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Changes in Energy Dependence and Morphological Characteristics with the Development of Rice Nursling Seedlings Raised under Different Light and Temperature Conditions

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Abstract:

The developmental changes of energy dependence, from a reliance on endosperm to reliance on photosynthetic tissue, and the morphological characteristics of rice nursling seedlings were examined. The seedlings were raised in temperature-controlled greenhouses set at 30/25°C, 24/19°C and 17/12°C with a day/night cycle after emergence. The growth of the seedlings was compared to the growth of seedlings raised under dark conditions in the same greenhouses. The relationship between the consumption of endosperm nutrients and the shoot dry weight is represented by two regression lines for the seedlings raised in light, but is represented by one regression line for those raised in the dark. The slope of the regression lines in light were significantly different from that in the dark after 74% of the endosperm reserves were consumed and plant age reached 2.4. As the consumption of endosperm nutrients increased, the ratio of the shoot dry weight to the consumption of endosperm nutrients in light increased about threefold (i.e., from 0.476 to 1.433). It is thought that this change is due to an increase in the energy received from photosynthesis as a result of emergence and expansion of the third leaf. Seedlings with a plant age of 2.4 in light attained enough plant length (7cm) for the normal transplanting techniques under the three temperature conditions.

Keywords:

Endosperm, Number of roots, Nursling seedling, Photosynthesis, Plant age in leaf number, Plant length, Raising of seedling, Rice

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