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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  
January 2006 Progress Report

*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:*

- During 2005, surveys in seven states involved use of 95 cactus moth pheromone traps resulting in 365 samples that have been identified and counted to date (approximately 40 samples remain to be identified). These traps yielded 11,385 moths, of which most were small pyralids collected in Arizona and California. Thirty-six species in various families of moths have been identified from the pheromone traps. Sixteen *Cactoblastis cactorum* moths were collected in traps operated at Bon Secour National Wildlife Refuge (Fort Morgan) between May 17 and August 16, 2005.
- Larvae of four native species of cactus moths have been reared and photographed. These include *Melitara prodenialis* in eastern U.S. and three unidentified species of *Melitara* in Arizona and New Mexico.

*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 trips to Mississippi, Alabama, and Georgia.
- Steven Hight's data transferred to complete system and verified.
- Establishment of 5 sentinel sites in MS with three additional sentinel sites in progress.
- Mapping and data collection trip to San Antonio, TX.

### *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 modeling efforts at the ESA International Conference (see below).

### *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:*

- An identification sheet for eastern *Opuntia* species has been developed for volunteers.

### *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:*

- The Cactus Moth Detection and Monitoring Network came online early 2005 and was opened to the public in June. To date, there have been 851 pricklypear reports submitted with 776 being positive sightings of the cactus. These reports came from 12 different collectors and spanning 10 states.
- There have been 783 moth reports submitted with 56 being positive sightings of the invasive cactus moth. Of those 56 reports, 51 are part of the "historical" sightings throughout the Southeast made by Stephen Hight.

### *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:*

- Lucas Majure attended ESA International conference in Merida, Mexico: Ecology in an Era of Globalization. (Poster title: *Assessing habitat requirements for host plants (Opuntia spp.) of Cactoblastis cactorum in the Southeastern United States*)
- Elizabeth Sellers presented a multi-authored paper, *The National Cactus Moth Detection Network and Database*, at the ESA International conference in Merida, Mexico: Ecology in an Era of Globalization.
- Workshop on the cactus moth partnership with representatives from USDA-APHIS, USGS, and MSU on January 31, 2006 at MSU.

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