Abstract:

Environmental conditions can influence epigenetic variability of clonal organisms. These environmentally induced changes have potential to persist in following generations. In theory, this transgenerational memory could allow clonal (and especially apomictic) plants to partly compensate reduced genetic variability and could enhance adaptative ability of apomictic populations. According to Muller's ratchet model, asexual organisms amass deleterious mutations, which could lead to their extinction. Possible transgenerational memory could partly compensate for this. It could also account for longtime survivorship of asexual organisms in environment. This thesis deals with transgenerational memory of triploid apomictic populations of *Hieracium alpinum*, with completely missing sexuality and thus genetically uniform offspring. Transgenerational effect in *Hieracium alpinum* was studied on clonal lineages originated from 5 populations (Norway, Austria, Bosnia and Herzegovina and Slovakia). Seeds were planted in cultivation experiment I in 3 treatments (control, added nutrients, added salicylic acid) and vegetative and generative traits were measured. Plants responded to nutrient addition but not to salicylic acid. Treatment with nutrient addition increased biomass, number of leaves and SLA (specific leaf area) and lowered LDMC (leaf dry mass content). No significant differences in plants seed weight and yield per capitulum among different maternal environments were recorded. The seeds from treated plants were left to germinate and part of seeds was treated by demethylation agent 5-azacytidin. There were no differences in germination, germination rate and index of germination rate among the maternal treatments. The seeds were subsequently used in cultivation experiment II using maternal treatment × nutrient design. Vegetative traits of seedlings and later on of adult plants were measured. Maternal environment had no significant effect on measured traits. Plants responded to nutrient addition in F1 generation through increased biomass, leaf traits SLA and LDMC reactions were weaker. On the contrary, plants responded to aplication of 5-azacytidin mainly through these leaf traits. Our results suggest that triploid apomictic plants of *Hieracium alpinum* are not able to transfer nutrient information to their offspring and their response to nutrients is mainly through fenotypic plasticity. The effect of 5-azacytidin was in accordance with other published consequences of DNA methylation changes in other species. This suggest that DNA methylation might play a key role in plant adaptations.

Keywords:

Hieracium alpinum, transgenerational effect, epigenetic variability, fenotypic plasticity, evolution of asexual organisms, apomixis, nutrients, salicylic acid