

Galicio-Portuguese oak forest of *Quercus robur* and *Quercus pyrenaica*: biodiversity patterns and forest response to fire.

Summary

The history of European forest is closely related to human activity in the territory. In brief, forests have been intensively exploited and transformed during millennia of human occupation. Portugal is no exception, representing an excellent case study of the dynamics between forest and society. In the beginning of the Holocene, oak forests (*Quercus* spp.) covered most of the country. Human settlements in the Neolithic marked the start of intense deforestation. Land was converted to agriculture and wood was overexploited. Presently, deciduous oak forests represent 4% of the Portuguese forest. On the other hand, pine (*Pinus pinaster*) and eucalypt (*Eucalyptus globulus*) are the dominant species after a century of intense forest plantation. The abandonment of agricultural areas, due to rural exodus in the last decades, has been promoting forest natural regeneration, and may represent a window of opportunity to restore natural forests and to support a transition to multifunctional forests. Considering the long history of perturbation that has affected natural forests, the objective of this dissertation was to assess the current value of natural forests for the conservation of biodiversity and their resistance and resilience to fire. This study was aimed at Galicio-Portuguese oak forests of *Quercus robur* and *Quercus pyrenaica* that are good representatives of natural forest in northern Portugal. The value of deciduous oak forest for biodiversity was investigated in two contexts: in comparison with pine and eucalypt plantations and in a countryside context. Response to fire was analysed in comparison with pine plantations after a large wildfire. With respect to the value of deciduous oak forests for biodiversity, results suggest that oak forests support more forest species than forest plantations and than other habitats in the multi-habitat framework. Moreover, oak forests seem to be the preferred habitat, or even the only habitat, for several species. The conservation value of large oak forest patches was also detected through the analysis of species-area relationships. Regarding forests response to fire, results suggested a lower vulnerability and higher resistance, in comparison to pine plantations, of these forests to fire disturbance. Finally, the potential role of deciduous oak forests in the future management of the Portuguese forest is discussed.

Key-words: Biodiversity; Forest response to fire; Natural forest; *Quercus pyrenaica*; *Quercus robur*.