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Original Research Article

Estimation of Heterosis for Green Cob Yield and Quality Traits in Sweet Corn (*Zea mays* L. Ssp. *saccharata*) Hybrids

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A B S T R A C T

The study was carried out to estimate heterosis for green cob yield and quality traits in sweet corn hybrids (*Zea mays* L. Ssp. *saccharata*). Forty five hybrids using line x tester mating design were developed, which along with their eighteen parents and three checks (Priya, Madhuri and Sugar-75) were evaluated at three locations during *kharif* 2019 and *rabi* 2019-20, in randomized block design. Estimation of heterosis over the best check (sugar-75), mid parent and better parent was done on pooled basis for twelve characters. Estimates for mid parent heterosis were found positively significant for 42 hybrids for green cob yield over the environments, with hybrid L_8 x T_3 (354.12 %) exhibiting maximum and positively significant heterosis for the green cob yield. Hybrid L_3 x T_1 in E_1 and E_2 (374.48 and 445.02 %, respectively) and L_8 x T_3 (413.55 %) in E_3 reported highest significant relative heterosis for green cob yield. For the green cob yield, on pooled basis hybrid L_8 x T_3 (280.33 %) exhibited maximum better parent heterosis. Further, hybrids L_3 x T_1 (374.48 %), L_1 x T_3 (388.87 %) and L_8 x T_3 (338.62 %) in E_1, E_2 and E_3, respectively were identified exhibiting maximum and positively significant hybrid vigour over the better parent. Over the best check Sugar-75 on pooled basis, highest and significantly positive economic heterosis was exhibited by the sweet corn hybrid L_3 x T_1 (39.39 %).

Keywords

Sweet corn, Green cob yield, Heterosis, TSS

Introduction

Sweet corn (*Zea mays* var. *saccharata*), is a specialty corn which is characterized by translucent, horny appearance of kernel when matures and wrinkled when it dries. The mutant mutant genes *su*, *su1* and *se* prevent the conversion of sugar into starch and thus such corn tastes sweet. Total sugar content in sweet corn at milky stage ranges from 25-30% as compared to 2-5% of normal corn (Sadaiah *et al.*, 2013). Sweet corn breeding aims to improve quality and appearance as well as cob yield. The genetic base of sweet corn breeding programme is relatively narrow and related inbreds often are crossed to make hybrids that meet the strict market requirements on quality and appearance (Tracy, 1994). However, development of superior hybrids is more difficult in sweet corn because the heterotic patterns are poorly defined (Revilla and Tracy, 1997). Generally, all commercial sweet corn hybrids are based on one or more defective endosperm mutants, and production of high quality seed is more difficult for sweet corn than for most types of corn (Tracy, 1994). Recombining the same inbreds repeatedly without infusion of new heterotic combinations may lead to the depletion of heterosis (Revilla *et al.*, 2000). Sweet corn breeders have often focused on improving quality and ear appearance, rather than on enhancing yield (Tracy, 1993). But emphasis on kernel sweetness along with yield needs to be considered as the major objective of sweet corn improvement. The quality parameters are relatively more important especially because of direct consumption of sweet corn as vegetable and the preference of the consumers. In the present study, attempts were made to identify superior hybrid combinations using line x tester method.

Materials and Methods

Eighteen diverse sweet corn inbred lines were used as parents (fifteen females and three testers) (Table 1). The crosses were made at Instructional Farm, RCA, Udaipur during *kharif* 2018. Total 66 genotypes comprising of 45 sweet corn hybrids, 18 parental lines and 3 standard checks (Priya, Madhuri and Sugar-75) were evaluated in RBD in three environments (E_1 at Instructional Farm, RCA, Udaipur during Kharif-2019, E_2 at ARS, Banswara during Kharif-2019 and E_3 at Instructional Farm, RCA, Udaipur during Rabi-2019-20) in RBD with three replications.

Recommended agronomic practices were used to raise a healthy crop. Observations were recorded for 14 characters like days to 50 per cent tasseling, days to 50 percent silking, plant height, ear height, days to green cob harvest, ear length, ear girth, number of grain rows/cob, number of grains/row, green cob weight/ plant, green cob yield, green fodder yield, TSS content of green grain and protein content. Ten plants were taken from each row for recording observations from each replication. TSS content was recorded using hand refrectometer.

Heterosis over mid-parent and better parent was calculated with the standard formula. Estimates of standard heterosis was calculated according to Virmani *et al.*, (1982) and the significance of heterosis was tested using 't' test.

Results and Discussions

The degree and direction of heterotic response varied not only from character to character but also hybrid to hybrid over the environments. For characters related to crop duration like days to tasseling, silking and maturity, negative heterosis is desirable. For yield characters like plant height, ear length and girth, number of grain rows/ ear, number of grains/ row, green cob yield, green fodder yield and green cob weight/ plant and for quality characters like sugar content and protein content, heterosis in positive direction is desirable. Further for characters like days to 50 per cent tasseling and silking, days to maturity and ear placement, heterosis should be significant in the negative direction. While for the characters related to yield and its attributes and quality, positively significant heterosis is desirable.

The estimation of standard heterosis was done over the best check Sugar-75 over the three environments for all the characters under study (Table 2 and 3). The analysis of data for economic heterosis for green cob yield over the three environments revealed that the sweet corn hybrid L7 x T1 exhibited highest estimates of positively significant standard heterosis against the best check Sugar-75 (71.40%). Perusal of data showed that for days to 50 per cent silking, only one sweet corn hybrid L10 x T2 (-7.74%) possessed negatively perceptible economic heterosis. Maximum estimate for economic heterosis in perceptibly negative direction for ear height was shown by the sweet corn hybrid L15 x T2 (-48.52%). For ear length, maximum estimate of economic heterosis in positively significant direction was reported for the sweet corn hybrid L3 x T1 (40.59%). The sweet corn hybrid L1 x T3 (14.45%) exhibited highest and positively significant standard heterosis for number of grain rows/ ear. Further, L8 x T1 (41.66%) showed maximum estimate of significant and positive heterosis for number of grains/ row. Maximum and positively significant heterosis over the best check was shown by the sweet corn hybrid L7 x T1 (73.68%) for green cob weight/ plant. Highest and positively perceptible economic heterosis for green fodder yield (kg/ ha) and TSS content of green grain was observed for the sweet corn hybrids L4 x T2 (86.24%) and L11 x T1 (17.89%) respectively. None of the sweet corn hybrids were reported to exhibit significant economic heterosis in required direction for the characters days to 50 per cent tasseling, plant height, days to green cob harvest, ear girth and protein content over the three environments against the best check Sugar-75.

Estimates for relative heterosis were found positively significant for 42 hybrids for green cob yield over the environments among which the sweet corn hybrid L8 x T3 (354.12%) exhibited maximum and positively significant heterosis for the green cob yield. The hybrid L8 x T3 also exhibited positively significant mid parent heterosis for green cob weight/ plant (335.15%). For green fodder yield, 41 hybrids showed significantly positive relative heterosis over the environments, where the hybrid L1 x T3 (274.98%) exhibited maximum vigour over the mid parents. Over all 28 hybrids manifested significant heterosis in positive direction for TSS content of green grain where maximum mid parent heterosis was shown by the hybrid L14 x T2 (28.46%). For ear length, hybrid L1 x T3 (104.78%) exhibited maximum and significantly positive mid parent heterosis. The sweet corn hybrid L15 x T2 (1.70%) evinced highest and positively significant mid parent heterosis for protein content. The sweet corn hybrids L10 x T2 and L12 x T2 exhibited maximum significant negative mid parent heterosis for days to 50 per cent tasseling (-18.24%) and silking (-17.95%) respectively. Hybrid L12 x T2 (-14.11%) reported maximum and significant mid parent heterosis in negative direction for days to green cob harvest. Maximum estimate of mid parent heterosis in positively significant direction for plant height and number of grain rows/ ear was reported for the sweet corn hybrid L2 x T1 (82.11% and 32.12%). The sweet corn hybrid L8 x T3 recorded highest and positively significant relative heterosis for ear girth (55.72%) and green cob weight/ plant (335.15%). Hybrid L3 x T3 (144.69%) revealed maximum heterosis for number of grains/ row over the mid parent in positively perceptible direction.

Table.1 List of genotypes used

S. No	Symbol	Pedigree	S. No	Symbol	Pedigree
1.	L_1	SC-7-2-1-2-6-1	10.	L_{10}	BAJ-SC-17-2
2.	L_2	SC-18728	11.	L_{11}	BAJ-SC-17-1
3.	L_3	BAJ-SC-17-6	12.	L_{12}	DMSC-28
4.	L_4	BAJ-SC-17-10	13.	L_{13}	Mas Madu (sh2 sh2)
5.	L_5	BAJ-SC-17-12	14.	L_{14}	MRCSC-12
6.	L_6	BAJ-SC-17-9	15.	L_{15}	SC-33
7.	L_7	BAJ-SC-17-11	16.	T_1	SC-35
8.	L_8	BAJ-SC-17-8	17.	T_2	SC-32
9.	L_9	BAJ-SC-17-4	18.	T_3	DMRSC-1

Table.2 Heterosis, heterobeltiosis and economic heterosis for sweet corn hybrids for days to green cob harvest, green cob weight/ plant and green cob yield

S. No.	Crosses	Heterosis, heterobeltiosis and economic heterosis for sweet corn hybrids								
		Days to green cob harvest			Green cob weight/plant (kg)			Green cob yield (kg ha^{-1})		
		Heterosis	Heterobeltiosis	E. Heterosis	Heterosis	Heterobeltiosis	E. Heterosis	Heterosis	Heterobeltiosis	E. Heterosis
1	L_1 X T_1	-5.95**	-11.53**	-2.23	143.89**	92.09**	5.26	146**	92.19**	1.51
2	L_2 X T_1	-5.32**	-9.29**	0.25	144.87**	141.09**	26.32**	146.03**	142.88**	28.28**
3	L_3 X T_1	-8.12**	-8.73**	0.86	214.15**	161.37**	42.11**	219.18**	163.91**	39.39**
4	L_4 X T_1	-5.44**	-7.61**	2.11	59.65**	27.16**	15.79**	59.31**	26.31**	13.91*
5	L_5 X T_1	-2.98	-5.15*	4.82	93.11**	73.42**	-5.26	93.08**	72.99**	-8.63
6	L_6 X T_1	-4.68*	-8.85**	0.74	93.59**	84.29**	0.0	94.21**	84.33**	-2.64
7	L_7 X T_1	-3.42	-6.72**	3.1	236.31**	219.97**	73.68**	241.52**	224.52**	71.4**
8	L_8 X T_1	-4.21*	-5.71**	4.2	188**	123.44**	21.05**	192.02**	124.47**	18.56**
9	L_9 X T_1	-1.9	-7.28**	2.47	52.73**	8.59*	36.84**	54.16**	9.04**	38.92**
10	L_{10} X T_1	-7.39**	-9.52**	0	105.23**	76.63**	31.58**	105.95**	76.58**	30.47**
11	L_{11} X T_1	-6.18**	-8.17**	1.48	96.58**	68.07**	26.32**	98.32**	68.95**	26.78**
12	L_{12} X T_1	-4.52*	-6.07**	7.3	160.25**	150.9**	36.84**	162.82**	153.18**	33.72**
13	L_{13} X T_1	-8.31**	-8.62**	0.99	122.24**	99.5**	36.84**	123.21**	99.66**	33.66**
14	L_{14} X T_1	-9.49**	-12.29**	3.34	127.1**	121.7**	26.32**	128.69**	123.16**	23.85**
15	L_{15} X T_1	-0.48	-7.73**	1.98	-22.46*	-34.42**	-63.16**	-26.47**	-38.06**	-67.29**
16	L_1 X T_2	-7.68**	-13.7**	-3.34	145.94**	91.43**	5.26	148.52**	91.9**	4.75
17	L_2 X T_2	-9.92**	-14.25**	-3.97	151.91**	144.09**	36.84**	153.41**	146.18**	34.37**
18	L_3 X T_2	-11.31**	-12.49**	-1.98	193.08**	140.71**	31.58**	197.22**	142.62**	32.43**
19	L_4 X T_2	-13.03**	-15.58**	-5.45	47.02**	18.55**	5.26	46.3**	17.43**	5.9
20	L_5 X T_2	-11.38**	-13.92**	-3.59	177.23**	145.41**	36.84**	180.36**	147.61**	35.15**
21	L_6 X T_2	-4.3*	-9.06**	1.85	-16.56*	-21.78*	-57.89**	-19.34**	-24.62**	-58.85**
22	L_7 X T_2	-11**	-14.59**	-4.33	164.29**	147.61**	36.84**	166.74**	149.58**	36.22**
23	L_8 X T_2	-5.65**	-7.73**	3.34	219.43**	144.99**	36.84**	225.45**	147.33**	35**
24	L_9 X T_2	-7.76**	-13.37**	-2.97	19.19**	-14.42**	5.26	18.21**	-15.57**	7.57
25	L_{10} X T_2	-13.49**	-16.02**	-5.95	31.72**	14.95*	26.32**	30.69**	13.62*	-16.05*

*.** significant at 5 and 1%, respectively (Continued)

S. No.	Crosses	Heterosis, heterobeltiosis and economic heterosis for sweet corn hybrids								
		Days to green cob harvest			Green cob weight/plant (kg)			Green cob yield (kg ha^{-1})		
		Heterosis	Heterobeltiosis	E. Heterosis	Heterosis	Heterobeltiosis	E. Heterosis	Heterosis	Heterobeltiosis	E. Heterosis
26	L_{11} X T_2	-9.43**	-11.93**	-1.37	90.68**	65.27**	26.32**	91.05**	65.01**	23.82**
27	L_{12} X T_2	-14.11**	-14.95**	-2.85	128.71**	117.07**	21.05**	130.51**	118.6**	19.32**
28	L_{13} X T_2	-11.83**	-12.71**	-2.23	77.42**	61.62**	5.26	77.51**	61.13**	7.86
29	L_{14} X T_2	-10.93**	-13.13**	2.35	81.38**	79.94**	0	82.9**	81.39**	0.67
30	L_{15} X T_2	-1.2	-8.95**	1.97	37.3**	14.6	-36.84**	35.8**	12.89	-38.38**
31	L_1 X T_3	-6.99**	-12.87**	-2.85	305.44**	237.71**	5.26	321.68**	246.78**	3.04
32	L_2 X T_3	-9.48**	-13.65**	-3.71	236.59**	134.81**	21.05**	260.22**	147.15**	27.2**
33	L_3 X T_3	-8.53**	-9.54**	0.87	224.19**	155.6**	-10.53	233.66**	159.4**	-10.44
34	L_4 X T_3	-8.39**	-10.88**	-0.62	108.18**	27.73**	15.79**	109.08**	26.74**	14.3*
35	L_5 X T_3	-6.96**	-9.43**	0.99	130.7**	70.85**	-26.32**	133.19**	70**	-28.89**
36	L_6 X T_3	-5.71**	-10.21**	0.12	197.26**	111.61**	5.26	204.16**	113.5**	1.28
37	L_7 X T_3	-9.29**	-12.76**	-2.73	296.67**	182.48**	36.84**	307.6**	185.9**	35.97**
38	L_8 X T_3	-8.38**	-10.21**	0.12	335.15**	268.63**	10.53	354.12**	280.33**	7.94
39	L_9 X T_3	-5.19**	-10.77**	-0.5	20.03**	-30.28**	-10.53	19.67**	-31.17**	-12.3
40	L_{10} X T_3	-5.65**	-8.21**	2.35	19.11*	-23.99**	-42.11**	14.14	-28.13**	-46.9**
41	L_{11} X T_3	-7.97**	-10.32**	0.0	109.8**	33.43**	0	123.48**	40.27**	5.26
42	L_{12} X T_3	-7.68**	-8.78**	4.21	178.56**	96.76**	-5.26	183.82**	97.46**	-3.36
43	L_{13} X T_3	-11.74**	-12.43**	-2.35	184.87**	85.83**	26.32**	188.63**	85.62**	24.26**
44	L_{14} X T_3	-9.77**	-12.18**	3.46	153.94**	73.29**	0	157.77**	73.37**	-3.78
45	L_{15} X T_3	-4.45*	-11.76**	-1.62	185.75**	122.01**	-15.79**	192.12**	123.43**	-19.2**
46	S.E.Diff.	1.81	2.09	-	0.01	0.01	-	380.61	439.49	-
47	CD 5%	3.56	4.11	9.99	0.02	0.02	0.03	748.42	864.2	2098.92
48	CD 1%	4.69	5.41	13.16	0.03	0.03	0.04	985.44	1137.89	2763.34

*.** significant at 5 and 1%, respectively

Table.3 Heterosis, heterobeltiosis and economic heterosis for sweet corn hybrids for green fodder yield, TSS content of green grain and protein content

S. No.	Crosses	Heterosis, heterobeltiosis and economic heterosis for sweet corn hybrids								
		Green fodder yield (kg ha^{-1})			TSS content of green grain (%)			Protein content (%)		
		Heterosis	Heterobeltiosis	E. Heterosis	Heterosis	Heterobeltiosis	E. Heterosis	Heterosis	Heterobeltiosis	E. Heterosis
1	L_1 X T_1	154.26**	103.38**	29.37**	13.27**	0.99	10.47*	-0.79	-1.55*	-1.95
2	L_2 X T_1	119.09**	87.44**	19.23**	7.96**	-4.51*	4.51	-0.35	-0.81	-0.29
3	L_3 X T_1	200.97**	182.29**	79.57**	6.51**	-1.89	7.35	-0.37	-1.16	-1.56
4	L_4 X T_1	66.17**	61.68**	2.85	-5.68**	-11.06**	-2.7	0.14	-0.25	0.1
5	L_5 X T_1	66.78**	26.76**	-19.37**	5.26*	-0.63	8.74*	-0.23	-0.89	-1.37
6	L_6 X T_1	60.9**	34.95**	-14.15*	-2.27	-2.82	6.31	0.16	0.12	-0.29
7	L_7 X T_1	223.38**	150.73**	59.49**	13.97**	3.73	13.52**	-0.34	-1.14	-1.56
8	L_8 X T_1	17.95**	3.73	-34.02**	-3.99*	-5*	3.95	0.06	0.01	-0.39
9	L_9 X T_1	88.37**	60.63**	44.84**	17.99**	-0.21	9.15*	-0.03	-0.74	-1.17
10	L_{10} X T_1	45.23**	33.84**	0.99	-0.86	-2.75	6.38	0.05	-0.03	-0.29
11	L_{11} X T_1	132.3**	122.23**	41.36**	9.4**	7.75**	17.89**	-0.11	-0.88	-1.27
12	L_{12} X T_1	217.87**	151.19**	59.79**	23.59**	5.35*	15.26**	1.01	0.94	0.68
13	L_{13} X T_1	172.3**	168.48**	75.71**	7.4**	-7.46**	1.25	-0.66	-1.43	-1.86
14	L_{14} X T_1	65.3**	57.17**	10.89	11.38**	-2.11	7.07	-0.14	-0.18	-0.59
15	L_{15} X T_1	-31.26**	-44.13**	-64.46**	-11.23**	-11.54**	-2.5	0.99	0.24	-0.2
16	L_1 X T_2	139.26**	101.08**	12.68*	6.58**	4.12	-6.45	1.33	1.12	-0.49
17	L_2 X T_2	155.14**	130.53**	29.19**	6.38*	3	-7.49	0.24	-0.78	-0.29
18	L_3 X T_2	132.06**	131.39**	29.67**	-2.12	-3.34	-10.96*	1.31	1.08	-0.49
19	L_4 X T_2	220.53**	209.52**	86.24**	-12.05**	-15.26**	-17.89**	0.27	-0.69	-0.29
20	L_5 X T_2	223.51**	157.24**	44.16**	17.59**	13.16**	9.92*	1.26	1.16	-0.39
21	L_6 X T_2	-20.95**	-30.08**	-60.82**	-6.61**	-14.53**	-7.56	0.69	0.17	-0.39
22	L_7 X T_2	146.77**	100.52**	12.37*	21.32**	21.27**	8.95*	1.41*	1.16	-0.39
23	L_8 X T_2	91.1**	77.85**	-0.33	-5.95**	-13.53**	-7.42	0.99	0.47	0.0
24	L_9 X T_2	10.55**	-10.37**	-19.19**	20.11**	10.63**	-0.62	1.59*	1.45	-0.1
25	L_{10} X T_2	71.37**	49.32**	12.67*	0.87	-6.52**	-1.6	1.13	0.49	0.2

*.** significant at 5 and 1%, respectively (Continued)

S. No.	Crosses	Heterosis, heterobeltiosis and economic heterosis for sweet corn hybrids								
		Green fodder yield (kg ha^{-1})			TSS content of green grain (%)			Protein content (%)		
		Heterosis	Heterobeltiosis	E. Heterosis	Heterosis	Heterobeltiosis	E. Heterosis	Heterosis	Heterobeltiosis	E. Heterosis
26	L_{11} X T_2	76.47**	73.35**	0.71	7.59**	-0.65	5.41	1.63*	1.41	-0.2
27	L_{12} X T_2	161.2**	116.65**	21.41**	19.34**	10.89**	-0.35	0.63	0	-0.29
28	L_{13} X T_2	60.57**	49.03**	-2.47	23.03**	15.69**	3.95	1.07	0.85	-0.68
29	L_{14} X T_2	72.2**	54.49**	9	28.46**	23.5**	10.96*	0.8	0.2	-0.2
30	L_{15} X T_2	-3.22	-17.24**	-53.62**	-14.41**	-22.31**	-14.42**	1.7*	1.52	0
31	L_1 X T_3	274.98**	244.47**	31.43**	24.14**	16.93**	13.31**	1.16	0.32	0
32	L_2 X T_3	235.77**	186.46**	29.57**	22.81**	14.71**	11.17**	-0.21	-0.61	-0.1
33	L_3 X T_3	173.26**	114.97**	19.77**	8.72**	6.04*	2.77	0.95	0.1	-0.2
34	L_4 X T_3	40.71**	7.71	-35.19**	0.79	0.79	-2.29	-0.47	-0.79	-0.39
35	L_5 X T_3	146.46**	142.23**	-19.87**	8.14**	8.01**	4.92	0.67	-0.06	-0.39
36	L_6 X T_3	163.56**	129.47**	-1.11	-8.64**	-13.39**	-6.31	0.13	0.01	-0.29
37	L_7 X T_3	233.46**	218.77**	11.67*	4.58*	0.72	-2.36	1.06	0.19	-0.1
38	L_8 X T_3	184.81**	136.65**	14.23*	-8.23**	-12.59**	-6.38	0.18	0.07	-0.2
39	L_9 X T_3	31.9**	-10.68**	-19.47**	16.52**	3.74	0.55	1.06	0.29	0
40	L_{10} X T_3	-23.38**	-45.47**	-58.86**	12.5**	8.05**	13.73**	0.06	0.05	-0.2
41	L_{11} X T_3	147.26**	91.61**	11.31	6.34**	1.74	7.98	0.45	-0.39	-0.68
42	L_{12} X T_3	95.96**	82.75**	-32.52**	-1.55	-11.61**	-14.36**	0.96	0.96	0.68
43	L_{13} X T_3	72.08**	28.04**	-16.21**	21.4**	10.25**	6.87	1.12	0.28	0
44	L_{14} X T_3	107.2**	50.51**	6.19	4.46	-3.1	-6.1	0.2	0.17	-0.1
45	L_{15} X T_3	52.44**	37.4**	-45.31**	-10.79**	-16.15**	-7.63	0.13	-0.68	-0.98
46	S.E.Diff.	573.62	662.36	-	0.31	0.36	-	0.07	0.08	-
47	CD 5%	1127.94	1302.44	3196.32	0.61	0.71	1.73	0.14	0.16	0.39
48	CD 1%	1485.17	1714.92	4208.12	0.8	0.93	2.28	0.18	0.21	0.52

Maximum perceptible negative heterobeltiosis was reported for the hybrid L13 x T3 (-18.79%) over the pooled environments for days to 50 per cent tasseling while hybrid L10 x T2 (-20.09%) exhibited maximum and negatively significant heterobeltiosis for days to 50 per cent silking (-20.09%) and days to green cob harvest (-16.02%). For plant height and number of grain rows/ ear, L2 x T1 (75.20% and 29.76%, respectively) exhibited highest and positively significant better parent heterosis over the environments. Significant and negative better parent heterosis was observed for L9 x T2 (-32.62%) for ear height. Hybrid L1 x T3 showed highest and significant value for heterobeltiosis in positive direction for ear length (96.43%) and green fodder yield (244.47%). Hybrid L13 x T3 (42.87%) exhibited maximum and positively significant heterobeltiosis over the three environments for ear girth. Maximum positively perceptible heterosis over the better parent was observed for the hybrid L3 x T3 (125.31%) over the three environments for grains/ row. Hybrid L8 x T3 exhibited maximum positively perceptible heterosis over the better parent for green cob weight/ plant (268.63%) and green cob yield (280.33%). For TSS content of green grain, the hybrid L14 x T2 (23.50%) exhibited maximum heterosis over the better parent in significantly positive direction. None of the sweet corn hybrids were reported to exhibit significant better parent heterosis over the environments for protein content.

The results were in conformity with the earlier findings of Dagla *et al.,* (2104), Rajesh *et al.,* (2015), Ruswandi *et al.,* (2015), Wahba *et al.,* (2016), Bharti (2017), Choudhary *et al.,* (2017), Yuwono *et al.,* (2017) Kumari *et al.,* (2018) and Mahato (2018).

The quality parameters are relatively more important especially because of direct consumption of sweet corn as vegetable and the preference of the consumers. The overall results indicated that emphasis on green cob yield, green fodder yield and kernel sweetness may be considered in the objective of sweet corn hybrid development.

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