

### Using genomic data for evaluation of the regeneration processes of Pyrenean oak populations (*Quercus pyrenaica*).

Like many other plants, the Pyrenean oak presents two different reproductive strategies: sexual and asexual reproduction. Sexual reproduction requires the exchange of genetic material (DNA) between the two parent trees and the formation of an acorn. On the other hand, asexual reproduction, or budding, involves the bursts of a small bud from the root of an adult tree originating a new tree which, unlike the one that bursts from an acorn, is genetically identical to its parent tree, that is, it is a true clone.

Therefore, the regeneration of forests of this species can be achieved by the two processes mentioned above. The SILVPAST Operational Group has established as one of its' aims the evaluation of the role of each of these two reproductive strategies for the regeneration of oak forest in the Beira Interior region, in Portugal. For that purpose, two Pyrenean oak populations, from the two study areas of the project, will be studied, at Quinta da França (Covilhã) and Middle Côa (Almeida). This study will modulate the degree of parenthood based on the distance between two trees and therefore the relative importance of short and long distance dispersal processes, the former being more associated with budding and the latter with acorn formation, on the regeneration and persistence of Pyrenean oak forests on changing rural landscapes.

For this study, DNA will be extracted from oak leaves. The DNA is then analyzed to assess the parenthood relations between the sampled oaks. The methods used are similar to paternity tests (Figure 1).

At each study area, three sampling strategies are being applied: i) sampling of adult trees and young trees in their close vicinity, ii) sampling of all trees inside a limited area (50 m X 50 m) and iii) sampling of isolated trees outside of the oak forest.

These results will contribute to understand the effect of land-use and landscape structure on the processes underlying the natural regeneration of Pyrenean oak forests in this region. Forestry companies will be able to assess how their oak forests are regenerating as well as having a measure of their genetic diversity. The genetic diversity will be greater in forests with more seed (acorn) regeneration. Oak forests with higher genetic diversity will have a greater capacity to adapt, survive and reproduce under new conditions and will be less affected by climate change.



Figure 1. Stages of the genetic study: collection of Pyrenean oak leaves (left), DNA extraction from leaves (center), and analysis of genetic data (right)