Identification of QTLs for Cold-Tolerance by Multi-locational Screening of RI Lines in Rice

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Objective

The objective of the present study was to identify QTLs associated with cold tolerance by multi-locational screening of RILs. In order to develop cold tolerant varieties adaptable to wide-range of cold stresses, a strategy facilitating MAS is being adopted to accumulate QTLs detected from different environments.

Maerials and Methods

0	Methods:
	Dasanbyeo(indica)/TR22183(japonica)(F9) RI 166 lines
\bigcirc	Methods:
	The two RIL populations were grown in Kunming(Yunnan, China), the igh-altitude area,
	Chuncheon(cold-water irrigation) and Suwon(nomal environment).
0	QTL and epistasis analysis:
	Interval mapping using Qgene 3.06 program and Epistacy version 2.0 SAS program.

Rusults and Discussion

- 1. All of the characters in both RIL populations revealed nomal distributions with some transgressive segregations, and varied more or less along test environments (Figure 1).
- 2. Several QTLs were identified in all characters tested which were associated with cold tolerance (Table 1 & Figure 2). Percent phenotypic variation of QTLs ranged from 7.29% from 23.1%. In most of the characters, unique QTLs to each environment were detected, which were regarded as QTLs responsive to the specific cold-environment of each test location.
- 3. A number of significant two-loci interactions between markers were detected.

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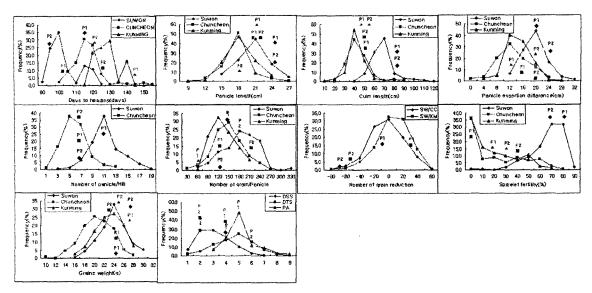


Figure 1. Frequecy distribution of agronomic characters in RILs population from Dasanbyeo/TR22183 cross cultivated in Suwon, Chuncheon, and Kunming China.

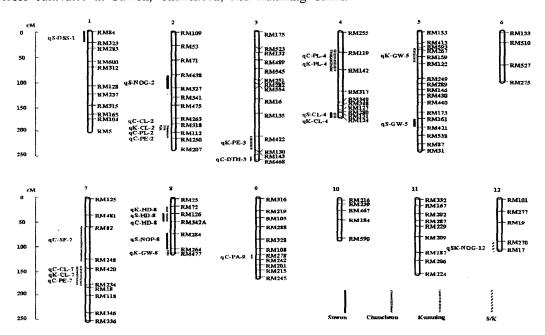


Figure 2. QTL detected for agronomic characters in Dasanbyeo/TR22183 cross. (S: Suwon, C: Chuncheon, K: Kunming, SK: Suwon/Kunming, HD:Heading date, CL: Culm length, PL: Panicle length, PE: Panicle exsertion, NOP: No. of panicle, NOG: No. of grain, SF: Spikelet fertility, GW: 1000 grain-weight, DSS: Leaf discoloration at seedling stage, PA: Phenotypic acceptability for cold tolerance)