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Ostracod assemblages in various littoral plant communities of a shallow lake (Lake Swidwie, Poland)

Agnieszka Szlauer-Łukaszewska

The focus of this study was Lake Swidwie in northwestern Poland. Together with the surrounding ditches, small ponds, rushes and bogs, the shallow Lake Swidwie provides an exceptionally diverse complex of habitats for invertebrate fauna. Thus, the lake and its periphery were an ideal area for investigating the taxonomic diversity of Ostracoda in various types of littoral plant communities. Both habitats within the lake, and in its periphery were included in the study. The following lake habitats were distinguished: (1) *Phragmitetum australis* and *Typhetum angustifoliae* rushes, (2) *Telypteridi-Phragmitetum* rush floating mat, (3) underwater meadows (elodeids) comprising either *Ceratophyllum* and *Myriophyllum*, or charophytes, (3) *Nuphar lutea* and *Nymphaea alba* nympheids, (4) canal between the lake A and B with *Phragmitetum australis* rushes occur with a complex of small ponds and canals.

Samples for ostracod study were taken from surfaces of approximately 1 m^2 of vegetation, and from an upper layer of sediment by means of a hand dredge with 50 μm mesh net. Data processing was aided by statistical treatment. The CANOCO v.4.5 software package was employed in analysis of the relationships between the species composition and environmental parameters, the relationship between the lake and its periphery with respect to seasonality, and the dependence of the species composition on the lake micro-environment. These were tested by means of detrended correspondence analysis (DCA), canonical correspondence analysis (CCA), and redundancy analysis (RDA), respectively. The forward selection of variables t with the Monte Carlo Permutation test was carried out. In addition, the Shannon-Wiener biodiversity index (H'), density, dominance and frequency and were calculated. The examined environmental parameters like share of sediments in relation to plant cover was determine on the base of phytosociological relevé.

A total of 65 samples were examined, which yielded 76,000 individuals. These were identified as belonging to 40 taxa, including 31 species. High diversity of littoral plant assemblages of the lake and its periphery, lack of economic activity in adjacent areas, and the location of Lake Swidwie within bird migration routes are inferred to contribute to the lake's ostracod taxa richness. With respect to ostracod density, seasonal vegetation covering proved an important factor, as the density of ostracods was found to increase with the increase in plant covering.

Bradleystrandesia reticulata (ZADDACH, 1844), *Candonopsis kingsleii* (BRADY & ROBERTSON, 1870), *Paracandona euplectella* (ROBERTSON, 1889), *Pseudocandona insculpta* (G.W. MÜLLER, 1900) and *P. compressa* (KOCH, 1838) occurred mainly in spring, while *Fabaeformiscandona hyalina* (BRADY & ROBERTSON, 1870), *Candona candida* (O.F. MÜLLER, 1776) and *Candona weltneri* HARTWIG, 1899 occurred mainly in autumn. Periodic water and fauna exchange between the lake and its periphery is enabled, e.g., during highstands. Thus, occurrence of some taxa in only one of these habitats points to differing preferences of the ostracod species. *Cyclocypris globosa* (O.F. MÜLLER, 1776), *Cypridopsis elongata* (KAUFMANN, 1900) and *Pseudocandona pratensis* (HARTWIG, 1901) were found to occur only in the lake periphery. These taxa appear to prefer small water bodies, e.g. ditches or swamps. *Darwinula stevensoni* (BRADY & ROBERTSON, 1870), *Dolerocypris fasciata* (O.F. MÜLLER, 1776), *Fabaeformiscandona hyalina*, *F. levanderi* (HIRSCHMANN, 1912), *Ilyocypris decipiens* MASI, 1905, *Limnocythere inopinata* (BAIRD, 1843), *Metacypris cordata* BRADY & ROBERTSON, 1870, *Physocypria kraepelini* G.W. MÜLLER, 1903, *Pseudocandona hartwigi* (G.W. MÜLLER, 1900) and *P. insculpta* were characteristic for the lake plant littoral. The charophyte meadow habitat differed from other habitats in a significant dominance of *Cyclocypris ovum* (JURINE, 1820) and *Cypridopsis vidua* (O.F. MÜLLER, 1776) (73 % and 26.6 %, respectively), and in exceptionally high ostracod abundance relative to the whole study area (5800 individuals/m^2). The Shannon-Wiener (H') biodiversity index for this habitat was the lowest and equalled 0.6. In this habitat, the charophyte growth was so thick, that ostracods had no contact with bottom sediments beneath the vegetation. The higher spatial diversity of the underwater meadows with *Ceratophyllum* and *Myriophyllum* resulted in higher species diversity coefficient, despite the similar dominance of *C. ovum* and *C. vidua*. The muddy habitats were dominated by *Cypria ophtalmica* (JURINE, 1820), *C. exculpta* (FISCHER, 1855) and *Physocypria kraepelini*. *Cypridopsis vidua*, which was dominant in submerged meadows, was not numerous in non-vegetated muddy habitats. *Phragmitetum australis-Typhetum angustifoliae* and *Telypteridi-Phragmitetum* rushes differed with respect to habitative conditions, but *Notodromas monacha* (O.F. MÜLLER, 1776), *Dolerocypris fasciata* and *Metacypris cordata* were common in both types. Both the dominance coefficient and density of *Notodromas monacha*, *Metacypris cordata* and *Pseudocandona compressa* were higher in *Telypteridi-Phragmitetum* rushes. *Cyclocypris ovum*, *Dolerocypris fasciata*, *Fabaeformiscandona hyalina* and *Limnocythere inopinata* were more abundant in *Phragmitetum australis-Typhetum angustifoliae* rushes.

Authors address:
Agnieszka Szlauer-Łukaszewska
University o Szczecin, ul. Waska 13, 71-415 Szczecin, Poland; aszlauer@gmail.com