AgriLIFE EXTENSION
Texas A&M System

2010 PROGRESS REPORT: SUMMARY

TEXAS AGRILIFE EXTENSION SALTCEDAR BIOLOGICAL CONTROL IMPLEMENTATION PROGRAM

Allen Knutson and Mark Muegge

Texas Agrilife Extension Service,
Texas A&M University System

Saltcedar trees defoliated by Leaf Beetles on the Pecos River near Pecos, TX as viewed from the FM 3398 bridge. Sept 25th, 2009.

2010 Project Summary.
Texas Agrilife Saltcedar Biological Control Implementation Program.

Summary. The Saltcedar Biological Control Implementation Program has released saltcedar leaf beetles for the biological control of saltcedar at 23 sites in 16 counties in west Texas. Leaf beetle populations are established at 12 of these sites and in 2010 defoliated as estimated 500 acres of saltcedar. Established populations are present at 12 sites in the Colorado River Basin (Martin, Mitchell, Borden and Tom Green Counties), the Red River Basin (King County), the Brazos River Basin (Crosby County), and in the Pecos/Rio Grande River Basin (Pecos, Reeves and Brewster Counties). In 2010, this project field collected 354,000 Crete beetles and 47,000 Tunisian beetles for re-distribution at new sites, bringing the 2009-2010 total collection to over 700,000 beetles.

Introduction. Saltcedar is an invasive shrub or small tree that grows in dense stands along streams and rivers of west Texas. Saltcedar negatively impacts water quantity and quality, native vegetation and the overall health of these riparian habitats. Saltcedar typically exists as large, often monotypic stands which deplete groundwater through leaf transpiration. Trees also exude salt from their leaves which contributes to the salt content of water and soil. Saltcedar has little wildlife value and shades out forbs and native and improved grasses, reducing biological diversity and productivity. Dense stands of saltcedar also impede water flow and increase sedimentation.

In 2008, the Saltcedar Biological Control Implementation Program SBCIP was organized by the Texas AgriLife Extension Service to provide technical assistance and educational programs to land owners, land and water resource managers, and others relative to biological control of saltcedar. The objectives of this program are to 1) implement biological control of saltcedar using leaf-feeding beetles for the long-term suppression of saltcedar and 2) educate land owners, land managers and others about biological control and riparian habitats in this watershed. The Implementation Program is focused on establishing saltcedar beetle populations along saltcedar-infested areas of streams and rivers in each of the major river basins of west Texas: Red River, Brazos River, Colorado River and Pecos/Rio Grande River Basin. Once established, saltcedar beetles are expected to naturally disperse along saltcedar infested tributaries and draws and into upland sites throughout each watershed. The SBCIP will conduct long-term monitoring of canopy dieback and tree mortality due to defoliation and the replacement vegetation at selected sites.

Collection and Release Efforts.

During 2009, this project field collected and released more than 300,000 saltcedar beetles. In 2010, this project collected 354,000 Crete beetles, primarily from the Big Spring/Colorado City area but also from the Pecos River site, for release at new sites. In addition, 47,000 Tunisian beetles were collected from near Presidio and released on the Pecos River. During 2009 and 2010, the SBCIP program has collected over 700,000 beetles.

In previous years, very large numbers of beetles were collected in August-September in the Big Spring area. In 2010, as discussed below, beetle populations were so low that despite repeated searches in August and September, few beetles could be found after August 4 and additional collection and release of beetles was not possible.

Status of Current Sites, 2010.

The Saltcedar Biological Control Implementation Program has released two species of leaf beetle: the Mediterranean tamarisk beetle, *Diorhabda elongata* and the Subtropical tamarisk beetle, *D. sublineata*. The Mediterranean tamarisk beetle was collected from Crete, hence its name "Crete" beetle, and was first released in 2004 on Beals Creek near Big Spring, TX. The Crete beetle has been released at 20 sites and populations are established at 11 sites. The Subtropical tamarisk beetle was introduced from Tunisia and is referred to as the "Tunisian" beetle. Beginning in 2009, the Tunisian beetle has been released at 5 sites and has established at one site (Table). Both species have been released at two sites to determine which species is best adapted.

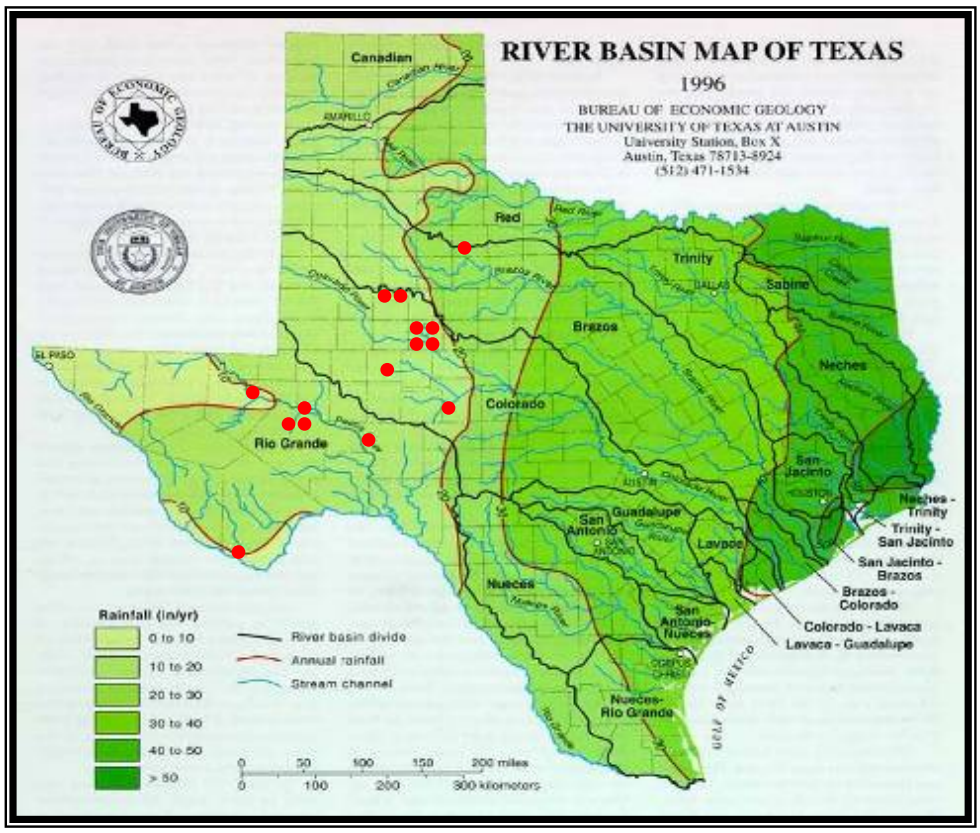
As a result of the SBCIP efforts, leaf beetles have been released at 23 sites in 16 counties. Populations are now established at 12 sites in the Colorado River Basin (Martin, Mitchell, Borden and Tom Green Counties), the Red River Basin (King County), the Brazos River Basin (Crosby County), and in the Pecos/Rio Grande River Basin (Pecos, Reeves and Brewster Counties). A beetle population is considered established if beetles overwinter at the site and then increase and defoliate trees without additional beetles being released at the site during the current season. Once established, a beetle population is expected to persist indefinitely and expand its distribution. Saltcedar leaf beetles were released in 2010 at an additional 11 sites, but are not yet established.

In general, saltcedar beetle populations at Big Spring and surrounding counties did not increase or disperse in 2010 as rapidly as they did in 2009. One explanation is a large proportion of the beetle population, as pupae, may have drown as a result of the heavy and prolonged rainfall that occurred in late June and early July across much of west Texas. The pupal stage occurs on the soil surface for about 5-6 days before the adult beetle emerges. Pupae are therefore susceptible to drowning when low lying areas flood and streams and rivers overflow. Remnants of Hurricane Alex, downgraded as a tropical storm, brought heavy rainfall into the West Texas area in beginning in late June. From June 29 through July 9, rainfall occurred on 8 of these 11 days at Big Spring, TX and totaled 3.34 inches. If a large portion of the beetle population was in the pupal stage at this time, which is likely, these pupae could have drown during this period of rainfall. As saltcedar and therefore beetles occur in areas prone to flooding, this unusual rainfall event may have resulted in an overall decline in beetle populations at many sites. The total rainfall during April through August, 2010, at Big Spring was 9 inches, compared to 5 inches in 2009, a year in which beetle populations greatly increased and dispersed.

Status of Saltcedar Beetles at Project Implementation Sites, Fall, 2010.

Site	County	Site	Species	Over-wintered	Defoliating	Established
Colorado River Basin						
1	Martin	Sulphur Springs	Crete	◆	◆	◆
2	Mitchell	Gillespie	Crete	◆	◆	◆
3	Tom Green	Twin Buttes	Crete	◆	◆	◆**
4	Borden	Tobacco Creek	Crete	◆		
5	Borden	Lake Thomas	Crete	◆	◆	◆
6	Mitchell	Wright	Crete	◆	◆	◆
7	Mitchell	I-20 Bridge	Crete	◆	◆	
8	Mitchell	Bradberry	Crete	◆	◆	◆
9	Coke	Lake Spence	Crete			
10	Coleman	Lake Ivie	Crete			
Red River Basin						
11	King	Guthrie	Crete	◆	◆	◆
12	Motley	Matador	Crete			
Brazos River Basin						
13	Kent	Jayton	Crete			
14	Garza	Post	Crete			
15	Crosbyton	White River	Crete	◆	◆	◆
Pecos / Rio Grande River Basin						
16	Reeves	Pecos	Crete	◆	◆	◆
17	Pecos	Cooper	Crete/ Tunisian	◆	◆	◆
18	Pecos	Whyte, Hw18	Tunisian			
19	Pecos	Leon Springs	Crete			
20	Crockett	Iraan	Crete/ Tunisian			
21	Reeves	Pecos North	Tunisian			
22	Brewster #1	Big Bend NP, Santa Elena	Crete	◆	◆	◆
23	Brewster #1	Big Bend NP, Gravel Pit	Tunisian	◆	◆	◆

** This area was treated with herbicide for brush control in the spring 2010 and as a result the saltcedar was defoliated. Without saltcedar to feed on, the beetle population apparently collapsed as no beetles could be found during June, 2010.



● Indicates saltcedar biological control implementation site

Impact of Beetles on Saltcedar Trees and Vegetation.

Tree defoliation by beetles is estimated each fall at each release site and the distribution of beetles is mapped to monitor dispersal. Beetle populations at many sites are still very small and defoliating less than 0.1 acres. An estimate of the acreage of saltcedar defoliated at sites with large beetle populations is shown below.

Site Number and Location	Extent of Beetle Dispersal -miles	Acres of Saltcedar Defoliated by Beetles
1. Sulphur Draw	5	15
2. Gillepsie Ranch	6	45
5. Lake Thomas	1	12
6. White Ranch	3	15
8. Bradberry Ranch	0.4	2
15. White River Lake	0.4	10
16. Pecos River	11	200
23. Rio Grande	17	205
	Total acreage	**504**

Current Project/Focus Areas.

Upper Colorado River/Colorado River Municipal Water District

The 2006 Colorado River Watershed Restoration and Management Plan is designed to improve the environmental health of the Upper Colorado River Basin. A key aspect of this plan is the control and management of saltcedar. As part of the Implementation Program, most of the saltcedar adjacent to the Colorado River and parts of Beals Creek was killed by herbicide spraying beginning at Lake J.B. Thomas and extending down river to Lake Spence. However, not all of the saltcedar was sprayed. The Colorado Municipal Water District, with funding from Wal-Mart Inc., provided funding to SBCIP to establish beetle populations to suppress saltcedar growth and eliminate seed production from unsprayed sites, suppress regrowth of trees surviving the herbicide program and promote biological control of saltcedar throughout the upper Colorado River watershed.

Southern Plains, Rolling Plains/Natural Resource Conservation Service.

The Saltcedar Biological Control Implementation Program has worked closely with NRCS since 2006 in releasing saltcedar leaf beetles in Borden and Fisher Counties. With funding from the Southern Agriculture Research and Education (SARE) Program, this program was expanded in 2010. Saltcedar leaf beetles were collected from Big Spring and shipped to NRCS offices for release in each of Kent, Motley, Garza, Terry and Lynn Counties. Each county received 6,000 beetles in June and 10,000 beetles in August, for a total of 16,000 each. NRCS personnel in these counties also received on-site training in releasing and monitoring beetles.

Pecos River, Pecos River Restoration Program.

The goal of this program is to implement the Watershed Protection Plan developed for the Pecos River as a means to improve the quality of water in the Pecos River and to improve the health of the watershed. Part of this plan is the long term suppression of saltcedar using biological control. In 2010, beetles defoliated all of the saltcedar along 11 miles of the Pecos River near Pecos, TX and dispersed along 35 river miles. With funding from the program, the SBCIP released saltcedar leaf beetles at five new sites in on the Pecos River in 2010. At two of these sites, the Tunisian beetle was released nearby the Crete species to determine which species is best adapted to this southern region.

Rio Grande River, Big Bend National Park.

Saltcedar is an exotic, invasive species which threatens the ecology and biodiversity of Big Bend National Park. In 2008, the Saltcedar Biological Control Implementation Program initiated a project to provide technical expertise, assistance and material support (cages and beetles) to establish leaf beetle populations in Big Bend National Park for the biological control of saltcedar. In 2010, a population of Crete beetles established at Santa Elena Canyon along the Rio Grande River. In July, the population had dispersed across an area of 0.2 miles and defoliated about 35 large saltcedar trees. Also in 2010, a population of Tunisian beetles established at the Gravel

Pit Campground. In September, this population had defoliated a large acreage of saltcedar trees along an estimated 17 river miles from Boquillas Canyon up river to Mariscal Canyon.

Impact on Athel Trees near Presidio, Tx.

The subtropical tamarisk beetle was released by USDA-ARS and Sul Ross University at research sites along the Rio Grande River near Presidio, Texas in 2009. In 2010, these populations rapidly increased and by late August had defoliated almost all of the saltcedar along 20 river miles around Presidio, TX. Beetles soon crossed into Mexico where they defoliated saltcedar along five miles of the Concho River. With almost no saltcedar leaves remaining, the hungry beetles attacked athel trees, a very closely related species of saltcedar. While it was well known that saltcedar beetles fed on athel (although they prefer saltcedar) the speed and intensity of defoliation of athel in this region was unexpected. Athel, *Tamarix aphylla*, is valued for its shade, wind protection and drought hardiness. It is cold sensitive and as a result its distribution in the US is limited almost exclusively to the Rio Grande River corridor. However, athel is commonly found in urban areas and on ranches in Mexico. A survey in Presidio, Tx, estimated about 20 athel trees were planted in home/farm landscapes but many more athel trees are found in and around nearby Ojinaga, Mexico. Mexican officials generally recognize the beneficial aspects of the biological control program against saltcedar, but are also concerned about the potential risk to athel. Several state, federal and international agencies are working with Mexican officials and organizations to address this concern. Fortunately, many of the defoliated athel trees grew new leaves in the late summer, much the same way saltcedar does. As the abundance of saltcedar declines in this area due to beetle feeding, the overall beetle population is expected to decline as well. This suggests that the impact of leaf beetles on athel should decline in years ahead.

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