

**THE IMPORTANCE OF RECENT POPULATION HISTORY FOR
UNDERSTANDING GENETIC DIVERSITY IN THREATENED
SPECIES, WITH SPECIAL REFERENCE TO
*DRYOPTERIS CRISTATA***

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ABSTRACT

The maintenance of genetic diversity and stochastic losses of diversity during periods of small population size have become major points of concern in conservation biology. However, empirical research on random evolutionary processes in natural plant populations is still scarce and is reviewed here in comparison to our case study on *Dryopteris cristata*. Detailed recent population histories of this wetland fern have been documented in Switzerland. We found that the lack of correlation between present-day genetic diversity and current population size in this fern, as well as in other newly rare and endangered plant species, is best explained by recent population histories.

Genetic diversity is strongly affected by genetic bottlenecks, which resulted in a loss of about 40% of genetic variation even in the long-lived allotetraploids *D. cristata* and a Hawaiian silversword. In contrast, distinct reductions in population size did not severely reduce genetic diversity in populations of the latter two species in the short-term. Accordingly, there was almost no spatial genetic substructure in populations of *D. cristata*. However, evidence for genetic drift was found in small populations of *D. cristata* and has also been reported for flowering plant species, indicating that small populations are nevertheless prone to random losses of genetic diversity in the long-term. This short review elucidates the importance of recent population history for both population genetics and conservation biology. Understanding population history can substantially improve predictions on the genetic diversity in remnant populations of threatened species. Further studies on natural populations of plant species with different life cycles and ploidy levels remain valuable.