2.63	-3.64	2.79	-3.67	2.71
27	S_5 × NDT-3-2-1-1 × NDT-7	2.85	9.61*	2.80	9.67*	2.82	9.64**
28	S_5 × NDT-3-2-1-1 × NDT-4	-12.41**	-0.10	-12.24**	0.10	-12.32**	0.00
29	S_5 × NDT-3-2-1-1 × NDT-5	-3.43	5.26	-3.38	5.38	-3.41	5.32
30	S_5 × NDT-3-2-1-1 × A. Vikas	-0.96	3.94	-0.95	4.09	-0.96	4.02
31	S_5 × NDT-3-2-2-2 × NDT-2-2	9.39*	16.58**	9.25*	16.55**	9.32**	16.57**
32	S_5 × NDT-3-2-2-2 × NDT-7	11.48*	18.81**	11.31*	18.74**	11.39**	18.78**
33	S_5 × NDT-3-2-2-2 × NDT-4	0.89	15.07**	0.87	15.05**	0.88	15.06**
34	S_5 × NDT-3-2-2-2 × NDT-5	1.86	11.02*	1.83	11.07*	1.84	11.04**
35	S_5 × NDT-3-2-2-2 × A. Vikas	-0.57	5.86	-0.56	5.98	-0.57	5.92
No. of crosses with significant +ve heterosis		3	10	3	10	3	11
No. of crosses with significant -ve heterosis		11	0	11	0	13	0
Range of heterosis		-19.95 to 15.03	-3.84 to 18.81	-19.69 to 14.79	-3.59 to 18.74	-19.82 to 14.91	-3.71 to 18.78

, * Significant at 5 per cent and 1 per cent probability levels, respectively.

Conclusion

Based on the above findings it may be concluded that for total fruit yield per plant crosses 2013/TODVAR-2-2 × NDT-2-2, 2013/TODVAR-2-2 × NDT-5, NDT-6 × Arka Vikas, NDTH-11W-9-1-1-1 × NDT-4 and 2012/TLCVRes-1-2 × NDT-4 showed high heterosis over parents (better and standard) and also possessed desirable fruit quality as per market demand. Therefore, they may be exploited as commercial hybrid in future.

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