

POST-FIRE MANAGEMENT OF CORK OAK FOREST (*QUERCUS SUBER*)

Promoting sustainable management practices for recovery of burnt areas



THE WHAT AND WHY

The importance of the cork oak tree in the Mediterranean Basin and its vulnerability to fire

Cork oak (*Quercus suber*) forest stands and the ecosystems in which these are included have a great socioeconomic and ecological relevance in the western Mediterranean Basin, where they occupy more than 2 million hectares. The cork oak tree has a unique feature that sets it apart from all other Mediterranean broadleaved species: a bark (cork) that can reach 30 cm thick. This has been used for thousands of years as a renewable natural resource and a versatile, valuable raw material. Nowadays, world cork market exports represent about EUR 1.6 thousand million per year. Due to its commercial value, cork is periodically harvested, usually every 9 to 15 years. Beyond cork exploitation, these areas have often an

agroforestry or silvopastoral use, among others. Cork oak ecosystems have also a remarkable ecological value, supporting high biodiversity, including many endemisms, and providing a habitat for several endangered species. Despite being so valuable, cork oak stands have been facing several problems which threaten their sustainability. One of these problems is the occurrence of forest fires which have affected many stands in the last decades in several of the Mediterranean regions. Although cork oak is frequently considered to be the most fire resistant and resilient species among the native trees of this region, factors like cork harvesting can change that, making it paradoxically one of the most vulnerable tree species.



Cork oak stand in an agroforestry system (Credits: Filipe Catry).



Cork oak trees with basal regeneration about two years after a wildfire (Credits: Filipe Catry).

HOW IS THE CHALLENGE ADDRESSED

Post-Fire Management: Setting goals, assessing damage, and planning restoration actions

After a wildfire, it is important to define management goals and plan for restoration actions. Usually the most common objective for burnt cork stands is to recover their cork production as soon as possible. Post-fire management alternatives will largely depend on the fire severity, and so, firstly one should make a multidisciplinary damage assessment to identify direct and indirect economic and ecological impacts and risks. After a fire, a strong negative economic impact is expected because the burnt cork loses its value and the productivity decreases. Tree survival and the severity of the damage will depend on many factors, but one of the most important is usually bark thickness. The minimum time needed to start re-harvesting good quality cork again (good quality cork is the one that can be used for

wine corks), will be about 40 years for dead trees that need to be replaced, about 30 years for surviving trees with stem mortality, and 10 years for those trees with good crown regeneration. In terms of the ecosystem, the most common ecological consequences are a decrease on tree cover and vigour, decrease on acorn production, with reduced regeneration potential and food availability for livestock and wildlife, decreased retention of carbon, nutrients and water, and an increase in soil erosion risk. All these economic and environmental aspects should be taken into consideration when planning post-fire forest management. Inadequate management will risk increasing fire damage with serious negative consequences in the mid- and long-term.



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HIGHLIGHTS

- Cork oak forest stands have a great socio-economic and ecological importance in the Mediterranean Basin.
- Wildfires have severe and long-lasting impacts on cork oak stands and represent one of the main threats to their sustainability.
- In the short-term after a fire, the priorities should be to avoid soil erosion, the presence of large domestic or wild herbivores, pruning and cork harvesting.
- Post-fire recovery actions should favour natural regeneration wherever possible



Crown regeneration of a burnt cork oak (Credits: Filipe Catry).

FURTHER INFORMATION

Literature

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Research project link

<http://www.isa.ulisboa.pt/ceabn/projeto/2/82/study-of-the-effects-of-fire-and-forest-management-in-cork-oak-forest-stands>

ADVANTAGES AND DISADVANTAGES

Sustainable management: measures for better recovery of burnt areas

For safety reasons dead and severely damaged trees should be cut when they pose a risk of falling over, to improve plant health (if plant pests are present), and to promote natural regeneration (from the tree stump). This is especially important when their crowns are dead or their trunks are badly damaged. The decision to cut should be well considered and in some countries, such as Portugal, you need to ask for permission before cutting. Cuts should be done close to the ground and the timber/cork can be sold. In some cases and depending on the management goals, dead trees may be left standing or on the forest floor to favour biodiversity. Machinery use should be minimised to avoid soil erosion, compaction and destroying natural regeneration.

Cork harvesting and branch pruning in trees with crown regeneration should not be made in the first years after the fire since trees will be weak. Several authors recommend waiting 2 or 3 years until the crown has recovered about 75% of its pre-fire volume and cork is about 2 to 3 cm thick. Cork harvesting should be done carefully using experienced workers, and leaving the cork on the trees whenever it does not come off easily as to not damage the trees.

In many cases, and mostly if cork had not been harvested recently before the fire, trees will regenerate from the crown and/or from the stem base. If the crown regenerated in a uniform way, usually there will be no need for intervention. Otherwise, if crown regeneration is absent or very weak, basal resprouts are a good way of regenerating forest stands, and this method is much faster, effective and cheaper than sowing or planting. Frequently there will be many shoots originating from the base of the tree trunk, and thinning may be needed. In such cases up to 3 shoots should be left, choosing the most well developed and shaped ones. There is little information on this matter, but it seems that it is better not to be thinning the resprouts during the early years.

During the first year after a wildfire, large herbivores should not access the stand, whether that might be livestock (goat, sheep, cow) or wildlife (e.g. deer), to allow for natural regeneration to develop and to reduce soil compaction and erosion. When most of the trees have died, are regenerating from the base of the trunks, or if the goal is to increase the stand density through natural regeneration or sowing/planting, these animals should be kept away for several years. In general, all actions that contribute to maintaining and improving the health and vigor of trees are also important for increasing their fire resistance and resilience.