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Estimation of Generation Mean- Five Parameter Model for the Evaluation of Drought Tolerant Lines in Rice (Oryza sativa L.)

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Abstract

In order to study mode of gene action in rice for traits related to yield [spikelet per panicle, per cent filled grains, 1000-grain weight (g) and yield per plant] and drought tolerance (proline content and stomatal behavior), six varieties of rice (HUR 3022, Sarjoo 52, Nagina 22 and Birsa Gora) were investigated under two different conditions i.e. moisture stress (rain fed) and moisture non – stress (irrigated). Direct crosses were made between drought susceptible parents (HUR 3022 and Sarjoo 52) and drought tolerant parents (Nagina 22 and Birsa Gora). F1's were back crossed with the recipient parents i.e. drought susceptible parents at Agricultural Research Farm, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi and off season at CRRI, Cuttack, Odisha in 2009- 2010. In 2010, F1's been grown and were allowed to self for obtaining F2 seeds. In the next generation F2 seeds were planted to raise F3 population. Therefore, five different populations (generations) including P1, P2, F1, F2 and F3 were planted in a randomized complete block design with three replications. The additive × additive (i) model was significant for traits spikelet per panicle, 1000 – grain weight and yield per plant in both the environments where as dominance × dominance was found to be significant for per cent filled grains in both the environments. Simple scaling test indicated that the inheritance of traits related to yield was described by non-allelic interactions mainly additive × Additive and dominance × dominance and duplicate epistasis.

Keywords: Generation Mean analysis; Gene effect; Quantitative Traits; Drought; Oryza sativa L.