

The aim of my study was to sum up the data about genetic variability of freshwater gastropods living in temporary ponds. My model species were moss bladder snail (*Aplexa hypnorum*) and the critically endangered ramshorn snail (*Anisus vorticulus*). Genetic variability was investigated by two mtDNA and two nuclear markers. The differences in genetic variation at the COI gene follow the pattern of different catchments. However, these findings do not agree with the patterns derived from genetic markers ITS1 and 16S. The reasons for the differences between the different markers are discussed in several ways involving few possible historical scenarios, but also possible errors of laboratory methods. In this study, there was only little success in amplification and the most likely reason is the inhibitory effect of snail mucus on DNA amplification. Another problem that occurred when this work was to obtain the sequence of the parasite (fluke) instead *Anisus* gene using gastropod specific primers. In addition to genetic and related methodological part of this work is the third part concerning the evaluation of environmental factors periodic pools in the presence and absence of the species studied. The fourth part is focused on the phylogenetical analyses of the european and american *Aplexa* lineages.