
Parasite-mediated difference in functional response between invasive and native freshwater amphipods

Vincent Médoc^{*1}, Corentin Iltis², and Thierry Spataro^{3,4}

¹Institut d'écologie et des sciences de l'environnement de Paris (IEES) – Institut de recherche pour le développement [IRD], Université Paris-Est Créteil Val-de-Marne (UPEC), Université Pierre et Marie Curie (UPMC) - Paris VI, CNRS : UMR7618 – 7 quai Saint Bernard, 75005 Paris, France

²Institut d'écologie et des sciences de l'environnement de Paris (IEES) – CNRS : UMR7618 – 7 quai Saint Bernard, 75005 Paris, France

³Ecologie, Adaptation, Interactions – AgroParisTech – 16 rue Claude Bernard, 75005 Paris, France

⁴Institut d'écologie et des sciences de l'environnement de Paris (IEES) – Institut de recherche pour le développement [IRD], Université Paris-Est Créteil Val-de-Marne (UPEC), Université Pierre et Marie Curie (UPMC) - Paris VI, CNRS : UMR7618 – Campus de Jussieu, 7 quai Saint Bernard, 75005 Paris, France

Abstract

Biological invasions constitute a major threat to biodiversity and a pressing need is to find methods that reliably predict the likelihood and degree of impact of invaders. For this, it has been proposed to compare the functional response (FR, the relationship between resource use and availability) of existing or potential invaders to that of their native counterpart on shared prey. Although this approach has proven to be effective in that impact prediction for known invaders was consistent with already reported field impacts, extrapolation of results to natural populations can be improved by including biotic and abiotic environmental variables in the experimental design. For instance, parasites dominate food webs and infection often modifies host phenotype in ways that may alter resource use. Parasites are therefore likely to alter invasive - native differences in FR, which might impair our ability to predict invasive species impacts. We compared the FR of the freshwater amphipod *Dikerogammarus villosus*, one of the 100 worst invasive species in Europe, to that of two non-invasive amphipods, *Gammarus pulex* and *Echinogammarus berilloni*. *D. villosus* has invaded Western Europe along with *Cucumispora dikerogammari*, a co-introduced microsporidian parasite known to alter the predatory behaviour of its host. We therefore performed the FR comparison with only non-infected specimens or with a prevalence corresponding to what is observed in natural populations. Infection changed the FR of *D. villosus* and the between – amphipods difference in FR. Most interestingly, depending on the FR parameter, the effect was not the same.

Keywords: Biological invasions, impact prediction, functional response, parasitism, freshwater amphipods

*Speaker