



Research article

Genetic diversity and relationship of Indonesian swamp rice (*Oryza sativa* L.) germplasm based on agro-morphological markers

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Abstract

Importance of the work: Swamp rice (*Oryza sativa* L.) is essential germplasm for future rice breeding because of some agronomical characters or functional genes.

Objectives: The genetic diversity and relationship was determined of 108 cultivars of Indonesian swamp rice using 31 agro-morphological markers to identify the distinctiveness of the characters that contributed to the genetic diversity based on Pearson correlation analysis among these characters.

Materials & Methods: The standardized Shannon diversity index (H') was used to determine the genetic diversity of the germplasm. Principal components analysis (PCA) and the unweighted pair group method with arithmetic mean (UPGMA) were used to identify the distinctiveness of the characters that contributed to the genetic diversity and to reconstruct relationships.

Results: This germplasm was generally low in genetic diversity (Shannon index value of 0.31 for qualitative and 0.36 for quantitative traits). However, two agro-morphological characters, namely the flag leaf attitude and culm diameter of the basal internode, had the highest diversity ($H' = 0.68$ and 0.97 , respectively). PCA confirmed that these two characters contributed significantly to the emerging phenomenon. The culm diameter of the basal internode had a moderate correlation with panicle length and the panicle number of the primary and the secondary basal branches ($r = 0.44$ – 0.67). The UPGMA revealed that this germplasm was grouped into nine clusters, with the eighth being the largest (71 cultivars). In addition, the UPGMA revealed that some cultivars had closest relationships, such as *Unyil* with *Karat Kaleng* and *Pelita Rampak* versus *Katimuri*. Conversely, the farthest relationships were for *Sawah Kanyut* versus *Siam Gumpal* and *Siam Salawi* versus *Siam Gumpal*.

Main finding: This information might be useful in future rice breeding programs, particularly in developing new rice cultivars for swamp areas.

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