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Implementation of a pioneer program for soil monitoring and assessment of factors influencing soil biodiversity in Austria

Johann Zaller¹, Marion Mittmannsgruber^{1,2}, Edith Gruber¹, Elisabeth Wiedenegger¹, **Dmytro Monoshyn**², Yoko Muraoka¹, Kathrin Pascher^{1,3,4}, Stefan Schindler³, and Rajasekaran Murugan^{1,2}

¹University of Natural Resources and Life Sciences Vienna (BOKU), Institute of Zoology, Department of Integrative Biology and Biodiversity Research, Vienna, Austria (johann.zaller@boku.ac.at)

²Institute of Soil Research, University of Natural Resources and Life Sciences Vienna, Austria

³Biodiversity and Nature Conservation, Environment Agency Austria

⁴Department for Knowledge and Communication Management, University for Continuing Education Krems, Austria

Systematic monitoring of soil biodiversity and soil health is still in its infancy in Europe. In Austria, there are several active biodiversity monitoring programs such as the BINATS Biodiversity-Nature-Safety or ÖBM-K Austrian Biodiversity Monitoring of the Cultural Landscape projects. However, these projects focus on habitat diversity, vascular plants, grasshoppers, butterflies and wild bees, but have not taken soil organisms into account. This is surprising, as soils are among the most species-rich habitats and intact soils are the basic prerequisite for the integrity of ecosystems. Healthy soils also play an important role in buffering extreme climate events such as heavy rainfall or drought, or sequester carbon. The aim of the BodenBiodiv project is to close this glaring data gap for Austria and to identify the causes of various indicators of soil biodiversity in the agricultural landscape. As part of objective 1, systematic monitoring of earthworms in the agricultural landscape will be established in 200 quadrants (625 x 625 m) throughout Austria, which are part of the BINATS and ÖBM-K monitoring programs. Lists of the earthworm species present, their abundance and biomass as well as a distribution map are being compiled. In addition, a manual for future surveys on national monitoring of soil biodiversity will be compiled using harmonized terminology as a supplement to the existing monitoring manuals in Austria. Objective 2 deals with the analysis of factors that determine the occurrence of earthworms. For this purpose, site characteristics (land use, altitude) and soil properties (pH value, nutrient concentrations, moisture content, carbon content, soil microorganisms) as well as and management practices are associated with the recorded earthworm parameters and the available biotope mapping of the plots. Objective 3 is to compile a first Red List of earthworms in Austria. BodenBiodiv focuses on indicators of the status of species and biotope types; genetic diversity is also to be determined later on the basis of backup samples. The comprehensive data set from different climatic regions in Austria, from lowlands to high alpine areas, BodenBiodiv also enables the assessment of the influence of climatic variables on soil biodiversity. By incorporating data from existing biodiversity monitoring programs, we can expand our understanding of the interactions between below-ground and above-ground biodiversity.

