Polyploidy, life cycle, herbivory and invasion success: work on *Centaurea maculosa*


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The knapweed, *Centaurea maculosa*, has been introduced from Europe (EU) into North America (NA) during the late 19th century, where it has become a prominent rangeland weed. Flow cytometry studies of populations sampled in EU and NA revealed diploid (2x) and tetraploid (4x), as well as few mixed populations in EU but, so far, only 4x populations in NA. Field observations suggest that 2x populations are predominantly monocarpic and 4x populations polycarpic. Age structure using herb chronology will be presented for various populations. In the greenhouse, we are growing plants of 77 native EU populations, both 2x and 4x, and of 23 invasive 4x NA populations, conducting performance tests with specialist and generalist herbivores and analyzing defence traits. We specifically explore the link between ploidal level, life history traits, phenotypic plasticity and reproductive strategy to investigate trade-offs with defence traits. To test if a polycarpic habit has been negatively selected by specialist herbivores in the native but positively in the introduced range, where specialist herbivores are absent, we started a 2x vs 4x competition experiments in the presence and absence of herbivores. The results will be integrated with information from niche modelling and community invasibility experiments.

Use of morphometrics and multivariate analysis for classification of *Diorhabda* ecotypes from the old world

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Six years of data have shown high potential of *Diorhabda elongata* as an effective biological control of *Tamarix* spp. in some regions of the USA. There is evidence that five ecotypes may represent different sibling species. Consequently, taxonomic studies of the saltcedar beetle are critical in *Tamarix* control programs. In addition, there is disagreement among taxonomists about the existence and number of *D. elongata* sibling species. Five genitalic ecotypes based on morphology of the genitalia are reported: elongata, carinata, sublineata, carinulata and meridionalis. These ecotypes may be suitable for control of *Tamarix* in differing biogeographic areas of the western USA. We developed a classification system of *Diorhabda* ecotypes based upon measurements of both genitalic and external structures using a combination of factor and cluster analyses. The first factor associated with 59% of the variability is explained by external body parts; the other four factors are associated with genitalic measurements and together explained 34.24% of the data variability. The cluster analysis was able to reproduce a good separation of the 85 specimens into five ecotypes. A dendrogram constructed from the analysis shows the highest affinity between the carinata and sublineata morphotypes and the highest difference between elongata and the rest of ecotypes.