

PhD project summary

Forests in postglacial areas are historically devoid of earthworms. However, climate change and accelerated human influence in northern regions facilitate a northward invasion of earthworms in these regions. Our project aims to unravel, whether Scandinavian boreal forest are under a similar threat of earthworm invasion like the ones in North America. Species are often considered invasive, if they are able to rapidly colonise new environments, and have remarkable influence in functioning of the colonised ecosystem. The project addresses both of these aspects. Based on eDNA analysis of (archived) soil samples from the Swedish National Forest Soil Inventory (NFSI), we will try to evaluate whether there is a so-called earthworm “invasion front” in Swedish forest ecosystems, and whether it extended northward in the past 50 years. Available data from soil properties, vegetation cover and climatic conditions will help us understanding factors potentially facilitating or hindering northward earthworm distribution expansion. At the same time, we assess the potential consequences of earthworm establishment in northern boreal forests. To do this we are running a mesocosm experiment close to Uppsala, with forest soil turfs collected from northern Sweden, where earthworms are yet scarce. After controlled earthworm introduction, we will be able to detect potential changes in soil properties linked to earthworm colonisation of northern forests. We have a special focus on detecting shifts in soil C and N cycling, as well as soil microbial (especially fungal) communities.