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

Plant Production Science
Vol. 11 (2008) , No. 2 203-210

Effects of Assimilate Supply and High Temperature during Grain-Filling Period on the Occurrence of Various Types of Chalky Kernels in Rice Plants (*Oryza sativa* L.)

Tadashi Tsukaguchi[1)] and Yusuke Iida[2)]

1) Ishikawa Prefectural University
2) Niigata University

(Received: July 5, 2007)

Abstract: The objective of this study was to clarify the effect of assimilate supply and high temperature on the occurrence of chalky kernels, i.e. milky white, white back, basal white and white belly kernels. Rice cultivars Koshihikari and Takanari, contrasting in number of spikelets in a panicle were used. After heading, sink-source manipulation was imposed on plants, through changing supply of assimilates to spikelets by shading or panicle clipping. Plants with each sink-source manipulation were subjected to temperature treatments, i.e., high temperature and ambient temperature, using a temperature-gradient chamber. Percentage of various types of chalky kernels was examined with the treatment for each cultivar. High temperature treatment increased milky white and white back kernels while no significant effect of temperature was observed on the percentage of white belly and basal white kernels. Effects of sink-source manipulation on the occurrence of chalky kernels varied with the type of chalky kernels. Although sink-source manipulation had no effect on white back and basal white kernels, it had a significant effect on the percentage of milky white and white belly kernels, which indicates the association of assimilate supply with the occurrence of these types of chalky kernels. A close hyperbolic relation was observed between the rate of assimilate supply and the percentage of milky white kernels, suggesting that milky white kernels are caused by assimilate deficit during the initial half period of grain filling. The higher percentage of milky white kernels at a given rate of assimilate supply at a high temperature implied that the high temperature during the grain-filling period increases

the assimilate demand to avoid the occurrence of milky white kernels. This is presumably because the high temperature during the grain-filling period accelerates grain growth especially in inferior spikelets.

Keywords: Assimilate supply, Chalky kernels, Grain filling, High temperature, Milky white kernels, Rice

To cite this article:

Tadashi Tsukaguchi and Yusuke Iida: “Effects of Assimilate Supply and High Temperature during Grain-Filling Period on the Occurrence of Various Types of Chalky Kernels in Rice Plants (*Oryza sativa* L.)”. Plant Production Science, Vol. **11**, pp.203-210 (2008) .

doi:10.1626/pps.11.203

JOI JST.JSTAGE/pps/11.203