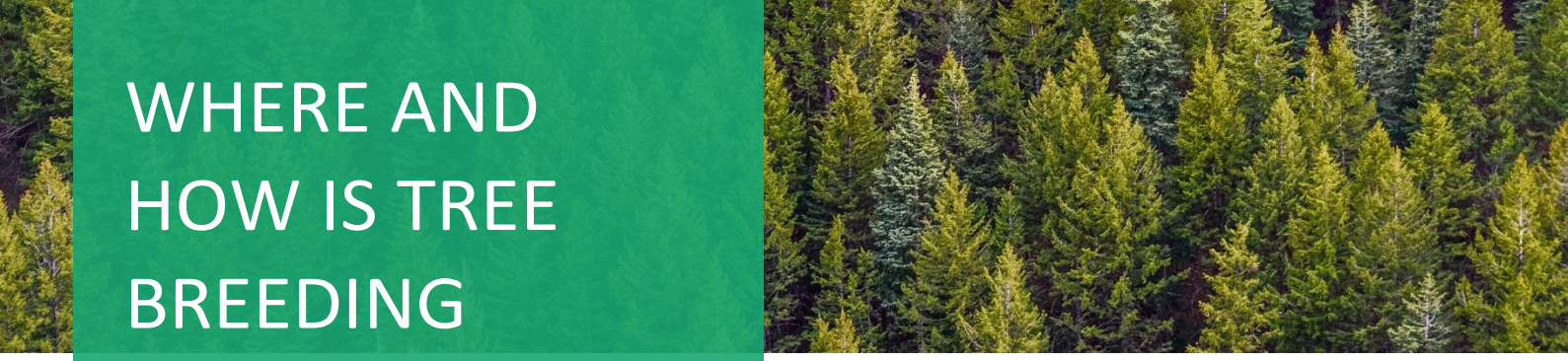

WHERE AND HOW IS TREE BREEDING USED?

Forest reproductive material is a part of a tree that can be used for reproduction such as a seed, cutting or seedling. **Improved seed** is produced by **seed orchards**, which contain the best parental trees gathered in a specific planted orchard. Seeds are collected and can be used either by a nursery to produce seedlings in a container or directly sown in the forest to enable reforestation after clear-cuts, for afforestation and restoration programmes or as enrichment to support natural regeneration.

Improved reproductive material can also result from cuttings of the best individuals in progeny tests, for example, mainly with poplar, willow and eucalyptus.

The genetic diversity of improved material is always characterized by its origin and its performance and deployment strategies (i.e. where and when to use a genetic resource) vary a lot to maximise resilience. For example, the genetic diversity of improved Maritime pine is almost similar to the wild population and can be used on large areas. However, the genetic diversity of clonal cultivars is fixed by diversity present in the national registers, and deployment should consider distributing a large number of varieties at regional level to make stands resilient to pests and diseases.

Deployment will also consider protected areas to limit inappropriate hybridisations and preserve the multifunctionality of forest landscapes.*

*For more information on the importance of genetic diversity: **http://www.euforgen.org/forest-genetic-resources/why-do-they-matter/**

In Europe, the amount of improved reproductive material produced is very low compared to the extent of afforested or reforested areas. In Europe there is a limited number of forest species benefiting from breeding programs, most of the material coming only from selected stands. The most common plantations based on improved material are mainly in the UK with Sitka spruce, in France with Maritime pine, in Portugal with Eucalyptus, in Nordic countries with spruce and Scots pines, with black locust in Hungary and all over Europe with Douglas fir.

WHY IS TREE BREEDING IMPORTANT IN A GLOBAL CHANGE CONTEXT?

In most European countries global climate change induces more drought, more heat and with the increase of world trade, more risk of emerging pests and diseases. Tree breeders selecting the best genetic resources for future forests need to identify and analyse the capacity of existing trees to deal with all these expected but also unexpected threats and anticipate future conditions. The B4EST project provides tools to estimate vulnerability and adaptation capacity of forest reproductive material.**

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