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ONLINE ISSN : 1349-1008

PRINT ISSN : 1343-943X

Plant Production Science

Vol. 7 (2004) , No. 2 109-117


[\[PDF \(215K\)\]](#) [\[References\]](#)

Varietal Differences in the Responses of Yield Components of Rice Plants to Nitrogen-Free Basal Dressing Accompanied with Sparse Planting Density in the Tohoku Region of Japan

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(Received: July 17, 2003)

Abstract: Grain yield of rice plants is composed of different yield components that vary with the genotype, environmental condition and cultivation practice. Experiments were conducted in 1999, 2000 and 2001 in the field of Iwate University, Japan to study the responses of yield components to the practice of nitrogen-free basal dressing accompanied with sparse planting density (BNo) in 12 rice cultivars or lines. The results showed that the number of spikelets per panicle (NSp^{-1}), especially in the late-maturing cultivars and in 2001, was often larger in BNo than in the conventional cultivation (CONT). The number of panicle m^{-2} (Npm^{-2}), however, was significantly smaller in BNo than in CONT, resulting in a small number of spikelets m^{-2} (NSm^{-2}) in BNo. The difference between BNo and CONT in NSm^{-2} varied with the cultivar and the year, and it was often smaller in the late-maturing cultivars than in the early- and medium-maturing ones, and was also smaller in 2001 than in 1999 or 2000. The percentage of ripened grains (PRG) was higher in BNo than in CONT in all cultivars, and the average PRG of 12 cultivars in BNo was 14.0%, 9.0% and 4.8% higher than that in CONT in 1999, 2000 and 2001, respectively. Grain weight (1,000-grain weight) was heavier in BNo than in CONT in most cultivars, and the 1,000-grain weight averaged over cultivars and years was 0.8 g (3%) heavier in the former than in the latter. High temperatures during the grain-filling period significantly and adversely affected 1,000-grain weight in CONT, but only slightly in BNo. The stably high PRG and heavy 1,000-grain weight in BNo, especially in the year with unfavorable weather (1999), could

compensate for the small N Pm^{-2} in BNo so as to achieve a high and stable yield in the Tohoku region.

Keywords: [Nitrogen-free basal dressing](#), [Rice cultivars](#), [Sparse planting density](#), [Weather conditions](#), [Yield components](#)

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To cite this article:

Pham Quang Duy, Satoru Sagawa, Mitsugu Hirano and Eiki Kuroda: "Varietal Differences in the Responses of Yield Components of Rice Plants to Nitrogen-Free Basal Dressing Accompanied with Sparse Planting Density in the Tohoku Region of Japan". *Plant Production Science*, Vol. 7, pp.109-117 (2004) .

doi:10.1626/pps.7.109

JOI JST.JSTAGE/pps/7.109

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