



# BEETLE - MANIA

BIOLOGICAL CONTROL OF SALT CEDAR IN TEXAS

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## 2014. After a Slow Start, Leaf Beetles Again Attack Saltcedar in Texas

The saltcedar leaf beetle feeds only on saltcedar and athel. Athel is a closely related species that grows along the Rio Grande River in Texas.

If saltcedar or athel trees are not present, the larvae starve to death.

Saltcedar beetles were first established in Texas in 2004 at Big Spring, TX. Since then, there have been no reports of beetles or larvae feeding on any other plant except saltcedar and its close relative athel (*Tamarix aphylla*).

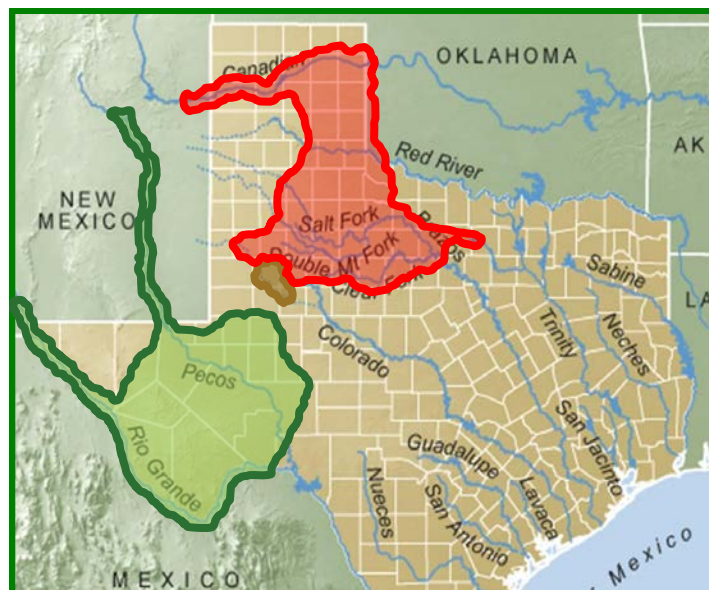
After a slow start this past summer, saltcedar leaf beetle populations increased and defoliated saltcedar trees again in many areas of Texas in 2014, further weakening trees defoliated in previous years. In areas where trees have been defoliated for 3-4 consecutive years, trees are dying back and canopies are thin and declining. There are now 3 species of leaf beetles established in Texas.

**Rio Grande and Pecos Rivers.** The subtropical leaf beetle is well established in far west Texas on the Pecos River and on the Rio Grande from Big Bend National Park to El Paso. In 2013, this species dispersed along these two rivers into New Mexico. However, it has not yet been reported downriver from Big Bend National Park. The species got off to a slow start in 2014, and beetles were ab-

sent from many sites. Beetle numbers finally increased in September and defoliated trees at some locations. About 5-10% of the saltcedar trees at these sites on the Rio Grande between Lajitas to Candelaria appear to be dead due to feeding by beetles.

**Texas High Plains.** The larger tamarisk beetles, originally from Uzbekistan, is well established in the Texas High Plains and Rolling Plains and adjacent areas in Oklahoma. In 2014, beetles defoliated large areas of saltcedar at Palo Duro Canyon and along the Prairie Dog Town Fork of the Red River and the Salt Fork near Clarendon, TX. Defoliation was also widespread at Lake Meredith and on the Canadian River, but was more localized than in 2013. The Uzbek beetle also tracked the Canadian River west and was reported for the first time in New Mexico when it was found at Ute Lake, near Logan, N. M.

**Upper Colorado River.** The third species, the Mediterranean leaf beetles, originally from Crete, was found only in Howard and Martin Counties but again extensively defoliated large areas of saltcedar.



Approximate distribution of the subtropical leaf beetle in the Trans Pecos region (green area), the Mediterranean leaf beetle in the upper Colorado River (brown area), and the larger leaf beetle in the High, South and Rolling Plains of Texas (red). Beetles are not present throughout the shaded regions, but if not present, are likely to disperse in the future to new sites within the shaded region.

Larvae of the saltcedar leaf beetle feed on saltcedar leaves and tender bark. Larvae feed for about 12-14 days during the summer. Full grown larvae are about 1/3 inch long. Several generations are completed per year. The adult stage overwinters on the ground under leaf litter and in bunch grasses.

## Beetles Move on the Upper Brazos River.

A surprise find in 2014 was the presence of leaf beetles defoliating saltcedar at Possum Kingdom Lake in late July. A survey of the Brazos River and its tributaries above Possum Kingdom in August found beetles at Lake Graham and at four bridges crossing the Brazos in Young, Baylor and Knox counties. At some sites, beetles had defoliated up to 80% of the saltcedars. Leaf beetles were also present on the Double Mt. Fork of the Brazos in Knox, Stonewall and Fisher Counties and the saltcedar trees visible from the HW 70 bridge north of Rotan were heavily defoliated.

At Hubbard Creek Reservoir, near Breckenridge, leaf beetles had defoliated several areas of saltcedar growing near the lake shore. Leaf beetles were also found on the Clear Fork of the Brazos River in Shackelford and Jones County, at Lake Stamford in Haskell County and Lake Fort Phantom Hill north of Abilene. However, saltcedar trees were much less common and beetle numbers much lower at these sites.

The beetles found on the Upper Brazos are the larger tamarisk beetle, *D. carinata*, originally collected from Uzbekistan. This species is widespread in the Texas High Plains and northern Rolling Plains and in late 2013 was found as far south as Aspermont (Stonewall County). The species naturally dispersed from this area south to Abilene and southeast to Possum Kingdom Lake and now is found throughout the Up-

per Brazos River Basin. This natural movement apparently occurred during the fall of 2013 through the summer of 2014, and represents a movement of more than 100 miles cross-country (Aspermont to Possum Kingdom Lake). Finally, leaf beetles were found defoliating saltcedars at Lake Bridgeport, part of the Trinity River Basin, in Wise County in 2014. This is the now the most easterly population of leaf beetles in Texas.

**More To Be Done.** As of 2014, leaf beetles were present on an estimated 60% of the saltcedar acreage in Texas. There are still large infestations of saltcedar where leaf beetles are not yet present, including the Lake Spence and Lake Ivie reservoirs on the Colorado river. Efforts to establish beetles at these two reservoirs during the past 4 years have not been successful and the Mediterranean beetles in the upper Colorado River have not moved down river. In the future, the larger tamarisk beetle from the north or the subtropical beetles from the south may reach these reservoirs. Also, the saltcedar infestations the Lower Rio Grande Valley are distant from any leaf beetles population.

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## Leaf Beetles at Possum Kingdom Lake

Saltcedar has invaded the shoreline of Possum Kingdom Lake as lake levels have receded in recent years. Beetles defoliated these young trees in 2014. Ants, which feed on leaf beetles, are uncommon in these sandy areas, and as a result, leaf beetles thrive.



## Impact of Beetle Feeding on Saltcedar Trees

Saltcedar is hard to kill. Leaf beetles kill trees by slow starvation. Feeding by larvae and adults removes the green foliage necessary to make food, the carbohydrates, needed by the tree. Larvae also feed on tender bark, causing branches ends to die back. Saltcedar trees draw upon carbohydrate reserves stored in the root crown to regrow new leaves during the summer. However, if trees are again defoliated by beetles that

season, food reserves again decline as the tree tries to produce new leaves. During the winter, the tree survives on the stored carbohydrates and further depletes these reserves. With limited food in the spring, the green canopy is reduced as upper branches die back. Due to this stress, new leaves and branches are small and deformed, a condition termed epicormic growth. As beetles continue to feed on trees for

several years, the tree declines further until only a few green shoots are present and some trees die. For seedling trees, death can be more rapid. While the process is slow, other plants begin to grow as the open canopy allows sunlight to reach the soil and without leaves during much of the summer, water use is less. Leaf beetles will never eradicate saltcedar, but it should be less abundant where beetle populations persist.

## The Cactus Moth: A Biological Control Agent for Prickly Pear Becomes An Invasive Pest in North America

The use of the cactus moth, *Cactoblastis cactorum*, as a biological control agent for prickly pear cactus in Australia is one of the most successful programs using an insect to control a weed. Prickly pear was introduced into Australia and cultivated to rear a small insect that feeds on this cactus. The insect, cochineal, was then and is today collected from the pads and processed to extract a bright red dye. The prickly pear planted in Australia soon escaped cultivation and became a very severe pest of grazing lands. By 1925, 60 million acres were infested and about 30 million were so densely infested with prickly pear that the land was nearly impenetrable by man or cattle.

Entomologists found the cactus moth caterpillar feeding on prickly pear in Argentina and it was collected and released into Australia in 1925. During

the next few years, the cactus moth destroyed the prickly pear infestation and the land was reclaimed for grazing and agricultural use.

The cactus moth was released to control prickly pear in some Caribbean Islands in the 1950s. Unfortunately, in 1989 the cactus moth was discovered in the Florida Keys. This discovery raised the alarm because the cactus moth feeds not only on prickly pear, but on many of the other 60 species of cactus in the genus *Opuntia* that are found in the US. Many *Opuntia* species are not weeds but play an important role in ecosystems. Some species are endangered. Also, if the cactus moth reached Mexico, it could be a serious pest of prickly pear used as food for humans and livestock and valued at \$80 million annually. The cactus moth could also threaten the ornamental cactus industry.

Thus, in the US, the cactus moth is considered an invasive pest and is under federal quarantine regulations.

From Florida, the cactus moth moved along the Gulf Coast as far west as the coast of Louisiana. Control efforts are focused on removing prickly pear plants along the Gulf coast and quarantine of cactus plants from infested areas. To-date, cactus moth has not been reported from Texas.

The caterpillar of the cactus moth is initially pink in color but becomes reddish-orange with black dots that connect and form transverse bands. Caterpillars feed on the tender tissue inside the prickly pear pad. The larvae eventually hollow out the pad which yellows and dies. The mature caterpillar is about one inch long and several can feed together within a pad.



Cactus Moth Caterpillars and Pads Fed Upon by Cactus Moth Caterpillars. Photographs by Christine Miller, Univ. Florida.



**Texas Panhandle. 2014. Saltcedar defoliated by beetles on ranch near Borger, TX. (photo E. Jones).**



**Rio Grande River near Presidio, TX. Sept. 2014. Canopy dieback and tree death due to repeated feeding during five years by saltcedar beetles. (photo A. M. Hilscher).**



**Upper Colorado River, near Colorado City, TX. October, 2014. Canopy dieback. Beetles present here since 2009. (photo A. Knutson).**

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