



Somatic seedlings at field as the first cross-European perspective for conifer multi-varietal forestry

Seed-based plantation forestry with improved varieties has to deal with rapidly changing environmental conditions. An adapted reaction is required to stimulate tree productivity to fulfil the rising wood demands. Deployment issues of high-value, adapted varieties (e.g. in regard to drought, wind exposure, fast-turnover) becomes critical in hard-to-propagate conifer species and calls for complementary strategies like **vegetative propagation through somatic embryogenesis (SE)**. The use of SE offers key advantages, as selected varieties can be multiplied to an unlimited extend and **adequately mixed according to both market and societal demands and further implemented in a plantation strategy called Multi-Varietal Forestry (MVF)**.

In [MULTIFOREVER](#) we aim to use high-quality somatic seedlings in clonal mixtures to **initiate demonstration trials and evaluate their advantages for MVF**.

Our toolbox: *The Consortium is relying on already existing, large cryopreserved SE clone collections of commercially relevant conifers (Norway spruce, maritime & radiata pines, hybrid larch, Douglas-fir). Both productivity and diversity issues can be managed by combining clones in varietal mixtures. We are able to easily exchange SE cultures, embryos, acclimatised plantlets or ready-to-plant somatic seedlings across borders to compile clone mixtures depending on external conditions – the phytosanitary passports as well as reference ‘seed plants’ included!*

Research question:

Is it possible to select an optimal clonal mix and cultivation strategy according to socio-economic and environmental demands?



Ready-to-plant Douglas-fir somatic seedling (HUB/SBS) at the French FCBA plot (April 2020)

Against all (corona) odds: field trials were already established this spring 2020

Based on prior knowledge gained from SE field trials by partners, new demonstration plots with 2- to 3-year-old somatic seedlings and standard seedling references were managed for 3 species with the support of our subcontractors in clonal mixtures (SBS=Staatsbetrieb Sachsenforst, Germany; LNU=Linnaeus University, Sweden):

Species	Douglas-fir (ca. 3 ha)			Hybrid larch		Norway spruce
SE plant production	HUB/SBS (14 clones)			HUB/SBS (10 clones)		LUKE (10 clones)
Plantation	HUB/SBS	FCBA	UPSC/LNU	LUKE	HUB/SBS	HUB/SBS
Seedling ref. standards	GE, FR	GE, FR	GE, FR, FI	GE, FI	GE	GE, FI
Country	Germany	France	Sweden	Finland	Germany	Germany

This alternative propagation method combined with an afforestation strategy can contribute to **optimized wood production while reducing risks to environmental impacts** through e.g. more dynamic diversity management at stand and landscape levels. The results shall prefigure **what MVF could look like**, before we will be able to share our experience based on different data sets and may offer this possibility to you – as potential stakeholders (foresters, breeders, scientists) – and the future forestry.

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Project title:

MULTIFOREVER: Towards intensification of conifer production through multi-varietal forestry based on somatic embryogenesis

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Our trial network for testing MVF strategies in conifers:

14 field trials with SE clones and clonal mixes were (solid lines) or are intended to be (dotted lines) established for 5 species in 5 EU countries.

- Pinus radiata*
- P. pinaster*
- Larix decidua / L. x eurolepis*
- Pseudotsuga menziesii*
- Picea abies*

