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Effects of Physiological and Morphological Characteristics of Root Tips Excised from Rice Seminal Roots on Subsequent Growth in vitro

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Abstract:

Tissue culture of excised root is a useful method with which genetic variation of plant root itself can be determined without the influence of shoot. We aimed to determine the effects of age and elongation rates of the seminal root axis of rice on subsequent growth in a culture medium. Taichung Native 1 (indica type) and Yukara (japonica type) were used in the experiments. The seminal root tips (1-cm-length) were sampled every day after bedding on agar and their morphological and physiological characteristics were monitored by recording the persence of lateral roots and primordia, dry weight and C·N content. Root tips with different ages or elongation rates were then cultured, and subsequent growth was observed after three week culture. Root tips which were older and had lower elongation rates showed inferior root growth in both cultivars. When a more than three-day-old seminal axis on which lateral roots started to emerge was excised, less L-type first order lateral roots was produced than that grown on the two-day-old axis, and this affected the total root number and length. The dry weight or C·N content of excised segments decreased as the excision day, and these characteristics showed a close correlation with the subsequent root growth. Thus, we concluded that the excision of root tip segments at an earlier stage ensures excellent development of seminal root system in vitro.

Keywords:

Age, C·N content, Elongation rate, Excised root culture, Lateral root, Oryza sativa L., Rice, Root tip segment

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