Geophysical Research Abstracts
Vol. 18, EGU2016-15215, 2016
EGU General Assembly 2016

Biological and physical conditions of macroinvertebrates in reference lowland streams

Jan de Brouwer (1,2), Joris Eekhout (3), Piet Verdonschot (1,2)

(1) Alterra, Wageningen University and Research Centre, Wageningen, The Netherlands (jan.debrouwer@wur.nl), (2) Institute for Biodiversity and Ecosystem Dynamics (IBED), University of Amsterdam, Amsterdam, The Netherlands, (3) Centro de Edafología y Biología Aplicada del Segura (CEBAS), Consejo Superior de Investigaciones Cientificas (CSIC), Murcia, Spain

Channelisation measures taken halfway the 20th century have had destructive consequences for the diversity of the ecology in the majority of the lowland streams in countries such as the Netherlands. Currently, stream restoration measures are being implemented in these degraded lowland streams, where design principles are often based on outdated relationships between biological and physical conditions. Little is known about the reference conditions in these streams. Therefore, the aim of this research is to quantify the relationships between biological and physical conditions of macroinvertebrates in reference lowland streams.

The research was conducted in four near-natural lowland streams in Central Poland. Field data were obtained during a field campaign in 2011. The following data were obtained in a 50-m reach in each of the four streams: macroinvertebrate sampling, spatial habitat patterns, bathymetry, and flow-velocity. Furthermore, water level, light sensitivity and temperature sensors were installed to obtain the temporal dynamic of these streams. Macroinvertebrates were sampled in 9 different habitat types, i.e. sand, gravel, fine organic matter, stones, branches, leaves, silt, vegetation, and wood. Macroinvertebrates were determined to the highest taxonomic level possible. Data from the bathymetrical surveys were interpolated on a grid and bathymetrical metrics were determined. Flow velocity measurements were related to habitats and flow velocity metrics were determined.

Analysis of the data shows that flow conditions vary among the different habitat, with a gradient from hard substrates towards soft substrates. Furthermore, the data show that stream as a unit best explains species composition, but also specific habitat conditions, such as substrate type and flow velocity, correlate with species composition. More specific, the data shows a strong effect of wood on species composition. These findings may have implications for stream restoration design, which mainly focus on large-scale reconstruction of channel planform, whereas this study shows that improvement of stream ecology should focus on the smaller habitat scale.