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STUDY ON *PER SE* PERFORMANCE AND HETEROSIS FOR GREEN COB YIELD AND ITS ATTRIBUTING TRAITS IN SWEET CORN (*ZEA MAYS* L. *SACCHARATA*)

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ABSTRACT

Heterosis is the potential tool to achieve sustainability in crop production. Identifying appropriate parental combinations is a prerequisite for deriving the highest level of heterosis, which is of immense value for commercializing hybrids. In the present experiment, fifty hybrids were generated by crossing ten lines with five testers using line × tester mating design in sweet corn. Fifty hybrids and their respective parents were evaluated along with the standard check sugar 75. Based on *per se* values, the lines L_1, L8, L_7 and L_{10} and tester T_1 and T_5 were considered superior for green cob yield, while in the case of hybrids, $L_2 \times T_2$, $L_1 \times T_1$, $L_1 \times T_5$, $L_7 \times T_4$, $L_1 \times T_4$ and $L_4 \times T_1$ were considered best for green cob yield. Out of fifty hybrids studied, nine hybrids manifested significant positive heterosis over the standard check for green cob yield and it varied between 16.07 (L_{10} x T_1) to 58.73 % (L_2 x T_2). The hybrids viz., L_2 x T_2, L_1 x T_5, L_1 x T_1, and L_4 x T_1 recorded significant heterosis for yield and yield contributing traits.
***Keywords*:** Heterosis, line x tester, sweet corn

Introduction

Maize is one of the most important cereal crops grown in the world and is the leading crop in the United States. Sweet corn is one of the speciality corn identified as a recessive gene mutation of field corn as early in the 19^{th} century. Mainly three types of genes *viz., su 1*(sugary), *se* (sugary enhancer), and *sh2* (shrunken 2) have been identified in sweet corn, which is responsible for sweetness. Traditional varieties are sugary 1(*su1*) mutants and their sugar to starch conversion rate is high. Currently, super sweet varieties containing *shrunken 2* (*sh 2*) mutant retain sweetness for a more extended period , thus making these varieties suitable for sale at distant markets (Kumar 2008).

Sweet corn serves as a raw material for deriving a large number of industrial products such as starch syrup, dextrose and dextrin etc. Thus sweet corn with varied uses has excellent export and domestic market potential. Sweet corn matures early and green ears can be harvested in 75-80 days after planting. The leftover stalk can serve as useful fodder for the livestock. Thus it can fit easily in multiple or intercropping systems. An optimum kernel moisture content of 70 to 74 *per cent* is required at harvest time to achieve acceptable frozen cobs (Pratt, 1939). When the moisture content is more than 74 *per cent*, the cobs are immature and below 70 *per cent*, they lose the sweetness and develop an unpleasant taste and texture. It has a thinner pericarp than regular corn, making it tender (Pradeep *et al.,* 2005). Sweet corn has the highest edible quality at the milky dough stage.

The commercial production of hybrid varieties will be justified with a sufficient level of heterosis, as it is a quicker, cheaper and easier method of increasing crop production (Kalhoro *et al.,* 2015). In order to exploit the potential of heterosis, choosing the ideal parents in the crossing programme is a prerequisite. *Per se* performance of individual parents could be one of the criteria to achieve the desired level of heterosis. *Per se*, performance could be defined as the inherent genetic potential of an individual without considering the effect of hybridization or heterosis. The relationship between *per se* performance and heterosis is complex and may vary depending upon the specific traits, genetic background and environmental condition. High *per se* performance contributes towards high heterosis under the combination of favourable alleles from different parents, which can further enhance performance beyond what is observed in either parent line.

Material and Methods

The material for experimentation is generated by crossing of ten lines and five testers (Table 1) to generate fifty hybrids. Sugar-75 was chosen as standard check. The fifty hybrids along with parents and standard check were sown in Randomized Block Design (RBD) with three replications. The recommended package of practices for sweet corn adopted for raising a good crop. The observations on cob length, cob width, and number of kernel rows per cob, number of kernels per row, hundred seed weight and green cob yield were recorded at the time of harvesting. The estimation of better parent heterosis and economic heterosis was done as per the methods given by Fonseca and Peterson (1968) and Meredith and Bridge (1972), respectively.

Results and Discussion

The analysis of variance for field experiment in RBD design was carried out for the mean data. The results (Table 2) revealed significant differences among all the genotypes under the study indicating the presence of sufficient variability between the parents and hybrids. Further, partitioning of mean sum of square due to genotypes indicated that the differences among parents and hybrids were significant for all the traits under study. The significant differences among parents indicated that the parents chosen were diverse from one another. Mean sum of squares due to parents Vs hybrids were significant for all the characters under study except cob length and cob width, which reflects the presence of reasonably good amount of heterosis in the hybrids.

The *per se* performance of parents disclosed that the line L_1 and tester T_1 ranked top for green cob yield and also for most of the yield attributing traits *viz.,* cob width, number of kernel rows per cob and hundred seed weight. The parents, L_7, L_6 and T_5 were good for the number of kernels per row and hundred seed weight. Overall, lines L_1, L_8, L_7 and L_{10} and testers T_1 and T_5 exhibited superior *per se* performance for green cob yield and yield attributing traits (Table 3).

The *per se* performance of hybrids revealed that the hybrid $L_1 \times T_1$ was superior in terms of performance for green cob yield, cob length and number of kernels per row. While the maximum *per se* performance was recorded by the hybrid $L_2 \times T_2$ for green cob yield and 100 seed weight. The hybrids *viz.,* $L_2 \times T_2$, $L_1 \times T_1$, $L_1 \times T_5$, $L_7 \times T_4$ and $L_4 \times T_1$ recorded good *per se* performance for green cob yield when compared to other hybrids (Table 2 and Table 4).

The data from Table 3 for green cob yield (t/ha) revealed that out of fifty hybrids under study, Twelve hybrids exhibited significant and positive heterosis over better parent and nine hybrids manifested significant heterosis over standard check sugar-75. The estimates of standard heterosis for green cob yield per plant ranged between – 16.07 *per cent* ($L_{10} \times T_1$) and 58.73 (L_2 x T_2) *per cent.* The hybrid L_2 x T_2 (58.03 %) manifested maximum standard heterosis, followed by hybrid L_1 x T_1 (52.35%). The significant better parent heterosis and standard heterosis for green cob yield were also reported by Lahane *et al.* (2015), Patel *et al.* (2019), Kumari *et al.* (2018),Gami *et al.* (2018) and Chavan *et al.*(2022). None of the hybrids under study recorded significant standard heterosis for cob length. The hybrids L_4 x T_1 (17.15 %) and L_1 x T_1 (13.87 %) recorded significant standard heterosis for cob breadth. Three hybrids *viz.,* L_1 x T_1 (45.70 %), L_4 x T_1 (15.71 %) and L_6 x T_1 (15.71%) exhibited significant economic heterosis for the number of kernel rows per cob. Only one hybrid L_8 x T_3 (12.88 %) manifested significant standard heterosis for the number of kernels per row. The hybrid L_2 x T_2 (17.10 %) recorded the significant positive standard heterosis for hundred seed weight. Similar positive significant standard heterosis for cob length and hundred seed weight was reported by Jha *et* al. (2014), Izar and Chakraborty (2013), Nandhitha *et al.* (2018) and Gujar *et al.* (2022). The superior performance of L_1 x T_1 and L_1 x T_5 might be attributed to high x high parental *per se* performance, indicating positive and positive alleles interaction in crosses. Similar results of positive interactions between alleles to obtain heterotic combination was reported by Patel *et al.* (2019) in maize. Therefore hybrids L_2 x T_2, L_1 x T_5, L_1 x T_1, L_4 x T_1 and L_7 x T_4 were superior in terms of both *per se* performance and heterosis. Hence these hybrids were found promising for commercial exploitation.

Table 1: List of lines and testers utilized in hybridization

SI.No	Code No.	Name of the lines	SI. No	Code No.	Name of testers
1	**L1**	USC 1-2-3	11	**T1**	12039-1
2	**L2**	USC -10-3	12	**T2**	SC 11-2
3	**L3**	USC 1378-5-1	13	**T3**	1413-6-2-2
4	**L4**	USC 1421-5-2-2	14	**T4**	1421-5-2-1
5	**L5**	USC 11-2	15	**T5**	SC 1107
6	**L6**	WNC 12012-2			
7	**L7**	WNC 12069-2			
8	**L8**	WNC 12068-2			
9	**L9**	WNC 12084-1			
10	**L10**	USC 8324			

Table 2: Mean squares analysis of variances for green cob yield and yield attributing traits.

Characters	Sources of variation				
	Genotypes	Hybrids	Parents	Parents vs hybrids	Error
Cob length	7.18**	5.43**	13.23**	8.39	2.27
Cob breadth	4.61**	3.86**	7.44**	2.14	1.33
Number of kernel rows per cob	96.74**	79.98**	144.37**	251.70**	9.60
Number of kernels per row	10.62**	9.39**	13.50**	30.52**	1.70
100 seed weight	8.39**	7.17**	9.50**	52.49**	0.81
Green cob yield	4.30**	4.52**	2.65**	17.13**	0.20

Table 3: *Per se* performance of parents and hybrids for green cob yield and yield contributing traits.

	Cob length (cm)	Cob width (cm)	Number of kernel rows per cob	Number of kernels per row	Hundred seed weight (g)	Yield (t/ha)
Parents						
L_1	19.56	15.28	16	37	9.11	11.24
L_2	12.11	10.33	7	11	6.32	8.06
L_3	15.51	13.02	13	36	9.07	9.97
L_4	18.07	14.43	13	37	7.80	9.57
L_5	18.39	14.88	15	34	7.03	8.07
L_6	16.45	13.39	14	30	11.99	10.47
L_7	19.78	16.06	14	39	13.27	10.96
L_8	19.28	14.22	13	36	9.29	11.20
L_9	15.61	11.86	12	32	10.55	6.43
L_{10}	17.13	13.34	14	32	9.66	10.14
T_1	19.93	16.21	16	36	10.26	14.03
T_2	18.56	14.47	15	40	8.93	9.31
T_3	17.88	14.07	14	32	7.82	10.36
T_4	15.85	12.40	14	28	9.15	8.62
T_5	18.09	14.69	16	37	9.48	13.24
Mean of parents	**17.48**	**13.91**	**14**	**33**	**9.32**	**11.58**
Hybrids						
L_1 x T_1	20.08	16.07	23	39	10.33	18.33
L_1 x T_2	18.19	14.98	16	39	8.89	13.45
L_1 x T_3	17.61	13.28	14	35	10.96	8.25
L_1 x T_4	18.30	14.82	15	39	10.81	14.21
L_1 x T_5	16.35	13.48	14	36	9.28	18.13
L_2 x T_1	13.45	9.99	12	13	7.28	11.35
L_2 x T_2	18.90	14.42	14	38	14.85	19.13
L_2 x T_3	20.95	14.72	16	36	12.37	9.94
L_2 x T_4	14.95	11.19	11	18	8.12	9.56
L_2 x T_5	16.87	13.86	15	32	13.71	12.2
L_3 x T_1	18.37	15.07	14	33	11.22	11.86
L_3 x T_2	17.63	14.10	14	33	10.62	9.99
L_3 x T_3	19.09	14.37	15	36	11.44	9.78
L_3x T_4	19.23	13.53	14	35	11.03	10.95
L_3 x T_5	19.17	14.27	13	39	10.66	11.52
L_4 x T_1	19.14	16.53	18	39	10.84	14.22
L_4 x T_2	17.12	14.06	14	38	10.67	6.57
L_4x T_3	17.64	12.70	13	39	8.63	10.91
L_4 x T_4	15.61	13.14	13	35	7.36	8.94
L_4 x T_5	17.34	13.98	14	31	9.90	11.43
L_5 x T_1	17.50	14.82	13	36	11.67	7.94
L_5 x T_2	18.13	15.48	14	32	12.37	8.7
L_5 x T_3	19.30	15.17	15	40	9.89	10.19
L_5 x T_4	19.30	14.04	14	40	9.07	10.42
L_5 x T_5	18.38	14.77	17	39	9.73	10.01
L_6 x T_1	18.27	15.54	18	30	8.70	10.9
L_6 x T_2	17.31	14.69	16	32	11.88	10.77
L_6 x T_3	18.41	14.32	15	39	11.30	11.06
L_6 x T_4	17.16	13.32	16	34	10.88	12.05
L_6 x T_5	15.84	13.42	14	32	9.80	9.51
L_7 x T_1	18.90	15.63	15	38	10.92	14.21
L_7 x T_2	17.22	13.70	14	36	10.36	9.62
L_7 x T_3	18.82	14.89	14	41	12.85	11.27
L_7x T_4	18.28	14.14	15	32	13.55	15.83
L_7 x T_5	18.19	14.71	13	39	11.74	12.4
L_8x T_1	18.22	15.38	15	40	11.05	10.08
L_8 x T_2	17.86	14.09	15	35	10.17	10.53
L_8x T_3	19.31	14.69	16	44	9.02	11.81

L_8 x T_4	18.22	15.30	14	35	11.45	9.22
L_8 x T_5	18.08	13.53	16	35	10.45	14.84
L_9 x T_1	18.56	14.58	15	38	11.58	12.62
L_9x T_2	15.62	12.60	14	36	7.93	9.69
L_9 x T_3	17.51	12.88	13	38	11.60	12.26
L_9 x T_4	20.41	14.59	15	40	11.03	13.11
L_9 x T_5	16.96	14.45	16	39	9.63	11.15
L_{10}x T_1	18.55	14.37	16	35	10.43	13.98
L_{10}x T_2	18.45	14.11	15	39	9.31	12.46
L_{10}x T_3	18.45	13.15	13	36	9.58	10.88
L_{10}x T_4	17.79	13.29	14	36	9.29	10.64
L_{10}x T_5	17.62	13.74	13	41	11.20	10.08
S-75 (Check)	19.59	14.66	16	39	10.87	12.04
Mean of Hybrids	**17.97**	**14.16**	**15**	**36**	**9.32**	**11.58**
CV(%)	2.41	1.84	2.09	4.96	1.44	1.52

Table 4: Percentage of heterobeltiosis (BH) and standard heterosis (SH) for green cob yield and yield contributing traits

Hybrids	Cob length		Cob width		Number of kernel rows per cob		Number of kernels per row		Hundred seed weight		Green cob yield	
	BH	SH	BH	SH	BH	SH	BH	SH	BH	SH	BH	SH
L_1 x T_1	0.72 ns	2.50 ns	-0.88 ns	13.87 *	41.67 **	45.70 **	6.29 ns	1.71 ns	9.64 ns	-6.41 ns	30.66 **	52.35 **
L_1 x T_2	-6.99 ns	-7.13 ns	-1.96 ns	6.14 ns	2.87 ns	2.87 ns	-2.51 ns	0.00 ns	-4.05 ns	-18.09 **	19.66 **	11.91 ns
L_1 x T_3	-9.95 ns	-10.09 ns	-13.07 *	-5.88 ns	-10.71 ns	-10.71 ns	-5.99 ns	-10.04 ns	-26.78 **	-37.50 **	-26.60 **	-31.30 **
L_1 x T_4	-6.41 ns	-6.55 ns	-3.01 ns	5.01 ns	-1.44 ns	-1.44 ns	6.00 ns	1.44 ns	-1.16 ns	-15.63 *	26.42 **	18.28 **
L_1 x T_5	-16.40 **	-16.52 **	-11.78 ns	-4.49 ns	-8.57 ns	-8.57 ns	-3.30 ns	-7.46 ns	-21.58 **	-33.06 **	36.87 **	50.42 **
L_2 x T_1	-32.53 **	-31.33 **	-38.35 **	-29.18 **	-25.00 **	-22.86 **	-64.07 **	-67.05 **	-93.24 **	-94.57 **	-19.08 **	-5.54 ns
L_2 x T_2	1.85 ns	-3.51 ns	-0.30 ns	2.22 ns	-8.82 ns	-11.44 ns	-3.35 ns	-0.87 ns	55.45 **	17.10 **	105.51 **	58.73 **
L_2 x T_3	17.17 *	6.94 ns	4.64 ns	4.32 ns	20.49 **	4.97 ns	12.46 ns	-6.88 ns	33.06 **	-21.22 **	-4.02 ns	-17.17 **
L_2 x T_4	-5.66 ns	-23.67 **	-9.78 ns	-20.69 **	-22.24 **	-30.02 **	-34.52 **	-52.72 **	-42.28 **	-78.78 **	10.90 ns	-20.22 **
L_2 x T_5	-6.75 ns	-13.89 *	-5.65 ns	-1.77 ns	-5.72 ns	-5.72 ns	-11.24 ns	-16.34 *	3.61 ns	-19.74 **	-7.90 ns	1.66 ns
L_3 x T_1	-7.86 ns	-6.23 ns	-7.05 ns	6.78 ns	-13.90 *	-11.44 ns	-7.94 ns	-13.75 *	-5.33 ns	-24.02 **	-15.42 **	-1.66 ns
L_3 x T_2	-4.98 ns	-9.97 ns	-2.56 ns	-0.09 ns	-8.82 ns	-11.44 ns	-17.04 **	-14.90 *	-8.73 ns	-31.25 **	0.20 ns	-16.90 **
L_3 x T_3	6.79 ns	-2.54 ns	2.13 ns	1.82 ns	8.19 ns	-5.74 ns	-0.30 ns	-6.59 ns	36.39 **	-19.24 **	-5.63 ns	-18.84 **
L_3x T_4	21.33 **	-1.84 ns	3.92 ns	-4.09 ns	-3.17 ns	-12.86 ns	-3.06 ns	-9.18 ns	29.13 **	-29.28 **	9.83 ns	-9.14 ns
L_3 x T_5	5.97 ns	-2.14 ns	-2.88 ns	1.11 ns	-14.29 *	-14.29 *	6.69 ns	0.57 ns	-3.19 ns	-25.01 **	-13.04 *	-4.16 ns
L_4 x T_1	-3.98 ns	-2.28 ns	1.97 ns	17.15 **	12.50 ns	15.71 *	7.57 ns	1.71 ns	38.73 **	11.34 ns	1.35 ns	18.01 **
L_4 x T_2	-7.74 ns	-12.59 *	-2.83 ns	-0.38 ns	-8.82 ns	-11.44 ns	-3.63 ns	-1.15 ns	-1.97 ns	-26.16 **	-31.49 **	-45.43 **
L_4x T_3	-2.40 ns	-9.92 ns	-12.01 ns	-9.99 ns	-3.25 ns	-15.71 *	5.45 ns	-0.29 ns	0.83 ns	-40.30 **	5.34 ns	-9.14 ns
L_4 x T_4	-13.65 *	-20.30 **	-8.96 ns	-6.87 ns	-4.76 ns	-14.29 *	-3.48 ns	-8.74 ns	63.68 **	-37.01 **	-6.74 ns	-25.48 **
L_4 x T_5	-4.11 ns	-11.45 ns	-4.86 ns	-0.94 ns	-10.01 ns	-10.01 ns	-15.45 *	-20.06 **	-1.06 ns	-23.36 **	-13.69 *	-5.26 ns
L_5 x T_1	-12.21 *	-10.65 ns	-8.57 ns	5.03 ns	-18.06 **	-15.73 *	-0.00 ns	-8.31 ns	-34.22 **	-47.20 **	-43.39 **	-34.07 **
L_5 x T_2	-2.28 ns	-7.42 ns	4.08 ns	9.73 ns	-10.28 ns	-12.86 ns	-19.00 **	-16.92 **	10.26 ns	-16.94 **	-6.52 ns	-27.70 **
L_5 x T_3	4.97 ns	-1.45 ns	1.95 ns	7.49 ns	1.48 ns	-2.87 ns	15.21 *	2.00 ns	49.87 **	-7.07 ns	-1.61 ns	-15.24 *
L_5 x T_4	4.95 ns	-1.46 ns	-5.60 ns	-0.47 ns	-7.48 ns	-11.44 ns	15.21 *	2.00 ns	24.67 *	-22.70 **	20.87 *	-13.57 *
L_5 x T_5	-0.04 ns	-6.14 ns	-0.72 ns	4.68 ns	8.57 ns	8.57 ns	6.69 ns	0.57 ns	-2.97 ns	-24.83 **	-24.44 **	-16.62 **
L_6 x T_1	-8.36 ns	-6.74 ns	-4.15 ns	10.11 ns	12.50 ns	15.71 *	-15.94 *	-22.92 **	6.77 ns	-14.31 *	-22.31 **	-9.70 ns
L_6 x T_2	-6.70 ns	-11.61 ns	1.54 ns	4.11 ns	4.41 ns	1.41 ns	-20.10 **	-18.05 **	6.11 ns	-20.07 **	2.87 ns	-10.53 ns
L_6 x T_3	2.98 ns	-6.01 ns	1.80 ns	1.49 ns	7.80 ns	-1.44 ns	21.79 **	0.85 ns	11.19 ns	-16.61 **	5.67 ns	-8.03 ns
L_6 x T_4	4.32 ns	-12.41 *	-0.50 ns	-5.60 ns	15.61 *	5.70 ns	10.23 ns	-13.47 *	10.09 ns	-17.44 **	15.16 *	-0.00 ns
L_6 x T_5	-12.40 ns	-19.11 **	-8.62 ns	-4.87 ns	-7.14 ns	-7.14 ns	-12.46 ns	-17.48 **	-9.76 ns	-30.10 **	-28.22 **	-20.78 **
L_7 x T_1	-5.18 ns	-3.51 ns	-3.56 ns	10.80 ns	-8.35 ns	-5.74 ns	-3.15 ns	-2.87 ns	13.09 ns	-0.49 ns	1.31 ns	18.28 **
L_7 x T_2	-12.93 *	-12.07 ns	-14.68 *	-2.91 ns	-4.39 ns	-7.14 ns	-10.61 ns	-8.31 ns	-18.32 **	-28.13 **	-12.23 ns	-20.22 **
L_7 x T_3	-4.84 ns	-3.90 ns	-7.27 ns	5.53 ns	-3.07 ns	-10.01 ns	4.57 ns	4.87 ns	-0.19 ns	-12.17 *	2.80 ns	-6.37 ns
L_7x T_4	-7.57 ns	-6.65 ns	-11.92 *	0.24 ns	1.57 ns	-5.70 ns	-18.01 **	-17.78 **	-13.27 ns	-23.68 **	44.46 **	31.58 **
L_7 x T_5	-8.04 ns	-7.13 ns	-8.37 ns	4.28 ns	-14.29 *	-14.29 *	0.86 ns	1.14 ns	-6.35 ns	-17.60 **	-6.37 ns	3.05 ns

L_8x T_1	-8.58 ns	-6.96 ns	-5.10 ns	9.02 ns	-4.17 ns	-1.44 ns	11.00 ns	2.72 ns	18.55 *	-4.85 ns	-28.11 **	-16.34 *
L_8 x T_2	-7.37 ns	-8.83 ns	-2.60 ns	-0.14 ns	1.48 ns	-1.44 ns	-12.56 *	-10.31 ns	5.23 ns	-20.73 **	-5.95 ns	-12.47 ns
L_8x T_3	0.17 ns	-1.41 ns	3.28 ns	4.11 ns	16.43 *	1.44 ns	21.99 **	12.88 *	29.13 **	-8.89 ns	5.48 ns	-1.94 ns
L_8 x T_4	-5.50 ns	-6.99 ns	7.55 ns	8.41 ns	1.57 ns	-8.59 ns	-1.23 ns	-8.60 ns	13.87 ns	-19.66 **	-17.65 *	-23.27 **
L_8 x T_5	-6.23 ns	-7.71 ns	-7.87 ns	-4.09 ns	3.56 ns	3.56 ns	-3.34 ns	-8.89 ns	12.31 ns	-13.00 *	12.08 *	23.55 **
L_9 x T_1	-6.91 ns	-5.26 ns	-10.08 ns	3.31 ns	-7.62 ns	-4.99 ns	6.08 ns	-2.73 ns	-1.02 ns	-20.56 **	-10.05 ns	4.71 ns
L_9x T_2	-15.81 *	-20.23 **	-12.90 *	-10.70 ns	-8.80 ns	-11.42 ns	-9.49 ns	-7.17 ns	-25.98 **	-44.24 **	4.12 ns	-19.39 **
L_9 x T_3	-2.05 ns	-10.60 ns	-8.46 ns	-8.74 ns	-1.60 ns	-14.27 *	18.33 *	-2.01 ns	28.33 **	-24.01 **	18.31 *	1.66 ns
L_9 x T_4	28.80 **	4.20 ns	17.63 *	3.40 ns	4.76 ns	-5.72 ns	24.65 **	2.85 ns	83.06 **	-7.57 ns	51.99 **	9.14 ns
L_9 x T_5	-6.23 ns	-13.41 *	-1.63 ns	2.41 ns	0.00 ns	0.00 ns	7.61 ns	1.43 ns	4.24 ns	-19.25 **	-15.83 **	-7.20 ns
L_{10}x T_1	-6.94 ns	-5.29 ns	-11.35 ns	1.84 ns	-2.77 ns	0.00 ns	-0.31 ns	-8.60 ns	-4.92 ns	-23.69 **	-0.31 ns	16.07 *
L_{10}x T_2	-0.56 ns	-5.79 ns	-2.47 ns	0.00 ns	0.00 ns	-2.87 ns	-1.11 ns	1.43 ns	0.43 ns	-24.34 **	22.91 **	3.60 ns
L_{10}x T_3	3.21 ns	-5.80 ns	-6.52 ns	-6.80 ns	-6.26 ns	-14.29 *	12.03 ns	-6.59 ns	-2.22 ns	-42.10 **	4.99 ns	-9.70 ns
L_{10}x T_4	3.79 ns	-9.19 ns	-0.40 ns	-5.81 ns	0.00 ns	-8.57 ns	11.34 ns	-7.17 ns	37.66 **	-33.88 **	4.90 ns	-11.63 ns
L_{10}x T_5	-2.58 ns	-10.04 ns	-6.47 ns	-2.62 ns	-14.29 *	-14.29 *	11.10 ns	4.72 ns	-14.76 ns	-33.97 **	-23.86 **	-16.07 *

Table 5: List of superior performing hybrids in terms of per se performance and standard heterosis for green cob yield and yield attributing traits

SI. No.	Characters	*Per se* performance	Standard heterosis
1.	Cob length	L2 x T3, L9 x T4, L1 x T1, L8x T3	-
2.	Cob breadth	L4 x T1, L7 x T1, L6 x T1, L5x T2	L4 x T1, L7 x T1
3.	Number of kernel rows per cob	L1 x T1, L4 x T1, L6 x T1, L5x T5	L1 x T1, L4 x T1
4.	Number of kernels per row	L8 x T3, L7 x T3, L10 x T5, L5x T3	L8 x T3, L7 x T3, L10 x T5
5.	100 seed weight	L2 x T2, L2x T5, L7 x T4, L7x T3	L2 x T2
6.	Green cob yield	L2 x T2, L1 x T1, L1 x T5, L7x T4, L1x T4, L4x T1	L2 x T2, L1 x T1, L1 x T5, L7x T4 L1x T4, L4x T1

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