

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

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

ONLINE ISSN : 1349-1008

PRINT ISSN : 1343-943X

**Plant Production Science**

Vol. 11 (2008) , No. 3 336-343



[\[PDF \(4065K\)\]](#) [\[References\]](#)

## Gene Expression and Accumulation of Rubisco in Bundle Sheath and Mesophyll Cells during Leaf Development and Senescence in Rice, a C<sub>3</sub> Plant

[Koichi Tsutsumi](#)<sup>1)</sup>, [Michio Kawasaki](#)<sup>1)</sup>, [Mitsutaka Taniguchi](#)<sup>1)</sup> and [Hiroshi Miyake](#)<sup>1)</sup>

1) Graduate School of Bioagricultural Sciences, Nagoya University

(Received: December 18, 2007)

**Abstract:** Gene expression of ribulose 1,5-bisphosphate carboxylase/oxygenase (Rubisco) large subunit (*rbcL*) and small subunit (*rbcS*) in bundle sheath and mesophyll cells of rice, a C<sub>3</sub> plant, was examined during leaf development and senescence by *in situ* hybridization.

Localization of Rubisco protein in both cells was also examined by immuno-electron microscopy. Gene expression and accumulation of Rubisco were related with the chlorophyll fluorescence parameters. The chlorophyll fluorescence parameters, such as  $F_v/F_m$  and  $\Phi_{PSII}$ , gradually increased during leaf development with the increase in the accumulation of Rubisco. However, the chlorophyll fluorescence parameters decreased earlier than the Rubisco content during leaf senescence. The expression of *rbcS* decreased earlier in bundle sheath cells than in mesophyll cells during leaf development, whereas the expression of *rbcL* in both cells was retained during leaf development and decreased during leaf senescence. On the other hand, Rubisco content of bundle sheath and mesophyll cells increased during leaf development and decreased during leaf senescence. Rubisco was retained even after the disappearance of the expression of *rbcS* and *rbcL* detectable by *in situ* hybridization. The present results suggest that the expression pattern of *rbcS* in bundle sheath cells was somewhat different from that in mesophyll cells, but this difference was not reflected in Rubisco content.

**Keywords:** [Bundle sheath](#), [C<sub>3</sub> photosynthesis](#), [Chlorophyll fluorescence](#), [Immuno-](#)

[\[PDF \(4065K\)\]](#) [\[References\]](#)



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

[RIS](#)

[BibTeX](#)

To cite this article:

Koichi Tsutsumi, Michio Kawasaki, Mitsutaka Taniguchi and Hiroshi Miyake: "Gene Expression and Accumulation of Rubisco in Bundle Sheath and Mesophyll Cells during Leaf Development and Senescence in Rice, a C<sub>3</sub> Plant". *Plant Production Science*, Vol. **11**, pp.336-343 (2008) .

---

doi:10.1626/pps.11.336

JOI JST.JSTAGE/pps/11.336

Copyright (c) 2008 by The Crop Science Society of Japan



---

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

