

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 January 2005

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, Development of a Prickly Pear Predictive Model, 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:

- Refined and finalized cactus moth data sheet and data fields for the preliminary test of the web-based database in February.

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 develop a spatial model to predict cactus distribution in a GIS framework, to assist in locating cactus populations that may be infested with the cactus moth.

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:

- Refined and finalized the prickly pear cactus data sheet and data fields for the preliminary test of the web-based database in February.
- Transferred data fields from notes to data forms for archiving
- Graduate students continued preliminary sampling of possible cactus locations throughout Mississippi. Populations of both *Opuntia humifusa* and *O. pusilla* have been located, along with potential hybrid populations.; as well as some areas apparently well suited to *Opuntia* but not occupied during their surveys.
- An undergraduate student, Joshua Easterling, has been hired to obtain Lat/Long location data for herbarium specimens in the NC and SC herbaria. A listing of herbarium samples from the Pullen Herbarium at the University of Mississippi is being prepared, for which location data also will be obtained.
- These location data (herbarium records and new surveys) will be used to initiate modeling efforts during the coming weeks, and those activities will be augmented by efforts at the planned Cactus Modeling Workshop.

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:

- Continued work on prickly pear cactus fact sheets for printing and web dissemination

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:

- Initiated configuration of the server for the database.
- Designed a database structure based on the survey forms for reporting the locations of pricklypear and moths.
- Developed web forms for submitting the survey forms to the database.
- Continued to design a web site for the cactus moth.

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:

- Planned cactus modeling and mapping workshop scheduled for 15 FEB 2005 in Tunica, MS.
- Participated in two teleconferencess regarding data fields for cactus moth database.

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