Genetic architecture, inter relations in selection programme for yield enhancement in paddy (*Oryza sativa* L.)

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The present study was carried out at the Agricultural and Horticultural Research Station, Kathalagere, India. Sixty-seven sophisticated paddy breeding lines were used in the experiment. Three replications of the experiment were carried out, each with a plot size of 4 m × 3 m. Grain yield per plot (kg), grain yield per hectare (kg), plant height (cm), panicles per square meter, days to 50% flowering, and days to maturity were all noted. Genetic variability and diversity parameters – two important aspects of plant breeding – were analysed. When selecting the genotypes, varieties, and breeding lines, higher genetic and phenotypic coefficients of variability (GCV and PCV) should be taken into account to progress and prosper in the yield and yield contribution towards varietal performance. These include days to 50% flowering, days to maturity, plant height (cm), panicles per square meter, and grain yield per plot (kg). Genetic diversity studies demonstrated that the factors that contributed most to the genotypes' divergence were the following: plant height, grain production per plot, panicles per square meter, days to 50% flowering, and days to maturity. Several crossing studies have shown that transgressive segregants with high genetic yield potential and early maturity can improve the quality of some clusters, which are made up of superior genotypes.

Keywords: Diversity, genetic coefficient of variability, paddy, phenotypic coefficient of variability, yield enhancement.

than one-fifth of the world's calories and nutrients, making wheat the most important grain[3]. Hossain *et al.*[4] state that rice is composed of 75–80% carbohydrate, 12% water, and 75% protein. In addition, rice is used to make animal feed in many countries worldwide[5].

Over 50% of the world's population eats rice as a staple food. Known as the grain of life, rice is a staple cereal consumed by almost 90% of the Asian population. Nearly 94% of the world's rice production and its by-products come from the Asian continent, which also accounts for the majority of the crop. Between 2020 and 2021, India alone harvested 124.37 million tonnes of rice on an area coverage of around 45.8 million hectares. Approximately 2.04 million hectares and 6.9 million tonnes of rice were produced in Tamil Nadu[6]. As the population rises, there is a corresponding need to increase rice crop productivity, which can be achieved by developing cultivars with high-yielding potential. Variability was examined using a range of cultivars from various backgrounds, allowing for trait selection to an incremental increase in yield.

Genetic diversity is a more significant factor in crop improvement programmes because descendants from different paternities show amplified heterosis and provide a pervasive of variability in advanced descendants. Diversity not only fosters genetic variation but also paves the way for the formulation of new gene recombination within the gene pool. To ensure the effective use of genetic treasure, more knowledge about the genetic diversity of closely related crop genres is necessary. With the aforementioned objectives in mind, the present study was carried out to identify the genotypes/cultivars that diverge genetically.