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Effect of Leaf Beetle Herbivory on the Fire Behavior of Invasive Tamarisk

Riparian areas are often considered barriers to the spread of wildfire, due to higher foliage moisture and humidity compared to the surrounding landscapes. But invasions of nonnative *Tamarix* spp. into desert riparian ecosystems in the southwestern U.S. and its replacement of native vegetation raises questions about potential shifts in fuel characteristics and fire behavior.

The question is further complicated by uses of the beetle *Diorhabda carinulata* as tamarisk biocontrol, where beetle herbivory increases desiccation of tamarisk foliage, creating high loads of dead leaf and twig material in the crown. Crown fires are common in tamarisk stands during summer months, and beetle herbivory may further elevate flammability before the dead foliage drops from the plants into the litter layer.

UC Santa Barbara and USGS researchers examined these questions in a study published in the *International Journal of Wildland Fire*. Researchers evaluated the potential effects of *Diorhabda* herbivory on tamarisk fire behavior at a Great Basin and a Mojave Desert site. Fire behavior response was measured with a fire intensity index and with maximum temperature, duration, flame lengths, rates of spread, and proportion of vegetation consumed by fire.

Researchers found that maximum temperature, flame length, and rate of spread were enhanced by foliar desiccation of tamarisks at both sites. There was a trend for desiccated trees to burn with greater intensity at only the Mojave site. However, at both sites, fire behavior parameters were influenced to a greater degree by litter depth, vegetation density, and windy conditions than by foliar desiccation.

Diorhabda will likely cause short-term increases in fire risk in tamarisk stands and enhance fire intensity during summer months. In the long-term, however, *Diorhabda* biocontrol will hopefully reduce fire intensity and risk in invaded riparian areas, as it decreases overall tamarisk biomass and allows less flammable native vegetation to recover.

Management Implications

- Maximum temperature, flame length, and rate of spread of fires in tamarisk-dominated riparian areas can be enhanced by foliar desiccation of tamarisks by *Diorhabda* beetles.
- However, fire behavior parameters at study sites were influenced to a greater degree by litter depth, vegetation density, and windy conditions than by foliar desiccation.
- *Diorhabda* will likely cause short-term increases in fire risk in tamarisk stands and enhance fire intensity during summer months. In the long-term, however, *Diorhabda* biocontrol will hopefully reduce fire intensity and risk in invaded riparian areas as it decreases overall dominance of riparian fuelbeds by tamarisk.

THIS BRIEF REFERS TO:

Drus, GM, TL Dudley, ML Brooks, JR Matchett. 2012. The effect of leaf beetle herbivory on the fire behaviour of tamarisk (*Tamarix ramosissima* Lebed.). *International Journal of Wildland Fire*. doi: 10.1071/WF10089

<http://www.werc.usgs.gov/ProductDetails.aspx?ID=4899>
<http://www.werc.usgs.gov/brooks>



Dan Bean/Colorado Department of Agriculture

The tamarisk leaf beetle, *Diorhabda carinulata*, from Asia, has been introduced as a way to control the invasive tamarisk.