



Cactus Moth Detection and Monitoring Network on Public and Private Lands in the United States. A partnership between USDA-APHIS, USGS, and Mississippi State University
Progress Report June 2006

Introduction. Cactus moth (*Cactoblastis cactorum*), one of the most successful biological control agents in history, has been transported around the world in various prickly pear cactus control programs. By 2002, free-living populations of the moth had spread from the Florida Keys to the Florida Panhandle and South Carolina. It now poses a serious threat to native prickly pear cactus populations in the American Southwest, as well as the cactus industry and desert ecosystems in Mexico.

A research, extension, and coordination effort to monitor the spread and develop integrated control of cactus moth has been developed as part of collaborative research between USGS and Mississippi State University, with assistance from USDA-APHIS. This project has the following components: Early Detection and Reporting of Cactus Moth, Distribution of Prickly Pear Cactus, in the Region, Modeling of *Opuntia* Distribution, Cactus and Cactus Moth Extension Information, Web-Based Database of Cactus and Cactus Moth Locations, and Regional Coordination

I. Early Detection and Reporting of Cactus Moth. Task Description: Cactus moth detection techniques will be tested to find an optimal approach for detection, and a network of detection sites at known cactus locations will be implemented. The MSU insect collection will develop instructional information for potential volunteer monitors at the selected monitoring sites, and provide for moth species verification and vouchering.

Summary of Objectives:

1. Develop and test techniques for (a) detecting cactus moth infestations, (b) delimiting infested areas, and (c) determining effectiveness of control actions.
2. Develop a cactus moth detection network in the project area.
3. Develop protocols for monitoring native and ornamental cactus populations.
4. Develop protocols for reporting and verifying suspected cactus moth infestations.

Progress this month:

- Received 22 pheromone traps from Grand Bay National Wildlife Refuge and adjacent areas in Jackson County, MS, 7 traps from Arizona nurseries, 3 traps from Padre Island, TX and 1 trap from Mustang Island St. Pk., TX . No cactus moths were detected and non-target Lepidoptera were identified and recorded.
- Met with Thomas Simonson, University of Alberta, to review preliminary DNA data on phylogeography of cactus moth. Based on haplotypes, cactus moths were introduced independently on more than one occasion into southeastern U.S.
- Collected native cactus moth caterpillars in Texas State Parks for rearing to adult stage (collections in progress until July 3).

II. Distribution of Opuntia in the Region.

Task Description: MSU staff, natural resource agency professionals, and volunteers will be used to search for populations of *Opuntia* cactus in the region. Native cactus populations will be located using herbarium records, contact of federal, state, and NGO biologists, and surveys. The location and description of all *Opuntia* cactus populations in the region and of cactus moth monitoring sites will be placed on a web-accessible database, as part of extension efforts listed below.

Summary of Objectives:

1. Develop and test methods to locate and map populations of cactus in support of surveys to detect and delimit cactus moth infestations in the region
2. Utilize professionals and volunteers to survey cactus locations in the Southeastern region.

Progress this month:

- Mapping and data collection conducted in AL, AR, GA, MS, NC, OK, SC, and TN.

- Contacted list of gulf coast land units established by BJ Lewis, USDA.
- Visited 3 cemeteries in Jackson County, MS and 1 cemetery in Hancock County, MS. No *Opuntia* found at any of the 4 sites.

III. Modeling of *Opuntia* Distribution in the Region.

Task Description: We will develop spatial models to predict cactus distribution in a GIS framework.

Summary of Objectives:

1. Develop cactus distribution prediction models

Progress this month:

- Continued data collection on Bon Secour NWR and Dauphin Island for plant community and autecological information on *Opuntia stricta*. *Cactoblastis* was still active at those sites.
- Began DNA extractions for inter- and intraspecific comparisons of MS and AL *Opuntia*.
- Surveyed a new population of the prairie-specific variety of *Opuntia* in Pontotoc Co.

IV. Cactus And Cactus Moth Extension Information.

Task Description: We will develop web-based information to aid in the identification of cactus and the cactus moth.

Summary of Objectives:

1. Web-based educational materials on cactus and the cactus moth
2. Educational program on cactus moth, including on-line and printed fact sheets and brochures.

Progress this month:

- Distributed cactus moth information pamphlets to Texas State Park personnel and at annual meeting of Lepidopterists Society in Gainesville, FL (200+ attendees).

V. Web-based database for cactus and cactus moth distribution.

Task Description: We will develop a web-based avenue for reporting suspected locations on the web, and web GIS database to display the movement of the moth and locations of natural cactus populations. Our webpage URL is http://www.gri.msstate.edu/cactus_moth.

Summary of Tasks:

1. Operational web database for locating and mapping cactus and cactus moth populations.

Progress this month:

- Monitoring surveys that come into the system.
- Setup some behind-the-scene scripts to perform maintenance tasks.
- Addressed some hardware problems with the server.

VI. Coordination.

Task Description: A collaborative project of this size involving multiple agencies requires a concerted effort to coordinate activities and agree on the tasks to be done and data to be collected.

Coordination activities this month:

- Invasive Species Working Group Telecon on 29 June 2006.
- USDA-APHIS meeting in Pensacola on 22 June 2006.
- USGS site visit 26-29 June 2006

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