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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 March 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:*

- Supplied preserved larvae of Cactus Moth as reference specimens to Steve Passoa (APHIS-PPQ, Ohio State University), Gary Russell (APHIS-PPQ, Arizona), Robin Kropp (Arizona-Sonora Desert Museum).
- Developed final Cactus Moth data forms.
- One larva of the native moth, *Melitaria* spp., was located feeding on cacti on Horn Island (*Opuntia humifusa*), but no other larvae (or other moth stages) were encountered during this trip. Two probable moth traps were encountered on Dauphin Island during the surveys, neither of which contained moths.

*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:*

- MSU personnel surveyed Horn Island and Grand Bay in Mississippi and Dauphin Island in Alabama during March 18-20, and USDA APHIS personnel re-visited the same locations on March 21-24 to select candidate test sites.
- Test sites in both Mississippi and Alabama were selected for remote sensing of all three native cactus species in these two states. Habitats included oyster shell midden islands in Grand Bay, MS, sandy scrub dune habitat on Horn Island, and urban areas on Dauphin Island. USDA-APHIS personnel will fly aerial surveys during April, and MSU and USDA personnel will conduct ground-truthing for vegetation and spectral data.
- *Opuntia* population coordinates obtained from Attala, Copiah, Grenada, Hinds, Holcomb, Kemper, Leflore, Madison, Noxubee, Oktibbeha, Tallahatchie, Warren, Webster, and Winston Counties in Mississippi, Greene County in Arkansas, Butler County in Missouri, and Madison County in Tennessee.

*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:*

- Presentation to Old Waverly Garden Club included discussion of Cactus Moth and need for monitoring ornamental cactus.
- Cactus moth information handed out to public at the Jackson Garden and Patio Show, 11-13 March, in Jackson, MS. Approximately 9,000 attended the show.
- Factsheet, Devil's-tongue [*Opuntia humifusa* (Raf.) Raf.] in Mississippi, peer reviewed and ready for processing for publication and web paging.

*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:*

- Finishing the online submission for the Pricklypear, Visual Observation, and Trap forms.
- Worked on providing search/view capabilities for all three reports.
- Worked on providing verifier capabilities within the system.
- Alpha test of web interface completed.
- Beta test was not completed; it will be performed the first week of April.

*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:*

- Made changes to the database to better accommodate the needs of the system and have been in communications with Ron Weeks (USDA-APHIS) so that ArcPad can match the web forms. Will be meeting with Ron during the first week of April.
- Coordinated ground-truth sampling effort with David Bartels, USDA-APHIS, for aerial survey effort.
- First meeting with Master Gardener Coordinator for Mississippi to discuss issues regarding volunteer participation.

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