



Assisted tree migration: 70 islands of trees of the future

Introduction

For several years, foresters in the Grand Est region have been witnessing the decline of massifs due to repeated droughts (2018, 2019, 2020 and 2022), heatwaves and other insect attacks (bark beetles or processionary caterpillars). This high mortality affects the main species of the region: spruce, fir, beech and oak. It has now been shown that the climate is changing so quickly that species do not have time to migrate to avoid contexts that become unfavourable for them.

Methodology and results

Faced with this observation, even if we can hope for a natural adaptation of forests, doing nothing constitutes a significant risk for the forest ecosystem as well as for wood production. To counter, or at least mitigate, as best as possible these mass diebacks, one of the responses consists of setting up islands of the future, controlled experiments allowing the testing of non-native tree species on plots of 0.5 to 2 hectares.

OG FuturForEst tested ten new species more adapted to climate change via the creation of a network of 70 islands of the future: 2-hectare plots spread over public and private forests. Five hardwoods (Hungarian oak, downy oak, swamp oak, Byzantium hazel, American sweetgum) and five softwoods (evergreen redwood, Macedonian pine, Calocedra, Cilicia fir, Arizona cypress) were selected for their potential for tolerance to current climate and adaptation to future climatic conditions, as well as for their ability to produce quality timber.

A preliminary survey made it possible to identify and characterize 75 plots (exposure, altitude, pedology) with public and private forest owners. The surface area of the devices is between 1 and 2 hectares with a relatively homogeneous station on the island and the planting work took place from November 2020 to January 2023. Identical on all the plots, the preparation of the land consists of: entire grinding of spontaneous vegetation, prior fencing of the plot and the creation of manual pots when placing the plants in pots (2,000 plants/ha). A guide for the maintenance and monitoring of the devices has also been written to guide owners and managers in monitoring the plantation over the first years.

This OG was also part of the ESPERENSE research project led by the national AFORCE network (www.reseau-aforce.fr) for the adaptation of forests to climate change, integrating rigorous protocols and banking on the

pooling of knowledge to initiate a network of multi-partner experiments . This project aimed to improve knowledge of the behaviour of new species and provenances in different forest station contexts.

Lessons learned

The creation of this network of more than 70 islands now makes it possible to test in the long term new species in varied station conditions observe their response to climate change in the Grand Est region. From these experiments, details are expected on suitable silvicultural routes, as well as on the compatibility of species with forest stations.

The project also strengthened collaboration between the different managers and allowed all the players in the sector to organize themselves to achieve the production of plants of new species: seed supply sector, processing of batches of seeds, production in the nursery, etc. We can note the supply difficulties (problem of fruiting or geopolitical context) of seeds and plants of the species selected and originating from the Mediterranean basin, central Europe or the United States.

The creation of the GO in two phases - emergence then development - made it possible to take the time necessary to establish the partnership and define the common problem among different Franco-Belgian forest management organizations, both public and private, in the service of developing forestry knowledge.



Figure 1. Experimental system in the Prény forest. Planting of two islands of trees of the future as part of the FuturForEst programme (Pubescent oak and Arizona cypress). Pubescent oak root ball plant presenting major root problems.
 Sylvain Gaudin © CNPF

The information presented in this factsheet was developed by the FOREST4EU partner, drawing on the innovations and knowledge generated by the indicated operational group with their explicit authorization.

Further information

<https://www.xn-reseau-national-agricultures-ruralits-bkd.fr/centre-de-ressources/projets/futurforest>



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