BIOSIS – A framework and a tool for assessing soil multifunctionality

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Soils play an important role in sustaining life, and they are also full of life! These soil biota can be beautiful and have intrinsic value, but for a long time know now they have been recognised for their important role in supporting range of soil functions, and therefore soil quality. Soil quality is define as the capacity of soil to perform multiple functions, such as water regulation and nutrient cycling. However, defining the who contributes to multifunctionality and how, still remains a challenge. When assessing these functions for soil quality determination, soil biological data are rarely included, as they are often considered difficult to measure, to interpret, and less usable by farmers. The most often used biological parameters are, therefore, few simple and relatively cost-effective measurements, but don't necessarily provide much information on functionality. But is this sufficient to understand the role of soil biology in soil quality? With a team of scientists from the Soil Biology group at WUR and with collaboration with soil biologists across Europe we have tried to unravel some of this complexity and suggest a way forward which allows us to understand this complexity across a range of scales. In Creamer et al., (2022), we developed a framework to help us defining the role of soil biota in four soil function models relating to agricultural systems: Water Regulation and Purification, Nutrient Cycling, Disease and Pest Management and Carbon and Climate Regulation. We start with the function, which can be broken down into sub-functions, which are supported by a range of soil processes, which are supported by a range of biological actors. But how to select biological methods for assessing soil functions? In some cases we can measure the process directly and in others we can measure the biological actor as a proxy of the process. Zwetsloot et al., (2022) combined the soil functional models described earlier which define the who and how of multifunctionality with the 'Logical sieve concept' from Ritz et al., (2009) and develop a flexible selection tool which applies filters on pertinence to the soil functions, applicability of the method to the land-use system under assessment and logistical criteria based on the users requirements. We need to ensure to understand and take into account the context of assessment and the users requirements to make sure that the adoption of soil biological measurements is a success as different context require different methods. This new selection tool is available at the BIOSIS (Biological Soil Information System website) platform (https://biosisplatform.eu/) and is freely available to use. We invite you to come and collaborate with us by using the tool and sharing your experiences with us.

Is important to underline that soil biological measurements should never be taken in isolation and it is the ambition of the BIOSIS platform to also define the chemical, physical, management and wider environmental parameters that should also be assessed to ensure we understand and can truly assess the functions which our soils deliver to support life on land.

References

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