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ICHTHYOFAUNA OF A NEAR-NATURAL PYRENEAN RIVER: SPATIO-TEMPORAL VARIABILITY AND REACH-SCALE HABITAT

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Abstract

The characterization of fish communities and their relationships with abiotic factors is necessary for a number of environmental management issues. This study aims to analyze the spatio-temporal variability in the structure of fish communities in an undisturbed and unpolluted Pyrenean river in relation to aquatic habitat features. Fish and habitat were sampled seasonally in 2002 at fourteen sampling sites along the Erro River, a tributary of the Ebro basin (Navarra, northern Spain). Fish communities comprised eight native species, and their capture efficiency estimates were high and consistent along the river. Differences between species in estimated capture probability values were related to attributes such as body size and/or abundance, underscoring the importance of using species-specific capture probabilities. The observed low variability of species capture probabilities allows their use as reference values for future population size estimations based on single-run electrofishing surveys in similarly sized rivers. The longitudinal fish species distribution was analyzed by means of separate hierarchical cluster analyses performed on total species' densities and species' densities partitioned by size-classes, both of which displayed similar patterns of fish community composition along the Erro River. The changes on species presence and relative contributions to local fish communities along the river were also evident from diversity indices, which showed strong and significant positive relationships with distance from the source. Seasonal values in diversity indices were also significantly different within sampling sites, indicating that low-order streams support lower diversity and less-structured fish communities because seasonal flow variations lead to high variability in hydrochemical parameters, habitat size and diversity. Two separate canonical correspondence analyses were performed to jointly summarize the variation in aquatic habitat parameters in relation to fish community size structure in terms of densities or biomasses. In both analyses, the first axis was related to the along-river gradient and the second axis accounted for seasonal variation. The relative positions of fish species along the spatio-temporal gradients are in accordance with their habitat preferences described in the Pyrenean area. These results provide a framework for understanding how the spatio-temporal variations of reach-scale aquatic habitat features structure fish communities in a Pyrenean river with low anthropogenic disturbance.

Key words: aquatic habitat, Erro River, fish communities, Iberian Peninsula, longitudinal zonation, seasonality

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