United States Department of Agriculture
Animal and Plant Health Inspection Service
Program Aid No. 1793

Center for Plant Health Science and Technology National Programs

Survey Detection and Identification

Who We Are

The Center for Plant Health Science and Technology's (CPHST) Survey Detection and Identification (SDI) program provides the "what, when, where, and how" for field survey operations within the Plant Protection and Quarantine (PPQ) branch of the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS). For example, SDI projects determine the top national pest and disease threats with biological background, predict geographic areas of risk, and provide methodologies to detect invasive plant pests and diseases most effectively. All this work furnishes scientific support to regulatory program managers and decisionmakers engaged in strategic planning and deployment of programs within APHIS–PPQ.

New remote-sensing technologies, such as hyperspectral imaging, hold great promise for quickly identifying areas of infestation of plant pests. A CPHST scientist is using a hyperspectral imaging device to validate data obtained from satellite imagery, a process known as "ground truthing."

The SDI mission area provides the scientific underpinning for APHIS–PPQ survey programs to detect and identify plant pest and disease threats rapidly. Early detection of emerging pests and diseases is a critical component for safeguarding plant resources. SDI offers strategy and tactics to policymakers to achieve safeguarding results. APHIS–PPQ fulfills the SDI mission through projects in cooperation with academic institutions, industry, and other government agencies.

CPHST specialists in the SDI unit develop robust diagnostic tools and implement them to optimize identification of quarantine pests, pathogens, weeds, and mollusks.

A delta trap containing a pheromone (sex attractant scent) is being deployed in a wooded area near a high-risk waterway to survey for gypsy moths. Pheromone traps can also be used to kill pests without releasing appreciable amounts of toxicants into sensitive ecosystems.

What We Do

To improve APHIS–PPQ program management, SDI

- Convenes scientific workshops to design, develop, and advance strategies in support of the agency's mission.
- Makes presentations to diverse audiences to enlist support for PPQ goals.
- Develops centers of excellence in spatial technologies to support the survey and management of invasive plant pests.
- Prospects for novel technologies in other fields, such as defense, and adapts them for use in plant protection.
- Works with the CPHST labs to develop more efficient traps, synthesize pheromones, and devise techniques for the early detection of pests and diseases.
- Finds and recruits into CPHST the best scientific talent available.
- Engages the expertise and resources of other agencies in areas of mutual interest that support the PPQ mission.

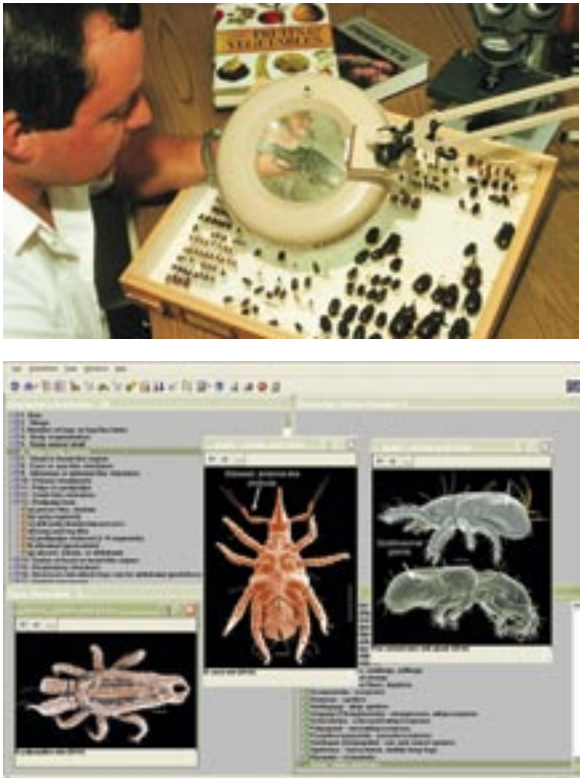
*Mexican fruit fly (*Anastrepha ludens*) is a significant pest of citrus in South Texas and intermittently shows up in South Florida and California.*

Where We Are Going

Congress and policymakers in USDA clearly recognize the urgent need for early detection of plant pests and diseases. Since the 9/11 terrorist attacks, leaders have rapidly increased pest-detection resources. These resources must be used wisely.

Tremendous agricultural, forest, landscape, and environmental resources are at risk from bioterrorism, as well as unintentional pest introductions. CPHST seeks out the best partners from academia, industry, and government who can provide the scientific skills and knowledge to meet the ever-growing challenge to detect and identify destructive, nonnative pests and diseases when they are introduced into the United States and before they become established.

With a pipeline of more than 40 active SDI projects, CPHST is leading the way in protecting American plant resources.



CPHST scientists are developing methods to make the traditionally cumbersome process of identification (top) quicker and more efficient. New screening methods reduce the number of pests sent for identification, and matrix-based, digital, interactive keys (bottom) help identifiers make decisions faster and more accurately.

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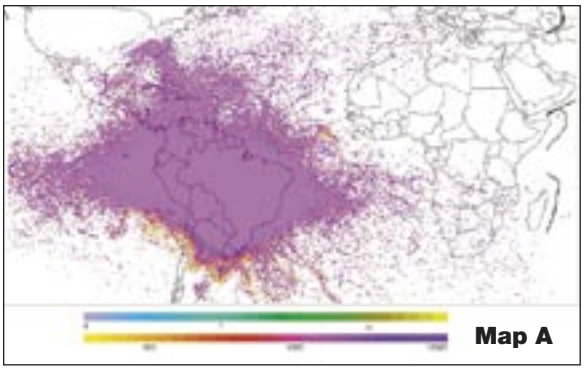

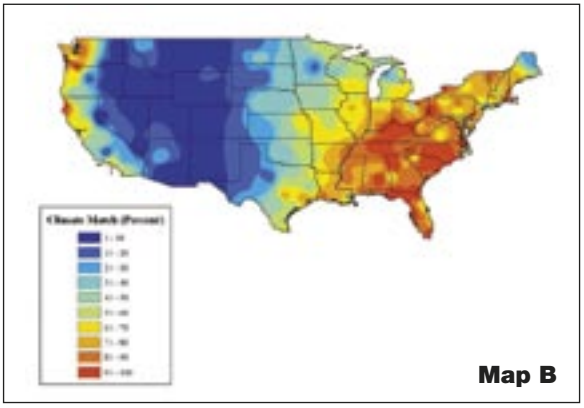

CPHST scientists develop environmental models to predict the potential approach and spread of diseases to and throughout the United States. These models help decision-makers gauge the best possible utilization of resources for survey and early detection as well as eradication and control measures. Map A illustrates the potential worldwide spread of soybean rust spores over a 23-year period. Map B displays the suitable climates for Phytophthora ramorum *(Pr), the fungus that causes the disease commonly referred to in the United States as sudden oak death.*

Cover photo: Chrysomelid beetle adult.

Photo credits: David Evans Walter took the mite photographs shown on the screen-capture from the World Wide Web. All other images are from the APHIS photo collection.

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