

The long road to overexpression of embryogenesis-related genes in *Larix decidua*

- A promising alternative to trigger somatic embryogenesis

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Somatic embryogenesis (SE) has been elicited in a number of different plant species. The clones arising from this method have been of great use in reverse genetics as well as mass propagation. In conifers, however, this process was exclusively achieved on immature and mature zygotic material. As zygotic material has unpredictable characteristics due to recombination, time-consuming posterior selection process need to be conducted in forest tree breeding programs. A method for triggering SE on juvenile, or even adult material of conifer trees would be desirable. This possibility offers anterior selection (i.e. use of elite material) by circumventing the recombination processes of zygotic material.

A new strategy is based on genes with relevance to embryogenesis, that might also be involved in the initiation of SE (i.e. transcription factors LEC and WOX). The idea is to utilize inducible promoter systems, in particular the XVE (ZUO *et al.*, 2000) and GVG (AOYAMA & CHUA, 1997) cassettes, for controlled expression of genes, which are in part embryo-lethal, when continuously overexpressed. First results concerning the application of inducers, however, showed abnormalities in cell proliferation and development, either due to the activity of the inducers themselves or their solving agents..

Another challenge is to establish a reliable transformation method for juvenile or adult plant material. With regard to forest tree breeding, genetically modified organisms for wide range planting are undesirable. To circumvent this problem we intend to discuss two alternative strategies: Transient transfection by either *Agrobacterium*-mediated transfer or electroporation and utilization of stable integration of recombination systems such as Cre-lox (SAUER, 1987).

Our objective is to explore the methods of molecular biology for utilization in tree breeding, their potential, drawbacks and hardships.