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Impact of Formica exsecta Nyl. on grassland soil seed bank and vegetation patterns

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The mound building ant species Formica exsecta Nyl. is widely distributed in subalpine grassland ecosystems of the Central Swiss Alps. We studied the impact of this species on soil seed bank and vegetation patterns in a grassland used as a cattle pasture over several centuries, but abandoned in 1914. This grassland, located at 1950 m a.s.l. and 11 ha in size, is since then part of the Swiss National Park. We counted more than 700 active ant mounds over the whole grassland. The mounds show a distinct spatial pattern with most mounds located in tall-grass vegetation, which is rarely visited by ungulates, in particular red deer (Cervus elaphus L.), whereas heavily grazed short-grass vegetation is almost completely avoided by ants. Qualitatively, i.e. with regard to plant species composition, the soil seed bank was very similar between ant mounds and areas that were untouched by mounds. In contrast, the quantity of seeds was several times larger in mound material compared to the mineral soil outside of the mounds. Additionally, the composition of the vegetation was significantly different on ant mounds compared with the grassland vegetation outside of the mounds with e.g. dominance of graminoides on ant mounds vs. dominance of herbaceous species in the grassland vegetation. Even one meter outside from the edge of the ant mounds, the composition of the vegetation was still influenced by the ant mounds. Over all, Formica exsecta has a considerable impact on vegetation patterns in the grassland ecosystem studied.