

Combining tree physiology, fire science and forest management principles to predict tree survival and damage in burned forests

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Forest fires in Spain cause damages at tree and stand levels, modifying the present landscapes and causing socioeconomic and ecological losses. The study area presents complex landscapes with diverse forests and different species mixtures. The objective of the study is to emphasize the influence of morphological traits in the survival of tree species in burned areas and assess the effect of species mixture in stand fire damage. Data are obtained from the second (1986-1996) and third Spanish National Forest Inventories (1997-2007) and data about species traits from several traits databases. The models analyze stand damage and tree mortality due to forest fires, including the morphological traits of the present species, aiming to determine the effect of those traits on tree level resistance and the influence of species mixture on stand level vulnerability. Preliminary results show that pine dominated stands with high tree diameter variability and stand density present a higher level of damage. Tree mortality increases with decreasing tree diameters and high proportions of dead trees in the stand. The results will help identify resistant forests that because of their species mixture and species adaptations, will mitigate the impact of fire. The developed models can be used as a tool for forest planning decision making processes.