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Research Notes

Studies on heterosis for yield and quality parameters in brinjal (*Solanum melongena* L.)

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In India, brinjal is cultivated in an area of about 5.0 lakh hectares with an annual production of 78.8 lakh tonnes (Anon. 2001). In Tamil Nadu, the area is estimated around 8006 ha with an annual production of 97,550 tonnes. The productivity of eggplant in India is very low (15.80 t/ha) as compared to 300 tonnes in the Netherlands, where the F_1 hybrids constitute most of the economical cultivars. In egg plant, the consumer preference is region specific and as such there is a need to develop F_1 hybrids for different regions. With these views as the background, the investigations was carried out at the College Orchard, Horticultural College and Research Institute, Coimbatore during 2000-2001.

Seven lines viz. L_1 -EP 45, L_2 -EP 65, L_3 -EP 113, L_4 -CO 2, L_5 -SM 8, L_6 -APAU Bagmathi, L_7 -Pusa Anupam were crossed with four testers viz. T_1 Aruna, T_2 - Arka Nidhi, T_3 - Surya and T_4 -Pusa Uttam and the resultant twenty eight hybrids were evaluated to study the per se performance and heterosis over better parent (heterobeltiosis) for various characters and presented in the Table 1.

The results indicated that higher percentage of long styled flowers was observed in the parents L_7 (44.55), L_6 (44.05) and L_1 (41.70) and L_1 (51.20) L_7 (50.55) and L_2 (48.55) produced comparatively more number of fruits per plant. The yield per plant was high in L_1 (3.20kg), L_6 (3.10 kg) and L_3 (2.61 kg). The fruit borer incidence was very less in L_6 (35.7), L_7 (36.55) and L_4 (36.55).

Among the parents, high ascorbic acid content was observed in L_4 (12.53 mg), L_2 (12.25 mg) and L_3 (12.17 mg). The parents L_1 , L_6 and T_3 showed lower total phenol. Based on per se performance, the line L_3 and L_7 and the testers T_2 & T_4 could be considered superior.

The hybrid $L_3 \times T_1$ accounted for the highest heterobeltiosis for percentage of long styled flowers. Similar results were reported by Ponnuswami (1990) and Jerard (1996). Among the crosses, significant positive heterobeltiosis observed in $L_2 \times T_4$ for fruits per plants. These results conform to the earlier findings

Table 1. *Per se* performance of parents for yield and quality parameters in brinjal

Parent	% of long styled flowers	Fruits/plant	Yield per plant (kg)	Fruit borer incidence (%)	Ascorbic acid (mg/100 g)	Total phenol
P ₁	41.70	51.20	3.20	52.65	11.29	1031.5
P ₂	40.80	48.85	2.41	55.60	12.25	1139.5
P ₃	30.80	42.80	2.61	48.45	12.17	1130.5
P ₄	35.45	27.00	2.20	36.55	12.53	1118.5
P ₅	39.10	44.55	2.38	43.95	10.68	1111.5
P ₆	44.05	36.05	3.10	35.70	11.78	1046.5
P ₇	44.55	50.55	2.21	36.55	11.21	1173.5
T ₁	29.35	31.15	1.71	53.35	9.84	1056.5
T ₂	27.90	37.15	2.06	56.55	9.15	1222.5
T ₃	29.25	35.30	1.92	48.90	10.08	1052.0
T ₄	37.10	36.50	2.16	55.65	9.12	1210.5
L ₁ x T ₁	45.85	65.85	2.80	44.55	9.52	1489.5
	(9.95)**	(28.61)**	(-12.69)**	(-15.58)**	(-15.71)**	(44.40)**
L ₁ x T ₂	40.90	60.00	3.67	29.55	11.22	1534.5
	(-1.91)	(17.18)**	(14.68)**	(-43.87)**	(-0.65)	(48.38)**
L ₁ x T ₃	54.10	59.10	3.17	31.90	10.62	1582.0
	(29.73)**	(15.43)**	(-0.88)	(-34.76)**	(-5.94)*	(48.13)**
L ₁ x T ₄	57.75	53.90	2.24	53.25	15.57	1540.5
	(38.48)**	(5.27)**	(-30.20)**	(1.34)	(37.82)**	(49.35)**
L ₂ x T ₁	52.25	56.60	1.95	29.55	11.12	1004.5
	(38.06)**	(15.86)**	(-19.02)**	(-44.61)**	(-9.21)**	(-4.92)
L ₂ x T ₂	51.10	56.65	2.86	26.90	10.60	1431.0
	(25.24)**	(15.96)**	(18.75)**	(-51.09)**	(-13.44)**	(25.58)**
L ₂ x T ₃	45.85	68.45	1.95	35.60	9.61	1175.5
	(12.37)**	(40.12)**	(-19.16)**	(-27.19)**	(-21.51)**	(11.74)**
L ₂ x T ₄	66.00	102.40	3.93	24.90	16.46	1339.5
	(61.76)**	(109.62)**	(62.93)**	(-54.72)**	(34.18)**	(17.55)**
L ₃ x T ₁	54.95	64.90	2.61	38.55	10.40	1489.5
	(78.40)**	(51.63)**	(-0.11)	(-20.43)**	(-14.46)**	(40.98)**
L ₃ x T ₂	54.10	59.20	3.57	25.40	12.83	1498.0
	(70.64)**	(38.31)**	(36.34)**	(-47.57)**	(5.47)*	(32.51)**
L ₃ x T ₃	54.65	45.85	2.33	43.70	12.12	1524.0
	(77.43)**	(7.12)**	(-10.74)**	(-9.80)**	(-3.29)	(44.87)**
L ₃ x T ₄	48.20	52.50	2.32	45.45	10.87	1223.5
	(29.91)**	(22.66)**	(26.91)**	(-6.19)**	(-10.66)**	(8.23)**
L ₄ x T ₁	45.70	36.35	1.91	57.45	9.28	1319.5
	(28.91)**	(16.69)**	(-13.40)**	(57.18)**	(-25.97)**	(24.89)**
L ₄ x T ₂	51.15	42.15	2.73	23.80	14.12	1543.5
	(44.28)**	(13.45)**	(23.45)**	(-34.88)**	(12.67)**	(37.99)**
L ₄ x T ₃	47.95	35.75	1.28	29.80	10.27	1503.0
	(35.26)**	(1.27)	(-42.15)	(-18.46)**	(-18.05)**	(42.87)**
L ₄ x T ₄	51.15	45.80	2.83	56.05	10.94	1416.0
	(37.87)**	(25.47)	(26.05)**	(53.35)**	(-12.66)**	(26.60)**
L ₅ x T ₁	46.05	50.00	3.78	24.30	15.28	1455.0
	(17.77)**	(12.23)**	(58.67)**	(-44.71)	(43.02)**	(37.72)**
L ₅ x T ₂	47.15	53.85	3.30	31.70	11.27	1449.5
	(20.55)**	(20.87)**	(38.55)**	(-27.87)	(5.47)*	(30.41)**

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Parent	% of long styled flowers	Fruits/plant	Yield per plant (kg)	Fruit borer incidence (%)	Ascorbic acid (mg/100 g)	Total phenol
$L_5 \times T_3$	56.00 (43.22)**	39.30 (-11.78)**	2.46 (3.19)	38.45 (-12.57)**	12.46 (16.62)**	1219.5 (15.92)**
$L_5 \times T_4$	61.20 (56.52)**	71.35 (60.15)**	3.85 (61.66)	23.50 (-46.53)**	15.18 (42.12)**	1262.5 (13.58)**
$L_6 \times T_1$	39.90 (-9.42)**	48.65 (34.95)**	3.14 (1.16)	46.95 (31.51)**	10.31 (-12.53)**	1496.5 (43.00)**
$L_6 \times T_2$	49.10 (11.46)**	63.15 (69.98)**	2.77 (-10.62)**	32.25 (-9.66)**	10.33 (12.30)**	1003.5 (-4.10)**
$L_6 \times T_3$	48.85 (10.89)**	57.75 (60.19)**	2.18 (-29.56)**	28.15 (-21.14)**	11.47 (-2.68)	1002.5 (-4.20)
$L_6 \times T_4$	54.50 (23.72)**	52.70 (44.18)**	2.78 (-10.30)**	31.00 (-13.16)**	11.62 (-1.35)	1505.0 (43.81)**
$L_7 \times T_1$	42.50 (-4.60)**	44.40 (-12.16)**	2.74 (23.82)**	28.35 (-22.43)**	9.77 (-12.82)**	1465.5 (38.71)**
$L_7 \times T_2$	61.15 (37.26)	60.10 (18.89)**	3.84 (74.14)**	22.00 (-39.80)**	18.00 (60.60)**	1001.5 (-14.65)**
$L_7 \times T_3$	48.00 (7.74)	59.50 (17.70)**	3.13 (41.34)**	27.85 (-23.80)**	16.06 (43.31)**	1495.0 (37.40)**
$L_7 \times T_4$	60.05 (34.79)	40.85 (-19.18)**	3.10 (40.14)**	22.70 (-37.89)	14.47 (29.06)**	1568.5 (33.66)**

Values in the brackets indicates the heterobeltiosis per cent.

of Prasath (1997) and Jansirani (2000). The heterobeltiosis values were the highest positive and significant in the cross $L_2 \times T_4$ followed by $L_5 \times T_4$. The hybrid $L_7 \times T_2$ recorded negative and significant heterobeltiosis for total phenols.

The hybrids with high per se performance also registered high heterotic effect. Based on these, the hybrids $L_2 \times T_4$ (EP 65 x Pusa Uttam), $L_5 \times T_4$ (SM 8 x Pusa Uttam) and $L_7 \times T_2$ (Pusa Antipam x Arka Nidhi) were found superior in respect of yield and quality contributing characters and these hybrids could be considered for exploitation of heterosis.

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