

Characterisation of globally diverse blast-resistant upland rice (*Oryza sativa* L.) germplasms based on morpho-physiological and yield attributes

ABSTRACT

Upland rice is a valuable base population for protecting against genetic erosion and broadening the gene pool of rice germplasms, and rice is also the staple food of more than 100 million people across the world. Therefore, an experiment was conducted to elucidate the performances of 27 globally diverse blast-resistant upland rice genotypes in terms of morphological, physiological and yield trait characteristics and to determine the correlations between and assess the diversity among these characteristics. All of the genotypes were evaluated in a randomised complete block design with three replications. Analysis of variance revealed 18 traits with significant to highly significant variations among themselves. The BRRRI dhan42, BRRRI dhan43, Ja Loy, C, Choke Tang and Chirikata 2 genotypes matured early, and the Chirikata 2, C, Choke Tang, BRRRI dhan43 and Padi Beleong genotypes were best in terms of yield. The greatest heritability was recorded for the numbers of filled grains/panicle and the yield/plant, which demonstrated that these traits can be successfully transferred to the offspring if selection for these characteristics is performed in a hybridisation programme. The 27 genotypes were grouped into six clusters based on the contributing morphological, physiological and yield characteristics. The first four principal components accounted for 40, 59, 70 and 79% of the total variation, respectively, which indicated abundant genetic differences between these genotypes. The Chirikata 2, C, Choke Tang and BRRRI dhan43 were selected as the best genotypes and could be used as valuable resources for high-yielding, early maturing, blast-resistant cultivars and parental sources for hybridisation programmes for challenging environments in the future.

Keyword: Morphology; Physiology; Principal component analysis; Upland rice; Yield attributes