

## Heterosis Studies for Yield Characters in Brinjal (*Solanum melongena* L.)

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**Abstract:** The present investigation entitled as "Heterosis studies in brinjal" was conducted at Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during kharif season 2011. The experiment comprised of six parent and fifteen hybrid with one Check. The yield/ha. was observed significantly maximum under cross Local C1 × AKL-17. In yield/ha, positive heterosis was found in cross Local C1 × AKL-2 over mid, better parent and standard heterosis. Hence, these crosses showed positive heterosis yield character.

**Keywords:** Brinjal, heterosis, yield.

### INTRODUCTION

Brinjal is solanaceous vegetable crop grown in all the seasons. Brinjal is an important solanaceous vegetable crop grown in India and in other part of the world. The required goals of increasing productivity in the quickest possible time can be achieved only through heterosis breeding, which is feasible in this crop (Kakizaki, 1931). Information on the magnitude of heterosis in different cross combination is a basic requisite for identifying crosses that exhibit high amount of exploitable heterosis. Keeping all these points in view, an investigation was carried out

### MATERIAL AND METHODS

The present investigation entitled as "Heterosis studies in brinjal" was conducted at Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during kharif season 2011. The experiment comprised of six parent and fifteen hybrid with one Check. The experiment was carried out using Randomized Block Design (RBD) with three replications. The observations were recorded

for Number of fruits per cluster, Fruit weight (g), Fruit length (cm), Fruit diameter (cm), Number of fruits per plant, Yield per plant (g), Yield per plot (kg), Yield per ha (q). The data obtained in respect of all analyzed by using statistical method.

### RESULT AND DISCUSSION

The parental mean for number of fruit per cluster ranged from 2.53 (AS-1 × AKL-17) to 3.96 (PhuleHarit × AKL-12) Whereas, in case of the Crosses it ranged from 1.97 (PhuleHarit × AKL-20) to 3.17 (AS-1 × AKL-12). Mid parent heterosis is ranged from -43.00\*\* (PhuleHarit × AKL-20) to 42.86 \*\* (Local C-1-1 × AKL-17) Out of 15 Crosses, 1 Cross showed significant positive heterosis. The cross Local C-1-1 × AKL-17 (42.86)\*\* highest average heterosis. The heterobeltiosis ranged from -50.83 (PhuleHarit × AKL-20) to 33.33 \* (Local C-1-1 × AKL-17)-Out of 15 Crosses, 1 Cross showed significant positive heterobeltiosis. The cross exhibited Local C-1-1 × AKL-17 (33.33)\*\* highest heterobeltiosis. The standard heterosis ranged from 1.43 (AS-1 × PhuleHarit) to 38.57 (AKL-12 × AKL-20). Out of 15 Crosses, all Crosses showed positive standard

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heterosis. The cross Local C-1-1 × AKL-17 (71.33)\*\* exhibited highest standard positive heterosis. Out of fifteen hybrids, one over mid parent, one over better parent showed significant heterosis in the desired (positive) direction. One hybrid showed significant positive heterosis over standard check.

For fruit length among the parents, mean ranges from 9.43 cm (AKL-12) and 14 (Local C-1-1), where as in crosses 8.70 (PhuleHarit × AKL-12) to 12.37 (Local C-1-1 × AKL-17) Per cent heterosis. Mid parent heterosis is ranged from 1.53 (AKL-17 × PhuleHarit) to 29.57 \*\* (AKL-12 × AKL-20) Out of 15 Crosses, 1 Cross showed significant positive heterosis. The cross (AKL-12 × AKL-20) 29.57\*\* highest average heterosis. The heterobeltiosis

ranged from 2.33 (AKL-17 × AKL-20) to 27.41 \* (AKL-12 × AKL-20) Out of 15 Crosses, 2 Crosses showed significant negative heterobeltiosis. The cross exhibited 27.41\* highest negative heterobeltiosis.

The standard heterosis ranged from and 42.78 \*\* (PhuleHarit × AKL-12) to 89.19 \*\* (Local C-1-1 × AKL-17). Out of 15 Crosses, all Crosses showed positive standard heterosis. The cross (Local C-1-1 × AKL-17) 89.19\*\* exhibited highest standard positive heterosis followed by (Local C-1-1 × AKL-12) 81.03\*\*. Out of fifteen hybrids, one over mid parent, one over better parent showed significant negative heterosis. All crosses showed significant positive heterosis over standard check.

**Table 1**  
**Magnitude of heterosis for No. of fruits per cluster, fruit length (cm), fruit diameter (cm)**

Crosses	Heterosis% over								
	No. of fruits/cluster			Fruit length			Fruit diameter		
	MP	BP	SH	MP	BP	SH	MP	BP	SH
(Local C-1-1) × (AS-1)	-6.02	-13.33	11.43	-12.37	-20.71 **	69.81 **	-1.46	-3.81	20.38 *
(Local C-1-1) × (AKL-17)	42.86 **	33.33 *	71.43 **	1.37	-11.67	89.19 **	16.34 *	11.9	40.05 **
(Local C-1-1) × (PhuleHarit)	-10.05	-21.01	34.29	0.14	-15.71 *	80.52 **	7.49	-0.95	23.96 *
(Local C-1-1) × (AKL-12)	-16.38	-17.78	5.71	1	-15.48 *	81.03 **	14.96 *	4.29	30.51 **
(Local C-1-1) × (AKL-20)	-17.51	-18.89	4.29	2.2	-17.14 *	77.46 **	9.66	-8.1	15.02
(AS-1) × (AKL-17)	9.52	2.22	31.43	3.12	0.3	68.79 **	-16.34 *	-19.52 *	0.72
(AS-1) × (PhuleHarit)	-32.06 **	-40.34 **	1.43	12.8	5.45	77.46 **	10.08	1.43	26.94 **
(AS-1) × (AKL-12)	7.34	5.56	35.71	12.23	4.24	75.42 **	1.84	-7.62	15.61
(AS-1) × (AKL-20)	-3.95	-5.56	21.43	13.37	1.52	70.83 **	2.84	-13.81	7.87
(AKL-17) × (PhuleHarit)	-26.32 *	-35.29 **	10	-1.53	-3.67	47.37 **	-2.52	-3.33	3.69
(AKL-17) × (AKL-12)	-14.12	-15.56	8.57	12.18	9	66.75 **	10.54	7.78	15.61
(AKL-17) × (AKL-20)	-5.08	-6.67	20	4.46	-2.33	49.41 **	12.42	0.56	7.87
(PhuleHarit) × (AKL-12)	-10.14	-22.5	32.86	-3.95	-6.67	42.78 **	-5.98	-8.33	-1.67
(PhuleHarit) × (AKL-20)	-43.00 **	-50.83 **	-15.71	12.66	5.33	61.14 **	25.47 **	12.22	20.38 *
(AKL-12) × (AKL-20)	9.6	7.78	38.57	29.57 **	27.41 *	75.42 **	14.29	2.22	9.65
Pusa Hybrid-6 (Check)									
	Mid parent	Better parent	Standard Check	Mid parent	Better parent	Standard Check	Mid parent	Better parent	Standard Check
SEm±	0.39	0.45	0.45	0.89	1.31	1.031	0.46	0.53	0.53
CD @ 5%	0.79	0.91	0.91	108	2.08	2.08	0.93	1.07	1.07
CD @ 1%	0.60	1.22	1.22	2.41	2.78	2.78	1.24	1.43	1.43

\* - Significant at 5 % level

\*\* - Significant at 1 % level

**Table 2**  
**Magnitude of heterosis for Fruit weight (g), Fruits per plant, Yield per hectare (q)**

Crosses	Heterosis% over								
	Fruit weight			Fruits per plant			Yield per hectare		
	MP	BP	SH	MP	BP	SH	MP	BP	SH
(Local C-1-1) × (AS-1)	1.13	-2.27	239.51 **	-2.96	-8.89	-36.96 **	4.63	4.10	-4.99
(Local C-1-1) × (AKL-17)	41.84 **	7.21	247.41 **	47.40 **	41.67 **	-1.98	96.49**	46.50**	33.71**
(Local C-1-1)×(PhuleHarit)	19.91	-23.98	146.34 **	-17.26	-27.98 **	-32.73 **	10.90	-24.02	-30.65**
(Local C-1-1) × (AKL-12)	31.72 *	-2.05	217.41 **	-28.94 **	-39.09 **	-41.00 **	1.61	-13.22	-20.80
(Local C-1-1) × (AKL-20)	10.02	-12.28	184.24 **	15.73	8.33	-25.04 **	25.77	-3.33	-11.77
(AS-1) × (AKL-17)	15.62	-14.62	196.88 **	-0.6	-0.9	-36.77 **	13.98	-15.60	-22.97
(AS-1) × (PhuleHarit)	-27.33	-54.59 **	57.91	0.98	-15.23	-20.81 *	-14.29	-41-71**	-46.80**
(AS-1) × (AKL-12)	16.18	-15.53	193.72 **	-25.42 **	-38.29 **	-40.23 **	-4.78	-19.17	-26.23
(AS-1) × (AKL-20)	-42.14 **	-55.04 **	56.33	3.42	0.91	-36.00 **	-39.73**	-53.98**	-58.00
(AKL-17) × (PhuleHarit)	81.25 **	38.1	128.97 **	-17.89	-31.07 **	-35.61 **	57.93	-631.98*	-37.91**
(AKL-17) × (AKL-12)	25.85	22.86	103.71 *	-1.68	-18.65 *	-21.20 *	18.92	-28.70	-34.93*
(AKL-17) × (AKL-20)	45.37 *	35.25	160.56 **	8.39	5.76	-32.92 **	38.17	-28.95	-35.16*
(PhuleHarit) × (AKL-12)	9.54	-15	34.23	-30.89 **	-32.54 **	-34.65 **	-25.66	-59.92**	-63.42**
(PhuleHarit) × (AKL-20)	63.66 *	18.85	128.97 **	-34.26 **	-45.63 **	-49.84 **	16.77	-47.01**	-51.64**
(AKL-12) × (AKL-20)	10.71	0.82	94.23 *	-18.69	-34.31 **	-35.61 **	-6.72	-41.92**	-47.00**
Pusa Hybrid-6 (Check)									
	Mid parent	Better parent	Standard Check	Mid parent	Better parent	Standard Check	Mid parent	Better parent	Standard Check
SEm±	37.31	43.08	43.08	12.7	1.47	1.47	58.76	67.85	67.85
CD @ 5%	75.41	87.08	87.08	2.57	2.97	2.97	126.03	145.52	145.52
CD @ 1%	100.91	116.53	116.53	3.44	3.98	3.98	158.91	143.50	143.50

\* - Significant at 5 % level

\*\* - Significant at 1% level

For the fruit diameter among parents ranged from 5.70 (AKL-12) to 7.33 (Local C-1-1 ). Among 15 hybrids the range was from 4.73 (AS-1 × AKL-20) to 6.66 (Local C-1-1 × AS-1). Mid parent heterosis is ranged from -16.34\* ( AS-1X AKL-17) to 25.47\*. (Phuleharit × AKL-20) Out of 15 Crosses, 3 Cross showed significant positive heterosis. The cross (Phuleharit × AKL-20) 25.47\*\* highest average heterosis followed by (Local C-1-1 × AKL-17) 16.34\*. The heterobeltiosis ranged from -19.52\*(AS-1 × AKL-17) to 12.22 (PhuleHarit) × (AKL-20) Out of 15 Crosses, non of the Crosses showed significant heterobeltiosis. The standard heterosis ranged from -1.67 (PhuleHarit) × (AKL-12) to 40.05 \*(Local C-1-1) × (AKL-17) over standard heterosis. Out of 15 Crosses, 6 Crosses showed positive standard

heterosis. The cross (Local C-1-1 × AKL-17) 40.05\*\* exhibited highest standard positive heterosis followed by (Local C-1-1 × AKL-12) 30.51\*\*. Out of fifteen hybrids, 3 over mid parent, non of the cross over better parent showed significant heterosis. 6 crosses showed significant positive heterosis over standard check.

Among the parents, parent (AS-1 × AKL-17) was recorded higher fruit weight (366.66)and lowest was noticed in(PhuleHarit) (91.66). Whereas, in crosses ranged from 165 (AS-1 × AKL-20) to 366.67 (Local C-1-1 × AKL-17). Mid parent heterosis is ranged from 1.13(Local C-1-1 × AS-1) to 63.66\* (PhuleHarit × AKL-20) Out of 15 Crosses, 5 Crosses showed significant positive heterosis. The cross AKL-17 × Phuleharit (81.25)\*\* highest average

heterosis followed by Phuleharit × AKL-20(63.66)\*. The heterobeltiosis ranged from - 55.59\*\* .( AS -1 × Phuleharit) to 35.25 (AKL-17 × AKL-20) Out of 15 Crosses, 2 Crosses showed significant negative heterobeltiosis. The cross exhibited( AS -1 × AKL-20) -55.04\*\* highest negative heterobeltiosis followed by .( AS -1 × Phuleharit) - 54.59\*\*. The standard heterosis ranged from 34.23 (PhuleHarit × AKL-12) to 239.51\*\* (Local C-1-1 × AS-1).Out of 15 Crosses, 12 Crosses showed positive standard heterosis. The cross (Local C-1-1 × AKL-17) 247.41\*\* exhibited highest standard positive heterosis followed by (Local C-1-1 × AS-1) 239.51\*\*. Out of fifteen hybrids, five over mid parent, 2 over better parent showed significant negative heterosis. 12 hybrids showed significant positive heterosis over standard check.

A range of mean for number of fruits per plant among parents ranged from 10.53 (AS-1) to 16.20 (PhuleHarit) where as in crosses 10.46(AKL-12 × AKL-20) to 16.8 (AKL-17 × AKL-12). Mid parent heterosis is ranged from -34.26\*\* (PhuleHarit × AKL-20) to 47.40 \*\* (Local C-1-1 × AKL-17) Out of 15 Crosses, 3 Cross showed significant positive heterosis. The cross (LocalC-1-1 × AKL-17) 47.40\*\* highest average heterosis. The heterobeltiosis ranged from -45.63\*\* PhuleHarit × AKL-20) to 41.67\*\* (Local C-1-1 × AKL-17), Out of 15 Crosses, one Crosses showed significant heterobeltiosis (Local C-1-1 × AKL-17) 41.67\*\*. The standard heterosis ranged from and -49.84\*\* (PhuleHarit × AKL-20) to -1.98 (Local C-1-1 × AKL-17) over standard heterosis . Out of 15 Crosses, 14 crosses showed negativestandard heterosis. Out of fifteen hybrids, 1 over mid parent, one cross over better parent showed significant heterosis. 14 crosses showed significant negative heterosis over standard check.

A range of mean for number of fruits per plant among parents ranged from 68.03 (AKL-12) to 90.92 (AKL-20) where as in crosses 170.42 (Local C-1-1 × Phuleharit) to 455.53 (Local C-1-1 × AS-01). Mid parent heterosis is ranged from -55.91\*\* (Local C-1-1 × Phuleharit) to 55.44\*\* (AS-1 × AKL-17) Out of

15 Crosses, one Cross showed significant positive heterosis. The cross (AS-1 × AKL-17) 55.44\*\* highest average heterosis. The heterobeltiosis ranged from -62.95\*\* (Local C-1-1 × Phuleharit) to 4.74\*\* (AS-1 × AKL-17). Out of 15 Crosses, one Cross showed significant heterobeltiosis 4.74\*\* (AS-1 × AKL-17) . The standard heterosis ranged from and -66.20 (Local C1-1 × AKL-17) to 33.71\*\* AS-1 × AKL-17 over standard heterosis. Out of 15 Crosses, one cross showed positive standard heterosis.

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