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Somatic embryogenesis of hybrid larches (*Larix x eurolepis* and *Larix x marschlinsii*): perspectives for breeding

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INTRODUCTION

Advances in plant biotechnology offer new opportunities in the field of plant propagation. Development of clonal propagation method, such as somatic embryogenesis (SE), has numerous applications such as mass-production of genetically improved plants and the amenability of embryonic cultures to cryogenic storage (Klimaszewska *et al.* 2007). Since the 90's, researchers at INRA have been engaged in research on somatic embryogenesis in *Larix* species (*Larix x eurolepis*, *Larix x marschlinsii*). Indeed, compared to the parental species, the hybrids are known for their remarkable vigour as well as for their superior stem form and site adaptation (Pâques 1992). Improved procedure for SE of hybrid larches was applied for the propagation of the new hybrid variety REVE-VERT registered in 2005 (Lelu-Walter and Pâques 2009). Requirements for the effective integration of somatic embryogenesis into the larch breeding programme are presented.

RESULTS and DISCUSSION

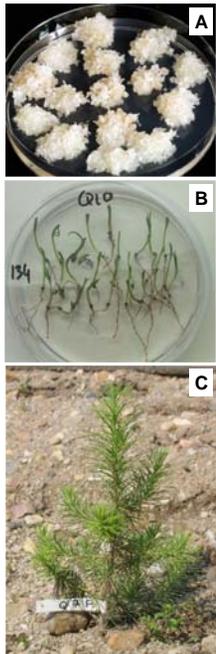


Fig.1: Examples of SE developmental stages: A: Embryonal mass multiplication B: Germinated SE C: Embling 1 year old

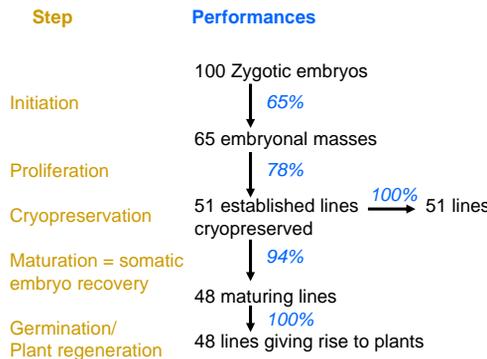


Fig.2 : Performances of each step of hybrid larch SE

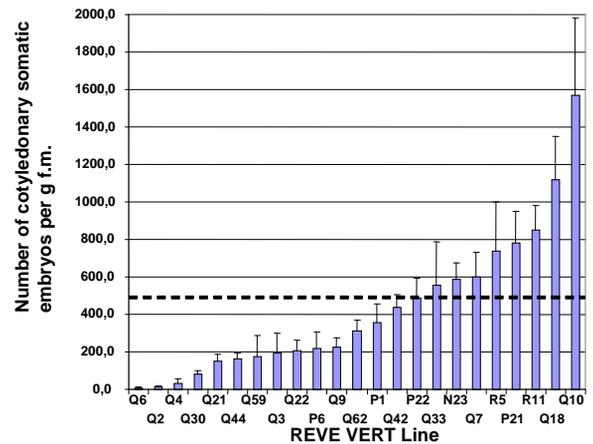


Fig.3: Mean number of cotyledonary somatic embryos produced per *Larix x eurolepis* line (variety REVE-VERT).

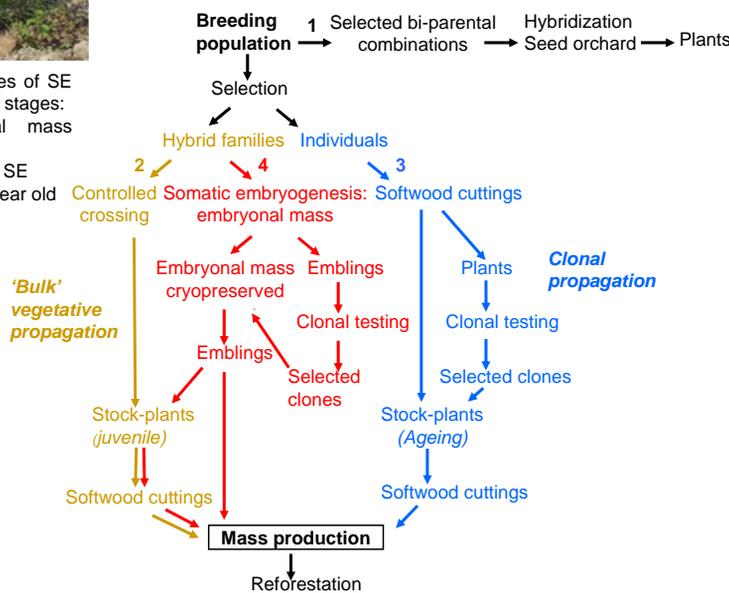


Fig.4 : SE as an alternative or a complementary way to mass-propagate hybrid larch varieties.

Somatic embryogenesis (figs 2, 3)

- Efficient SE protocol
- Cryopreservation did not reduce embryogenic potential of embryonal masses

SE interests for the breeding programme (fig 4)

- Efficiency of the propagation system and maintenance of juvenility via cryopreservation. This results in flexibility in breeding programme (balancing of genetic gain, genetic diversity in the management of the varieties in plantations)
- Alternative to rooted cuttings: increase of precision in progeny testing by vegetatively propagating hybrid full-sib families.
- Possibility to get genetically stable controls over time.

Requirement for SE integration into breeding programme

- Behaviour of the emblings in field demonstration plots,
- Genetic diversity: check the representation of all the combinations,
- Enlarge the cryobank,
- SE propagation from mature material.

Conclusion: SE protocol of hybrid larches (*L. x eurolepis*, *L. x marschlinsii*) should influence breeding strategies by offering an alternative tool for accelerated production of large quantities of plants for clonal tests.

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