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The ligule ultrastructure of the tidal swamp rice (*Oryza sativa*) landraces of South Kalimantan, Indonesia, and their genetic diversity and relationship

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Abstract. *Mursyidin DH, Purnomo, Daryono BS. 2021. The ligule ultrastructure of the tidal swamp rice (*Oryza sativa*) landraces of South Kalimantan, Indonesia, and their genetic diversity and relationship. Biodiversitas 22: 5280-5285.* In-depth characterization of rice landrace is needed in supporting the future conservation and crop breeding programs. Tidal swamp rice (*Oryza sativa* L.), belonging to this landrace, provided useful agronomic traits for both programs. In this study, the nine the tidal swamp rice ligule samples, mainly from South Kalimantan, Indonesia, were observed ultrastructurally using the SEM method. The diversity and relationships of this landrace based on the ligule ultrastructure were also determined using PCA and UPGMA methods. Generally the tidal swamp rice showed a unique ultrastructure of their ligule, composed of the large trichomes (prickle hair), small trichomes (micro hair), stomata-like structure, and silica cells, as well as the papillae that line along the veins. In this case, we found four patterns of the prickle hair on the ligule's abaxial surface, which has never been reported previously, namely scattered randomly, lined up on the vein, grid-step-like pattern, and unpatterned. The results of PCA and UPGMA showed that this landrace grouped into the same main three clusters, where Sardani (an outgroup) was included in the second cluster and joined with other cultivars from South Kalimantan. This information may be useful for the development of taxonomy and plant structures, and plant genetics and conservation.

Keywords: Conservation, multivariate analysis, plant breeding, plant structure, SEM

Abbreviations: PCA: Principal Component Analysis; SEM: Scanning Electron Microscopy; UPGMA: Unweighted Pairs Group Method with Arithmetic Average