

## Abstract

Genetic composition of hybrid zones often reflects geographical and ecological gradients. Hybrid zone of *Arabidopsis lyrata* and *A. arenosa* in Central Europe can be convenient model system for testing such hypothesis. These are well circumscribed but still interfertile, and their offspring is fully fertile. Besides repeated hybridisation events, the current state is complicated by the autopolyploidisation events of one of the parents, namely *A. lyrata*, which is present in the area studied both as diploid and tetraploid. This hybrid zone was already described in previous publications, which showed certain gradient of introgression. Moreover, the area of the hybrid zone represents a transition between Alpine and Pannonian climate along an altitudinal gradient leading from the Prealps to the lowland Wienerwald.

The current thesis is the as yet most detailed study of this hybrid zone both in respect of number of studied populations and the amount of data acquired using the methods of RAD Sequencing, multivariate morphometrics and flow cytometry. The analysis of genetic data showed a gradient of introgression, where parental populations are placed at opposite ends, whereas genetically intermediate hybrids are placed in its centre. Analysis of the genome size showed an additional gradient, where hybrids possess intermediate genome size in comparison to the tetraploid parents. Monoploid genome size of tetraploids is higher than that of diploids. We proposed both adaptive evolution (connected with dynamics of transposons) and genetic drift (bottle-neck effect and founder effect) playing a role in those phenomena.

Morphometric analysis confirmed characters that are currently in use for the identification of both parental species. They showed a morphological gradient of parents and hybrids, where hybrids are generally morphologically intermediate (e.g. in shape of trichomes). The morphological gradient is correlated with that of genome size and altitude. The ecological (i.e., altitudinal) gradient brings considerable advantage for the hybrids, as it provides habitats, where parental taxa are absent and hybrids can acquire selection advantage, at the same time it prevents moving of hybrids towards habitats occupied by the parental taxa. Diploid *A. lyrata* seems to be competitively weakest and is currently restricted to disappearing relict stands.

**Key words:** *Arabidopsis*, Brassicaceae, Cruciferae, introgression, polyploidy, genome size, morphology