27 Gene Transfer in Aspen

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Introduction

*Populus* has been developed as a model system for biotechnological research in tree species. It has a relatively small genome, can be easily regenerated *in-vitro*, and genetically transformed with *Agrobacterium* strains. Certain genes that cause activation or inactivation of specific hormones could be of interest in terms of understanding plant growth and development. It is also interesting to determine if such genes, when introduced into long-lived tree species, would be stably expressed over a longer period of time.

Several genes of bacterial origin have been identified which inactivate hormones or liberate them from precursors (*rolC*, Estruch et al. 1991a; *rolB*, Estruch et al. 1991b; *isopentenyltransferase* (*ipt*), Barry et al. 1984; *indoleacetic acid lysine synthetase*, *iaaL*, Glass and Kosugue 1986). In transgenic tobacco and potato plants carrying one of the genes mentioned above, certain morphological and physiological responses have been identified (Spena et al. 1987; Schmülling et al. 1988; Spena et al. 1991; Fladung and Ballvora 1992; Fladung 1990; Fladung et al. 1993).

In this study, aspen (*Populus tremula*) and hybrid aspen (*P. tremula × tremuloides*) were transformed with genes under control of the 35S promoter of the cauliflower mosaic virus or the light-inducible promoter of the small subunit of ribulose-bisphosphate carboxylase gene of potato in presence or absence of the maize transposable element *Ac*. Data are presented on efficiency of transformation, phenotypic evaluation, and molecular analysis with polymerase chain reaction (PCR) using specific primers and Southern blot hybridisation.
Fig. 1. The p35S-Ac-RolC (top) and the prbcS-RolC (bottom) constructions. The entire constructions are located between the EcoRI and HindIII sites of the binary vector pPCV002. p35S-Ac-RolC: The Ac transposable element is inserted between the 35S-RNA cauliflower mosaic virus promoter and the RolC coding region. prbcS-RolC: The rbcS1 promoter of potato (Wolters et al. 1988) is inserted upstream of the RolC coding region. BL, BR, left and right border sequences of vector T-DNAs; pg5, truncated promoter of T1-DNA gene 5; pNOS, promoter of nopaline synthase gene; pAocs, polyadenylation sequence of octopine synthase gene; NPT-II, neomycin phosphotransferase gene of transposon Tn5; E, EcoRI; H, HindIII; B, BamHI; K, KpnI. (Spena et al. 1989, Schmülling et al. 1993)