

Wildfire impacts on seedbank and vegetation dynamics in *Calluna* heath

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Abstract

Moorlands dominated by *Calluna vulgaris* (hereafter *Calluna*) are globally rare and under increasing threat of wildfires due to climate change. The soil seed bank is important for community resilience, but research on its contribution to regenerating vegetation after moorland fires has to date focused on prescribed fire or on the short-term ([?] 2 year) impacts of wildfire. To address the role of the seed bank in long-term vegetation regeneration, we studied a chronosequence of six wildfire sites within a Scottish moorland catchment, ranging from 2 to 64 years since burning. We recorded vegetation composition and sampled the seed bank. *Calluna* and *Erica* spp. comprised 66 % and 27 % of germinated seeds, respectively, and the majority of vegetation species were not represented in the seed bank. Canonical Correspondence Analysis (CCA) revealed that time since fire was a strong predictor of vegetation species composition, but it had no effect on seed bank composition, suggesting that the same species dominate the seed bank regardless of burning. Whilst total seed density was marginally reduced after wildfire and slightly increased with time, the non-*Calluna* seed bank was more notably affected. The proportion of non-*Calluna* species decreased with time in both vegetation and seed bank as *Calluna* cover was re-established and the seed bank of other species became gradually depleted. Whilst relative non-*Calluna* cover in the vegetation was at a maximum at the start of the chronosequence and then declined, the proportion of non-*Calluna* in the seed bank followed a unimodal pattern after fire and reached a peak after around 35 years. Our results contribute to the knowledge of how moorland ecosystems regenerate after severe disturbances, which are likely to become more common as the climate changes.

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