

MonViA - Development of a concept for a national trend monitoring of the earthworm community

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The National Monitoring of Biodiversity in Agricultural Landscapes “MonViA” is a joint project of the Julius Kühn Institute, the Thünen Institute and the Federal Agency for Agriculture and Food with the aim of developing a modular monitoring system for agricultural landscapes. A decisive part of this monitoring is the earthworm community.

Intact earthworm communities are essential for high and stable soil fertility. However, earthworms are not evenly distributed in the German agricultural landscape due to natural limiting factors such as texture, moisture and soil pH. Areas where these limiting factors are ideal would be “comfort zones” for earthworms where habitat functions are assumed to be normal and intact. Such “comfort zones” are therefore best suited to observe anthropogenic effects of agricultural use on the diversity and function of earthworms.

In order to characterise agricultural areas, especially arable land, with regard to their relative performance (“comfort zones”) for earthworms, a meta-analysis will be carried out using available data from the JKI, TI, existing databases and literature data. The aim is to identify typical earthworm species for the respective site-specific comfort zones. Suitable species must be abundant in the comfort zone, distributed over several comfort

zones and easily identifiable.

The results of the meta-analysis are transferred to geomaps, which identify several “comfort zones” in Germany for earthworms via a web GIS application developed in the project. Only these zones will be the focus of a practicable long-term monitoring of the diversity and abundance of earthworm communities under consideration of soil properties and soil cultivation systems. To validate the results, soil analyses and earthworm surveys will be carried out in April and October 2020 and 2021 using standardized methods for the direct and indirect detection of the abundance and activity of earthworms, with a particular focus on the bioindicator species.

Ultimately, all the results achieved in the project are incorporated into the development and implementation of a cost- and personnel-effective yet meaningful monitoring concept for the effects of cultivation measures on the diversity and abundance of earthworm communities and their ecological services. The concept should serve as a basis for a national trend monitoring of biological diversity and identify long-term trends in the biodiversity of earthworm societies in the agricultural areas typical for Germany, for example in the event of a change in management methods.