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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 September 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, 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:*

- Traps with experimental pheromone for cactus moth that were operated during August and early September in California (97 traps), Arizona (24 traps), New Mexico (2 traps), and Padre Island, Texas (10 traps) were sent to Richard Brown for identification of moths. Identifications of 2,992 moths were made, none of which were *Cactoblastis cactorum*. Two species of native cactus moths were collected. Cactus feeding larvae collected during July at six locations in New Mexico were also identified as native 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. We will also develop a spatial model to predict cactus distribution in a GIS framework.

*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:*

- Checked three locations in Harrison and Hancock counties where *Opuntia* has been previously been reported. No damage to plants from Hurricane Katrina, although one plant had been completely inundated with brackish water for several hours. No cactus moth was detected at these locations.

- Completed data collection at semi-permanent plots in MS and AL to evaluate environmental conditions contributing to growth and began data analyses.
- New sites have been surveyed for *Opuntia* (in Noxubee and Neshoba Counties, MS), and specimens from those sites have been added to the greenhouse *Opuntia* collection, which now includes about 90 individual plants from more than 40 sites in the southeastern US. This collection includes specimens of *Opuntia stricta* var. *dillenii*, *O. humifusa* var. *humifusa*, *O. humifusa* var. *austrina*, *O. pusilla* and a possible *O. humifusa* × *pusilla* hybrid.
- Completion of data entry from mapping trips to AL, AR, LA, MS, and TX.
- Continued mapping and data collection in northern and central MS, since hurricane Katrina has postponed mapping trips planned for the MS barrier islands (trap data forms) with NPS and BJ Lewis (USDA-APHIS) and the Pascagoula and Escatawpa River systems.
- Based upon post-Katrina aerial images, visits to the Chandeleurs in S. Louisiana previously planned have been cancelled. Based upon post-Katrina aerial images, New Harbor, Raccoon Island and the Rigolets may still have *Opuntia* populations.
- No information on how Rita impacted *Opuntia* populations on Grand Chenier in LA, but there is a need to validate much of the coastal population data in the database from LA (Katrina and Rita) to AL (Katrina).

### 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:*

- Expanded the distribution of monthly reports to NAKARI, an international newsletter regarding cactus and succulents

### 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:*

- Attended a training class on ESRI's Mapping technology to better provide the mapping capabilities.
- Re-configured internal database and ArcSDE to enhance mapping capabilities.
- Redesigned the map to take advantage of ArcIMS capabilities and to enhance the map for outside as well as in-house use.

### 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:*

- Submitted two abstracts to the Ecological Society of America International meeting in Merida, Mexico on the cactus moth effort
- Submitted a poster presentation abstract for the NBII All-Node Workshop in Albuquerque, NM.
- Participated in an USGS Early Detection Rapid Response teleconference.
- Participated in an Invasive Species Working Group teleconference.

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