

Abstract

The main drivers of microevolution in the genus *Sorbus* are interspecific hybridisation and polyploidy. The fate of new hybrid and polyploid taxa is determined by their mode of reproduction. Especially apomixis could be very advantageous for these new taxa. The *S. aria* agg. (subg. *Aria*) plays an important role within the genus since its members are involved in all hybridisation events and thereby is responsible for the substantial part of variation of the genus. Flow cytometry, molecular markers and multivariate morphological analyses were employed to evaluate the processes generating the variability in the *S. aria* group.

Three ploidy levels were detected among species from subg. *Aria* in the Czech Republic. All of them could be found in the South Moravia, whereas only tetraploids occur in the Bohemia region. Moreover, most of the Czech taxa (5 out of 7) grow also only in the South Moravia which is therefore considered as a centre of diversity of the genus *Sorbus* in the Czech Republic.

Flow cytometry seed screen revealed 7 modes of reproduction among the individuals from *S. aria* agg. A wide range of sexual and apomictic types of reproduction including reduced and unreduced gametes was detected. All of the diploid individuals are completely sexual. Among polyploid taxa, most of the species are obligate apomicts and only two species reproduce both sexually and asexually.

All taxa and lineages were defined using microsatellite markers. Genetic variation was then determined for each group. According to the assumption, the most variable species is diploid and sexual *S. aria* s.str. However, there is no correlation between the rate of residual sexuality and genetic variation among apomictic polyploids. Possible parental species of hybrids were identified based on multilocus genotypes. Most of the hybrids arose from crossing between *S. aria* s.str. and *S. danubialis*. Only one group (*S. pannonica* agg.) is a progeny of *S. aria* s.str. and *S. graeca* (or *S. collina*).

Basically, it is possible to distinguish all studied groups using morphological characters. However, the characters on leaves usually overlap. It is caused by the exceptional phenotypic plasticity of each species and even of the same genotypes.

Keywords: *Sorbus*, apomixis, hybridization, polyploidy, speciation, flow cytometry, microsatellites.