

Sandrine ANGELIBERT

Université Paul Sabatier Toulouse III
UMR 5177 CNRS-UPS
Laboratoire d'Ecologie des Hydrosystèmes
118 route de Narbonne
F-31062 Toulouse Cedex 4
<angelibe@cict.fr>

*Thesis defended on 19 July 2004 before University Paul Sabatier Toulouse II, Life Sciences
Department, Branch Ecology of Continental Aquatic Systems*

An investigation of the ponds of the Regional Park of Causses du Quercy: Functioning, biodiversity, and connectivity between ponds. Proposals for management and conservation.

Abstract

In the arid karstic region of the "Causses du Quercy" (SW France), ponds constitute the only available surface water resource on this limestone plateau.

As the natural evolution of ponds leads to the filling of these ecosystems, a comparative study of three ponds at various stages of succession showed the evolution of abiotic parameters (temperature, oxygen concentration...) as a function of stages of succession. Concurrently, ponds varied in terms of plant and animal species richness. Each pond supported a distinctive fauna and took part in the global biodiversity of these ecosystems.

At a larger scale, thirty ponds were studied to investigate factors affecting the distribution of the fauna in a pond network. We identified 230 species of invertebrates and 6 species of vertebrates. The results do not permit to draw up a typology of ponds or to highlight characteristic communities of these ponds. As ponds surrounded by terrestrial landscape constitute "islands" for the aquatic fauna, five taxonomic groups were chosen based on their different capabilities of dispersion to study the species distribution: Odonata, Coleoptera, Amphibia, Mollusca and Oligochaeta. For Odonata, pond area influenced species distribution. For Amphibia, forested ponds were more likely to include all the species. For both Mollusca and Oligochaeta, the passive dispersers, the results indicate that the species distribution was a randomised distribution. For Coleoptera, the distribution was not a randomised distribution but we did not find the factors which could explain this distribution.

Then, we used the capture-mark-recapture technique in order to estimate the degree of linkage in three patchy populations of odonates located in three ponds. We demonstrated that three factors influenced the dispersal ability of these odonates: abiotic factors (especially weather conditions), interspecific differences (sensitivity to weather conditions, species size and behaviour), intraspecific characteristics (sex and age).

This study underlines the role of ponds in the biodiversity of the study area and the role of pond network and of the temporal evolution of these ponds in the maintenance of this biodiversity. Results are discussed in order to propose management plans to maintain the biodiversity of these ecosystems.