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PERFORMANCE AND COMBINING ABILITY IN DIALLEL CROSSES OF MAIZE

BY

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ABSTRACT

Ten agronomic and yield properties in a set of 28 F1 crosses of eight inbreds of corn (*Zea mays*, L.) were investigated in 1991 and 1992 seasons at the Experimental Farm of the Faculty of Agriculture at Moshtohor, Qalubia. Significant general combining ability (GCA) was detected in both years except for mid-silking date of the first season only. Specific combining ability (SCA) was significant for plant height, ear diameter, number of rows/ear, number of kernels/row, weight of ears/plant and grain yield/plant in both years. High GCA/SCA ratios were obtained except for number of rows/ear and mid-silking date. The preponderance of significant SCA effects except for mid-tasseling date, ear height and ear length confirm the high consequence of both additive and non-additive effects on the inheritance of the studied traits. Most of the favorable GCA effects were located in the two inbreds P1 and P2. High incidence of SCA effects were also located in crosses including either inbreds. Percent increase or decrease from the check double cross D.C. 215 for grain yield ranged from -33.70 to 36.62 % and from -42.68 to 31.63 % in the first and second year, respectively. Crosses showing beneficial increase are quite a few.

INTRODUCTION AND REVIEW

Breeding inbreds of corn (*Zea mays*, L) that confer earliness and high yielding ability to their crosses is a major aspect of a hybrid corn program. Literature review is replete with studies on general (GCA) and specific (SCA) combining abilities derived from various diallel studies. Previous results show an agreement on a more important role of GCA in the inheritance of about all characters than SCA with the exception of grain yield/plant (7 and 13). Non-additive effects were shown to influence the inheritance of plant height, ear length and diameter, number of grains/row, weight of 100-grain and grain yield/plant, (1, 4, 5, 10, 11, 12 and 13) with the additive effects being the major portion of the genetic variance. Nevertheless, other studies showed that the inheritance of these traits depended more on non-additive effects with a lesser