

## ABSTRACT

Wildfires constitute one of the main threats to many Spanish forest areas, especially with forecasts on climate change and land use that predict a worsening of the problem. Due to that, it is a main goal to develop new tools and technologies that improve the efficiency in the protection of our forest ecosystems. In addition, it is important to facilitate forest fire extinction and reduce their burned surface and severity, if they were occurring.

In this context, our main objective is to carry out an assessment of the effectiveness of preventive treatments for reducing fuel load through prescribed and mechanical burns. It seeks to provide useful information to forest managers, so that they can have a better knowledge of the response of the ecosystem after the management tools studied and that this knowledge is implemented in the management and prevention plans of forest fires.

The efficiency of the tool used to modify the fuel model and evaluate the reduction of fuel load in the short term has been evaluated. Furthermore, we have studied the effects of burning on the plant-soil interface in the short term.

The methodology used has focused on esparto as a target plant species (*Macrochloa tenacissima* (L.) Kunth), due to its importance in the understory of the study area and resprouter ability. The management turned out to be key for fuel management and fire prevention in the study area. Efficacy and performance have been estimated for different fuel treatment methods, these being prescribed burning and mechanical clearing, in forest fire preventive infrastructures. The effects on the reduction and control of fuel load were also estimated on an obligate seeder, rosemary (*Salvia rosmarinus* (L.) Schelid). It seeks to evaluate the response of the vegetation and its influence on the fuel load according to the time of treatment.

This knowledge will be transferred to the competent managers so that it can be implemented in the optimization of the application of preventive management tools for forest fires, both to generate safe areas for extinguishing personnel (in the event of a fire) and to reduce the size and severity of a possible fire, generating a more adequate and sustainable fire regime for the needs and objectives of land use planning in the study area. Also, the results will be disclosed to the general public to inform society of the tools that managers have, including the use of friendly fire.

**Key words:** forest management, fire prevention, ecosystem response.