

Somatic Embryogenesis in Interior Spruce: Successful Implementation within Forest Regeneration Programs

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Abstract-Somatic embryogenesis is a tissue culture method that has been successfully implemented for the asexual propagation of interior spruce (*Picea glauca* (Moench) Voss x *Picea engelmannii* Parry). Essentially an unlimited number of proembryos can be developed; each proembryo is a clone of the original explant. Proembryos then proceed through more advanced stages of embryogenesis, resulting in the formation of cotyledonary embryos, which are similar to their zygotic counterparts. Somatic embryos are germinated in containers to produce plants which resemble young seedlings. Subsequently, they are transferred to styrofoam blocks and acclimatized to *ex vitro* conditions in the nursery.

Following acclimatization of somatic seedlings to the *ex vitro* environment of the nursery, they exhibit morphological development and physiological patterns that are comparable to normal seedlings. Comprehensive stock quality assessment prior to field planting has indicated that somatic and normal seedlings have comparable performance potential under optimal, cold and drought conditions. Somatic and normal seedlings also have comparable field performance over two years on a reforestation site.

Initiatives are underway in the following areas to improve the somatic seedling program. First, scale-up of production capability from 250,000 to 1,000,000 over the next three years. Second, continue to improve the quality of somatic seedlings that can be developed with new nursery cultural practices. Third, increase genetic diversity within the program to a minimum of 1000 lines (from superior seed families) for field trials that will select elite lines for deployment in reforestation programs. Fourth, develop early selection capability to identify superior families and lines.

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