

Abstract

This PhD thesis aimed to test the intraspecific variation in invasive potential in freshwater ecosystems. As a model for my research, I have chosen *Dikerogammarus villosus* (Sowinsky, 1894) – an invasive Ponto-Caspian amphipod that spread in European aquatic environments from two geographically isolated and genetically distinct source populations – the Danube and the Dnieper deltas, forming the Western and the Eastern invasive groups, respectively. The wide distribution of both genetic units in various ecosystems of Europe, a high voracity and predatory pressure, successful competition for the habitat and resources, a high fecundity and fast maturation as well as large body size make this species a perfect model to study the invasion potential at the population level.

My first aim was to test if the Eastern Group of *D. villosus* could spread in lakes using boating as an invasion vector. My analyses revealed that the introduction of this species was promoted by high tourist pressure, especially sailing activities. *Dikerogammarus villosus* rapidly increases its abundance and range in new environments and contributes to the eradication of native and other invasive species.

My next aim was to assess the morphological variation of this species across populations of different origins, from native and invaded ranges as well as inhabiting various types of water bodies (i.e., freshwater lakes, freshwater river sections, brackish waters). My findings displayed a high morphological variation of *D. villosus*. I observed the adaptations in the mouthparts of the Eastern Group to be more herbivorous. I noticed the adaptations in the gnathopods of the Western Group for higher predatory capacity and in walking legs to enhance their locomotion abilities. The morphospace change between native and invaded ranges indicates the high phenotypic plasticity of the Eastern Group.

My third aim was to test if the groups differ in food preference as shown in the morphological study. The results revealed that the Western Group choose more often the food of animal origin than the plant tissue. Meanwhile, the Eastern Group reaches for meat and plant food with a similar frequency. I assume that the Western populations may display higher predatory pressure, affecting the benthic communities, while the Eastern populations may use food resources more efficiently in case of their limitation.

My last aim was to test if these two groups differ in their ability to spread. I noticed that the Eastern Group can be bolder in exploring new environments. On the other hand, this group successfully competes for the preferred habitat forcing the weaker Western Group to spread more. In case of the future meeting of both groups, I assume that the Western Group will be promoted to spread to new environments.

In summary, I showed that the two groups, differing in genetic composition, also differ in certain biological traits which may promote their invasion in slightly different conditions. My results revealed the significance of the local conditions and genetic origin of populations in shaping their invasive traits that promote their dispersion and impact the environment. I stress the importance of integrating data from multiple populations to better assess the biology of the invasive species and try to predict its further spread in the environment and its potential consequences.

A handwritten signature in blue ink, appearing to read 'H. Rodriguez', is located in the lower right quadrant of the page. The signature is fluid and cursive, with a long, sweeping underline.