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TYPE GENE ESTIMATION ACTION FOR GRAIN YIELD IN SOME NEW WHITE MAIZE (*Zea mays* L.) INBRED LINE USING TOP CROSS.

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ABSTRACT

Twenty five white maize inbred lines were topcrossed to each of two white line testers, i.e. Sd 7 and Sd 63 in 2011 summer season. The results of 50 topcrosses along with is parents (25 inbred lines and two testers) and two check hybrids, i.e SC 10 and SC 128 were evaluated in 2012 growing season at two locations (Gemmeiza and Mallawy). Results clearly showed that, partition sum of squares due to crosses into its components showed that mean squares due to lines and testers were highly significant for all traits. Non-additive gene effects were more important than additive ones in the inheritance of all traits under combined data and the ratio of (δ^2 GCA) x L / δ^2 SCA x L was less than unity for all traits. The tester Sd 7 exhibited highly positive($\hat{g}_i$) for grain yield, while the female Gm. 30, Gm. 35, Gm. 36, Gm. 54 and Gm. 58 had desirable positive and significant ($\hat{g}_i$) for grain yield. The crosses (Gm. 30 x Sd.7),(Gm. 36 x Sd.7) and (Gm. 58 x Sd.7) considered the best crosses for grain yield and could be used as good hybrids in maize breeding programs.

Keywords: Maize, Top cross, Tester, Inbred Lines, Combining ability, Variance

INTRODUCTION

The standard top crosses procedure as suggested by Davis (1927) has been widely used to evaluate both general combining ability (GCA) and specific combining ability (SCA). Jenkins (1935) and Sprague (1939) suggested the method of early testing greatly affected by then nature and number of tester needed for efficient evaluation of inbred lines. Sprague and Tatum (1942) was the first to partition the total combining ability effects of the lines into GCA and SCA. Matzinger (1953) defined a desirable tester as the one that combines the greatest simplicity in use with maximum information on performance to be expected from tested lines when used in other combinations. Rawling and Thompson (1962) and Hallauer (1975) stated that appropriate tester should include simplicity in use, provide information that correctly classifies the relative importance of lines and maximize genetic gain. The choice of suitable tester is important to information on evaluation inbred lines. (Horner *et al.* (1973) , Russell *et al*. (1973) and Walejko and Russel. (1977) using inbred lines as tester resulted in significant improvement, not only for combining ability with the specific testers but also of GCA as measured by crosses with unrelated broad base populations. Nawer and El- Hosary (1985) and Ragheb *et al.* (1995) estimated general and specific combining ability and their role in the inheritance of grain yield and ear character. Mahgoub *et al*. (1996) and Soliman *et al*. (2001) provided that narrow genetic base testers can by effectively used to identify lines having good GCA and the most efficient is the one that have allow frequency of favorable alleles.. Barakat and Osman (2008) indicated that tested inbred lines and testers exhibited significant GCA effects vary greatly according to the studied traits. The variance magnitude due to GCA for tested and tester lines was higher than that due to SCA for all studied traits.

The main objectives of this study were to estimate general (GCA) and specific (SCA) combining ability effects and type gene action involved in the manifestation of grain yield and other agronomic traits and identify superior single crosses from this study to be used in improvement maize breeding programs.

MATERIALS AND METHODS

This study was carried out in 2011 and 2012 summer seasons at both of Gemmeiza and Mallawy experimental station of the Agriculture Research Center (ARC), Egypt. The materials of this investigation were consisted of twenty five (S_5) white inbred lines derived through selection from wide genetic base population Giza 2. In 2011 growing season, 25 inbred lines and two inbred lines testers (Sd 7 and Sd 63) were planted in separate plots and top crosses were made between lines and testers at Gemmeiza Experimental Station according to line x tester design II by Kempthorne (1957). In 2012 summer season, 50 single crosses resulting from first season and two cheeks i.e. single cross. 10 (SC 10) and single cross. 128 (SC 128) ware evaluated at both of Gemmeiza and Mallawy Experimental Stations. A randomized complete blocks design (RCBD) with four replications was used for each location . Each experimental unit consists of one row/ plot, 6 meter long and 80 cm. wide (4.8 m^2), and hills were spaced at 25 cm. All cultural practices were applied as recommended .

Data were collected on mean plot basis regarding to the following characters:-

1- Days to 50% silking (number of days to 50% silking)
2- Plant height (cm) was measured from the soil surface to the base of the flag leaf.
3- Ear height (cm) was measured from the soil surface to ear node.
4- Resistance to late wilt %
5- Grain yield, which was adjusted to 15.5 % moisture content (estimated in ard./fed.).

RESULTIES AND DISCUTION

1. Analysis of variance

The analysis of variance for five traits (days to 50% silking, plant height, ear height, resistance to lat wilt and grain yield) under combined data are presented in Table (1). Location mean squares for all studied traits were highly significant, meaning that the situation was differ from location to another. These results are in agreement with Barakat and Ibrahim (2006). Mean squares among crosses exhibited highly significant for all traits studied. This indicated that there were differences among the crosses under the combined data for all traits These results are in agreement with those of Ibrahim *et al.* (2007). Partition sum of squares due to crosses into its components showed that mean squares due to lines and testers were highly significant for all traits, revealing that greater diversity existed among testers and lines. Considering the interaction between lines x testers significant and highly significant differences were obtained for all studied traits, indicating that testers did not express similar orders of ranking according to performance of their crosses with the three testers. Mean squares of crosses x Loc. and their partitions; lines x Loc., testers x Loc. and lines x testers x Loc. were highly Significant under their combined data for all traits, except testers x loc for days to 50% silking, indicating that these traits differed from location to another. These results in agreement reports by **Amer** *et al.* **(**2004)

Table 1. Analysis of variance for days to 50% silking, plant height, ear height resistance to late wilt and grain yield and other agronomic traits of 25 inbred lines top crossed with two testers combined over two locations, during 2012 season.

S.O.V.	df	Days to 50% silking	Plant height	Ear height	Resistance to late wilt	Grain yield ard/fed
Location	1	1062.8**	77256.2**	25154.0**	6.8**	19716.5**
Reps/Loc.	6	40.0	1302.2	1553.5	5.0	176.3
Crosses	49	22.0**	418.3**	378.0**	12.6**	153.2**
Lines	24	28.8**	540.5**	539.2**	11.0**	155.1**
Testers	1	4.0**	2366.8**	1376.4**	1.4**	1608.8**
L x T	24	16.0**	215.0**	175.2**	14.6**	90.5**
Crosses x Loc.	49	3.9**	438.8**	387.5**	71.1**	60.7**
L x Loc.	24	4.4**	529.0**	573.7**	50.3**	35.1**
T x Loc.	1	1.4	3220.6**	1095.6**	42.9**	836.6**
L x T x Loc.	24	85.1**	5584.9**	4124.5**	93.2**	1294.4**
Error	294	1.7	50.0	48.3	0.4	11.7
C.V. %		2.1	2.9	4.8	0.6	13.3

**** indicate significant at 0.01 levels of probability.**

Mean performance

Average performance of five traits overall crosses and checks combined over two location are presented in Table (2). For days to 50% sllking, 39 crosses were earlier than check SC10, while not crosses exhibited earlier than early check SC 128. Nine crosses had shorter plants than the shortest check SC.128 under combined data, i.e., (Gm. 43 x Sd.63), (Gm. 46 x Sd.63), (Gm. 47 x Sd.63), (Gm. 52 x Sd.7),(Gm. 52 x Sd.63) ,(Gm. 57 x Sd.7),(Gm. 57x Sd.63), (Gm. 61 x Sd.63) and (Gm. 68 x Sd.63). Eight crosses exhibited lower ear position than the check SC. 128 under the combined analysis.

For grain yield/fad, the result in Table 2 revealed that the crosses; (Gm. 30 x Sd.7),(Gm. 36 x Sd.7) and (Gm. 58 x Sd.7) had superiority in grain yield/fad. over the height check cultivar SC 10.

Type of gene action:

Estimates of variance for general (δ^2 GCA) and specific (δ^2 SCA) combining ability under the combined data are shown in Table 3.The results showed that (δ^2 SCA) was higher than (δ^2 GCA) for all studied traits under combined data, indicating that non-additive gene effects were more important than additive ones in the inheritance of these traits under combined data. The results were similar as reported by Venugopal *et al;* (2002) and Ibrahim *et* al (2007). The ratio of (δ^2 GCA) x L / δ^2 SCA x L was less than unity for all traits, indicated that the non additive gene effects were more interacted with locations than additive genes for these traits. Similar results were reported by Ibrahim *et al*, (2007).

General combining ability effects ($\hat{g}_i$) :

High positive of general combining ability effects would be useful in most traits, while for days to 50 % silk, plant height and ear height, high negative values would be useful from plant breeder point of view. General combining ability effects would be estimated, wherever the significant of GCA mean square for the trait in view. Estimation of ($\hat{g}_i$) for five traits under the combined data are presented in Table 4. The parental tester inbred line Sd 63 exhibited significant ($\hat{g}_i$) for plant and ear height towards short plants and lower ear position, respectively. For grain yield/fad, the male inbred line Sd 7 showed highly positive ($\hat{g}_i$) for grain yield as reported by **Soliman and Osman (2006).**

Result in Table 4 showed that, 1, 6 and 6 inbred lines had desirable significant ($\hat{g}_i$) for days to 50 % silk, plant and ear height towards earless and short plants and lower ear position, respectively. On another hand the inbred lines; Gm. 47 and Gm. 48 exhibited negative significant ($\hat{g}_i$) for days to 50 % silk, plant and ear height. For grain yield/fad, 5 inbred lines; Gm. 30, Gm. 35, Gm. 36, Gm. 54 and Gm. 58 had desirable positive and significant ($\hat{g}_i$) for this trait.

Specific combining ability effects ($\hat{s}_{ij}$) :

Estimation of ($\hat{s}_{ij}$) for the five studied traits at the combined data are presented in Table 5. Regarding days to 50% silking, result in Table 5 appeared that, eight crosses exhibited desirable ($\hat{s}_{ij}$) towards earliness.

For plant height, result in Table 5 cleared that, the cross; (Gm. 46 x Sd.63) had significant and / or highly significant for ($\hat{s}_{ij}$) towards shortness. For grain yield, the crosses; (Gm. 45 x Sd.63), (Gm. 54 x Sd.63), (Gm. 58 x Sd.7), (Gm. 61 x Sd.7),(Gm. 65 x Sd.7) exhibited significant and/or highly significant inter and intra-allelic interaction of dominance and its epistatic effects for grain yield under the combined data.

Superiority percentages:

Superiority percentages related to two checks SC10 and SC128 for the 50 crosses under combined data are presented in Table 6. For grain yield, results in Table 6 indicated that, the values of superiority related to SC10 ranged from -41.7% to 16.20% for crosses (Gm. 65 x Sd.63) and (Gm. 58 x Sd.7), respectively, and ranged from -40.0% for the cross (Gm. 65 x Sd.63) to 19.4% for the cross (Gm. 58 x Sd.7) relative to check cultivar SC 128. The results indicated also that, the single crosses; (Gm. 30 x Sd. 7, Gm. 36 x Sd. 7 and Gm. 58 x Sd. 7) gave grain yield/ fad. significantly exceeded both the check cultivars; SC10 and SC 128. One cross; (Gm. 61 x Sd. 7) had superiority percentage relative to SC 128 only. The obtained results are in good agreement with those reported by Ibrahim *et al.* (2007).

Table 2. Mean performance of 50 topcrosses between 25 inbred lines and two testers, as well as two checks for grain yield and other agronomic traits, combined over two locations, during 2012 season.

crosses	Days to 50% silking	Plant height	Ear height	Resistance to lat wilt	Grain yield ard/fed
Gm. 25 x Sd.7	61.3	253.9	154.9	95.0	24.9
Gm. 25 x Sd.63	61.6	246.0	148.3	98.0	23.8
Gm. 29 x Sd.7	61.1	242.1	150.8	97.0	32.2
Gm. 29 x Sd.63	59.9	242.8	144.0	96.0	23.5
Gm. 30 x Sd.7	60.8	251.4	152.9	96.0	33.8
Gm. 30 x Sd.63	61.1	242.6	145.8	95.0	29.1
Gm. 32 x Sd.7	59.3	254.6	151.9	97.0	31.4
Gm. 32 x Sd.63	61.5	252.6	150.5	98.0	23.4
Gm. 35 x Sd.7	60.6	239.8	141.6	97.0	32.1
Gm. 35 x Sd.63	60.0	239.3	144.4	97.0	32.0
Gm. 36 x Sd.7	60.9	248.0	150.6	94.0	34.5
Gm. 36 x Sd.63	61.1	246.3	144.8	98.0	24.9
Gm. 39 x Sd.7	60.0	250.5	150.4	96.0	30.1
Gm. 39 x Sd.63	60.0	248.4	147.4	95.0	24.2
Gm. 41 x Sd.7	62.5	240.4	146.9	98.0	25.4
Gm. 41 x Sd.63	60.5	249.4	146.9	95.0	27.0
Gm. 42 x Sd.7	62.9	250.8	148.1	97.0	26.4
Gm. 42 x Sd.63	60.5	248.5	147.1	97.0	27.1
Gm. 43 x Sd.7	59.5	246.8	143.1	98.0	25.9
Gm. 43 x Sd.63	61.4	230.6	133.3	97.0	22.9
Gm. 45 x Sd.7	64.5	242.5	141.6	94.0	23.9
Gm. 45 x Sd.63	63.6	246.5	151.4	97.0	28.2
Gm. 46 x Sd.7	62.1	257.0	155.0	97.0	27.0
Gm. 46 x Sd.63	63.5	234.9	143.5	94.0	18.9
Gm. 47 x Sd.7	60.6	241.0	142.1	95.0	25.7
Gm. 47 x Sd.63	60.8	229.1	130.8	95.0	19.4
Gm. 48 x Sd.7	60.3	239.0	141.9	98.0	22.5
Gm. 48 x Sd.63	60.1	236.6	133.0	98.0	21.6
Gm. 50 x Sd.7	61.5	243.6	143.6	98.0	24.8
Gm. 50 x Sd.63	59.1	242.0	142.6	97.0	24.4
Gm. 52 x Sd.7	61.4	232.9	133.0	95.0	21.5
Gm. 52 x Sd.63	61.0	228.0	126.3	96.0	18.5
Gm. 53 x Sd.7	60.9	248.4	147.9	98.0	29.4
Gm. 53 x Sd.63	60.0	242.8	135.4	97.0	24.5
Gm. 54 x Sd.7	61.4	240.4	136.0	97.0	25.7
Gm. 54 x Sd.63	59.6	244.3	145.1	94.0	30.3
Gm. 55 x Sd.7	60.5	242.0	143.9	96.0	27.1
Gm. 55 x Sd.63	65.1	241.3	140.6	97.0	23.5
Gm. 57 x Sd.7	64.3	234.8	132.0	97.0	23.9
Gm. 57 x Sd.63	60.8	233.1	135.8	96.0	18.1
Gm. 58 x Sd.7	59.8	248.1	151.3	95.0	35.0
Gm. 58 x Sd.63	60.5	250.6	148.9	95.0	24.3
Gm. 61 x Sd.7	60.5	243.8	141.3	98.0	33.2
Gm. 61 x Sd.63	60.4	230.6	139.5	96.0	20.8
Gm. 63 x Sd.7	65.4	252.9	145.6	96.0	21.8
Gm. 63 x Sd.63	63.8	245.9	152.0	97.0	23.2
Gm. 65 x Sd.7	65.3	250.4	152.3	95.0	28.8
Gm. 65 x Sd.63	62.0	236.5	136.5	98.0	17.6
Gm. 68 x Sd.7	60.8	245.0	142.4	98.0	26.9
Gm. 68 x Sd.63	64.9	229.6	134.6	97.0	22.1
average	61.4	243.2	143.8	96.3	25.7
S.C. 10	63.8	259.3	153.8	100.0	30.2
S.C. 128	59.6	242.3	142.4	96.0	29.4
$LSD_{0.05}$	1.3	7.0	6.9	0.8	3.4

Table 3. Variance for general (δ^2 GCA) and specific (δ^2 SCA) combining ability combined over locations

	Days to 50% silking	Plant height	Ear height	Resistance to lat wilt	Grain yield ard/fed
δ^2 G.C.A	0.40	23.79	19.58	0.09	7.93
δ^2 S.C.A	-8.63	-671.23	-493.66	-6.01	-150.49
δ^2 G.C.A / δ^2 S.C.A	-0.05	-0.04	-0.04	-0.10	-0.05
δ^2 G.C.A x Loc.	-0.79	35.67	-31.63	-0.14	-8.26
δ^2 S.C.A x Loc.	20.84	1383.71	1019.06	1.85	320.68
δ^2 G.C.A x Loc ./ δ^2 S.C.A x Loc.	-0.04	0.03	-0.03	-0.08	-0.03

Table 4. General combining ability effects ($\hat{g}_i$) of 25 inbred lines and 2 testers for grain yield and other agronomic traits combined over two locations, during 2012 season.

Parents		Days to 50% silking	Plant height	Ear height	Resistance to lat wilt	Grain yield ard/fed
Testers						
Sd 7		0.10	2.43**	1.86**	0.06	2.01**
Sd 63		-0.10	-2.43**	-1.86**	-0.06	-2.01**
SE testers						
g_i	0.05	0.20	1.44	1.38	0.45	0.60
	0.01	0.26	1.86	1.78	0.59	0.78
Lines						
Gm. 25		0.03	6.78**	7.78**	0.19	-1.39
Gm. 29		-0.91**	-0.72	3.60	-0.19	2.08
Gm. 30		-0.47	3.84	5.53*	-0.69	5.71**
Gm. 32		-1.04**	10.47**	7.41**	1.07	1.66
Gm. 35		-1.10**	-3.66	-0.78	0.57	6.32**
Gm. 36		-0.41	3.97	3.91	-0.44	3.99**
Gm. 39		-1.41**	6.28*	5.10*	-1.19	1.38
Gm. 41		0.09	1.72	3.10	-0.19	0.43
Gm. 42		0.28	6.47*	3.85	0.57	0.99
Gm. 43		-0.97**	-4.47	-5.59*	0.82	-1.33
Gm. 45		2.65**	1.34	2.72	-0.69	0.29
Gm. 46		1.40**	2.78	5.47*	-0.69	-2.80**
Gm. 47		-0.72*	-8.10**	-7.34**	-1.19	-3.17**
Gm. 48		-1.22**	-5.35*	-6.34**	1.44	-3.66**
Gm. 50		-1.10**	-0.35	-0.66	0.82	-1.16
Gm. 52		-0.22	-12.72**	-14.16**	-1.31	-5.75**
Gm. 53		-0.97**	2.41	-2.16	1.32	1.23
Gm. 54		-0.91**	-0.85	-3.22	-0.94	2.24*
Gm. 55		1.40**	-1.53	-1.53	0.32	-0.44
Gm. 57		1.09**	-9.22**	-9.91**	0.07	-4.76**
Gm. 58		-1.29**	6.22*	6.28**	-1.19	3.91**
Gm. 61		-0.97**	-5.97*	-3.41	0.69	1.23
Gm. 63		3.15**	6.22*	5.03	-0.06	-3.25**
Gm. 65		2.22**	0.28	0.60	0.19	-2.55*
Gm. 68		1.40**	-5.85*	-5.28*	0.69	-1.23
SE lines						
g_i	0.05	0.70	5.08	4.87	1.59	2.14
	0.01	0.90	6.57	6.29	2.07	2.76

***,** refer to 0.05 and 0.01 level of significantly, respectively .**

Table 5. Specific combining ability ($\hat{s}_{ij}$) effects of 50 top crosses (25 inbred line and 2 testers) for grain yield and other agronomic traits combined over two locations, during 2012 season.

crosses		Days to 50% silking	Plant height	Ear height	Resistance to lae wilt	Grain yield ard/fed
Gm. 25 x Sd.7		-0.29	1.51	1.46	-1.31	-1.44
Gm. 25 x Sd.63		0.29	-1.51	-1.46	1.31	1.44
Gm. 29 x Sd.7		0.53	-2.75	1.52	0.32	2.32
Gm. 29 x Sd.63		-0.53	2.75	-1.52	-0.32	-2.32
Gm. 30 x Sd.7		-0.29	1.94	1.71	0.32	0.35
Gm. 30 x Sd.63		0.29	-1.94	-1.71	-0.32	-0.35
Gm. 32 x Sd.7		-1.23*	-1.43	-1.17	-0.19	1.98
Gm. 32 x Sd.63		1.23*	1.43	1.17	0.19	-1.98
Gm. 35 x Sd.7		0.21	-2.18	-3.23	-0.44	-1.97
Gm. 35 x Sd.63		-0.21	2.18	3.23	0.44	1.97
Gm. 36 x Sd.7		-0.23	-1.56	1.08	-2.19	2.79
Gm. 36 x Sd.63		0.23	1.56	-1.08	2.19	-2.79
Gm. 39 x Sd.7		-0.10	-1.37	-0.36	0.32	0.96
Gm. 39 x Sd.63		0.10	1.37	0.36	-0.32	-0.96
Gm. 41 x Sd.7		0.90	-6.93	-1.86	1.32	-2.78
Gm. 41 x Sd.63		-0.90	6.93	1.86	-1.32	2.78
Gm. 42 x Sd.7		1.09*	-1.31	-1.36	0.32	-2.36
Gm. 42 x Sd.63		-1.09*	1.31	1.36	-0.32	2.36
Gm. 43 x Sd.7		-1.04*	5.63	3.08	0.57	-0.48
Gm. 43 x Sd.63		1.04*	-5.63	-3.08	-0.57	0.48
Gm. 45 x Sd.7		0.34	-4.43	-6.73	-1.44	-4.17
Gm. 45 x Sd.63		-0.34	4.43	6.73	1.44	4.17**
Gm. 46 x Sd.7		-0.79	8.63**	3.90	1.57	2.02**
Gm. 46 x Sd.63		0.79	-8.63**	-3.90	-1.57	-2.02
Gm. 47 x Sd.7		-0.16	3.51	3.83	0.07	1.13
Gm. 47 x Sd.63		0.16	-3.51	-3.83	-0.07	-1.13
Gm. 48 x Sd.7		-0.04	-1.25	2.58	0.19	-1.57
Gm. 48 x Sd.63		0.04	1.25	-2.58	-0.19	1.57
Gm. 50 x Sd.7		1.09*	-1.62	-1.36	0.57	-1.83
Gm. 50 x Sd.63		-1.09*	1.62	1.36	-0.57	1.83
Gm. 52 x Sd.7		0.09	0.01	1.52	-0.56	-0.55
Gm. 52 x Sd.63		-0.09	-0.01	-1.52	0.56	0.55
Gm. 53 x Sd.7		0.34	0.38	4.40	0.32	0.43
Gm. 53 x Sd.63		-0.34	-0.38	-4.40	-0.32	-0.43
Gm. 54 x Sd.7		0.78	-4.37	-6.42	1.57	-4.31**
Gm. 54 x Sd.63		-0.78	4.37	6.42	-1.57	4.31**
Gm. 55 x Sd.7		-2.41**	-2.06	-0.23	-0.69	-0.24
Gm. 55 x Sd.63		2.41**	2.06	0.23	0.69	0.24
Gm. 57 x Sd.7		1.65**	-1.62	-3.73	0.57	0.88
Gm. 57 x Sd.63		-1.65**	1.62	3.73	-0.57	-0.88
Gm. 58 x Sd.7		-0.48	-3.68	-0.67	-0.19	3.39**
Gm. 58 x Sd.63		0.48	3.68	0.67	0.19	-3.39**
Gm. 61 x Sd.7		-0.04	4.13	-0.98	0.94	4.22**
Gm. 61 x Sd.63		0.04	-4.13	0.98	-0.94	-4.22**
Gm. 63 x Sd.7		0.71	1.07	-5.04	-0.81	-2.71
Gm. 63 x Sd.63		-0.71	-1.07	5.04	0.81	2.71
Gm. 65 x Sd.7		1.53**	4.51	6.02	-1.56	3.59
Gm. 65 x Sd.63		-1.53**	-4.51	-6.02	1.56	-3.59*
Gm. 68 x Sd.7		-2.16**	5.26	2.02	0.44	0.36*
Gm. 68 x Sd.63		2.16**	-5.26	-2.02	-0.44	-1.44
SE S_{IJ}	0.05	1.01	7.19	6.88	2.24	3.02
	0.01	1.31	9.29	8.90	2.94	3.90

Table (6): Superiority percentages of the fifty single crosses relative to two check hybrids for grain yield under the combined data.

CROSSES	Grain yield ard/fed	
	SC 10	SC128
Gm. 25 x Sd.7	-17.4*	-15.1*
Gm. 25 x Sd.63	-21.1*	-18.9*
Gm. 29 x Sd.7	6.6	9.5
Gm. 29 x Sd.63	-22.1*	-19.9*
Gm. 30 x Sd.7	12.1*	15.2*
Gm. 30 x Sd.63	-3.5	-0.8
Gm. 32 x Sd.7	4.1	7.0
Gm. 32 x Sd.63	-22.4*	-20.2*
Gm. 35 x Sd.7	6.4	9.4
Gm. 35 x Sd.63	6.1	9.1
Gm. 36 x Sd.7	14.5*	17.7*
Gm. 36 x Sd.63	-17.3*	-15.0*
Gm. 39 x Sd.7	-0.3	2.5
Gm. 39 x Sd.63	-19.9*	-17.7*
Gm. 41 x Sd.7	-15.8*	-13.5*
Gm. 41 x Sd.63	-10.7	-8.2
Gm. 42 x Sd.7	-12.5*	-10.1*
Gm. 42 x Sd.63	-10.2	-7.7
Gm. 43 x Sd.7	-14.0*	-11.6*
Gm. 43 x Sd.63	-24.1*	-22.0*
Gm. 45 x Sd.7	-20.9*	-18.7*
Gm. 45 x Sd.63	-6.5	-3.9
Gm. 46 x Sd.7	-10.6*	-8.1
Gm. 46 x Sd.63	-37.3*	-35.5*
Gm. 47 x Sd.7	-14.8*	-12.4*
Gm. 47 x Sd.63	-35.6*	-33.8*
Gm. 48 x Sd.7	-25.3*	-23.3*
Gm. 48 x Sd.63	-28.2*	-26.2*
Gm. 50 x Sd.7	-17.9*	-15.6*
Gm. 50 x Sd.63	-19.1*	-16.8*
Gm. 52 x Sd.7	-28.9*	-26.9*
Gm. 52 x Sd.63	-38.5*	-36.8*
Gm. 53 x Sd.7	-2.5	0.2
Gm. 53 x Sd.63	-18.6*	-16.4*
Gm. 54 x Sd.7	-14.9*	-12.5*
Gm. 54 x Sd.63	0.4	3.2
Gm. 55 x Sd.7	-10.3	-7.8
Gm. 55 x Sd.63	-22.0*	-19.8*
Gm. 57 x Sd.7	-20.9*	-18.7*
Gm. 57 x Sd.63	-40.0*	-38.3*
Gm. 58 x Sd.7	16.2*	19.4*
Gm. 58 x Sd.63	-19.6*	-17.4*
Gm. 61 x Sd.7	10.0	13.1*
Gm. 61 x Sd.63	-31.2*	-29.3*
Gm. 63 x Sd.7	-27.8*	-25.8*
Gm. 63 x Sd.63	-23.1*	-20.9*
Gm. 65 x Sd.7	-4.6	-1.9
Gm. 65 x Sd.63	-41.7*	-40.0*
Gm. 68 x Sd.7	-10.9	-8.4
Gm. 68 x Sd.63	-26.6 *	-24.6*
SE 5 %	3.36	3.36

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تقدير نوع الفعل الجيني لمحصول الحبوب في بعض سلالات الذرة الشامية البيضاء الجديدة باستخدام التهجين القمي

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إجريت هذه الدراسة خلال الموسمين الزراعيين ٢٠١١ ، ٢٠١٢ بمحطتي البحوث الزراعية بالجميزة وملوي. في موسم ٢٠١١ تم إجراء التهجين القمي في محطة البحوث الزراعية بالجميزة بين ٢٥ سلالة بيضاء مستنبطة من مجتمع جيزة٢ مع كشافيين هما السلالة سدس ٧ والسلالة سدس ٦٣ . وفي موسم ٢٠١٢ تم تقييم الـ ٥٠ هجين فردي المنتجة من الموسم الأول بالإضافة إلى هجينين المقارنة وهما هـ٠ف ١٠ ، هـ٠ف ١٢٨ في موقعي الجميزة وملوي. وكانت الصفات محل الدراسة هي عدد الإيام من الزراعة حتى ظهور ٥٠% من النورة المؤنثة ارتفاع النبات والكوز والنسبة المئوية للمقاومة لمرض الذبول المتأخر ومحصول الحبوب أردب/فدان. وكانت أهم النتائج المتحصل عليها ما يلي :

١. أظهرت النتائج إلى أن التباين الراجع إلى كل من الهجن والسلالات والكشافات عالية المعنوية لجميع الصفات تحت التحليل المشترك.
٢. الفعل الجيني الغير مضيف كان له الدور الرئيسي في وراثة جميع الصفات محل الدراسة.
٣. أظهرت السلالة الكشاف سدس ٧ قدرة عالية على التآلف لصفة المحصول.
٤. أظهرت النتائج إلى أن السلالات جميزة ٣٠ ، ٣٥ ، ٣٦ ، ٥٤ ، ٥٨ ذات قدرة عالية على التآلف لصفة محصول الحبوب.
٥. توصي هذه الدراسة بتفوق الهجن جميزة ٣٠ × سدس ٧ ، جميزة ٣٦ × سدس ٧ ، جميزة ٥٨ × سدس ٧ تفوقاً معنويا على أفضل هجن المقارنة هـ٠ف ١٠ في صفة محصول الحبوب وهذه الهجن يمكن استخدامها في تحسين برنامج بحوث الذرة الشامية.

قام بتحكيم البحث

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