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Studies on the Effect of the Relative Humidity of the Atmosphere on the Growth and Physiology of Rice Plants : Effects of ambient humidity in the dark period on the growth and the translocation of ¹³C-labelled photosynthetic products

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Abstract:

Rice seedlings(age in leaf number of 3)were grown for 10 days at 75% relative humidity in the light period(12-hr)and at 60, 75, or 90% humidity in the dark period(12-hr)Dry matter production of the plants grown under higher humidity in the dark period was higher than that of the plants grown under lower humidity.High humidity in the dark period also increased the leaf area, heightened the plant length and accelerated leaf emergence.Then, the effects of humidity in the dark period on the ¹³C-labelled CO₂ assimilation, translocation of ¹³C-labelled photosynthetic products, water content and respiration were examined.The amount of ¹³C assimilated by plants grown under high humidity in the dark period was greater than that by plants grown under low humidity in the dark period.High humidity in the dark period brought about a greater transfer of ¹³C-labelled photosynthetic product to the youngest (late-emerging)leaf than low humidity.High humidity in the dark period also induced an increase in water content, which resulted in the promotion of photosynthesis.Respiration in the dark was not influenced by humidity.Therefore, the promotion of increased leaf area, increased plant height and accelerated leaf emergence, which were observed in plants grown under high humidity in the dark period, is due to increased photosynthesis and the translocation of photosynthetic product to the late-emerging leaves in the plants.These results indicate that humidity in the dark period plays an important role in the growth and development of rice seedlings.

Keywords:

¹³CO₂ feeding study, Photosynthetic product, Relative humidity, Rice, Translocation., IN JAPANESE

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