Genetic diversity and selection criteria in blast resistance rice (Oryza sativa) genotypes/lines under tropical environments

ABSTRACT

Genetic diversity has been a critical step in knowing the different growth traits for selection and varietal improvement of rice. The present study aimed to estimate the phenotypic and genotypic correlation coefficients among the growth traits and to work out how to select between traits. Three field experiments were carried out in Malaysia during the cropping season of 2016/2018. Sixteen advanced blast resistant rice lines were studied in order to find out the genetic diversity in some quantitative characters and to find out the relationship between yield and yield related components by using the multivariate analysis. The field trials were conducted in a split-plot design replicated three times in a plot of 35×28.5 m2. The planting distant was 25×25 cm spacing and the plot size was 2×1.5 m2 unit for genotype in each replication. There was a significant difference among the characters, most of the genotypes responded significantly. The high phenotypic coefficient of variation (PCV), genotypic coefficient of variation (GCV), heritability, relative distance and genetic advance indicated that different traits especially tonnes per hectare (Tha), grain weight per plot (GWTPP) and kilogram per plot (kgplot) significantly influenced the yield trait. In addition, the genotypes were grouped into 9 major clusters based on the assessed characters by using the UPGMA dendrogram. Group 1 with Group VII could be hybridized in order to attain higher heterosis or the best between the genotypes, which becomes helpful in developing a good selection in rice.

Keyword: Genetic diversity; Multivariate analysis; Phenotypic variance; Genotypic variance; Cluster analysis; Rice (Oryza sativa)