Is the enemy of my enemy my friend? – Influence of Aleutian mink disease virus on introduced American mink and other mustelids

Some animals and plants that are introduced into new locations become invasive and successfully colonise vast areas of their novel range. The explanation for the colonisation success of these organisms is still unclear. Among many ecological and evolutionary hypotheses which try to explain why these non-native species "conquer new lands" is one which suggests that, during invasion, intruders often lose their enemies: predators, parasites or other pathogens. The lack of enemies, which limit the number of organisms in populations inhabiting their native range, leads to their higher fitness in newly colonised areas and accelerates their expansion. In some cases however, a non-native species may be introduced together with their enemies (these enemies are mostly pathogens), and may still colonise new areas. In such a case we may suppose that the enemy, for some reason, does not spread together with its invasive host or it does not affect the invasive species in its new environment. Our study provides an opportunity to look into the relationship between an invader and its old enemy, when they are both far from home.

In our project we are going to study one of the most common, non-native invasive mammals in Europe – the American mink, and its enemy – the virus causing Aleutian mink disease. In many countries in Europe, the spread of both feral mink and virus populations is related to the development of the mink farming industry. In Poland, in the last two decades the number of mink farms increased to 300 and most of them are located in the north-western part of the country. Mink which escape from these farms supply the feral population. It is already known from previous studies that the feral mink population in Poland is divided into at least 4 groups with limited migration and gene flow. Our main objective is to find out which factor affects the prevalence of Aleutian mink disease virus more: occurrence of mink farms or migration of mink between sites. Moreover, we expect that the genetic substructure in Aleutian mink disease virus strains reflects the history of mink invasion and the substructure of host populations. Another interesting question that we ask in our planned research is whether the higher prevalence of the virus in the mink population leads to increased prevalence of the virus in other native mustelids (polecats, stone and pine martens)? To evaluate the influence of Aleutian mink disease virus on mink population, we will compare body condition of infected and non-infected mink. As the infection usually causes the enlargement of internal organs, we will measure the size of spleen, liver, etc. Finally, infection should affect the reproduction of mink. Therefore, we will compare the number of reproducing females, number of cubs per female, and reproductive success (calculated as the number of females that gave birth to at least one cub that survived more than 5 months) between infected and non-infected mink.

Such a comprehensive look at the influence of Aleutian mink disease virus on invasive mink will inform the conservation of native species. We expect that our research will contribute to a better understanding of the invasive success of the American mink, particularly as the mink expansion is still ongoing in many European countries and mink negatively impact many native species (especially birds). Moreover, this project will increase our knowledge concerning the host-virus relationship and dynamics of virus spread in ecosystems. According to the saying: "the enemy of my enemy is my friend", we may expect that the results of our research will show the negative impact of Aleutian mink disease on feral mink populations, although unfortunately it may also show that the invasive pathogen is more damaging to native wildlife than its natural host.