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Influence of grass invasion on soil parameters in a Belgian heathland

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Until the early nineteenth century, the Belgian landscape was characterized mainly by the presence of heathland, a typical cultural landscape with important ecosystem services. Since then, urbanisation has led to the conversion of large stretches of heathland to be converted to forest, arable land or cities. Increased concentrations of exhaust gasses result in elevated concentrations of nitrogen (N) in the atmosphere. Through rainfall this N enters the soil and is fixed via precipitation reactions, which in turn leads to higher N soil concentrations. Because Calluna vulgaris (common heather; the dominant plant species in heathlands) thrives on soil containing low nutrient concentrations, it is now being outcompeted by plant species more suited to these altered nutrient levels. As a result, the heathland is slowly evolving into grassland and, consequently, its ecosystem services and soil nutrient cycling are changing.

Here, we present the preliminary results of our investigation into the influence of grass encroachment on nutrient cycling in heathlands. For this research question, we set up a gradient of 14 plots of increasing grass cover from 0 to 100%. The woody structures of heather contain high concentrations of lignin, consequently the 100% heather plots have a more recalcitrant organic input. It is therefore hypothesized that the nutrient turnover in these plots are lower than in the 100% grass plots since grass has lower lignin concentrations and thus higher litter quality. We set up a series of measurements on pooled and homogenized soil samples of these 14 plots. We measured N mineralization and nitrification, 2 enzymes and relevant soil parameters. Interestingly, there were no significant results found for the N mineralization and nitrification. The measurement of the enzymes chitinase and phosphatase showed a significant correlation, indicating the impact of vegetation on the enzymatic activity, and therefore on the soil nutrient cycle.