

## Abstract

Crayfish plague is an emerging disease caused by the oomycete *Aphanomyces astaci*, a pathogen listed among the 100 World's Worst Invasive Alien Species. It was introduced into Europe in the second half of 19<sup>th</sup> century from North America and caused collapses of European native crayfish populations. Nowadays, *A. astaci* is widespread in Europe and has spread also to other parts of the world, threatening all susceptible crayfish of non-North American origin. The aims of this MSc thesis were 1) to provide information about crayfish plague outbreaks from recent years, and by using microsatellite and mtDNA markers reveal *A. astaci* genotypes involved; 2) to test healthy-looking indigenous crayfish for potential occurrence of chronic infections by *A. astaci* in Czechia. Six new crayfish plague outbreaks were confirmed from 2016 to 2018, involving at least five distinct pathogen strains. My results provide first evidence of the *A. astaci* genotype group D causing *Astacus astacus* and *Austropotamobius torrentium* mass mortalities in Czechia. MtDNA sequencing revealed two haplotypes of the D haplogroup, indicating two independent sources of infection presumably either from ornamental crayfish or spreading from neighbouring countries. The genotype group A was recorded in two *A. astacus* mortalities and genotype group E in one *A. torrentium* mortality. The genotype Up was re-identified in *A. astacus* outbreak after 13 years from its first occurrence in Czechia. In 15 tested populations of indigenous crayfish, no case was of chronic infection by *A. astaci* was observed. It seems that this phenomenon is not very common in Czechia; however, its occurrence cannot be ruled out. Apart from these results, summarized in the thesis in a form of a manuscript draft, I provide in appendices two published studies to which I contributed as a co-author. In the first, I have examined well-established populations of *Procambarus virginalis* and *Faxonius limosus* for the presence of *A. astaci* in Bratislava, Slovakia in 2016. The presence of the crayfish plague pathogen was confirmed only in *F. limosus*; however, horizontal transmission of *A. astaci* to *P. virginalis* is expected, as well as the further spreading of this crayfish in the Danube river. In the second attached study, I've tested for the presence of the crayfish plague pathogen *Procambarus clarkii* from Indonesia, as well as crabs *Parathelphusa convexa* and shrimps *Macrobrachium lanchesteri* coexisting in syntopy with one infected population of this globally most widespread invasive crayfish. The presence of *A. astaci* was confirmed in *P. clarkii* from outdoor established population as well as from pet trade in Indonesia, and in crabs and shrimps syntopic with *P. clarkii*. The findings highlight the threat the spread of this species present to native crayfish in Indonesia and adjacent regions, including New Guinea and Australia.

**Key words:** crayfish plague; *Aphanomyces astaci*; chronic infections; mortalities; genotype; vectors