

Although the genus *Nymphaea* (waterlily) includes only two native species (*N. alba* and *N. candida*) in Central Europe, it poses a great challenge to taxonomy and biosystematics. The determination of both species is hampered by their phenotypic similarities, and species boundaries can be further blurred by interspecific hybridization. In addition, ornamental cultivars of different parentage often escape from cultivation and make the situation even more complex.

To get insight into the caryological and phenotypic variability of czech waterlilies, the DNA flow cytometry and both distance-based and geometric morphometrics were used. Collections showed two different groups of fluorescence intensities, corresponding to *N. alba* and *N. candida*, respectively. In addition, intermediate values of nuclear DNA amount were found in some plants from South Bohemia, indicating their hybrid origin. Surprisingly, ornamental cultivars possessed the smallest genome sizes. The amount of nuclear DNA therefore seems to be a promising species-specific marker that enables not only native species but also cultivars to be distinguished. Cytometrically-proven individuals have been subjected to multivariate morphometrics, and high differentiation was discovered especially between native species. More complicated seems the distinction between cultivars and *N. alba*.

The research have finally found species-, hybrid-, and cultivar-specific characters combinations, where the new character, anther curvature, was used. Some differentiation was observed also on pollen grains, which have apart of it documented only slightly decreased fertility in hybrids, but significantly decreased pollen fertility in cultivars. Nevertheless, the natural hybridization seems to have a little effect on genetic integrity of native species, escaped ornamental cultivars likely represent a more serious thread due to their obvious competitive abilities and frequent confusions with the native taxa.