

In Vitro Screening of Rice Genotypes for Drought Tolerance using Polyethylene Glycol

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Abstracts—Drought is a major abiotic factor that limits plant growth and productivity. Lack of accurate screening techniques is a limiting factor to develop rice cultivars tolerant to drought, which is the most important constraint in rice productivity. This experiment was carried out with a collection of eighteen rice genotypes to screen for drought tolerance under in vitro condition using polyethylene glycol (PEG) at four concentrations (0, 20, 30, 40 and 80 mg/l). Important seedling characters like shoot length, root length, number of primary roots per seedling, seedling fresh weight and seedling dry weight were recorded and statistically analyzed for significant differences. The genotypes recorded significant differences for all the seedling characters in response to various moisture stresses. The effects of drought stress, genotypes, and their interaction were also highly significant for all the seedling characters studied. These values gave indication that each genotype showed the different responses on drought conditions as the result of tolerance level. An increase in PEG concentrations markedly affected the seedling characters indicating precise nature of the in vitro screening. Based on results, three genotypes viz., IET 24171, Annada and Tulsibhog were found to be drought tolerant, five genotypes viz., MTU-1010, Kalo Nunia, Bonnidhan, Bitti-1 and Malsira showed medium tolerance while the rest MTU-1075, Nobin, KNS-2-D-3, Jashoya, Kalodhayapa, Mungamuthi, Tulaipanji, Fulpakri and Jaldhyapa were susceptible. The tolerance index for selection of genotypes following the equation outlined by IRRI was used for identification of tolerant rice genotype. The method used in the study appeared to be simple, cost effective and accurate in screening large set of germplasm.