The role of earthworms in sustainable agriculture

Soil forms the basis for all agricultural production. An integral part of every healthy soil is its living component, consisting of a complex food web of soil organisms that contribute, via their activities and interactions, to the processes that support soil fertility. This is recognized in the concept of 'functional agro-biodiversity' (FAB) where particular focus is given to groups of soil organisms that are, or can be, useful in supporting agricultural production.

At the heart of this concept lies the idea to foster FAB *via* adaptations in agricultural management strategies in order to make the best use of the intrinsic potential of soils for e.g. pest control and disease suppression, or improvement of soil structure and fertility, i.e. enhancing ecosystem services. The aim of FAB is to develop new agro-ecological farming practices that, by taking soil organisms and their functions into account, are less dependent on fossil fuel based inputs than the current systems.

In my lecture, I will demonstrate the importance and potential of earthworms as key components in the FAB concept. This is based both on their individual impact on the soil system and their interactions with other soil organism groups. I will present a method to quantify the ecosystem service *earthworm bioturbation,* the translocation of soil due to earthworm burrowing and feeding. This measure can be used as a long-needed proxy for comparing the impact of earthworms in different agro-ecosystems. Finally, I will explore the need to align scientific research, policymaking and on-farm implementation in order to attain agricultural sustainability.

Astrid Taylor