Differences in Growth and Herbivore Resistance in Hybrid Populations of the Invasive Tree Tamarisk (*Tamarix* sp.) in the Western United States

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Abstract

The biological control agent *Diorhabda carinulata* (Desbrochers) (Coleoptera: Chrysomelidae) sometimes fails to establish or repeatedly avoids particular hybrid genotypes of the invasive plant tamarisk (*Tamarix* sp.). While the failure of *D. carinulata* to establish can sometimes be attributed to predation, the exact role that plant hybridization plays in resistance to herbivory is unknown. We designed field and common garden experiments to examine how hybrid genotypes from various populations affect *D. carinulata* feeding. Hybrid tamarisk plants representing 14 North American populations and two Chinese populations of *Tamarix chinensis* Lour. were collected and propagated in a common garden in Colorado. The level of species introgression for each plant in the study was determined using amplified fragment length polymorphisms (AFLPs). Plants were measured for growth rates, height, canopy size, and biomass. We subjected living plants to herbivory by *D. carinulata* confined within cages. Additionally, we used a novel bioassay consisting of dried plant material, agar, and water to test resistance of hybrid genotypes to herbivory by *D. carinulata*. Plants with high levels of *T. chinensis* introgression were fed upon less than plants with high levels of *Tamarix ramosissima* Ledeb. introgression. Also, plants from southern latitudes (high levels of *T. chinensis* introgression) grew faster and larger than plants from both northern USA latitudes and China, suggesting possible evolution of competitive ability. These differences in growth and resistance to herbivory help explain why some populations and individual plants are not attacked by *D. carinulata*. Future host choice experiments may reveal that other species of *Diorhabda* are more successful at controlling these particular individuals.