Minufiya J. of Agric. Res. Vol. 41 No. 3 (2016) "Minufiya J. Plant Prod.: 567– 586 "

LINE X TESTER ANALYSIS AND HETEROSIS FOR GRAIN QUALITY CHARACTERS OF SOME PARENTAL LINES OF HYBRID RICE (*Oryza sativa* L.)

M.M.A. Awad-Allah, Mariam T. Wissa and A. M. Elmoghazy.
Rice Res. Dept. Field Crops Res. Inst., ARC, Egypt

Received: Apr. 3 , 2016 **Accepted : Apr. 28 , 2016**

ABSTRACT: *This research was conducted at the research farm of the Sakha Agriculture Research Station, Sakha, Kafr El-Sheikh, Egypt, during 2011, 2012 and 2013 years. Eighteen crosses were made between G46B, IR69625B and IR79156B as lines and IR 73000-70, IR 71137-184- 3-2-3-3, IR 74, AC 1795, Maybelle and IR 72868-1 as testers and their parents were evaluated in a randomized complete block design (RCBD) with three replications to evaluate the extent of combining ability and gene action for grain quality traits. This investigation studied the grain quality traits under Egyptian conditions. The results showed that analysis of variance of combining ability revealed significant differences among parents, crosses and line x tester interaction for most of the traits. The ratio of K^2 GCA / K^2 SCA was more than unity for grain elongation, this result indicated that the preponderance of additive gene effects in the expression of this trait. On the contrary, the ratio of K^2GCA / K^2 SCA was less than unity for grain shape, hulling percentage, milling percentage, gelatinization temperature and amylose content which indicated that preponderance of non-additive gene effects in the expression of these traits and the role of environmental conditions in controlling these traits. In addition, the study also detected the best general combiner among lines and tester for all the tested grain quality characters. The results showed that the G46B, Maybelle and IR 71137-184- 3-2-3-3 showed the best general combiners for grain shape. While, IR 73000-70 was found to be the best general combiner for amylose content percentage. Moreover, the results indicated that the crosses; IR69625B x IR 71137-184- 3-2-3-3 and IR69625B x IR 72868-1 R were found to be the best specific combiner for amylose content percentage. Moreover the crosses of G46B x AC 1795 and IR79156B x Maybelle were found to be the best specific combiner for grain shape. This indicated that the superior crosses were found to involve at least for one parent with high GCA and other parent having high, average and low GCA effects.*

Key words: *Breeding, combining ability, gene action, grain quality, hybrid rice, Oryza sativa.*