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COMBINING ABILITY IN NEW HIGH OLEIC SUNFLOWER LINES

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In the high oleic sunflower breeding program of the National project TISEN, combining abilities of breeding lines were studied using a line x tester model. Test crosses combining 6 citoplasmatic male sterile testers (CMS) per 16 restorers (RHA) were made in the 2002, hand crossing three plants for each tester with 5 plants for each RHA. During 2003, the test crosses were evaluated in a randomised block design with three replications in irrigated conditions, together with three commercial controls (two conventional and one high oleic). Values of all traits were analysed by the "line x tester" analysis according the method of Kempthorne (1957) and Singh and Chouduary (1976).

Six test cross progenies performed better than the best control, two, 47/6-6 x 11 1-1-1 and 47/6-6 x Oleik 3-3-3 showed seed and oil yield, respectively, of 50 qha^{-1} and 20 q ha^{-1}, both with an oleic acid content higher than 89%. The general combining ability (GCA) of the lines was nearly always significant. The analysis of variance (Table 1) of the combining ability showed the importance of non additive component in the control of the considered traits. The ratio SCA/GCA was, in fact, always higher than one. At the same time a CMS line, 47/6-6, was, a good combiner and a good tester in evaluating the RHA, showing a high variance among test crosses. SCA was high for many crosses and those with the best values also showed the highest absolute values of the traits. The best hybrids were combinations of parents with good and bad GCA, or between two with low GCA. In the expression of individual traits the average contribution of the RHA was high for oil content and seed weight, whereas that of CMS was high for plant height.

Table 1: Analysis of variance for combining ability of RHA and CMS

Source of variation	Degree of freedom	Achenes yield (q ha^{-1})	Oil content DM. (%)	Oil yield (q ha^{-1})	Thousand seed weight (g)	Plant height (cm)
Replications	2	7,85	5,01	1,58	44,60	33,35
Crosses	95	122,28**	23,59**	24,48**	207,03**	1076,52**
Lines (L)	15	171,80*	72,97**	28,58	475,44**	1368,73**
Testers (T)	5	430,84**	103,61**	7,18**	1278,39**	12651,60**
L x T	75	91,80**	8,37**	17,10**	81,93**	246,36**
Error	190	5,08	2,23	1,0	19,92	151,11
GCA		0,28	0,14	0,01	1,16	7,73
SCA		28,91	2,05	0,07	20,67	31,75
SCA/GCA		103,25	14,64	7,00	17,81	4,11

*,** : significant per P≤ 0.05 and 0.01, respectively.

Literature

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