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ONLINE ISSN: 1349-0990

PRINT ISSN: 0011-1848

■ Japanese journal of crop science

Vol.66 , No.4(1997)pp.675-681

[\[Full-text PDF \(870K\) \]](#) [[References](#)]**Relationship between Export Rate of Photoassimilates and Activation State of Sucrose Phosphate Synthase in Submerged Floating Rice**

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[Received: 1996/12/02]

[Published: 1997/12/05]

[Released: 2008/02/14]

Abstract:

Floating rice (*Oryza sativa* L.) responds to submergence by rapid internodal elongation. This stimulated growth needs an increase in the supply of photoassimilates. We investigated the effects of submergence on the export rate of photoassimilates determined by a ^{13}C -tracer experiment and the activity of sucrose phosphate synthase (SPS), a key enzyme in the sucrose biosynthesis pathway, in floating rice. Plants at the 9.5 leaf stage were submerged up to the tip of the 7th leaf blade for 5 days. Export rates of the ^{13}C -photoassimilates at the 9th (9L) and 10th (10L) leaf blades were much higher in the submerged plants than in the control. In order to analyze the activation state of SPS, the activities of SPS were assayed under saturated substrates (V_{max}) and limiting substrates plus Pi (V_{limiting}). The V_{limiting} of SPS of the 9L and 10L were higher in the submerged plants than in the control, whereas the V_{max} did not differ between both plots. These results indicate that the SPS of the leaves in the upper position was more highly activated in the submerged plants. Moreover, the V_{limiting} of SPS was correlated positively with the export rate. These results suggest that an increase in the V_{limiting} of SPS induced by a high activation state might accelerate the export rates of photoassimilates, and that this is probably one of the important factors that support the supply of photoassimilates required for the rapid growth of the sink organs in submerged floating rice.

Keywords:
 ^{13}C , Export rate of photoassimilates, Floating rice, Sucrose phosphate synthase
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