Post-mining landscapes, and the dynamics and distribution of soil faunal succession

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Abstract
Soil biota play an essential role in ecosystem services provided by soil. Here we studied some of the factors affecting soil biota colonization, distribution, biodiversity and conservation values, and their impact on plants' interactions, in reclaimed and unreclaimed (spontaneous succession) post mining sites, located in the spoil heaps after coal mining near Sokolov, Czech Republic, which was summarized in four research papers.

Transplant of soil blocks show that despite abundant soil fauna communities in the blocks, they migrate little into surrounding sites, which indicate that access to the disturbed surfaces does not guarantee a successful colonization in the post mining sites where a new soil profile is to be developed. Studying the heterogeneous distribution of fauna under various vegetation patches and sites, we showed that different faunal (i.e., microbial, meso, and macrofaunal) groups' distribution heterogeneity could be partly explained by different explanatory factors and using one set of factors for all the groups would not be powerful enough to create a short-list of the influential elements for each of the faunal groups. Investigating the importance of microtopography, in our young spontaneous succession post mining sites, showed that the wavy surfaces, in the small spatial scales, support the species diversity and biological conservation value. That said, studies that are limited in their focal groups might overlook the importance that flat surfaces could have for some other red-listed species and different focal group’s species diversity.

Our laboratory experiment confirmed the field observations, that earthworms have an influence in the plant community change since they can reduce the dominance of a given species in favor of others. We have found that as a result of earthworm’s physical bioturbation of the soil the fungal symbionts, i.e., the mycorrhiza, and their hosts react differently which plays a role in the species succession and composition dynamic of such disturbed lands by releasing the suppressive pressure of the dominant vegetation.