ONLINE ISSN : 1349-1008
PRINT ISSN : 1343-943X

Plant Production Science
Vol. 8 (2005) , No. 2 122-130

The Effect of the Amount of Nitrogen Fertilizer on Starch Metabolism in Leaf Sheath of Japonica and Indica Rice Varieties during the Heading Period

Tatsuya Hirano[1)2)], Yoshihisa Saito[2)], Hiroaki Ushimaru[1)] and Hiroyasu Michiyama[1)2)]

1) Faculty of Agriculture, Meijo University
2) Graduate School of Agriculture, Meijo University

(Received: May 6, 2004)

Abstract: The effects of the amount of nitrogen fertilizer on the starch metabolism of rice leaf sheath during the heading period in the japonica rice variety, cv. Nipponbare were compared with those in the indica varieties, cv. Tetep and Johna. The rice plants were grown under a low- (similar to the standard nitrogen level in paddy field) or high-nitrogen condition, and the starch content of the second leaf sheaths below the flag leaf was analyzed from the second leaf stage (growth stage 1) until 21 days after the heading (growth stage 7). The starch content of the plants grown under the high-nitrogen condition at the heading stage (growth stage 4) was lower than that under a low-nitrogen condition in all the varieties. The decrease in the activity of starch branching enzyme (SBE) was considered to be important for the repression of starch accumulation under a high-nitrogen condition. Under the high-nitrogen condition, Nipponbare accumulated more starch in the second leaf sheath than indica varieties at the heading stage. However, the phenomenon could not be accounted for by the activities of AGPase and SBE. Semi-quantitative RT-PCR analysis suggested that the lower activities of SBE in the second leaf sheath under the high-nitrogen condition may be due to, at least in part, the decrease in the expression level of *RBE4*.

Keywords: ADP-glucose pyrophosphorylase, Debranching enzyme, Indica rice, Japonica rice, Leaf sheath, Nitrogen fertilizer, Starch, Starch branching enzyme

To cite this article:

Tatsuya Hirano, Yoshihisa Saito, Hiroaki Ushimaru and Hiroyasu Michiyama: “The Effect of the Amount of Nitrogen Fertilizer on Starch Metabolism in Leaf Sheath of Japonica and Indica Rice Varieties during the Heading Period”. Plant Production Science, Vol. **8**, pp.122-130 (2005) .

doi:10.1626/pps.8.122

JOI JST.JSTAGE/pps/8.122