



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 2008

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:

- The first known record of the exotic cactus moth and the native *Melitara* occurring in the same cactus cladode was detected by Tom Harding in St. Johns Co., FL, and identification of the larvae of the two species were confirmed.

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 northern Florida including dunes and residential areas on Atlantic coast west of Jacksonville Florida.
- Made site visit and discussed project and sentinel site monitoring at Kathryn Abbey Hanna Park and Guana Tolomato Matanzas National Estuarine Research Reserve in northeastern Florida.

- Mapping trip to southeastern Alabama and western Florida planned for Feb. to assist USDA-APHIS efforts to establish sentinel sites and setup traps.

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:

- We initiated DNA extraction to develop population-level markers for *Opuntia* species.
- We are planning a research expedition to Argentina to collect data on distribution and ecological site characteristics for *Cactoblastis cactorum*.

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:

- No new items

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:

- Developed scripts to check data points against state and county listed in the report in order to identify reports with either incorrect coordinates or wrong counties.

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:

- MSU hosted a Cactus Moth Detection and Monitoring Network meeting on 4 December 2007 with MSU, USGS, NBII, and USDA-APHIS personnel in attendance.

Publications

Simonsen, T.J., R.L. Brown, and F.A.H. Sperling. 2008. Tracing and invasion: phylogeography of the cactus moth, *Cactoblastis cactorum* (Berg) (Lepidoptera: Pyralidae) in the U.S.A. based on mitochondrial DNA. submitted to Environmental Entomologist.

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