IN VITRO PROPAGATION OF PARADOX WALNUT ROOTSTOCK (JUGLANS HINDSII X J. REGIA).

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OBJECTIVE

Paradox walnut rootstock is a first generation hybrid (F₁) derived from pollinating Juglans hindsii with J. regia pollen. The occurrence of hybrid progeny among the F₁ population varies considerably ranging from 0 to near 100 percent. Complicating matters is the range of performance of the individual hybrids in traits considered to be desirable in paradox as a rootstock. It is therefore highly desirable to develop methods for vegetative propagation of paradox so that sufficient quantities of rootstock with uniform characteristics can be generated. Although conventional vegetative propagation methods such as leaf cuttings, hardwood cuttings and trench layering can be used to propagate paradox, it has proven to be relatively difficult. In vitro propagation of Juglans sp. (including paradox) has not been reported. The nature of this work, therefore, focused on developing tissue culture techniques for plant regeneration from paradox walnut with the intent of propagating superior clones.

PROCEDURE

The tissue culture approach followed the rational of proven systems in other deciduous trees. Basically, the techniques center on organogenesis which involves three steps of culture manipulation: 1) Initiation of culture, 2) stimulation of multiple shoot formation, and 3) plant regeneration by rooting tissue culture shoots. The actual experimentation involved subjecting axillary bud explants to a range of plant growth regulators, at first, singly, then in combination while scoring the effects of such treatments on the basis of appearance.

RESULTS

Cultures were initiated by preconditioning axillary bud explants on basal medium (lacking plant growth regulators). Any variation as a result of developmental history are minimized resulting in a more uniform response to subsequent treatments. Multiple shoot formation was optimal under 1.0 mg/l benzyladenine (BA) in the presence of 0.001 mg/l indolebutyric acid (IBA). An average of 5 shoots per bud initiate through axillary branching and adventitious shoot production. After subculturering these tissue culture shoots, rooting has been accomplished by a treatment of 6 mg/l IBA. Any callus induction is minimal with no subsequent effects on the ability to acclimate these tissue culture derived plantlets. Acclimation has been accomplished starting with
85% relative humidity followed by a gradual reduction of this humidity level. The process from explant to established plantlet is achieved in 18 weeks.

CONCLUSION

The results demonstrate the feasibility of the tissue culture approach for mass propagation of paradox. The next logical step is to apply this process on a larger scale sufficient to satisfy commercial requirements.