

Influence of management and biological factors on the spread of parasitic infection in the wild – a case of blood sucking nematode *Ashworthius sidemi* invasion in European bison (*Bison bonasus*) in the Białowieża Primeval Forest, Poland

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The full course of new parasite introductions in wild animals is difficult to accurately trace. We documented and analysed the blood-sucking nematode *Ashworthius sidemi* (Trichostrongylidae) introduction and spread in European bison (*Bison bonasus*) from the initial phase of its progression. In the Polish part of the Białowieża Primeval Forest (BPF) the parasite was first found in 2000. The prevalence and intensity of *A. sidemi* infection grew over the following years, reaching 100% of investigated bison four years after introduction and a maximal median intensity of 8200 nematodes per animal in the winter of 2008/2009. In the years 2011–2015 a decline of median infection intensity was observed, varying from 410 to 2050 nematodes, and the prevalence decreased to the average value of 94%. Among the factors analysed, the number of years since introduction, herd size, age, and sex proved to significantly influence infection intensity. A higher infection rate was recorded in sub-adults compared to juveniles and adults. Males had significantly lower infection rate than females, but this was the case for adults only. Herd size and the number of years since *A. sidemi* introduction significantly influenced the infection intensity. The highest infection rates were recorded in the biggest bison herds, where the winter supplementary feeding of bison is intense. Moreover, the longer the parasite was present in the host population, the more important herd size became as a factor. Our study has allowed for the long-term analysis of parasite invasion in a large herbivore in the wild: from the appearance of the parasite, through the period of rapid increase in prevalence and intensity of the infection, to the stabilization phase in the host-parasite system. It was indicated that it is not solely biological factors that determine the rate of parasitic infection in wildlife; management practices can also have a strong influence. Knowledge about the course of biological invasions and the factors influencing them in wildlife can help in the modelling, prediction, prevention, or even reduction of the emergent diseases. This is especially important in the conservation management of rare and endangered species under intensive human care as the management practices may pose a threat to the species.

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