Abstract:

Myriophyllum L. (watermilfoil) belongs to one of the most invasive genus of the Northern Hemisphere. The three most agressive species, one of which is native to Europe (*M. spicatum*), are widespread throughout the majority of United states and two of them (*M. aquaticum* and *M. heterophyllum*) are becoming invasive in several Europaean countries as well. Therefore, Europaean populations of both native and invasive species, represents ideal place where to study processes which account for watermilfoils' invasivness. In this study, flow cytometry, morphometric analyses and germination experiments were employed to evaluate cytotype and morphological variability of *Myriophyllum* along with its potential to hybridize and propagate generatively.

Five ploidy levels were detected in Europe, however no ploidy variability has been found within any species except for *M. sibiricum* (hexaploids and nonaploids) and one population of *M. aquaticum* (hexaploids and oktoploids). Flow cytometry proved to be useful tool for purposes of distinguishing species of different ploidy level and their potential hybrids. Nevertheless, the key species – *M. sibiricum* and *M. spicatum* – among which probably even more aggressive hybrids were recently identified, have similar hexaploid level. Thus flow cytometry cannot facilitate determination of these morphologically indistinct species.

Although morphometric analyses showed clear differentiation of all our native species, it did not help to reliably classify differences between *M. sibiricum* and *M. spicatum.* Hence, scientists should draw attention to optimalizing various molecular methods rather than to morphology itself.

Comparing genome size of North American and Europaean populations, a signifficant difference in genome size between both areas was detected in *M. spicatum*. This result could imply, that American populations are inhabited by hybrids *M. spicatum* × *M. sibiricum* rather than by pure *M. spicatum* Yet, morphometrical analyses showed that, the percentage of morphologically distinct individuals of northamerican *M. spicatum* is still high to consider all agressive individuals in North America of a hybrid origin. Moreover, the ascertained potential of *M. spicatum* to reproduce generatively is not negligible and it should be taken into account in designing future experiments as well as in planning management strategies for reducing invasive populations of watermilfoils.

Key words: *Myriophyllum*, watermilfoil, flow cytometry, polyploidy, morphometrical analyses, germination experiments, ecology, distribution.