

Abstract

Intensive cytotype screening in the primary contact zone of relict serpentine *Knautia arvensis* agg. revealed a striking predominance of the derivative tetraploid (81 % of subpopulations) over the diploid maternal race. Eleven mixed-ploidy subpopulations with the close spatial proximity of both cytotypes were identified. Flow cytometric analyses of almost 5 000 individuals led to discovery of two extremely rare minority cytotypes (3x, 6x).

Vegetation analyses were made at two different spatial scales and in both cases confirmed the absence of distinctions in habitat preferences of cytotypes. Slight microhabitat segregation of cytotypes was however apparent at the finest spatial scales.

Cytotype distribution within mixed-ploidy sites was not random. Striking patterns of cytotype clumping into cytotype uniform patches and negative spatial correlations between diploid and tetraploid individuals were apparent at all sites. Distribution of life cycle stages of diploids and tetraploids within the mixed-ploidy subpopulations were significantly different.

The clonality was the most common mode of reproduction in the subpopulations of both cytotypes. Seedlings accounted for only 7 % of new plants. Significant distinctions in the plant vigour between the cytotypes were showed during the *in situ* comparison in mixed-ploidy subpopulations. Tetraploid plants had more leaves and longer leaf length, diploids produced more basal rosettes.

The comparison of both cytotypes was also made during the greenhouse cultivations. Di- and tetraploid seeds did not differ in germination rates. On the other hand, the size of sampled subpopulations had significant effect on the germination success, probably through inbreeding depression. Tetraploid individuals had significantly greater leaf lengths compared to diploids. This was apparent when the plants were grown both with grass (competitor) and alone (control).

On the basis of conducted survey, the directional selection seems to be driving the long term coexistence of di- and tetraploids in the primary contact zone of *Knautia arvensis* agg. Considering the persistence and longevity of plants or their limited dispersal capabilities, the possibility of short term (or mid-term) stability of cytotype coexistence can not be ruled out.