Abstract

Polyploidization, hybridization and various reproductive strategies significantly contribute to plant evolution and diversity. Their direct influence on plant evolution is especially apparent in the Rosaceae family and is also mirrored in its still partly unclear and reticulate phylogeny. Two model genera were chosen to add a piece of knowledge to the puzzle of polyploidization, hybridization and apomixis in the Rosaceae.

The results demonstrate both the creative and destructive force of hybridization and polyploidization, particularly in the genus *Prunus*. A significant proportion of wild *Prunus fruticosa* populations under examination underwent hybridization and genetic erosion. Crop-to-wild hybridization with both cultivated sour and sweet cherries has resulted in two morphologically indistinguishable hybrids markedly differing in ploidy level and reproductive potential. On the one hand, a triploid block was manifested in sterile triploid hybrids, but, on the other, partial fertility of tetraploid hybrids allowed repeated backcrossing (i.e. introgression). The crop-to-wild phenomenon has significant consequences for both conservation and agriculture.

Polyploidization and hybridization are frequently accompanied by apomixis among the Rosaceae. Apomixis may play a substantial role in the stabilization of newly arisen genotypes (microspecies). Although particular lineages are reflected by a specific genome size/ploidy level and reproductive pattern (e.g. in *Hieracium, Pilosella, Rubus, Sorbus*), *Cotoneaster integerrimus* s.l. in the Western Carpathians did not show any significant differentiation in this respect. The whole group was found to be homogeneously tetraploid and facultatively apomictic. Besides prevailing pseudogamy combined with minor sexuality, different apomictic pathways were identified (e.g. autonomous apomixis or haploid parthenogenesis). The potential for further polyploidization is supported by a minor proportion of B_{III} individuals. By contrast, *Cotoneaster tomentosus* clearly differed in both ploidy level and reproduction mode, being pentaploid and obligately apomictic.

To sum up, the effects of the detected crop-to-wild hybridization in cherries were markedly determined by the ploidy level. Homoploid hybridization represents a gene-flow bridge towards endangered *Prunus fruticosa* whereas heteroploid crosses result in sterile triploid progeny. On the other hand, polyploid and facultatively apomictic *Cotoneaster integerrimus* s.l. exhibited a homogenous cytotype and breeding pattern in the entire study area. The take-home message of the presented case studies emphasizes substantially different consequences of analogous evolutionary drivers in the Rosaceae family (polyploidy, hybridization and reproductive strategies).