

Abstract

The mode of reproduction can greatly influence the demography and the evolutionary success of the taxon. In the case of autonomous asexual formation seeds are apomictic taxa fully independent of pollinators and compatible partners. For sexual taxa with strict autoincompatibility it is the opposite, i.e. sexual taxa need pollinators and compatible partners for birth of offspring. Therefore, in marginal population and for more extreme situation with lower pollinating activity will have apomictic taxa a higher level of reproductive assurance than sexual taxa vascular plants.

This hypothesis was tested in natural populations of apomictic and sexual taxa. In the diploma thesis we therefore investigate the method mode of reproduction and reproductive assurance of 52 taxa of the genus *Hieracium* s. str. (family *Asteraceae*) in Europe. Of these, 12 were diploid sexually diploid taxa and 42 polyploid apomictic reproductive taxa. From these taxa we harvested seeds from fully developed capitulum and we determined the potential (total number of seeds in the capitulum) and the realized (the percentage of well-developed seeds at the capitulum). The ploidy of the offspring (the embryos and the seedling) and method origins of seeds we examined using flow cytometry.

The results show that the plants of diploid species produce the seeds only sexually. Plants of triploid and tetraploid taxa produced the seeds predominantly apomictically (99.75 %). Only 16 seeds (of the total of 6 459 seeds) in four taxa of *H. amplexicaule*, *H. macilentum* s. l., *H. nigrescens* s. l. and *H. rapunculoides* were identified as containing residual sexuality. In most cases (at 13 seeds), they were BIII hybrids (embryo formation after pollination from the unreduced embryo sac), at 3 seeds formation embryo after pollination from the reduced embryo sac. The realized seed set was in agreement with our hypothesis usually lower in case of sexual than apomictic taxa. Only species *H. alpinum*, which had its seeds collected in natural populations, showed seed set slightly higher in case of sexual rather than asexual plants. At plants *H. alpinum* of cultivated in the greenhouse was the result was inverse. The sexual plants had much lower seed set than asexual plants. It was due to the lack of pollinators and compatible partners in greenhouse. Dispersion in realized seed set hawkweeds was predominantly higher in case of sexual diploid plants than in case of asexual polyploid taxon. It is caused by higher the degree of stochasticity of successful pollination in sexual species.

Summarizing the results, diploid plants produce seeds strictly sexually. Polyploid plants produce seeds predominantly asexual, but residual sexuality is also present to a small extent.

Realized seed set in sexually diploid plants may depend on the presence of pollinators and compatible partners on the site, but in apomictic polyploid plants these two effects do not play any role. At some apomictic plants we also never found a 100 % realized seed set. This can be caused by various factors, for example nutrients deficiency, climate (microclimate), pests or defects at formation seeds.

Keywords: apomixis, embryo, endosperm, flow cytometry, *Hieracium* s. str., ploidy, residual sexuality, seed set