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# Identification of QTLs for Chlorophyll Content Under Low Nitrogen Conditions in RILs Derived from Korean *japonica* rice

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**[Introduction]**

The flag leaf of rice supplies carbon assimilates to the panicle during the ripening stage. The high chlorophyll content of flag leaf under low nitrogen conditions could increase photosynthesis and it is one of the source traits that affect yield in rice.

**[Materials and Methods]**

RIL population consists of 88 lines derived from a cross between two Korean *japonica*, JJ625 (large grain breeding line) and Namchan (high yielding variety under low nitrogen conditions). Two parents and 88 RILs were planted by two replications at the paddy field treated with low nitrogen fertilizer (4.5kg/10a). The chlorophyll content of flag leaves was collected at the fully flowering stage using SPAD-502 plus. The genotyping of RILs was conducted using Target Capture Sequencing, and a total of 511 informative SNPs were obtained. The linkage map construction and QTL analysis were carried out by QTL IciMapping 4.2 program

**[Results and Discussion]**

JJ625 showed higher Chlorophyll contents of flag leaf and earlier heading date than Namchan. The average and range for chlorophyll contents of RILs were 39.1 and 35.2~44.1, respectively. The linkage map of RILs was constructed using 521 SNPs and represented 1841.3 cM for the total genetic length. Four QTLs for chlorophyll content were detected on chromosomes 1 and 8 and explained 70.7% of phenotypic variation. All alleles derived from JJ625 showed positive effect and *qCCF1.1* presented the highest LOD, PVE, and additive effect among four QTLs. Besides, three heading date QTLs were identified on chromosomes 1, 2, and 8. *qDTH8* was collocated with the same marker interval of *qCCF8*, and *qDTH1* was mapped on 13 cM upstream of *qCCF1.2*. This result implies chlorophyll content could be related to heading date in this population. QTLs identified in this study would be applied to improve yield potential under low nitrogen conditions.

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