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Association between Grain Shattering Habit and Formation of Abscission Layer Controlled by Grain Shattering gene *sh-2* in Rice (*Oryza sativa* L.)

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Abstract:

Rice grain shattering habit is closely associated with the abscission layer formed at the base of sterile lemmas (empty glumes). In the current study, the character expression of *sh-2*, one of the representative shattering genes, was investigated by comparing some agronomic parameters among Norin 29, a Japanese non-shattering cultivar, and its shattering near-isogenic line SH-AJNT, as well as Dee-geo-woo-gen, a shattering indica cultivar. After observation of longitudinal sections of sterile lemmas bases, the abscission layer was not found at the spikelet differentiation stage. However, at the reproductive cell formation stage, SH-AJNT faintly formed the abscission layer. No abscission layer, on the other hand, appeared in Norin 29 throughout the stage of panicle development. The breaking strength at the base of sterile lemmas was measured to compare the threshability among materials. Until 19 days after heading, both threshability on Norin 29 and SH-AJNT exhibited similarly high values, indicating non-shattering conditions. At 21 days after heading, the grain of SH-AJNT dropped more easily than those of previous stages, while Norin 29 kept its persistent character. This difference is important for the evaluation of SH-AJNT and Norin 29, shattering and non-shattering cultivars, respectively. The progressive decline in the breaking strength of SH-AJNT was thought to be associated with the ripening of the grain.

Keywords:

Abscission layer, Germination rate, Grain ripening, Rice, *Oryza sativa* L., Shattering gene

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