

## Post-fire attractiveness of maritime pines (*Pinus pinaster* Ait.) to xylophagous insects

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**Abstract** The spectrum and dynamics of xylophagous insects infesting *Pinus pinaster* after a fire event were studied from November 2007 to December 2008 at Sierra de Outes (Galicia, NW Spain). Insects were collected within and outside the fire area. Relationships among species status, species abundance, tree parameters and tree injury were assessed. Mortality of injured trees was also recorded. Insect colonization built up consistently during the first year after the fire, although the pests did not colonize unburned trees in nearby areas. Thirteen insect species from six xylophagous families were collected. *Tomicus* spp., *Buprestis novemmaculata*, *Anobium punctatum* and *Pissodes castaneus* were the first species detected. *Tomicus* spp. (29%) and *Ips sexdentatus* (23%) were the dominant taxa. Bole char height and soil burn severity were positively correlated with insect presence. Trees with short stem diameter and thinner bark were also preferred. *B. novemmaculata* presence was positively correlated with crown scorch. Loss of cambium hydration was negatively related to the occurrence of pests, likely because sapwood desiccation and loss of nutrient impede brood development. About 33.3% of the fire-scorched pines died. The results recommend the removal of injured and dying pines after

fire, to avoid the rise of pest population threatening recovering trees in the burned areas.

**Keywords** Fire injuries · *Pinus pinaster* · Scolytinae · Wildfire · Xylophagous insect community

### Introduction

Fire and insects are intrinsic and synergistic components of forest ecosystems, because their interaction may delay or redirect succession, affect nutrient cycling and alter plant species composition and diversity (McCullough et al. 1998). Studies on plant selection processes by phytophagous insects are often focused on the taxonomic aspect of host selection (i.e. host/non-host discrimination), while knowledge on qualitative characteristics within the host range is still poor (Bernays and Chapman 1994; Campbell and Borden 2009).

Host selection mechanisms by bark beetles are fundamentally olfactory and visual, driven by plant size, shape, colour and volatile compounds (Bernays and Chapman 1994; Brattli et al. 1998; Mustaparta 2002; Saint-Germain et al. 2007a; Campbell and Borden 2009). Several species of wood-feeding insects almost exclusively prefer trees that are heavily stressed or have been recently killed by fire, fungal diseases, defoliating insects or harvesting operations, taking advantage of the weakened defence system of the host plant (Christiansen et al. 1987; Paine et al. 1997; Dajoz 2000; Parker et al. 2006). Following fire, insect populations might decrease temporarily, due to mortality from direct fire effects (Saint-Germain et al. 2004), and increase thereafter, because volatiles from host plant act as kairomones and lead to recruitments of xylophagous insects from outside the burned area (Lieutier 2004).

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