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

Promoting sustainable management practices for recovery of burnt areas

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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 hardwood 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 billion per year. Due to its commercial value, cork is periodically harvested, usually every 9 to 15 years. Beyond this commercial use, these areas are also usually used as silvopastoral areas. Cork oak ecosystems have also a remarkable ecological value, supporting high biodiversity, including several endemic species, and providing a habitat for endangered ones. Despite being so valuable, these stands have been facing many problems which threaten their sustainability. One of the biggest 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 trees are frequently considered to be the most fire resistant and resilient trees 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 growing from their stumps about two years after a fire (Credits: Filipe Catry).

HOW IS THE CHALLENGE ADDRESSED

Post-Fire Management: Setting Goals, Assessing Damage, and Planning Restoration Actions

It is important to define management goals after a fire and plan for restoration. 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 commercial impact should be expected. Burnt cork loses its value and the productivity decreases. The severity of the damage to the trees will depend on many factors, but one of the most important is usually cork thickness. It will take about 40 years minimum to start re-harvesting good quality cork from the site if the trees have died (good quality cork is the one that can be used for wine corks). These will need to be replaced. It will take about 30 years before harvesting from those surviving trees with high canopy mortality, and 10 years from those trees with high canopy regeneration. In terms of the ecosystem the most common consequences are a decrease on tree cover and vigour, decrease on acorn production, reduction on the regeneration and food availability for livestock and wildlife, decreased carbon retention, nutrients and water and an increase in soil erosion. 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 seriously negative consequences in the mid and long terms.

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Keywords: cork oak tree; fires; sustainable management; post fire recovery; cork harvesting; mortality; resilience; natural regeneration

HIGHLIGHTS

- Cork oak forest stands have a great socio-economic and ecological importance in the Mediterranean Basin.
- Fire has a severe and lasting impact on these stands and is one of the main threats to their sustainability.
- In the short term right after a fire, the priorities should be to prevent soil erosion, the presence of large domestic or wild herbivores, pruning and cork harvesting.
- When improving the burned area one should favour natural regeneration wherever possible

Canopy regeneration of a burnt cork oak (Foto: Filipe Catry).

FURTHER INFORMATION

Literature

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Research project link

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ADVANTAGES AND DISADVANTAGES

Sustainable management: measures for better recovery of burnt areas

For security 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 canopies 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 close to the ground and the resulting timber/cork can be sold. In some cases one's management choices may include leaving these trees standing or on the forest floor to favour biodiversity. Machinery use should be minimised to avoid destroying natural regeneration, soil erosion and compaction.

Cork harvesting and tree pruning with canopy regeneration should not be made in the first few years after the fire since trees will be weak. Several specialists recommend waiting 2 or 3 years until canopy recuperation has reached 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, leaving the cork on the trees whenever it does not come off easily as to not hurt the trees.

In a lot of cases, and mostly if cork had not been harvested recently before the fire, trees will regenerate from the canopy or the stump. If the canopy is regenerated in a uniform way there will be no need for intervention. Otherwise, tree stump regeneration is a good, rapid way of regenerating forest stands, and easier 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 to indicate it is better not to be thinning the trees during the first few years.

During the first year after a fire, larger herbivores should not access the stand, whether that might be livestock (goat, sheep and cow) or wildlife (e.g. deer) to allow for natural regeneration to occur and reduce soil compaction. If most of the trees have died, are regenerating from the stump or stand density is being increased, these animals should be kept away for several years. It is also important to take every action that improves fire resistance and resilience.