

ONGOING GENETIC IMPROVEMENT

To move the pine improvement program forward, we perform greenhouse trials to study the pine resistance to a variety of pests and diseases. Current research is focused on evaluating resistance to pitch canker and wilt disease caused by the pine wood nematode, which is considered a major threat in Europe. The aim is to identify and transfer resistant maritime pine plants to the forestry sector in the coming years.



GREENHOUSE TRIALS

The silviculture improvement program began in 2016, to develop advanced, specific silviculture for improved maritime pine. Through this research, we seek to determine measures that can be applied to silvicultural treatments (site preparation, plantation density and initial fertilization) for obtaining highly productive, sustainable pine plantations and improving the competitiveness of the sector.



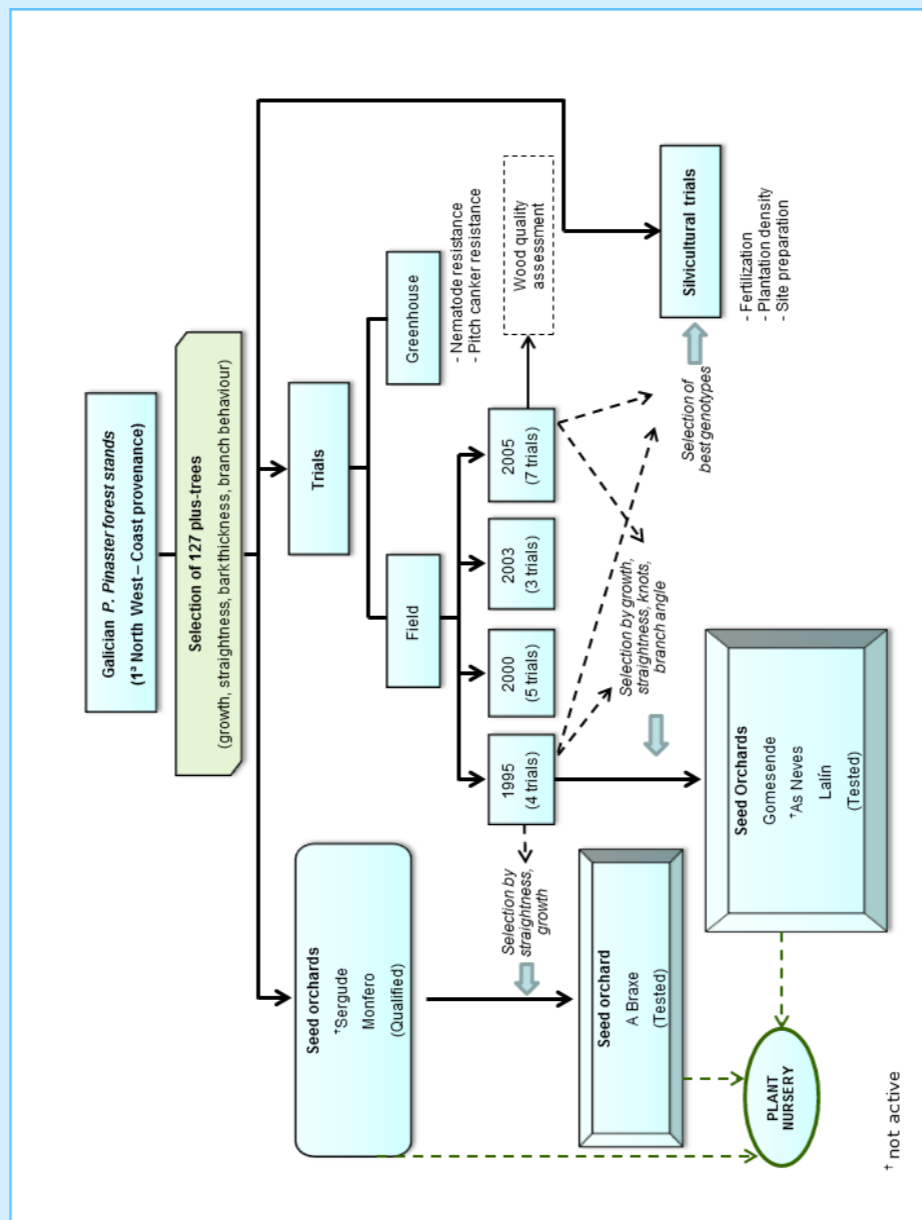
SILVICULTURAL IMPROVEMENT



WOOD QUALITY

High-quality wood is the desired outcome of genetic improvement and pine-specific silviculture. Evaluation of wood quality parameters began in 2018 on two site trials that had been installed in 2005. Ongoing assessment will make it possible to identify the improved pine trees capable of generating the greatest economic yield for each purpose.

CIF-Lourizán maritime pine improvement and silvicultural program diagram



D.L.: 2217-2018

Address:

Lourizán Forest Research Centre (CIF Lourizan)
 Silviculture and Improvement Department
 Raquel Díaz Vázquez, Eva Prada Ojea, Enrique Martínez Chamorro
 Carretera de Marín, km. 3,5. 36153 Pontevedra
 Telephone: 986 805000
<http://lourizan.xunta.gal/en>

MARITIME PINE (*Pinus pinaster*) TESTED CATEGORY SEED ORCHARDS



XUNTA DE GALICIA

A successful forest plantation depends heavily on the quality of the plant being deployed. Quality must be both external (good shape and form) and genetic (to distinguish origin differences with regard to growth, resistance to diseases and plagues, etc.). While external quality can be observed by looking at the plant in the nursery, genetic quality is not visually detectable at purchase. Thus, plants come with labels that certify their category.

LABELS AND CATEGORIES

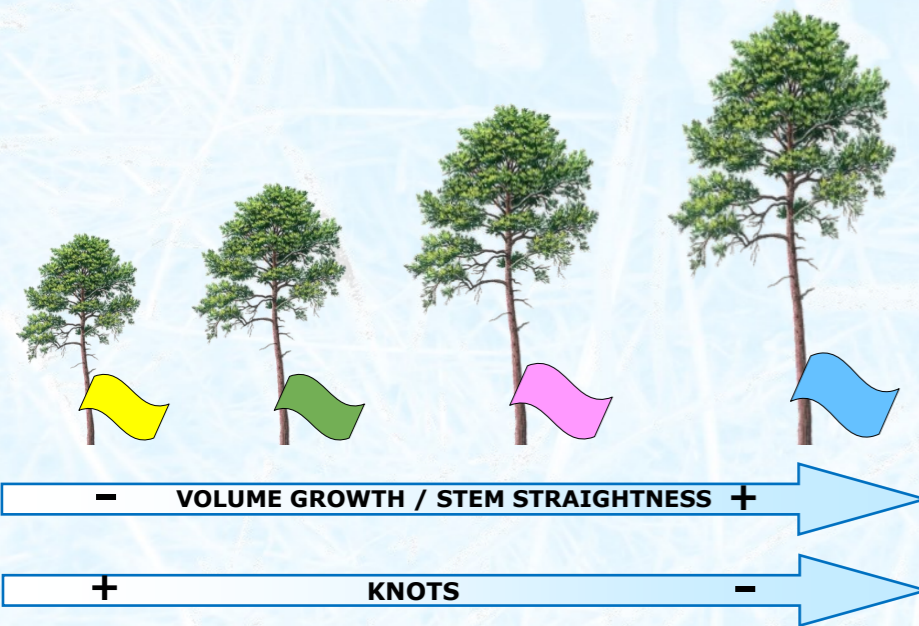
CATEGORY	CHARACTERISTICS	GUARANTEE
Source-identified	No selection	Genetic quality not evaluated
Selected	Visual selection at population level	Genetic quality not evaluated
Qualified	Visual selection at individual level	Genetic quality not evaluated
Tested	Genetic selection	Genetic quality evaluated

The category label color provides information on the plant being purchased, and each category corresponds to a level of selection. We expect greater production and better adaptation from plants in categories indicating higher genetic quality.

Only the blue label ("Tested category") guarantees that the material has been evaluated for genetic quality and rated as superior.

TESTED CATEGORY

Blue-Label seeds from the new Galician seed orchards (registered in 2016 and 2018) have been tested to guarantee superiority for interesting traits, such as those indicating better growth, stem straightness and fewer knots.



SEED ORCHARDS

A seed orchard is a basic material consisting of a plantation designed and managed to maximize tree inter-pollination and to provide easily-harvestable seed crops.

BASIC MATERIAL (BM)



What is BM?

BM consist of the trees from which we collect seeds, cuttings and planting stock for commercialization. There are several types:

- Seed Source
- Stand
- Seed Orchard
- Parents of Families
- Clone
- Clonal Mixture

FOREST REPRODUCTIVE MATERIAL (FRM)



Seeds Plants Cuttings

What is FRM?

FRM is the generic name for the seeds, cuttings and planting stock harvested from basic material used in forest establishment. The four categories are: source-identified, selected, qualified and tested.

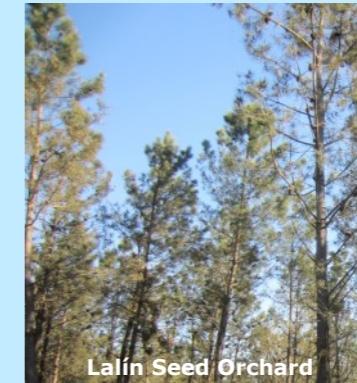


PLANT NURSERY

PLANTATION

REGISTRATION OF A NEW SEED ORCHARD

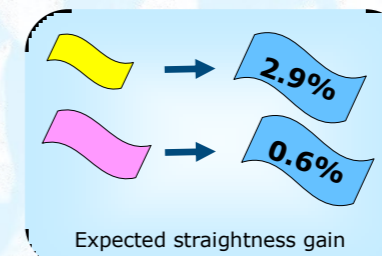
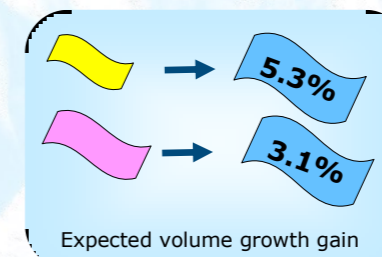
Following the loss of the As Neves seed orchard in the forest fires of October 2017, a new seed orchard in Lalín (Pontevedra) was listed in the Galician Register of Basic Material (DOG n° 206, 29 October 2018) in 2018, as a production site for Blue-Label tested seeds.



The new Lalín seed orchard, like the seed orchard in Gomesende (Ourense), was planted in 1995 as a test site of the CIF - Lourizán improvement program. To qualify as a Blue-Label seed orchard, the trees with the worst-performing timber production

traits were cut down and removed to ensure the genetic superiority of the standing pines.

The Galician seed orchards have numerous tree families from the Galician coast (86-90 families) ensuring that the seeds collected will maintain high genetic diversity.



In plantations using seed from the Lalín seed orchard, we expect a maximum volume growth gain of 5.3% with respect to those using source-identified (yellow category) seeds, and 3.1% compared to those using qualified (pink category) seeds. Stem straightness gains are expected to be of 2.9% and 0.6%, respectively.

TRANSFER

Any person registered as a supplier may collect Blue-Label tested seeds from the new seed orchards after notifying the competent authority for forestry matters in accordance with Decree 220/2007.

