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Studies on heterosis for qualitative and quantitative traits in rice

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1 SUMMARY

The present investigation is carried out to estimate heterosis effects on the yield and its component traits in ten parent genotypes and their F1 hybrids as well as cluster analysis of the parent genotypes at the Experimental Farm of Rice Research and Training Center,(RRTC), Sakha, Kafr EL-Sheikh, Egypt during 2010 and 2011 summer seasons,. A line x tester cross was conducted among the ten parents in 2010 to produce 24 crosses. The analysis of variance revealed highly significant differences among the 34 genotypes (24 cross combinations, 4 lines and 6 testers) tested for all traits under investigation. Heterosis was found to be highly significant for all studied traits. For mid-parent heterosis, cross combination Giza 179xSKC 23819-192-2-1-2-3-1-1-1-2 scored the best values for number of tillers plant^{-1}, number of panicles plant^{-1}, number of filled grains panicle^{-1} and panicle density. The cross combination Sakha106xSKC 23819-192-2-2-1-1-2-1-2-2 gave the best values for number of days to heading (day) and 1000-grain weight (g).The cross Sakha103xSKC23819-192-2-1-2-4-5-3-2-1 gave the best values in flag leaf area (cm^2) and Spikelet's fertility%. The cross combination Sakha103x SKC23819-189-1-1-1-3-1-2-4-2 showed the lowest plant height among the genotypes studied, while the cross Sakha106x SKC23819-189-1-1-1-3-1-2-4-2 gave the highest value for grain yield plant^{-1} and for panicle weight. The cross Sakha106xSKC 23819-192-2-2-1-1-2-2-1-2 gave the highest value and for panicle length cross Giza 179x SKC23819-189-1-1-1-3-1-2-4-2 scored the highest value. For better-parent heterosis, cross combination Giza 179xSKC 23819-192-2-1-2-3-1-1-1-2 gave the highest values for number of tillers plant^{-1}, number of filled grains panicle^{-1}, panicle length and panicle density, cross Giza178x SKC 23819-192-2-1-2-2-4-2-1-2 recorded the best value for number of days to heading, for plant height the cross Sakha103x SKC23819-189-1-1-1-3-1-2-4-2 gave the best value and the cross Sakha103xSKC 23819-192-2-1-2-4-5-3-2-1 scored the highest value for flag leaf area, cross Sakha106x SKC23819-189-1-1-1-3-1-2-4-2 gave the highest value for grain yield plant^{-1}, and cross Giza 179x SKC23819-189-1-1-1-3-1-2-4-2 gave highest value for number of panicles plant^{-1}, and cross Sakha106xSKC 23819-192-2-2-1-1-2-1-2-2 scored the highest value for 1000-grain weight and Spikelet's fertility%, cross Sakha106xSKC 23819-192-2-2-1-1-2-2-1-2 gave the highest value for panicle weight. The cluster analysis showed that the parent genotypes formed two groups. The first group included only the variety Giza 178 because it was moderate in maturation. The second group included the rest of the parental genotypes according to the different traits.