Submitted Abstract

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Abstract

Large and severe disturbances may erode the resilience of temperate forest ecosystems and alter their recovery dynamics, especially under global change. Regeneration failures after stand-replacing disturbances have been documented in North America, particularly when juxtaposed with unfavourable environmental conditions (i.e. extreme droughts following the disturbances, in dry topographic positions). We examine if there are similar tree regeneration failures following large and severe disturbances in temperate forests of Europe. We investigated mid to long-term recovery after disturbances causing canopy mortality above 70 % of basal area in patches larger than 1 ha. Across a network of ≈100 sites, including various forest types and management practices, and 26 disturbance events, including wind, fire, and bark beetle, we studied regeneration density, structure, and composition, which are key indicators of forest resilience. Density of regenerating individuals was weighted according to their respective height, aggregated at plot-level, and standardized based on plot size and time since disturbance, in order to be comparable across sites. Ecological drivers of regeneration density, including disturbance characteristics (agent, size), topographic (elevation, aspect, topographic wetness), climatic (growing degree days, aridity index) and management factors (salvage logging, planting), were formally analysed using mixed models, while ungulate browsing and biotic interactions (e.g. vegetation competition) were qualitatively assessed. Separate analyses were also performed for three successional groups of tree species (pioneer, light-demanding, and shade-tolerant). We quantitatively evaluated physiognomic recovery by comparing regeneration densities with country-specific restocking targets used in forest practice, and compositional recovery by comparison with pre-disturbance stand composition or mixture management goals. Preliminary results on regeneration patterns and drivers will be presented in the context of forest resilience to large and severe disturbances.