

Author: [ADVANCED](#)Volume Page Keyword: 

[TOP](#) > [Available Issues](#) > [Table of Contents](#) > [Abstract](#)

ONLINE ISSN : 1349-1008

PRINT ISSN : 1343-943X

Plant Production Science

Vol. 12 (2009) , No. 2 224-232

[\[PDF \(689K\)\]](#) [\[References\]](#)

The QTL Analysis of RuBisCO in Flag Leaves and Non-Structural Carbohydrates in Leaf Sheaths of Rice Using Chromosome Segment Substitution Lines and Backcross Progeny F₂ Populations

[Takashi Kanbe](#)¹⁾, [Haruto Sasaki](#)²⁾, [Naohiro Aoki](#)¹⁾, [Tohru Yamagishi](#)¹⁾ and [Ryu Ohsugi](#)¹⁾

1) Graduate School of Agricultural and Life Sciences, The University of Tokyo

2) Field Production Science Center, Graduate School of Agricultural and Life Sciences, The University of Tokyo

(Received: July 21, 2008)

Abstract: In rice (*Oryza sativa* L.), the maintenance of high photosynthetic rate of flag leaves and the carbon remobilization from leaf sheaths after heading is a critical physiological component affecting the yield. To clarify the genetic basis of RuBisCO content of the flag leaf, a major determinant of photosynthetic rate, and non-structural carbohydrate (NSC) concentration in the third leaf sheath at heading, we carried out quantitative trait loci (QTL) analysis with 39 Koshihikari/Kasalath chromosome segment substitution lines (CSSLs) and backcross progeny F₂ population derived from target CSSL holding the QTL/Koshihikari in the field. QTLs for RuBisCO content and NSC concentration at heading were detected between R2447-C1286 and R2447-R716 on chromosome 10, respectively, by comparing Koshihikari with four CSSLs for chromosome 10 (SL-229, -230, -231 and -232). The progeny QTL for RuBisCO content and for NSC concentration at heading *qRCH-10* and *qNSCLSH-10-1*, respectively, were detected at similar marker intervals between RM8201 and RM5708. In addition, QTLs for RuBisCO content at 14 d after heading, *qRCAH-10-1* and *qRCAH-10-2*, were detected in regions different from that of *qRCH-10*. No QTL for NSC concentration at 14 d after heading was detected between RM8201 and R716, the region analyzed in this study. The QTLs *qRCH-10* and *qRCAH-10-1* for RuBisCO content would have additive effects. These QTLs for RuBisCO content and NSC concentration newly found using CSSLs and their backcross progeny F₂ population should be useful for better understanding the genetic basis of source and temporary-sink functions in rice and for

genetic improvement of Koshihikari in terms of their functions.

Keywords: [Backcross progeny](#), [Chromosome segment substitution lines \(CSSLs\)](#), [Leaf sheath](#), [Non-structural carbohydrate \(NSC\)](#), [QTL](#), [Rice \(*Oryza sativa* L.\)](#), [RuBisCO](#)

[\[PDF \(689K\)\]](#) [\[References\]](#)

Download Meta of Article [\[Help\]](#)

[RIS](#)

[BibTeX](#)

To cite this article:

Takashi Kanbe, Haruto Sasaki, Naohiro Aoki, Tohru Yamagishi and Ryu Ohsugi: "The QTL Analysis of RuBisCO in Flag Leaves and Non-Structural Carbohydrates in Leaf Sheaths of Rice Using Chromosome Segment Substitution Lines and Backcross Progeny F₂ Populations". Plant Production Science, Vol. **12**, pp.224-232 (2009) .

doi:10.1626/pps.12.224

JOI JST.JSTAGE/pps/12.224

Copyright (c) 2009 by The Crop Science Society of Japan



[Japan Science and Technology Information Aggregator, Electronic](#)

