

**E218** Interaction of IAA and Brassinosteroids on Growth and Gravitropic Response of Primary root of *Zea mays* L.

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We have investigated the effect of Brassinolides (BL) on gravitropism of maize roots. BL  $10^{-7}$ M stimulated root elongation about 30% and IAA  $10^{-7}$ M inhibited about 10% but cotreatment of IAA and BL resulted in synergistically stimulated root growth about 43%. BL treatment for 2h enhanced gravitropism but IAA had no effect. Cotreatment of IAA and BL showed a dramatically increased gravitropism. Instead of IAA, auxin analogs such as 2,4-D,  $\alpha$ -NAA and IBA treated with BL showed same effect, too. To see whether this phenomenon was specific to auxin, BL was treated with various phytohormones such as GA, ABA and cytokinin respectively. As a result, it did not show that significant difference between BL and BL plus phytohormone. PCIB, an auxin action antagonist and TIBA reduced the enhanced effect of IAA plus BL on gravitropism. Since gravity-induced redistributions of auxin and  $Ca^{2+}$  are closely related to development of gravitropism, we tested BL effects on radioactive IAA and  $Ca^{2+}$  movement. Consequently, BL caused more rapid downward movements of IAA and  $Ca^{2+}$  in root tip. The cpm ratio (upper/lower half tip segment) maintained relatively constant in BL treated tissue but in control decreased drastically for 3h. Our data suggest that in gravistimulated maize root, stimulative interaction of BL is specific to auxin and which is closely related to enhanced asymmetric movements of auxin and  $Ca^{2+}$ .

**E219** Photoinactivation of Photosystem II in Leaves of Pepper (*Capsicum annuum* L.) Grown under High light and Low light

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The maximal photochemical efficiency (Fv/Fm) of PSII and the number of functional PSII were determined to compare the susceptibility of PSII to photoinhibition *in vivo* using pepper leaves grown under different irradiances (low light;  $100 \mu\text{mol} \cdot \text{m}^{-2} \cdot \text{s}^{-1}$ , high light;  $550 \mu\text{mol} \cdot \text{m}^{-2} \cdot \text{s}^{-1}$ ). The modulation of PSII functionality *in vivo* was induced in 1.1% CO<sub>2</sub> by varying irradiance and duration of light treatment after infiltration of leaves with water (control) or lincomycin through the cut petioles of leaves from 30- to 40-day old plants. The Fv/Fm ratio was declined linearly in response to the increased photon exposure both in low-light grown and high-light grown plants. The number of functional PSII was declined exponentially with increasing photon exposure and more rapidly in lincomycin-treated leaves than control, contradicting to a previous result that there was a steep decline at low photon exposure in lincomycin-treated pea (Park et al, 1995). However, there was no big difference in the number of functional PSII between low-light grown and high-light grown pepper both in control and lincomycin-treated pepper. These results suggest the possible existence of different photoprotective mechanisms between low-light grown and high-light grown pepper.