Theme: **4 - Climate change adaptation & forest health**

Position in the Value Change: **Forestry**

Factsheet type: **Practice**

Cork oak understory vegetation management

APFC - Coruche Private Forest Landowners Association

Keywords

cork

cork oak

Quercus suber

understory management

Mechanization

NWFP

Cork

Scale

National

Context

Mechanization in the 20th century generalized the use of agricultural implements in agriculture and in agro-forestry systems. In the Iberian Peninsula, this phenomenon has been associated with tractors of greater power that have replaced animal traction. This fact had serious impacts on the natural regeneration, roots and vitality of the cork oaks.

Recent studies show that the loss of trees in the cork forest is more linked to the impact of vegetation control systems with soil mobilization (mainly in soils with depth limitations and slopes > 15%) than to climate changes (6).

Objective

The cork oak forest management involves interventions in the understory with the following objectives: reduction of the fire risk, operationality of the cork harvesting, promotion of cork oak recruitment and reduction of competition for water and nutrients between trees, herbs and shrubs. The techniques currently available for the forest producer to carry out these operations are: the practice of grazing and / or mechanized interventions (harrowing, shrub cutter, shredding). The choice among several mechanical techniques should consider cork oak sustainability and the potential impacts over soil & plants.

Results

The soil mobilization up to 20 cm deep has the following consequences (5):
- 40% loss of root volume
- breakdown of root structure
- limitation of hydraulic tree redistribution
- loss of tree functionality

Cutting the roots by mobilizing the soil, decreases the water catchment capacity and aggravates water stress, which can lead to mortality due to interruption of the root-leaf transport system, once the trees are decoupled from the water supply sources.
Shrub cutters, as a mechanized intervention, allow effective control of vegetation, distributing organic matter on the soil surface, ensuring the preservation of the cork oaks root systems, and contributing to soil conservation against erosion.

Recommendations

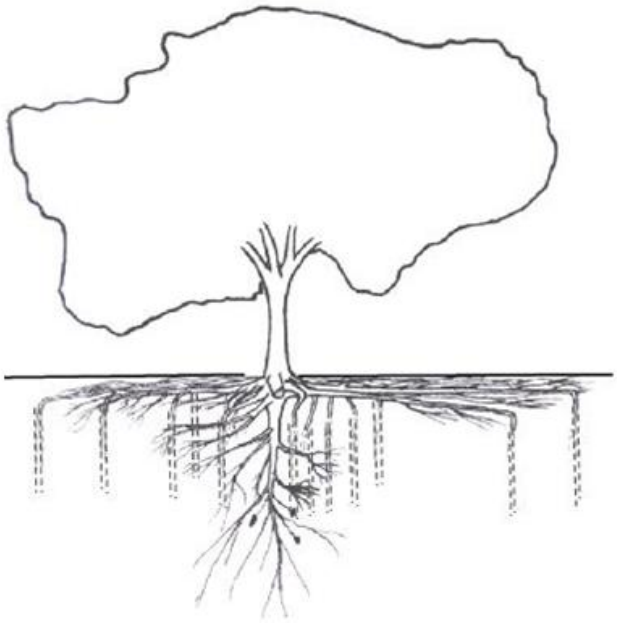
Avoid soil mobilization, especially in soil conditions with depth limitations, poor in organic matter and poor water retention capacity;
Preferably use the shrub cutters to carry out the control of shrub vegetation;
Confine the mobilization of the soil (harrowing) to strategic areas for forest fire defense;
Combine the various existing techniques for vegetation control (shrub cutter, shredders, extensive grazing and harrowing) according to the characteristics of the property;
Maintain areas of less intervention, by bands or patches, to promote the establishment of natural regeneration and reduce soil erosion risk.

Impacts and weaknesses

Despite the fact that shrub cutters use has been happening since 2007, progressively increasing the area intervened with this technique, the main disadvantages comparing with the disc harrow are the need for more frequent interventions and a higher cost (€ / ha). These two have been limiting factors in the technique expansion to the majority of the cork oak forests.
The positive contribution in increasing soil carbon sequestration is an opportunity to consider in the future, as has already happened between 2011/14 through a project called Terraprima Matos (www.terraprima.pt/en/projecto/1).

Future developments

More information is needed on the different machinery available and the several conditions that can help the farmers and the technicians in their choice.
Long term projects for assessing the soil conditions and the cork oak recruitment after several years of ploughing and shrub cutter need to be maintained in order to demonstrate that in the long term, the additional cost of the shrub cutter may be a secure investment in terms of soil conservation and cork oak sustainability.



The cork oak is characterized by having a root system with structural and functional characteristics adapted to dryness, maximizing water intake through extensive and deep roots. It presents a dimorphic root system, with shallow roots (connected with the water of the topsoil) and with deep roots (exploiting water in depth, namely in the water tables). Source: David et al. 2013, 2016 (3)(4)

Further information

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About INCREDIBLE Project

INCREDIBLE project aims to show how Non-Wood Forest Products (NWFP) can play an important role in supporting sustainable forest management and rural development, by creating networks to share and exchange knowledge and expertise. 'Innovation Networks of Cork, Resins and Edibles in the Mediterranean basin' (INCREDIBLE) promotes cross-sectoral collaboration and innovation to highlight the value and potential of NWFPs in the region.

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