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Selection of Lines Harboring QTL, *qVDT11*, to Enhance Drought Tolerance in Rice

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[Introduction]

Drought is the most serious abiotic stress limiting rice production. However, little progress has been made in the genetic analysis of drought tolerance, because it is a complex trait controlled by a number of genes. Recently drought caused by global climate change is seriously giving a threat to world rice production and food security in rice field. Therefore, development of drought tolerant variety is becoming an important issue to maintain rice production.

[Materials and Methods]

In this study, twelve backcross lines (BC₂F₃) derived from a cross between Nagdong and SNDH42 (Samgang/Nagdong doubled-haploid, SNDH) were evaluated for drought tolerance. The donor parent was an SNDH42 line harboring *qVDT11*, major QTL related to drought tolerance. The recurrent parent was the japonica cultivar Nagdong, susceptible to drought. Twelve backcross lines were analyzed to confirm the presence of *qVDT11* using DNA markers linked to this QTL. To score the drought phenotype degrees of twelve backcross lines, we withheld water for 6 weeks and treated the re-watering for 7 days in greenhouse condition. After watering, visual phenotype was observed 1~9 degree according to the standard evaluation system for rice. Ratio of recovered leaf length in a main culm (RRL) was calculated using the following formula: (leaf length-dried leaf length/leaf length)×100. Root length and root dry weight were also evaluated.

[Results and Discussions]

Three lines harboring *qVDT11* showed tolerant score as 3~5 degree. The RRL of three drought tolerant lines were 80.2~99.8% for first leaf, which was higher than that of Nagdong. The RRL of three drought tolerant lines for the second and third leaf also was higher than Nagdong. Root length of tolerant lines was 14.9~18.9cm, which was longer than Nagdong. Root dry weight of tolerant lines was 305~397mg, which was heavier than Nagdong. These three lines could be used for breeding of drought tolerant cultivar in rice.

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