**The influence of physiological traits on climatic niche occupancy and competitive ability in the polyploid plant, *Chamerion angustifolium* (Onagraceae)**

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Polyploidy—the possession of more than two copies of each chromosome in the nucleus—has significant physiological consequences, but little is known about how the altered physiology of polyploids influences their ecology. Here, we present results from two studies investigating how physiological traits influence (i) the climatic niche and (ii) competitive ability in *Chamerion angustifolium*, a polyploid plant. Tetraploid *C. angustifolium* have physiological adaptations to tolerate drought relative to diploids and are less tolerant of freezing. To investigate differences in the climatic niches of diploids and tetraploids, we compiled a dataset of 134 *C. angustifolium* populations of known ploidy across North America. We extracted climate data associated with these populations and found that tetraploids occupy a drier niche than diploids, while diploids occupy a colder niche than tetraploids. Using ecological niche models, we demonstrate that the climatic niches of diploid and tetraploid *C. angustifolium* are very similar to their geographic distributions. To investigate differences in the competitive abilities of diploid and tetraploid *C. angustifolium*, we conducted a competition experiment in the greenhouse where we grew both cytotypes together at different densities and relative proportions across a soil-moisture gradient. We found that cytotypes did not differ in their competitive abilities across the soil-moisture gradient. Collectively, our results suggest that physiology is at least partially responsible for differences in the realized climatic niches of diploid and tetraploid *C. angustifolium*, but do not enable tetraploid *C. angustifolium* to outcompete diploids when water is limited.