

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

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

ONLINE ISSN : 1349-1008

PRINT ISSN : 1343-943X

**Plant Production Science**

Vol. 6 (2003) , No. 1 52-58



[\[Image PDF \(552K\)\]](#) [\[References\]](#)

## Effects of Elevated CO<sub>2</sub> Concentration on Photosynthetic Carbon Metabolism in Flag-Leaf Blades of Rice before and after Heading

[Naohiro Aoki](#)<sup>1)</sup>, [Kiyomi Ono](#)<sup>1)</sup>, [Haruto Sasaki](#)<sup>2)</sup>, [Saman P. Seneweera](#)<sup>3)</sup>, [Hidemitsu Sakai](#)<sup>2)</sup>, [Kazuhiko Kobayashi](#)<sup>3)</sup> and [Ken Ishimaru](#)<sup>1)</sup>

- 1) Department of Plant Physiology, National Institute of Agrobiological Sciences
- 2) Graduate School of Agriculture and Life Science, University of Tokyo
- 3) National Institute of Agro-Environmental Sciences

(Received: September 25, 2001)

**Abstract:** We monitored the effects of elevated atmospheric CO<sub>2</sub> concentrations on the photosynthetic carbon metabolism in the flag leaves of rice plant (*Oryza sativa* L. cv. Akitakomachi) before and after heading. The plants were grown under ambient (350 ppm : control) or elevated (650 ppm) CO<sub>2</sub> conditions. Flag-leaf blades grown under high CO<sub>2</sub> accumulated more starch than control leaf blades before heading, but the level of starch declined to almost zero under both CO<sub>2</sub> concentrations as soon as the development of ears began. Before heading, the transcript level of sucrose-phosphate synthase (SPS) (EC 2.4.1.14), a key enzyme in the sucrose synthesis in flag-leaf blades was significantly higher under elevated CO<sub>2</sub> conditions than under elevated CO<sub>2</sub> (P<0.01). The difference in the expression of SPS decreased after heading, coinciding with a change in starch contents in both groups. These results showed that the effects of elevated CO<sub>2</sub> concentration on rice plants might vary with the growth stage of the leaf blades. We also discussed the influence of the changes in the carbohydrate metabolism of rice plants caused by elevated CO<sub>2</sub> concentration on yield.

**Keywords:** [Elevated CO<sub>2</sub> concentration](#), [Rice](#), [Starch](#), [Sucrose-phosphate synthase](#),



[\[Image PDF \(552K\)\]](#) [\[References\]](#)

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

[RIS](#)

[BibTeX](#)

To cite this article:

Naohiro Aoki, Kiyomi Ono, Haruto Sasaki, Saman P. Seneweera, Hidemitsu Sakai, Kazuhiko Kobayashi and Ken Ishimaru: "Effects of Elevated CO<sub>2</sub> Concentration on Photosynthetic Carbon Metabolism in Flag-Leaf Blades of Rice before and after Heading". *Plant Production Science*, Vol. **6**, pp.52-58 (2003) .

---

doi:10.1626/pps.6.52

JOI JST.JSTAGE/pps/6.52

Copyright (c) 2004 by The Crop Science Society of Japan

---



---

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

