



Increase and transfer knowledge to producers about the natural regeneration processes of cork oaks and holm oaks in agro-forestry systems in Alentejo region, Portugal.

Introduction

Cork oak (*Quercus suber*) and holm oak (*Quercus rotundifolia*) forests are Mediterranean ecosystems characterized by an open, irregular forest that regenerates naturally and is associated with agricultural and livestock activities, in a traditional and multifunctional system, agro-silvo-pastoral land use.

One of the greatest threats to economic and ecological sustainability of these systems is the lack of natural regeneration, which tends to be aggravated by climate change. This threat is embodied in the current context of management of cork oak and holm oak forests which, on the one hand, resort almost exclusively to artificial regeneration (mainly by plantation), with high costs, aggravated when the young plants fail and promotes the intensification of grazing or which, on the other hand, resorts to the extensification of management forestry and the abandonment of the cork oak forests.

OG OakRegeneration was set out to better understand the natural regeneration process; occurrence patterns, growth dynamics and survival rates of natural regeneration in cork oak and holm oak forests.

The objective is to make better use, protect and promote the natural regeneration of cork oaks and holm oaks in very restricted areas of the cork oak forests, typically areas where productive, agricultural and/or grazing activity was temporarily excluded, and where the local, biophysical and soil-climatic conditions were fortuitously favorable to the success of the natural regeneration process. For this purpose, a partnership was created with 8 entities, including producers and agro-forestry producers' associations, having installed 14 demonstration areas subject to forest inventory and continuous monitoring to assess the dynamics of density, structure and growth of juvenile trees.

In this work, the process of natural regeneration by seed was described, paying special attention to the fruiting phase, the germination phase and the recruitment phase of juvenile trees in function of soil types, competition with spontaneous shrub vegetation, whether in density, or in type of species. In this last item, this effect on soil fertility, solar irradiance, water stress, nitrogen fixation and biodiversity of the system was also analysed. It was also described the process of natural regeneration by bursting stumps and the most

appropriate techniques to increase the success rate of this practice. The advantages and disadvantages of these forest regeneration processes were analysed too.

As the main result of this project, a Manual of Management Techniques for Natural Regeneration Areas of Cork Oaks and Holm Oaks - Application and Demonstration of Good Management Practices was drawn up, on paper and available online to be distributed by interested agro-forestry producers."

Lessons learned

In cork oak forests, there seem to be no problems with regeneration density in the fruiting and germination phases, nor with the survival of young trees that matured in the seedling phase. The bottleneck of the process occurs in the temporal transition between regeneration of the year (without normal diameter) for the regeneration of seedlings (normal diameter up to 5 cm).

In the natural regeneration process, the density of recruitment of juvenile trees (normal diameter greater than 20 cm) represents 50% of the regeneration density of seedlings (with normal diameter and less than 5 cm). Between cork and holm oaks, the survival curves, despite being very similar, present some differences.

The survival curves in relation to the type of grazing are very similar and are distinguished only in the initial stages of the regeneration process.

Although grazing with cattle is pointed out as one of the most serious factors responsible for the failure of the regeneration process. Plant density curve in grazed areas with cows and sheep is very similar. Technics like grazing management or individual protection of natural regeneration can improve survival curves.

For more information contact

augusta.costa@iniav.pt

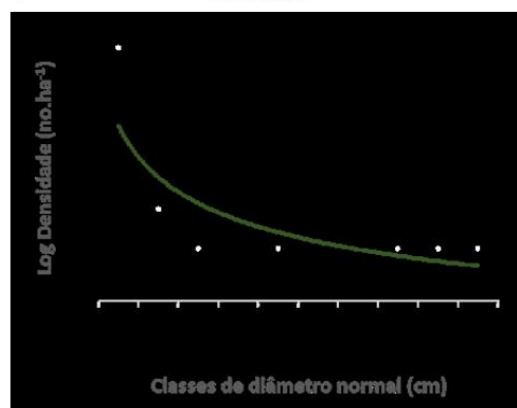
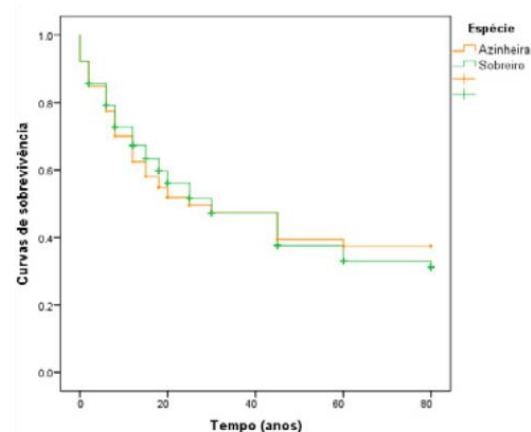
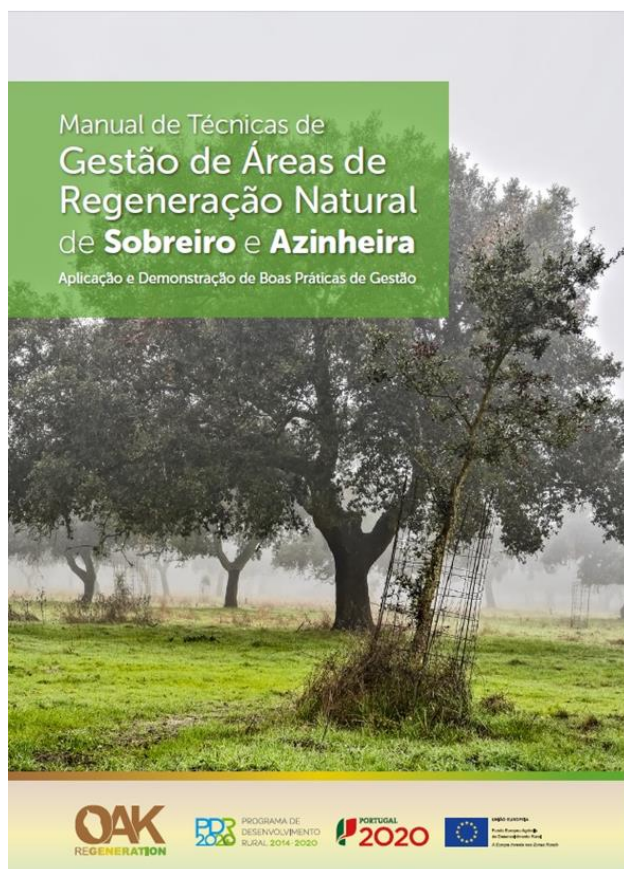


Figure 1. Published materials and data.

The information presented in this factsheet was developed by the FOREST4EU partner, drawing on the innovations and knowledge generated by the indicated operational group with their explicit authorization.

Further information

<https://www.oakregeneration.pt/en/>



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Associação de Produtores Florestais do Vale do Sado

FOREST4EU

FOREST4EU Project
 FOREST4EU Project
 info@forest4eu.eu

Website