



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 March 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:

- Obtained larvae from Puerto Rico and forwarded to University of Alberta for use in molecular phylogeography study of cactus moth dispersal.
- Received pheromone traps from Puerto Rico and confirmed presence of cactus moth at Guanica.
- Distributed brochures at annual meetings of Southeast Branch Entomological Society of America (March 5-7) and Association of Southeastern Biologists (March 29-31).

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:

- Associate species drop-downs completed and data entry initiated for San Antonio-Corpus Christi, TX data collection trip.
- Mapping and data collection conducted in Mississippi, Alabama, Tennessee, and Florida.

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:

- Presentation on cactus habitat modeling delivered at the Southeastern Ecology and Evolution Conference in Tuscaloosa, AL.
- Contributed to summary write-up of USGS Modeling Conference held in November 2005 in Olympic National Park, WA.

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:

- Edited revised GRI website and provided photographs for distinguishing cactus moth from native species.
- Attended Jackson Garden and Patio Show, Jackson, MS March 10-11 and distributed cactus moth information to the public.

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.

Summary of Tasks:

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

Progress this month:

- Added pricklypear and cactus moth related information to the cactus moth website (http://www.gri.msstate.edu/cactus_moth). This should allow the site to provide much needed information in one place for the public to get informed on the issues.
- Configured Web Map Service for the ArcIMS map to allow the data layers to be available to the NBII Geospatial Information Framework.

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:

- Attended CPHST Lucid3 Workshop at Ft. Collins, CO for learning how to use this software. Lucid keys are used by USDA-APHIS employees, and will be used for developing web-based identification keys for cactus moth larvae.
- Presented update to Invasive Species Working Group, NBII teleconference on the cactus moth efforts, March 30.
- Attended NBII Southern Appalachian Information Node strategic planning meeting, 13-14 March 2006.

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