

Title of Project: Biological Control of Saltcedar at Lake Meredith, Texas

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Objectives:

1. Determine successful establishment of the saltcedar beetle, *Diorhabda elongata*, as a biocontrol agent on saltcedar in the Canadian River drainage at Lake Meredith, Texas.
2. Redistribute the saltcedar beetle to other saltcedar infestations in the Canadian River drainage.
3. Initiate research on compatibility of saltcedar biocontrol with other control measures, especially regarding controlled burning of saltcedar.

Methods:

In 2002, the Entomology Program at the TAES research center at Amarillo/Bushland began a cooperative effort with the U. S. Bureau of Reclamation to develop a biocontrol program for saltcedar at Lake Meredith. In 2003, permission was given by the U. S. Fish and Wildlife Service to establish release sites for *D. elongata* at various locations, including Lake Meredith. With the restrictions lifted, we began releasing the beetle in the spring and summer of 2004 at two sites at Lake Meredith. Eggs from a strain of *D. elongata* originating in Posidi, Greece were obtained in 2004 and released into cages near Lake Meredith to facilitate their establishment. There have been no previous studies on the development, population growth and effect of this particular strain of saltcedar leaf beetle in Texas, although a strain more suited for southern climates has been studied in the Temple area. In 2004, partially supported by a grant from the Texas Water Resources Institute (report submitted), we released the eggs, and recorded the dispersal, reproductive capacity, development rate, and longevity of life stages of the beetle, as well its over-wintering success in the Texas High Plains. Visual estimates of the established *D. elongata* population indicate a 10-fold increase from the first to the second generation of beetles, with each generation being produced within 4-6 weeks. Based on the data collected to date, it is expected that there should be 3-4 saltcedar leaf beetle generations per summer. Adult beetles are already dispersing away from their original release location and damage to saltcedar foliage at the point of beetle release has been destroyed.

Objectives 1 and 2. In 2005 we will monitor our 2004 release sites for successful beetle emergence from overwintering populations, population increase and dispersal as in 2004. Visual examination of the site coupled with GPS mapping of recovered beetles and damage to saltcedar trees will be used to estimate the extent of the beetle infestation. As the beetle population increases during the summer, adults and larvae will be collected and taken to other sites along

the Canadian River to establish new infestations. These sites will also be mapped, and beetle density, dispersal and saltcedar damage will be recorded. The Bureau of Reclamation, with whom we are cooperating in this research, has a detailed protocol for the methodology involved in these releases and redistribution efforts. Although to extensive for this proposal, the complete methodology can be found at: www.aphis.usda.gov/ppq/enviro_docs/pdf_files/diorhabgendr.pdf. or the complete sampling protocol (31 pages) can be obtained from the project leader upon request.

Objective 3. In addition to monitoring the release made in 2004, and redistributing the beetles to other sites, in 2005, we will have the opportunity to initiate research that will determine if the beetles can be used in conjunction with other control methods. The Canadian River Municipal Water Authority and the National Park Service at Leak Meredith will conduct a controlled burn of saltcedar on land just to the east of our 2004 release site. This will provide a unique opportunity to study the ability of the beetles to colonize saltcedar regrowth and, long-term, to determine if stress to saltcedar from burning is enhanced by feeding of the beetles on the regrowth. We will use protocols similar to those mentioned above to visually, and with GPS, track the beetles' dispersal from our 2004 site to the burn site, monitor beetle population density and dispersal and damage to saltcedar.

As a note to sampling procedures, in late 2004, a pheromone (attractant) was discovered for *D. elongata*, and we will incorporate pheromone traps into our sampling in 2005. We believe that this type of trap will more accurately delineate the distribution of the beetles in and around our release sites, and the limits of their ability to disperse in a given year. These records will be invaluable in the future to understand the success of the release program.

Although we had good results in 2004, we also noticed that the screening material used in cages to contain adults was somewhat open to predators that attacked the beetles. In 2005 we will replace the previous screening with a more robust material.

Anticipated Results:

We expect that *D. elongata* will have a significant impact on saltcedar in a relatively short time, and be economically effective since the biocontrol agent is self-perpetuating. *D. elongata* has been shown to totally defoliate up to five acres of saltcedar in a single summer at experimental release sites (Jack DeLoach, USDA/ARS, Temple, TX, personal communication). In addition to reducing or eliminating saltcedar stands at Lake Meredith, these release sites will act as a source for the beetles that can be redistributed to other sites. The insect has been thoroughly screened and tested for host plant specificity by the USDA, and no detrimental effects are expected on non-target plants.

In this project, we are cooperating with the U. S. Bureau of Reclamation in order to be involved in the future redistribution the insects to other areas in the Texas Panhandle. The funding request we are making is to pay and support student workers during the spring and summer of 2005 to assist in the establishment of release sites, collection and monitoring of the insects, and assessment of the damage done to saltcedar at the release sites. In 2004, we found that there was a significant need for additional personnel on this project, since the visual and GPS mapping was extensive and time consuming. In 2005, we will assign 15% of a research assistant with our program, J. B. Bible, to this project, and we will also fund an additional summer research worker to this project.

TAES/TWRI
Water Resources Research
Project Budget Form

Cost Category	Funds requested	Cost share	Total
Salaries and Wages			
Research assistant (15% time)	0	4,862	4,862
Student worker	4,320	4,320	8,640
Student fringe	356	356	712
Supplies	500	0	500
Capital Equipment (>\$5,000)	0	0	0
Services and consultants	1,000	0	1,000
Travel	600	600	1,200
Other direct costs	0	0	0
Indirect costs (45.5%)	0	3,049	3,049
Total direct costs	6,776	13,187	19,963

Note: All cost share amounts will be paid from TAES account
502970-86220.

Budget Notes:

1. All cost share amounts will be paid from TAES account 502970-86220, which is funded by the USDI Fish and Wildlife Service grant for biological control of weeds.
2. The funding of \$1,000 for Services and consultants is for assistance in identification of native plants in the Lake Meredith/Canadian River area. In 2004, we contracted with Mr. J. R. Bell to assist with these identifications. Mr. Bell is a retired DuPont employee with extensive an botany background.