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Heterosis for quantitative and qualitative traits in brinjal (*Solanum melongena* L.)

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Abstract

Throughout the last century, brinjal breeding has been based on various standard methods, which has ultimately resulted in the development of improved brinjal cultivars and hybrids having high quality and yield. In the present study, consisting of 6 diversified genotypes of brinjal along with their hybrids and one standard check were evaluated during *kharif* season under randomized block design with two replications. Data on quantitative characters were recorded and better-parent and standard heterosis were determined. Significant levels of heterosis were detected for all the traits studied. Pronounced heterosis over standard check was observed for Plant height 22.49 % in Seetipulam Local × Sevathampatti Local, number of branches per plant in Spiny Local × Sevathampatti Local (46.97 %), fruit yield per plant in Sevathampatti Local × Spiny Local (34.57%) and number of fruits per plant fruit in Spiny Local × Manaparai Local (36.68%). The crosses the highest negative and significant heterosis was exhibited by the hybrids Sevathampatti Local × Seetipulam Local and Seetipulam Local × Sevathampatti Local (-10.06 %) over standard check for earliness (days to first flowering and days to first harvesting). In this study Seetipulam Local ×Sevathampatti Local found superior for most of the characters (earliness and yield/plant) and it can be commercially exploited after assessing their stability.

Key words: Heterosis, *Solanum melongena*, earliness, yield, fruit borer.

Introduction

Brinjal (*Solanum melongena* L.) belongs to the family *Solanaceae,* has chromosome number of 2n=24 and cultivated extensively in different parts of India and considered to be one of the most remunerative vegetables (Pramaniket al. 2012). According to Vavilov (1928), centre of origin of brinjal is the Indo-Burma region. Brinjal is an important year-round widely consumed vegetable in tropical and subtropical regions of globe. It is a versatile crop adapted to different agro-climatic regions and can be grown throughout the year. Globally, India is the largest producer of vegetables and ranks second in production of brinjal or eggplant. However, the present production and productivity of eggplant is not enough to meet the nutritional security of increasing population. Additionally, there are also regional preferences for fruit shape, size, taste, colour, etc. as these traits vary significantly with the type of eggplant cultivar. The fruits of eggplant are widely consumed in various culinary preparations and are rich source of protective nutrients. Eggplant contains a higher content of free reducing sugars, anthocyanin, phenols, glycoalkaloids (solasodine) and amide proteins. Bitterness in eggplant is due to the presence of saponins and glycoalkaloids (Mariola et al. 2013). Eggplant is well known for its medicinal properties and has also been recommended as an excellent remedy for liver complaints and diabetic patients (Tiwari et al. 2009). Due to the multiple health benefits of eggplant, which include anti-oxidant, anti-diabetic, hypotensive, cardioprotective and hepatoprotective effects, the demand for eggplant has been on a rapid and steady rise in the recent years (Ojiewo et al. 2007). Heterosis breeding has become the widely used breeding method for increasing productivity of the important solanaceous vegetable crops including brinjal. Ease of handling the flowers during artificial emasculation and pollination and realization of higher number of hybrid seeds per effective pollination causes higher yield of hybrids. Lack of appropriate hybrids for specific area and purpose is the major problem in popularizing the hybrids of brinjal. In the present investigation, thirteen parents were selected on the basis of divergence. They were mated in line × tester mating design to raise hybrids and relative heterosis, heterobeltiosis and standard heterosis was calculated for different yield attributes.

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Materials and Methods

The experiment was carried out during Rabi 2018 at college orchard, Tamil Nadu Agricultural University, Coimbatore (Tamil Nadu) India. The experimental material consisted of six parents namely, Sevathampatti local (P1), Marthandam local - II (P2), Seetipulam local (P3), Manaparai local (P4), Spiny local (P5) and Karungal local(P6) and their 30 hybrids derived from 6 × 6 full diallel (including reciprocal) mating design. The hybrids and parents were evaluated along with the checks VRM-1 in a randomized block design with two replications. Each plot consisted of ten plants in a row at 60 × 60 cm^2 inter and intra row spacing. All the recommended package of practices is adopted for growing a healthy crop. Five randomly selected plants, excluding the border ones, from each plot of all the two replications were tagged and used for recording the observations and average values were computed.

Results and Discussion

The plant height is one of the important characters by which the growth and vigour of the plant are determined. For the plant height, five out of thirty hybrids exhibited significant positive heterosis over mid parental value highest in 26.53 % in Seetipulam Local ×Sevathampatti Local followed by Sevathampatti Local ×Seetipulam Local and Marthandam Local-II×Manaparai Local. The heterobeltiosis exhibited significant positive heterosis in the hybrids 13.27 % in seetipulam Local ×Karungal Local followed by 15.75 % in Manaparai Local ×Marthandam Local-II. When the hybrids were compared with the check (VRM-1), the heterotic effect was high in 22.49 % in Seetipulam Local ×Sevathampatti Local. Totally seven hybrids exhibited significant and negative standard heterotic values over the check (Table 1). The heterosis over check were high in Sevathampatti Local ×Seetipulam Local, Marthandam Local-II×Manaparai Local, Seetipulam Local ×Sevathampatti Local, Manaparai Local ×Marthandam Local-II Spiny Local ×Manaparai Local and Manaparai Local ×Spiny Local. This is conformity to the finding of Biswas et al. (2013), and Mistry et al. (2018) who also recorded the same results.

Positive and significant relative heterosis for number of branches per plant was exhibited by nine crosses and it high in 34.10 % (Spiny Local ×Sevathampatti Local). The positive and significant heterobeltiosis noticed high

Table 1: Heterosis for plant height, no. of branches per plant and days to first flowering

Cross	Plant height			No. of branches per plant			Days to first flowering		
	RH	BPH	SH	RH	BPH	SH	RH	BPH	SH
P1×P2	-15.31	-21.42*	-3.77	-2.7	-12.2*	9.09	9.61	7.04	12.52
P1×P3	20.47**	-4.77	16.62**	17.92**	3.03	3.03	-6.14	-10.23	-10.06*
P1×P4	0.07	-7.95	12.73	-7.77	-11.21	-4.04*	-9.38*	-11.96	-6.45
P1×P5	-28.26**	-30.42**	-14.79	2.3**	-5.93	12.12*	-11.93*	-15.74*	-7.59*
P1×P6	12.41	-6.14*	14.95	14.21	9.60**	9.60	4.37	3.98	4.17
P2×P1	4.76	-2.8*	19.04	0.90	-8.94*	13.13*	-0.55	-2.89	2.09
P2×P3	-3.09	-18.64**	-14.74**	-14.72	-31.71**	-15.15	5.41	-1.44	3.61
P2×P4	-0.79	-1.72	2.99*	-8.7*	-14.63**	6.06	-13.29*	-13.75*	-8.35*
P2×P5	-16.36**	-20.09**	-8.04	-8.71	-10.57	11.11*	6.54	4.33	14.42*
P2×P6	11.71	-0.41	4.37	-0.93	-13.82*	7.07	2.04	-0.72	4.36
P3×P1	26.53**	0.02	22.49**	21.39**	6.06*	6.06	-6.14	-10.23	-10.06*
P3×P2	-5.15	-20.37**	-16.55**	18.27	-5.28**	17.68*	8.91	1.83	7.59
P3×P4	11.07	-6.04*	-3.39	22.65	3.74*	12.12	-6.53	-13.04	-7.59*
P3×P5	-7.97	-25.54**	-14.31*	30.73	6.36	26.77*	11.7	2.42	12.33
P3×P6	21.32**	13.27**	-7.07*	24.85*	13.19	4.04	17.5*	12.79	12.14
P4×P1	-2.30	-10.14	10.05	27.18	22.43	32.32*	-3.68	-6.43	-0.57
P4×P2	16.86**	15.75**	21.31*	-12.17*	-17.89**	2.02	-7.9*	-8.39*	-2.66
P4×P3	-3.81	-18.62*	-16.33	-20.44	-32.71*	-27.27	9.02	1.43	7.78
P4×P5	3.75	-1.78	13.04*	1.33	-3.39	15.15*	2.46	0.87	10.63
P4×P6	11.34**	0.09	2.92	12.12**	3.74	12.12*	-6.27	-9.29	-3.61
P5×P1	1.13**	-1.92**	20.12**	34.1**	23.31	46.97**	-3.73	-7.9*	1.02
P5×P2	-9.85**	-13.88**	-0.89	-7.05	-8.94	13.13*	1.24	-0.87	8.73*
P5×P3	-4.84	-23.00**	-11.39*	-9.38	-26.27	-12.12	-3.02	-11.07	-2.47
P5×P4	6.37	0.70	15.89*	-5.78	-10.17	7.07	-1.23	-2.77	6.64
P5×P6	-9.84	-22.78**	-11.13	-10.05	-20.34*	-5.05	-2.00	-6.57	2.47
P6×P1	-1.19	-17.49*	1.04	12.63*	8.08	8.08	5.70	5.30	5.50
P6×P2	-10.22	-19.96	-16.12	4.67	-8.94*	13.13*	-11.69*	-14.08	-9.68*
P6×P3	3.03	-3.81	-21.08*	9.70*	-0.55	-8.59	8.55*	4.2	3.61
P6×P4	9.71	-1.38	1.41	19.19**	10.28**	19.19*	0.37	-2.86	3.23
P6×P5	-6.89	-20.25**	-8.22	7.18	-5.08*	13.13*	3.63	-1.21	8.35

*Significant at 5% level and **Significant at 1% level; RH– Relative heterosis BPH– Better parent heterosis SH– Standard heterosis

in 10.28 % (Karungal Local ×Manaparai Local). Four hybrids recorded positive and significant heterobeltiosis (Table 1). The positive significant values over standard check wereregistered in thirteen hybrids and were high in Spiny Local ×Sevathampatti Local (46.97 %), Spiny Local × Marthandam Local-II and Spiny Local ×Sevathampatti Local. Number of branches per plant was the heterosis over check was highest in the hybrid Sevathampatti Local × Spiny Local, Spiny Local ×Marthandam Local-II, Spiny Local × Sevathampatti Local, Manaparai Local × Sevathampatti Local and Seetipulam Local ×S piny Local. Similar consequences for heterosis were obtained by Reddy and Patel (2014), Kumar et al. (2017) and (Mistry et al. 2018).

The estimation of earliness is an advantageous trait for selecting breeding lines for commercial importance. Early opening of flowers in hybrids promote early yield to fetch better price in market. Earliness is one of the main attributes which is measured in terms of days to first flowering and days to first harvest in this study. The RH estimates of days to first flowering were noticed in the hybrid -13.29 % (Marthandam Local-II × Manaparai Local) and five hybrids recorded significant negative heterosis. The highest negative and significant heterobeltiosis (BPH) was exhibited in the hybrid Sevathampatti Local ×Spiny Local (-15.74 %) and totally four hybrids exhibited negative significant values. When the 30 hybrids developed were compared with the standard check (SH) VRM-1, the highest negative and significant heterosis was exhibited by the hybrids Sevathampatti Local × Seetipulam Local and Seetipulam Local ×Sevathampatti Local (-10.06 %). Totally six hybrids exhibited significant and negative standard heterotic values over the check (Table 1). The lowest value was recorded in the hybrids Sevathampatti Local × Seetipulam Local and Seetipulam Local × Sevathampatti Local for heterosis over check. This is in conformity with the results of Kumar et al. (2013), Reddy and Patel (2014b), Shahjahan et al. (2016) and Mistry et al. (2018).

The relative heterosis for number of days to first harvest was negative and significant which ranged from -11.62 (Karungal Local ×Marthandam Local-II) to -7.51 % (Sevathampatti Local ×Spiny Local). Among the thirty hybrids, four hybrids recorded significant negative heterosis (Table 2). The range of heterobeltiosis was

Table 2: Heterosis for days to first harvest, fruit length and fruit girth

Cross	Days to first harvest			Fruit length			Fruit girth		
	RH	BPH	SH	RH	BPH	SH	RH	BPH	SH
P1×P2	-0.27	-1.31	0.8	14.18**	4.09*	3.29*	-19.47**	-24.16**	-0.69
P1×P3	-5.94	-8.71*	-8.71*	32.34**	22.98	22.04	19.07**	7.57	24.44**
P1×P4	-5.77	-7.71*	-3.75	9.51	8.32	9.87	-1.14	-2.55	12.74
P1×P5	-7.51*	-8.18	-6.83*	-13.5	-17.54*	-9.76	6.21	-3.90	11.18
P1×P6	0.80	0.40	1.21	25.65**	24.75**	23.79**	-7.54**	-7.72**	6.76
P2×P1	-1.33	-2.36	-0.27	37.82**	25.64*	24.67*	-28.39**	-32.56**	-11.70
P2×P3	3.55	-0.52	1.61	19.71*	17.25	-0.11	-23.96	-34.88**	-14.73
P2×P4	-8.44*	-9.38*	-5.49	15.09	3.89	5.37	-7.05	-13.63*	13.08**
P2×P5	-1.51	-1.84	0.27	35.17**	18.04	29.17**	-13.5	-25.81**	-2.86
P2×P6	0.53	-0.13	2.01	33.05**	22.09**	19.41**	3.13	-3.04	26.95**
P3×P1	-3.87	-6.7	-6.7*	2.85**	-4.42	-5.15	21.23**	9.51	26.69**
P3×P2	6.43	2.24	4.44	11.24*	8.94	-7.18	9.35	-6.35**	22.62
P3×P4	-5.95	-10.54**	-6.70*	-9.17	-16.43**	-15.24**	-11.2**	-18.74**	-8.67*
P3×P5	6.24	2.38	3.89	-6.03	-16.43	-8.55	30.4**	30.16**	21.92**
P3×P6	6.74	3.19	4.02	-2.46	-8.74	-10.75	-1.20	-10.6	3.03
P4×P1	-3.94	-5.91	-1.88	-6.45	-7.46	-6.14	-6.00	-7.34	7.19
P4×P2	-6.62	-7.58	-3.62	13.05*	2.05	3.51	-1.92	-8.87*	19.32**
P4×P3	4.46	-0.64	3.63	-11.16	-18.27**	-17.11**	-21.82**	-28.45**	-19.58*
P4×P5	-1.76	-3.08	1.07	17.84*	13.53	24.23**	12.03	2.7	15.42
P4×P6	-8.76*	-10.28**	-6.43*	5.45	3.57	5.04	-9.55	-10.68	2.95
P5×P1	-1.23	-1.95	-0.50	-0.11	-4.30*	4.22	7.41	-2.81	12.44
P5×P2	-1.12	-1.44	0.67	9.58**	-4.31	4.71**	-1.08	-15.16**	11.09
P5×P3	0.48	-3.17	-1.74	12.11	-0.30	9.10	18.72**	18.5**	11.01**
P5×P4	1.76	0.39	4.69	4.52*	0.70	10.2**	-11.19	-18.58	-8.49
P5×P6	-0.99	-1.32	0.13	0.63	-4.71	4.28	8.09*	-2.03	12.91**
P6×P1	-4.14	-4.52	-3.75	13.41**	12.6**	11.73**	-23.23**	-23.37**	-11.35
P6×P2	-11.62**	-12.2*	-10.32*	26.21**	15.81**	13.27**	-8.98	-14.43	12.05**
P6×P3	4.13	0.67	1.48	9.53	2.47	0.22	9.68	-0.75	14.38
P6×P4	-0.92	-2.57	1.61	8.31	6.38	7.89	-1.33	-2.56	12.31
P6×P5	0.60	0.26	1.74	7.72	2.00	11.62	16.96*	6.02	22.18**

*Significant at 5% level and **Significant at 1% level

RH– Relative heterosis BPH– Better parent heterosis SH– Standard heterosis

from -7.71 (Sevathampatti Local ×Manaparai Local) to -12.20 (Karungal Local ×Marthandam Local-II) %. Seven hybrids showed negative and significant heterobeltiosis. The heterosis over the standard check was found to be negative in ten hybrids and ranged from -10.32 (Karungal Local ×Marthandam Local-II) to -6.43 % (Manaparai Local ×Karungal Local). In case of days to first harvest, the heterosis over check were low in Karungal Local × Marthandam Local-II, Sevathampatti Local ×S eetipulam Local, Seetipulam Local × Sevathampatti Local and Sevathampatti Local × Spiny Local. Similar results were reported by Mistry et al. (2018).

Fruit length is an important yield contributing character. A positive and significant heterosis values for fruit length over mid parent was registered in fifteen hybrids with highest relative heterosis (RH) value in the hybrid Marthandam Local-II×Sevathampatti Local (37.82 %). The heterobeltiosis for fruit length were high in 25.64 % in (Marthandam Local-II×Sevathampatti Local). Positive and significant heterobeltiosis (BPH) values were recorded in six hybrids. The hybrid Marthandam Local-II×Spiny Local recorded the highest positive and significant heterosis over standard check (SH) VRM-1 of 29.17 % (Table 2).

Fruit girth is also another important yield contributing trait. The heterosis over mid parental value (RH) for fruit girth registered high in 30.40 % (Seetipulam Local ×Spiny Local). Relative heterosis was positive and significant for five hybrids out of thirty studied. Heterobeltiosis (BPH) high in 30.16 (Seetipulam Local ×Spiny Local) and two hybrids combinations showed positive and significant values. The highest positive and significant standard heterosis over check (SH) was recorded in the hybrid Marthandam Local-II×Karungal Local (26.95 %). Ten hybrids recorded positive and significant values over check VRM-1 (Table 2). The hybrids Seetipulam Local ×Sevathampatti Local, Sevathampatti Local ×Seetipulam Local, Seetipulam Local ×Spiny Local, Karungal Local ×Spiny Local and Marthandam Local-II×Karungal Local were found to have more fruit girth in heterosis over check. The high fruit girth in one of the parent resulted in hybrids with more fruit girth. Similar results were reported by Makani et al. (2013), Kumar et al. (2017) and Mistry et al. (2018).

Single fruit weight is yet another yield determining component. The heterotic value of single fruit weight high in 18.34 % (Sevathampatti Local ×Spiny Local) and four hybrids exhibited positive significant heterosis over mid parental values. Heterobeltiosis for this character more in 13.43 % (Manaparai Local ×Spiny Local) and totally five hybrids recorded positive and significant values. When the hybrids were compared with the standard check VRM-1, highest positive and significant heterosis was noticed in the hybrid Manaparai Local ×Spiny Local (10.83 %). Twenty hybrids exhibited positive and significant heterotic values over standard check (Table 3). The heterosis over check was high in Manaparai Local ×Spiny Local, Marthandam Local-II×Sevathampatti Local, Karungal Local ×Manaparai Local and Manaparai Local ×Karungal Local. Similar results for heterosis were reported by Dubey et al. (2014)and Mistry et al. (2018).

The number of fruits/plant is a prime trait of importance which decides the yield of plant. The heterosis for mid parent (RH) values for number of fruits per plant exhibited were high in 24.22 % (Spiny Local × Manaparai Local). Eight hybrids showed positive and significant heterotic values for this character. The heterosis for better parents (BPH) recorded more in 24.22 % (Spiny Local × Manaparai Local) and three hybrids exhibited positive significant heterosis. The hybrid Spiny Local ×

Table 3: Heterosis for single fruit weight and number of fruits per plant

Cross	Single fruit weight			Number of fruits per plant		
	RH	BPH	SH	RH	BPH	SH
P1×P2	-1.23	-1.28	-1.20	7.98	6.65	14.25
P1×P3	-2.64	-4.29	-0.83	12.02*	7.88	15.57**
P1×P4	-8.66	-9.75	-9.67	-9.36**	-10.55**	-1.58
P1×P5	18.34*	8.79	8.89*	6.68	5.28	15.83**
P1×P6	3.38	1.37	1.46	8.29	-0.25	6.86
P2×P1	10.30	10.23*	10.33*	-4.74	-5.91	0.79
P2×P3	3.20	1.38	5.05	13.21	10.35	15.3
P2×P4	2.73	1.56	1.53	4.06	1.44	11.61
P2×P5	-2.80	-10.6	-10.62	3.57*	0.96	11.08**
P2×P6	12.16*	10.04*	10.01*	2.71	-4.29	0.00
P3×P1	0.30	-1.41	2.16	2.05	-1.72	5.28
P3×P2	4.26	2.43	6.14	-4.62	-7.03	-2.86
P3×P4	1.36	-1.53	2.03	-3.91	-8.63	0.53
P3×P5	3.01	-6.77	-3.40	-10.21	-14.63*	-6.07
P3×P6	7.83	3.97	7.73	-2.79	-7.18	-7.92
P4×P1	4.22	2.97	3.06	-21.26**	-22.3**	-14.51
P4×P2	1.59	0.44	0.41	-1.85	-4.32	5.28
P4×P3	7.29	4.22	8.00*	15.27*	9.60	20.59**
P4×P5	22.03	13.44**	10.83*	0.48*	0.48*	10.55**
P4×P6	13.48	12.6*	10.01*	-14.62	-22.3	-14.51
P5×P1	4.63*	-3.81	-3.73	-11.02	-12.19	-3.39
P5×P2	3.56	-4.74	-4.77	19.8*	16.79	28.5**
P5×P3	8.11	-2.15	1.39	-6.68	-11.27*	-2.37
P5×P4	-3.17	-9.99	-12.07	24.22*	24.22*	36.68**
P5×P6	8.21	1.32	-2.54	13.04*	2.88	13.19**
P6×P1	5.49	3.44	3.53	-6.68	-14.04	-7.92
P6×P2	-1.08	-2.95	-2.98	8.13	0.76	5.28
P6×P3	-1.94	-5.45	-2.03	-0.28	-4.79	-5.54
P6×P4	13.78**	12.90*	10.3*	14.10	3.84	14.25**
P6×P5	12.41	5.25	1.24	8.83*	-0.96	8.97

*Significant at 5% level and **Significant at 1% level
RH– Relative heterosis BPH– Better parent heterosis
SH– Standard heterosis

Manaparai Local recorded highest standard heterosis (SH) over check VRM-1 (36.68 %). Totally nine hybrids exhibited positive and significant (SH) values over standard check hybrid (Table 3). The heterosis over check were high in Sevathampatti Local × Seetipulam Local, Manaparai Local × Spiny Local, Spiny Local × Manaparai Local, Spiny Local × Marthandam Local-II and Manaparai local × Seetipulam Local. Similar results for heterosis were reported by Prasad et al. (2010), Prasad et al. (2015), Bhushan and Singh (2013), Reddy and Patel (2014b) and Mistry et al. (2018).

The ultimate interest of the breeder is to get high yield. The mid parent heterosis (RH) values for yield per plant were highest in 27.24 % (Sevathampatti Local × Spiny Local). Six hybrids exhibited positive and significant heterosis over the mid parent. The positive and significant better parent heterosis (BPH) for this character was the highest in the hybrid Sevathampatti Local × Spiny Local (25.29 %). Four hybrids recorded positive and significant (BPH) values. When the hybrids were compared with the standard check VRM-1, the highest positive and significant heterosis (SH) was noticed in the hybrid Sevathampatti Local × Spiny Local (34.57 %). Totally thirteen hybrids exhibited positive and significant (SH) values over the standard check (Table 4). The heterosis over check were high in sevathampatti Local × Spiny Local, Sevathampatti Local × Seetipulam Local, Manaparai Local × Spiny Local, Marthandam Local-II × Sevathampatti Local, Marthandam Local-II × Seetipulam Local and Spiny Local × Manaparai Local. The same trend of results for heterosis were reported by Prakash et al. (2008), Bhakta et al. (2009), Hazra et al. (2010), Dharwad et al. (2011), Biswas et al. (2013), Reddy and Patel (2014b)and Mistry et al. (2018).

The fruit infestation by the fruit borer decides the marketable yield of crop. Themore number of infested fruits attributed to the production of more unmarketable fruit yield. The relative heterosis were lowest in -30.83 % (Manaparai Local ×Karungal Local). Five hybrids recorded negative and significant values for this character. Lowest negative and significant heterobeltiosis value -40.76 (Manaparai Local ×Seetipulam Local). Nine hybrids recorded negative and significant heterotic value (Table 4). The highest negative and significant standard heterosis of -31.12 % was

Table 4: Heterosis for yield per plant, fruit infestation and shoot infestation

Cross	Yield per plant			Fruit infestation			Shoot infestation		
	RH	BPH	SH	RH	BPH	SH	RH	BPH	SH
P1×P2	6.55	1.38	20.58**	10.3**	-4.31	-23.65**	-9.10	-11.94	-12.12*
P1×P3	11.32*	9.67	21.4**	-9.32	-9.52	-27.49*	-11.75	-11.86	-17.31*
P1×P4	-14.66**	-17.27**	-5.35*	-1.73	-17.15**	-3.68	3.91	-0.53	-6.92
P1×P5	27.24**	25.29*	34.57**	8.21**	5.10*	-11.03	-8.15	-11.77	-10.39
P1×P6	2.67	-4.21	2.88	-9.21	-14.89	-22.37*	-8.37	-13.11	-9.32
P2×P1	12.36	6.92	27.16**	36.33**	18.28	-5.63**	7.44	4.09	3.87
P2×P3	13.26	9.34	30.04**	8.46**	-6.08**	-24.73	-1.72	-4.67	-4.86
P2×P4	-31.57**	-32.87**	-20.16	16.08**	-12.68**	1.52	-14.88**	-20.94**	-21.1**
P2×P5	-4.06	-10.03	7.00**	39.84**	18.36*	0.20	-2.40	-3.25	-1.73
P2×P6	-4.47	-14.88*	1.23	14.26	-6.13	-14.38**	3.45	1.18	5.61*
P3×P1	9.43*	7.81	19.34**	25.01	24.73	-0.04*	-6.82	-6.94	-12.7*
P3×P2	-4.12	-7.44	10.08**	73.63**	50.35**	20.5	9.90	6.61	6.39
P3×P4	-2.38	-3.96	9.88*	-11.07**	-24.88**	-12.66**	10.2	5.36	-1.15
P3×P5	9.96	6.69	18.11	25.14**	21.8**	3.12	-8.86*	-12.34	-10.96*
P3×P6	-20**	-26.39**	-18.52*	-3.66	-9.51	-17.46**	70.63**	62.01**	69.08**
P4×P1	-28.39**	-30.58**	-20.58*	0.18	-15.53**	-1.8	10.81	6.08	-0.74
P4×P2	-3.00**	-4.84**	13.17	14.25**	-14.05**	-0.08	45.70**	35.32	35.04
P4×P3	4.20	2.52	17.28*	-29.86**	-40.76**	-31.12**	-0.18	-4.57	-10.47*
P4×P5	19.77**	14.39*	30.86**	20.02**	3.71	20.58**	57.09**	44.72**	46.99**
P4×P6	5.16	-4.68	9.05	-30.83	-38.28**	-28.25	-8.07*	-16.35*	-12.70*
P5×P1	7.00**	5.36*	13.17**	26.77**	23.12*	4.23	-8.03*	-11.65	-10.26
P5×P2	15.13	7.96	28.40	28.69**	8.92*	-7.79	0.39	-0.49	1.07
P5×P3	-9.96	-12.64	-3.29	24.95**	21.61**	2.96	-1.27	-5.03	-3.54
P5×P4	16.76**	11.51*	27.57**	16.44**	0.62	16.98**	1.67**	-6.33**	-4.86**
P5×P6	3.13	-2.37	1.65	-7.63*	-10.95*	-18.78**	-13.29	-14.45	-10.72
P6×P1	1.85	-4.98	2.06	13.93	6.79	-2.6*	-0.96	-6.08	-1.98
P6×P2	3.30	-7.96*	9.47	1.57	-16.56	-23.89**	16.70	14.14	19.13*
P6×P3	-21.21**	-27.51**	-19.75*	3.75	-2.54	-11.11**	0.50**	-4.58**	-0.41**
P6×P4	-4.37	-13.31	-0.82	16.19	3.68**	20.54	-5.03	-13.59*	-9.81
P6×P5	8.14	2.37	6.58	-17.63*	-20.59*	-27.57**	26.02	24.33	29.76

*Significant at 5% level and **Significant at 1% level

RH– Relative heterosis BPH– Better parent heterosis SH– Standard heterosis

observed in Manaparai Local ×Seetipulam Local and totally fourteen hybrids recorded negative and significant over standard check. The heterosis over check were high in Manaparai Local ×Seetipulam Local, Karungal Local ×Spiny Local, Spiny Local ×Karungal Local, Sevathampatti Local ×Seetipulam Local, Manaparai Local ×Karungal Local and Manaparai Local ×Spiny Local. This is in conformity with the results of Kumar et al. (2013).

The relative heterosis for Shoot infestation ranged from -14.88 % (Marthandam local- II × Manaparai Local) to 70.63% (Seetipulam Local × Karungal Local). Seven hybrids registered significant and negative heterosis over mid parental value. The heterobeltiosis (BPH) varied from -20.94 (Marthandam Local – II × Manaparai Local) to 62.01% (Seetipulam Local × Karungal Local) and eight hybrid combinations showed negative and significant values for this character. Ten cross combinations were significantly negative over check (Table 4).This is in conformity with the results of Kumar et al. (2013).

Conclusion

Cross Seetipulam Local × Sevathampatti Local showed significant negative heterosis over better parent and standard check for earliness (days to first flowering and days to first harvesting) and significant positive heterosis over better parent and standard check for yield per plant. Therefore, cross Seetipulam Local × Sevathampatti Local can be commercially exploited after assessing the stability for yield and other parameters.

सारांश

पिछली सदी से बैंगन में प्रजनन को आधार मूलतः विभिन्न मानकों पर आधारित था। जिसके परिणाम स्वरूप बैंगन की अनेकों मुक्त परागित प्रजातियों एवं संकरों का विकास उत्तम गुणवत्ता एवं उपज के लिये किया गया। वर्तमान अध्ययन में 6 विविध प्रभेदों व उनके संकरों व एक प्रतिमान नियंत्रक के साथ मूल्यांकन रेण्डोमाइज्ड ब्लाक डिजाइन में दो बार प्रतिकृति कर किया गया। मात्रात्मक घटकों के आंकड़ें एकत्रित किये गये तथा उत्तम पितृ व मानक ओज का निर्धारण किया गया। अध्ययन के घटकों में सार्थक स्तर तक ओज पाया गया। मानक नियंत्रक से उच्च ओज ऊँचाई हेतु सिटीपुलम लोकल x सेवाथाम्पट्टी लोकल 22.49 प्रतिशत पौध शाखाओं की संख्या हेतु स्पाइनी लोकल x सेवाथाम्पट्टी लोकल 46.97 प्रतिशत; फल उपज। पौध हेतु सेवाथाम्पट्टी लोकल x स्पाइनी लोकल में 34.57 प्रतिशत तथा प्रति पौध फलों की संख्या हेतु स्पाइनी लोकल x मानापराई लोकल में 36.68 प्रतिशत पाया गया। अधिकतम नकारात्मक एवं सार्थक ओज सेवाथाम्पट्टी लोकल x सिटीपुलम लोकल तथा सिटीपुलम लोकल x सेवाथाम्पट्टी लोकल (–10.06 प्रतिशत) संकरों में नियंत्रक की तुलना में अगेतीपन (प्रथम पुष्पन के दिन व प्रथम तुड़ाई के दिन) के लिये पाया गया। इस अध्ययन में सिटीपुलम लोकल x सेवाथाम्पट्टी लोकल में उत्तमता अनेकों गुणों (अगेतीपन व प्रति पौध उपज) के लिये पाया गया जिन्हें स्थायित्व मूल्यांकन हेतु व्यवसायिक रूप से उपयोग हेतु किया जा सकता है।

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