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**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 April 2007

Webpage: [http://www.gri.msstate.edu/cactus\\_moth](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 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:*

- Genitalia of *Cactoblastis cactorum* were dissected and stained for use in training workshop for International *Cactoblastis cactorum* conference workshop.
- *Opuntia stricta* was checked on 14 April at Fort Morgan where removal of cactus is in progress. *Cactoblastis* egg sticks were found on one cactus plant that was overlooked in the cleaned area being cleaned. No egg sticks or larvae were found on the south side of the sea wall, although *Opuntia stricta* was abundant.
- *Opuntia pusilla* was checked 15 April in Meridian, Lauderdale Co., MS; no native or exotic cactus moths present.
- Collected *Melitara* (native moth) from Arkansas for rearing and EM work.
- To date, 41 Cactus Moth Sentinel Sites have been established throughout the Carolinas. Species that are being monitored include *Opuntia humifusa*, *O. pusilla*, and *Opuntia stricta* (native species), as well as *O. ficus-indica* and *O. engelmannii linguiformis* (ornamental species).

*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:*

- Presentation of SEM work on *Opuntia* pollen, glochids, and spines delivered at the Southeastern Microscopy Society Conference in Decatur, GA by M.S. student Lucas Majure.

- Collected what is being termed *Opuntia* aff. *grandiflora* in Arkansas.
- Conducted mapping and data collection trips in N MS, S TN, and N AL.

### 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:*

- Storm dispersal modeling of *Opuntia* along the Mississippi Gulf Coast; a poster will be presented at the USDA-APHIS International *Cactoblastis cactorum* Conference.

### 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:*

- A revised manual is now available at both the cactus moth webpage and the GRI publications webpage: Floyd, J. and J.D. Madsen. 2007. Survey Information for the National Cactus Moth (*Catoblastis cactorum*) Detection and Monitoring Network. [GeoResources Report #5013](#), GeoResources Institute, Mississippi State University, Mississippi State, MS. 14pp.
- Packets of brochures on the cactus moth were sent to Plymouth Bluff Environmental Education Center (Columbus), Mississippi Museum of Natural Science (Jackson), Columbus State University, GA, Noxubee N.W. Refuge, and Natchez Trace Parkway Visitors Center (Tupelo) for distribution.

### 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](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:*

- New modifications have been made to the active Arc-IMS map so that points outside of the continental United States can be viewed.
- A new version of the volunteer manual has been uploaded.

### 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:*

- Presented "Cactus Moth Detection and Monitoring Network on Public and Private Lands in the United States: A Partnership between USDA-APHIS, USGS, and Mississippi State," at the NBII's Invasive Species Working Group teleconference on 26 April 2007.
- Submitted an annotation to *Ecology on the Web*, a section of the *Bulletin of the Ecological Society of America* newsletter, which will be printed in October.

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