HYBRID REGENERATION DYNAMICS IN A MIXED PLANTATION OF INTERFERTILE SPECIES

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INTRODUCTION

Assisted gene flow (AGF) : **Reduction of maladaptation** induced by climate change

Our study

Maladaptation of *Abies alba* in the southern part of its range

⇩

Hybridization of Euro-Mediterranean firs

A. alba, A. cephalonica, A. pinsapo, A. nordmanniana

Site : Mont Ventoux (Vaucluse, France)
Plantation of **271 trees in 1975**
Origin of the seeds : **old arboretum**
A mix of **pure species and already hybridized trees**

MATERIALS AND METHODS

1 Genetic classification of 271 adult fir trees (Plantation)

Objective 1 : Determine which species the adult firs belong to

Inpout : 14 SSRseq & 64 SNP

Structure
Version 2.3.4 (Jul 2012)
Stephens and Pritchard (2003)

A. alba | *A. cephalonica*

Firs "Pure species"
Ancestry derives from one species

Objective 2 : Determine generational level of adult hybrid firs

Simulation of hybrid fir individuals

STRUCTURE sensitivity analysis

Generational level of adult hybrid firs

A. cephalonica x A. pinsapo | *A. alba x A.cephalonica*

Firs "Hybrid"
Ancestry derived from multiple species.

2 Genetic classification of 1500 fir seedlings (Natural regeneration)

Objective 3 : Determine the seedlings'parents

Inpout : 14 SSRseq & 64 SNP

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Generational level of seedling hybrids firs

A. cephalonica

Seedlings "Pure species"
Parents from the same genetic group

A. cephalonica x A. pinsapo | *A. alba x A.cephalonica x A. pinsapo*

Seedlings "Hybrid"
Parents from different genetic groups

3 Analysis of survival, growth, and proportion of hybrids according to genetic group and generational level of seedlings.

RESULTS

1

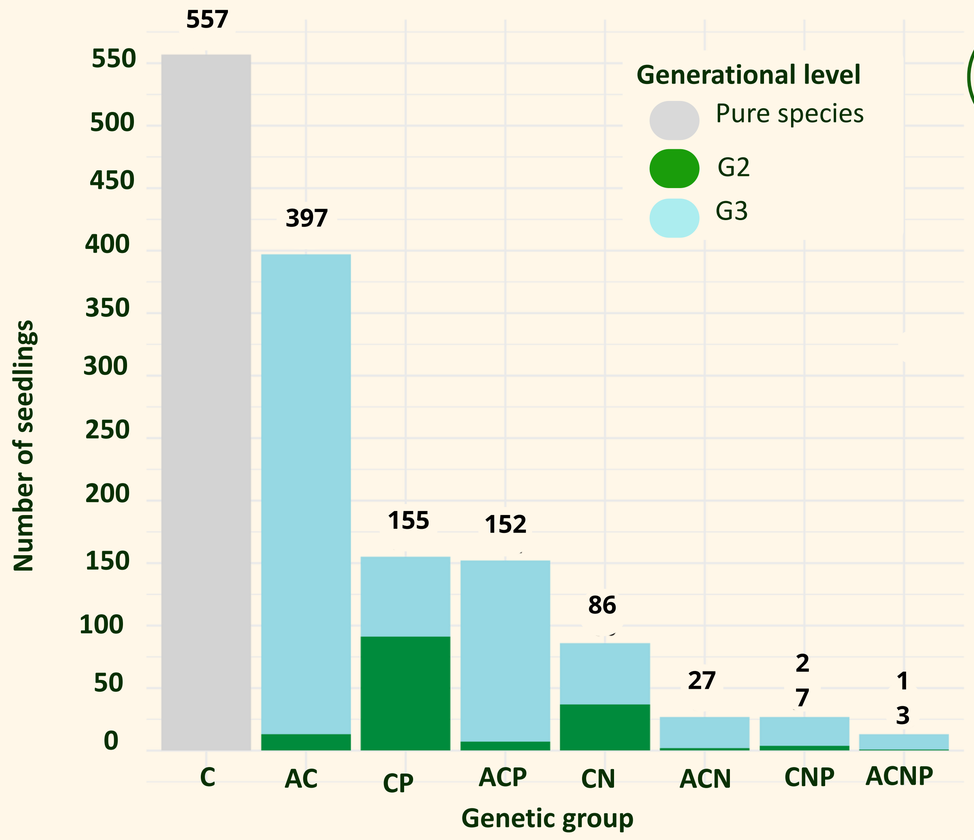

Figure 1 *: Distribution of seedlings across genetic groups and generational levels.*

High diversity of hybrid seedling groups ➡ **Interfertility of the 4 firs species studied and their hydrids**

3 **No differences in growth and survival among seedlings** ➡ **No hybrid depression**

2

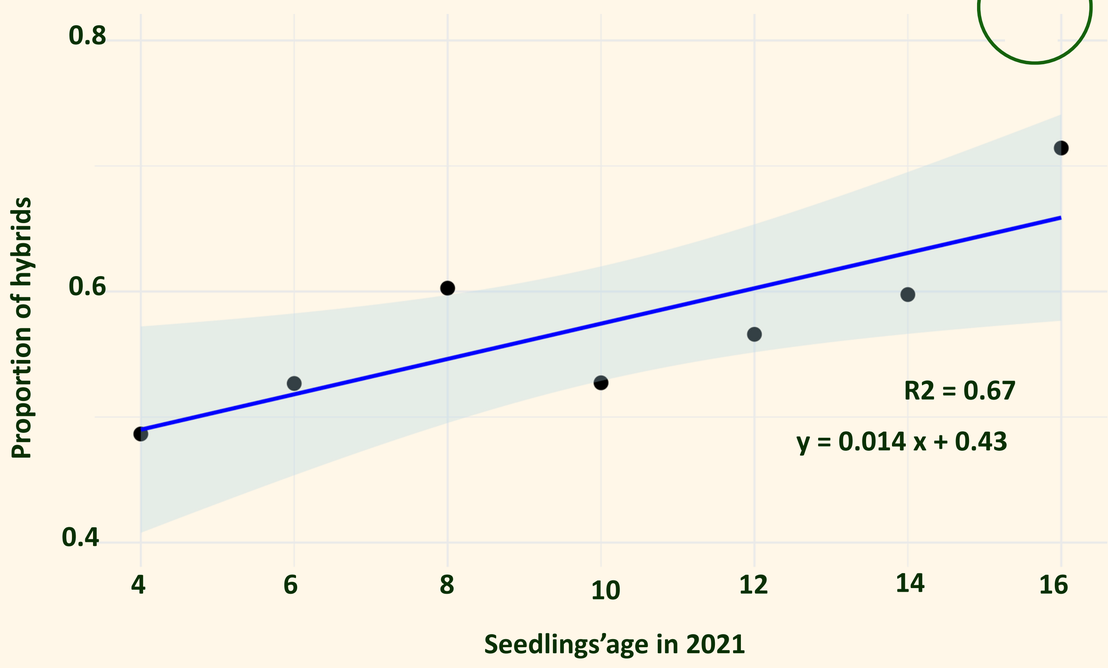

Figure 2 *: Evolution of hybrids proportion according to hybrid's age*

Significant increase in the proportion of hybrids over time

➡ **Preferential selection of hybrids over time**

"Bounded hybrid superiority model" (Moore, 1977)

Modelling assumptions : Genetic group of adulte firs contribute consistently to reproduction over time and do not differ in terms of sexual maturity.

CONCLUSIONS

- Strong natural regeneration in a mixed-species fir plantation
- Viable and performing hybrids
- Positive short-term effect of Assisted Gene Flow

RESEARCH OUTLOOK

- Long-term monitoring of the hybrids
- Assessment of drought resistance in hybrids
- Spatially explicit study

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