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Effects of Top Dressing on Growth and Panicle Dry Weight as Affected by Soil Water Stress at the Early Panicle-Development Stage in Rice (*Oryza sativa* L.)

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Abstract: Rice yield is reduced by a short period of water stress at the early panicle-development stage. This study was conducted to examine the factors that reduce the panicle dry weight of rice subjected to water stress and the alleviating effects of top dressing after the stress. Akihikari, Nipponbare and Akebono were grown in 4-L pots under submerged soil conditions. One half of the pots were subjected to the same degree of water stress during panicle development and the other half was grown without water stress. On the day after the stress treatment, chemical fertilizer was applied to one half of each water treatment. Panicle dry weight at maturity was decreased by water stress and the top dressing after the stress alleviated the decrease. The top dressing increased panicle dry weight under the two water treatments in all three cultivars. Increase of panicle dry weight was dependent on that of total dry weight from drainage to full heading, from full heading to maturity, and from drainage to maturity. Leaf area duration (LAD) and net assimilation rate (NAR) were responsible for changes in total dry weight. Effect of water stress was prominent before full heading, while that of top dressing after full heading. It was concluded that reduction of LAD and NAR may be involved in reduction of panicle dry weight by water stress at the early panicle-development stage, and that top dressing after the water stress may mitigate the effect of water stress on panicle dry weight through the improvement of LAD and NAR.

Keywords: Leaf area duration, Net assimilation rate, Rice, SPAD, Total dry weight

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