



U.S. Geological Survey – MSU Cactus Moth Detection Network

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International *Cactoblastis cactorum* Conference, Phoenix, AZ; 7-10 May 2007

Topics

- MSU / USGS Project
- Cactus Project Components
- Survey Process

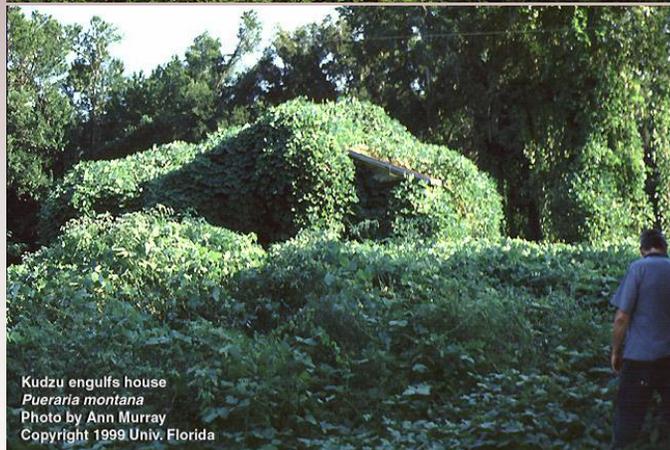


The MSU / USGS Partnership

- Research
 - Management-oriented efforts on invasive aquatic and terrestrial plants and invasive invertebrates
- Extension and Outreach
 - Rapid dissemination of information in a web-based format
- Regional Coordination
 - State and Regional (AL, AR, LA, MS, TN) Invasive Species Groups



Giant salvinia (*Salvinia molesta*)



Kudzu (*Pueraria lobata*)

Partnership Topics

- Invasive Aquatic Plant Research
- Invasive Terrestrial Plant Research
- Invasive Invertebrates:
 - Cactus Moth and Native Cactus Distribution Detection Network
- Extension and Outreach
- Regional Coordination

Project Components

- Targeted research projects
- Early detection and rapid response
- Web-based database development
- eExtension information
- Coordination meetings and workshops



Dr. John Byrd, MSU, discusses cogongrass control techniques with southeastern state and federal agency representatives as part of the first invasives tour

Cactus Moth Detection Network

- Identification of Cactus Moth (Richard Brown)
- Survey for native pricklypear cactus (Victor Maddox)
- Early detection network for cactus moth (Madsen, Maddox, Westbrooks)
- Predictive mapping of pricklypear cactus populations (Gary Ervin)
- Extension publications (John Madsen)
- Web-based database and ArcIMS map (Cliff Abbott and John Madsen)
- Coordination (John Madsen)



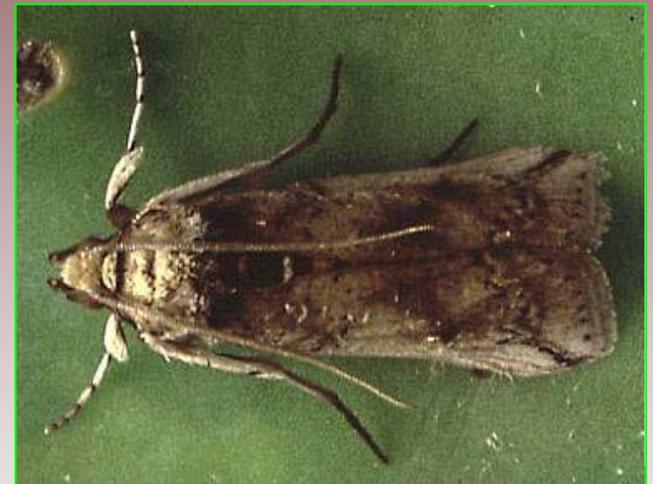
Larvas de *Cactoblastis cactorum*, plaga sudamericana del nopal. Al parecer no está presente en México, **NO DEBE SER INTRODUCIDA!**, ya que puede convertirse en una plaga exterminadora de las especies de nopal más utilizadas por la población mexicana. Si la ves, **REPÓRTALA DE INMEDIATO!** : portillo@cencar.udq.mx (imagen bajada de internet).

<http://www.geocities.com/granacochinilla/fotos02.html>

Identification of Cactus Moth

Richard Brown

- Test, select, and implement cactus moth detection techniques.
- Identification and verification of cactus moth specimens
- Taxonomic methods for moth species



David Habeck, Univ. Florida



Distribution of Native Cactus

Victor Maddox, Gary Ervin

- Locate known populations of cactus in the region
- Predict locations of additional cactus populations
- Utilize public and private land management professionals and volunteers to survey cactus locations in the southeastern region.
- Develop a GIS database of cactus for future searches of cactus moth



Madsen – cactus in a south MS old field



Predictive Mapping of Cactus

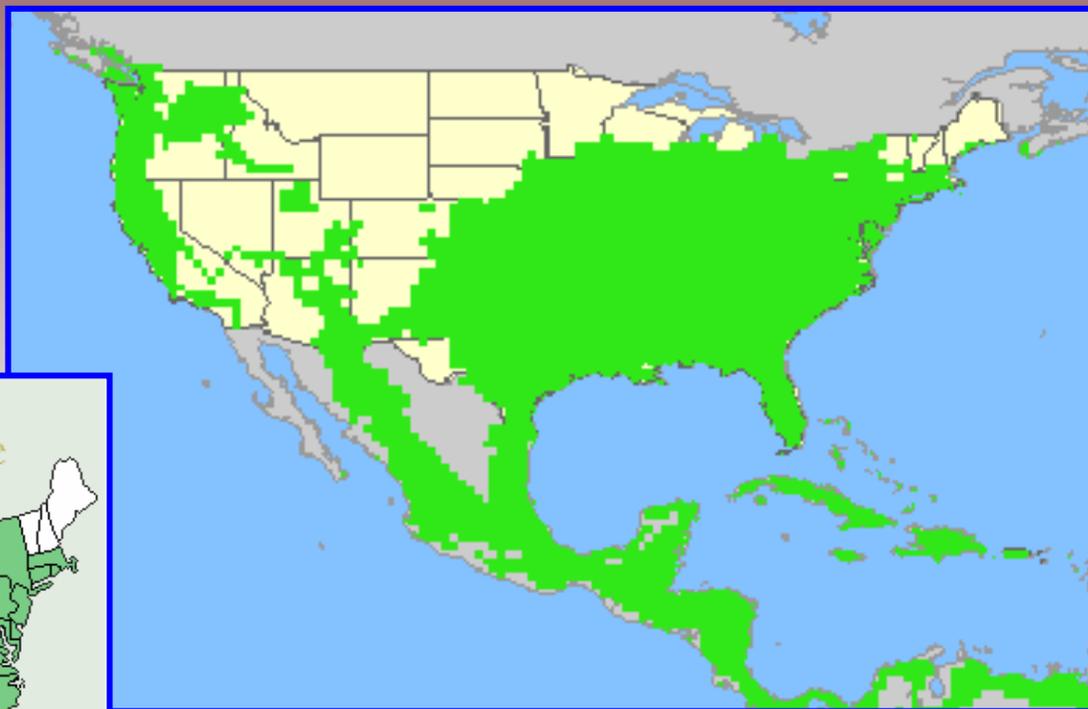
Gary Ervin

- Predictive tools for both pricklypear cactus and cactus moth locations
- GIS models for predicting habitats and ecological range

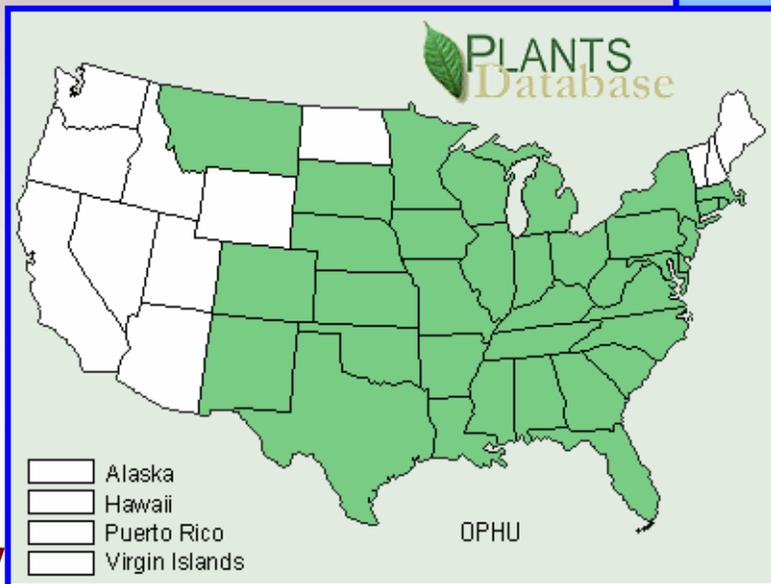




Model results from GARP, using data on: frost frequency, precipitation, max/min temperature, and wet-day frequency



O. humifusa



Early Detection Network for Cactus Moth

John Madsen, Victor Maddox, Randy Westbrook

- Implement a cactus moth detection network in the southeastern region, expanding to nationally
 - Public and private conservancy land managers, state plant inspectors, volunteers (Victor Maddox, Randy Westbrook)
 - Sentinel Sites
 - Citizen observations



David Habeck, Univ. Florida



Cactus Moth and Native Cactus Information

John Madsen

- Web-based educational materials on cactus and the cactus moth
- Instructions to volunteers and cooperators at public and private conservancy lands
- Operational web database for reporting, locating and mapping cactus and cactus moth populations.



Dave Powell – Plains Prickly Pear (www.invasives.org)



Extension and Outreach Information

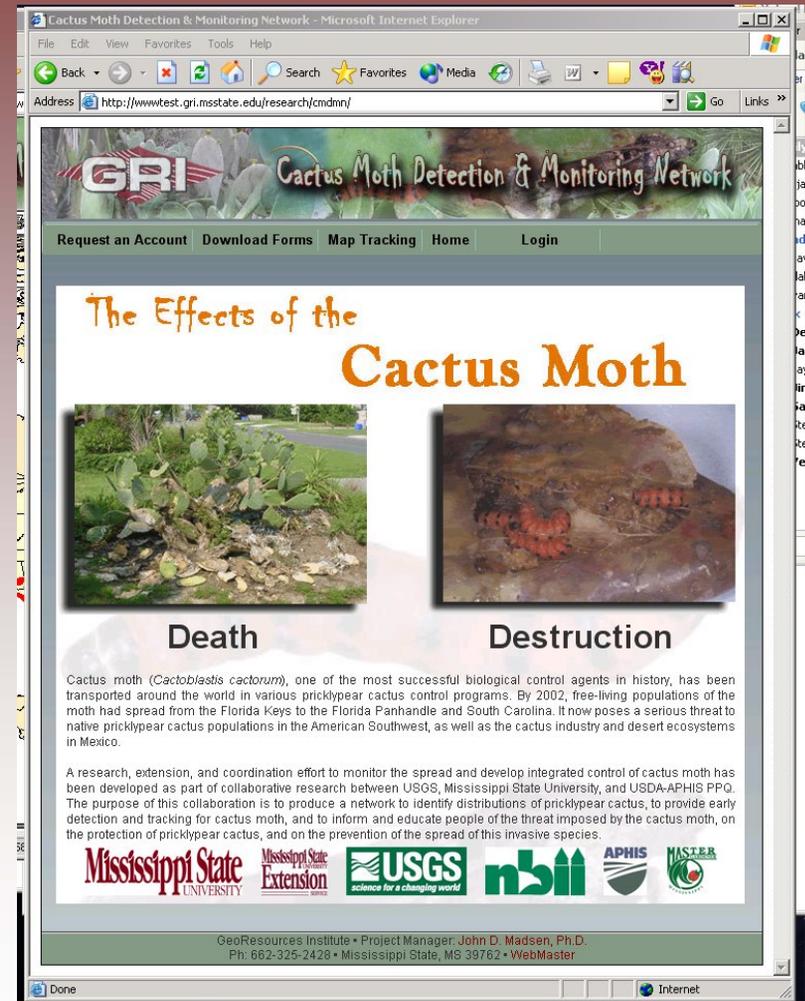


- Fact sheets
- Web blurbs
- Workshops
- Survey manual

MS Master Gardeners learn about cactus moth issues at their 2005 annual training program

Publications

- Publications needed as a “training book” for volunteers, as well as information for public.
- Information available both in printed and web-versions



Cactus Moth Detection & Monitoring Network - Microsoft Internet Explorer

Address: <http://wwwtest.gri.msstate.edu/research/cmdmn/>

The Effects of the Cactus Moth

Death **Destruction**

Cactus moth (*Cactoblastis cactorum*), one of the most successful biological control agents in history, has been transported around the world in various pricklypear 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 pricklypear 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, Mississippi State University, and USDA-APHIS PPQ. The purpose of this collaboration is to produce a network to identify distributions of pricklypear cactus, to provide early detection and tracking for cactus moth, and to inform and educate people of the threat imposed by the cactus moth, on the protection of pricklypear cactus, and on the prevention of the spread of this invasive species.

Mississippi State UNIVERSITY | Mississippi State Extension | USGS science for a changing world | nbit | APHIS | MASTER

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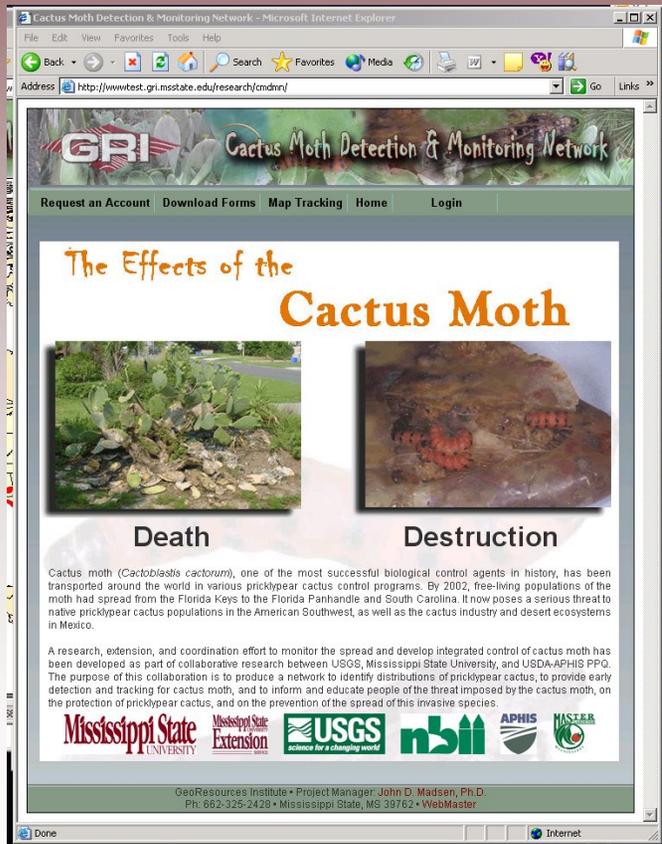


Publications Table

Brochure: The Cactus Moth: An Invading Pest	Richard Brown and Edda Martinez	Completed
Report: Survey Information for the National Cactus Moth (<i>Cactoblastis cactorum</i>) Detection and Monitoring Network	Joel Floyd and John Madsen	Completed
Fact Sheet Early Detection and Reporting of Cactus Moth in the U.S.	R.G. Westbrooks, J.D. Madsen, R.L. Brown	Completed
Handout: Have you seen Opuntia?	Victor Maddox	Completed
Factsheet: Identification of pricklypear cactus	Victor Maddox	Completed
Factsheet: Erect pricklypear cactus	Victor Maddox	Completed
Factsheet: Cockspur pricklypear cactus	Victor Maddox	Completed
Factsheet: Devils Tongue pricklypear cactus	Victor Maddox	Completed
Factsheet: Tuna pricklypear cactus	Victor Maddox	Completed

Web-based Database

Cliff Abbott and John Madsen



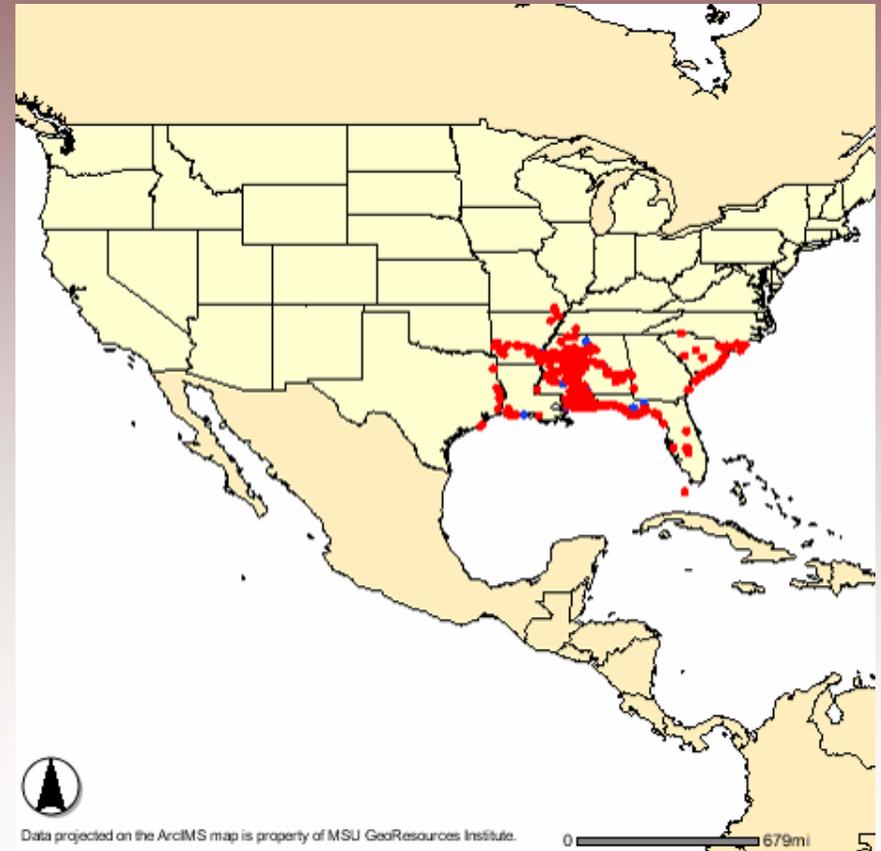
- Information
- Data entry
- Search reports
- Forms
- Arc-IMS map

www.gri.msstate.edu/cactus_moth



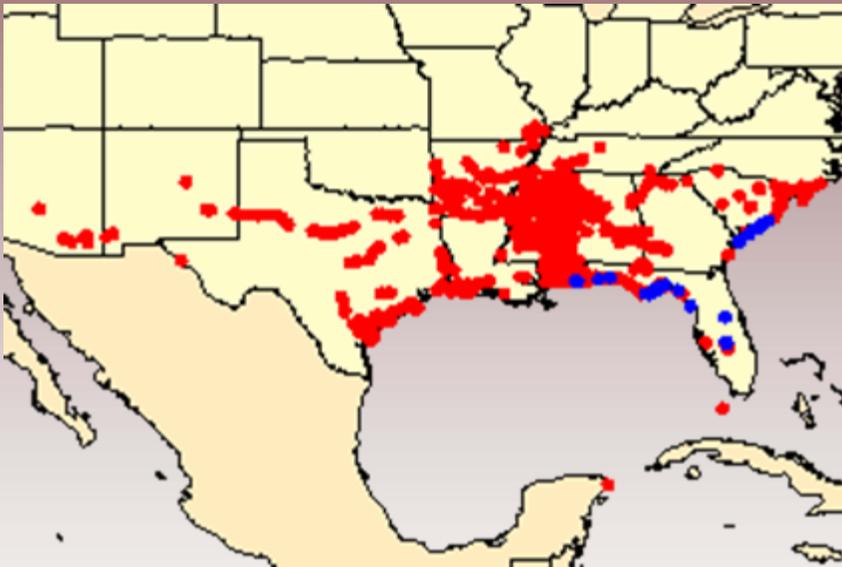
Cactus Moth and Native Cactus Information

- Web-based educational materials on cactus and the cactus moth
- Instructions to volunteers and cooperators at public and private conservancy lands





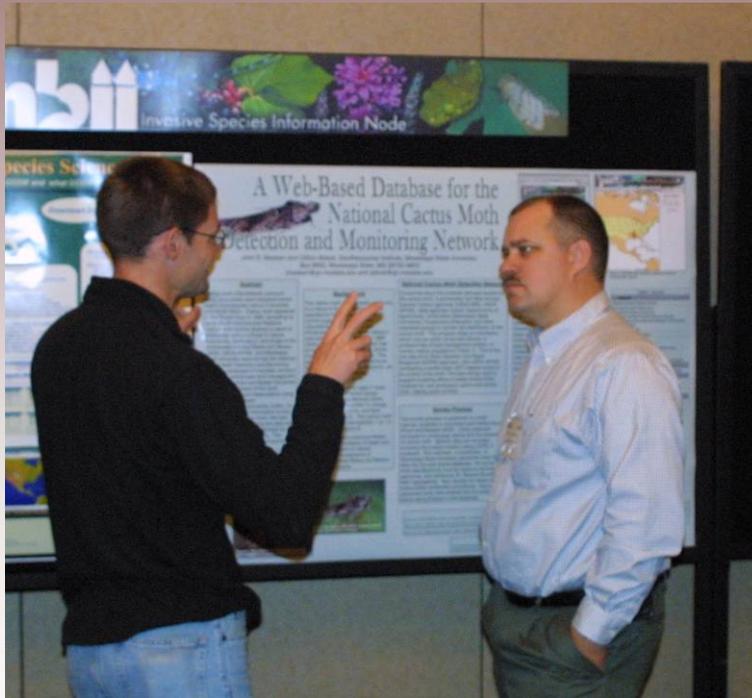
Arc-IMS Map



- Information updated daily
- Location of cactus, cactus moth, sentinel sites

Coordination

John Madsen



Jim Graham and John Madsen discuss databases at NBII All-Node Meeting, Albuquerque, NM

- Monthly cactus moth project updates available on line or by e-mail list
- Annual and interim reports to sponsor
- Meetings
- Invasive Species Working Group of NBII

Cactoblastis Collaboration

National Database and Detection Network

Mississippi State University, GeoResources
Institute (*database development/host
mapping*)

State Departments of Agriculture (CAPS)

USDA

APHIS PPQ- PDMP and CPHST

(Remote sensing, GIS, and database)

ARS

Dept of Interior

US Geological Survey

US Fish & Wildlife Service

US Park Service

Bureau of Land Mgmt

Department of Defense

The Nature Conservancy



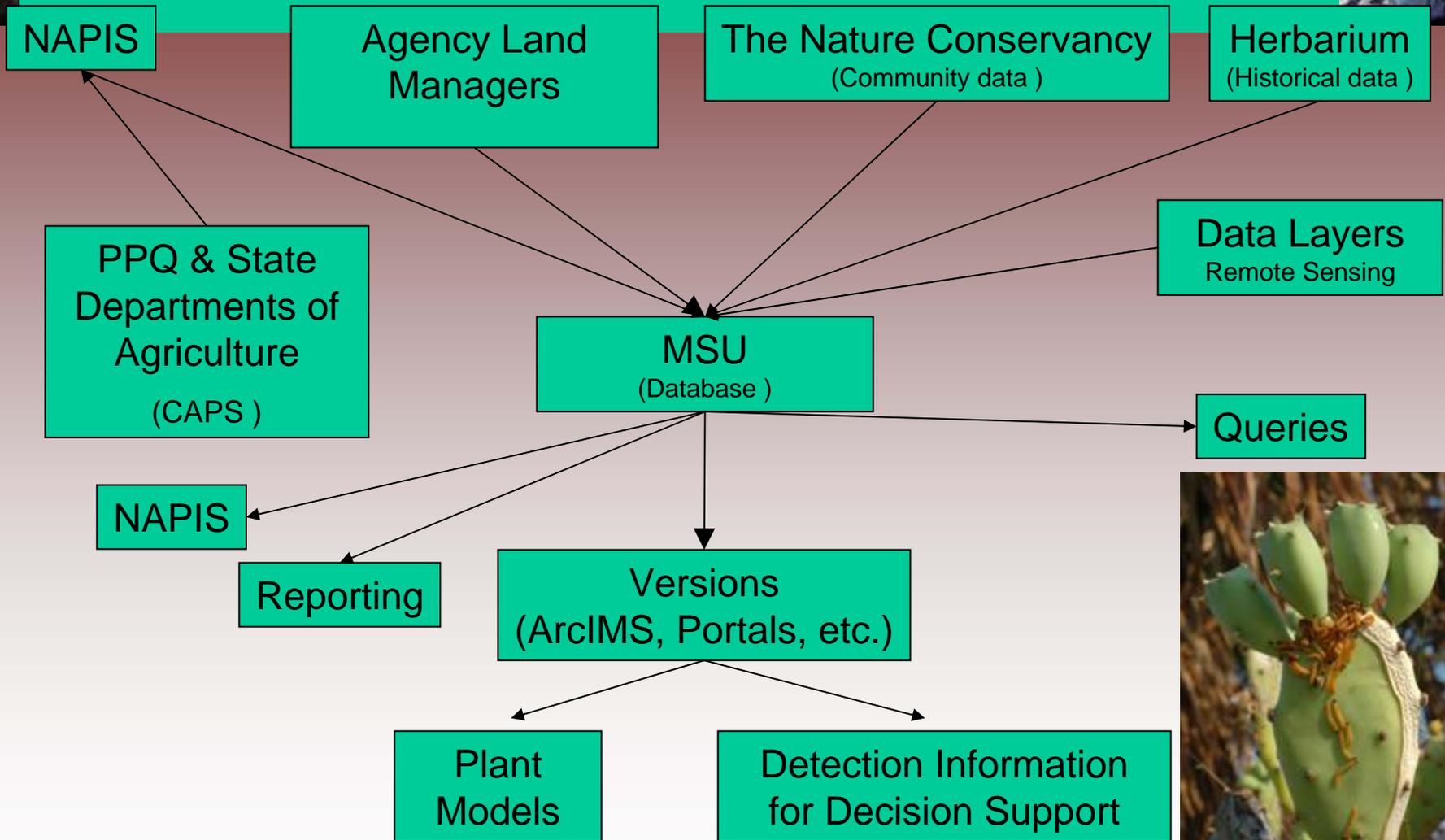
Survey Process



Dr. Richard Brown
verifies a cactus moth specimen

- Survey process provided in a survey manual to volunteers
- Sites are selected and appropriate information collected
- Data entered into webpage
- Cactus and cactus moth specimens verified by experts, as necessary

Data Schematic for Cactus Moth Detection Network





Sentinel Sites

- Sites monitored by team members or volunteers
- Monitor for arrival of cactus moth
- Use either visual observation or traps



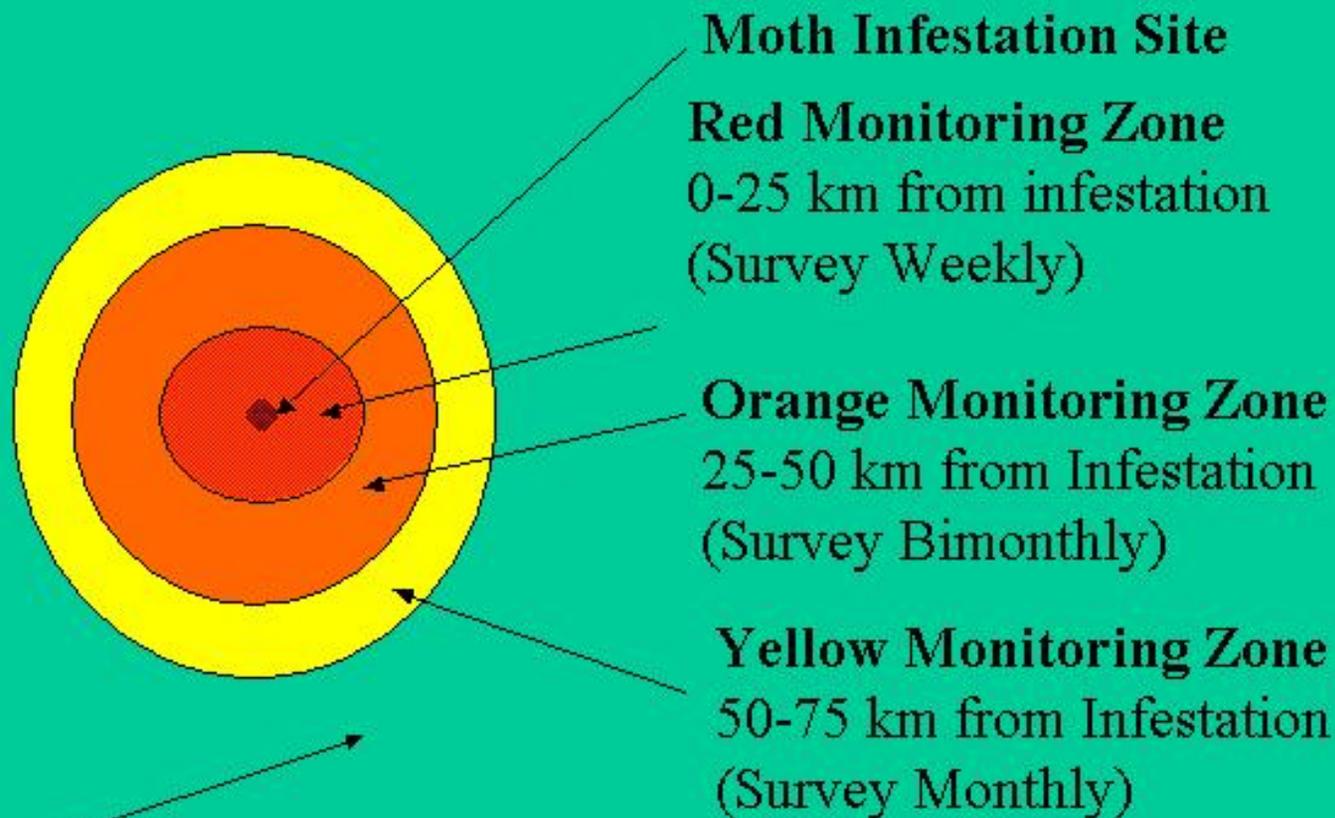
People – state and regional coordination

- Volunteers to collect and enter data
- Groups to “buy in” to the process and use the database
- Grass-roots effort for managing invasives



Chris May of Grand Bay NERR
deploying a cactus moth
pheromone trap

Cactus Moth Survey and Monitoring Protocols for the United States



Green Monitoring Zone - Other designated monitoring sites within the potential ecological range of cactus moth in the United States
(Survey Semi-annually)

Cactus Moth Collaboration: Identification

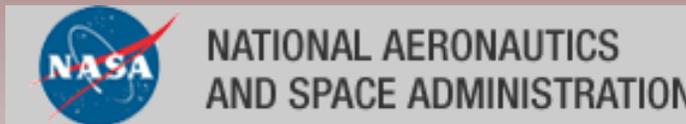
Dr. Richard Brown,
entomologist, MSU
Alma Solis, ARS
Systematic
Entomology
Laboratory,
Smithsonian





Summary

- Facilitate government agencies, NGOs, and citizens to pull together in managing cactus moth
- Provide the best management tools possible based on the biology and ecology of cactus moth
- Develop decision support tools and web-based information to better manage cactus moth
- Provide web-based database access for distribution of pricklypear cactus and cactus moth



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