

Spatial variety of soil biota: diversity of types vs. diversity of species

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The species diversity (α) of soil biota is estimated to exceed that of the vegetation by several orders of magnitude [1]. At the microbial level local species richness is always sufficient to drive ecosystem functions [2]. Another question is to what extent species composition of soil communities changes through space (β diversity). This question is more easily answered by soil zoologists, who deal with the main drivers that structure the soil community [3]. Types of soil communities can be distinguished using earthworms and microannelids as indicator groups [4]. On the basis of data from soil monitoring programmes it is shown how the species composition of annelid coenoses changes along environmental gradients and which threshold values exist, where other driver species begin to reorganize the community structure [5]. It can be shown that there is only a small number of such thresholds. Hence, the variety of types in soil biota remains rather low.

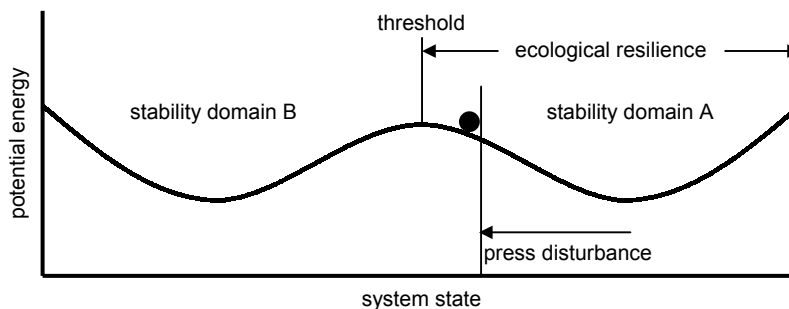


Figure 1: Stability landscape along an environmental gradient (e.g. soil reaction) with two stability domains. Press disturbances like acid rain or liming may shift the soil community into another domain.

Figure 1 represents a conceptual model of two stability domains [6] that occur along the gradient of soil reaction. They correspond with two types of soil communities of which the main drivers are earthworms and enchytraeids respectively. Press disturbances [7] like acid rain may shift the species composition gradually within the range of a domain or may push it into a new domain surpassing the threshold of ecological resilience.

References

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