

PDF - QUALITY AND GENETIC EVALUATION OF SOME GENOTYPES OF RICE (ORYZA SATIVA L.)
USING DIALLEL METHOD - researchcub.infoABSTRACT

The patterns of gene effects on agronomic and some quality traits of eight genotypes of rice (*Oryza sativa* L.) and their progenies were studied using Diallel analysis method 1 involving parents, F1 hybrids and their reciprocals. The eight genotypes studied were selected for their agronomic performance and protein content from thirty genotypes evaluated in a randomized complete block design and replicated three times at the Teaching and Research Farm of the Federal University of Technology, Owerri, Nigeria during the planting seasons of 2005 and 2006. The results of the Diallel analysis conducted during the 2007 planting season indicated larger magnitude of additive components of variance in attributes like number of tillers per plant, number of days to anthesis, panicle length, number of secondary branches per panicle, 1000-seed weight, grain width and grain length/grain width ratio. Non-additive variance was more important for plant height at flowering, number of seeds per secondary branch of panicle, grain length and percentage protein content. The nature and magnitude of general combining ability (GCA) and specific combining ability (SCA) effects, as well as the direction of heterosis assessed by the SCA effects, seemed to differ for different traits and various cross combinations. No parental line consistently had negative SCA effects for all the traits. Additive gene effects with high GCA values could be exploited in WITA 4 and Max for higher tillering ability, NERICA 1, Fofifa 16 and WAB 96-1-1 for earliness; WITA 4 and NERICA 1 for production of hybrids for greater number of secondary branches per panicle; CT 7127-49 and EMPASC 105 for development of hybrids with greater number of spikelets per panicle; NERICA 1, CT 7127-49 and EMPASC 105 for producing hybrids with more fertile grains; CT 7127-49 and NERICA 1 for developing progenies with more seeds per secondary branch of panicle; IR 57689-73 and Fofifa 16 for 1000-seed weight and CT 7127-49 and WITA 4 for developing long and fine grains. WITA 4 and EMPASC 105 were observed to be semi-dwarfs and offer themselves as candidate genotypes for reduction of plant height to reduce stem lodging and increase yield. The phenotypic generation means of the parental lines (P1 and P2), F1 and reciprocal cross and the BC1 and BC2, evaluated during the 2009 planting season for the study on genetic effects of the characters on the breeding lines generated, indicated that the F1 generation means were higher than their mid-parent values especially for percentage protein content. The F1 and F2 generation means were not significantly different in the majority of the cases except for lowland x upland and upland x lowland hybrids for percentage fertile spikelets and numbers of spikelets per panicle. Varied genetic effects were observed on the characters for generation mean analysis on six parameter model. Additive and dominance as well as epistatic gene effects were involved in the inheritance of most characters. Digenic interactions were significant for most of the traits. Presence of significant dominance effect combined with duplicate epistasis restricted the scope for simple selection for most of the characters. Reciprocal and maternal effects were also implicated for most of the traits.

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