Ostracoda (Crustacea) as indicators for surface water quality: a case study from the Ledra River basin (NE Italy)

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Wastewater discharges associated with urbanisations, farming activities and industry may dramatically reduce the ecological health of river ecosystems. Their efficiency is usually assessed through monitoring of the physical and chemical environment near the discharge point. However, discontinuous monitoring of the abiotic environment may fail to detect periodic malfunctioning and do not recognize indirect effects on the ecosystem.

We assessed the potential of an alternative approach to assess the impact of wastewater discharges, based on the monitoring of ostracod

density, richness and community composition. We linked community structure of Recent non marine ostracods (Crustacea: Ostracoda) with physical-chemical (altitude, water temperature, pH, total alkalinity, electric conductivity, chemical oxygen demand and concentrations of major ions and nutrients) and microbiological (total coliform bacteria and fecal coliform *Escherichia coli*) parameters at stations before and after wastewater treatment plants in a river basin.

The study area covers all the Ledra River basin (21 km long), localized in Friuli Venezia Giulia (NE Italy). This basin includes a variety of habitat typologies as lowland springs, channels and streams, with different levels of anthropogenic impact. In the study area 27 sampling stations were selected, 8 of these were located near the water treatment plant effluents in the main river course. All stations were visited twice a year from September 2008 until September 2011 and samples were drawn before and after the effluent flows.

The results indicate that monitoring ostracods is a potentially valuable approach, for two reasons. Communities appeared to be well differentiated even in the small spatial area of this study, indicating that they can provide sufficient resolution to pick up even minor impacts. Secondly, despite the seasonal succession in species composition, spatial differentiation was consistent over time, suggesting that ostracods provide a time-integrated picture of the water quality.

On the other hand, discharges did not affect the physical or chemical environment based on the repeated snapshot samplings. These results suggest that the monitoring of ostracods provides an integrated picture of the water quality of a lotic system, even on a very local scale.