It has been suggested that polyploidization affects the ecological niche of a species, possibly ultimately leading to a shift in the distribution of the species, such as in geographical parthenogenesis. The phenomenon describes the wider distribution and shift of asexuals towards higher altitudes, northern latitudes and more extreme habitats when compared with their closely related sexual relatives. Several hypotheses have been proposed to explain such patterns with lacking empirical evidence because investigations rather focused on single hypotheses, which were rather tested several times independently on multiple organisms than *vice versa*. Therefore, the present study aimed to tackle the phenomenon of geographical parthenogenesis from multiple angles, i.e. testing several hypotheses simultaneously using *Hieracium alpinum* as a model system. In the arcto-alpine Asteraceae *H. alpinum* sexually reproducing diploid individuals occur in a small isolated area in the Eastern and Southern Carpathians, while apomictically reproducing, i.e. asexual reproduction via seeds, triploid plants occupy the remaining and much larger part of the range from the Balkans to the arctic parts of Europe. This implies that asexual triploids have had some fitness / colonization advantage(s), leading to a replacement of sexual diploids by asexual triploids, as shown by unpublished results of a phylogenetic / phylogeographic study of this species. Therefore, the central question of the present thesis is to determine what factor(s) contributed to the currently observed pattern of geographical parthenogenesis in this species.

In a large field survey, more than 30 populations covering large part of the species' distributional range were visited. Results obtained from field observations and measurements as well as experimental approaches provided new insights in the phenomenon of geographical parthenogenesis. Though evidence (i) of obligatory apomictic reproduction in triploids and obligate sexual reproduction in diploids and (ii) for a higher and more stable reproductive assurance of asexual triploids was furnished, a rather "consistent inconsistency" , i.e. considerable intra- and inter-

population variation was found in many other measured traits. Such lack of between-cytotype differentiation can be most likely explained by the large latitudinal and elevational gradient covered by our sampling across the species range because these gradients were accompanied by differences in abiotic and biotic conditions. In particular, the distinctiveness of Scandinavian when compared to Central European mountains in the abiotic and biotic environments was likely the cause for these observed patterns. In summary, our data suggest that uniparental reproduction advantage (so-called Baker's Law) together with the obligatory apomictic reproduction could, at least partly, explain the geographical parthenogenesis pattern of *H. alpinum*. However, no support for the Red Queen hypothesis (i.e. between-cytotype differences in the level and amount of biotic interactions) and nearly no between-cytotype differences in seed and eco-physiological leaf traits were found in the framework of the present thesis.

This is fairly interesting, as polyploidization, accompanied by changes in the plants' morphology, could alter the manner by which different cytotypes respond to the local abiotic and biotic conditions. Therefore, it remains unclear how much of the putative enhanced fitness / colonization ability of triploids is due to (i) the higher and more consistent reproductive assurance, (ii) the polyploidization driven alteration in the plants' phenotype (alterations of morphology) and genotype, or (iii) the combination of both. The already conducted, but so far not evaluated, plasticity experiment should untangle this problem, as it should allow me to investigate whether sexual genotypes / clonal lineages react differently to the given environments or not. If the between-cytotype differences in plasticity are bigger than the differences between sexual genotypes / clonal lineages, then the fitness / colonization advantages due to polyploidization could play an important role in the geographical parthenogenesis pattern. In case of clear-cut differences between the sexual genotypes / clonal lineages, then sexual genotypes / clonal lineages adapted to the local environments they occur in.

Future work should focus on *H. alpinum*'s evolutionary history. More specifically, investigations with the focus on the genetic constitution of sexual genotypes / asexual clonal lineages as well as the intra-specific phylogenetic relationships (i.e. phylogeography and age of sexual genotypes / asexual clonal lineages) hold the potential to shed light on the mechanisms underlying the pattern of geographical parthenogenesis in this species.