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Effects of Plant Growth Regulators on the Appearance of "MC Type" Rice Seedlings

Hajime WATANABE and Kiyoshi TAKAHASHI

1) Faculty of Agriculture, Tohoku University

2) Faculty of Agriculture, Tohoku University

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Abstract:

Rice seedling with the mesocotyl and foliage leaves enclosed in the coleoptile are here referred to as "MC type" seedlings and are considered to be suitable for deep sowing. We investigated the effects of seven plant growth regulators (PGRs), including gibberellic acid (GA_3), indole-3-acetic acid (IAA), abscisic acid (ABA), kinetin (KIN), ethylene (ET), brassinolide (BR) and fluridone (Flu) on the appearance of MC or non-MC type rice seedlings. The seedlings were grown on 0.8% agar medium in the presence or absence of PGRs under aseptic conditions at 30°C in the dark for 14 days. Among the PGRs tested, both ABA and BR promoted the appearance of MC type rice seedlings. Flu, an inhibitor of carotenoid synthesis, and indirectly, of ABA biosynthesis, reduced the percentage of MC type rice seedlings and promoted the growth of leaves. The response of mesocotyl was different from that of the leaves. Mesocotyl elongation growth was stimulated by ABA but reduced by Flu. Furthermore, when applied simultaneously with Flu, the effect of ABA was eliminated. These results suggest that the appearance of MC type rice seedlings is under the control of endogenous ABA and, that Flu affects not only ABA biosynthesis but also its action.

Keywords:

Abscisic acid, Brassinolide, Coleoptile, Deep sowing, Fluridone, Mesocotyl, Rice-seedling

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