



Earthworms drive succession of both plant and Collembola communities in post-mining sites

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Previous field observations indicated that earthworms promote late-successional plant species and reduce collembolan numbers at post-mining sites in the Sokolov coal mining district (Czech Republic). Here, we established a laboratory pot experiment to test the effect of earthworms (*Aporrectodea caliginosa* Savigny and *Lumbricus rubellus* Hoffm.) and litter of low, medium, and high quality (the grass *Calamagrostis epigejos*, the willow *Salix caprea*, and the alder *Alnus glutinosa*, respectively) on late successional plants (grasses *Arrhenatherum elatius* and *Agrostis capillaris*, legumes *Lotus corniculatus* and *Trifolium medium*, and non-leguminous dicots *Centaurea jacea* and *Plantago lanceolata*) in spoil substrate originating from Sokolov post-mining sites and naturally inhabited by abundant numbers of Collembola. The earthworms increased plant biomass, especially that of the large-seeded *A. elatius*, but reduced the number of plant individuals, mainly that of the small-seeded *A. capillaris* and both legumes. Litter quality affected plant biomass, which was highest with *S. caprea* litter, but did not change the number of plant individuals. Litter quality did not modify the effect of earthworms on plants; the effect of litter quality and earthworms was only additive. Species composition of Collembola community was altered by litter quality, but earthworms reduced the number of individuals, increased the number of species, and increased species evenness consistently across the litter qualities. Because the results of this experiment were consistent with the field observations, we conclude that earthworms help drive succession of both plant and Collembola communities on post-mining sites.