



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

June 2005 Progress Report

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, 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:

- Continued cactus moth surveys (residential areas and natural areas) in Jackson and Harrison Counties, MS, with concentration on Gulfport, Van Cleave, and cemeteries. No cactus moth detected.
- Identification of insects collected from pheromone traps from Padre Island National Seashore, Texas (9 traps) and Bon Secour National Wildlife Refuge, Alabama (19 traps) for presence of cactus moth. Two adults from two separate trap locations from Bon Secour were identified as *Cactoblastis cactorum*.
- Obtained *Cactoblastis cactorum* and *Melitara dentata* larvae from APHIS lab in Tallahassee, FL for examination and comparison of mouthparts and sensory structures.

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. We will also develop a spatial model to predict cactus distribution in a GIS framework.

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.
3. Develop a cactus distribution prediction model

Progress this month:

- Collected cactus vouchers (*O. humifusa*, *O. stricta*) for greenhouse collection from South Carolina, Georgia, and Florida.
- Received land use/cover data from Southeast GAP program – these will be used in combination with soils data to begin surveying of random plots for data collection in the region.
- Established contacts at Weeks Bay NERR for conducting cactus/cactus moth surveys.
- Continued surveys for native cactus and cactus moths in MS, AL, and surrounding states.
- Continued surveys for *Opuntia* (residential areas) and in 8 cemeteries in Jackson and Harrison Counties, MS.
- Developed a list of 103 cemeteries in coastal Mississippi counties for future surveys.

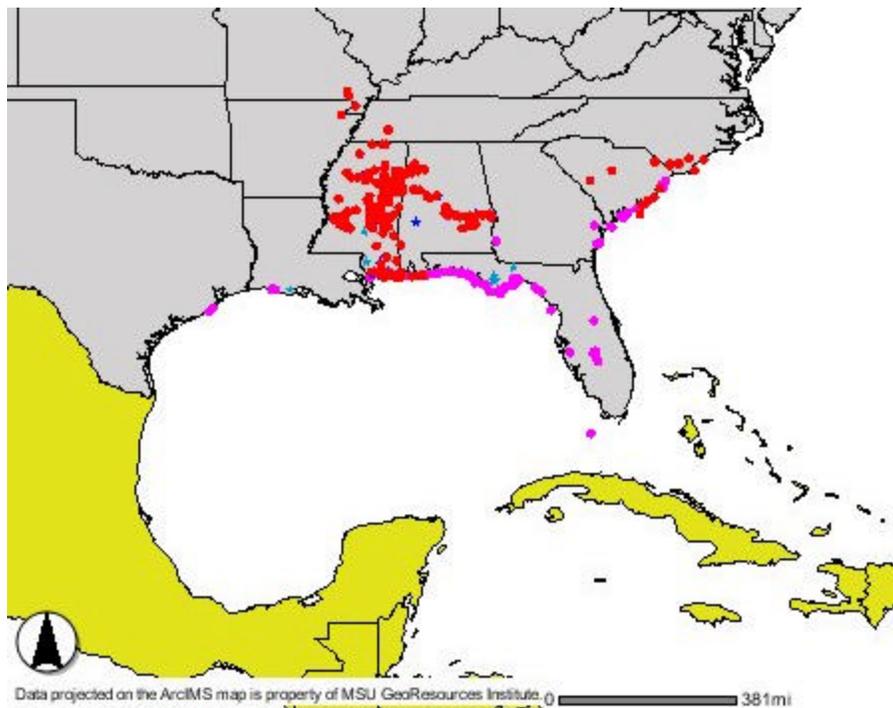


Figure 1. Locations surveyed for pricklypear cactus from the GRI database. Red, pricklypear present with full data; magenta, pricklypear present but incomplete data; blue, pricklypear absent with full data; aqua, pricklypear absent but incomplete data. See the webpage http://www.gri.msstate.edu/cactus_moth for updated maps, information, and to enter observations.

III. 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 public.
- Draft survey manual completed for internal review.

IV. 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.

Summary of Tasks:

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

Progress this month:

- Implemented the capability to read/write DBF files to be used with ArcPad.
- Continuing to setup the ArcSDE server to link the database to a map.
- Continuing to setup scripts to update the map with current locations from the database.
- Setup a map showing the current locations from the database.
- Redesigned the map to make it more functional.

V. 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:

- Coordinated efforts with USDA-APHIS and USGS.

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