Determination Superior Hybrid Combinations in Sunflower and Testing Hybrid Performance in Broomrape (*Orobanche Cumana Wallr.*) Infested Areas

Oğuz GUNDUZ[1], Abdurrahim Tanju GOKSOY[2]

[1]Tekcan Seed, Kesan, Edirne, Turkey, oguzgunduz@ttmail.com

[2]Uludag University, Agriculture Faculty, Field Crops Dept. Bursa, Turkey

ABSTRACT

This research was conducted during 2004 - 2007 to estimate the parents and crosses showing superior general and specific combining abilities, F_1's hybrid vigor and genetic structure of a hybrid sunflower population in terms of phenological characters, agronomical traits, yield and quality characters and to identify suitable parents and promising hybrid combinations of resistance to Broomrape. Twenty five experimental hybrids were created using 5 cytoplasmic male sterile (CMS) and 5 pollen tester (restorer) lines having different levels of resistance to Broomrape in sunflower. Field trials of the research were made at three different locations (Center, Ferhadanli and Banarli districts) in Tekirdag province. The experiments were designed in a randomized complete block with three replications.

According to the results, the general and specific combining ability (sca) variances were highly significant for all traits investigated except days to 50% flowering. According to the general combining ability effects obtained from the all locations, A_3 (TTAE 4156A) for oil content, seed yield and oil yield were determined as the most suitable parents. The significant SCA effect and high mean values of hybrids combinations showed that A_4 x B_7, A_3 x B_7, A_4 x B_8, A_5 x B_6, A_3 x B_9 and A_3 x B_8 for seed and oil yields were promising hybrid combinations. It was found that A_3 x B_6, A_3 x B_7, A_3 x B_{10} and A_4 x B_7 hybrids produced 20-25 % more oil yield compared with the average of control cultivars in some location. The results of Broomrape test indicated that, based on the commercial checks results, all trial areas were infested with the new races. In Ferhadanli, except Sanbro, all of the hybrids have showed lower attack degree. B_{10} male line was resistant to broomrape population in all locations. A_3 x B_6 and A_3 x B_7 experimental hybrids were found highly tolerant to the new broomrape races in all locations, instead of their parents' susceptibility. Also, none of the B_{10} male line hybrids were not showing any resistance to broomrape even at tolerant level.

As a results, genotypes A_3 (TTAE 4156A), A_4 (TTAE BAH8 A), B_6 (RHA14) and B_7 (RHA 20) were the parents involved in the best-yielding crosses. Among these parents, A_3 and B_7, which possesses a considerable positive GCA effect, might be utilized as a good parent in hybrid sunflower breeding programs. On the other hand, A_3 x B_6, and A_3 x B_7 might be considered as promising hybrid combinations for higher yield based on their heterosis and heterobeltiosis values, SCA effects and resistance to Broomrape.

Key Words: Sunflower, *Helianthus annuus* L., combining ability, heterosis, line x tester, broomrape, O*robanche cumana* W., yield and quality.