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Changes with Aging of Endogenous Abscisic Acid and Zeatin Riboside in the Root System of Rice

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Abstract:

Plant roots produce abscisic acid (ABA) and zeatin riboside (ZR) which are known to counteract the aging of plant organs. Changes in ABA and ZR levels were determined by an enzyme immunoassay method in rice roots, in order to evaluate their roles in root system development, especially of seminal root axis (SRA) and lateral roots (LR). Rice plants were grown for 35 days after sowing (DAS) under submerged soil conditions in root boxes. In the seminal root system, ABA and ZR levels reached the highest peaks at 10 and 21 DAS, respectively. The ABA peak corresponded with the times when the nitrogen concentrations in LR decreased to the lowest level and the ZR peak coincided with the 2nd peak of the nitrogen level, as indicated by our previous finding. A drastic increment in ZR level in the seminal root tip at 6 DAS coincided with rooting of 2nd order LR and closely related to emergence of 4th leaf and 1st node nodal roots, which indicated the significant role of ZR in the early development of rice seedlings. Comparison of LR and SRA revealed that SRA showed a much higher ZR level and much lower content ratio of ABA to ZR than those of LR. Furthermore, the ratio in the seminal root tip was very similar to that of SRA. This indicates that the hormonal characteristics of LR and SRA would be far different.

Keywords:

Abscisic acid, Aging, Enzyme immunoassay, Lateral roots, *Oryza sativa* L., Seminal root system, Senescence, Zeatin riboside

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