

## ABSTRACT

Characteristics contributing to rice (*Oryza sativa* L.) grain yield were investigated to identify selection aids and yield stability across environments. Six aromatic rice genotypes including five new mutants developed at the Faculty of Agriculture were studied in a preliminary test and three genotypes were selected and further tested with two non-aromatic controls in Low Country Wet Zone in a Randomized Complete Block Design with three replicates during four seasons. Observations on plant characteristics, quality and yield were made. Analysis of variances, co-variances, simple correlations, genotypic and phenotypic correlations and path analysis were applied for yield and yield related growth characteristics.

Analysis of variance revealed high significance among the genotypes. Grain yield showed highly significant positive correlations with panicle length ( $r=0.686$ ), leaf area ( $r=0.774$ ) and flag leaf area ( $r=0.527$ ) negative correlation with panicle number ( $r= -0.777$ ), leaf angle ( $r= -0.728$ ) and flag leaf angle ( $r= -0.813$ ). Plant height did not significantly correlate with yield and therefore it was not included in the path analysis.

Path analysis showed that panicle length, leaf angle and leaf area have positive direct effects towards yield ( $P= 0.9818, 0.2772$  and  $0.1151$  respectively). Flag leaf angle ( $P= -0.2551$ ) was more important than flag leaf area ( $P= -0.1331$ ) and recorded negative direct effects. Therefore in selecting for rice grain yield, special attention should be given to number of effective tillers per plant (number of panicles), length of the panicle, leaf angle, flag leaf angle and leaf area.

For the stability test, five selected genotypes 28 ING, 39/1, 22/3, BG 379/2 and RU 102 were grown at five environmentally different locations in Kotapola, Mapalana,

Komangoda, Thihagoda and Gombaddala, in the Matara District. Variety into location interaction was studied for all the characters and the varieties were grouped accordingly. Aromatic mutant line 22/3 developed at the Faculty of Agriculture, University of Ruhuna with 2 controls (RU 102 and BG 379/2) included in this study showed a higher stability for the five sites i.e. Kotapola, Mapalana, Komangoda, Thihagoda and Gombaddala, and could be recommended for all the sites. However, the genotypes 39/1 and 28 ING showed general adaptability for the locations Mapalana, Gombaddala and Kotapola only.

The three aromatic breeding lines included in this study recorded international standard values required for aromatic rice for length, length to breadth ratio and linear elongation ratio and acceptable yield. Considering the higher value fetched by aromatic rice in the local and international markets, introduction of these new breeding lines in the Matara District and in areas with similar soil and climatic conditions may assure fairly good income for rice farmers. A brown rice variety RU 102 developed at the Faculty of Agriculture used as a control in this study consistently out yielded BG 379/2 in all locations and all seasons. It is grown by farmers in the area and is already popular and requires official release as a recommended variety for seed production and further expansion.