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# COMBINING ABILITY FOR NEW TWENTY ONE YELLOW MAIZE INBRED LINES

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## ABSTRACT

Twenty one new yellow inbred lines from $S_5$ of maize were top crossed with two inbred lines Sk-73 and Sk-6241 as testers at Sakha Agriculture Research Station in 2004 growing season. The fourty two single crosses and two commercial hybrids SC155 and SC pioneer 3084 were evaluated in summer 2005 at Sakha and Mallawi Research Stations. The data were taken on silking date (days), plant height (cm), ear length (cm) and grain yield (ard/fed.).The results of the present study combined over two locations could be summarized as follows:

Mean squares for testers and lines were significant over the two locations for all traits except plant height for testers. Significant differences were also, detected of lines x testers interaction for all the studied traits except plant height.

Additive genetic variances played an important role in the inheritance for grain yield and silking date while the non-additive genetic variances played an important role in the inheritance of plant height and ear length. The magnitude of the interaction between SCA with location was higher than of GCA x location for grain yield and plant height.

The new inbred lines Sk-L1, Sk-L17, Sk-L20 and Sk-L21 exhibited the highest positive and significant GCA effects for grain yield and ear length . while, the new inbred lines Sk-L1, Sk-L2, Sk-L3, Sk-L4, Sk-L16 and Sk-L20 had the highest negative and significant GCA effects for number of days to 50% silking (earliness).

Ten single crosses (Sk-73 x Sk-L20), (Sk-73 x Sk-L21), (Sk-6241 x Sk-L6), (Sk-6241 x Sk-L12), (Sk-6241 x Sk L-15), (Sk-6241 x SkL-16),(Sk-6241 x Sk-L17), (Sk-6241 x Sk-L18), (Sk-6241 x Sk-L20) and (Sk-6241 x Sk-L21) were significantly increased than the commercial SC 3084 (27 ard/fed.) and higher than commercial SC155 (30.9 ard/fed.) but not significantly for grain yield. Meanwhile, five single crosses (Sk-6241 x Sk-L4), (Sk-6241 x Sk-L7), (Sk-6241 x Sk-L16), (Sk-6241 x L19) and (Sk-6241 x Sk-L20) were significantly negative for number of days to silking toward earliness.

These single crosses would be prospective and more efficient to be used in maize breeding programs for improving grain yield and earliness.

## INTRODUCTION

Top crossing have been used fairly widely for the preliminary evaluation combining ability of new inbred lines (Jenkins, 1978), but there is no general agreement about the best type and number of testers for this purpose. Hallauer and Miranda (1981) found that the low performing testers gave a better idea of GCA of the lines than high performing testers. Ali and

Tepora (1986) found that the inbred line as a narrow genetic base exhibited the highest genetic variation in the test crosses progenies for general combining ability effects for grain yield. Mahmoud (1996) stated that the most efficient testers were those of narrow genetic base followed by broad genetic base. Many investigators suggested that GCA effects were more important than SCA effects in the inheritance of grain yield, from them, Shehata ((1992), El-Zeir *et al.,* (1993) and El-Zeir *et al.,*(2000)), while Lonnquist and Gardener (1961), Shehata and Dhawan (1975) and Mosa (2001) found that SCA effects were more important than GCA effects in the inheritance of grain yield.

**The main objectives of this investigation were as follows.**

- Evaluation 21 new inbred lines of maize in top crosses with two testers under two locations.
- To determine the important type of gene action.
- To identify the most superior lines and top crosses to improve the yielding ability in maize breeding programs.

## MATERIALS AND METHODS

Twenty ne new yellow inbred lines from $S_5$ of yellow maize derived at Sakha Agricultural Research Station. These 21 inbred lines were crossed with two inbred testers; Sk-73 and Sk-6241 in summer 2004. The fourty two single crosses and two commercial hybrids, SC155 and SC pioneer 3084 were evaluated at Sakha and Mallawi Research Stations in summer 2005 season. A Randomized Complete Block Design (RCBD) with four replications was used in the two locations. Plot size was one row, 6 m long, 80 cm apart and 25 cm between hills. All recommended agronomic practices were done from sowing to harvesting.

Data recorded on number of days from sowing to 50% emergence silking, plant height (cm), ear length (cm) and grain yield per plot adjusted to 15.5% moisture content after that was transfered to (ard/fed.)

Analysis of variance for the combined data over two locations were done according to Steel and Torrie (1980). Line x tester analysis according to Sing and Chaudhary (1985) was done for combined data over two locations.

## RESULTS AND DISCUSSION

Mean squares of the lines x testers analysis on four traits over two locations are shown in Table (1). Mean square of locations were significant for all the studied traits except plant height. These results indicated that the behavior of the traits differed from location to another. These results are in agreement with those of Soliman *et al.,* (1995), El-Zeir *et al.,*(2000) and Amer *et al.,*(2002).

Mean squares for testers and lines were significant over the two locations for all traits except plant height for testers. These results reflected the presence of great diversity among testers and inbred lines in their respective top crosses.

**Table (1): Mean squares of line x tester analysis on four traits over two locations.**

| S.O.V | d.f | Silking date (days) | Plant height (cm) | Grain yield (ard/fed.) | Ear length (cm) |
|---|---|---|---|---|---|
| Location (loc) | 1 | 614.33** | 1792.19 | 4122.02** | 192.01** |
| Rep/loc | 6 | 20.50 | 761.11 | 117.35 | 2.23 |
| Tester (T) | 1 | 133.76** | 162.96 | 1858.83** | 25.19** |
| T x loc | 1 | 2.33 | 490.58* | 33.32 | 4.29* |
| Lines (L) | 20 | 14.01** | 879.32** | 97.67** | 11.56** |
| L x loc | 20 | 1.37 | 180.98 | 11.74 | 2.84** |
| T x L | 20 | 3.69** | 259.88 | 36.85 | 6.96** |
| T x L x loc | 20 | 0.54 | 194.94 | 22.19* | 1.03 |
| Error | 258$^{+}$ | 1.16 | 141.42 | 13.14 | 0.86 |

***,** significant at the 0.05 and 0.01 levels of probability, respectively.**
**+ included checks.**

Mean squares of lines x testers interactions were significant for all the studied traits except plant height indicating that lines (females) differed in this order of performance in crosses with each of the testers (males). The interaction between lines and locations were not significant in all the studied traits except ear length. While, testers x lines x locations were not significant for all the studied traits except grain yield. These results indicated that the lines behave differently from location to another. These results are in agreement with those obtained by El-Itriby *et al.,*(1990), Soliman and Sadek (1999), El-Zeir *et al.,* (2000), Mosa (2001) and Amer *et al.,*(2002).

Mean performance of 42 top crosses and two checks on four traits over two locations are shown in Table (2). The high mean values of grain yield were obtained from ten top crosses (Sk-73 x Sk-L20), (Sk-73 x Sk-L21), (Sk-6241 x Sk-L6), (Sk-6241 x Sk-L12), (Sk-6241 x Sk- L15), (Sk-6241 x Sk-L16),(Sk-6241 x Sk-L17), (Sk-6241 x Sk-L18), (Sk-6241 x Sk-L20) and (Sk-6241 x Sk-L21). These ten top crosses exceed significantly in grain yield the SC pioneer 3084 while nine of then outyielded in significantly the check SC155 according the L.S.D. in the last line of Table (2). Seven top crosses (Sk-73 x Sk-L1), (Sk-73 x Sk-L21), (Sk-6241 x Sk-L8), (Sk-6241 x Sk-L9), (Sk-6241 x Sk-L10), (Sk-6241 x Sk-L11) and (Sk-6241 x Sk-L12) were increased significantly than the two checks SC155 and SC pioneer3084 for ear length. Meanwhile, five top crosses (Sk-6241 x Sk-L2), (Sk-6241 x Sk-L7),( Sk-6241 x Sk-L16), (Sk-6241 x Sk-L19) and (Sk-6241 x Sk-L20) were significantly decreased toward earliness than the two checks.

Estimates of GCA and SCA variances and their interactions with two locations are given in Table (3). The results showed that the GCA was higher than SCA for grain yield and silking date indicating that the additive genetic variance played an important role in the inheritance of these traits than the non-additive genetic variance. These results are in agreement with those of Ali and Tepora (1986), Mosatafa *et al.,*(1995), Mahmoud (1996), El-Zeir (1999) and Amer et al., (2002) for grain yield, Mahmoud (1996) and Soliman and Sadek (1999), for silking date, while the SCA exceeded the GCA for plant height and ear length indicating that the non- additive genetic variance played an important role in the inheritance of these traits.

**Table (2): Mean performance of 42 $F_1S$ and two checks on four traits over two locations.**

| Cross | Silking date (days) | Plant height (cm) | Grain yield (ard/fed.) | Ear length (cm) |
|---|---|---|---|---|
| Sk-73xSk-L1 | 59.62 | 239.12 | 29.68 | 20.37 |
| Sk-73xSk-L2 | 60.25 | 219.12 | 22.56 | 17.82 |
| Sk-73xSk-L3 | 60.0 | 211.00 | 22.40 | 17.92 |
| Sk-73xSk-L4 | 60.25 | 224.62 | 24.19 | 18.95 |
| Sk-73xSk-L5 | 60.75 | 247.37 | 28.03 | 18.50 |
| Sk-73xSk-L6 | 61.00 | 220.50 | 23.30 | 16.57 |
| Sk-73xSk-L7 | 61.50 | 228.62 | 26.52 | 17.40 |
| Sk-73xSk-L8 | 61.50 | 235.75 | 24.25 | 18.92 |
| Sk-73xSk-L9 | 61.62 | 227.12 | 23.61 | 17.80 |
| Sk-73xSk-L10 | 63.00 | 233.00 | 20.88 | 18.97 |
| Sk-73xSk-L11 | 61.87 | 224.00 | 24.07 | 19.07 |
| Sk-73xSk-L12 | 62.25 | 243.87 | 23.62 | 18.15 |
| Sk-73xSk-L13 | 62.62 | 239.37 | 22.61 | 16.55 |
| Sk-73xSk-L14 | 62.62 | 223.37 | 19.24 | 18.70 |
| Sk-73xSk-L15 | 62.12 | 230.12 | 23.38 | 16.77 |
| Sk-73xSk-L16 | 59.62 | 232.75 | 23.25 | 19.25 |
| Sk-73xSk-L17 | 61.62 | 230.87 | 27.01 | 20.45 |
| Sk-73xSk-L18 | 62.25 | 238.50 | 25.38 | 19.20 |
| Sk-73xSk-L19 | 62.00 | 242.25 | 22.83 | 17.17 |
| Sk-73xSk-L20 | 60.62 | 238.00 | 32.35 | 19.37 |
| Sk-73xSk-L21 | 61.87 | 250.50 | 30.79 | 20.55 |
| Sk-6241xSk-L1 | 59.87 | 244.87 | 29.31 | 19.35 |
| Sk-6241xSk-L2 | 58.75 | 230.75 | 27.20 | 18.70 |
| Sk-6241xSk-L3 | 59.37 | 220.75 | 27.36 | 17.33 |
| Sk-6241xSk-L4 | 59.37 | 235.75 | 29.92 | 18.62 |
| Sk-6241xSk-L5 | 60.50 | 247.50 | 29.89 | 19.05 |
| Sk-6241xSk-L6 | 59.75 | 235.62 | 33.57 | 18.02 |
| Sk-6241xSk-L7 | 59.12 | 224.50 | 26.94 | 18.35 |
| Sk-6241xSk-L8 | 61.75 | 236.12 | 29.02 | 20.42 |
| Sk-6241xSk-L9 | 59.87 | 234.75 | 25.36 | 20.00 |
| Sk-6241xSk-L10 | 60.12 | 227.75 | 28.45 | 20.00 |
| Sk-6241xSk-L11 | 61.00 | 221.50 | 27.60 | 20.52 |
| Sk-6241xSk-L12 | 61.37 | 230.87 | 32.71 | 19.97 |
| Sk-6241xSk-L13 | 61.12 | 237.00 | 26.78 | 19.85 |
| Sk-6241xSk-L14 | 61.50 | 237.25 | 25.42 | 19.12 |
| Sk-6241xSk-L15 | 60.25 | 231.62 | 30.97 | 18.75 |
| Sk-6241xSk-L16 | 58.75 | 235.62 | 32.27 | 17.92 |
| Sk-6241xSk-L17 | 60.50 | 231.87 | 31.42 | 18.75 |
| Sk-6241xSk-L18 | 61.12 | 237.00 | 31.29 | 19.40 |
| Sk-6241xSk-L19 | 58.50 | 238.00 | 28.49 | 17.15 |
| Sk-6241xSk-L20 | 58.25 | 233.50 | 32.80 | 19.15 |
| Sk-6241xSk-L21 | 61.62 | 236.50 | 31.99 | 19.12 |
| SC155 | 60.5 | 232.37 | 30.90 | 18.50 |
| SC3084 | 64.5 | 230.76 | 27.00 | 19.04 |
| LSD0.05 | 1.05 | 11.65 | 3.55 | 0.90 |

**Table(3): Estimates of genetic components and their interactions with environments.**

| | $\sigma^2$ GCA | $\sigma^2$ SCA | $\sigma^2$ GCA x loc. | $\sigma^2$ SCA x loc. |
|---|---|---|---|---|
| Silking date (days) | 1.02 | 0.393 | 0.027 | -0.155 |
| Plant height (cm) | 1.31 | 8.11 | 3.05 | 13.38 |
| Grain yield (ard/fed.) | 10.22 | 1.83 | 0.005 | 2.26 |
| Ear length (cm) | 0.096 | 0.74 | 0.053 | 0.042 |

The magnitude of the interaction for SCA x Location was markedly higher than those GCA x location for grain yield and plant height. These results indicated that the non-additive gene action was more affective to environmental differences than additive types of gene action. These results are in agreement with those obtained by Nawar and El-Hosary (1984), Sedhom (1992), Mosa (2001) and Amer et al., (2002)., while, GCA x locations was more than SCA x locations for silking date and ear length indicating that the additive types of gene action were more influenced by environmental than non additive types of gene action for these traits. These results are in agreement with those Mahmoud (1996), Soliman and Sadek (1999) and Amer et al.,(2002) for siking date.

Estimates of general combining ability effects for 21 inbred lines and two testers on four traits over two locations are presented in table (4). The results indicated that the inbred lines Sk-L1, Sk-L17, Sk-L20 and Sk-L21 exhibited the significant and positive GCA effects for grain yield and ear length. These inbred lines could be used in the maize breeding program in future. While the lines Sk-L1, Sk-L2, Sk-L3, Sk-L4, Sk-L16 and Sk-L20 had significantly negative GCA effects for silking date. These inbred lines could be of great value in the breeding program for earliness, while the inbred lines Sk-L2, Sk-L3, Sk-L7 and Sk-L11 had significantly negative GCA effects for plant height, they could be of great value in breeding program for short plants.

Estimates of specific combining ability effects for 42 $F_1$S crosses on four traits over two locations are shown in Table (5). The results showed that the best specific combining ability were observed in top crosses of (Sk-6241 x Sk-L13), (Sk-73 x Sk-L16) and (Sk-73 x Sk-L17) for ear length, (Sk-73 x Sk-L1), (Sk-6241 x Sk-L6) and (Sk-73 x Sk-L20) for grain yield

**Table (4): Estimates of general combining ability effects of 21 inbred lines on four traits over two locations.**

| Inbred lines | Silking date (days) | Plant height (cm) | Grain yield (ard/fed.) | Ear length (cm) |
|---|---|---|---|---|
| Sk-L1 | -1.00* | 8.92* | 2.46* | 0.97* |
| Sk-L2 | -1.25* | -8.13* | -2.22* | -0.52* |
| Sk-L3 | -1.06* | -17.19* | -2.28* | -1.08* |
| Sk-L4 | -0.93* | -2.88 | -0.10 | -0.026 |
| Sk-L5 | -0.12 | 14.36* | 1.96* | 0.03 |
| Sk-L6 | -0.37 | -5.00 | 1.39 | -1.46* |
| Sk-L7 | -0.43 | -6.50* | -0.35 | -0.90* |
| Sk-L8 | 0.87* | 2.86 | -0.53 | 0.91* |
| Sk-L9 | 0.00 | -2.13 | -2.72* | 0.22 |
| Sk-L10 | 0.81* | -2.69 | -2.53* | 0.84* |
| Sk-L11 | 0.68* | -10.32* | -1.35 | 0.97* |
| Sk-L12 | 1.06* | 4.30 | 1.08 | 0.34 |
| Sk-L13 | 1.12* | 5.11 | -2.35* | -0.58* |
| Sk-L14 | 1.31* | -2.75 | -4.91* | 0.16 |
| Sk-L15 | 0.43 | -2.19 | 0.02 | -1.02* |
| Sk-L16 | -1.54* | 1.11 | 0.71 | -0.15 |
| Sk-L17 | 0.31 | -1.69 | 2.21* | 0.91* |
| Sk-L18 | 0.93* | 4.67 | 1.21 | 0.47* |
| Sk-L19 | -0.50 | 7.05* | -1.28 | -1.52* |
| Sk-L20 | -1.31* | 2.67 | 5.46* | 0.53* |
| Sk-L21 | 1.00* | 10.42* | 4.14* | 0.91* |
| Sk73 | 0.63* | -0.69 | -2.34* | -0.27* |
| Sk6241 | -0.63* | 0.69 | 2.34* | 0.27* |
| $LSD_{gL}$ 0.05 | 0.52 | 5.82 | 1.77 | 0.45 |
| $LSD_{gT}$ 0.01 | 0.16 | 1.79 | 0.54 | 0.14 |

*** significant at the 0.05 level of probability.**

In general, the top crosses, Sk-6241 x Sk-L6, Sk-6241 x Sk-L16 and Sk-6241 x Sk-L20 were earlier and out yielded the two commercial crosses, SC155 and SC pioneer3084, therefore these crosses are prospective in maize breeding programs.

Percentage of the top crosses relative to SC155 and SC pioneer 3084 for silking date and grain yield over two location in Table (6) indicated that the best top crosses for earliness relative to SC155 were Sk-6241 x Sk-L2, Sk-6241x Sk-L3 and Sk-6241 x Sk-L4, Sk-6241 x Sk-L7, Sk-6241 x Sk-L16, Sk-6241 x Sk-L19 and Sk-6241 x Sk-L20, while all top crosses were significantly for earliness relative to SC3084. The best top crosses for grain yield were Sk-73 x Sk-L20 (4.69%), Sk-6241 x Sk-L6 (8.64%), Sk-6241 x Sk-L12 (5.86%), Sk-6241x Sk-L16 (4.43%) and Sk-6241 x Sk-L20 (6.15%) relative to SC155, while top crosses i.e., Sk-73 x Sk-L20, Sk-73 x Sk-L21, Sk-6241 x Sk-L6, Sk-6241 x Sk-L12, Sk-6241 x Sk-L15, Sk-6241 x Sk-L16, Sk-6241 x Sk-L17, Sk-6241 x Sk-L18, Sk-6241 x Sk-L20 and Sk-6241 x Sk-L21 expressed for grain yield relative to SC3084 with percentage of, 19.81, 14.04, 24.33, 21.15, 14.70, 19.52, 16.37, 15.89, 21.48 and 18.48, respectively.

**Table (5): Estimates of specific combining ability effects for 42 $F_1$S crosses on four traits over two locations.**

| Cross | Silking date (days) | Plant height (cm) | Grain yield (ard/fed.) | Ear length (cm) |
|---|---|---|---|---|
| Sk-73 x Sk-L1 | -0.75 | -2.17 | 2.53 | 0.77 |
| Sk-6241 x Sk-L1 | 0.75 | 2.17 | -2.53 | -0.77 |
| Sk-73 x Sk-L2 | 0.11 | -5.11 | -0.02 | -0.22 |
| Sk-6241 x Sk-L2 | -0.11 | 5.11 | 0.02 | 0.22 |
| Sk-73 x Sk-L3 | -0.31 | -4.17 | -0.21 | 0.58 |
| Sk-6241 x Sk-L3 | 0.31 | 4.17 | 0.21 | -0.58 |
| Sk-73 x Sk-L4 | -0.19 | -4.86 | -0.52 | 0.52 |
| Sk-6241 x Sk-L4 | 0.19 | 4.86 | 0.52 | -0.52 |
| Sk-73 x Sk-L5 | -0.50 | 0.63 | 1.40 | 0.08 |
| Sk-6241 x Sk-L5 | 0.50 | -0.63 | -1.40 | -0.08 |
| Sk-73 x Sk-L6 | 0.00 | -6.86 | -2.77 | -0.41 |
| Sk-6241 x Sk-L6 | 0.00 | 6.86 | 2.77 | 0.41 |
| Sk-73 x Sk-L7 | 0.55 | 2.75 | 2.09 | -0.22 |
| Sk-6241 x Sk-L7 | -0.55 | -2.75 | -2.09 | 0.22 |
| Sk-73 x Sk-L8 | -0.75 | 0.50 | -0.09 | -0.41 |
| Sk-6241 x Sk-L8 | 0.75 | -0.50 | 0.09 | 0.41 |
| Sk-73 x Sk-L9 | 0.24 | -3.11 | 1.47 | -0.84 |
| Sk-6241 x Sk-L9 | -0.24 | 3.11 | -1.47 | 0.84 |
| Sk-73 x Sk-L10 | 0.80 | 3.32 | -1.34 | -0.47 |
| Sk-6241 x Sk-L10 | -0.80 | -3.32 | 1.34 | 0.47 |
| Sk-73 x Sk-L11 | -0.19 | 1.94 | -0.59 | -0.47 |
| Sk-6241 x Sk-L11 | 0.19 | -1.94 | 0.59 | 0.47 |
| Sk-73 x Sk-L12 | -0.19 | 7.19 | -2.21 | -0.59 |
| Sk-6241 x Sk-L12 | 0.19 | -7.19 | 2.21 | 0.59 |
| Sk-73 x Sk-L13 | 0.11 | 1.88 | -0.22 | -1.41* |
| Sk-6241 x Sk-L13 | -0.11 | -1.88 | 0.22 | 1.41* |
| Sk-73 x Sk-L14 | -0.06 | -6.24 | -0.71 | 0.08 |
| Sk-6241 x Sk-L14 | 0.06 | 6.24 | 0.71 | -0.08 |
| Sk-73 x Sk-L15 | 0.30 | -0.05 | -1.52 | -0.72 |
| Sk-6241 x Sk-L15 | -0.30 | 0.05 | 1.52 | 0.72 |
| Sk-73 x Sk-L16 | -0.19 | -0.74 | -2.09 | 0.90* |
| Sk-6241 x Sk-L16 | 0.19 | 0.74 | 2.09 | -0.90* |
| Sk-73 x Sk-L17 | -0.06 | 0.19 | 0.15 | 1.08* |
| Sk-6241 x Sk-L17 | 0.06 | -0.19 | -0.15 | -1.08* |
| Sk-73 x Sk-L18 | -0.06 | 1.44 | -0.59 | 0.27 |
| Sk-6241 x Sk-L18 | 0.06 | -1.44 | 0.59 | -0.27 |
| Sk-73 x Sk-L19 | 1.11* | 2.82 | -0.34 | 0.27 |
| Sk-6241 x Sk-L19 | -1.11* | -2.82 | 0.34 | -0.27 |
| Sk-73 x Sk-L20 | 0.55 | 2.94 | 2.15 | 0.39 |
| Sk-6241 x Sk-L20 | -0.55 | -2.94 | -2.15 | -0.39 |
| Sk-73 x Sk-L21 | 0.50 | 7.69 | -1.84 | 0.83 |
| Sk-6241 x Sk-L21 | -0.50 | -7.69 | 1.84 | -0.83 |
| LSD $S_{LT}$ 0.05 | 1.05 | 11.65 | 3.55 | 0.90 |
| LSD $S_{LT}$ 0.01 | | | | |

*** significant at the 0.05 level of probability.**

**Table (6): Estimates of percentage of top crosses relative to SC155 and SC pioneer 3084 for silking date and grain yield over two locations.**

| Cross | Silking date (days) | | Grain yield (ard/fed.) | |
|---|---|---|---|---|
| | SC155 | SC3084 | SC155 | SC3084 |
| Sk-73x Sk-L1 | -1.45 | -7.57* | -3.95 | 9.93 |
| Sk-73x Sk-L2 | -0.41 | -6.59* | -26.99* | -16.44* |
| Sk-73x Sk-L3 | -0.83 | -6.98* | -27.51* | -17.04* |
| Sk-73x Sk-L4 | -0.41 | -6.59* | -21.72* | -10.41 |
| Sk-73x Sk-L5 | 0.41 | -5.81* | -9.29 | 3.81 |
| Sk-73x Sk-L6 | 0.83 | -5.43* | -24.60* | -13.70* |
| Sk-73x Sk-L7 | 1.65 | -4.65* | -14.17* | -1.78 |
| Sk-73x Sk-L8 | 1.65 | -4.65* | -21.52* | -10.19 |
| Sk-73x Sk-L9 | 1.85* | -4.47* | -23.59* | -12.56 |
| Sk-73x Sk-L10 | 4.13* | -2.33* | -32.43* | -22.67* |
| Sk-73x Sk-L11 | 2.26* | -4.08* | -22.10* | -10.85 |
| Sk-73x Sk-L12 | 2.89* | -3.49* | -23.56* | -12.52 |
| Sk-73x Sk-L13 | 3.50* | -2.91* | -26.83* | -16.26* |
| Sk-73x Sk-L14 | 3.50* | -2.91* | -37.73* | -28.74* |
| Sk-73x Sk-L15 | 2.68* | -3.69* | -24.34* | -13.41* |
| Sk-73x Sk-L16 | -1.45 | -7.57* | -24.76* | -13.89* |
| Sk-73x Sk-L17 | 1.85* | -4.47* | -12.59* | 0.04 |
| Sk-73x Sk-L18 | 2.89* | -3.49* | -17.86* | -6.00 |
| Sk-73x Sk-L19 | 2.48* | -3.88* | -26.12* | -15.44* |
| Sk-73x Sk-L20 | 0.20 | -6.02* | 4.69 | 19.81* |
| Sk-73x Sk-L21 | 2.26* | -4.08* | -0.36 | 14.04* |
| Sk-6241x Sk-L1 | -1.04 | -7.18* | -5.15 | 8.56 |
| Sk-6241x Sk-L2 | -2.89* | -8.91* | -11.97* | 0.74 |
| Sk-6241x Sk-L3 | -1.87* | -7.95* | -11.46 | 1.33 |
| Sk-6241x Sk-L4 | -1.87* | -7.95* | -3.17 | 10.81 |
| Sk-6241x Sk-L5 | 0.0 | -6.20* | -3.27 | 10.70 |
| Sk-6241x Sk-L6 | -1.24 | -7.36* | 8.64 | 24.33* |
| Sk-6241x Sk-L7 | -2.28* | -8.34* | -12.82* | -0.22 |
| Sk-6241x Sk-L8 | 2.07* | -4.26* | -6.08 | 7.48 |
| Sk-6241x Sk-L9 | -1.04 | -7.18* | -17.93* | -6.07 |
| Sk-6241x Sk-L10 | -0.63 | -6.79* | -7.93 | 5.37 |
| Sk-6241x Sk-L11 | 0.83 | -5.43* | -10.68 | 2.22 |
| Sk-6241x Sk-L12 | 1.44 | -4.85* | 5.86 | 21.15* |
| Sk-6241x Sk-L13 | 1.02 | -5.24* | -13.33* | -0.81 |
| Sk-6241x Sk-L14 | 1.65 | -4.65* | -17.73* | -5.85 |
| Sk-6241x Sk-L15 | -0.41 | -6.59* | 0.23 | 14.70* |
| Sk-6241x Sk-L16 | -2.89* | -8.91* | 4.43 | 19.52* |
| Sk-6241x Sk-L17 | 0.00 | -6.20* | 1.68 | 16.37* |
| Sk-6241x Sk-L18 | 1.02 | -5.24* | 1.26 | 15.89* |
| Sk-6241x Sk-L19 | -3.31* | -9.30* | -7.80 | 5.52 |
| Sk-6241x Sk-L20 | -3.72 | -9.69* | 6.15 | 21.48* |
| Sk-6241x Sk-L21 | 1.85* | -4.47* | 3.53 | 18.48* |

*** significant at the 0.05 level of probability.**

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## قدرة التالف فى إحدى وعشرون سلالة جديدة من الذرة الشامية الصفراء

**عصام عبد الفتاح عامر و عباس عبد الحى الشناوى**
**مركز البحوث الزراعية- معهد المحاصيل الحقلية- محطة بحوث سخا- قسم بحوث الذرة الشامية**

تم التهجين القمى بين احدى وعشرون سلاله صفراء جديدة من الذرة الشامية فى الجيل الذاتى الخامس مع اثنين من السلالات الكشافة هما سخا ٧٣ وسخا ٦٢٤١ وذلك فى محطة البحوث الزراعية بسخا خلال موسم ٢٠٠٤.

تم تقيم الـ ٤٢ هجين فردى مع اثنين من هجن المقارنة التجارية هـ.ف ١٥٥ وهـ.ف بايونير ٣٠٨٤ وذلك فى صيف ٢٠٠٥ فى محطتى بحوث سخا وملوى تم اخذ البيانات على الصفات الاتية عدد الايام للوصول الى ٥٠% من التزهير ( ظهور الحريرة) ، ارتفاع النبات ، طول الكوز ومحصول الحبوب بالاردب /فدان.

ويمكن تلخيص اهم النتائج لهذه الدراسة كمتوسط للموقعين كما يلى:-

- كانت البيانات معنوية لكلا من السلالات المختبرة و الكشافة على مستوى الموقعين وذلك لكل الصفات عدا ارتفاع النبات للسلالتين الكشافتين. وقد وجدت اختلافات معنوية للتفاعل بين السلالات المختبرة والكشافات لكل الصفات المدروسة عدا ارتفاع النبات.
- لعبت العوامل الوراثية المضيفة الدور الاهم فى توريث صفات محصول الحبوب والتزهير بينما لعبت العوامل الوراثية الغير اضافية الدور الاهم فى وراثة ارتفاع النبات وطول الكوز. كان التفاعل بين القدرة الخاصة على التالف مع المواقع اعلى من التفاعل بين القدرة العامة على التالف مع المواقع وذلك لصفتى محصول الحبوب وارتفاع النبات.
- اظهرت السلالات الجديدة سخا لـ١ ، لـ١٧، لـ٢٠و لـ٢١ أعلى تقديرات موجبة للقدرة العامة على التالف لمحصول الحبوب وطول الكوز . بينما امتلكت السلالات الجديدة سخا لـ١، لـ٢، لـ٣، لـ٤ ، لـ١٦ و لـ ٢٠ اعلى تاثيرات معنوية سالبة للقدرة العامة على التالف لصفة التبكير.
- زاد محصول الحبوب لعشرة هجن فردية زيادة معنوية عن محصول الحبوب لهجين المقارنة بايونير ٣٠٨٤ (٢٧ اردب/فدان) وزادت عن هجين المقارنة هـ.ف١٥٥ (٣٠,٩ اردب/فدان) زيادة غير معنوية. بينما اظهرت خمسة هجن فردية (سخا ٦٢٤١x سخا ٤)، (سخا ٦٢٤١x سخا ٧) ، (سخا ٦٢٤١ x سخا ١٦)، (سخا٦٢٤١ x سخا١٩) و (سخا٦٢٤١ x سخا٢٠) تبكيرا معنويا عن كلا من هجيني المقارنة مما يشير الى ان هذه الهجن الجديدة سوف تكون مبشرة واكثر فاعلية فى برامج تربية الذرة الشامية لتحسين المحصول والتبكير.