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## Epistatic Interaction Analysis of Two Dull Genes, *wx-mq* and *du1*, Affecting Amylose Content Using Nearly Isogenic Lines in Rice

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### [Abstract]

Glutinous rice is a key grain quality trait occupying an important part during rice processing in most rice growing areas. Amylose content (AC) of rice determine eating quality which is one of the major traits in rice breeding program.

In this study, a gene pyramiding approach was used to introduce two dull genes, responsible for low amylose contents, for glutinous rice breeding using marker assisted selection (MAS). Two dull genes were located on chromosome 6 (*wx-mq*, AC:12.7%) and chromosome 10 (*du1*, AC:10.3%), respectively. To test whether these two dull genes have an epistatic interaction, we developed an F<sub>2</sub> population by crossing two nearly isogenic lines(NILs) harboring *wx-mq* and *du1*. Gene based marker and KASP marker were used to select NILs(NIL-*nor*, NIL-*wxm**q*, NIL-*du1*, and NIL-*wxm**q/du1*) from the F<sub>2</sub> population. A two-way ANOVA revealed an epistatic interaction between the two genes in the F<sub>2</sub> population. The mean of Amylose contents for NIL-*nor*, NIL-*wxm**q*, NIL-*du1*, and NIL-*wxm**q/du1* were 17.3%, 12.5%, 9.7%, and 7.2%, respectively. This interaction was confirmed by an analysis of NILs indicating that both genes are involved in the same genetic mechanism controlling amylose contents. This result will be useful for rice breeding related to amylose content.

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