The question of the tempo of evolution is amongst the oldest conundrums in evolutionary biology and has not been satisfactorily answered yet. One of the attempts to do so is the frozen plasticity theory, which postulates that a sexually reproducing species is only capable of evolution within short periods of time after its genetic polymorphism decreases e.g. as a consequence of peripatric speciation. In the longer periods of evolutionary stasis, its evolution is limited by frequency-dependent selection and pleiotropy.

In this work, I have produced an open source software simulating the responses of populations of sexually reproducing individuals to varying environmental conditions. Using this software, I simulated evolution of populations with different probabilities of arising of alleles affecting more phenotypic traits and frequency-dependent selected alleles that have opposing phenotypic effects when present at the locus in one copy, respectively two copies.

I observed trends predicted by the theory of frozen plasticity: slower adaptation to instant environmental changes, lower achieved fitness and more frequent extinctions of populations with higher portions of investigated types of alleles, but only with low effect sizes and without statistical significance.

For future research, it would be desirable to expand the investigated parameter space and focus especially on larger populations where selection is more efficient.