SESSION : GT 04. Soil Biology / GT 16. Connecting People and Soils

TITLE : Citizen-based identification of earthworm morphotypes: insights from a large-scale biodiversity monitoring network in France

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ABSTRACT

Monitoring soil biodiversity remains difficult, particularly due to the high spatial and temporal resolution required to accurately reflect the dynamics of soil communities in cultivated landscapes. Earthworms, as key soil organisms, are commonly used as indicators, but their identification in the field is constrained by the difficulty of assigning individuals to species without expert knowledge. As a result, classification into morphotypes is often used as a practical alternative. This study examines the reliability of such classification within the French ‘500 ENI’ (Non-Intended Effects) Monitoring Network, which involves annual sampling in agricultural plots, followed by expert verification of identifications. Using data from over 48,000 earthworms collected across more than 950 plots, we calculated two indicators to assess classification reliability: the misclassification rate (MR) and the undetected rate (UR). Results showed an average MR of 28% and an average UR of 32%, with substantial variation depending on morphotype. Endogeic individuals were classified more reliably than epigeic types and anecics (both red- and black-headed). The reliability of classification was strongly influenced by the sampler's experience as well as by community characteristics, particularly total abundance, proportion of adults, and morphotype diversity. Our findings emphasize the need for strengthened support for participants with limited experience. In particular, we recommend developing targeted training materials and decision aids to improve classification accuracy. Specific attention should be given to plots with low-density communities, few adults, or low morphotype diversity, where classification is most error-prone. Additionally, promoting sampling during periods with favorable conditions for earthworm activity and maturity could help improve both detection and reliability. These measures would contribute to increasing the robustness of large-scale biodiversity monitoring efforts relying on morphotype-based assessments.

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