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Contributed Talk Abstract

Temperature and inter-specific competition alter the impacts of an invasive crayfish on a key ecological process

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Abstract Text:

Background/Question/Methods

Climate change is expected to alter the impacts of invasive species due to changes in their density, behaviour and phenology. As omnivorous and ectotherms, invasive crayfish species are particularly influenced by temperature and alter their impacts on native species by changing the consumption of native invertebrate preys, changing competitive interactions or increasing their impacts on key ecosystem processes, such as plant-litter decomposition. Two most invasive crayfish species are the signal crayfish *Pacifastacus leniusculus* (Dana) and the red swamp crayfish *Procambarus clarkii* (Girard), both established in Europe. Our main question was to assess if increasing temperature and intra and inter-specific competition between invasive crayfish could change their impacts on plant-litter decomposition directly, or indirectly by affecting the native detritivore invertebrates that feed on plant litter. A 15 days mesocosm experiment was performed to assess direct and indirect effects of two invasive crayfish species (*P. leniusculus and P. clarkii*), under intra and inter-specific competition, at 15 and 18° C, on leaf-litter decomposition and FPOM production in the presence of invertebrate *Sericostoma* sp. Each mesocosm had 2 crayfish (except control), 4 invertebrates trapped inside a transparent cylindrical cage (crayfish were able to move and interact around the cage) and a fine-mesh bag containing microbially-colonized

oak leaves. Oak leaves were added in mesocosms and cylindrical cages to assess invertebrate/crayfish leaf decomposition. The experimental design included 4 treatments: i) control – microbes and invertebrates; ii) *P. clarkii vs P. clarkii + microbes and invertebrates; P. leniusculus vs P. leniusculus + microbes and invertebrates; P. clarkii vs P. leniusculus + microbes and invertebrates*. At the end, we measured microbial, invertebrate and crayfish leaf decomposition.

Results/Conclusions

Increasing temperature and competition between *P. leniusculus* and *P. clarkii* changed their direct impacts on leaf-litter decomposition. Microbial decomposition was not affected by crayfish or temperature. There was an interaction effect of temperature and the presence of crayfishes on invertebrate's leaf decomposition. *Sericostoma* sp. increased leaf decomposition in warmer treatments in the control than in treatments with crayfishes at lower temperature. In intra-specific treatments, temperature significantly increased leaf-litter decomposition by *P.clarkii* (0.05 to 0.07 $g_L\ g_C^{-1}$**)** but no effect was detected for *P. leniusculus*. Interestingly, inter-specific competition and increasing temperature did not alter crayfish leaf-litter decomposition significantly (0.04 $g_L\ g_C^{-1}$). The same pattern was observed for crayfish FPOM production. Our results highlighted that temperature and competition between multiple invasive crayfish species might alter their impacts on a key ecological process.

Topic Selection:
Invasion: Ecosystem Processes

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Temperature and inter-specific competition alter the impacts of an invasive crayfish on a key ecological process

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