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## Analysis of the Dry Matter Production Process Related to Yield and Yield Components of Rice Plants Grown under the Practice of Nitrogen-Free Basal Dressing Accompanied with Sparse Planting Density

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**Abstract:** Experiments were carried out in 1999, 2000 and 2001 on the field of Iwate University, Japan to examine the effect of nitrogen-free basal dressing accompanied with sparse planting density (BNo) on the dry matter production (DMP) of 12 rice cultivars or lines belonging to the early, medium and late-maturing genotypes. During the period from transplanting to panicle initiation (PI), DMP was lower in BNo than in the conventional cultivation (CONT) in all 3 years. The DMP during the period from PI to full heading (FH) was also lower in BNo than in CONT, particularly in the high solar radiation year of 1999, because of the small leaf area index. During the ripening stage, leaf area index in BNo was smaller, but crop growth rate in BNo was similar to or higher than that in CONT due to the large net assimilation rate, which resulted from the large flag leaf and 2nd leaf, and the heavy specific leaf weight in BNo. The DMP per panicle during the period from PI to FH positively and significantly correlated with the number of spikelets panicle<sup>-1</sup>. The percentage of ripened grains (PRG) was also closely related with the amount of carbohydrates from stems ( $-\Delta S$ ) and photosynthesis after FH ( $\Delta W$ ) contributed to a spikelet during the early ripening period (during 20 days after FH). The higher DMP per panicle in BNo compared with CONT during the period from PI to FH, therefore, resulted in a larger number of spikelets panicle<sup>-1</sup> in the former. On the other hand, the large amount of carbohydrate supply per spikelet during the early ripening period could also secure a high and stable PRG in BNo, especially under unfavorable weather conditions.

**Keywords:** [Dry matter production](#), [Nitrogen-free basal dressing](#), [Rice cultivars](#), [Sparse planting density](#), [Weather conditions](#)

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