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Assessing the impact of post-fire forest management using beetles and ants as bioindicators

(Poster)

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Fire is one of the most frequent disturbances in forests ecosystems. Burnt forests in southern Europe are usually harvested with heavy machinery leaving very little woody biomass on-site. This second disturbance can alter the forests physical structure, ecological key processes, and the species dynamics and interactions. However, postfire logging practices using light machinery and leaving coarse woody debris on-site, would be a more sustainable alternative. This work analyzes the impact of forest fire and salvage logging in a Mediterranean pine-oak forest burnt in July 2016. Four plots of around 1 ha were logged in April 2017 (sustainable logging; SL) with light machinery, leaving the canopies on-site as piles of branches and preserving standing living trees. Three plots of similar size were unlogged (non-intervention, NI). The impact of the two treatments (NI and SL) on beetle and ant communities, has been studied in spring-summer 2017, soon after the logging. Ants and beetles have important ecological roles and are considered good bioindicators of forest disturbances. To capture flying beetles, 14 flight traps were placed at 3-4 meters from the ground in NI and SI treatments (7 per treatment) for 6 weeks. We then analyzed their abundance, species richness, diversity and feeding guild (DE defoliator, D detritivore, S sap feeding, G granivore, F fungal feeding, P predator, PD predator-detritivore, V vegetation feeding and X xylophagous). We captured 4533 individuals belonging to 123 beetle species from 23 families. There were no significant differences in species richness between the two treatments, although abundance and diversity were significantly higher in SL. A FAMD (Factor Analysis of Mixed Data) separates a group of non-saproxilytic (G, DE, D, P and V) from a group of saproxilytic (F, X, PD) species, more abundant at SL. On the other hand, 125 pitfall traps were set up in 5 microhabitats (25 traps/microhabitat): open ground and below sprouted shrubs in the NI treatment; and ground, below sprouted shrubs and under branch piles at SL. We captured 687 individuals belonging to 13 species of ants. There were no significant differences in species richness between treatments (NI vs. SL) and between microhabitats. However, ant abundance was highest below shrubs and under branch piles and diversity was highest in the open ground of SL. The higher temperature of this microhabitat likely favours the activity of different species. These provisional results will be completed with new plots managed by conventional salvage logging, with longer sampling until 2020 and with the parallel monitoring of vegetation, spiders, birds and mammals. Together, we hope to provide diversity indicators to be used in decisions regarding the management of burnt forests.