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Variation in ostracod (Crustacea, Ostracoda) communities in the alluvial valley of the upper Paraná River (Brazil) in relation to substrate

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Large river floodplains are convenient model systems to test for variation in animal and plant community structure, as they have a variety of habitats and substrates and are generally dynamic systems through the occurrence of flood pulses with varying intensity. South American floodplain systems furthermore have unique types of substrates, in the form of root systems of floating macrophytes. Here, we investigate the variation in ostracod communities in relation to substrates and related environmental variables. Specific hypotheses tested and questions addressed, comprise: (1) to which extent do ostracod communities vary with different substrates; (2) are these differences related to biological properties of different ostracod groups (e.g., swimming versus non-swimming) or of the macrophytes (e.g., size and complexity of root system); (3) are the ostracod communities related to abiotic factors?

Sampling was performed in 2004 in the alluvial valley of the Upper Paraná River, Brazil, in the wet and dry seasons. Five different substrates, including littoral sediment and four macrophyte species root and leaf systems, in four hydrological systems and a variety of habitat types, were sampled. Only monospecific stands of these plants were sampled. We sampled littoral ostracods by hauling a rectangular handnet (160 μm) close to the sediment-water interface and the floating vegetation was collected by hand, and comparable amounts of roots were thoroughly washed in a bucket. The residues were washed in the same handnet and the material preserved with alcohol (70 % final concentration).

54 species of Ostracoda were found in 4 families, Cyprididae, Candonidae, Limnocytheridae and Darwinulidae. The global RDA model incorporating all explanatory variables, was highly significant and explained 42.5 % of ostracod community variation ($F = 4.638$, $P = 0.002$). Substrate type contributed most to total explained community variation (11 %) followed by abiotic variables (6 %).

Variation partitioning analysis (RDA) showed that ostracod communities significantly differed between different substrates, mainly between the littoral and plants with small root systems (*Eichhornia azurea*) on the one hand, and plants with large and complex root systems on the other hand (*E. crassipes* and *Pistia stratiotes*).

RDA analyses indicated that the pleuston (biotic communities associated with root systems of floating plants) of *E. crassipes* comprised more non-swimming species than the pleuston of the smaller roots of *P. stratiotes*, but species-level Kruskal Wallis analyses could not detect significant differences between both macrophyte species. Abiotic factors also contributed to variation, but the ranges of all measured water chemistry variables were narrow. This uniformity in abiotic factors, which might be owing to the occurrence of large flooding events, unites all water bodies, even those that are generally separated from the main river and channel system.

The present study clearly showed that substrate type has an effect on ostracod communities in the pleuston of floating macrophytes. It now remains to be determined which aspects of these root systems cause the difference: size, complexity or chemical substances. In addition, it is also unclear which other variables cause the c. 60% as yet unexplained variation in ostracod community structure, observed in the present study. These could be abiotic factors, such as unmeasured variables of water chemistry, but could also be linked to biotic factors such as predation, competition and parasites.

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