



Review

Fire resistance of European pines

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ABSTRACT

Pine resistance to low- to moderate-intensity fire arises from traits (namely related to tissue insulation from heat) that enable tree survival. Predictive models of the likelihood of tree mortality after fire are quite valuable to assist decision-making after wildfire and to plan prescribed burning. Data and models pertaining to the survival of European pines following fire are reviewed. The type and quality of the current information on fire resistance of the various European species is quite variable. Data from low-intensity fire experiments or regimes is comparatively abundant for *Pinus pinaster* and *Pinus sylvestris*, while tree survival after wildfire has been modelled for *Pinus pinea* and *Pinus halepensis*. *P. pinaster* and *P. pinea*, and *Pinus canariensis* in special, are better equipped to survive fire, but low-intensity fire is tolerated even by species often referred to as fire-sensitive (*P. halepensis* and *Pinus radiata*). The relative fire resistance of European pine species is assessed on the basis of (i) morphological and experimental data, and (ii) mortality modelling that considers fire behaviour. Limitations of these approaches to rate fire resistance are discussed, and the current knowledge gaps are indicated.

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1. Introduction

Disturbance by wildland fire plays a prominent role in the ecology of pine ecosystems. Pine strategies to cope with fire can assist either species persistence (by sexual reproduction) or individual survival (Keeley and Zedler, 1998). Agee (1998) combined the fire severity concept with life-history characteristics

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