

Conservation Genetics of the European Beech in France¹

A. Ducousso,^{2,3} B. Musch,⁴ S. Irola,⁵ A. Quenu,⁵ A. Hampe,^{2,3} and R.J. Petit^{2,3}

European beech (*Fagus sylvatica*) is one of the most abundant tree species in Europe. Its genetic structure and diversity have been investigated using both molecular markers and adaptive traits as assessed in field and laboratory experimental tests looking at adaptive traits. A great deal of information also exists on the Quaternary history of the species and on plant communities associated with this keystone species. In France, the conservation of its genetic resources relies on both *in situ* and *ex situ* approaches. Some outlying populations at the margin of its distribution, that are known to have acted as populations directly descended from glacial refugia, have been selected as gene conservation units. Because these populations are under a particular type of pressure and because of their disproportionate importance for conservation, they are the focus of more detailed investigations. Such relict populations tend to occur in environmentally unusual areas characterized by highly stable mild climates, which have allowed them to persist *in situ* through both glacial and interglacial episodes. This results in a complex genetic structure. This climate stability has also favored populations of associated rare species, making these areas important zones not only for the conservation of *F. sylvatica* genetic resources, but also for the conservation of associated biodiversity. The integrated strategy used to preserve these populations and the associated communities, focusing on both research and action, includes establishment of *ex situ* plantations, citizen science for promoting the establishment of plantations using locally sourced seeds, and the identification and mapping of the most important risks faced by these populations (i.e., land use changes and concurrence with invasive tree species) to guide their management and restore the ecosystem.

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² INRA, 69 route d'Arcachon, 33612 Cestas, France.

³ Université Bordeaux, Pessac, France.

⁴ ONF. Ardon, Olivet, France.

⁵ Syndicat Mixte d'Aménagement du Bassin Versant du Ciron, Bernos-Beaulac, France.

Corresponding author: alexis.ducousso@pierroton.inra.fr.