

Oral – Session 3

Resilience to inundation in earthworm communities in river floodplain grassland: trait attributes and diversity

Faber Jack, Lange Marieke de, Kramer Koen

Alterra, Wageningen UR

The relationship between biological diversity and ecosystem functioning can be studied in terms of ecological traits in species. We studied ecosystem functioning in terms of resilience to stressors, using as an example an earthworm community in a frequently flooded floodplain in the Netherlands. Our general hypothesis was that ecological resilience is determined by the distribution of traits between species within the community: a greater diversity of traits to overcome the adverse effects of flooding will allow the earthworm community to better respond to inundation and therefore be more resilient. Whilst earthworms can occur in high densities in floodplains, periodic occasions of flooding restrict population growth and species diversity. The different mechanisms employed by earthworm species for coping with this stressor can be described by a combination of ecological traits. For 10 earthworm species encountered along an inundation gradient in the Duursche Waarden floodplain area flanking the river IJssel we compiled a dataset of 11 relevant ecological traits. Trait frequency analysis confirmed the presence of flood tolerance traits at more frequently inundated plots, such as active dispersal, hydrophily, and parthenogenetic reproduction. The greater diversity of flood tolerance trait attributes in low-elevation plots suggests that earthworm communities at these sites are more resilient to flooding. Ordination analysis using trait composition instead of species composition somewhat improved the proportion of variance explained, suggesting that trait composition yields more information on community resilience than species composition. The combination of the two approaches improved our understanding of community resilience.