The application of brassinosteroids in tree rooting technologies

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Plant propagation techniques using seeds or *in vitro* cloning are still not available for most ornamental cultivars of woody plants. Trees can lose their unique phenotypes when transferred to *in vitro* systems. Thus development based on the classical rooting technologies with green cuttings is crucial for improvement of propagation of green cuttings (shoot cuttings). To induce rhizogenes in green cuttings, ornamental horticulturists mainly use auxins, such as indole-3-butyric acid (IBA) or indole-3-acetic acid (IAA). However other hormones can also potentially be applied for rooting. Recent studies have shown that brassinosteroids (BRs) can act as synergists of auxins. Here we tested the hypothesis that these substances can also stimulate rhizogenes in trees and shrubs. We have examined the ornamental woody plants. These methods have low effectiveness but they make it possible to cultivate very high quality elite plant clones. Bioengineering approaches used for vegetative propagation of ornamental plants should relie on new techniques for increasing rate of rooting and survival of effect of epibrassinolide (EB), homobrassinolide (HB) and epicastasterone (EC) on rooting of green cuttings of *Thuja occidentalis* L. (Smaragd), *Picea abies* L. (Nidiformis), *Juniperus scopulorum* Sarg. (Blue Arrow), *Berberis thunbergii* DC (Dart`s Red Lady), *Cotoneaster lucidus* Schlecht., *Acer platanoides* L. (Drummondii) *Crataegus x media* (Paul`s Scarlet) and *Forsythia* × intermedia (*Golden Time*). We also compared effects of BRs with the action of auxins and substances with combined BR/auxin structures, such as tetraindolbrassinolide (TIBR), tetraindolcastasterone (TICS) and indolcastesterone (ICS). Obtained results have demonstrated that, in control group (treated with water), the rate of rooting was very low (10-20%). Treatment with of BRs increased rooting rate by two- to five-fold. Very similar results were obtained for auxins, however, in some cases, auxins were less effective as BRs. Response to BRs varied in different species suggesting significant complexity and evolutionary divergence in BR action on rooting of woody plants. *Picea abies* L., *Juniperus scopulorum* Sarg. and *Berberis thunbergii* DC demonstrated highest rooting rate after treatment by BRs. Intriguingly, EC was the most effective stimulator for some woody plants with much greater effect than other BRs and auxins. TIBR, TICS and ICS demonstrated less pronounced effects on rooting however they also caused some stimulation. Overall, these data demonstrated that BRs act as stimulators of formation of root system in woody plants and can be used commercially for root growth stimulation in plant biotechnology and ornamental horticulture.

Гормональная регуляция органогенеза орхидей при клональном микроразмножении *in vitro*

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Орхидеи – интересная группа растений, многие из которых являются редкими и внесены в списки исчезающих видов. Одним из возможных путей сохранения