



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 2007

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:

- Set up five new sentinel sites and mapped five new pricklypear populations on Petit Bois Island, the eastern most barrier island in MS (Jackson County).
- Pheromone traps from Arizona (25, nurseries), Texas (3, Padre Is. N.S.), Mississippi (19, Grand Bay NERR), were screened. All were negative.
- Visual observations were made of *Opuntia humifusa* at eight sites in fall line sandhills, Ochoopee dunes, and hammocks in Georgia (Taylor, Emanuel, and Tattnall Cos.) and data entered into monitoring network.
- *Opuntia* species were checked for *Cactoblastis* and native species of *Melitara* between Tucson and Nogales, Arizona.

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:

- Lucas Majure successfully defended his Master's thesis, which is available through the MSU Libraries, or via Gary Ervin's web pages. Title: The Ecology and Morphological Variation of *Opuntia* (Cactaceae) Species in the Mid-South, United States. URL: http://www.msstate.edu/courses/ge14/students/Majure_Thesis.pdf
- We visited Dauphin Island, AL on 08 July. *Cactoblastis* damage was noted near the Dauphin Island Estuarium and reported to USDA APHIS, who had removed 1.5 tons of damaged *Opuntia* from the island the previous week.
- We visited the Nokuse Plantation in Walton County, FL on 14 July. One large area of this property is occupied by a high density of *Opuntia humifusa* var. *humifusa*. We are coordinating with the managers to establish sentinel sites in areas being used for gopher tortoise habitat restoration.
- We identified three previously unrecorded populations of *Opuntia humifusa* var. *cespitosa* in Lawrence and Colbert Counties, Alabama (northwest portion of the state, near Tuscomb). One population was on the Nature Conservancy's Prairie Grove Glades. This population was identified by JoVonn Hill, a graduate student of Richard Brown.
- Conducted mapping and data collection trips across MS.

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:

- Quantitative data was collected at the Sand Hill Crane NWR and the Natchez Trace, for use in modeling.

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:

- Brochures on cactus moth were distributed at annual meeting of Lepidopterists' Society in Bakersfield, CA.

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:

- Continued maintenance and web support
- Continuing to transition the system to new ESRI software.

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 the ISWG teleconference for July 2007.

For more information, contact: Dr. John D. Madsen, ph. 662-325-2428 or jmadsen@gri.msstate.edu