Geophysical Research Abstracts
Vol. 20, EGU2018-5298, 2018
EGU General Assembly 2018

Effects of soil macrofauna plant interactions on soil formation and plant community development during primary succession in post mining sites

Jan Frouz

Fac. Sci. Charles University in Prague, Institute for environmental studies, Praha 2, Czech Republic (frouz@natur.cuni.cz)

During succession, plants interact with soil macrofauna either directly e.g. by herbivory or indirectly by effect of litter on soil decomposer community which feedback to plants via soil formation and nutrient cycling. Here I am presenting several studies conducted in one chronosequence of post mining sites in Czech Republic indicating cooperative effect of various interactions between plants and soil macrofauna on plant community and soil development.
Study of plant community along chronosequence show abrupt change in plant community which correspond with time of earthworm colonization in these sites and also by micromorphological evidence of starting organo-mineral A layer formation due to ants activity. This is consistent with fact results of laboratory experiment showing that earthworm inoculation promotes plant growth. More detailed investigation show that plants typical for early and intermediate succession stages show negative plant soil feedback this negative feedback is however less severe if the soil is affected by activity of earthworms or isopodes. When plants grow in competition, then earthworm presence promotes competition of late succession plants against early succession plants. In later succession soil there is larger effect of earthworm presence on plant growth, but in early succession soils earthworms have larger legacy effect e.i. effect which persist when earthworms has been removed from soil. Manipulation experiments show that development of early succession plans has to teach certain level of biomass production and litter accumulation to allow earthworm to establish. Laboratory and field experiment also show that beside worm colonization root herbivory by Elateridae larvae support replacement of early succession plants by late succession ones. These examples show that interactions between soil fauna and plant play important role in plant succession and soil development during ecosystem recovery.