



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 July 2006

Webpage: http://www.gri.msstate.edu/cactus_moth

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:

- Checked 12 pheromone traps (all USDA-APHIS) from South Carolina. Thirty cactus moth specimens were identified. Non-target Lepidoptera were identified and recorded.
- Checked 10 pheromone traps (4 USDA-APHIS; 6 Grand Bay Savannah) from Mississippi. Cactus moth was not detected and non-target Lepidoptera were identified and recorded.
- Checked 4 pheromone traps from Texas (Padre Island; State Park). Cactus moth was not detected and non-target Lepidoptera were identified and recorded.
- Visited 10 Texas state parks, historic sites, and recreation areas to check and collect native cactus moth larvae. Cactus pads and larvae were collected from three locations and transferred to the Mississippi Entomological Museum for rearing. Photos and descriptions were made of larvae. Upon emergence of adults, specimens will be identified, described, and preserved for use in preparing keys.

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 KY, MD, MS, NH, NY, OH, PA, SC, TN, VA, VT, and WV.
- Continued contacting list of gulf coast land units established by BJ Lewis, USDA.
- Worked with volunteer citizen scientists.

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 work on developing a database for morphological and, potentially, genetic analyses of MS *Opuntia* species – including collections of *O. humifusa* and *O. pusilla* with tuberous root thickenings, a character previously assigned only to *O. macrorhiza*.

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:

- Presented Cactus Moth update to 100 Master Gardeners in Senatobia, MS, on 21 July 2006.
- Cactus moth presentation given and cactus moth pamphlets distributed at 4-H Entomology Camp, Newton, MS, 20 July 2006.

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. Webpage:

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:

- Web search algorithms are being updated to increase search speed, and system is being maintained.

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:

- Participated in an ISWG conference call on 13 July 2006.

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