



Guiding post-fire recovery: an assessment of Scots pine seed predation in the framework of active restoration interventions after a high-severity wildfire

Matteo Domanico, Giulia Mantero, Francesco Pastore, Fabio Meloni, Matteo Garbarino, and Raffaella Marzano

University of Turin, Department of Agricultural, Forest and Food Science, Grugliasco, Italy (matteo.domanico@unito.it)

The increase of wildfire severity and frequency in the Mediterranean area combined with the harsher environmental conditions damped by ongoing climate change, can hinder regeneration recruitment, particularly for obligate seeders in mountain ecosystems. Therefore, rethinking current post-fire management strategies in mountain ecosystem is crucial to mitigate the consequences of wildfire regime alterations on forest ecosystems and to re-establish ecosystem trajectories after large and severe wildfires. The high temperatures and scarce rainfall that characterized Autumn 2017 in Piedmont (North-Western Italy) led to an uncommon fire season, with ten large wildfires that burned about 9700 ha. The Susa fire was the largest event, burning with mixed severity almost 4000 ha, with Scots pine (*Pinus sylvestris* L.) stands being affected with the highest severity. Following the event, a reforestation project was started, aiming to restore the forest cover, particularly in large high severity patches far away from seed trees, likely to be affected by further degradation phenomena. Given the scarcity of Scots pine seedlings available in forest nurseries, direct seeding was considered a valid option, but it needed to be carefully planned, especially because of seed predation and run-off. Indeed, post-dispersal seed predation plays a key role in the natural dynamics of forest ecosystems as it can deeply affect the number of seeds available for recruitment. To assess the dynamics and rate of seed predation by different taxa and to identify the magnitude of seed losses, an experimental approach was then applied. Specific field experiments are being performed in both the fall and spring seasons, starting from October 2023, to evaluate the magnitude of post-dispersal seed predation within the high severity patches of the Susa fire, its spatial distribution considering three different microhabitats (open areas, close to deadwood, under shrubs) and the main predators involved among insects, birds, and rodents. Understanding the impact of post-dispersal seed predation is a crucial aspect to develop targeted post-fire management strategies, possibly reducing restoration costs and improving its success.