Can ecological engineering help improving the postfire resilience of cork oak ecosystems in southern France?

T. Curt, Romain Bertrand, L. Borgniet, T. Ferrieux, E. Marini

To cite this version:

HAL Id: hal-02592383
https://hal.inrae.fr/hal-02592383
Submitted on 15 May 2020
Can ecological engineering help improving the postfire resilience of cork oak ecosystems in southern France?

Ecological engineering can provide knowledge and practices to act on the main drivers of cork oak persistence at landscape-scale (i.e. fire spread and vegetation regeneration) in a context of climate change and uncertainty.

1. Context: Wildfires and droughts damage cork oak populations

Cork oak (Quercus suber) is renowned as especially fire-resistant and fire-resilient. However, the legally-protected cork oak ecosystems experience increasing tree mortality and regeneration failure in the Maures massif (southern France), likely due to recurrent wildfires and severe summer droughts.

2. Materials and Methods: Spatially-explicit population modelling

- We gathered information from field experiments, field survey of mortality and regeneration, and from the study of past fire regime
- We simulated the population dynamics and different fire regimes using an individual-based and spatially-explicit model

3. Results

Acceptable and efficient management practices in this fire-prone environment would be:

(i) clearing shrubs at strategic places:
- to limit fire ignition and spread towards the highly flammable mosaic of shrubs and cork oaks, because high-severity and very large fires have a disproportionate impact on cork oak populations;
- to help the establishment of cork oak seedlings in narrow windows of opportunity after fire;

(ii) maintaining mature cork oak populations in good condition, although they poorly colonize the open areas after fires;

(iii) Favoring spatial connectivity between (seed) sources and ‘sinks’ (= favorable habitats)

(iv) selecting the trees that will probably survive and/or regenerate as soon as possible after a fire, with the help of postfire mortality and sprouting models

4. Conclusions

Shrub clearing and selection of trees and stands in good conditions should help maintaining cork oak populations even at high fire regime.

---

Thomas Curt, Romain Bertrand, Laurent Borgniet, Thibaut Ferrieux, Elodie Marini
Cemagref Unité de recherche EMAX (Ecosystèmes méditerranéens et risques) Centre d’Aix en Provence

International EECA Congress
Ecological Engineering “from concepts to applications”, Paris (France) 2-4 December, 2009