

Direct and indirect effects of the invasive signal crayfish *Pacifastacus leniusculus* on leaf decomposition and invertebrate communities

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The crayfish *Pacifastacus leniusculus* is one of the most problematic invasive species in aquatic ecosystems in Europe. The crayfish may play an important role in plant-litter decomposition through direct consumption of plant litter or by changing the density and/or the behavior of native invertebrate detritivores. However, these effects remain poorly studied and may be context dependent. Therefore, we selected two rivers in Northern Portugal (Rabaçal and Tuela) subjected to very low human disturbance, but where *P. leniusculus* was recently introduced and is currently spreading. In each river, three different sites were selected according to records of the crayfish density (absent, low density high density). At each site, we measured direct and indirect effects of *P. leniusculus* on leaf decomposition using a set of four-treatments controlling the presence/absence of crayfish in rectangular baskets containing leaf litter and allowing or not the entry of other aquatic benthic invertebrates, by covering the baskets with fine (500 µm pore size) or coarse mesh (5 mm pore size). Results showed differences in both rivers regarding abiotic conditions, mainly conductivity. After 28 days, leaf mass loss was 18% higher in Tuela than in Rabaçal. In Tuela, leaf mass loss was affected by the crayfish presence and crayfish density *in situ* and by the interaction between factors. In Rabaçal, leaf mass loss was significantly affected by crayfish *in situ* density and interaction. Crayfish presence increased leaf mass loss in both rivers. Invertebrate abundance, richness, equitability and species composition were affected differently in both rivers. Further microbial analyses are being performed to better understand the different patterns between rivers. Overall, results indicate that *P. leniusculus* may directly alter plant-litter decomposition and affected associated invertebrate communities; however, effects are highly context dependent.