



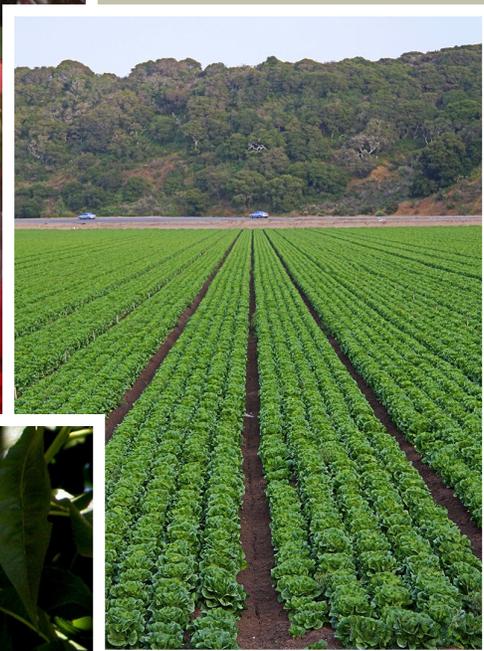
PLANT HEALTH

ANNUAL REPORT



MISSION

"To protect California from the damage caused by the introduction or spread of harmful plant pests."



2010

A C K N O W L E D G E M E N T S

CONTRIBUTORS:

*Permits and Regulations, Pest Exclusion, Pest Detection/Emergency Projects,
Plant Pest Diagnostics Center, Integrated Pest Control,
Office of Pesticide Consultation and Analysis*

EDITED BY:

David Pegos, Special Assistant

PROOFREADING ASSISTANTS:

Austin Webster and Matt Lugo

COMPILED BY:

Lisa Serrano



Robert Leavitt, Ph.D., Director

Phone: 916-654-0317

Fax: 916-651-2900

Website: www.cdfa.ca.gov/plant/ar

PHOTO CREDITS:

Photos on front cover, table of contents and pages 4, 10, 79 and 135: Ed Williams, CDFA

Detection Dog Hawkeye, page 12: Handler Tino Menchaca, Santa Clara County

Japanese Beetle Trap, page 54: Randall Gee

Photo on page 78: Integrated Pest Control Weed Database

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PLANT HEALTH

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T A B L E O F C O N T E N T S

PLANT HEALTH DIVISION.....[4](#)
 MISSION, TACTICAL GOALS, STRATEGIC VISION.....[4](#)
 ADMINISTRATION.....[5](#)
 Office of Pesticide Consultation and Analysis.....[6](#)
 Permits and Regulations.....[8](#)
 The Branches.....[11](#)
PEST EXCLUSION BRANCH.....[13](#)
PEST DETECTION/EMERGENCY PROJECTS BRANCH.....[55](#)
INTEGRATED PEST CONTROL.....[79](#)
PLANT PEST DIAGNOSTICS CENTER.....[115](#)
MAPS.....[135](#)
LIST OF ACRONYMS.....[151](#)



ABOUT THE DIVISION

The California Department of Food and Agriculture's (Department) Plant Health Services Division (Plant) mission is legislatively mandated and clearly articulated within the California Food and Agricultural Code, as follows:

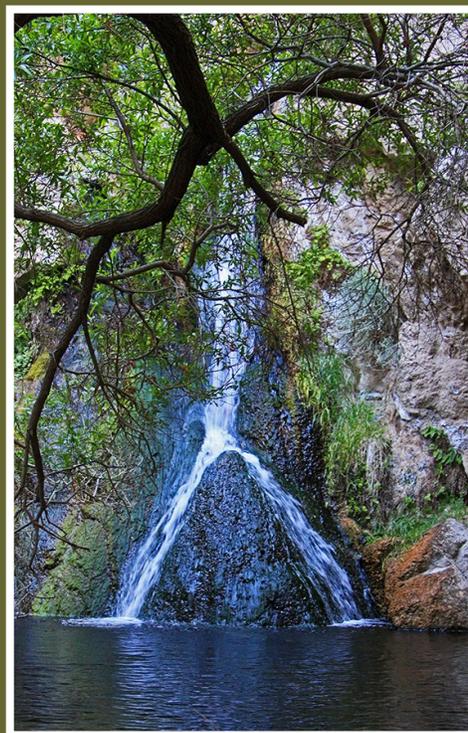
MISSION: *To protect California from the damage caused by the introduction or spread of harmful plant pests.*

The California Legislature, enacting this mandate, also recognizes that pest prevention is uniquely positioned to protect California's urban and natural environments as well as its agriculture. It specifically instructs the Department to protect ornamental and native plantings as well as agricultural crops from the harm caused by exotic pest invasions.

The Plant Division's Administration is charged with carrying out this mission. The Division has translated this mission into the following **Strategic Vision** and **Tactical Goals**. In California, a series of federal and state plant quarantine laws and regulations are enforced to restrict the entry and movement of commodities capable of harboring targeted plant pests and enable our eradication and control efforts. This approach of prohibiting or restricting the movement of plants, plant products or other commodities capable of harboring exotic plant pests is done in the interest of food security. CDFA is the first line of defense of the nation's food system utilizing the principles of integrated pest management, using the latest science

and technology. In this case, the public insurance of a safe and secure supply of food and fiber is based on the premise that it is more economically and environmentally sound to prevent the entry and establishment of dangerous plant pests than to live with them.

STRATEGIC VISION: *To provide leadership of pest prevention and management programs that effectively protect California's agriculture, horticulture, natural resources, and urban environments from invasive plant pests, and protect and ensure quality agricultural crop production.*





TACTICAL GOALS: *To prevent the entry, spread and establishment of invasive plant pests that could be detrimental to the State’s agriculture, public or natural resources by:*

- ◆ *Accurate and timely pest identification*
- ◆ *External and internal exclusion activities designed to prevent pest entry or establishment*
- ◆ *Early detection of plant pests before they become well established*
- ◆ *Timely and effective eradication actions to eliminate new pest infestations*
- ◆ *Control and containment systems for plant pests that have become widely established*
- ◆ *Research, information technology and pest risk analysis systems to assure that the pest prevention program is relevant, scientifically based and continuously improved*
- ◆ *Maintain outreach programs to enlist public support of pest prevention activities through enhanced public awareness and education*
- ◆ *Development of division employees, foster teamwork and a sense of accomplishments, and an enjoyable work place*

The Plant Division’s Administration encourages all branches and personnel to achieve the Division’s Mission, Vision, and Goals while adhering to the following core values:

VALUES:

- ◆ *Leadership: Provide clear direction, guidance and support*
- ◆ *Communication: Open, constructive exchange of ideas, opinions and information*
- ◆ *Decision: Decision-making based on the best available science, technology and common sense*
- ◆ *Team Work: Accomplishing Division goals through the cooperative efforts of each of our employees*
- ◆ *Credibility: A team that maintains the Division as a responsive, accountable and trusted organization*
- ◆ *Development: Maintain a system that develops employees, expands capabilities, acquires and utilizes accurate information and new technologies, while employing innovative pest prevention strategies*

The Plant Division works with national and international partners to achieve its Mission, Vision and Goals; in particular, along with the United States Department of Agriculture (USDA), the Division actively participates in the development of standards for pest prevention under the International Plant Protection Convention. The Division is also a sustaining associate member of the North American Plant Protection Organization (NAPPO), a regional trade organization that develops pest prevention standards for the three country members — the U.S., Canada and Mexico. California industry representatives are active participants in NAPPO panel committees and its Industry Advisory Group.



PLANT HEALTH ANNUAL REPORT

OFFICE OF PESTICIDE CONSULTATION AND ANALYSIS

PROGRAM SUMMARY

Formerly attached to CDFA's executive office, and later part of the Inspection Division, the Office of Pesticide Consultation and Analysis (OPCA) was relocated to the Plant Division in October 2010. OPCA's role is to consult with the Department of Pesticide Regulation (DPR) on new pesticide rulemakings prior to public notice. Such consultation is a statutory obligation instituted in response to CDFA's surrender of its pesticide regulatory authority to the nascent DPR in 1991. The consultation function is supported with a small portion of the pesticide mill assessment that funds DPR, and is implemented via a memorandum of understanding (MOU) between the sister agencies. In carrying out its consultative role, OPCA manages several outside research contracts, primarily with the University of California, which provide a source of unbiased expertise regarding potential regulatory impacts and the viability of pest management alternatives to pesticide chemicals under regulatory pressure.

PRINCIPAL ACTIVITIES IN 2010

METHYL IODIDE REPORT

Following up on CDFA's MOU consultation with DPR in December 2009, in May 2010 UC Davis completed its final report – produced under contract to OPCA – analyzing potential economic effects in the event that the new fumigant methyl iodide was not registered. The report was impressively thorough but ultimately inconclusive, especially given the unknowable future regulatory path of key alternative fumigants such as 1,3-dichloropropene and chloropicrin. DPR's initial MOU consultation notice had been triggered by their initial determination that the risk assessment results might preclude registration, but the Department later decided that it could satisfactorily mitigate the fumigant application risks, and in December 2010 issued its decision allowing methyl iodide to be used in California. That decision has been challenged in a lawsuit by environmental and farmworker groups.

VOC EMULSIFIABLE CONCENTRATE STUDY

During the year another key study – also done under contract to CDFA – neared completion: the UC Cooperative Extension analysis of alternatives to emulsifiable concentrate (EC) pesticides that emit high levels of volatile organic compounds (VOC's) into the atmosphere. This study, initiated in 2007, has been examining the feasibility and cost-effectiveness of EC alternatives in eight major crops: alfalfa, almonds, broccoli, cotton, grapes, lettuce, oranges, and walnuts. By year's end seven of the eight crop analyses had been completed. DPR has acknowledged the study's importance in helping them to meet their emission-reduction goals in a manner that minimizes impacts on production agriculture.

METHYL BROMIDE SUBCHRONIC MOU CONSULTATION

During 2010 DPR also consulted with CDFA on their new regulations governing subchronic (seasonal) exposure to methyl bromide. In the course of that consultation, OPCA identified and communicated to DPR serious fundamental flaws in Cal/EPA's internal economic analysis of the proposed regulation.

METHYL BROMIDE ALTERNATIVES INTERNATIONAL RESEARCH CONFERENCE

During the year OPCA also continued its longstanding service on the Program Committee that sets the agenda for the Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reductions, and continued its financial co-sponsorship of this important event. Last year the



OFFICE OF PESTICIDE CONSULTATION AND ANALYSIS

- *Continued*

conference met in Orlando; this year it will convene in San Diego. Pursuant to the terms of the Montreal Protocol that protects the ozone layer, most remaining methyl bromide uses probably will be eliminated by the year 2015.

DPR SURFACE WATER INITIATIVE

In February 2010, DPR published a preliminary draft set of rules designed to protect surface water from pesticide residues. In the latter half of the year, OPCA's UC Davis regulatory impact analysis contractor conducted preliminary work on an economic analysis of the new rules. The first phase of the economic analysis is slated for completion by the fall of 2011.

DPR CHLOROPICRIN RESTRICTIONS

Late in 2010, DPR placed the ubiquitous fumigant chloropicrin on the Toxic Air Contaminant List. CDFA is one of the agencies DPR has invited to participate in a working group to discuss potential mitigation measures that may be implemented in 2011 and after.

USDA/ARS FUMIGANT EMISSIONS—REDUCTION RESEARCH

In June 2010, USDA/ARS submitted its final report on a multi-year research project (initiated in 2005) devoted to examining methods to reduce fumigant VOC emissions using advance tarp technology in conjunction with water seals and/or organic amendments (e.g., steer manure, ammonium/potassium thiosulfate). While some promising avenues were explored, considerable additional research is needed in this area.

UC DAVIS VOC REACTIVITY STUDY

Under contract to CDFA, the UC Davis Department of Civil & Environmental Engineering initiated a year-long pilot study of pesticide VOC reactivity. The goal is to determine whether practical means may be found to adjust DPR's VOC emissions inventory based on a given pesticide's actual role in causing ozone air pollution, in lieu of the current system which inaccurately assumes that all pesticide emissions contribute equally to ozone formation.

EPA SPECIAL LOCAL NEED REGISTRATIONS

As in previous years, in 2010 OPCA served as the coordinator for renewal of the Department's Section 24(c) Special Local Need registrations used in the Plant Division's pest eradication and quarantine programs.

EPA AGRICULTURAL INITIATIVE GRANT REVIEWS

During the year OPCA assisted EPA Region 9 with the process of reviewing grant proposals under its Agricultural Initiative program that encourages environmentally friendly pest management practices.





PLANT HEALTH ANNUAL REPORT

PERMITS AND REGULATIONS

The permits and regulations program develops all regulations administered by the Plant Health Division and develops associated legally required documents such as notices, statements of reason, orders and certificates of compliance. The Special Assistant serves as regulatory coordinator for the Division and technical staff assistant to the Director.

This program issues state permits involving agricultural pests, approved laboratories, soil and quarantine commodities as authorized under administrative regulations and the Food and Agricultural Code. In addition, this program approves or disapproves applications for federal permits that are issued by the USDA. These permits concern movement into California of foreign and domestic plant pests, foreign soil, foreign postentry quarantine plant material, genetically engineered organisms (biotechnology permits) and foreign plants and plant products normally prohibited (departmental permits) entry into the United States. This is the third year since the USDA implemented its new web-based electronic permitting system (ePermits). The state concurrence process is also handled via the Internet for plant pest, biotechnology, soil, postentry quarantine and departmental permits.

STATE PERMITS

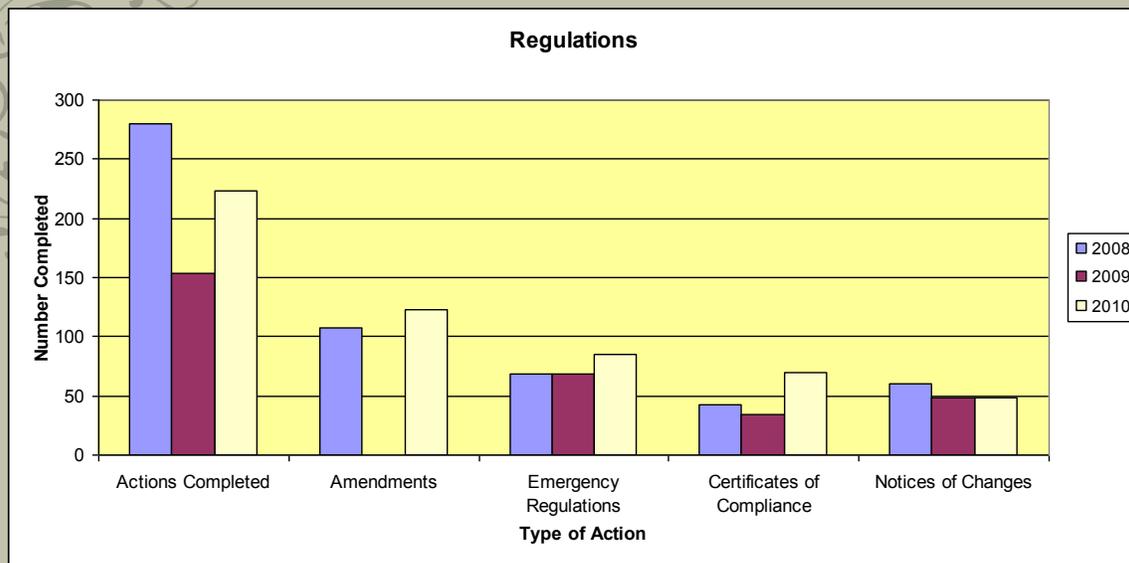
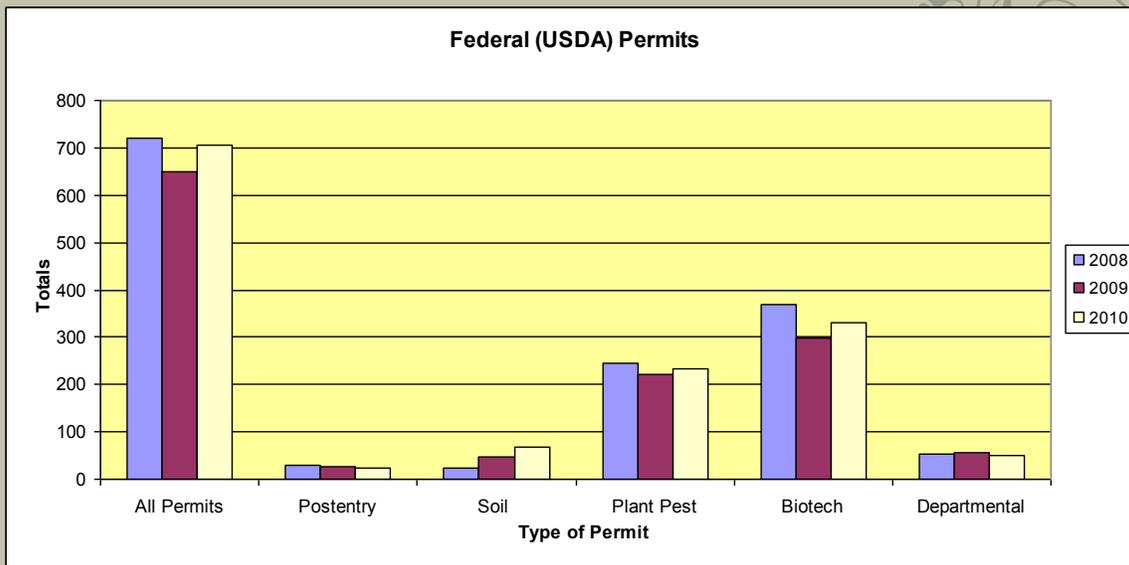
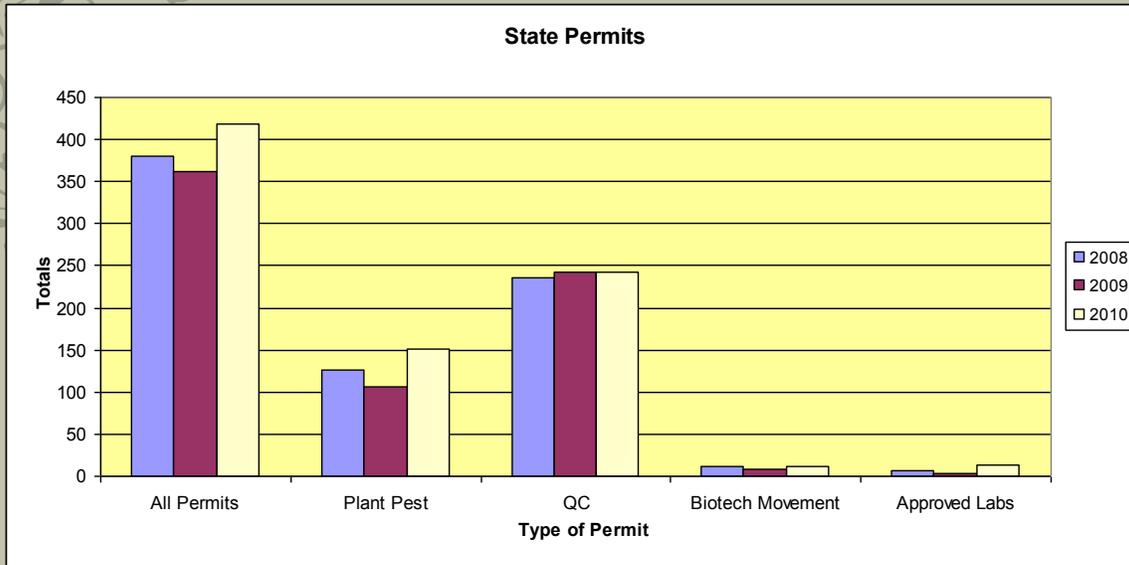
There were 419 state permits issued, consisting of 151 plant pest permits (68 for pathogens and 83 for arthropods), 242 quarantine commodities permits, 12 biotechnology movement authorizations and 14 approved laboratory permits.

FEDERAL (USDA) PERMITS

A total of 705 applications for federal permits were reviewed and processed including 23 postentry quarantine agreements, 68 soil permits, 234 plant pest permits, 331 biotechnology permits and 49 permits for federally prohibited plant material.

REGULATIONS

There were 223 regulatory actions; including 85 emergency regulations, 70 certificates of compliance; 56 notices of changes in the regulation and 12 orders (data not shown).







PLANT HEALTH BRANCHES

PEST EXCLUSION

The Pest Exclusion Branch (PE) is considered the first line of defense. The mission of the PE is to keep exotic agricultural and environmental pests out of the State and to prevent or limit the spread of newly discovered pests within the State. To accomplish this mission, PE has two roles: 1) quarantine regulatory compliance and enforcement and 2) service to the agriculture industry and the public. PE is divided into three program components: Interior Pest Exclusion (enforcement of quarantines, phytosanitary certification of exports), Exterior Pest Exclusion (border protection stations) and Nursery, Seed and Cotton (licensing, pest cleanliness, registration and certification, truth in labeling for seeds and quality cotton).



PEST DETECTION/EMERGENCY PROJECTS

The Pest Detection/Emergency Projects Branch (PD/EP) is responsible for the early detection and prompt eradication of serious exotic agricultural pests. PD/EP accomplishes its mission by conducting a statewide trapping program, staffed by county and state inspectors, for exotic insect pests, by implementing special surveys for significant agricultural pests and plant diseases for which traps are not available and by providing emergency eradication services using the best available technology. PD/EP also operates the CDFA Fruit Fly Rearing Facility, located in Waimanalo, Hawaii, which provides high-quality, sterile Mediterranean fruit flies for eradication projects in California.



INTEGRATED PEST CONTROL

The Integrated Pest Control Branch (IPC) conducts a wide range of pest management and weed eradication projects in cooperation with growers, agricultural commissioners and federal agencies. IPC manages biological control and vertebrate pest management functions. Assessments and fees are collected for some program activities and services. IPC contracts with counties, federal agencies, other California state agencies, research agencies and private businesses for various program components. Activities of five projects are coordinated through recommendations of three boards: Pink Bollworm, Beet Curly Top Virus and Tristeza, and two committees: Noxious Weed Management Oversight Committee and Vertebrate Pest Control Research Advisory Committee.



PLANT PEST DIAGNOSTICS CENTER

The Plant Pest Diagnostics Center (PPD) provides professional plant pest diagnostics support for CDFA's agricultural plant pest prevention regulatory programs, the United States Department of Agriculture, county departments of agriculture, universities, phytosanitary certification of California export products, other state agencies and the general public. PPD consists of five laboratories including: botany, entomology, nematology, plant pathology and seed taxonomy, and germination.







PEST EXCLUSION

About

VISION: *To be a dynamic organization and vital partner in protecting California’s agriculture, citizens, and environment.*

VALUES:

- ◆ *Effective leadership*
- ◆ *Mutual respect, cooperation and communication*
- ◆ *Professionalism and teamwork*
- ◆ *Dependability*
- ◆ *Decision-making using the best available information*
- ◆ *Empowerment and accountability*

BRANCH BACKGROUND:

Pest Exclusion is the cornerstone of the Department’s pest prevention system. The Pest Exclusion Branch is charged with preventing the introduction and spread of damaging and invasive plant pests into California.

TABLE OF CONTENTS

INTERIOR PEST EXCLUSION	15
<i>County High Risk Program</i>	15
<i>USDA Smuggling, Interdiction and Trade Compliance</i>	17
<i>California Dog Team</i>	17
<i>Sudden Oak Death</i>	23
<i>Trade Facilitation</i>	24
<i>Origin Inspection Program</i>	24
<i>Compliance Program</i>	25
<i>Phytosanitary Certification</i>	25
<i>Quarantine Response Program</i>	27
EXTERIOR PEST EXCLUSION	37
NURSERY, SEED AND COTTON	42
<i>Seed Services</i>	50
<i>Quality Cotton Program</i>	52

The primary responsibilities of the Pest Exclusion Branch are to keep serious pests out of the State and to prevent or limit the intrastate spread of newly-discovered pests. The Pest Exclusion Branch is responsible for: exclusion of serious agricultural pests, prevention or delay of the spread of serious pests within the State which have become established or which are being subjected to eradication, suppression or intensive control measures; phytosanitary certification of agricultural commodities for export to other states and foreign countries; assuring that nursery stock meets specified standards; registration and certification of avocado, caneberry, citrus, deciduous fruit and nut trees, garlic, grapevine, seed potato, and strawberry plant nursery stock for farm planting; assuring that seed meets labeled statements as to germination and purity, is free from noxious weed seeds, and properly labeled as to seed treatments if treated; assuring that all cotton grown in the San Joaquin Valley meets criteria established in the Joaquin Valley Quality Cotton Act; coordination of the enforcement of the California Desert Native Plants Act; investigations of agricultural commodity smuggling; and education of the traveling public about California plant quarantine laws.



PEST EXCLUSION BRANCH

KEY HIGHLIGHTS IN 2010:

- ◆ In response to detections of the European Grapevine Moth, emergency quarantines were implemented in portions of nine counties. Quarantine policies, procedures and compliance agreement documents were created and hundreds of grape growers, harvesters, haulers and receivers across the state were able to harvest, transport, and process wine, table and raisin grapes under appropriate safeguards.
- ◆ The Interior Pest Exclusion Program was reorganized into two separate programs due to the return of Light Brown Apple Moth regulatory responsibilities to the Branch and the addition of several new positions to address the increased workload associated with the Dog Teams and the Asian Citrus Psyllid quarantine project. Thus, the Emergency Quarantine Response Program was created from the Interior PE Program in order to focus on European Grapevine Moth, Asian Citrus Psyllid, Light Brown Apple Moth, Red Palm Weevil and exotic fruit fly emergency regulatory response activities statewide.
- ◆ The Asian Citrus Psyllid quarantine expanded into Ventura County and western Riverside County. The protocols for moving bulk citrus out of the quarantine area were revised based upon a review of the risk associated with the movement of incidental leaves and stems along with the fruit.
- ◆ The Dog Team project welcomed 3 new teams for a total of 13 teams in 9 counties while also wishing canines Tassie and Cece a happy and well-deserved retirement.
- ◆ The Nursery Program completed the Grapevine Registration and Certification regulation and continued to work with the citrus nursery industry to refine the Citrus Nursery Stock Cleanliness program regulations.
- ◆ The Border Protection Stations intercepted 3,548 actionable pests, including the Emerald Ash Borer from infested firewood.



INTERIOR PEST EXCLUSION

The Interior Pest Exclusion Program serves the citizens of California by working toward two goals

- ◆ Prevent the introduction and spread of harmful and invasive plant pests
- ◆ Promote market access for California agricultural products

Harmful and invasive exotic pests can directly damage crops by stunting growth, diminish quality, or invade croplands and irrigation systems. Pests can indirectly affect crops by causing unsightly damage that reduces marketability or by restricting exports to countries that impose quarantines on areas where pests are established. To protect California's agricultural interests from these and other consequences of harmful plant pests, the Interior Pest Exclusion Program works to reduce the risk of pests entering the state on infested commodities and spreading within the state from locations already infested.

California agricultural commodities are shipped to domestic and foreign markets worldwide. Agricultural officials representing other states and foreign countries will maintain and/or impose restrictions or prohibitions on California imports if grown in areas where pests of concern are known to occur. By preventing pests into the state of California and limiting their spread within the state, the Interior Pest Exclusion Program protects the worldwide marketability of California-grown commodities.

The activities of the Interior Pest Exclusion Program that are in support of these goals include managing the following programs, issues and services:

- ◆ County High Risk Pest Exclusion Program
- ◆ California Dog Team Program
- ◆ Sudden Oak Death State Interior Quarantine
- ◆ Origin Inspection Program and origin compliance issues
- ◆ Phytosanitary Issues pertaining to exports and domestic shipments
- ◆ Pest Exclusion Training for County Agricultural Commissioners' staff

COUNTY HIGH RISK PROGRAM

The primary task of the Interior Pest Exclusion Program is to manage and administer the County High Risk Pest Exclusion Program (CHRPEP). The CHRPEP is a cooperative program that provides state funds to county agricultural commissioners to conduct high-risk pest exclusion inspections on incoming agricultural shipments. Inspections are conducted at locations such as parcel facilities, air freight terminals and nurseries. Shipments are inspected for the presence of invasive pests including insects, pathogens and weeds.



PLANT HEALTH ANNUAL REPORT

The CHRPEP is a vital component in the State's overall pest prevention efforts and is a crucial part of CDFA's mission to:

- ◆ Ensure agricultural products entering California are pest free and able to be distributed to consumers
- ◆ Protect agriculture and the environment from the threat of newly-introduced pests

The CHRPEP was first established in December 1998 by urgency legislation, Senate Bill 2062, Rogers (Chapter 635, Statutes of 1996), known as "the Roger's Bill," to augment funding for counties to perform inspections on incoming shipments at the destination (terminal) points.

A study found that conducting a statewide County High Risk Pest Exclusion Program at optimal levels would cost approximately \$14 million per year. In 1998, Section 2282.5 of the Food and Agricultural Code and a state budget augmentation provided the county agricultural commissioners with the funding to conduct the optimal level program. However, in Fiscal Year (FY) 2002/03, the annual funding for the program was reduced to \$5.5 million, paid out of CDFA's funds.

The Interior Pest Exclusion Program administers the funds allocated to the counties for the inspection activities. In FY 2009/10, \$5,500,000 was disbursed to 43 counties. Funding for each county varied based on volume of shipments and the method of delivery (air freight, truck, parcel, etc.) of shipments into each county. In FY 2009/10, funding was provided for counties to conduct inspections of parcel facilities, airfreight, nursery stock and beehives from red imported fire ant (RIFA) infested areas.

The Interior Pest Exclusion Program provides oversight in the form of weekly and monthly monitoring of all pest interceptions and provides guidance pertaining to the disposition of pest-infested shipments. In 2010, approximately 600 shipments were rejected because of the presence of A- and Q-rated pests. The pests included snails, scale insects, whiteflies, beetles, thrips, weeds and various pathogens. Infested shipments included commodities, such as ornamental and dormant, bare-root nursery stock, fruit and vegetables, cut flowers and other ornamental plant products, seeds and beehives.

Additionally, over 1,800 shipments of foreign and domestic origin plant material were found to be in violation of state and/or federal plant quarantine regulations and were rejected. The origins of the rejected shipments included Mexico, Florida, Hawaii, Colombia, Thailand, Costa Rica, Oregon, Michigan, Alabama, Guatemala, Texas, Australia, North Carolina, Canada, Brazil, Singapore and the Dominican Republic.

PLANT HEALTH ANNUAL REPORT



UNITED STATES DEPARTMENT OF AGRICULTURE / SMUGGLING, INTERDICTION AND TRADE COMPLIANCE (USDA/SITC) PROGRAM

The Interior Pest Exclusion Program reports interceptions involving federal quarantine violations and/or pest finds of federal concern to the USDA/SITC program. The USDA/SITC program will determine which interceptions reported to them result in further actions or investigations on their part. The Interior Pest Exclusion Program encourages communication from the USDA/SITC program regarding their follow-up actions and investigations.

In 2010, a total of 11 interceptions were reported to USDA/SITC, including:

- ◆ Prohibited citrus plants from Georgia and Florida
- ◆ Prohibited rooted lemongrass from India
- ◆ Federal noxious weed *Hygrophila polysperma*
- ◆ Uncertified foreign fruit at swap meets

CALIFORNIA DOG TEAMS

The purpose of the California Dog Teams is to enhance inspection and surveillance activities related to plant products entering the state of California via parcel delivery facilities and airfreight terminals.

During 2010, California Dog Teams operated out of Contra Costa, Fresno, Los Angeles, Sacramento, San Bernardino, San Diego and Santa Clara counties and continued to intercept prohibited and regulated plant material entering California via unmarked parcels.

In October 2010, Alameda, San Joaquin and San Bernardino counties sent a total of three handlers to a 10-week training course at the National Detector Dog Training Center (NDDTC) in Georgia. All three handlers successfully completed training and graduated in December 2010. Additionally, experienced handlers from Sacramento and San Bernardino counties returned to the NDDTC to train with and receive new dogs after their previous dogs had retired.

By the end of 2010, there were a total of 13 teams operating out of 9 counties in California.

Each Dog Team is trained to inspect unmarked agricultural parcels to detect the presence of any unwanted plant pests including insect species, diseases or other harmful organisms that may pose a threat to the economic well-being of the state. Currently, California Dog Teams conduct inspections at UPS, FedEx, DHL and other private parcel carriers in Alameda, Butte, Contra Costa, Fresno, Imperial, Kern, Marin, Napa, Monterey, Placer, Riverside, Sacramento, San Benito, San Bernardino, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Solano, Sonoma, Sutter and Yuba counties.

The California Dog Teams have demonstrated that unmarked parcels present a high-risk pathway for harmful pests to enter California. In 2010, the California Dog Teams intercepted 1,708 unmarked



PLANT HEALTH ANNUAL REPORT

packages containing plant material, from which 48 pest interceptions were made which included 6 actionable A-rated and 42 Q-rated pests. Types of pests intercepted included a fruit fly larva, scale pests, ants, beetles, mealybugs and noxious weeds.

A summary of Dog Team pest interceptions during 2010 is shown in the tables below.

2010 DOG TEAM PEST INTERCEPTIONS

Unmarked Packages	1,708
Number of Actionable Pest Interceptions (A-and Q-Rated)	48
Number of Actionable Species	33

Number of	Scientific Name	Common Name	Origin	Rating
1	<i>Ceroplastes floridensis</i>	Florida Wax Scale	LA	A
2	<i>Pseudaulacaspis cockerelli</i>	Magnolia White Scale		A
1	<i>Carduus nutans</i>	Musk Thistle	Greece	A
1	<i>Clavaspis herculeana</i>	Herclueana Scale	HI	A
1	<i>Howardia biclavis</i>	Mining Scale	FL	A
1		Insect eggs	FL	Q
1	<i>Agallia sp.</i>	Leafhopper	HI	Q
4	APHIDIDAE		HI, FL WA	Q
1	CICADELLIDAE		HI	Q
1	<i>Clepsis melaleucana</i>	Leafroller	NV	Q
1	COCCIDAE		HI	Q
2	DIASPIDIDAE		HI	Q
1	GELECHIIDAE		HI	Q
1	GRACILLARIIDAE		FL	Q
1	GRYLLIDAE		FL	Q
1	Isoptera		HI	Q
1	<i>Kallitaxila granulata</i>	Planthopper	HI	Q
1	<i>Lagocheirus sp. (or near)</i>	Longhorned Beetle	HI	Q
1	<i>Leucaena sp.</i>		MX	Q
1	Papaveraceae		MX	Q
1	<i>Pheidole megacephala</i>	Bigheaded Ant	HI	Q
4	<i>Pheidole sp.</i>	Ant	HI, FL, AZ	Q
1	possibly <i>Trioza anceps</i>	Avocado Gall Psyllid	MX	Q
1	<i>Prococcus acutissimus</i>	Slender Soft Scale	HI	Q
3	PSEUDOCOCCIDAE		HI	Q
1	<i>Pseudococcus elisae</i>	Exotic Mealybug	HI	Q
1	<i>Pseudococcus jackbeardsleyi</i>	Mealybug	CA	Q
1	<i>Pseudococcus lycopodii</i>	Club Moss Mealybug	HI	Q
5	<i>Technomyrmex albipes</i>	Ant	HI, FL	Q
1	<i>Technomyrmex sp.</i>	Ant	HI	Q
1	TEPHRITIDAE	Fruit fly larva	HI	Q
2	THRIPIDAE	larva	FL, AZ	Q
1	VERONICELLIDAE		HI	Q



EXAMPLES OF SIGNIFICANT CALIFORNIA
DOG TEAM PEST INTERCEPTIONS

March 5, 2010. At the FedEx in Santa Fe Springs, Ebony, a black Labrador mix who graduated in December 2009 from the NDDTC, responded to an unmarked box sent from Arizona. Inspector Truong and supervisor Carmen Rieger



Ebony

opened the unmarked box and found it contained dandelion greens, bok choy, dill, green lettuce and parsley. The shipment was held and inspected. The mixed vegetables appeared home grown and contained ants, aphids, mites, slugs, springtails,

wasps and moths. One of the insects was a big-headed ant (*Pheidole sp.*) which is a Q-rated pest. The shipment's contents were destroyed by freezing.



Inspector Hung Truong and Ebony



Ebony

April 30, 2010. Jeremy Partch, San Diego County Dog Handler and his dog Friday, along with the help of assisting inspector Nick Basinski, intercepted a nursery shipment from Top Tropicals Botanical Garden and Nursery in Florida. The shipment was intercepted at UPS San Marcos and found to have violated Master Permit QC 390 for Florida Nursery Stock. In order to meet the quarantine requirements, the plant species in the shipment should have been on the Florida Department of Agriculture and Consumer Services approved nurseries list.

Since these Florida plants were not approved to be shipped under Master Permit QC 390 and were not accompanied by an original phytosanitary certificate, they violated California Code of Regulations 3271 (Burrowing and

Reniform Nematode) and the federal quarantine for imported fire ant (7 CFR 301.81). The plants were also in violation for not having proper markings under California Food and Agricultural Code Section 6421.

A shipment from this nursery was rejected for the same reasons in November 2009, but with different plant species.

The plants were sampled and Q-rated aphids were confirmed. The shipment was rejected and destroyed.

May 12, 2010. Contra Costa County dog team Mariah Slusser and Bart were working at the Santa Clara post office. As reported from Contra Costa County, the team pulled a suspect package originating from an



Packages/plants from shipping nursery



PLANT HEALTH ANNUAL REPORT

address in Greece addressed to a resident in San Jose, California. The recipient was contacted and permission was given to inspect the package. The inspection revealed loose plant cuttings in the package with what appeared to be numerous seed heads or flowers and a separate zip lock bag containing what appeared to be thistle heads and seeds. The recipient [reported that the] plant cuttings were intended as an herbal medicinal remedy.

The thistle was determined to be an A-rated weed species, *Carduus nutans* (Musk Thistle) and the other plant material was determined to be *Urtica urens*, a Z-rated weed species already present in California. The plant material was destroyed and letters in the package were forwarded in another package due to numerous seeds present in the original packaging.

In March, both Contra Costa dog teams began working out of the San Jose USPS facility located in Santa Clara County as part of a pilot program to detect and inspect unmarked packages (including first class and priority express) of plant material for pests shipped through the USPS. This is the first detection of an actionable pest in this pilot program.

May 25, 2010. San Bernardino Dog Team Mike Cochrane and CC intercepted an unmarked private-party-to-private-party shipment from Hawaii. The box was found already inside a truck at the FedEx facility in Ontario, California. It contained four leis, one garland made from alyxia leaves and two wedding bands. The leis and wedding bands were pest free, but a live larva was found by Mike and Keri Vigil on the alyxia. The leis and bands were released and the garland was held pending lab identification.

The ID of the Q-rated Tephritidae larva resulted in destruction of the garland.



Tephritidae Larvae

June 16, 2010. Sacramento's Dog Team (Jennifer and Tassie) intercepted an unmarked package from Mexico. Sacramento County reported that there was undeclared plant material (no surface pests) and some unidentified (putrid) meat along with some clothing and prepared food (mole, tortillas, etc.). The box appeared to have been opened by the U.S. Customs and Border Protection, as there was customs tape closing the bottom of the box.

The Sacramento County inspector confiscated the plant and animal material, and FedEx held the remaining items. The lab determined that the package contained a Q-rated Psyllid (avocado gall psyllid, possibly *Trioza anceps*), Q-rated *Leucaena sp.* and Q-rated Papaveraceae.

The SITC officer determined that none of the items in the package were federally actionable; however, since the package contained three Q-rated pests and did not have the correct markings, the material was destroyed.

July 30, 2010. While working at the San Marcos UPS facility, San Diego Dog Team Ted Olsen (handler), Greg Terhall (inspector) and Drake (detector dog) intercepted an unmarked package containing plumeria cuttings from Hawaii.

Samples submitted to the lab confirmed A-rated magnolia white scale, the first A-rated pest detected by this team! No doubt this A-rated find is the first of many more to come.



Avocado Gall



August 18, 2010. San Diego Agricultural K-9 Team, Jeremy Partch and Friday, along with Agricultural Inspector Narriman McNair, came upon four properly-marked boxes of Hawaiian plant material coming down a belt in the FedEx Carlsbad terminal. Senior Agricultural Inspector Partch recommended a random inspection of the plants to ensure that they met cleanliness standards. Upon opening the first box, Agricultural Inspector McNair quickly found a live slug crawling on one of the plants. Subsequently, all of the boxes were blue-tagged for a more thorough examination at the destination nursery. The next day, McNair performed a detailed inspection which produced four additional insect submissions. The final yield of this inspection was one Q-rated slug, Veronicellidae, found on *Heliconia sp.*, and two Q-rated mealybugs, Pseudococcidae, found on *Nephelium lappaceum* and *Rollinia deliciosa*.

The shipment was destroyed under Food and Agricultural Code, Section 6461.5 for presence of live pests.

August 24, 2010. A shipment of leis from Hawaii was intercepted at FedEx Santa Clara by Agricultural Inspector Jennifer Gracy, along with Santa Clara dog handler Tino Menchaca and his dog Hawkeye. 'This was a very emotional incident as the leis were sent as a special surprise for the shipper's mother's 80th birthday and "her final wish." Much (1/2 an hour) pleading and crying was involved from both sisters involved (shipper and receiver); however, we had no choice but to hold the leis until lab determinations could be made on the multiple insect samples submitted.' Q-rated ants, *Technomyrmex albipes*, were identified.



The county kindly e-mailed pictures of the leis to the receiver so her mother was able to see the beautiful leis her daughters had arranged for her birthday.

The shipment was destroyed under Food and Agricultural Codes, for presence of live pests (Section 6461.5) and for improper markings (Section 6421).

SAN BERNARDINO CANINE CC RETIRES

July 2010. The National Detector Dog Training Center recommended the retirement of San Bernardino County dog CC, due to a medical condition. Luckily for CC, her handler Mike Cochrane was willing and able to adopt her. Handlers are always given the first opportunity to adopt their partners at retirement. CC's medical condition requires her to be on medication for the rest of her life. Hats off to Mike for committing to her care!

CC's illustrious career includes the detection of parcels that contained 14 A-rated and 69 Q-rated pests. Beginning in February 2007, Mike and CC conducted parcel inspections at various parcel facilities throughout the Inland Empire Area.



PLANT HEALTH ANNUAL REPORT

One of the highlights of CC's career occurred in 2007. The team intercepted multiple parcels containing concealed Indian mangos, a host of Oriental fruit fly and other significant pests. The interceptions resulted in a nationwide alert, identified an international smuggling pathway, and resulted in a large fine against the shipping company.

The team has averaged 300+ parcel finds per year containing prohibited or restricted plant or animal material. The ability of CC to accurately identify unmarked parcels containing agricultural products has averaged 91.67% between 2007-2010.

Enjoy retirement and thanks for doing a doggone good job CC!

SACRAMENTO CANINE TASSIE RETIRES



Jennifer Berger and Tassie

November 2010. Sacramento County dog Tassie, or Tass Master 2000 as her handler lovingly refers to her, was retired. All dogs in the California Dog Team Program are required to retire by age nine. Miss Tassie has reached that mark and will soon sail into retirement.

Tassie's lengthy resume tops that of some seasoned human inspectors. Tassie has not only worked for CDFA's California Dog Program but also worked for the U.S. Customs and Border Protection and USDA's Plant Protection and Quarantine for programs, including Giant African Snail and Citrus Canker.

Unfortunately, Jennifer Berger, Tassie's current handler, does not have first

crack at adopting Tassie. Priority is given to Tassie's previous handlers. Jennifer is currently working with the National Detector Dog Training Center to determine which lucky handler gets the honor of taking Tassie home.

Among Tassie's many alerts on packages containing plant material infested with actionable pests, her claim to California fame is her detection of an unmarked package from Texas found infested with the Asian citrus psyllid (ACP). The ACP has been a pest high on the radar for the California citrus industry. Tassie's alert on this package prevented the introduction of ACP into the Sacramento area.

Jennifer and Tassie began working together in April 2009. During the 18 months they operated together, Tassie alerted on over 10,000 packages (marked and unmarked) containing plant material and accurately identified unmarked parcels containing agricultural products at a staggering average of 95.25% of the time.

Thanks for making California your last post Tassie! Happy tails to you in retirement!

Tassie hams it up with Secretary of Agriculture, A.G. Kawamura





SUDDEN OAK DEATH (*PHYTOPHTHORA RAMORUM*)

Interior Pest Exclusion has a lead role in administering the Cooperative *Phytophthora ramorum* Quarantine Project. The project is a cooperative effort between state, federal and county agencies for the purpose of enforcing state and federal regulations for *P. ramorum*, the causal agent of sudden oak death (SOD). Interior Pest Exclusion oversees the compliance agreements for the regulated establishments in both quarantine counties (where the pathogen is known to occur in the environment) and in regulated counties, which includes all other counties in the state. Listed below are the types of compliance agreements that were issued and/or monitored in 2010.

NUMBER OF BUSINESSES REGULATED FOR *P. RAMORUM* IN 2010

Counties	Regulated Business	Count
Quarantined	Nursery Stock/Soil of Nursery Stock	231
	Wood and Wood Products	30
	Greenery, Garland and Wreaths	13
	Green Waste Facility/Transporter	168
	Compost Facility	15
	Tree Farm	14
Regulated	Nurseries that ship host material	403
	Nurseries that only ship non-host material	1463
Total		2,337

As a component of the enforcement of the *P. ramorum* state and federal quarantines, nurseries are surveyed annually and samples are collected to test for the presence of *P. ramorum*. Surveys are also conducted at source nurseries (trace back) or destination nurseries (trace forward) as part of the investigation process when *P. ramorum* is detected. In 2010, a total of 2,097 nurseries were surveyed. The pathogen was detected at seven of the surveyed nurseries (see table below).

INTERIOR PEST EXCLUSION ACTIVITIES AT NURSERIES WHERE *P. RAMORUM* WAS DETECTED

Survey type	Quarantined Counties	Regulated Counties	Total
Compliance Agreement	2	2	4
Nursery Stock Cleanliness	0	0	0
Trace Forward	0	0	0
Other/Trace Back	2	1	3
Total	4	3	7



PLANT HEALTH ANNUAL REPORT

Following the detection of *P. ramorum* in a nursery, eradication is initiated by implementing the Federal (United States Department of Agriculture, Animal and Plant Health Inspection Service) Confirmed Nursery Protocol for *P. ramorum*, including the issuance of quarantine hold, delimitation survey, trace forward and trace back investigations and destruction of infected plant(s).

During 2010, over 18,418 samples were collected from nurseries for all purposes (annual compliance sampling and trace forward/trace back investigations). All samples were tested for *P. ramorum* at CDFA's Plant Pest Diagnostics Laboratory. *P. ramorum* was detected in less than one percent (or 28) of the total samples. Approximately 85 percent of the detections in nursery samples were taken from one plant type, *Camellia* spp. Other *P. ramorum*-positive nursery stock included species of the genera *Osmanthus*, *Rhododendron*, *Pieri*, and *Trachelospermum*.

TRADE FACILITATION

Interior Pest Exclusion administers the Origin Inspection Program and works cooperatively with agricultural officials in other states to develop compliance programs to facilitate the delivery of domestic and foreign origin commodities to California. These activities reduce the inspection workload of the Border Protection Stations and the County Agricultural Commissioners by communicating entry requirements and pest concerns to agricultural officials in the states' of origin and developing inspection procedures at origin to ensure pest-free shipments.

ORIGIN INSPECTION PROGRAM (OIP)

In 2010, 149 shippers in 11 states participated in the OIP. The commodities covered under the OIP

State	OIP Participants
Arizona	2
Colorado	1
Florida	2
Hawaii	28
Mississippi	1
Nevada	4
New Mexico	2
Ohio	1
Oregon	63
Utah	1
Washington	49
Total	154



include fruits and vegetables, cut flowers and cut greens, canola pellets, bulbs, seeds, grass sod and nursery stock.

Ongoing negotiations with other regulatory agencies are required, as shippers request new commodities to be included in the OIP.

COMPLIANCE PROGRAM

The Interior Pest Exclusion Program works with agricultural officials in other states to develop certification and inspection procedures that will meet California entry requirements. In 2010, the Interior Pest Exclusion Program worked with agricultural officials in 21 states (Alabama, Arizona, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Louisiana, Montana, New Mexico, Nevada, New York, North Carolina, North Dakota, Ohio, Oregon, Texas, Utah, Washington and Virginia) to develop certification and inspection procedures for nursery stock, cut flowers, bulk produce and fresh fruit gift packages.

PHYTOSANITARY CERTIFICATION ASSISTANCE

Phytosanitary certification is a service provided to industry to meet the plant quarantine requirements of foreign countries, other states or California's own interior quarantines. This service helps facilitate domestic and foreign trade in agricultural commodities. The Interior Pest Exclusion Program supports phytosanitary certification activities by:

- ◆ Working with the USDA, Animal and Plant Health Inspection Service to administer the Federal Phytosanitary Program and resolve phytosanitary issues involving California exports.
- ◆ Working with agriculture officials in other states and with the County Agricultural Commissioners and their staff to ensure domestically shipped commodities meet the requirements of other states.



PLANT HEALTH ANNUAL REPORT

The following table lists the major issues that the Interior Program staff assisted with in 2010:

Phytosanitary Issue	CDFA Activity
Oranges to South Korea	Assisted with review of the <i>Septora citri</i> treatment program.
Nursery stock to Canada and domestic markets	Assisted with implementation of snail free nursery operations and administered the Snail Free Master Permit Program to facilitate shipments to Canada and states with snail regulations.
Stone fruit to Mexico	Assisted with pre-season audits and site visits to review trap and lure placement in groves for Oriental fruit moth. Acted as liaison with county, federal and industry partners.
Citrus shipments to Australia	Assisted with approval of facilities authorized to ship to Australia and assisted stakeholders in implementing pre-clearance program requirements, especially for Asian Citrus Psyllid.
Table grape shipments to New Zealand	Assisted with work plan review and implementation of new cold storage requirements for <i>Drosophila suzukii</i> .
Moving and exporting microorganisms used for agricultural purposes to enhance plant growth	Assisted industry to outline procedural steps for the movement of permitted material. Information from the International Plant Protection Convention was provided.
Implementation of the United States Greenhouse Certification Program (USGCP)	Collaborated with USDA and counties to implement the USGCP Program at selected nursery facilities to enable shipments of low-risk commodities to Canada.
Blueberry plant shipments to Michigan, Oregon and Washington State	Assisted industry to formulate a standardized shipping protocol to address blueberry scorch virus.
Phytosanitary Certificate Issuance and Tracking (PCIT) user fees for plants and plant products	Collaborated with the USDA and the counties to implement the new fee structure incorporated into the PCIT system in California.
Hay shipments to China	Assisted with evaluations to ensure approved facilities are in compliance with work plan protocols.
Cherry, strawberry, stone fruit and table grapes to Australia	Collaborated with USDA, industry and academic partners to review and formulate a Pest Risk Analysis pertaining to <i>Drosophila suzukii</i> .

PEST EXCLUSION TRAINING FOR COUNTY BIOLOGISTS

The Interior Pest Exclusion staff provides assistance to county inspectors in preparation for annual quarantine certification examinations and training to new county inspector biologists. Three sessions were held in 2010 with a total of 21 attendees from Los Angeles, Ventura and Orange counties.



EMERGENCY QUARANTINE RESPONSE
PROGRAM

The Emergency Quarantine Response Program of the Pest Exclusion Branch serves the citizens of California by working toward the following goals:

- ◆ Containing and preventing the artificial spread of harmful and invasive plant pests when their reproductive population detections in the state trigger quarantine and regulatory actions.

When a reproductive population of a pest is discovered in California, an infestation is declared. The Pest Exclusion Branch's Emergency Quarantine Response Program responds by enacting emergency pest abatement and control measures to contain the infestation. If the pest is a federal action pest, emergency regulatory responses are coordinated with the USDA.

- ◆ To maintain domestic and foreign commerce for California agricultural commodities by certifying pest free fresh fruits, vegetables and nursery stock originating in a quarantine area.

California agricultural commodities are shipped to domestic and foreign markets worldwide. Agricultural officials representing other states and foreign countries maintain and/or impose restrictions or prohibitions on California agricultural commodities imports if grown in an established quarantine area. Certification of pest-free agricultural commodities grown in a quarantine area by the Emergency Quarantine Response Program facilitates the worldwide marketability of California-grown commodities.

In 2010, the Emergency Quarantine Response Program responded to the detections of the following quarantine pests of economic concern:

- ◆ Asian citrus psyllid
- ◆ Light brown apple moth
- ◆ European grapevine moth
- ◆ Mediterranean fruit fly
- ◆ Oriental fruit fly
- ◆ Melon fruit fly

Detection of the above-mentioned pests triggered state interior quarantines resulted in a 28,533 square mile area under quarantine (Table 1). Asian citrus psyllid quarantine accounted for 72 percent of the total quarantine area in Southern California.



PLANT HEALTH ANNUAL REPORT

TABLE 1: PLANT PESTS QUARANTINE AREAS IN CALIFORNIA—

Quarantine Pest	Quarantine Area (Square Miles)
Asian citrus psyllid	20,553
Light brown apple moth	5,222
European grapevine moth	2,089
Mediterranean fruit fly	329
Oriental fruit fly	252
Melon fruit fly	90
Total	28,535

In the year 2010, four Mediterranean fruit fly area infestations and two Oriental fruit fly infestations were successfully declared eradicated and quarantines were lifted (Table 2).

TABLE 2: QUARANTINES CONCLUDED IN 2010

Quarantine	Quarantine Area (Square Miles)
Mediterranean fruit fly, Escondido, San Diego County	148
Mediterranean fruit fly, Fallbrook, San Diego County	79
Mediterranean fruit fly, Imperial Beach, San Diego County	37
Mediterranean fruit fly, Santa Monica, Los Angeles County	65
Oriental fruit fly, Sacramento, Sacramento County	79
Oriental fruit fly, La Verne, Los Angeles County	84



ASIAN CITRUS PSYLLID QUARANTINE

Asian citrus psyllid (ACP) is a serious pest of great concern. ACP vectors the disease commonly known as citrus greening or Huanglongbing (HLB) which causes the decline and eventual death of plants that become infected. HLB infects plants in the family Rutaceae, including all citrus and several types of ornamental plants.

Asian citrus psyllid was first discovered in California in San Diego County on August 27, 2008 on a yellow panel trap placed in South Bay Terraces, a small community 11 miles north of the Mexican border. A state interior quarantine was declared on September 5, 2008. In October 2008, a portion of Imperial County was declared quarantined. Due to additional new ACP finds in Imperial County and in the adjoining state of Arizona, the entire Imperial County was placed under ACP quarantine on November 11, 2009. Because of new finds, the entire counties of Orange and Los Angeles were declared quarantined in August and September 2009, respectively. Further, additional finds of ACP in Pomona in Los Angeles County resulted in encompassing portions of San Bernardino and northwest Riverside County.

The ACP quarantine boundary expanded in December 2010 with new ACP detections in Ventura, Riverside and San Bernardino counties. Detection in Ventura County also encompassed a small portion of southern Santa Barbara County.

By the end of 2010, a total of 20,553 square miles was included in the quarantined area in Imperial, San Diego, Orange, Los Angeles, San Bernardino, Riverside, Ventura and Santa Barbara counties (see Table 1).

The ACP regulation prohibits the movement of ACP host nursery stock (citrus and citrus-related plants) from the ACP quarantined area, and allows movement within the quarantined area only if properly treated for ACP. A total of 1,372 production nurseries and 1,245 retail nurseries have compliance agreements to carry and treat citrus nursery stock within the ACP quarantined area.

Kaffir lime leaf processing by pureeing, drying and freezing were approved to allow the movement of these leaves.

Citrus fruit moving inside the quarantine area is not regulated by the ACP quarantine, but growers, harvesters and haulers of citrus fruit were required to ensure that harvested fruit and all bins and equipment used to transport citrus fruit was free of all plant parts (stems and leaves) prior to leaving the quarantined area until September 2010. At that time, the USDA's Center for Plant Health Science and Technology Unit showed the incidental leaf and stem debris in bulk citrus processed through a packing house or field cleaning machine presented a very slight risk of spreading ACP. Incidental leaf and stem tolerances were removed and compliance agreements amended.



ACP

An adult ACP in the feeding position.
(Photo by M. Rogers, Univ of Florida)



PLANT HEALTH ANNUAL REPORT

By the end of 2010, a total of 6,618 nurseries, growers, harvesters and haulers of citrus fruit, handlers of green waste, certified farmers markets and swap meet vendors were identified in the ACP quarantined area and were issued compliance agreements to aid in the enforcement of the quarantine requirements (See Table 2).

TABLE 1: ASIAN CITRUS PSYLLID QUARANTINE AREA IN CALIFORNIA

County	Quarantine Area (Square Miles)
Imperial**	4,484
Los Angeles**	4,089
San Diego*	3,702
Riverside*	3,817
Orange**	800
San Bernardino*	1,515
Ventura**	1,834
Santa Barbara*	312
Total	20,553

* Partial county under quarantine

** Entire county under quarantine

TABLE 2: NUMBER OF BUSINESSES REGULATED FOR ASIAN CITRUS PSYLLID IN 2010

Counties	Regulated	Count
San Diego, Imperial, Riverside, San Bernardino, Orange and Los Angeles. Regulated through December 31, 2010. (Ventura and Santa Barbara not included in this table.)	Production Nurseries	1,372
	Retail Nurseries	1,245
	Growers	1,237
	Certified Farmers Market / Swap Meet Vendors	1,067
	Harvesters	235
	Packers / Processors	616
	Green Waste	29
	Haulers / Transporters	817
Total		6,618



EUROPEAN GRAPEVINE MOTH QUARANTINE

The first North American detection of the European Grapevine Moth (EGVM) occurred in Oakville, Napa County, in September 2009. Statewide survey and trapping activities led to the detection of EGVM at additional sites. In an attempt to contain this EGVM infestation, on March 9, 2010 the California Department of Food and Agriculture (CDFA) established a state interior quarantine, which paralleled the United States Department of Agriculture (USDA) federal domestic quarantine order.



EGVM adult,
courtesy of Napa County

The initial state interior quarantine contained portions of Lake, Napa, Sonoma and Solano counties, totaling 162 square miles. With the onset of warm spring weather, additional detections of EGVM occurred in new areas within California and in May, portions of Fresno and Mendocino counties were added to the quarantine as the existing quarantine areas were expanded. Following the addition of a portion of Merced County in June, a portion of San Joaquin County was added to the state interior quarantine in August. A portion of Santa Clara County was the last area to be included in the quarantine in late September before EGVM entered into diapause for the winter season. In 2010, a total of 2,089 square miles were placed under quarantine statewide for EGVM.

Though detections of EGVM have not occurred in Lake County, the state interior quarantine includes a portion of the county as a result of the detection locations in Napa County.

Though a single EGVM was detected in Monterey County, a quarantine was not implemented.

EUROPEAN GRAPEVINE MOTH STATE INTERIOR QUARANTINE AREA (SQUARE MILES)

County	Fresno	Lake	Mendocino	Merced	Napa	San Joaquin	Santa Clara	Solano	Sonoma
Square Miles Under Quarantine	96	19	179	108	597	96	94	237	663

Quarantine regulations were developed and implemented to limit the risk of spreading EGVM further within California and the United States through artificial movement.

Grapes, the primary host of EGVM, are considered to be California’s main production crop. The EGVM state interior and federal quarantine regulations have tremendously affected the table grape and wine grape production industries in our state. Quarantine regulations have also greatly affected many other export production crops such as stone fruit (cherries), berries, pomegranates, olives and nursery stock. Byproducts of these crops, such as green waste (leaves, stems, fruit skins, etc.), must (crushed grapes containing juice, skins, seeds and stems) and pomace (dry pulpy residue resulting from the pressing of must) are also considered EGVM host material.

CDFA, USDA and the county agricultural commissioners have all worked closely to provide awareness of the implementation of EGVM state and federal quarantine regulations to the general public, residents in quarantine areas, growers of host commodities and establishments of all associated and affected industries.



PLANT HEALTH ANNUAL REPORT

Compliance agreements were issued to establishments in order to carry out production and processing activities of EGVM host material. Growers, harvesters, transporters, packing house operations and nurseries are among those establishments that are primarily regulated and directly engaged with quarantine regulations.

COMPLIANCE AGREEMENT ISSUED IN THE EGVM QUARANTINE AREA

COUNTY	Nursery- Production & Retail	Grower- Fruit for Certified Farmers' Markets	Grower- Fruit other than Grapes	Grower- Grapes	Harvester	Hauler	Packing/ Processing Receiver	Green Waste Receiver Inside Quarantine Area	Green Waste Transporter Inside Quarantine Area	Producer of Raisins	Receiver of Raisins
Fresno	27	16	184	198	317	258	97	0	6	213	24
Lake	0	0	0	1	7	15	0	0	3	0	0
Mendocino	14	0	0	170	146	159	0	0	10	0	0
Merced	0	0	2	4	2	3	1	0	1	0	0
Napa	33	70	597	638	466	815	0	0	8	0	0
San Joaquin	0	13	0	349	135	112	10	1	11	1	0
Santa Clara	0	0	0	34	23	28	0	2	2	0	0
Solano	15	4	10	42	45	33	4	0	1	0	0
Sonoma	0	0	0	637	437	510	0	2	16	0	0
Total	89	103	793	2,073	1,578	1,933	112	5	58	214	24



MEDITERRANEAN FRUIT FLY QUARANTINE

ESCONDIDO, SAN DIEGO COUNTY

In September 2009, Mediterranean fruit fly quarantine was established in the Escondido area of San Diego County. Additional fly finds and larval detection in November expanded the quarantined area from 77 to 148 square miles. A total of 674 compliance agreements were issued to regulated entities, including growers, harvesters, fruit haulers, fruit processors, fruit packers, swap meets, certified farmers markets, produce markets, nurseries and yard maintenance gardeners. Hold notices were issued to commercial and back yard growers of Mediterranean fruit fly host material. Many growers entered into a pre-harvest bait treatment program which allowed them to harvest the host material and move it off site. Project staff supervised 2,030 pre-harvest bait treatments for avocados, cherimoyas, citrus, guavas and persimmons. Near the end of the quarantine, the USDA determined that Hass avocados, while still on the tree, were not a Mediterranean fruit fly host. Then, majority of Hass avocado growers stopped pre-harvest bait treatments and began harvesting under newly-established protocol. All other avocado varieties including Lamb Hass are still hosts and those growers continued to treat. The quarantine concluded in August 2010.

FALLBROOK, SAN DIEGO COUNTY

In late October 2009, two wild male Mediterranean fruit flies were trapped in the Fallbrook/Bonsall area of San Diego County. Two additional flies and 68 larvae were also found. A 79 square mile quarantine was enacted in close proximity to the already established Escondido Medfly quarantine. Both quarantines were managed with the same staff in the San Marcos office. A total of 591 compliance agreements were issued to regulated entities, including growers, harvesters, fruit haulers, fruit processors, fruit packers, produce markets, swap meets, certified farmers markets, nurseries and yard maintenance gardeners. Hold notices were issued to commercial and back yard growers of Medfly host material. Many growers entered into a pre-harvest bait treatment program for commodities such as avocados, cherimoyas, citrus, guavas and persimmons. Project staff supervised 3,107 pre-harvest bait treatments. Near the end of the quarantine, the USDA determined that Hass avocados, while still on the tree, were not a Medfly host. The majority of Hass avocado growers stopped pre-harvest bait treatments and began harvesting under newly-established protocol. All other avocado varieties, including Lamb Hass, are Medfly hosts and those growers continued to treat. The quarantine concluded in August 2010.

IMPERIAL BEACH, SAN DIEGO COUNTY

A state interior quarantine for Mediterranean fruit fly was established in Imperial Beach on August 7, 2009 after the detection of a mated female fly. The quarantine encompassed 37 square miles and included portions of the cities of Chula Vista, San Diego and National City.

Interior Pest Exclusion and project staff issued 100 compliance agreements to nurseries, swap meets, a certified farmers market, yard maintenance companies, fruit sellers/distributors and two small growers in the quarantine area. Sterile Medflies were released each week for two life cycles around the find site to aide in eradication. The quarantine was declared eradicated on January 6, 2010.

SANTA MONICA, LOS ANGELES COUNTY

Mediterranean fruit fly quarantine was established in the Santa Monica area of Los Angeles County in November 2009 after the detection of three wild female Medflies, two were sexually mature and



PLANT HEALTH ANNUAL REPORT

mated. The 65 square mile quarantine area included the cities of Santa Monica, Pacific Palisades, Brentwood, Venice, Culver City, Century City, Westwood, Beverly Hills, Marina del Rey, West Los Angeles and Los Angeles. The quarantined area was primarily residential. A total of 535 compliance agreements were issued to wholesale produce distributors, swap meets, certified farmers' markets, produce markets, fruit sellers, nurseries, landscaping companies, recyclers and yard maintenance gardeners. There was no commercial production of host plants. There were 16 Certified Farmers Markets with 335 fruit sellers and 10 plant sellers. Residents of the area were asked not to move fruits, vegetables or other host material from the area. The quarantine concluded in August 2010.



Mediterranean Fruit Fly

Photo by: Jack Clark, University of California, Agriculture and Natural Resources

ORIENTAL FRUIT FLY QUARANTINE

SACRAMENTO COUNTY

In June 2010, a wild mated female Oriental Fruit Fly, *Bactrocera dorsalis*, was trapped in North Highlands in Sacramento County. This immediately triggered a quarantine area of 79 square miles. Over 200 compliance agreements were issued to Certified Farmers' Markets, growers, fruit sellers, nurseries, community gardens and yard maintenance workers. Fifteen small growers conducted pre-harvest bait treatments on cucumbers, peppers and tomatoes which were sold locally to small markets and at Certified Farmers' Markets. Hold notices were issued to homeowners, growers, and nurseries to prevent the movement of compromised host material. No additional flies or other life stages were found and the quarantine concluded in November 2010.

PASADENA/SAN MARINO, LOS ANGELES COUNTY

An Oriental fruit fly state interior quarantine was initiated in August 2010 in Los Angeles County after the detection of invasive Oriental fruit flies in the vicinity. The 89 square mile quarantine area includes the cities of Pasadena, San Marino, Los Angeles, Alhambra, Arcadia, San Gabriel, Pasadena, El Monte, Altadena, Highland Park, Rosemead, Temple City, Monrovia and Sierra Madre. The quarantined area is primarily an urban area.

Interior Pest Exclusion staff issued 329 compliance agreements to nurseries, certified growers, yard maintenance companies, produce markets, certified farmers markets and other identified sources of potential fruit movement. The quarantine is scheduled to end in May 2011.

LA VERNE, LOS ANGELES COUNTY

An Oriental fruit fly state interior quarantine was officially declared in August 2009 after having confirmed the detection of four males and one mated female Oriental fruit flies on three separate residential properties in the La Verne area of Los Angeles County. The 84 square mile quarantine included the areas of La Verne, Glendora, Pomona, Claremont, West Covina, Covina, Walnut and San Dimas. The area quarantined was primarily an urban area (mostly residential and commercial).



Project staff issued a total of 183 compliance agreements to affected businesses which included: nurseries, certified farmers markets, community gardens, and yard maintenance gardeners, produce markets, growers, packers and haulers. The eradication of this Oriental fruit fly quarantine was declared in May 2010.

MELON FRUIT FLY QUARANTINE

KERN COUNTY

Adult melon fruit flies (MFF) detected in Kern County on August 9 and 11, 2010, triggered an 82 square mile quarantine area in southern Kern County encompassing communities in Arvin, Lamont and Mettler. Additional MFF finds on August 28, 2010 subsequently increased the quarantine area to 92 square miles. Because the flies were detected in an agricultural setting, many growers were impacted by this quarantine. The main host commercial crops in this area included citrus, peaches, cauliflower, mustard, peppers, pumpkin, squash and tomatoes.

A total of 354 compliance agreements were issued to growers, packers, processors, aerial applicators, harvesters and haulers. There were 579 supervised quarantine insecticide treatments applied by growers in the quarantine area.

If no additional MFF are detected, then this melon fruit fly quarantine will be lifted in May 2011.

LIGHT BROWN APPLE MOTH QUARANTINE

A federal domestic quarantine order and state interior quarantine restrict the movement of LBAM hosts from the infested portions of regulated counties. Currently, over 5,200 square miles are under quarantine. This is a significant increase from 2009 where 3,900 square miles were under quarantine.

The quarantines restrict the movement of hosts in and out of the quarantine areas. Regulated host articles such as nursery stock, assorted fruits and vegetables, cut flowers and greenery, Christmas trees, hay, and green waste must also comply with the movement restriction(s). The quarantine includes provisions requiring regulated host articles to be inspected and found LBAM-free, originate from a premise that has been trapped and found LBAM-free grown under an integrated pest management system, or moved under specific conditions to a specific location and processed in an approved manner. Infested hosts or premises must be treated or reconditioned and re-inspected and found LBAM-free prior to movement. Persons or businesses in the quarantine that wish to move regulated host articles in and out of the quarantine area may sign a compliance agreement with their local regulatory official (i.e., the county agricultural commissioner or the Cooperative Light Brown Apple Moth Program) in order to self-certify their hosts for movement. The local regulatory officials conduct periodic inspections and oversight visits of all entities operating under compliance agreements in order to verify compliance.

In 2010, the California Department of Food and Agriculture (CDFA) Interior Quarantine within Marin, Sonoma, Napa, Solano, Contra Costa, San Francisco, Alameda, Santa Clara, San Mateo, Santa Cruz, San Joaquin, Monterey and San Benito counties was converted into a contiguous regulated area. This regulatory change permits the free movement of LBAM host material within the regulated area. Movement of host material outside the regulated area is subject to the state interior quarantine restrictions.



PLANT HEALTH ANNUAL REPORT

In 2010, the program initiated a “Best Management Practices” nursery cleanliness protocol to limit the spread of Light Brown Apple Moth through movement of commercial nursery stock from chronically positive nurseries. This protocol establishes a procedure for progressive enforcement of nursery cleanliness standards to ensure LBAM-free status prior to movement out of the regulated area.

COMPLIANCE AGREEMENTS ISSUED IN 2010

County	Nursery	Commodity	Other	Total
Los Angeles	6	0	1	7
Marin	1	2	2	4
Monterey	2	60	4	66
San Benito	0	11	1	12
San Diego	277	3	19	299
San Francisco	0	1	2	3
San Joaquin	2	112	18	132
San Luis Obispo	3	10	0	13
San Mateo	4	4	0	8
Santa Clara	3	16	1	20
Santa Cruz	5	24	1	30
Total	303	243	48	594



EXTERIOR PEST EXCLUSION

(BORDER PROTECTIONS STATIONS)

Since 1923, the California Department of Food and Agriculture (CDFA) has maintained agricultural inspection stations to inspect vehicles and commodities to ensure they are pest free and meet plant quarantine entry requirements. Today, the Exterior Pest Exclusion Program operates 16 inspection stations, known as Border Protection Stations (BPS), on the major highways entering California. These stations play an integral role in CDFA's efforts to exclude exotic invasive species from the State. Personnel working at BPS perform the following functions:

- ◆ Enforcement of federal and state plant quarantine laws and regulations.
- ◆ Inspection of vehicles and commodities to ensure freedom from exotic invasive species, including animals, weeds and pathogens.
- ◆ Taking control of high-risk shipments which cannot be inspected at the border by forwarding them to destination for inspection.
- ◆ Collection, analysis and dissemination of data pertaining to commodity movement, pest interceptions and traffic flow.
- ◆ Increasing public industry awareness about the importance in preventing the movement and spread of exotic invasive species.

Additionally, the program has cooperative relationships to assist many regulatory agencies and programs within and outside CDFA. A few of these include:

- ◆ CDFA—Animal Health Division
- ◆ CDFA—Inspection Services Division
- ◆ USDA—Animal and Plant Health Inspection Services (APHIS)
- ◆ USDA—Forest Service (USFS)
- ◆ The California Board of Equalization (BOE)
- ◆ The California Department of Fish and Game (CDFG)
- ◆ The California Department of Forestry (CDF)
- ◆ The California Highway Patrol (CHP)
- ◆ The California Department of Boating and Waterways



PRIVATE VEHICLE INSPECTIONS

In 2010, 27.3 million private vehicles entered California through the BPS. Of these, 2.3 million were determined to be high-risk and given detailed inspections. From these vehicles, 66,155 lots of plant material were rejected because they were either in violation of plant quarantine regulations or infested with pests. Inspection of rejected materials yielded 8,077 pest samples submitted for identification; of these, 2,418 were determined to be pests of concern to California.

SUMMARY OF ACTIONABLE PESTS INTERCEPTED FROM PRIVATE VEHICLES IN 2010

Type	Occurrences
Homoptera (scales, mealybugs, leafhoppers, whiteflies) , including: Magnolia white scale, citrus snow scale, wax scale, palm mealybug, etc.	822
Coleoptera (beetles) , including: Japanese beetle, cereal leaf beetle, pecan weevil, long-horned beetle, etc.	342
Mollusks (snails and mussels) , including: Quagga mussel, zebra mussel, false dark mussel, New Zealand mud snail, bradybaena snail, etc.	262
Lepidoptera (moths) , including: Gypsy moth, squash vine borer, hickory shuckworm, etc.	199
Hymenoptera (ants) , including: Imported fire ant, white-footed ant, Florida carpenter ant, etc.	136
Diptera (flies) , including: Cherry fruit fly, apple maggot, etc.	120
Animals: Piranhas, ferrets, gerbils, quaker parrots, etc.	114
Thysanoptera (thrips) , including: Palm thrip, eastern flower thrip, etc.	79
Weeds, including: Russian knapweed, diffuse knapweed, Canada thistle, Scotch thistle, hoary cress, etc.	68
Hemiptera (bugs) , including: Brown marmorated stinkbug, leaf footed bug, etc.	68
Other insects, pathogens, nematodes, and mites	208
Total	2,418



COMMERCIAL VEHICLE (TRUCK) INSPECTIONS

COMMERCIAL VEHICLE INSPECTIONS

In 2010, 7.14 million commercial trucks entered California through the BPS. Of these, 562,880 were determined to be high-risk and were given detailed inspections.

COMMERCIAL SHIPMENT DISPOSITIONS BY COMMODITY TYPE

Commodity	Inspected and Released	Sent to Destination Under Hold Notice for Inspection	Rejected Because of Pests or Lack of Certification
Produce (fresh fruits and vegetables)	419,111	85	1,734
Nursery Stock	8,835	11,178	611
Other Plant Material (cut greens, Christmas trees, etc.)	84,039	344	1,481
Seed	1,054	8,449	49
Feed Grain	4,904	38	42
Hay	65,747	258	177
Apiary (bee colonies)	630	3,126	136
Household Goods	43,149	3,308	368
Totals	627,469	26,786	4,598

PEST INTERCEPTIONS FROM COMMERCIAL SHIPMENTS

All commercial shipments of plant material and conveyances, even those not subject to state and federal quarantines, are inspected to ensure that they are not infested with pests. During the course of inspecting commercial shipments, 1,130 actionable pests were intercepted. Each of these detections resulted in the rejection of the shipment or conveyance until the infestation was eliminated (i.e., fumigation, cleaning, etc.) or the shipment was returned out of state. The table below illustrates the interceptions by type of pest.



COMMERCIAL VEHICLE PEST INTERCEPTION FROM
COMMERCIAL VEHICLES IN 2010

SUMMARY OF ACTIONABLE PESTS INTERCEPTED FROM COMMERCIAL VEHICLES IN 2010

Type	Occurrences
Homoptera (scales/mealybugs) , including: Citrus snow scale, magnolia white scale, palm whitefly, etc.	461
Weeds , including: Musk thistle, Scotch thistle, diffuse knapweed, spotted knapweed, etc.	226
Hymenoptera (ants) , including: Imported fire ant, white-footed ant, Florida carpenter ant, etc.	132
Lepidoptera (moths) , including: Tussock moth, bagworm, hickory shuckworm, etc.	66
Thysanoptera (thrips) , including: Chili thrip, whitefly thrip, etc.	51
Coleoptera (beetles) , including: Japanese beetle, May beetle, long-horned beetles, etc.	49
Mollusks (snails and mussels) , including: Quagga mussel, zebra mussel, bradybaena snail, etc.	21
Heteroptera (bugs) , including: Brown marmorated stinkbug, leaf-footed bug, lace bug, etc.	18
Diptera (flies) , including: Mexican fruit fly, cherry fruit fly, etc.	15
Other Insects and mites	91
Total	1,130

Wood-Boring Pests: In 2010, border protection station (BPS) staff continued to place high emphasis in checking incoming firewood for wood-boring pests like emerald ash borer and Asian longhorn beetle—species which have caused severe damage to forest and urban plantings in the eastern United States. During the year, wood-boring beetles were intercepted 229 times from firewood transported in private vehicles. This number included: 139 long-horned beetles (family Cerambycidae); 56 metallic wood-boring beetles (family Buprestidae), 28 weevils (family Curculionidae); and 6 powder-post beetles (family Bostrichidae).

In July, inspectors at the Topaz BPS intercepted 25 pieces of ash firewood from Michigan. Inspection of the wood revealed several larva, pupa, and adult emerald ash borers (*Agrilus planipennis*). The travelers planned to use the wood as they visited several public campsites throughout California. This incident marked the first interception of emerald ash borer at a BPS.

Invasive Weeds: 27 different species of invasive weeds of limited distribution or not known to occur in California were intercepted from private vehicles on 68 occasions and from commercial shipments



on 226 occasions. Species included: Diffuse knapweed, spotted knapweed, Scotch thistle, plumeless thistle, musk thistle, halogeton, and Dalmatian toadflax.

Of note were two interceptions of sulphur cinquefoil (*Potentilla recta*)--one taken from a private vehicle and the other from a commercial hay shipment. This invasive weed is native to Eurasia, but has spread throughout most of North America over the past century. These interceptions marked the first occurrences of this weed being intercepted at a BPS.

INTRA— AND INTER—AGENCY COOPERATIVE ACTIVITIES

WATER CRAFT INSPECTIONS

The BPS continued to play a key role in the multi-agency effort to prevent the introduction of quagga and zebra mussels into California through the transport of infested watercraft. To prevent the introduction of invasive mussels, the BPS staff inspect the exterior surfaces (i.e. hull, motor, trailer) of watercraft for adult mussels and ensure that the watercraft is free of standing water that can harbor the microscopic larval form of these pests.

In cooperation with the California Department of Fish and Game (CDFG), BPS inspectors checked 169,660 watercraft for aquatic invasive species including quagga mussel, zebra mussel, New Zealand mud snail and hydrilla. Of the boats inspected, 241 were found infested with pests—quagga mussel was intercepted 220 times. Additionally, 6,899 watercraft had amounts of standing water capable of transporting microscopic forms of these pests to new locations. The water was drained from these boats before they were allowed to enter the state.

BOARD OF EQUALIZATION USE TAX COLLECTION PILOT PROGRAM

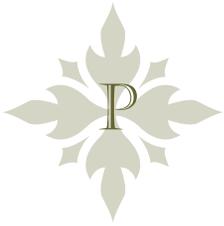
In conjunction with the Board of Equalization (BOE), a program to assess the level of Use Tax compliance was conducted at the Needles BPS from July 2006 through July 2010. The program involved BPS personnel collecting information on commercial shipments of commodities subject to the Use Tax and forwarding the data to BOE for follow up to determine if appropriate taxes were paid. Due to the pilot program's success, it was made permanent at Needles and extended to three additional stations (Hornbrook, Truckee and Yermo) in the fall of 2010. Information on these shipments is provided to BOE in order. In the 2010/2011 fiscal year, this program is projected to collect \$26.9 million Use Tax and penalties that otherwise might not be recovered.

GAME IMPORTATION DECLARATIONS

Under provisions of the California Fish and Game Code, everyone entering California with fish or game from other states are required to complete a game declaration form. The information from the forms helps the CDFG to identify potential violations of hunting and fishing laws and regulations, including a regulation to prevent the spread of chronic wasting disease. This disease is closely related to mad cow disease and affects and kills deer and elk in several other states. To assist the CDFG, the BPS inform people entering the state with fish and game about the law, provide them the form, and remit the completed forms to CDFG. BPS staff remitted 22,592 game declaration forms to the CDFG.

LIVESTOCK TRACKING

To assist CDFA's Animal Health Branch in tracking animal ownership and disease outbreaks, BPS recorded all shipments of livestock entering California. There were 42,465 shipments recorded.



MARKET EGG SHIPMENTS

To assist the Egg Quality Control Program in ensuring quality standards are met and appropriate mill fees are paid, BPS record all shipments of market eggs entering from other states. There were 13,467 shipments recorded.

NURSERY, SEED AND COTTON PROGRAM

NURSERY PROGRAM

The mission of the Nursery Program is to prevent the introduction and spread of agricultural pests through nursery stock and to protect agriculture and the consumer against economic losses resulting from the sale of inferior, defective or pest-infested nursery stock. In 2010, the total value of nursery and floral products produced was \$ 3.4 billion, a decrease of 8.6 percent over the previous year. The cost to run the nursery program for 2009/10 fiscal year was \$2.37 million. Nursery program activities are funded entirely from revenue received in the form of license and acreage fees and registration and certification fees. Revenue received in fiscal year 2009/10 totaling \$2.47 million was used to offset the costs of all program activities.

NURSERY REGULATORY AND INSPECTION ACTIVITIES

Financed primarily through license and acreage fees, nursery regulatory activities are conducted by



Photo Courtesy of Sean Dayyani (CDFA)

the county agricultural commissioners and their staff and are an integral part of the state's agricultural pest prevention system. Nursery inspection and regulatory activities have prevented numerous pests from being disseminated throughout agricultural and suburban communities by preventing and/or eradicating pests at the nursery level. The quality of nursery stock has improved as a direct result of the regulation of nursery stock.

In 2010, there were 11,540 licensed sales locations with 1,084 production (growing grounds) locations. Since 2007, the budget for nursery inspection contracts has been set at \$600,000. In addition, any disencumbered funds from the previous year's

nursery contracts are added to the next annual allocation. The amount added to the allocation for this year was \$83,377, resulting in a total of \$683,377 to be divided among the counties for the 2010/11 fiscal year contracts.



CITRUS NURSERY STOCK PEST
CLEANLINESS PROGRAM

California is the number one economic citrus state in the nation, with the USDA putting the value of California citrus at \$1,131,851,000. A 2002 report by Arizona State University indicates that there is at least \$825.6 million of direct economic output and another \$1.6 billion when all upstream suppliers and downstream retailers are included. This represents over 25,000 direct and indirect employees.

California has had a voluntary citrus nursery stock disease testing program since 1962. However, Senate Bill 140 (SB 140), chaptered November 2, 2009, required the California Department of Food and Agriculture (CDFA) to establish a mandatory Citrus Nursery Stock Pest Cleanliness Program (CNSPCP) to protect citrus nursery source propagative trees from harmful diseases, pests, and other risks and threats. The requirements of SB 140 apply to anyone propagating citrus by any means. Further, the bill authorized the department to adopt and enforce regulations to carry out the program and to establish a schedule of fees to cover the department's costs for administration, testing, inspection and other services under the program. Since SB 140 had an urgency clause, the Asian citrus psyllid (ACP), *Diaphorina citri*, had been detected in California, and both ACP and Huanglongbing (HLB) were known to be established in Mexico. The department adopted regulations as an emergency action effective May 6, 2010.



Following the emergency adoption, CDFA held several meetings with members of the citrus nursery industry and other interested parties regarding the CNSPCP. CDFA held two scoping meetings in June, two public hearings in September and a final meeting in December in order to develop regulations for the Program that would ultimately be widely accepted by the citrus nursery industry. Due to the diligent efforts of CDFA staff and extensive involvement and cooperation by the public, Program staff was able to develop regulations that insured the production of citrus nursery stock from disease-tested and protected sources for California growers and consumers.

In 2010, 44 citrus nurseries participated in the program. A total of 6,357 citrus seed and scion source trees were sampled and tested for tristeza and other viroids, an increase of 2,053 trees from 2009.

The disease and associated disease agents of concern to this program and approved test methods are listed below in Table 1. Additional inspections and tests other than provided in this section may be required by CDFA.



PLANT HEALTH ANNUAL REPORT

TABLE 1: DISEASES, DISEASE AGENTS OF CONCERN AND APPROVED TEST METHODS/INDICATORS

Diseases of Concern	Disease Agent(s)	Test/Indicator Plant
Viruses		
Infectious Variegation, Leaf rugose, Crinkly leaf	<i>Citrus variegation ilarvirus</i> , <i>Citrus leaf rugose ilarvirus</i> , <i>Citrus crinkly leaf ilarvirus</i>	Sour orange, Etrog citron
Leaf blotch aka Dweet mottle	<i>Citrus leaf blotch virus (CLBV)</i> , aka <i>Dweet mottle virus (DMV)</i>	Dweet tangor
Leprosis	<i>Citrus leprosis rhabdovirus</i>	Sweet orange
Psorosis A & B (Ring spot)	<i>Citrus psorosis ophiovirus</i>	Sweet orange, Dweet tangor
Satsuma dwarf	<i>Satsuma dwarf virus (SDV)</i> group	Satsuma mandarin, Dweet tangor, White sesame (<i>Sesamum indicum</i>), ELISA
Tatter leaf-Citrange stunt	<i>Apple stem grooving capillovirus (ASGV)</i> aka <i>Citrus tatter leaf virus (CTLV)</i>	Rusk citrange/RL Citrus excelsa
Tristeza (quick decline, stem pitting, seedling yellows)	<i>Citrus tristeza closterovirus (CTV)</i>	Mexican lime, ELISA, Immunoimpression direct tissue-blot immunoassay
Yellow mosaic	<i>Citrus yellow mosaic badnavirus</i>	Sweet orange, Pummelo, ELISA
Viroids		
Various citrus growth abnormalities and symptomatologies related to citrus viroids, including exocortis and cachexia	<i>Citrus exocortis viroid (CEVd)</i> , <i>Hop stunt viroids (HSVd)</i> , <i>Citrus variants of HSVd</i> , <i>Citrus viroids-IIa (CVD-IIa): non- cachexia</i> , <i>CVD-IIIb & -IIIc: cachexia</i> , <i>Citrus bent leaf viroids (CBLVD)</i> , aka <i>CVD-III</i> , <i>Citrus bark cracking viroids (CBCVd)</i> , aka <i>CVD-IV</i> , <i>Citrus viroids V (CVD-V)</i> , <i>Citrus viroids (CVD-VI)</i> , aka <i>CVD-OS</i>	Etrog citron Arizona 861-S1/RL & Imprint hybridization
Prokaryotes		
Citrus variegated chlorosis	<i>Xylella fastidiosa</i>	PCR & sequencing
Huanglongbing (citrus greening)	<i>Candidatus Liberobacter sp.</i>	Sweet orange, PCR, Source plant observation
Stubborn	<i>Spiroplasma citri</i>	Culture, Sweet orange
Witches' broom	<i>Candidatus phytoplasma aurantifolia</i>	Mexican lime, PCR
Unknown		
Australian dieback	<i>Uncharacterized, probably phytoplasma</i>	Sweet orange, grapefruit
Concave gum	<i>Unknown</i>	Dweet tangor, Sweet orange
Chlorotic dwarf	<i>Unknown</i>	Sour orange, rough lemon
Cristacortis impietratura	<i>Unknown</i>	Dweet tangor, Sweet orange
Vein enation	<i>Unknown, probably Luteovirus</i>	Mexican lime, Sour orange
Impietratura	<i>Unknown</i>	Dweet tangor, Sweet orange



REGISTRATION AND CERTIFICATION
SERVICES FOR PLANT MATERIALS

The CDFA Code authorizes CDFA to establish plant registration and certification (R & C) programs (see Table 2). These programs are implemented by the California Code of Regulations and enforced by the Secretary. In 2010, CDFA staff performed over 879 inspections for R & C including site approvals, growing season inspections, sampling for various purposes and harvest inspections. In addition to making inspections to meet R & C requirements, all nursery stock must also meet the general nursery regulatory standards for pest cleanliness.

R & C programs are voluntary programs developed at the request of various segments of the agricultural industry for the exclusion of specific plant pests that are not readily detected by ordinary inspections. These programs are the result of close working relationships between the University of California, United States Department of Agriculture (USDA) and CDFA, with the added support of the agricultural industry. Specific viruses, viroids, fungi, soil-borne pathogens and nematodes are the targeted pests of the nursery stock registration and certification programs.

The criteria for establishing these programs are: 1) there is an established need, 2) sufficient technical information is available, 3) a source of “clean” propagating stock has been established, and 4) methods have been developed to assure the continued pest cleanliness of the stock.

California presently has eight “clean stock” (registration and certification) programs available for use by the various segments of the agricultural industry.

TABLE 2: REGISTRATION AND CERTIFICATION PROGRAMS

Program	Planting Type (Blocks)	Target Pest	Testing or Treatment Required
Avocado Certification	Certified	<i>Phytophthora cinnamomi</i>	Hot water treatment of seed and soil fumigation
Avocado Registration	Registered (tree) Increase	Sun blotch viroid	Foundation tree index-testing for sun blotch viroid (UC)
Deciduous Fruit and Nut Tree Registration and Certification	Foundation, Mother, Scion, & Seed (tree) Increase Seed (bed) Certified (nursery row)	Various virus diseases, including prunus ringspot virus (PRSV) and prune dwarf virus (PDV)	Index-testing (UC) Index-testing for PRSV and PDV (CDFA) (Participant)
Grapevine Registration and Certification	Foundation & Increase (vineyard) Certified (nursery row)	Fanleaf, fleck, asteriod mosaic, leafroll, yellow vein (tomato ring -spot), corky bark virus	Nematode sampling (CDFA)
Seed Garlic Certification	Increase Certified	Stem and bulb nematode (<i>Ditylenchus dipsaci</i>) and white rot	Nematode sampling (CDFA)
Pome Fruit Tree Registration and Certification	Foundation & Mother (tree) Increase & Stool Certified (nursery row)	Various virus diseases	Index-testing (USDA & UC) Fumigation
Strawberry Nursery Stock Certification	Foundation Increase Certified	Mottle, vein-banding, crinkle, mild yellow-edge, necrotic shock, pallidosis, tomato ring-spot, witches-broom, pseudo mild yellow-edge, latent "c," leafroll, and feather-leaf viruses.	Index-testing (UC & CDFA) Nematode sampling
Nematode Certification	Nursery plantings produced for on-farm planting	Various plant-parasitic nematodes	Nematode sampling, fumigation supervision and commodity treatment (CAC & CDFA)



Photo Courtesy of Sean Dayyani

The primary tools developed for maintaining pest cleanliness of the stock in these programs are: 1) biological indexing (use of indicator plants which exhibit symptoms of virus or virus-like diseases) and enzyme-linked immunosorbent assay (ELISA), 2) laboratory techniques for the detection of nematodes, 3) eradication treatments (thermotherapy, fumigation and hot water treatments), and 4) visual field inspections targeted to specific life cycles of the pests and plants.

The costs of services to carry out these programs are borne by the participants. Fees are charged for the inspections, testing and treatments. In addition, the Fruit Tree, Nut Tree and Grapevine Improvement Advisory Board (IAB) provides partial to full funding for annual testing and inspections required by the Deciduous Fruit and Nut Tree R & C, Pome R & C and Grapevine R & C programs.

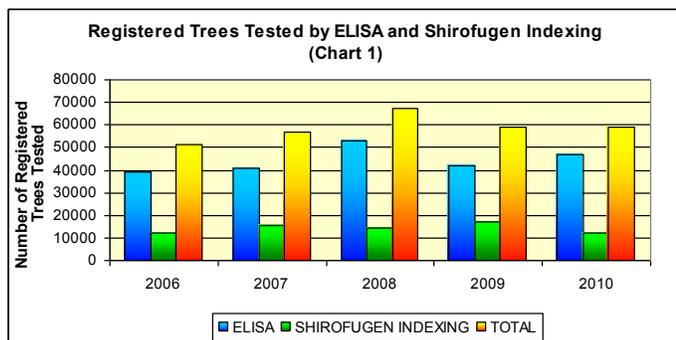
AVOCADO REGISTRATION AND CERTIFICATION PROGRAM

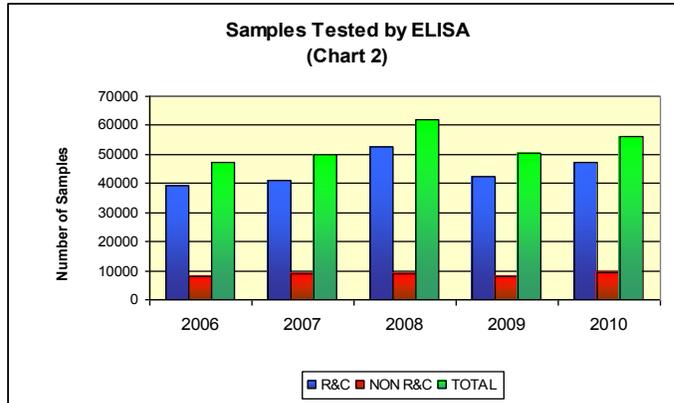
This program provides the registration of avocado rootstock and scion wood sources when inspected and tested for sun blotch virus. The Avocado Certification Program provides the certification of avocado nursery stock when grown under specific guidelines and inspected for freedom from *Phytophthora cinnamomi*, avocado root rot. Currently, one nursery is participating in the registration program and three nurseries are participating in the certification program.

DECIDUOUS FRUIT TREE & NUT TREE REGISTRATION AND CERTIFICATION PROGRAM

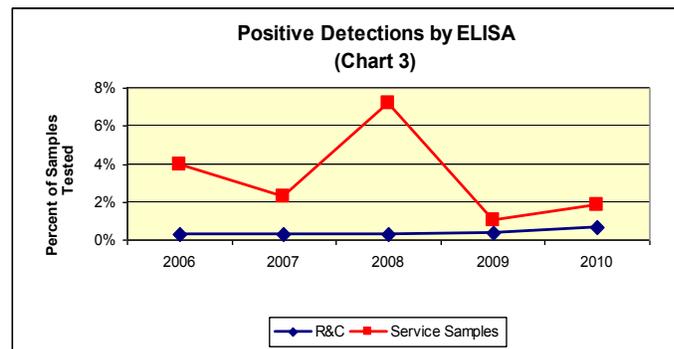
In the R & C program for deciduous fruit and nut trees, all trees in a Registered Mother Block, Registered Scion Block and Registered Seed Block are tested annually for viruses. Testing may be done by biological indexing using Shirofugen cherry as an indicator plant or by ELISA, an approved laboratory technique. Trees are tested for Prunus Necrotic Ring-Spot virus and Prune Dwarf Virus by Shirofugen cherry biological indexing technique at least once every five years and by ELISA for these viruses and others in the other four years. Tested trees may be used as a source of certified propagative material in the year following testing.

In 2010, 19 nurseries participated in the program. The total number of registered trees tested was 59,283 (47,125 by ELISA and 12,158 by Shirofugen indexing), compared to an average of 58,549 per year for the 2006-2009 growing seasons (See Charts 1 and 2).

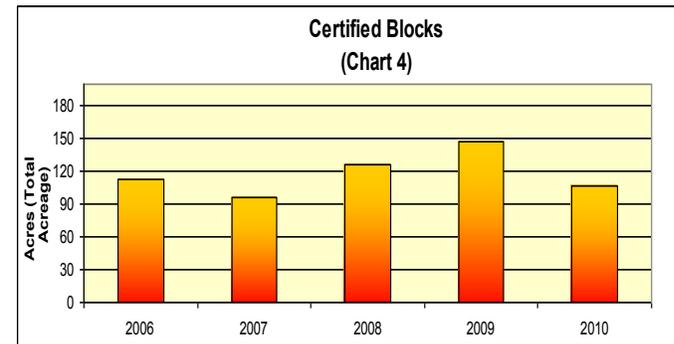




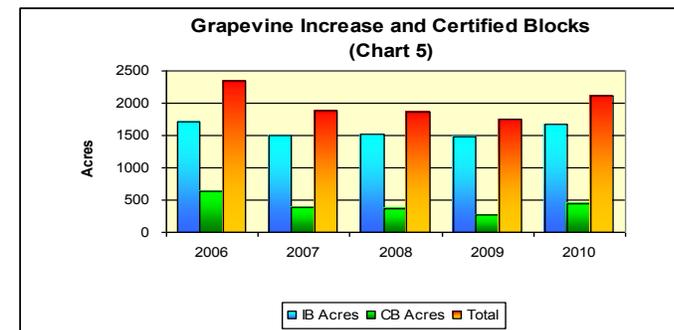
The total number of trees tested using the ELISA technique was 56,315 (47,125 registered trees and 9,190 service samples). The service samples are obtained from non-registered trees and tested as a service to the industry.



Of the 56,315 trees tested by ELISA, 488 (0.9 percent) were found positive for viruses. Only 319 (0.7 percent) of the registered samples tested positive for viruses, while 169 (1.8 percent) of the service samples tested positive for viruses (See Chart 3).



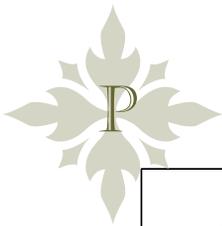
Of the samples taken from registered trees, one (0.01 percent) tested positive for viruses using the Shirofugen indexing. Certified nursery planting acreage totaled 107 acres in 2010, compared to an average of 121 acres over the previous four years (See Chart 4).



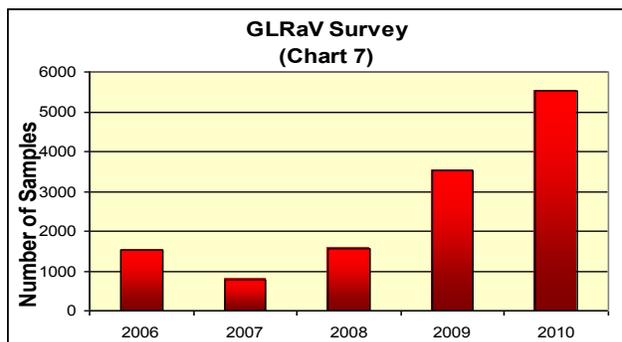
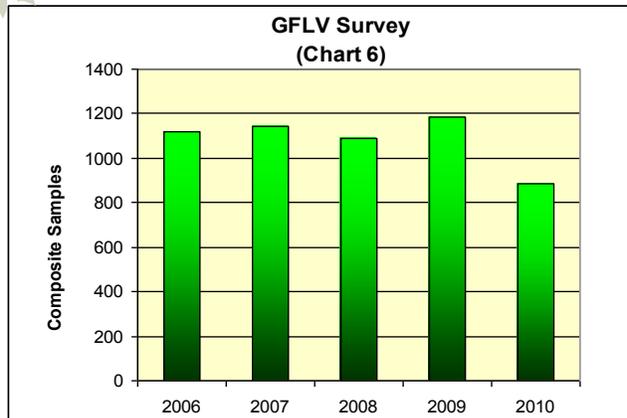
GRAPEVINE REGISTRATION AND CERTIFICATION PROGRAM

In 1996, CDFA began working with the grapevine industry and Foundation Plant Services (FPS) to review and revise the Grapevine R & C Program regulations. This was necessary in order to incorporate new knowledge about grapevine diseases, new technology for detecting grapevine viruses and other graft transmissible pathogens and best practices available for excluding diseases from certified grape planting stock. Since then, after a series of meetings, the revised regulations went into effect in 2010. Currently, thirty-four nurseries are

participating in the program. Grapevine Increase Block plantings totaled over 1,680 acres, an increase of 198 acres (11.8 percent) more than the previous year. Grapevine certified blocks (nursery plantings) totaled 437 acres and six greenhouse blocks, 164 acre (60.1 percent) increase from the previous year's 273 acres (See Chart 5).



PLANT HEALTH ANNUAL REPORT



CDFA collected and tested 887 composite samples (each is a composite sample from three vines) for grapevine fan leaf virus (GFLV) (See Chart 6). Plants were selected randomly for testing. However, if plants exhibiting typical GFLV symptoms were seen, those plants were also included in the survey. Of the total samples tested, one was positive for GFLV.

In 2010, 5,511 vines were sampled and tested for grapevine leafroll associated viruses (GLRaV) (See Chart 7). In total, 64 samples tested positive (1.2 percent) for leafroll associated virus 3 (GLRaV-3) in compared with 77 out of 3,534 samples (2.2 percent) that tested positive in 2009.

In 2004, the Fruit Tree, Nut Tree and Grapevine Improvement Advisory Board (IAB) began supporting trapping for vine mealybug (VMB).

The shipment of grapevine nursery stock within California became a problem as some northern counties were contemplating ordinances. Traps were deployed in certified (both Increase and Certified Blocks) and in non-certified plantings. Three counties assisted CDFA in trapping by doing non-certified plantings and in some cases, plantings in CDFA's Grapevine R & C Program. Traps are deployed in May and checked over the following six months. There were 604 traps placed in non-certified plantings and 282 traps deployed in plantings entered in the R & C programs. Male VMBs were found at three locations due to association with nearby vineyards. There were three positive finds for female VMB following intense inspections.

STRAWBERRY NURSERY STOCK REGISTRATION AND CERTIFICATION PROGRAM

Twelve nurseries participated in the Strawberry Nursery Stock R & C Program in 2010. The strawberry program differs from other registration programs in that foundation stock is maintained by nurserymen in their isolated plantings rather than by FPS of the University. Strawberry plants in foundation plantings are index-tested annually using *Fragaria vesca* and *Fagarira virginiana* strawberry indicator hosts for the following viruses: mottle, vein-banding, crinkle, mild yellow-edge, necrotic shock, pallidosis, tomato ringspot, witches broom, pseudo mild yellow-edge, latent C, leafroll and featherleaf. CDFA nursery staff virus indexed 6,752 foundation plants at the Department's greenhouse facility in Sacramento; a 28 percent decrease was seen over the previous year. Nineteen plants that were indexed tested positive for viruses and were rejected from the program. CDFA staff visually inspected over 756 acres of registered and certified strawberry nursery stock for the presence of virus diseases and other pests and collected and processed nematode samples.



POME FRUIT REGISTRATION AND CERTIFICATION PROGRAM

The Pome Fruit Tree R & C Program provides for the registration of rootstock and scion sources for the propagation of certified nursery stock when inspected and tested for virus diseases and other important pests. Three nurseries are currently participating in the program. In 2010, CDFA staff inspected and registered over 2,134 trees as propagative source trees. A total of 1.26 acres of nursery plantings were inspected and approved for sale as certified nursery stock.

SEED GARLIC REGISTRATION AND CERTIFICATION PROGRAM

The Seed Garlic Certification Program provides for the registration of seed garlic for the propagation of certified nursery stock when found free from stem and bulb nematode, *Ditylenchus dipsaci*, and when inspected and found free of white rot fungus, *Sclerotium cepivorum*. Two nurseries participated in 2010. A total of 74.06 acres were inspected and registered, an increase of 54.06 acres (270 percent) from 2009.

FRUIT TREE, NUT TREE AND GRAPEVINE IMPROVEMENT ADVISORY BOARD

The Fruit Tree, Nut Tree and Grapevine Improvement Advisory Board (IAB) element of the Nursery Program administers an industry-requested assessment (Food and Agricultural Code, Section 6981) on the production of nursery plants such as deciduous pome and stone fruit trees, nut trees and grapevines. The mission of the IAB is to improve the quality and pest free fruit tree, nut tree and grapevine nursery stock offered for sale. The assessment is used to fund research on plant pests, breeding varieties that are resistant to plant pests, plant pest diagnostics, varietal identification and disease elimination. The University of California Foundation Plant Services (FPS) provides support and serves as a source of clean planting stock. FPS carries out activities related to the development of planting materials for pome and stone fruit trees, nut trees and grapevines and subvents the costs to carry out Department programs concerning the R & C of pome and stone fruit trees, nut trees and grapevines. The assessment is collected with the nursery license renewal. In 2010, the total assessment collected on gross sales of fruit trees, nut trees and grapevines was \$1,219,529, a 5.8 percent decrease from the collection of \$1,294,842 in 2009.

In 2010, the IAB approved funding for 10 research proposals totaling \$229,800, funding of FPS in the amount of \$473,000 and payment to the Nursery Program to subvent R & C activities in the amount of \$247,000. The total budget approved was \$1,460,000. As revenues still remain low relative to the past five years, the Board recommended a lower level of funding for research, the FPS (University of California, Davis) and the CDFA R & C program.



SEED SERVICES

The Seed Services Program interacts with the United States Department of Agriculture (USDA), agricultural departments in other states, industry representatives, and the California Crop Improvement Association. The Program is responsible for insuring quality seeds for the production of safe and healthy food grown by California farmers. An advisory board of nine seed industry members and two public members provides oversight of the Seed Services Program for the department.



Photo Courtesy of Cathy Vue (CDFA)

The primary activity of the Seed Services Program is to administer the California seed law. Enforcement activities are conducted throughout the state and are funded entirely through an annual assessment on the value of agricultural, vegetable and grass seed sold in California. Staff of the Seed Services Program assist county agricultural commissioners in all seed-related enforcement activities and evaluate compliance at the local and statewide level. Associate Agricultural Biologists with the California Department of Food and Agriculture coordinate enforcement activities of assigned counties and conduct seed sampling as well as perform extensive investigations for seed complaints.

The total number of firms registered to sell seed in California remained around 500 firms in FY 2009/10. The value of seed sold for planting in California exceeded \$495 million in FY 2009/10, which is slightly less than reported sales in FY 2008/09. The reduction in reported dollar amount of sales can be attributed almost exclusively to a reporting error by a larger seed company that mistakenly reported their total worldwide sales in FY 2008/09 rather than just their California sales.



Photo Courtesy of John Heaton (CDFA)

Expenditures by the Seed Services Program for FY 2009/10 were \$1,070,973. Major expenditures were the funding of the department's seed laboratory (\$379,911), the Seed Biotechnology Center at the University of California, Davis (\$200,000) and seed subvention contracts paid to agricultural commissioners (\$120,000).

An overall reduction in expenditures from prior years enabled the Seed Advisory



Board to recommend a reduced assessment rate of \$0.28 per hundred dollars of gross seed sales. While employee furloughs caused a temporary reduction in expenditures, it was only because of increased enforcement efforts that identified over 100 firms not previously reporting their sales that the Program was able to increase collections and the Board was able to recommend a reduction in the assessment rate. The 28 cent assessment rate represents a 12 percent reduction from the 32 cent assessment rate collected in previous years.

The annual subvention to county agricultural commissioners for the enforcement of the California Seed Law remains at \$120,000 and is authorized by FAC section 52323. This voluntary program uses monthly enforcement reports submitted by counties to monitor work and establish the annual funding for each county. The commissioners are required to maintain a compliance level of at least 85 percent on the labels of all seed offered for sale in their respective counties. In FY 2009/10, county personnel evaluated 3,022 labels of unique seed lots offered for sale. The labels on 2,758 additional seed lots from out-of-state seed suppliers were also inspected by county staff for compliance. Fifty stop-sale orders were issued on 76,000 pounds of agricultural seed and 182,000 pounds of grass seed. Twenty-seven stop sale orders were released once the labeling issues were corrected or the seed was denied entry into California.

In addition to assuring label compliance, the Seed Services Program administers an alternative dispute resolution process for farmers and labelers that have a disagreement over the quality of seed. Participation in the dispute resolution process is a mandatory prerequisite before pursuing legal remedy in court for a seed complaint. In FY 2009/10, the Seed Services Program conducted four investigations related to complaints involving poor quality seed. Three of the disputes were resolved during conciliation and one is currently pending.

Agricultural biologists at CDFA collected over 537 seed samples as part of the compliance marketing efforts in the state. The samples are analyzed by the CDFA Seed Laboratory in Sacramento. A recent analysis of the laboratory's results revealed that greater than 90 percent of the samples were in compliance. Only six percent were found to be out of compliance. Two percent of the samples collected were for investigative purposes and another two percent were sent to the Federal Seed Lab



Photo Courtesy of Cathy Vue (CDFA)



for confirmation of variety type. Of the non-compliant samples, about 21 percent were cited for misrepresenting germination, while 42 percent had slight misrepresentations of the percent of pure seed and 61 percent of the failed samples had slight misrepresentations of inert material.

The Seed Services Program will continue its efforts to prevent violations of the Plant Variety Protection Act (PVPA) and Certified Seed standards. Records of Inspection submitted by county inspectors assist the Seed Services Program to identify possible violations of FAC section 52489, which states it is illegal to violate specific sections of the PVPA. The Seed Services Program will also continue to work with the Federal Seed Regulatory and Testing Branch, as well as the California Crop Improvement Association, to implement additional measures that insure seeds sold in California are free of pests and of the best quality available for our growers.

QUALITY COTTON

The Quality Cotton Program has the primary responsibility of enforcing the San Joaquin Valley Cotton District laws and regulations. The Cotton District consists of all counties in the San Joaquin Valley. The 22-member San Joaquin Valley Cotton Board, composed of cotton growers, cotton industry representatives and public members, administers the Program. Cotton growers and industry members are elected to the Board by their peers. One of the Board's major duties is to establish quality standards for San Joaquin Valley Acala and Pima varieties. To accomplish this, the Board has a multi-location cotton variety-testing program. The Board meets at least three times a year to review



Photo Courtesy of Mike Colvin (CDFA)

the progress of its variety-testing program and determines which new varieties meet or exceed existing quality standards and are superior in some meaningful respect, such as improved yield or resistance to disease. The exceptional quality and yield of the cottons in the District are a reflection of the Board's sound decisions.

Throughout the year, Board committees examine major cotton issues in order to make well-researched recommendations to the full Board.

For the first time in a decade, CDFA's Pink Bollworm Program reported an increase in total cotton acreage in the San Joaquin Valley. Pima acreage was 181,955, up almost 53 percent and Upland acreage (including Acala) was 107,530, up 73 percent from 2009. The total cotton acreage was 289,485, an increase of 108,205 acres. Most experts predict that the acreage will increase next year.



Due to this continued pattern of declining acreage in the San Joaquin Valley and the resulting funding issues, the Board is considering ways to further reduce operations of the Program.

In 2010, due to the unforeseen future of the Program, no assessments were collected for the San Joaquin Valley Cotton District. As a result, the Program operated off of reserve assessment funds from previous years. The assessments are the primary source of income for the Board's testing program and the enforcement of the San Joaquin Valley Quality Cotton District Laws and Regulations.

COMPLIANCE AGREEMENTS ISSUED IN 2010

County	Nursery	Commodity	Other	Total
Alameda	10	0	8	18
Contra Costa	5	0	35	40
Los Angeles	6	0	1	7
Marin	1	2	2	5
Monterey	2	60	4	66
Sacramento	7	7	3	17
San Benito	0	11	1	12
San Diego	277	3	19	299
San Francisco	0	1	2	3
San Joaquin	2	112	18	132
San Luis Obispo	3	10	0	13
San Mateo	4	4	0	8
Santa Clara	3	16	1	20
Santa Cruz	5	24	1	30
Yolo	0	1	2	3
Total	325	251	97	673



TABLE OF CONTENTS

PEST DETECTION	56
<i>Exotic Fruit Fly Program</i>	57
<i>Gypsy Moth Program</i>	59
<i>Japanese Beetle Program</i>	60
<i>Additional Insect Surveys</i>	61
EMERGENCY PROJECTS	67
MULTI-YEAR ERADICATION PROJECTS	69
ESTABLISHED PEST PREVENTION PROGRAM	75



PEST DETECTION/EMERGENCY PROJECTS

About

The Pest Detection/Emergency Projects Branch (PD/EP) is a component of California's pest prevention system, and has the following overall objective and vision:

Objective and Vision: To initiate and operate programs designed to detect and eradicate exotic pest infestations before the pests become established in California.

California is extraordinarily susceptible to invasive species with the increased risks associated with the number of international passengers and the amount of cargo entering the State. California maintains 11 seaports that handle over 32 percent of our nation's trade. In 2010, the ports of Los Angeles and Long Beach ranked one and two respectively in North America Container Traffic (Canada, Mexico and the United States) by TEU's (Twenty-foot equivalent unit ~ cargo containers). The Port of Los Angeles handled 7,800,000 TEU's and Long Beach 6,263,499 TEU's.

New pest pathways and escalating pest pressures go hand-in-hand with the State's rising population and the upsurge in the movement of goods and materials into the State. Global trade brings a host of unwanted pests that compromises the pest prevention system. The Pest Detection and Emergency Projects (PD/EP) branch's role in the California Department of Food and Agriculture's (CDFA) pest prevention system is to detect exotic insects as soon as possible after their introduction into the State. The branch operates a statewide detection trapping program, conducts special detection surveys and maintains teams of emergency projects responders.

Through the early detection of exotic plant pests, PD/EP increases the potential for eradication by minimizing the size of the area that needs to be treated. The detection system is designed to find insect pests before they infest one square mile or more and plant diseases before they infest one-half of a square mile. This approach also reduces the impact on the public and the environment by avoiding large area treatment programs. Consistent with this goal, staff develops specific action plans for eradicating pest infestations. These action plans outline the necessary steps for eliminating the most serious pests that may require regulatory action.

2010 HIGHLIGHTS

- ◆ Red Palm Weevil (RPW) was detected in Orange County. This is the first detection of RPW in the United States.
- ◆ After the initial 2009 detections in Napa County, the European grapevine moth (EGVM) was detected in 9 more California counties (Fresno, Mendocino, Merced, Monterey, San Joaquin, Santa Clara, Santa Cruz, Solano, and Sonoma).
- ◆ Asian citrus psyllid (ACP) was detected in Riverside, San Bernardino and Ventura counties for the first time.



- ◆ The gypsy moth infestation in Ojai was declared eradicated.
- ◆ Melon fly was detected in Arvin, Kern County. This is the first detection of melon fly in the county.
- ◆ Mediterranean fruit fly was detected in Imperial County. This is the first medfly detection in the county.

PEST DETECTION

Pest detection is the second line of defense, after the Border Protection Stations (BPS) and the Customs and Border Protection (CBP), against the permanent establishment of exotic insect pests and plant diseases in California. Despite regulations, point of entry inspections, and best practices to keep exotic pests out of the State, non-native pests continue to invade California. Exotic insect pests have an enormous host range and are difficult and costly to manage once established in an area. They are also very difficult to eradicate, especially in the California environment where the climate is similar to their native habitat and their natural predators are not present. Additionally, California offers a wide variety of ecological niches where invasive pests can become quickly established.

Early detection protects more than agriculture. Limiting the need for pesticide applications protects the environment as less pesticide is released into the environment.

STATEWIDE TRAPPING

California’s moderate, Mediterranean climate, coupled with the State’s fertile soil and diverse land resources, allows year-round production of many commodities. A great number of crops in California would be threatened by the introduction of exotic pests. Early detection is the key to preventing large infestations and possible establishment of exotic pests.

The foundation of the detection program is a statewide trapping program. The statewide trapping network deploys over 111,000 traps, targeting many federal-actionable pests, including exotic fruit flies, Japanese beetle and gypsy moth (Table 1).

TABLE 1 - NUMBERS OF EXOTIC INSECT TRAPS BY TRAP TYPE AND LURE

Trap Type	Jackson	Jackson	Jackson	McPhail	ChamP	Gypsy Moth	Japanese Beetle
Targeted Pest	Mediterranean Fruit Fly	Oriental Fruit Fly	Melon Fly	Exotic Fruit Flies	Exotic Fruit Flies	Gypsy Moth	Japanese Beetle
Number of Traps	24,231	19,923	19,550	19,426	2,603	15,059	10,232



The Branch administers the statewide detection trapping program through trapping contracts with 47 (of its 58) county departments of agriculture. State personnel maintain the trapping programs in Marin, Mendocino, Orange, Riverside, San Francisco, Santa Barbara, Santa Clara, Ventura and Yuba counties.

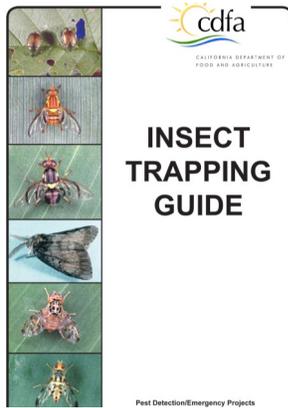


Figure 1—Insect Trapping Guide

The foundations for the statewide detection trapping program are contained in the Insect Trapping Guide (ITG). The ITG (Figure 1) provides information for trap placement, inspection and maintenance. The ITG also contains: color plates showing the statewide trap density for the pests listed in Table 1, images of these target pests, the traps and attractants used to detect them, tables of the trapping seasons and host preferences for placing the traps.

Quality control inspections emphasizing correct trap placement, host selection, timeliness of inspections, record keeping and the ability to identify target insects are performed by PD/EP entomologists on all trapping programs to ensure that they are biologically sound as referenced by the Branch’s Insect Trapping Guide.

EXOTIC FRUIT FLY PROGRAM

Due to California’s moderate climate, availability of host plants, agricultural and residential plantings, international trade patterns and culturally diverse population demographics, the risk of introduction of exotic fruit flies in the State is very high. The California exotic fruit fly detection program is a cooperative effort between PD/EP, the United States Department of Agriculture (USDA) and the California county agricultural commissioners. The detection program is designed to trap new introductions of target flies as they occur before they become breeding populations. This trapping program provides assurance to California’s trading partners that the State is free from these economically damaging pests.

Figure 2— Mediterranean Fruit Fly Trap in Nectarine Tree



The development of species specific lures allows for a variety of trap types in combination with different attractants (Figure 2). During the 2010 trapping season, over 85,000 exotic fruit fly traps were in place for detection monitoring (Table 1).

EXOTIC FRUIT FLY DETECTIONS IN 2010

In 2010, 39 exotic fruit fly adults representing seven species were captured in nine California counties (Table 2 and Figures 3 through 7). These detections triggered 21 delimitation trapping programs and 5 eradication projects.



PLANT HEALTH ANNUAL REPORT

TABLE 2—EXOTIC FRUIT FLIES DETECTED

Pest	County	Number Detected	Total by Species
<i>Anastrepha fraterculus</i> South American fruit fly	Los Angeles	1	1
<i>Bactrocera correcta</i> Guava fruit fly	Los Angeles	1	3
	Orange	1	
	San Mateo	1	
<i>Bactrocera cucurbitae</i> Melon Fly	Kern	8	8
<i>Bactrocera dorsalis</i> complex Oriental fruit fly	Los Angeles	11	23
	Marin	1	
	Orange	2	
	Sacramento	1	
	San Bernardino	6	
<i>Bactrocera dorsalis</i> complex Oriental fruit fly	Santa Clara	2	
<i>Bactrocera scutellata</i> Striped fruit fly	Los Angeles	2	2
<i>Bactrocera zonata</i> Peach fruit fly	Sacramento	1	1
<i>Ceratitis capitata</i> Mediterranean fruit fly	Imperial	1	1
Total	39		



Figure 3.
Northern California



Figure 4.
San Francisco Bay Area



Figure 5.
Central Valley



Figure 6.
Los Angeles Basin

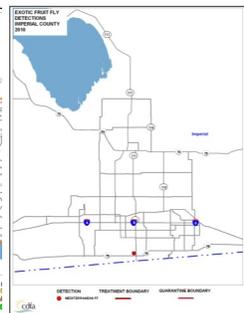


Figure 7.
Imperial County

Note: For larger map, please see Maps, page 135 - or - click on Figure links.



GYPSY MOTH PROGRAM

The gypsy moth causes defoliation in millions of acres annually, attacking hardwood forest and shade trees in Europe and the eastern United States. Gypsy moth larvae generally prefer oaks, but may feed on several hundred different species of trees and shrubs. The gypsy moth is a major threat to California forests and urban forests.

The Asian gypsy moth (AGM), also a voracious pest of trees, is a race of this species that occurs in Eastern Europe and Asia. Since the female AGM is an active flyer, capable of flying up to 25 miles, an introduction of AGM into California would pose a major threat. AGM is not known to be established in North America. CDFA's Pest Exclusion and PD/EP branches, along with the USDA and county agricultural commissioners, have prevented the establishment of these moths in California through detection and treatment programs.

GYPSY MOTH DETECTION



Figure 8.
Gypsy Moth Trap Detection

During the 2010 season, 17,177 delta traps were deployed to monitor gypsy moth (GM) and Asian gypsy moth (AGM) introductions as part of California's program to detect and delimit new GM and/or AGM infestations. Traps are placed in rural and urban residential areas of the State where there are 300 or more homes per square mile. Trap density is two traps per square mile in California's 58 counties California ports receiving shipments from Russia, the Far East and Japan have traps placed at the rate of 25 delta traps per square mile in a one-mile buffer around each port (*See Cooperative Agricultural Pest Surveys (CAPS), Table 6, Figure 9*).

During the 2010 season, one gypsy moth was trapped in Palo Alto - Santa Clara County (Table 4, Figure 8). Additional traps were deployed at the rate of 25 per square mile in the four square mile area surrounding the detection site. This specimen was analyzed for possible AGM identification using the mitochondrial DNA test as well as the FS1 Nuclear DNA test. The results were negative for AGM.

Note: For larger map, please see Maps, page 135 - or - click on Figure link.

2010 GYPSY MOTH DEPLOYMENT AND DELIMITATION TRAPPING

Due to the life cycle of the gypsy moth (GM), two years of negative trapping for the adult moth is required to declare an area free from GM. In 2010, delta traps baited with disparlure were deployed in Los Angeles, Santa Clara and Ventura Counties to delimit possible GM infestations from the 2009 find (Santa Clara), the 2007 and 2008 finds (Los Angeles and Ventura), and the two AGM's detected in 2009 (Los Angeles). No additional moths were detected in these traps.



PLANT HEALTH ANNUAL REPORT

TABLE 4 – GYPSY MOTH DELIMITATION TRAPPING IN LOS ANGELES, SANTA CLARA AND VENTURA COUNTIES

County	City	Number of traps
Los Angeles	2007 Carson (AGM)	2,014
	2007/2009 Rolling Hills/San Pedro/ Wilmington (AGM)	2,388
Santa Clara	2009 Los Gatos (GM)	77
	2010 Palo Alto (GM)	100
Ventura	2007 Ojai (GM)	155
Total		4,734

JAPANESE BEETLE PROGRAM



Figure 9. Leaves skeletonized by Japanese Beetle—Kentucky

The Japanese beetle (JB) is a serious pest of turf, crops and ornamental plants (Figure 9). This pest is established in the eastern United States. The four parts of this program are: high hazard trapping, statewide JB detection trapping, aircraft inspection and air cargo facility trapping.

Aircraft originating from east of the Mississippi River are a high-risk pathway for the introduction of JB. This is supported by the large number of beetles collected on aircraft from infested states (Table 5). The Branch prevents the establishment of JB in California through its aircraft inspection program and the statewide deployment of traps.

JAPANESE BEETLE DETECTION

In 2010, 13,578 JB traps were deployed throughout the urban and high-risk areas of the State. Additionally, 5,142 traps were placed at high hazard sites, air cargo facilities and the 11 airports where inspections were performed.

The trap density for statewide JB detection is two traps per square mile. A high-density trapping array is deployed in a one-mile buffer around each airport and at transfer/sorting facilities used by air cargo and express mail carriers. Four JBs were trapped in proximity to the Los Angeles International (2) and



Ontario (1) Airports and the Lemoore NAS (1) in Kern County. One beetle was trapped in a general detection trap in Elk Grove, Sacramento County.

AIRCRAFT INSPECTIONS

During the summer when adult JB are active, an intensive aircraft inspection program is implemented at California airports where incoming aircraft arrive from airports in JB-infested states. The program is designed to find and remove JB's hitchhiking in aircraft before they escape from the aircraft and enter the surrounding environment. Inspections yielded the interception of 371 JB's, (325 – dead, 46 – live) (Table 5).

TABLE 5 - NUMBER OF AIRCRAFT INSPECTED AND BEETLES COLLECTED BY AIRPORT

County	Airport	Number of Aircraft Inspected	JB Collected		
			Alive	Dead	Total
Alameda	Oakland International	418	2	39	41
Los Angeles	Burbank	236	0	34	34
	Long Beach	225	0	6	6
	Los Angeles International	4,404	18	74	92
Orange	John Wayne	346	0	6	6
Sacramento	Mather	137	7	30	37
	Sacramento International	90	0	1	1
San Bernardino	Ontario	916	18	126	144
San Diego	Lindbergh Field	1,780	0	5	5
San Francisco	San Francisco International	134	0	0	0
Santa Clara	San Jose International	93	1	4	5
Total		46	325	371	

ADDITIONAL INSECT SURVEYS

COUNTY COMMITMENT

The county agricultural commissioners maintain additional detection traps over and above those funded through pest detection contracts with PD/EP. The types of traps deployed target those pests that pose a risk to their counties. These include:



PLANT HEALTH ANNUAL REPORT

EUROPEAN CORN BORER

European corn borer (ECB) is a major pest of corn and can infest a wide variety of herbaceous plants. European corn borer is known to feed on 250 plants. Since its introduction, it has become established in most of the states east of the Rocky Mountains. Typical damage to corn plants caused by this insect is reduced plant vigor, leading to subsequent ear drop and stalk lodging. The 2010 survey was negative for ECB in California where sixty four traps were placed in ten counties.

EUROPEAN PINE SHOOT MOTH

European pine shoot moth is a destructive pest of ornamental, Christmas tree and timber pines. In the United States, this insect pest currently infests Connecticut, Delaware, Illinois, Indiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, Ohio, Oregon, Pennsylvania, Rhode Island, Washington, West Virginia and Wisconsin. As a result of the feeding damage, trees will have dead and stunted shoots. Infested trees are bushy and distorted. The 2010 survey was negative for the presence of European pine shoot moth in California where 31 traps were placed in six counties.

KHAPRA BEETLE

Khapra beetle (KB) is the world's most destructive pest of many stored grains and grain products. The KB is not known to occur in the United States. If left uncontrolled, the insect can make the surface of a grain storage facility appear alive with crawling larvae. They not only consume the grain, but may also contaminate it with body parts, which are known to cause human adult and especially infant gastrointestinal irritation. Branch entomologists, in conjunction with county staff, deployed and inspected 1,787 traps in 16 counties to guard against an introduction of this pest. The 2010 survey was negative for the presence of KB in California.

COOPERATIVE AGRICULTURAL PEST SURVEYS (CAPS)

The primary function of Cooperative Agricultural Pest Surveys (CAPS) is to survey, identify and monitor for pests of concern to U.S. agriculture and plant resources. CAPS program objectives are to detect exotic pests before they become well established, facilitate the export of agricultural products and collect and manage survey data. Through the CAPS program, PD/EP surveyed for the following exotic pests: Asian gypsy moth, cereal leaf beetle, citrus canker, Huanglongbing or yellow shoot disease, false codling moth, karnal bunt, plum pox potyvirus, potato cyst nematode. The PD/EP Branch assisted the Integrated Pest Control Branch with the exotic woodboring beetle and the red bay ambrosia beetle survey.

As part of the postentry quarantine program, PD/EP staff work with county staffs to inspect plant shipments for pests and diseases, and exclude them from entering California.

ASIAN GYPSY MOTH (AGM) SURVEY AT SEAPORTS

Eight deep water ports in Alameda, Humboldt, Los Angeles, Sacramento (delta), San Diego, San Francisco, San Joaquin (delta) and Ventura counties were trapped in a one-mile radius surrounding the



ports at a density of 25 traps per square mile for AGM. Deep water ports present a high risk for AGM introduction, as ships from Asian and Russian ports frequently carry AGM egg masses. These egg masses can hatch at or near United States ports, allowing larvae to be blown onshore. There were 1,204 traps for AGM placed in these counties. Additionally, at a density of five traps per square mile, traps targeting Pink gypsy moth, nun moth and Siberian silk moth were also placed at these ports. All traps were negative for these exotic moths (Table 6, Figure 10).

TABLE 6 - HIGH RISK PORT TRAPPING

County	Port	Asian Gypsy Moth	Pink Gypsy Moth	Nun Moth	Siberian Silk Moth	Number Detected
Alameda	Oakland	175	0	25	32	0
Humboldt	Humboldt	132	0	21	21	0
Los Angeles	Long Beach	450	20	70	70	0
San Diego	San Diego	97	0	21	23	0
San Francisco	San Francisco	112	0	16	24	0
San Joaquin	Stockton	100	0	20	20	0
Ventura	Hueneme	30	0	15	15	0
Yolo	West Sacramento	108	0	22	22	0
Total	1,204	20	210	227	0	



Figure 10.
Asian Gypsy Moth Seaport Traps

Note: For larger map, please see Maps, page 135 - or - click on Figure link.



PLANT HEALTH ANNUAL REPORT

CEREAL LEAF BEETLE SURVEY

Cereal leaf beetle (CLB) can cause considerable damage to barley, oats, wheat and rye. The CLB feeds on plant foliage, resulting in elongated, slender slits in the upper leaf surface. This damage can significantly reduce grain yield and quality. This beetle infests a number of other states. Branch entomologists conducted sweep net surveys at 2,229 sites in 57 counties to monitor for this pest. The 2010 survey was negative for the presence of CLB in California.

CITRUS COMMODITIES

This survey is for a series of diseases and their vectors that affect citrus. Staff plant pathologists surveyed for the following: citrus canker, Huanglongbing (HLB) or yellow shoot disease, Asian citrus psyllid, citrus variegated chlorosis and brown citrus aphid. Annually, 25 percent of the commercial citrus acreage is surveyed for the presence of these diseases and insect vectors. In addition to these surveys, yellow panel traps were placed at packing houses receiving citrus from countries known to be infested with Asian citrus psyllid, as well as around airports and markets that have received commodities from areas that are infested with live Asian citrus psyllid.

This survey occurred in 30 counties throughout the State. Entities that were surveyed include commercial citrus groves, nurseries that sell citrus plants or *Murraya paniculata*, citrus production nurseries, retail stores, ethnic grocery stores that sell curry leaves and high risk urban areas (Table 7).

In 2010, 9,872 samples were submitted for HLB (the majority of HLB samples were from the residential areas in the southern district), citrus canker and citrus variegated chlorosis. All samples were negative for these diseases.

TABLE 7 - STATEWIDE CITRUS COMMODITIES SURVEY SUMMARY

District	Commercial Citrus (Acres)	Residen- tial	Citrus Nursery	Orna- mental Nursery	Retail Stores	Survey Traps	Survey Samples	Results
Northern	770.6	1720	4	1	88		74	Negative
Central	55,583	0	27	2	0		175	Negative
Southern	13,119	1,330	9	77	0	10	9,566	Negative
Total	69472.6	3050	40	80	88	10	9815	Negative

FALSE CODLING MOTH

The false codling moth (FCM) is one of the most important pests of citrus and cotton in sub-Saharan Africa. The larvae of this moth infest a wide variety of fruits, vegetables and forest trees, but cause the most damage to citrus and cotton. The citrus industry alone in California produces in excess of \$1.8 billion in agricultural value for the State, and citrus is widely planted at residences throughout the



State. Detections in 2002 and 2005 of live larvae entering California via citrus imported from South Africa demonstrate a continuing pathway for entry. In July, 2008, one adult FCM was trapped in Ventura County, a major citrus producing county. This discovery was a new record for the Americas.

In 2010, a detection survey occurred in 33 counties. There were 2,372 sites were trapped in traps (1,114) placed in host trees June through December. All traps were negative for FCM.

KARNAL BUNT

Karnal bunt is a fungal disease of wheat, durum wheat, rye and triticale. The causal agent of Karnal bunt is *Tilletia indica*, a pathogen that infects wheat seed at the time of flowering. The federal quarantine for Karnal bunt was lifted in 2010. However, statewide, 23 counties participated in a voluntary survey for Karnal bunt. During the 2010 wheat harvest, 50 samples were collected. All fields were negative for Karnal bunt.

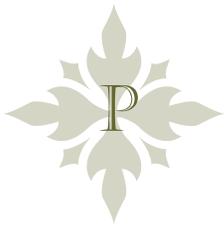
PLUM POX VIRUS

Plum pox potyvirus (PPV), also known as sharka, is the most devastating viral disease of stone fruit worldwide. The virus can cause a disease which severely reduces fruit yield and causes the production of blemished, unmarketable fruit. PPV has spread throughout Europe, the Mediterranean, the Middle East (Egypt and Syria), India, and Chile. The first documented detection of plum pox in North America was in a Pennsylvania orchard in 1999. A year later, Canadian officials detected PPV in Ontario and then, in 2006, United States detections were made in New York and Michigan. Currently, PPV is eradicated from Pennsylvania. New York still has an ongoing eradication program.

In 2010, commercial orchards in 14 California counties (2,524.4 acres) were surveyed for PPV. The 22,312 collected samples were submitted to the CDFA Plant Pest Diagnostic Center for analysis with negative results for PPV (Table 8).

TABLE 8 - STATEWIDE PLUM POX VIRUS SURVEY SUMMARY

County	Variety	Samples	Acreage	Results
Butte	Peach, Prune	2085	110.6	Negative
Fresno	Plum	3140	154	Negative
Glenn	Prune	2825	611	Negative
Kern	Nectarine, Peach	886	45.6	Negative
Kings	Nectarine, Plum, Pluot	1504	73.6	Negative
Los Angeles	Apricot, Nectarine, Peach, Plum	1783	109.6	Negative
Riverside	Apricot, Peach, Plum	124	6.2	Negative
Sacramento	Prune	770	135	Negative
San Benito	Cherry, Peach	560	29.5	Negative
San Joaquin	Apricot, Cherry	2610	392.5	Negative
Solano	Prune	1770	401	Negative
Stanislaus	Almonds	540	40	Negative
Sutter	Peach, Prune	1905	313	Negative
Tulare	Cherry, Nectarine, Peach, Plum	1810	103	Negative
Total		22,312	2,524.4	



PLANT HEALTH ANNUAL REPORT

POTATO CYST NEMATODE (PCN) SURVEY

Due to the detection of PCN in Idaho in 2006, the USDA holds a federal quarantine against the pest and requires a national survey of all certified seed potato fields. The objective of the nematode survey is to obtain current information on the occurrence and distribution of the PCN. These nematodes are parasites of over 90 species of solanaceous plants, such as potato, tomato and eggplant.

The 2010 PCN survey was based on California's 2009 and 2010 cultivated potato acreage. All seed potato fields in California were targeted for sampling and approximately 10% of the production fields within the selected counties were randomly selected for sampling. A total of 2,847 soil samples were submitted to the CDFA Plant Pest Diagnostic Center for identification (Table 9). All samples were negative for PCN.

TABLE 9 - POTATO CYST NEMATODE SURVEY DATA

County	Number of Soil Samples Processed		Total
	Seed Potato	Production Potato	
Kern	268	1,254	1,522
Modoc	0	90	90
Monterey	0	100	100
San Joaquin	610	0	610
Santa Barbara	166	0	166
Siskiyou	0	309	309
Sonoma	0	29	29
Yolo	0	21	21
Total	1,044	1,803	2,847

REDBAY AMBROSIA BEETLE

Redbay ambrosia beetle (*Xyleborus glabratus*), an exotic wood-boring insect, has the potential to vector a mycopathogen (*Raffaelea lauricola*) a deadly disease of avocado and other trees in the Laurel family. If infected, tree mortality can occur in six weeks. First detected in the U.S. near Savannah, GA in 2002, the beetle and *Raffaelea lauricola* have spread along the coast into South Carolina and Florida. In 2010, Lindgren funnel traps baited with manuka oil were placed in Los Angeles, Orange, San Diego and Ventura counties to detect the presence of redbay ambrosia beetle. Traps were placed at residential sites with avocado or bay laurel trees and/or commercial avocado groves. No beetles were detected.



OTHER SURVEYS

STATEWIDE POST-ENTRY QUARANTINE PROGRAM

The Post-entry Quarantine Program is a cooperative federal-state undertaking. By agreement, state plant pathologists and entomologists with specialized training perform field inspections of post-entry quarantine material (e.g., plant stock, plant cuttings, and bulbs). The purpose of the program is to conduct a survey of the growing site to determine whether to approve the site for placement of plant materials and to inspect post-entered plant material during the growing period for pests. In 2010, PD/EP staff inspected 94 shipments of various plants in 21 counties.

EMERGENCY PROJECTS

The PD/EP Branch provides the Division of Plant Health and Pest Prevention Services first response resources for combating introductions of catastrophic plant pests and diseases. Responding to a new pest or disease is similar to responding to a fire -- if the response is immediate; it is more effective, less damaging and substantially less costly.

The most important element of a successful response involves timing. Pests and diseases damage plants and animals at an exponential rate over time. Further, if eradication is not possible and the pest becomes established in a significant population, such as animal pests in wildlife or wilderness and exotic fruit fly pests in urban environments, pest becomes more difficult to control and control costs increase.

Early detection of incipient invasions and quick coordinated responses are needed to eradicate or contain invasive species before they become too widespread and control becomes technically and/or financially burdensome or, in some cases, impossible. To accomplish this, PD/EP maintains a Pest Response Team (PRT) that is trained in delimitation trapping, larval survey and treatment operations. Teams respond to infestations anywhere in the State within 24 hours. Action plans for specific pests have been developed by PD/EP scientific staff, scientists from other cooperating agencies and universities.

ERADICATION PROGRAMS

ORIENTAL FRUIT FLY COMPLEX

The oriental fruit fly complex comprises 68 species with varying distributions in Asia, Australia and the Pacific Islands. This complex is recognized as one of the most damaging fruit fly pests in the world due to its very wide host range, high reproductive potential, high mobility and adaptability to climate. This complex attacks over 230 different kinds of fruit. Two non-native fruit fly species now established in Hawai'i, *Bactrocera dorsalis* and *Bactrocera carambolae*, are now at increased risk of being introduced



PLANT HEALTH ANNUAL REPORT

into California primarily via air travel and tourism.

Four eradication programs were initiated in 2010. Two eradication programs from 2009 continued into 2010 – post treatment trapping - and were declared eradicated in 2010 (Table 10). Quarantines were established for finds in Pasadena/San Marino, Los Angeles County and North Highlands, Sacramento Counties. The primary treatment method for this group of flies is male attractant technique, which consists of applying a minimum of 600 (methyl eugenol (lure) mixed with insecticide) bait stations per square mile every two weeks for two generations of the fly. Eradication has been declared for one of the four 2010 infested areas. Three of these eradication projects are still in progress.

TABLE 10 - ORIENTAL FRUIT FLY COMPLEX ERADICATION PROJECTS

County	City	Number Trapped	Treatment Area (square)	Eradication Status	Miles under Quarantine
Los Angeles	La Verne ¹	6	14	Eradicated	84
	Pasadena/San Marino	7	15.9	In progress	89
Sacramento	Elk Grove ¹	3	7.3	Eradicated	0
	North Highlands	1	12.3	Eradicated	79
San Bernardino	Rancho Cucamonga	6	24	In progress	0
Santa Clara	Milpitas	2	11.6	In progress	0
Total	16	63.8			

¹ Program began in 2009 and post-treatment trapping continued into 2010.

MELON FLY

Within its range, the melon fly, *Bactrocera cucurbitae* (Coquillett), is one of the most important pests with which vegetable growers have to contend. Although found in Hawaii, it is not present in the continental United States. The melon fly is well distributed over most of India, which is considered its native home, and throughout most of southeastern Asia. It was introduced into the Hawaiian Islands from Japan about 1895, and by 1897, when it was first observed, it was already a serious pest. The melon fly was first found in California in 1956 and has been captured sporadically over the years. All infestations have been successfully eradicated.

In August, 2010, five melon flies were detected in one trap in Kern County. Upon placement of high density traps, three more flies were trapped. In response, 12,819 eradication traps were placed in a 20 square mile area surrounding the finds. A foliar spray with Spinosad® was applied within 200 meters of the three detection sites. Fruit removal occurred on the infested and adjacent properties. Three properties were involved and 70,661 pounds of fruit was removed and disposed of according to the melon fly action plan. Eradication traps will remain in place until the F₂ is complete (offspring of the first generation).



MULTI-YEAR ERADICATION PROJECTS

ASIAN CITRUS PSYLLID

The Asian citrus psyllid (ACP), an exotic pest originally from Asia, has been introduced into Central and South America, the Caribbean and Mexico. In the United States, ACP has been found in Alabama, Florida, Georgia, Hawaii, Louisiana, Mississippi, South Carolina, Texas and California. The ACP feeds on members of the Rutaceae, primarily on *Citrus* spp. and *Murraya* sp., but is also known to attack several other genera. The most serious damage caused by ACP is its ability to effectively vector the phloem-inhabiting bacterium *Candidatus liberibacter* spp. that causes huanglongbing (HLB). HLB is considered one of the most devastating diseases of citrus in the world. Symptoms of HLB include yellow shoots with mottling and chlorosis of the leaves, misshapen fruit, fruit that does not fully color, and fruit that has a very bitter taste making it unusable for human consumption. Once a tree is infected, there is no cure; the diseased tree declines and dies. The disease, HLB, is present in Florida, Georgia, the territory of Puerto Rico, and parts of Louisiana and South Carolina, and Mexico. Even without HLB, the psyllids cause injury to their host plants via the withdrawal of large amounts of sap as they feed and the production of large amounts of honeydew that coat the leaves of the tree, encouraging the growth of sooty mold and blocking sunlight from reaching the leaves. This pest presents a major threat to citrus grown within the State. California is the top citrus producing state in the U.S., with total production valued at over \$1.8 billion.

ACP was originally detected in San Diego and Imperial counties in 2008. Since then the psyllid has been found in Los Angeles, Orange, Riverside, San Bernardino, Santa Barbara and Ventura counties. Detections of ACP result in delimitation trapping and treatment 400-meters around the detection sites (Figures 10, 11 and 12). Treatment and trapping activities occurred in eight counties in 2010 (Table 11). The treatment trigger for ACP treatment is one psyllid find. All host plants on properties where ACP was detected were treated with imidacloprid (soil drench) and cyfluthrin (foliar spray).



Figure 11. Asian Citrus Psyllid Ventura County

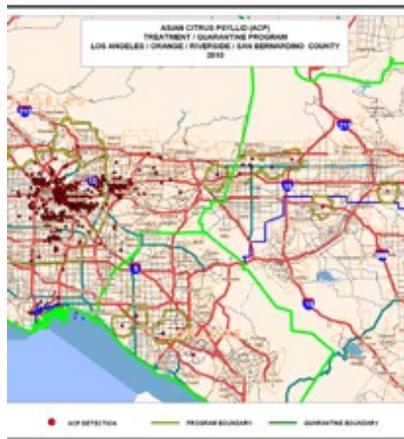


Figure 12. Asian Citrus Psyllid Los Angeles Basin



Figure 13. Asian Citrus Psyllid San Diego and Imperial Counties

Note: For larger map, please see Maps, page 135 - or - click on Figure links.



PLANT HEALTH ANNUAL REPORT



Yellow panel trap placed in citrus tree
Photo Courtesy of CDFA.

In all areas of California where ACP has been detected, survey for HLB occurs. Live psyllids and plant samples from ACP detection sites, and random properties, are sent to the Plant Pest Diagnostic Center for analysis. In 2010, HLB was not detected in Asian citrus psyllids or leaf samples taken from trees where ACP was detected.

Yellow panel traps were also placed in citrus trees (Figure 14) at exotic fruit fly trap sites throughout California to determine if ACP is present in these counties (Table 11).

TABLE 11 - ASIAN CITRUS PSYLLID PROGRAM DATA

County	Number of Detection Traps Placed	Number of Delimitation Traps Placed	Properties Treated in 2010	Samples Tested for HLB in 2010
Imperial ¹	2,830	670	6,535	2991
Los Angeles ¹	4,879	3,949	16,282	3780
Orange ¹	1,304	1,165	527	413
Riverside ¹	4,539	502	3	1218
San Bernardino ¹	1,199	2,705	299	74
San Diego ¹	2,456	713	1,048	219
Santa Barbara ¹	717	77	0	0
Ventura ¹	2,057	247	2	20
Non-quarantine	15,987	0	0	0
Total	35,968	10,028	24,696	8,715

¹Under partial or complete quarantine for ACP

²County and state-run traps

Two major components of the treatment program are public outreach and environmental monitoring. Public meetings are held within the treatment areas to inform residents of CDFA activities and answer any questions. Environmental monitoring ensures the protection of human health and the environment; sampling media include air, leaf, soil, tank and water. Leaf samples were also analyzed to determine uptake (assimilation) of imidacloprid in the citrus plants (Table 12).



TABLE 12 – TREATMENT EFFICACY AND ENVIRONMENTAL MONITORING SAMPLING - ASIAN CITRUS PSYLLID

County	Leaf samples for imidacloprid uptake	Air/Leaf/Tank/Soil/Fruit samples for pesticide (cyfluthrin and/or	Equipment check on treatment trucks ¹
Imperial	0	8	
Los Angeles	209	17	
Orange	12	6	
San Bernardino	0	28	
San Diego	115	4	
			8

¹ Random tank samples

EUROPEAN GRAPEVINE MOTH (EGVM)

The first detection of EGVM, *Lobesia botrana* (Figure 15), in North America occurred in Napa County in October 2009. In 2010, more than one hundred thousand moths were detected in the county. The infestation in Napa County, and subsequent trapping throughout California (Figure 16) triggered quarantines affecting portions of Napa, Solano and Sonoma counties. More isolated infestations resulted in smaller quarantines in portions of Fresno, Mendocino, Merced, San Joaquin and Santa Clara counties. Single moths were detected in Monterey and Santa Cruz counties, but with no additional moths trapped, no quarantines were implemented (Table 13, Figure 17).



Figure 15.
Adult European Grapevine Moth (EGVM)



Figure 16.
European Grapevine Moth Trap in Vineyard



Figure 17. EGVM Detections

Note: For larger map, please see Maps, page 135 - or - click on Figure link.



EGVM has two main hosts, grapes and olives, as well as many other minor hosts. EGVM is an important pest of grapes, in which losses of 80 percent have been reported. Young larvae can penetrate grape berries, hollowing them out leaving the skin and seeds. This causes direct damage to the berry and predisposes the grape clusters to fungus infection (mold).

Statewide, 40,176 traps were placed in 2010. State sponsored treatment consisted of fruit removal and, if the owner preferred, application of *Bacillus thuringiensis kurstaki*, *Btk*.

TABLE 13 - EUROPEAN GRAPEVINE MOTH ERADICATION PROJECTS

County	Number of Traps	Number Trapped	Fruit Removal	Quarantine
Fresno	8,431	11	Yes	Yes
Mendocino	1,336	36	Yes	Yes
Merced	848	4	Yes	Yes
Monterey	1,733	1	No	No
Napa	3,758	100,831	No	Yes
San Joaquin	3,522	2	Yes	Yes
Santa Clara	596	3	Yes	Yes
Santa Cruz	449	1	No	No
Solano	1,514	11	Yes	Yes
Sonoma	4,965	59	No	Yes

RED IMPORTED FIRE ANT

Since its introduction in the United States, the red imported fire ant (RIFA), *Solenopsis invicta*, has become a major agricultural and urban pest in the southeastern states. Because of its venomous sting and aggressive nature, RIFA is also a human health threat. In addition to agricultural problems such as interference of harvesting equipment by ant mounds and damage to young plant growth and fruit tree flowers, RIFA may completely eliminate ground nesting bird species from a given area. The PD/EP branch maintains eradication and regulatory programs against infestations in the Central Valley and parts of Southern California.

Northern California- Survey and Treatment Activities

A majority of the RIFA infestations can be traced back to out-of-state beehives that are brought into California with hitchhiking RIFA on the pallets the hives are placed on, and within the hives themselves. These bee colonies are brought into the State to pollinate the almond blossoms.



General survey targets almond orchards, specifically the areas where the beehives have been placed within the orchard. Spam® bait are placed systematically throughout the orchard and inspected for RIFA. If RIFA are discovered delimitation survey, treatment, and post-treatment survey occur (Tables 14 and 15). Infested properties are treated with abamectin, pyriproxyfen and /or methoprene depending on the crop and product labeling. Properties are treated three times a year until eight treatments have been completed. After three consecutive, negative post-treatment surveys, a property is considered RIFA-free.

TABLE 14. RIFA SURVEY

Survey - by Type	County	Location	Acres	Status
General	Kern	General	10,524	Negative
Delimitation	Merced	Ballico/Cressey	1,890	Positive
Post-treatment	Madera	General	325	Negative
		Chowchilla	2,371	548 acres infested
	Merced	Ballico/Cressey	910	Positive
	Stanislaus	Turlock	325	Negative

TABLE 15. RIFA TREATMENT

Treatment	County	Acres
	Madera	2,668
	Merced	6,680
	Stanislaus	10
Total		9,358

In November, three RIFA were collected from a nursery at a big box store in Delano (Kern County). This was the first RIFA find in the county since 2006. It is believed the RIFA came into the nursery on large potted palm trees.

Southern California – Quarantine and Regulatory Activities

The RIFA quarantine is designed to contain the spread of RIFA by requiring inspection and treatment of articles (nursery stock, soil, landscaping and beehives). Three counties are regulated in the 865.5 square mile quarantine zone: all of Orange (790 square miles), parts of Riverside (67 square miles) and parts of Los Angeles (8.5 square miles).

Infestations within the quarantine area are treated to prevent the movement of the ant. Necessary treatments on residential, commercial and public land are applied by County Vector Control Districts in Orange County and the Coachella Valley (Riverside County). In Los Angeles County, inspectors from the agricultural commissioner’s office make the insecticide application.



PLANT HEALTH ANNUAL REPORT

Regulatory enforcement of the RIFA quarantine is accomplished by issuing compliance agreements to businesses and individuals within the quarantine areas that commercially grow, produce, propagate, handle, store, maintain, ship, transport or process regulated articles and commodities. Establishments within the compliance program follow specified treatment procedures necessary to ensure that the commodities intended for movement are free from RIFA. Program staff issued 118 new compliance agreements, bringing the number of monitored establishments to 6,271.

RIFA has been found in 110 nurseries since the beginning of inspections in October 1998. Ninety nurseries have completed treatment protocols and were taken out of positive nursery classification after four consecutive negative quarterly surveys. Twenty nurseries are still under treatment (broadcast bait) for RIFA.

RED PALM WEEVIL

In September, 2010, the Orange County entomologist notified CDFA of a weevil submission in Laguna Beach, Orange County by a pest control advisor. The weevil was identified as Red Palm Weevil, *Rhynchophorus ferrugineus*, (Figure 18), the most serious pest of date palms in the world. Damage to palms occurs as the weevil larvae and adults tunnel and feed inside the crown and trunk (Figure 19); this damage can result in the death of mature trees within two to three years. Primary hosts of the red palm weevil include 24 species of palms in 14 genera. One of these is the most common landscape palm found in California, the Canary Island Palm. Red palm weevil represents a potential threat to California's \$30 million dollar date crop should it become established in date-growing areas of California. Ornamental palm tree sales are estimated at \$70 million per year in California.



Figure 18.
Adult Red Palm Weevil
Photo by John Kabashima



Figure 19.
Symptomatic Tree in Laguna Beach
Photo by Laura Petro (CDFA)



Figure 20.
Inspector Checking Red Palm Weevil Trap (Photo by CDFA)

Subsequent survey in Laguna Beach of 1,963 properties and 13,485 palm trees in the vicinity of the September residential property resulted in three properties being identified with RPW. This is the first record of RPW in the United States.



OTHER SURVEY(S) OF NOTE

DUPONCHELIA FOVEALIS

Duponchelia fovealis is listed as a pest of quarantine significance by the USDA. The moth has a broad host range and larvae can cause damage to leaves, crowns and stems in vegetables - such as peppers, pomegranates, aquatic and bedding plants, and nursery stock. In May 2010, the Canadian Food Inspection Agency (CFIQ) notified the USDA of an interception of *Duponchelia fovealis* larvae in a nursery shipment originating from Vista, San Diego County. The nursery was treated by the owner and then inspected by county staff; no larvae were found. CDFA placed traps in the square miles around two nurseries in San Diego County - one nursery in San Marcos where *D. fovealis* was detected in 2004 and the nursery in Vista for the 2010 detection. The traps were placed the week of June 28, and the first moths were trapped on July 1. Trace forward information provided by the affected nurseries resulted in the expansion of detection surveys in 26 counties within California. Traps were placed at five per square mile around trace forward locations. More than 6,052 moths were detected and confirmed in 16 counties in California - primarily in the environment and on a wide range of hosts. During September and October 2010, *D fovealis* was confirmed in fourteen additional states including: Alabama, Arizona, Colorado, Florida, Georgia, Maine, Mississippi, North Carolina, Oklahoma, Oregon, South Carolina, Tennessee, Texas, and Washington. The moth is primarily considered a greenhouse pest and doesn't tolerate harsh winters.

HARRISIA CACTUS MEALYBUG (HCM)

In August, 2010, *Harrisia cactus mealybug*, *Hypogeococcus pungens*, (HCM) a threat to columnar cacti in the subfamily Cactoideae, was confirmed from a residence in Beverly Hills. This is the first detection of HCM in California. HCM is native to South America and is currently distributed in Florida and Puerto Rico. In response to this detection, PD/EP staff visually surveyed host plants on 166 properties, in a 400-meter radius around the detection site, to determine if the HCM spread to other properties. While more samples were confirmed at the initial site, no HCM was detected on other properties.

ESTABLISHED PEST PREVENTION PROGRAMS

HAWAII FRUIT FLY REARING FACILITY

The Hawaii Fruit Fly Rearing Facility (HFFRF) is the main supplier of sterile Mediterranean fruit fly (MDFF) pupae for CDFA's Preventive Release Program (PRP). The HFFRF is located on the island of Oahu, approximately 30 miles from Honolulu International Airport. Due to the HFFRF's close proximity to the airport, pupae are immediately transported there and flown to Los Angeles. This minimizes the amount of time the MDFF pupae are in hypoxia and therefore provides for a very high quality sterile MDFF. In 2010, the facility produced sterile male MDFFs with 85 percent of the pupae emerging as



adults and 82 percent able to fly following emergence from the pupal case. The facility operates daily to meet the demands of the PRP. The facility shipped over 148.5 million pupae per week.

MEDITERRANEAN FRUIT FLY PREVENTATIVE RELEASE PROGRAM



Quality Control Tests

The preventative release of sterile MDFFs over nearly 2,500 square miles of the greater Los Angeles Basin is the primary mission of the Mediterranean Fruit Fly Preventative Release Program (PRP). The goal is to prevent the MDFF from infesting the Los Angeles Basin. The PRP is the largest fruit fly program using sterile insect technique (SIT) in the United States.

The PRP is a cooperatively-funded and administered program between the USDA and CDFA. The PRP began in July 1996 following a successful two-year area wide release of sterile MDFFs to eradicate existing populations of MDFFs in the Los Angeles Basin. The PRP uses continuous releases of sterile MDFFs to prevent MDFF colonization throughout the Los Angeles Basin, including major portions of Los Angeles, Orange, Riverside and San Bernardino counties.

David R. Rumsey Emergence and Release Facility

Each week, 225 million sterile Mediterranean fruit fly pupae are delivered to the David R. Rumsey Emergence and Release Facility located on the Joint Forces Training Base (JFTB) in Los Alamitos. The sterilized pupae are shipped via air freight daily, throughout the year, from production facilities operated by CDFA in Hawaii and the USDA in Guatemala. Four days after the sterile MDFFs are received as pupae, they are released as adult flies from fixed wing aircraft over the Los Angeles Basin.

The standard rate of release is 62,500 sterile male flies per square mile per week, with a higher rate of 125,000 sterile male MDFFs being released in a historically high-risk area encompassing 250 square miles in central Los Angeles. A typical week features 51 missions flown over 15,000 linear miles to release 177 million sterile MDFFs.

To date, the PRP has been highly successful, resulting in a 97 percent reduction in the number of MDFF infestations in the Los Angeles Basin since the beginning of the preventive releases. After completing 14 years of the program, a total of 175 billion sterile MDFFs have been released during 34,395 flight missions traveling over 8,696,000 linear miles.

Current Sterile Insect Technique Programs

All MDFF and MXFF Sterile Insect Technique (SIT) eradication programs in California are based out of the Los Alamitos facility. In addition to regular releases over the Los Angeles Basin, in 2010 the PRP made eradication releases of sterile MDFFs over Santa Monica (Los Angeles County) and several communities in San Diego County (Table 16).



TABLE 16 - ADDITIONAL SIT FLIGHTS DUE TO ERADICATION PROJECTS

County	Location	Type of Fly	Linear Miles	Flights per Week
San Diego	Escondido	MDFF	15,146	4
	Fallbrook	MDFF	3,889	
	San Diego PRP	MDFF	133,889	21
Los Angeles	Santa Monica	MDFF	756	2
Total			154,850	27

CDFA EXOTIC PEST CALL MANAGEMENT SYSTEM

The Exotic Pest Call Management System (CMS) is a toll-free telephone number, accessible statewide, that provides information regarding current programs to the public with maximum efficiency. A menu driven format is available to any caller who wants to obtain information regarding CDFA activities. Information is recorded by an operator and entered into an internet database. In 2010, the CMS received 5,465 calls from the public (Table 17).

TABLE 17 - CALLS TO THE EXOTIC PEST CALL MANAGEMENT SYSTEM

Pest	Calls Received	Pest	Calls Received
Asian Citrus Psyllid	3,388	Japanese Dodder	78
Africanized Honey Bee	9	Light Brown Apple Moth	233
Avian Health Program	19	Mediterranean Fruit Fly	60
Asian Longhorn Beetle	6	Melon Fruit Fly	1
Asian Gypsy Moth	2	Mexican Fruit Fly	3
Diaprepes Root Weevil	41	Oriental Fruit Fly	145
European Grapevine Moth	469	Other Related ¹	110
False Codling Moth	3	Other Non-Related ²	192
Gypsy Moth	14	Red Imported Fire Ant	319
Guava Fruit Fly	1	Red Palm Weevil	325
Glassy Winged Sharpshooter	3	White Striped Fruit Fly	3
Huanglongbing	2		
Grand Total 2010			5,465

¹Calls about non-agriculture related insects or plant pests the caller found in his/her home.

²Miscellaneous calls, not related to Food and Agriculture activities.

The caller is given or directed to the appropriate number.



TABLE OF CONTENTS

BEET CURLY TOP VIRUS CONTROL PROGRAM	83
BIOCONTROL PROGRAM	83
HYDRILLA ERADICATION	88
WEED MANAGEMENT AREA PROGRAM	90
PINK BOLLWORM ACTIVITIES	95
COTTON BOLL WEEVIL	98
VETERBRATE PEST CONTROL	99
LIGHT BROWN APPLE MOTH PROGRAM	103



INTEGRATED PEST CONTROL

About

The Integrated Pest Control Branch (IPC) is a part of California's pest prevention system with the following overall objective:

Development, implementation and communication of sound public policies on prevention of the damage exotic and harmful plant pests and disease can cause.

The Integrated Pest Control Branch conducts a wide range of pest management and weed eradication projects in cooperation with growers, agricultural commissioners, federal and state agencies, and non-governmental organizations.

BEET CURLY TOP VIRUS CONTROL PROGRAM

Beet curly top virus (BCTV) is an extremely serious plant virus affecting several hundred varieties of ornamental and commercial crops in California. The only known vector of this virus is the sugar beet leafhopper (BLH), *Circulifer tenellus* (Baker).

BCTV is highly destructive to commercially produced sugar beets, tomatoes, peppers, cucumbers, muskmelons, watermelon, squash, pumpkins, green and dry beans, spinach and varieties of vine seed. Because of the threat to commercial crops, the growers of susceptible crops contribute 100 percent of the funds necessary to control BCTV in California. BCTV also infects backyard gardens upon which many people in California depend to provide fresh table vegetables.

The Beet Curly Top Virus Control Program (BCTVCP) utilizes intensive surveys to locate and monitor BLH populations throughout the year. Once the populations are located, they are evaluated as to the amount of virus in BLH samples, the potential for migration of BLH's to susceptible crops in the area, and the feasibility of control versus natural mortality due to parasites, predators or weather trends affecting host plants.

THE GENERAL PEST CONTROL STRATEGY DEVELOPED BY THE BCTVCP IS TO:

- ◆ Reduce the potential number of over-wintering female BLH's through the application of insecticide on Russian thistle and other weed hosts in the early fall.
- ◆ Further reduce surviving gravid over-wintering BLH females, prior to egg deposition, once they have concentrated on winter host plants.
- ◆ Selectively treat areas of habitat where a spring population of BLH's has developed, preventing migration to crops during late spring and early summer.



PLANT HEALTH ANNUAL REPORT

DURING THE 2010 SEASON THE BCTVCP ACCOMPLISHED THE FOLLOWING:

- ◆ Monitored and selectively suppressed over-wintering female BLH populations on winter host plants prior to egg deposition.
- ◆ Located, monitored and selectively suppressed the spring hatch of BLH's prior to maturation and migration into susceptible crops.
- ◆ Assessed the program's success by surveying susceptible crops for BCTV.
- ◆ Mapped all Russian thistle acreage and suppressed high BLH populations prior to dispersal to over-wintering areas.
- ◆ Continued to support and solicit research relative to BLH control and BCTVCP objectives.

During 2010, using aircraft and ground spray equipment, a total of 32,750 acres were treated with Malathion to control BLH populations. The acreage totals for 2010 were almost half of the 10-year treatment average of approximately 62,000 acres.

W I N T E R S U R V E Y / T R E A T M E N T

Several storm systems came through the state during winter 2010. The germination of winter host plants over most westside rangeland habitat occurred during January 2010. Early surveys found few beet leafhoppers (BLH) due to foggy and cool weather conditions. Due to wet, cool weather all winter, BLH were found only in small numbers and never became concentrated. Winter treatments were not performed.

S P R I N G S U R V E Y / T R E A T M E N T

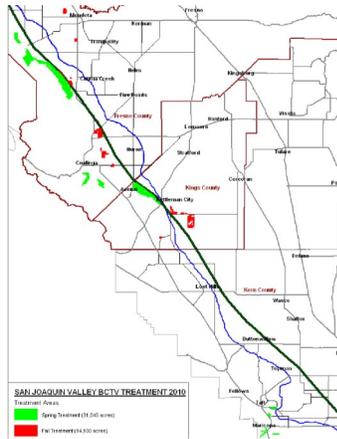
SAN JOAQUIN VALLEY

Winter rains produced a fairly lush growth of rangeland vegetation in most areas. BLH nymphs were found in northern Fresno County. Early nymph emergence in Kern County was spotty. In April higher numbers of beet leafhoppers were found emerging on the westside. Numbers increased in areas of Kern County, where an estimated 2,000 acres were mapped for treatment. Approximately 9,000 acres was mapped for treatment in both Kings and Fresno Counties.

A total of 31,070 acres were aerielly treated to control beet leafhopper populations in Kern, Kings and Fresno Counties from April 13-26. A total of 4,882 acres were treated on BLM administered lands.



IMPERIAL / RIVERSIDE COUNTIES



[Map.](#) San Joaquin Valley
BCTV Treatment 2010

Initial surveys in the Imperial Valley showed widespread host plant development in the desert. Roadside host plant densities were considerable in most areas. BLH counts on roadside plants were found to be much higher than BLH counts in the open desert. BLH counts on roadsides in Riverside County were not as high as counts in the Imperial Valley.

Program staff performed ground-rig spot treatments to the Imperial and Palo Verde Valleys on May 17, 2010. A total of 1,160 acres were treated in Imperial County and 40 acres were treated to control BLH populations in the vicinity of Blythe and Palo Verde.

Note: For larger map, please see Maps, page 135 - or - click on Map link.

SALINAS VALLEY

Program staff surveyed roadside host plants and susceptible crops in the Salinas Valley in mid-July. Beet leafhopper (BLH) counts were very low. Beet Curly Top Virus (BCTV) symptoms were not observed in susceptible crops.

FALL SURVEY / TREATMENT

Russian thistle development was short and sparse in the fall. BLH numbers were generally low through most of the summer on the westside of the San Joaquin Valley. Many growers cultivated fallow ground, destroying potential hosts. Host plant acreage experienced a steady decline due to drying, cultivation and grazing. The potential treatment acreage (35,000-40,000 acres) was reduced significantly by cultivation and grazing during the summer months. Approximately 20,000 acres remained as potential by October. Standard waivers were sent to 76 property owners to obtain permission to perform survey and treatment, if necessary.

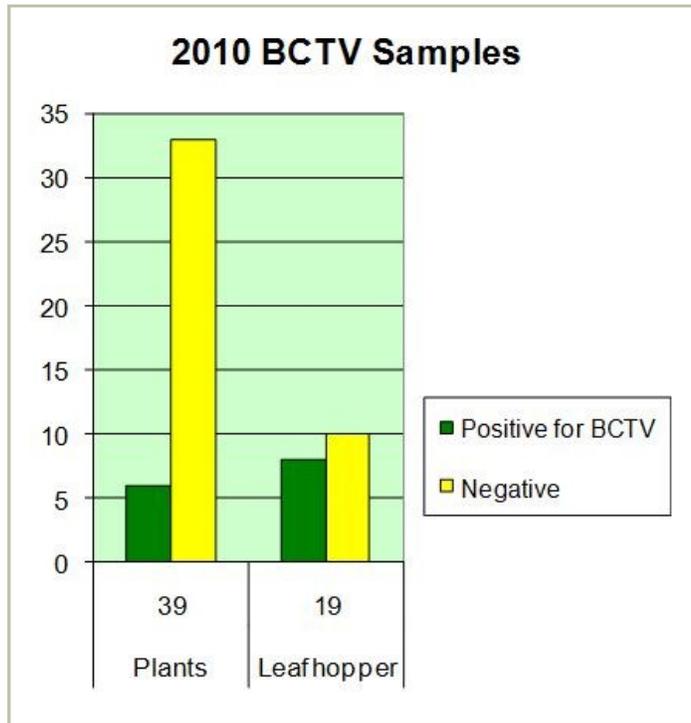
A total of 14,100 acres were aerially treated from October 5th through October 15th. Treatment activities were hampered by weather conditions. Windy conditions shortened many treatment days. No treatments were performed in Kern County due to declining host plant and BLH populations.



BEET LEAFHOPPER AND HOST
PLANT STRAIN SAMPLES

Program staff collected 125 plant and leafhopper samples to characterize BCTV strains in the field. Samples were sent to Dr. Robert Gilbertson at University of California Davis for analysis. Fourteen samples (24%) tested positive for BCTV. This was a 73% drop from 2009. Of the 14 positive samples, beet severe curly top virus was found only 4 times. Beet mild curly top virus was found most often.

Tomato spotted wilt virus (TSWV) was present and complicated the visual assessment of BCTV symptoms in tomato plants. TSWV infection in tomato was not as prevalent during the spring. However, TSWV became significant in several tomato fields during the summer.



RESEARCH

Dr. Bill Wintermantel, USDA Salinas, presented a two-year research proposal to the Beet Curly Top Virus Control Board (Board) to identify the most important crop and weed host reservoirs for beet curly top virus (BCTV) and other economic plant viruses. The information would be used to improve Integrated Pest Management strategies in controlling BCTV in susceptible crops. The Board recommended funding for the first year, with approval of funding for the second year pending review.



BIOLOGICAL CONTROL PROGRAM

KEY HIGHLIGHTS FOR THE BIOLOGICAL CONTROL PROGRAM FOR 2010 ARE:

- ◆ A parasite of the olive psyllid was discovered in Spain in 2010. The psyllid is a new invasive pest of olive production in California.
- ◆ An egg parasitoid (*Aprostocetus vaquitarum*) of *Diaprepes* (citrus root weevil) successfully overwintered in field cages in San Diego County, which suggests that this species can tolerate winter temperatures in southern California. Over 1,700 adults of *A. vaquitarum* were released at field sites in San Diego County in 2010.
- ◆ A second parasite species of *Diaprepes* eggs was discovered and is now in quarantine being tested for safety (that is, how specific its host range is). Those tests will determine its potential for release in California.
- ◆ Over 13,000 adults of *Psytallia concolor* (Namibia) and over 5,000 *Psytallia lounsburyi* were released against the olive fly in California in 2010.
- ◆ The lygus bug is a serious pest of cotton and strawberry production in California. The lygus bug parasite, *Peristenus relictus*, was established in Santa Cruz and Monterey counties. Efforts in 2010 were directed at establishing the parasite in Kern and Ventura counties. Over 2,400 adult *P. relictus* were released in 2010: 1,200 in Kern County and 1,200 in Ventura County.
- ◆ It is anticipated that several parasites of the Asian citrus psyllid will become available in the next few years. Upgrades were initiated on greenhouse facilities in southern California that will be needed for mass production of these parasites.
- ◆ The vine mealybug is a serious invasive pest of grape and wine production in California. The newly discovered parasite, *Anagyrus pseudococci* (Spanish strain), appears to be highly effective against this serious grape pest. In 2010, over 33,000 adult *A. pseudococci* were released in San Joaquin Valley vineyards.
- ◆ The biggest bottleneck in developing new biological control agents against noxious weeds is the time needed to complete host specificity testing. For this, non-target native plant species need to be obtained and sent to the laboratories performing the pre-release host testing. In 2010, over 60 species of native plant species and varieties of commercial crops were sent to cooperating federal laboratories in order for them to complete the necessary host specificity testing. This will greatly speed up development of new biological control agents for several noxious weeds in California.
- ◆ Giant reed, *Arundo donax*, is an invasive weed that infests riparian corridors throughout California. The stem-boring wasp, *Tetramesa romana*, is the first insect approved for use as a biological control agent against this noxious weed. In 2010, over 1,700 adult wasps were released in four counties in California.



The primary objective of the Biological Control Program is to implement self-sustaining biological controls for serious insect and weed pests in California. The Biological Control Program is divided into two working groups: one for insect pests and one for invasive weeds.

INSECT PESTS

Olive Psyllid - The olive psyllid was first reported infesting olives in Orange County in 2007. Since then, it has been reported in San Diego, Riverside, Orange, and Monterey Counties. During June 2010, olive psyllids collected in eastern Spain and southern France were sent to the University of California, Berkeley Quarantine for rearing. From these, the primary parasitoid *Psyllaephagus euphyllura*, emerged. This parasite is the primary parasite controlling olive psyllid populations in Spain. Additional collections will occur in 2011 to initiate a colony in quarantine to support the necessary pre-release studies required.



Figure 1.
Olive psylla infesting inflorescence of olive, southern Spain.

Light Brown Apple Moth - Naturally occurring egg parasitism of the light brown apple moth in California was assessed at several coastal sites using sentinel egg cards. To date, four species of egg parasites have been found: *Trichogramma platneri*, *T. fasciatum*, *T. sp. nr. deon* (W strain) and *T. sp. nr. pretiosum* (Mt. Shasta strain). Collection of *T. fasciatum* in California is the first record of its occurrence in the United States. Combined egg parasitism by the four *Trichogramma* species varied widely among sites. Parasitism rates at one location where light brown apple moth densities had been high for several years increased dramatically in 2010, occurring as high as 90% at one point during early summer. In contrast, egg parasitism at four other locations near Santa Cruz was low, especially during March through May. In addition to mortality due to egg parasitism, egg predation by generalist predators was considerable, often exceeding 50%. The principal predator has not been determined.

Diaprepes Root Weevil - The egg parasitoid, *Aprostocetus vaquitarum*, is currently being imported into California from Florida for use against the Diaprepes weevil (citrus root weevil) in San Diego County. Over 1,700 adult parasites were released at six sites in five cities in San Diego, Orange, and Los Angeles counties from March through September 2010. The releases occurred at sites known to be infested with the root weevil and which had not been treated with insecticides. All release sites were searched for Diaprepes egg masses to determine the success of the parasite releases. No recoveries of *A. vaquitarum* have occurred to date.

Sleeve cage trials were conducted in 2010 to determine if *A. vaquitarum* could survive the climatic conditions in southern California. In these trials, *A. vaquitarum* attacked and developed to the adult stage on the root weevil egg masses within the cages, suggesting that the parasite will use the

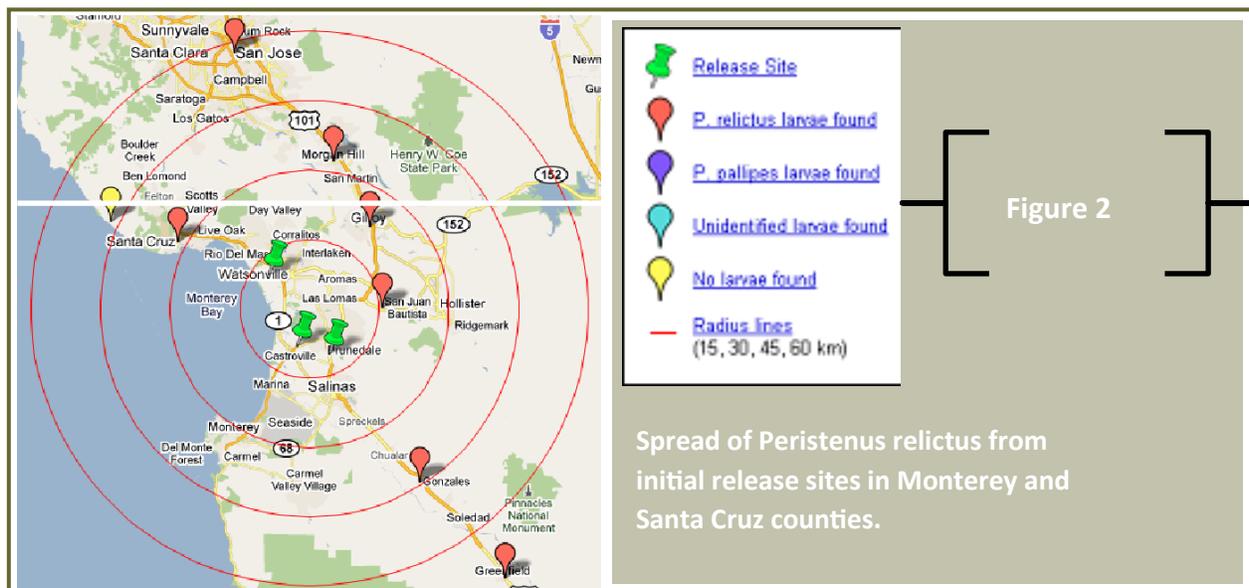


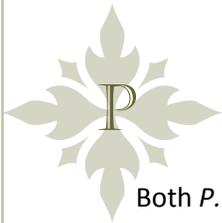
Diaprepes eggs found in southern California and survive the winter temperatures that occur in this area.

A second egg parasite, *Haeckliana sperata*, is now under examination for use in California. Host specificity testing for *H. sperata* has begun in cooperation with the University of California, Riverside. All necessary permits for field collection and transport of these weevils and their associated plant species have been obtained. Initial trials have found this parasite to only attack Diaprepes eggs.

Other species of egg parasites belonging to the genus *Fidiobia* (Hymenoptera: Platygasteridae) are being investigated for possible use against Diaprepes eggs. With the assistance of USDA-APHIS, negotiations are underway with the country of Columbia to export *Fidiobia* parasitoids to a quarantine facility in Florida for further study. The export of these parasitoids may occur in 2011 and host specificity testing would begin once a colony is established in quarantine.

Lygus Bug – The plant bug, *Lygus hesperus*, is a serious pest to numerous field, fruit, and seed crops, including strawberries and cotton. Control costs exceed \$40 million annually to strawberry growers in central California alone. Recently, two nymphal parasites, *Peristenus relictus*, and *P. digoneutis*, have proven effective in reducing lygus bug numbers in other locations of the United States. We have successfully imported and colonized *P. relictus* in the strawberry production areas in Monterey and Santa Cruz counties. The build-up of the parasite population has resulted in high parasitization rates in resident lygus bug populations. Encouraged by these results, University of California Cooperative Extension requested releases of this parasite in Ventura and Santa Barbara counties. Previous efforts to establish *P. relictus* and *P. digoneutis* in the southern San Joaquin Valley had failed so a new biotype of *P. relictus* was obtained from Morocco, Africa, by USDA-ARS cooperators. It is expected that this biotype will better match the hot summer temperatures found in the southern San Joaquin Valley. In 2010, approximately 1,200 *Peristenus relictus* (Morocco) were released at the USDA-ARS Shafter field station in Kern County. In addition, approximately 1,200 adults from a mix of the southern European and Moroccan strains of *P. relictus* were released in Ventura County.





PLANT HEALTH ANNUAL REPORT

Both *P. relictus* and *P. digoneutis* have been recovered for nine years since last released into a managed plot of alfalfa in Sacramento County. After reaching a high of 20 nymphs per sweep, lygus bug populations have dropped to an annual peak of about 1-2 per sweep, a decrease of 90%. In addition, *P. relictus* has been recovered for six consecutive years post-release in the Monterey Bay region. In 2010, a north-south transect and an east-west transect were sampled to document the regional spread of this parasite in both regions.

WEED PESTS

Giant reed - The first approved natural enemy of giant reed, the stem-boring wasp, *Tetramesa romana*, was released in four counties in California during 2010. The wasp was provided by the USDA-ARS weed biocontrol laboratory in Weslaco, TX. Two biotypes collected from different regions of Europe were released in California.

The Caloma biotype from Spain was released in Glenn County. The Perpignan biotype from France was released in Yolo, Sonoma, and Mendocino counties. Infested *Arundo* stems were placed in the field from which adult wasps emerged and attacked new stems. A subset of stems at each location was dissected several weeks following their

placement in the field. Observations showed that some emergence had occurred but by November, most individuals were still live larvae within the original galled stems. Based on these dissections, approximately 200 individuals of the Caloma biotype and approximately 1,500 of the Perpignan biotype were released.

Rush skeletonweed – Three biological control agents have been established against rush skeletonweed in California in the 1970's which resulted in dramatic decline of infestations in the Sacramento Valley. Despite these reductions in weed abundance, rush skeletonweed occasionally is found in new areas of

Figure 3. Emergence holes of *Tetramesa romana* on galled stems of giant reed sent from USDA, ARS in Texas.



Figure 4. Release site in Glenn County





California where it is kept under control by local eradication efforts. In July 2010, San Mateo County requested that biological controls be moved into the urban areas of their county infested with rush skeletonweed. A pre-release survey revealed the absence of the gall midge and the gall mite but the presence of the rust fungus. It is presumed that the fungus moved there on its own. To assist with actions of the rust fungus, the gall mite was collected in Placer County and moved to San Mateo County. Approximately 150 mite galls were released at three sites in the infested area. Two months later, many of the plants treated with the mites exhibited gall formation suggesting successful transfer of the mites to this area.

Mediterranean sage – The far northeast area of California has been invaded by Mediterranean sage, a noxious weed of roadsides, pastures, and rangelands. To assist in its control, the root and crown boring weevil, *Phrydiuchus tau*, is being released in this area. In 2010, weevils were collected from southern Oregon and released at two sites along Hwy 139 south of Tule Lake, CA, an area that had not received releases in previous years.

Purple loosestrife - The two leaf beetles, *Galerucella pusilla* and *G. californiensis*, have become well established in purple loosestrife infestations in Shasta and Butte counties in northern California which resulted in severe defoliation of the large stands of plants in these areas. In 2010, efforts were made to establish these biological control agents on a purple loosestrife infestation in Fresno County. Approximately 6,000 beetles were mass collected during the spring generation and released at a site outside of Sanger in Fresno County. The release consisted of mainly late larval stages with about 10% adult beetles.

Dalmatian toadflax – The stem weevil, *Mecinus janthinus*, was established in a large infestation of Dalmatian toadflax in Los Angeles County. The infestation, estimated at over 2,000 acres, occurs on California State Park and US Forest Service properties. Field monitoring of the population build-up and impact on plant populations continued in 2010. The results show that *M. janthinus* has established and spread several meters away from release points, attacking most of the toadflax plants within 20 meters of release locations. Most toadflax plants attacked by *M. janthinus* did not flower or produce seed in 2010. Based on its current trajectory, it is expected that *M. janthinus* populations will result in dramatic reductions in toadflax abundance in this area. A specific effort is being made to document the effect that reductions in toadflax may have on the abundance of native wildflowers that are of major importance in this location.



PLANT HEALTH ANNUAL REPORT

HYDRILLA ERADICATION

HIGHLIGHTS FOR 2010:

- ◆ The Chowchilla River / Eastman Lake project is no more, after being a part of the Hydrilla Program for 20 years. The Department declared final eradication in spring of 2010.
- ◆ Hydrilla is disappearing again from Clear Lake, despite a tense couple of years after the infestation rebounded in 2007 (Table). After peaking in 2008 with 196 separate plant finds, plant numbers declined rapidly with only 12 finds in 2010, a decrease of 94%. This year, no large plants were found, and almost all the finds were sickly and below the surface. Even better, only five of the finds occurred outside current treatment areas, so only 20 acres were newly brought under treatment this year. With herbicide alone costing nearly \$1000 per acre and about 720 acres already under treatment, this relatively minor increase in costs was very welcome. The crews this year searched the entire 100+ miles of shoreline 6.9 times during June through November, or once every 3.4 weeks. They also treated nearly every plant find within one or two days of finding it. Hydrilla reappeared at Clear Lake after being absent between June 23, 2003 and July 11, 2007. Following the eradication protocol, treatments had ended in the 2006 season. Program biologists had anticipated the plant's possible re-appearance and increased the number of boat crews from two in 2006 to three in 2007, and four crews in 2008.

TABLE 3.

HYDRILLA AND TREATMENTS IN CLEAR LAKE, LAKE COUNTY, 2000 TO 2009.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Number of hydrilla "finds"	67	41	12	1	0	0	0	72	196	76	12
Number of survey units with finds	31	21	6	1	0	0	0	24	39	24	7
Fluridone treated acres	1148	1335	1440	1256	520	137	0	245	573	690	719
Copper treated acres	117	62	28	5	0	0	0	245	325	120	20

- ◆ Surveyors could find no plants for the sixth year in a row in the infestations at Hesseltine Pond/Bear Creek and Mokelumne Hill (both Calaveras County, infestations found in 1988), and in Tulare County (found 1997). They have found no plants for four years in a row in the two infestations near Redding (Shasta County, found 1994 and 1996) and the three separate ponds in Nevada County (found 2004 and 2005).



- ◆ The Biologist for the Oregon House project in Yuba County lined the Citron Pond with a pond liner, a heavy synthetic rubber sheeting. The 0.2-acre pond has had the heaviest and most persistent infestation in the project. The Biologist did much of the work himself, with help from a variety of colleagues in Integrated Pest Control. The liner should spell the end of the infestation in that pond.
- ◆ No new infestations of hydrilla were found in California this year, while visiting some 60 lakes, ponds, streams and spending three weeks surveying the Sacramento-San Joaquin River Delta.
- ◆ The Program continues to encounter challenges in its attempt to contain a new invader, South American spongeplant. Spongeplant is very similar to water hyacinth, and California would benefit from keeping it out. The first infestation in California was found in 2004 in a 4.5-acre pond in Shasta County. It responded well to treatment, but in 2006 we discovered large quantities of very small seedlings, indicating that the plant comes back vigorously from seeds. After repeated treatments and hand removal, almost no plants were found in 2010 after a single treatment early in the season. The seed bank appears to last at least three years. Unfortunately, since mid 2007, infestations have appeared in at least five other locations, almost all in the San Joaquin Valley. Some infestations are scattered over miles of canal. While the infestation in west Fresno County at first seemed limited to the area between Firebaugh and Dos Palos, now plants extend to north of Los Banos. Most areas have very sparse populations, and the plant population in any one location generally declines dramatically with modest efforts at control. However, the multiple finds are straining the Program's ability to keep up.

Background: Hydrilla is a Threat to the Water Resources of the State

Hydrilla is an invasive, submerged, non-native aquatic plant that has been called the world's worst underwater weed. It can reduce water storage capacity of lakes, ponds and reservoirs; impede water delivery from streams, canals and drains (Figure); jam water control structures and choke hydroelectric generators; degrade fish and wildlife habitat; ruin fishing, boating and related tourism; and endanger public health by reducing water flow and producing mosquito breeding habitat. Experience from the infestation in the Imperial Irrigation District indicated that hydrilla can reduce water



Figure 5.
Hydrilla clogging an irrigation delivery canal in Imperial County

deliveries from canals as much as 85 percent. Control costs in highly infested states, such as Florida and Texas, are in the tens of millions of dollars per year.



PLANT HEALTH ANNUAL REPORT

CDFA IS THE LEAD AGENCY FOR THE ERADICATION OF HYDRILLA

Though CDFA is the lead agency, the Hydrilla Eradication Program cooperates closely with local county agricultural commissioners and federal, state, county and city agencies, with Native American tribes and with private individuals and entities. In addition, the Hydrilla Eradication Program received financial and in-kind support in 2010 from the California Department of Boating and Waterways, the California Department of Water Resources, the United States Department of the Interior-Bureau of Reclamation, the Lake County Department of Agriculture and the Lake County Department of Public Works, the Yuba County Agricultural Commissioners Office and the Yuba-Sutter Weed Management Area.

WEED MANAGEMENT AREA (WMA) STATE FUNDING PROJECT

WEED MANAGEMENT AREAS (WMAs) ARE DYNAMIC GROUPS OF LOCAL STAKEHOLDERS WORKING TO SOLVE INVASIVE WEED ISSUES. WMAs ARE A UNIQUE AND CRUCIAL INFRASTRUCTURE BECAUSE:

- ◆ They work at the local level and address local issues.
- ◆ They foster collaboration between the public and private sector.
- ◆ They emphasize education and prevention.
- ◆ They bring in matching resources at a ratio of three matching dollars to every state dollar.
- ◆ They are partners for a better environment.
- ◆ They are meant to complement, not supplement, the California Department of Food and Agriculture's (CDFA) core weed management programs.



Figure 6. Solano County WMA Annual Meeting Field Demonstration of weed treatment techniques. (Photo, courtesy of Solano County Resource Conservation District)



Figure 7. Humboldt County WMA coordinated with Weitchpec School students to remove A-rated meadow knapweed (*Centaurea x pratensis*) and then reseed with native grasses. Photo compliments of Mid Klamath Watershed Council



Weed Management Areas (WMAs) are local organizations that bring together landowners and managers (private, city, county, state, and federal) in a county or multi-county area to coordinate efforts and expertise against common invasive and noxious weed species.

CDFA received \$1.5 million in state general funds for weed eradication projects to be distributed to weed management areas. After consulting with various stakeholder groups and the Weed and Vertebrate Committee of the California Agricultural Commissioners and Sealers Association (CACASA), the CDFA WMA Program issued a request for proposals in March 2010.

Ten percent of funds are set aside for CDFA program administration and research. After allocations toward administrative costs and research, the balance is allocated to baseline funding for each county partner in a WMA. The WMA Oversight Committee reached a consensus to provide funds to all 58 counties, as opposed to 45 WMA groups, since many WMA groups include more than one county. Baseline funding is not competitive, but rather an equal distribution to each county partner within a WMA.

By legislation, a portion of the funds are allocated for competitive grants. A request for proposals was developed and all WMA groups were eligible to compete. A WMA Advisory Committee ranked the proposals according to achievement of high priority objectives such as permanent eradication and protection of high value assets. The WMA Advisory Committee, as required by the agricultural code, included industry, conservation, scientific and public group representatives. Proposals were required to show a minimum 50:50 match.

For the past several years, the United States Forest Service (USFS) has funded CDFA to manage a grant program for the prevention, detection and eradication of noxious and invasive weed populations on non-federal public and private lands near forested lands throughout California. The USFS Grant is to prevent the movement of noxious and invasive weeds onto federal forested lands. CDFA has managed the Program via a competitive grant program to weed management areas. Funded projects have included survey and detection for noxious and invasive weed populations, control and eradication activities, and public outreach and education to stop or slow the spread of noxious and invasive weed seed and plant parts.

Many of the USFS lands throughout California are relatively weed-free. However, invasive weeds can move onto USFS lands from adjacent and nearby non-federal public land, private land and tribal land. Pathways of infestation include public and private roads, logging trails, firebreaks, streams, rivers and wind. Weed seed and plant parts can be transported onto forested lands by vehicles (cars, pickup trucks, logging trucks, road maintenance and construction traffic), people (shoes and clothing, hunting, fishing, camping and logging equipment), nearby fire “burned” areas, roadsides and utility rights-of-way, pastures and rangelands, agricultural lands and abandoned wild lands.

Several WMA groups have been funded over the years to address the following noxious weeds: meadow knapweed, spotted knapweed, purple loosestrife, slender false-brome, leafy spurge,



PLANT HEALTH ANNUAL REPORT

Dalmatian toadflax, rush skeletonweed, perennial pepperweed, musk thistle, Scotch thistle, Iberian starthistle, yellow starthistle, and arundo.

In summary, this partnership between the USFS and the CDFA has proven to be an effective program to slow or prevent the movement of noxious and invasive weeds onto federal forested lands.

THE TERRESTRIAL NOXIOUS WEED PROGRAM



Figure 8. District Biologist Robin Breckenridge removing an incipient A-Rated rush skeletonweed (*Chondrilla juncea*) population in Sonoma County. Early detection and extirpation of invasive plants helps to prevent their establishment in California.

The Terrestrial Noxious Weed Program is dedicated to the early detection, containment, and eradication of A-rated noxious weeds. If allowed to become established, these noxious weeds have the potential to cause significant economic and environmental harm to California. Working with a variety of state, federal, and private stakeholders, the Terrestrial Noxious Weed Program crosses a wide variety of property boundaries in order to preserve the enjoyment of a weed-free natural resource, agricultural lands and recreational areas throughout California.

blueweed, Austrian peaweed and others. The project also provides general supervision, technical assistance and training in weed control to personnel engaged in regulatory weed control activities.

This program maintains a staff of biologists with expertise in regulatory weed eradication and suppression programs. Successful eradication has been attained in 13 weed species including: whitestem distaff thistle, giant dodder, serrate spurge,

The California Food and Agricultural Code, Section 403, states, "The Department shall prevent the introduction and spread of noxious weeds," which authorizes the Noxious Weeds Program. In addition, the state of California incorporates the federal noxious weeds as state noxious weeds by regulation (CCR, Section 3161).

TERRESTRIAL NOXIOUS WEED ERADICATION PROGRAM HIGHLIGHTS:

- ◆ 170 distinct A-rated weed infestations were treated and evaluated by program staff.
- ◆ 23 presentations on noxious weed biology, identification and management techniques were given by program staff.

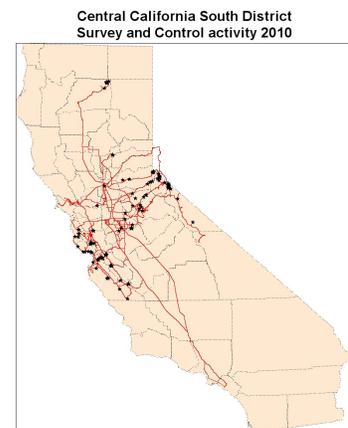


Figure 9. The Terrestrial Noxious Weed Program is divided into six districts. Pictured above is the 2010 survey and control activity for the South-Central California District Biologist.

Note: For larger map, please see Maps, page 135 - or - click on Figure link.



Over 600 public, private and non-governmental attendees participated in these outreach and education events.

- ◆ 15,000+ miles of state, county and forest service roads were surveyed for incipient noxious weeds.

AMERICAN RECOVERY AND REINVESTMENT ACT (ARRA)



Figure 10. California Conservation Corps Crew removing fig trees in Putah Creek riparian forest. Photo compliments of Yolo County Resource Conservation District.

In an effort to stimulate local economies and prevent the spread of invasive weeds onto forested lands, the United States Forest Service (USFS) partnered with CDFA to distribute American Recovery and Reinvestment Act (ARRA) funds. These funds are being used to employ people in the field for coordinated weed control and mapping.

In fall 2009, IPC received award letters from the USFS for two grants totaling \$7,497,000 (with \$331,000 designated for the distressed counties of Los Angeles and Siskiyou). The majority of the grant work began in January of 2010 and will end in December of 2011. The grant has been distributed to approximately 41 CDFA partners for the prevention, early detection and eradication of noxious and invasive plants on non-federal forested lands.

ARRA NOXIOUS WEED PROJECT HIGHLIGHTS:

- ◆ 70+ noxious weed species targeted for control.
- ◆ 180,000+ acres of valuable forested lands were surveyed for the presence of noxious weeds.
- ◆ Based on the survey, noxious weed projects covering over 2,550 acres were selected for control.
- ◆ 150+ full-time equivalents (FTEs) were put to work, helping to stimulate struggling programs and prevent the spread and invasion of noxious weeds onto forested lands.



Figure 11. Truckee River, A-Rated Musk thistle (*Carduus nutans*). 6/23/08 Pre-treatment



Figure 12. 8/18/10 Post treatment Two years after initial treatment and intermittent spot treatments

Photos compliments of Nevada County Department of Agriculture



JAPANESE DODDER



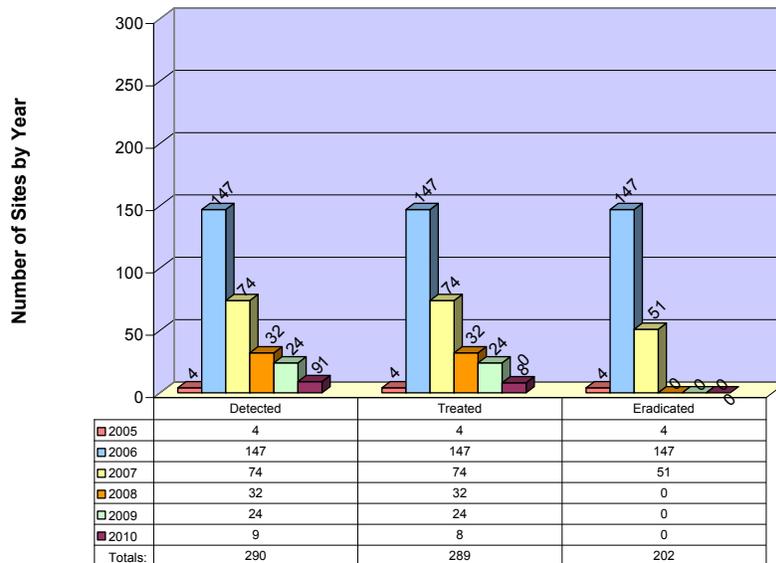
Figure 13. CDFA and Yolo County Biologists working to remove Japanese dodder plant material along the Sacramento River in Yolo County

Japanese dodder is a noxious, annual parasitic plant native to the eastern Asian seaboard. It is within a group of dodders frequently referred to as “Giant dodder” (*C. Cuscuta reflexa* and *C. japonica*). First introduced to the United States in Texas in 1941, other infestations were found in Florida in 1943 and in South Carolina on the campus of Clemson University in 1971. Japanese dodder is a leafless parasitic plant that uses specialized root structures called haustoria to obtain water and nutrients from a host plant. Once *C. japonica* seedlings locate a suitable host their regular roots die, while the haustoria colonize the host stem and begin to draw resources from the host.

In 2010, the goals of the Japanese dodder (*C. japonica*) survey and eradication program were to detect and eradicate infestations of Japanese dodder in California. The 2010 survey covered over 369 miles, while a total of nine infestations were identified in the counties of Alameda (1), Sacramento (7) and Yolo (1). The Yolo County find was reported by a concerned citizen who was familiar with Program outreach material. The site was treated by removing affected host plant material followed by transport to landfill for deep burial.

Eradication has been achieved in the following five counties: Shasta (3 sites), Solano (3 sites), Sutter (2 sites), San Joaquin (1 site), Los Angeles (1 site). Japanese dodder, (*Cuscuta japonica*) detections in California have declined significantly since the initial find in 2005. Since program inception in 2005, the cumulative total of detections is 290 – all sites received at least one treatment and are under post-treatment monitoring.

Japanese Dodder 2005-2010



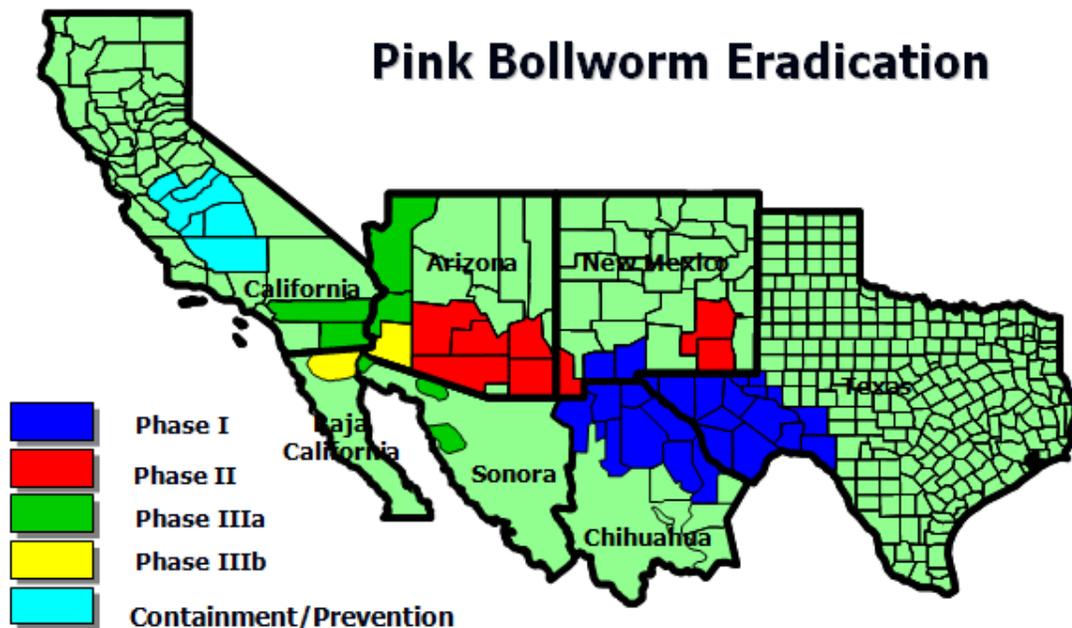


PINK BOLLWORM AND
OTHER COTTON PESTS

PINK BOLLWORM ACTIVITIES

The boll weevil, *Anthonomus grandis* Boheman, and the pink bollworm, *Pectinophora gossypiella* Saunders, are probably the two most important cotton pests in the United States (US). These serious economic pests are the subject of various area-wide control programs by federal, state, local and commercial organizations throughout areas of the US Cotton Belt. A pink bollworm cooperative eradication program has been started in defined cotton growing regions in Arizona, California, New Mexico, Texas and Mexico.

The California Department of Food and Agriculture (CDFA) Pink Bollworm (PBW) Program prevents the establishment and spread of this devastating pest. It follows the basic guidelines and protocols established under the United States Department of Agriculture (USDA) Area-wide PBW Eradication Program. The technology used to eradicate the pink bollworm has five primary components: 1) extensive survey; 2) transgenic *Bacillus thuringiensis* cotton; 3) pheromone application for mating disruption; 4) sterile PBW moth releases; and, 5) crop cultural control requirements. Program technologies are applied on an area-wide basis within each area.



EL-LISSY,
PLANNING



PLANT HEALTH ANNUAL REPORT

The program activities of detection and control are coordinated with the USDA and other cooperating state agencies. The CDFA PBW Program uses a risk-based management approach for program detection and control objectives within the San Joaquin Valley (SJV) containment / prevention area.

The USDA pays the costs of sterile production/release activities within California's Area-wide PBW Eradication Program. All other program costs of the CDFA PBW Program are industry funded. The assessment fee remains at \$2.00 per bale.

TRAPPING

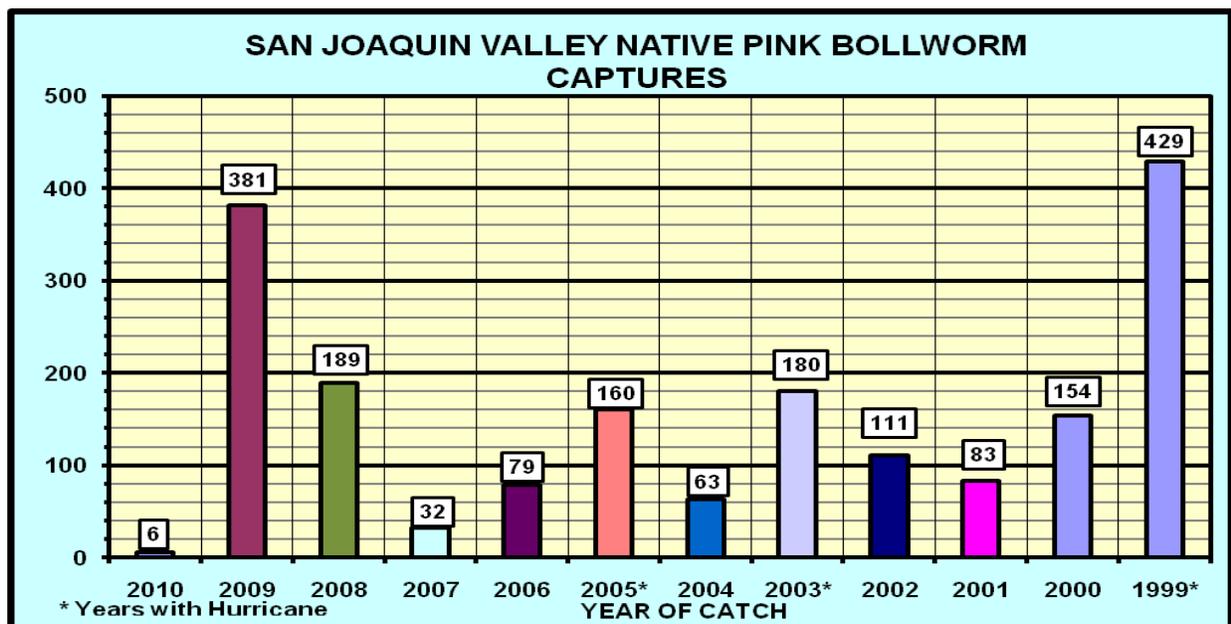
All cotton fields throughout the State are mapped each year and digitized into computers. Computer-generated maps depict individual cotton fields and are used to guide trapping, boll survey, sterile moth releases, and plowdown monitoring.

A grand total of 305,375 acres of cotton was mapped in California during 2010. Southern California cotton acreage totaled 11,205 acres. The Sacramento Valley had a total of 4,685 acres.

PBW Program personnel mapped 289,485 acres of cotton in six counties of the San Joaquin Valley (SJV). Pima cotton plantings in the SJV totaled 181,995 acres (~ 63 percent) for 2010.

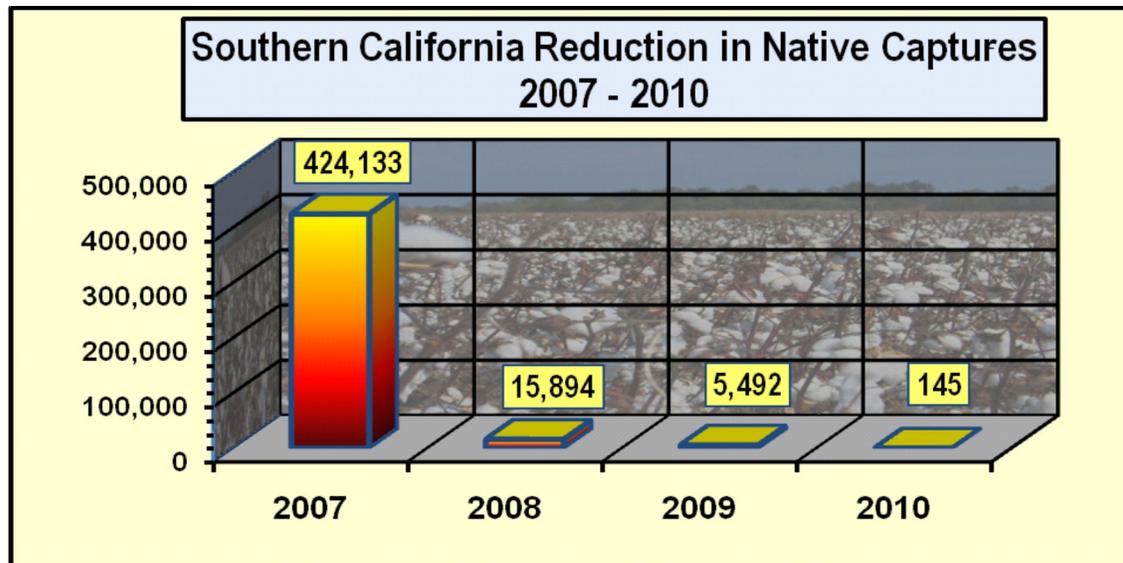
IDENTIFICATION

For the San Joaquin Valley (SJV), the lab examined 3,594 traps containing suspect moths submitted by trappers. A total of 81,567 sterile moths and 6 native moths were identified in the SJV traps in 2010.





In Southern California, pink bollworm (PBW) populations were significantly reduced from the previous year. There was a slight spike in native captures from mid-August into September due to migration from the adjoining area of northern Mexico. Overall, there was a significant decline in natives trapped compared to the Pre-Area-wide PBW Eradication Program 2007 capture levels. Since 2007 there has been a 99.9 per cent drop in PBW moths per trap per week.



STERILE INSECT RELEASE

The average daily release rate for the San Joaquin Valley was 2.0 million sterile moths per day after sterile release began on May 10. The release rate was consistent at approximately 12 million per week until releases concluded October 9, 2010. Approximately 265.9 million sterile pink bollworm moths were released in the San Joaquin Valley.

Southern California cotton growing regions were added to the USDA Pink Bollworm (PBW) Area-wide Eradication Program in 2007. The strategy for this program includes insect monitoring, planting of *Bacillus thuringiensis* (*Bt*) cotton, sterile insect release and pheromone treatments in non-*Bt* cotton.

Mass aerial dispersal of sterile PBW moths was performed on cotton plantings in Imperial, Riverside and San Bernardino counties. Approximately 100.9 million sterile moths were released during the cotton-growing season in southern California as a component of the PBW Area-wide Eradication Program.



PLANT HEALTH ANNUAL REPORT

PHEROMONE APPLICATIONS



Sterile Release
Flight in Northern
San Joaquin Valley

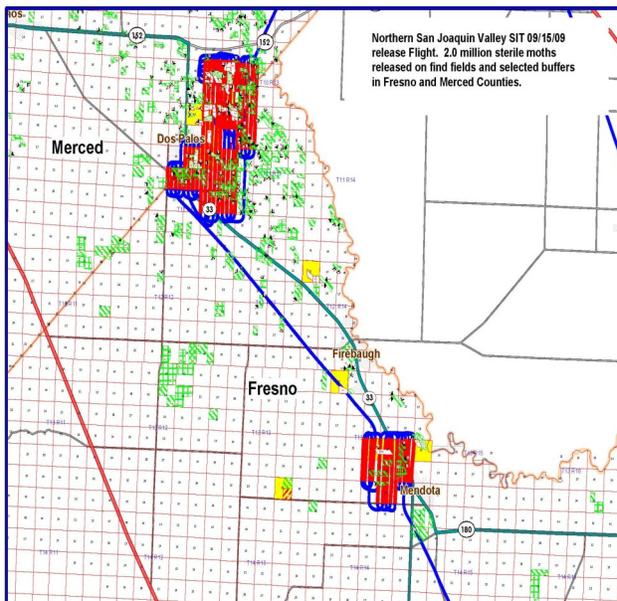
Pheromone mating disruption had proved a successful control method for the PBW Program. This technique can induce mating confusion, interfering with reproduction. Four fields in Fresno County totaling 205 acres were treated at the rate of 200 ropes per acre. While native finds spanned multiple generations in 2009, no natives were captured in the roped fields during the 2010 season. The pheromone ropes were placed with a special tractor/transplant-rig with the cooperation and help from the staff of the Arizona Cotton

Research and Protection Council.

BT RESISTANCE MONITORING

Cooperating with the USDA, the Arizona Cotton Research and Protection Council, and the University of Arizona, Pink Bollworm (PBW) Program staff conducted trapping and boll survey designed to evaluate PBW resistance to *Bacillus thuringiensis* (Bt) cotton. To date, no resistance has been observed.

COTTON PLOWDOWN REGULATIONS



CDFA Program Photo

A reduced tillage permit was issued by CDFA to the PBW regulated districts in the SJV. A minimum tillage permit was also issued to regulated districts in Imperial and Riverside counties. These permits had several key requirements, including post harvest cotton plant shredding, tillage sufficient to prevent plant regrowth, and regulatory inspection of cotton fields. For the SJV only, substantial prohibited or restricted areas were based on PBW native finds. The most significant change was not requiring that roots, plant stubs, shredding debris and trash remaining from harvesting or clean-up operations be mixed with surface soil.

COTTON BOLL WEEVIL

Since 1990, no boll weevils (BW), *Anthonomus grandis*, have been trapped in California. The declaration of eradication of BW was issued December 1993. Program efforts continue to maintain BW-free status. Traps are placed in southern California cotton growing areas to monitor BW activity. No cotton boll weevils were detected in 2010.



VERTEBRATE PEST CONTROL

THE KEY ACCOMPLISHMENTS FOR 2010 INCLUDE:

- ◆ Public Outreach and Education Seminars: Wildlife Damage Management
- ◆ Completed Re-registration of Two Remaining CDFA Rodenticides
- ◆ CDFA Added Deleted Pest Species Back Onto Rodenticide Labels
- ◆ Specialty Crop Block Grant Award
- ◆ Vertebrate Pest Control Research Advisory Committee (VPCRAC)

The primary objectives of the Vertebrate Pest Control Research Program are to maintain the California Department of Food and Agriculture's (CDFA) field-use rodenticide registrations, provide public education on wildlife damage management, and to administer the Vertebrate Pest Control Research Program. The agricultural community and other stakeholders utilize the CDFA's rodenticides in order to prevent and control vertebrate pest damage to agricultural commodities, agricultural infrastructure, water control and conveyance structures, and to protect public health and safety.

The Vertebrate Pest Control Research Program funds research studies to investigate application strategies to improve rodenticide efficacy, studies to reduce the potential hazard of secondary poisoning to non-target species, and product chemistry and residue data to support the expanded use of rodenticides on crops. Since 1991, the Vertebrate Pest Control Research Program has funded 126 research projects totaling over \$9.2 million.

PUBLIC OUTREACH AND EDUCATION SEMINARS: WILDLIFE DAMAGE MANAGEMENT

In 2010, the Vertebrate Pest Control Research Program staff provided public outreach and education seminars to the Bay Area Vector Control Professionals, the Pesticide Applicators Professional Association, the U.S. Fish and Wildlife Services, the U.S. Department of Agriculture, the California Agricultural Commissioners and Sealers Association, and the Department of Pesticide Regulation. Twelve education seminars were presented to the public including talks presented at the following conferences:

- ◆ Vertebrate Pest Conference
- ◆ Agriculture in the Classroom State Conference

Approximately 2,000 people attended the education seminars presented by Vertebrate Pest Control Research staff. The education seminars were presented on Laws and Regulations, Vertebrate Pest Biology, Bird Control, Predator Management, Small Mammal Control, Invasive Species Management, and current research projects.

Additionally, Vertebrate Pest Control Research staff revised the outdated Vertebrate Pest Control Research Advisory Committee Surcharge informational tri-fold and drafted a new informational tri-fold on The US Environmental Protection Agency's 2008 Rodenticide Risk Mitigation Decision and Impacts to Field Use Rodenticides. The tri-folds were distributed to the County Agricultural Commissioners offices.



RE-REGISTRATION OF TWO REMAINING CDFA RODENTICIDES COMPLETED

In 1998, the U. S. Environmental Protection Agency (USEPA) issued a Re-registration Eligibility Decision (RED) for the Rodenticide Cluster which included any rodenticide first registered prior to November 1, 1984. The re-registration was initiated to ensure that the earlier registered rodenticides would meet the more stringent current standards for registration, including mitigating risks to children and non-target animals. Five of the California Department of Food and Agriculture's (CDFA) rodenticide products fell under this RED. The USEPA issued a Data Call-In (DCI) letter with the RED. The DCI included both generic and in some cases product specific data sets. CDFA responded with the required documents. The data generated during the DCI were used by USEPA to draft a comparative risk assessment. In January 2003, the preliminary risk assessment was made available for public comment, and in September 2004 a revised ecological risk assessment was issued. The USEPA issued a proposed risk-mitigation decision in January 2007 and received over 700 comments on the document. A final risk mitigation decision was issued May 28, 2008.

The final risk mitigation decision directed registrants to respond to USEPA in writing as to their desire to either maintain their registrations, by making required amendments, or to voluntarily cancel their registrations. CDFA drafted a letter stating CDFA's intent to maintain the rodenticide registrations. On, October 27, 2010, CDFA received a letter from USEPA granting re-registration of the following CDFA rodenticides:

- ◆ Rodent Bait Diphacinone Treated Grain (0.005%)
- ◆ Rodent Bait Diphacinone Treated Grain (0.01%)

CDFA worked collaboratively with USEPA and the Department of Pesticide Regulation to prepare the revised labels in compliance with the 1998 RED.

REVISIONS OF CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE RODENTICIDE LABELS

The USEPA has allowed CDFA to add pest species back to CDFA rodenticide labels. CDFA had been directed by USEPA to remove from the rodenticide labels rodent species that are considered "commensal" pests in most states. CDFA initiated a dialogue with USEPA to assert that several of the species considered "commensal" elsewhere in the United States are in fact serious pests in California agriculture. The Vertebrate Pest Control staff and the University of California Integrated Pest Management Vertebrate Specialist teleconferenced with USEPA Rodenticide Program Managers in September 2010 to discuss the need for the use of rodenticides against species such as rats and mice in agricultural settings. USEPA agreed to return the deleted pest species on the Chlorophacinone labels and included those same species on the subsequent CDFA Diphacinone product re-registration letter.



SPECIALTY CROP BLOCK GRANT AWARD

Vertebrate Pest Control Research Program staff applied for and was awarded a competitive Specialty Crop Block Grant (SCBG). The Grant will be used in collaboration with scientists from the National Wildlife Research Center to conduct laboratory efficacy trials of an anthraquinone-based repellent to minimize impacts of wild birds to production of blueberries, lettuce, melons, and ginseng. This research will include laboratory efficacy trials with European starlings offered treated blueberries, horned larks offered treated lettuce seedlings, grackles offered treated melons, and wild turkeys offered treated oats associated with straw coverings used to produce ginseng. Scientists at the USDA National Wildlife Research Center (NWRC) estimate that birds caused \$8.5 million of damage to blueberry production in the US (Avery et al. 1993). Lettuce is an important economic crop in several states; bird depredation to recently planted crops is a primary concern throughout many production areas, including California (Cummings et al. 1998). Respondents to a recent NWRC survey reported that wild turkeys were present (83%) and cause damage (60%) to ginseng every year (Werner et al.). These losses have motivated the use of several bird damage management techniques, including chemical repellents. Methyl anthranilate is currently registered for agricultural applications; however research has determined that the irritation threshold is so high that the use is cost-prohibitive. It is imperative that California develop a comprehensive integrated pest management program to identify and mitigate potential hazards associated with bird depredation to agricultural crops.

The measurable outcome for this project is efficacy data to be used in future registration of the active ingredient anthraquinone, which has the potential to add a new non-lethal tool to the arsenal for avian control in California. Anthraquinone repellents are not currently registered for agricultural applications. However, we feel that this active ingredient has the potential to be a more cost effective and efficacious alternative to methyl anthranilate.

VERTEBRATE PEST CONTROL RESEARCH
ADVISORY COMMITTEE



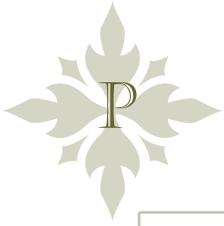
The Vertebrate Pest Control Research Advisory Committee held two meetings in 2010. The first was held on April 14, 2010 in Madera County and the second on October 13, 2010, in Monterey County.

THE FOLLOWING RESEARCH PROPOSALS WERE RECOMMENDED FOR FUNDING BY THE COMMITTEE, APPROVED BY THE SECRETARY OF CDFA, AND INITIATED IN 2010:

“Estimating Job and Revenue Savings from using a Variety of Pest Control Techniques to Protect Crops from Bird and Rodent Damage in California,” USDA, APHIS, Wildlife Services, National Wildlife Research Center

“Increasing Acceptance of Zinc Phosphide Baits,” USDA, APHIS, Wildlife Services, National Wildlife Research Center

“A Literature Review of Existing ‘Selective’ Bait Stations for Excluding Non-Target Animals and Metering Bait Dose,” University of California, Cooperative Extension.



PLANT HEALTH

ANNUAL REPORT

“Vertebrate Pest Control-Education and Certification using the Internet and Touch Screen Devices,” University of California, Cooperative Extension

“In-Vitro Inhibition of Chlorophacinone Metabolism in Resistant Meadow Voles using FIFRA 25b Inert Ingredients,” USDA, APHIS, Wildlife Services, National Wildlife Research Center

“Identifying the Level of Use of Aluminum Phosphide for Controlling Burrowing pests in California,” University of California, Cooperative Extension



LIGHT BROWN APPLE MOTH PROGRAM

LBAM is native to Australia, but has successfully invaded New Zealand, New Caledonia, Hawaii and the British Isles.



PLANT HEALTH ANNUAL REPORT

LIGHT BROWN APPLE MOTH PROGRAM

SPECIAL POINTS OF INTEREST:

- ◆ The sterile moth technique (SIT) deployed operational test releases in Napa and Sonoma Counties during the growing season in 2010. Additional SIT releases will be deployed in early 2011. This alternative eliminated the need for aerial spraying of LBAM pheromone over urban areas.
- ◆ The LBAM infestation in Santa Barbara (Santa Barbara County) was declared eradicated.
- ◆ The California Department of Food and Agriculture (CDFA) Interior Quarantine within Marin, Sonoma, Napa, Solano, Contra Costa, San Francisco, Alameda, Santa Clara, San Mateo, Santa Cruz, San Joaquin, Monterey, and San Benito counties was converted into a contiguous regulated area.
- ◆ Detection trapping within the contiguous regulated area was discontinued.
- ◆ The CDFA Interior Quarantine expanded into San Diego County.
- ◆ Pheromone dispensers were deployed in isolated LBAM infestations in Grant Line (Alameda County), Manteca, Tracy, and Stockton (San Joaquin County), Davis and Woodland (Yolo County), Los Osos and Arroyo Grande (San Luis Obispo County), Santa Barbara (Santa Barbara County), and East San Diego (San Diego County).
- ◆ The Program certified an Environmental Impact Report (EIR) for compliance with The California Environmental Quality Act in March 2010.
- ◆ The Program submitted an application for an NPDES permit from the State Water Resources Control Board. The permit indicated that no water monitoring or toxicity testing would be required.
- ◆ A “Best Management Practices” nursery cleanliness protocol was established to limit the spread of Light Brown Apple Moth through movement of commercial nursery stock.



BACKGROUND

LBAM is native to Australia, but has successfully invaded New Zealand, New Caledonia, Hawaii and the British Isles. The first recorded detection of LBAM in North America was in Berkeley, California (Alameda County) in February 2007. LBAM is an exotic insect pest of quarantine significance to both CDFA and USDA. Its larvae attack more than 2,000 host plants, including nearly all types of fruit crops, ornamental plantings, vegetables and nursery stock. During severe outbreaks, damage to fruit can be as high as 85 percent of the crop. In addition to direct damage caused by LBAM, California's export markets will suffer due to the implementation of quarantines by foreign and other state governments¹. Because LBAM is not known to occur in the continental United States, it does not have any natural enemies to keep its population in check. USDA considers it highly likely that LBAM will become permanently established in the United States if suppression, control and eradication measures are not implemented.

PROGRAM DESCRIPTION

The LBAM project is a Federal and State cooperative program that coordinates with the county agricultural commissioner's, other state and local agencies, industry and agricultural organizations throughout the state. The program is administered by the Director of the Division of Plant Health and Pest Prevention Services in accordance with the policies and priorities set forth by law and the Secretary of the Department. Program employees located at satellite facilities in Los Alamitos, Moss Landing, San Jose, Sacramento, and Nipomo are responsible for coordinating and implementing the program operations. They also work in conjunction with the county agricultural commissioner's to ensure the program activities are conducted in accordance with all statutory and regulatory requirements. An Insect Biosystematist at the Department's Plant Pest Diagnostics Center provides official identification of all the LBAM detected. Any suspect LBAM specimen from a non-regulated county is also confirmed by official identification from USDA's Systematic Entomology Laboratory.

THE LIGHT BROWN APPLE MOTH PROGRAM HAS FORMED THE FOLLOWING ADVISORY GROUPS:

LBAM TECHNICAL WORKING GROUP (TWG)

The LBAM TWG is comprised of representatives from the scientific and academic community and individuals with extensive experience regarding LBAM and eradication of invasive species. This group provides recommendations to CDFA and USDA Secretaries regarding feasibility and tools to achieve control, suppression, or eradication of the LBAM. The TWG did not convene during 2010.

¹Robert C. Venette, Erica E. Davis, Michelle DaCosta, Holly Heisler, and Margaret Larson, Mini Risk Assessment, Light Brown Apple Moth, University of Minnesota, Department of Entomology, September 21, 2003. Dowell, R. V., October 13, 2008. A Partial Analysis of the Potential Increase in Pesticide Use Light Brown Apple Moth Might Cause in Commercial Agriculture and Uncultivated Settings in California.



BACKGROUND

ENVIRONMENTAL ADVISORY TASK FORCE (EATF)

The EATF, chaired by CDFA Secretary A.G. Kawamura, is comprised of representatives from numerous environmental and research-oriented organizations. The EATF informs the Secretary of environmental concerns regarding the Light Brown Apple Moth Program, possible mitigating factors, and research into new suppression, control, and eradication methods. The EATF did not convene during 2010.

CALIFORNIA DEPARTMENT OF PESTICIDE REGULATION (DPR) AND OFFICE OF ENVIRONMENTAL HEALTH HAZARDS ASSESSMENT (OEHHA)

DPR provides consultation to CDFA regarding pesticide issues for materials used in the control, suppression, and eradication of LBAM. OEHHA provides consultation to CDFA regarding the potential human health effects of materials used in control, suppression, and eradication efforts. OEHHA has published several reports which have evaluated the potential human health risks associated with the use of an LBAM pheromone in mating disruption treatments. OEHHA staff attended several public meetings in 2010 to provide outreach to public stakeholders about the health risks associated with control, suppression, and eradication tools and methods.

LBAM STRATEGY ELEMENTS

1. **Statewide Detection**
Deploy LBAM traps in areas of the state where biologically reasonable, to detect new infestations of LBAM while at low population levels. Early detection increases the probability of eradicating incipient populations.
2. **Quarantine and Containment**
Prevent the spread of LBAM to new areas of the state by regulating shipments of host plants and material.
3. **Rapid Response**
Respond quickly to detections of LBAM in new areas by intensively trapping the area and applying eradication treatments to the small outlier infestations.
4. **Research**
Identify potential sources of the infestations; develop treatment alternatives, biological control organisms and the sterile moth technique.



STATEWIDE DETECTION



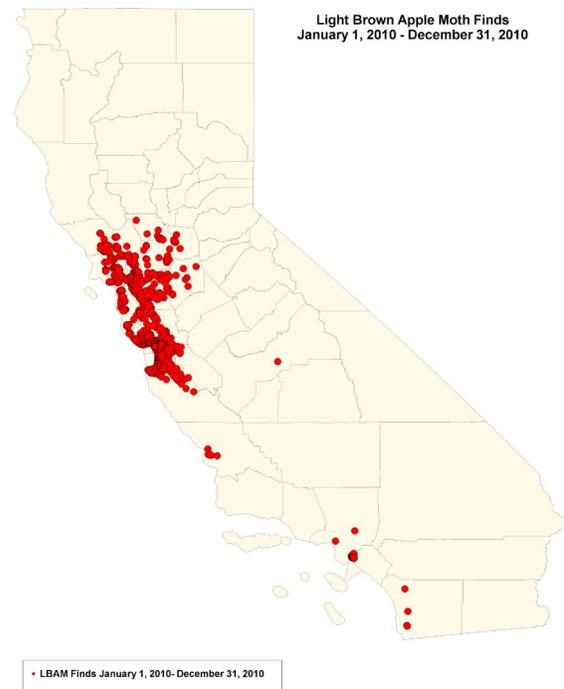
An inspector placing a LBAM trap.

Chronicle / Lance Iversen

CDFA, in cooperation with the USDA and the California county agricultural commissioners (CACs), has an intensive and extensive trapping array throughout the State to determine the extent of the infestation. The Program is designed to locate new LBAM infestations quickly and verify that uninfested areas remain free from LBAM. This trapping effort has revealed LBAM infestations in Alameda, Contra Costa, Fresno, Los Angeles, Marin, Monterey, Napa, San Benito, San Diego, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Solano, Sonoma and Yolo Counties. The rest of the State remains LBAM-free. Statewide detections of LBAM continue to increase in spatiotemporal intensity (Figure 1).

In 2010 detection traps were removed from the contiguous infested area within Marin, Solano, Contra Costa, Alameda, San Francisco, San Mateo, Santa Clara, Santa Cruz, Monterey, and San Benito counties. These counties are considered generally infested with LBAM. Detection traps were also removed from Del Norte, Humboldt, Trinity, Siskiyou, Modoc, Lassen, Plumas, Sierra, Alpine, Mono, Inyo, and Imperial counties as the traps were determined biologically unwarranted for LBAM survival and reproduction. A program evaluation concluded that detection traps are not warranted in areas where the moth cannot maintain a continuous breeding presence.

Figure 1. Light Brown Apple Moth Finds



THESE AREAS ARE DEFINED AS THOSE HAVING:

- At least one day per year with an air temperature of 3°F or less:
- At least ten consecutive days with an average air temperature of 86°F and/or greater;
- Insufficient warm weather to allow fewer than three LBAM life cycles per year.

Note: For larger map, please see Maps, page 135 - or - click on Figure link.



QUARANTINE AND CONTAINMENT



Figure 2. Light Brown Apple Moth Quarantine Boundaries—2010

A federal domestic quarantine order and state interior quarantine restrict the movement of LBAM hosts from the infested portions of regulated counties. Currently, over 5,200 square miles are under quarantine. This is a significant increase from 2008 where 1,800 square miles were under quarantine and in 2009 where 3,900 square miles were under quarantine (Figure 2).

The quarantines restrict the movement of hosts in and out of the quarantine areas. Regulated host articles such as nursery stock, assorted fruits and vegetables, cut flowers and greenery, Christmas trees, hay, and green waste must all comply with the movement restrictions. The quarantine includes provisions requiring regulated host articles to be

inspected and found LBAM-free, originate from a premise that has been trapped and found LBAM-free, grown under an integrated pest management system, or moved under specific conditions to a specific location and processed in an approved manner. Infested hosts or premises must be treated or reconditioned and re-inspected and found LBAM-free prior to movement. Persons or businesses in the quarantine that wish to move regulated host articles in and out of the quarantine area may sign a compliance agreement with their local regulatory official (i.e., the county agricultural commissioner or the Cooperative Light Brown Apple Moth Program) in order to self-certify their hosts for movement. The local regulatory officials conduct periodic inspections and oversight visits of all entities operating under compliance agreements in order to verify compliance.

In 2010, the California Department of Food and Agriculture (CDFA) Interior Quarantine within Marin, Sonoma, Napa, Solano, Contra Costa, San Francisco, Alameda, Santa Clara, San Mateo, Santa Cruz, San Joaquin, Monterey, and San Benito counties was converted into a contiguous regulated area. This regulatory change permits the free movement of LBAM host material within the regulated area. Movement of host material outside the regulated area is subject to the state interior quarantine restrictions.

In 2010, the program initiated a “Best Management Practices” nursery cleanliness protocol to limit the spread of Light Brown Apple Moth through movement of commercial nursery stock from chronically positive nurseries. This protocol establishes a procedure for progressive enforcement of nursery cleanliness standards to ensure LBAM-free status prior to movement out of the regulated area.

Note: For larger map, please see Maps, page 135 - or - click on Figure link.



The current international quarantines remain in place and other countries may impose their own quarantines on products from the infested portions of California. Canada and Mexico imposed regulations on the movement of agricultural products from the LBAM-infested portions of California in 2007 and these regulations are still in place. Chile did so in 2008. South Korea and China have made inquiries about the Light Brown Apple Moth Program in California. China has regulations in place pertaining to the movement of LBAM host material from Australia and New Zealand. They require that any regulated items be LBAM-free. Growers may treat with pesticide sprays, use cultural practices, inspections, etc., to achieve this requirement.

RAPID RESPONSE

The primary objective of the rapid response component is to quickly and efficiently eradicate incipient infestations of LBAM. In 2010, the treatment program used pheromone mating disruption applied by ground. Eradication of LBAM will require a systems approach using multiple tools, including applications of mating disruption pheromone, use of insecticide treatments, biological control technologies, releases of sterile moths and other technologies still under development.

Prior to the first treatment in any area, residents, local officials and elected officials are invited to an informational open house. This open house provides the residents an opportunity to learn about the treatment that will be occurring in their neighborhood and to ask specific questions. Program, health and environmental specialists are present to answer questions. During 2010, four informational open houses or public meetings were held in the infested areas.

Residents in the treatment area are notified via door-to-door notification, direct mail and the media. The notice contains the date and time of the treatment, the type of pesticide to be applied, any health and safety precautions the citizens may wish to take and a telephone number for residents to call for any additional information. The Department also introduced an e-mail update notification system.

Prior to any treatment, the Department's environmental scientist reviews the California Department of Fish and Game's (DFG) Natural Diversity Database to determine if any threatened and endangered species are present within the proposed treatment boundaries. Depending on the environmental concerns for a treatment area, the Department consults with the Department of Pesticide Regulation (DPR), Department of Health Services (DHS), California and United States Environmental Protection Agencies, DFG, United States Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration (NOAA) and the Monterey Bay National Marine Sanctuary (MBNMS). Treatment programs are modified if necessary to protect any threatened and endangered species that might be in the area.

TREATMENT RESPONSES

A dispenser formulation of the LBAM pheromone was used in 2010 to treat small outlier infestations.



PLANT HEALTH ANNUAL REPORT

The application of the pheromone dispenser treatment is very labor intensive; therefore, this application is reserved for small outlier infestations. As new technologies are developed and approved for use, they will be incorporated into the existing ground treatment plan.

The LBAM infestations in Stockton and Tracy (San Joaquin County), Santa Barbara (Santa Barbara County), and Woodland (Yolo County) were eradicated using mating disruption treatments delivered by the use of pheromone dispensers. Additional isolated LBAM infestations are currently being treated with pheromone dispensers in Grant Line and Tesla areas (Alameda County), Manteca and West Tracy (San Joaquin County), Los Osos and Arroyo Grande (San Luis Obispo County), East San Diego (San Diego County), and Davis (Yolo County).

ENVIRONMENTAL MONITORING

Prior to the start of any treatments, the CDFA consults with the DPR to determine the need and scope of any environmental monitoring. No additional environmental monitoring was needed for the use of the pheromone dispensers in 2010.

NPDES PERMIT

The Clean Water Act (CWA), at section 301(a), broadly prohibits the discharge of any pollutant to waters of the United States, except in compliance with an NPDES permit. Residual pesticides discharged into surface waters constitute pollutants within the meaning of the CWA even if the discharge is in compliance with the registration requirements of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Therefore, coverage under an NPDES permit is required.

In 2010 the Light Brown Apple Moth Program applied for an NPDES permit from the State Water Resources Control Board (SWRCB) for the incidental discharge of pesticides to waters of the United States as used within the program for control suppression, and eradication of LBAM within the State of California. The SWRCB evaluated the pesticides used under the program and determined that a permit was indeed needed for incidental discharges to water, but that Receiving Water Monitoring Triggers, water monitoring, and toxicology testing would not be required for any of the pesticides used under the program.

ENVIRONMENTAL IMPACT REPORT (EIR)

CDFA contracted with a consulting firm to produce an EIR covering the Program activities. A series of public hearings were held to gather public input on the content and scope of the EIR in Monterey, Santa Cruz, San Francisco and Oakland. The EIR was later expanded to cover the entire state of California and to include the use of sterile LBAM releases. A second series of public meetings about the expanded EIR was held in Los Angeles, San Jose and Sacramento. The draft EIR was available for public comment in 2009. The CDFA received some 300 public comments on the draft EIR. CDFA responded to the public comments and the Secretary of CDFA certified the EIR in March, 2010.



RESEARCH

Research is an integral part of the Light Brown Apple Moth Program because no single control, suppression, or eradication technique currently exists that can be practically, safely and effectively implemented over the entire LBAM-infested area. Therefore, the LBAM TWG recommends eradicating LBAM in a multi-faceted systems approach. As additional treatment methods are developed and approved for use in California, they will be implemented into the project.

Some treatments developed in Australia and New Zealand will have to be modified for California conditions. Others, such as the sterile insect technique (SIT), will require various levels of development and validation to make them functional and effective. The Department has developed a research plan with the following objectives:

- ◆ Expand upon and modify alternative methods to eradicate LBAM from California.
- ◆ Develop methods to control and suppress LBAM.
- ◆ Develop data on the possible environmental impacts of any control, suppression, or eradication method used by the Light Brown Apple Moth Program.
- ◆ Develop an effective DNA fingerprint and identification technology for LBAM.

RESEARCH AND DEMONSTRATION PROJECTS IN PROGRESS:

A) LBAM EGG PARASITISM BY *TRICHOGRAMMA* WASPS

Research by Dr. William Roltsch of CDFA and Dr. Nada Carruthers of USDA Agricultural Research Services has confirmed that California native *Trichogramma platerni* and *Trichogramma fasciatum* will successfully parasitize LBAM eggs. Parasitism varies by season and host sites, but releases of commercially available native *Trichogramma* should be successful in lowering populations. Inundative and augmentative releases of *Trichogramma* to facilitate management of LBAM are anticipated for the 2011 season.

B) LBAM SEASONAL ACTIVITY AND LARVAL PARASITISM BY NATIVE PARASITOIDS

Research by Dr. Nick Mills of the University of California and William Roltsch of CDFA has focused on the seasonal abundance and activity of LBAM at different sites within the infested area. The abundance and activities observed indicate that generations are not distinct and that LBAM of all stages can be found throughout the year. The research also looked at larval parasitism at different sites within the infested area and found two native larval parasitoids *Meteorus trachynotus* and *Enytus eureka* are responsible for most parasitism. Parasitism varies by season and presence of parasitoid populations, but can be quite high (75%). These natural enemies have not slowed the LBAM population from increasing each year since at least 2007.



C) FOREIGN EXPLORATION OF LBAM PARASITIDS.

Dr. Nick Mills of the University of California and William Roltsch of CDFA are collaborating with LBAM scientists in Australia and New Zealand to import LBAM parasites to evaluate their ability to attack LBAM, and to research their preference for LBAM compared to native or naturalized leaf roller moth larvae. Several exotic LBAM parasites were placed under quarantine and have undergone limited host range testing. All the parasitoids collected have proven to be difficult to rear in quarantine.

PLANT HEALTH
ANNUAL REPORT



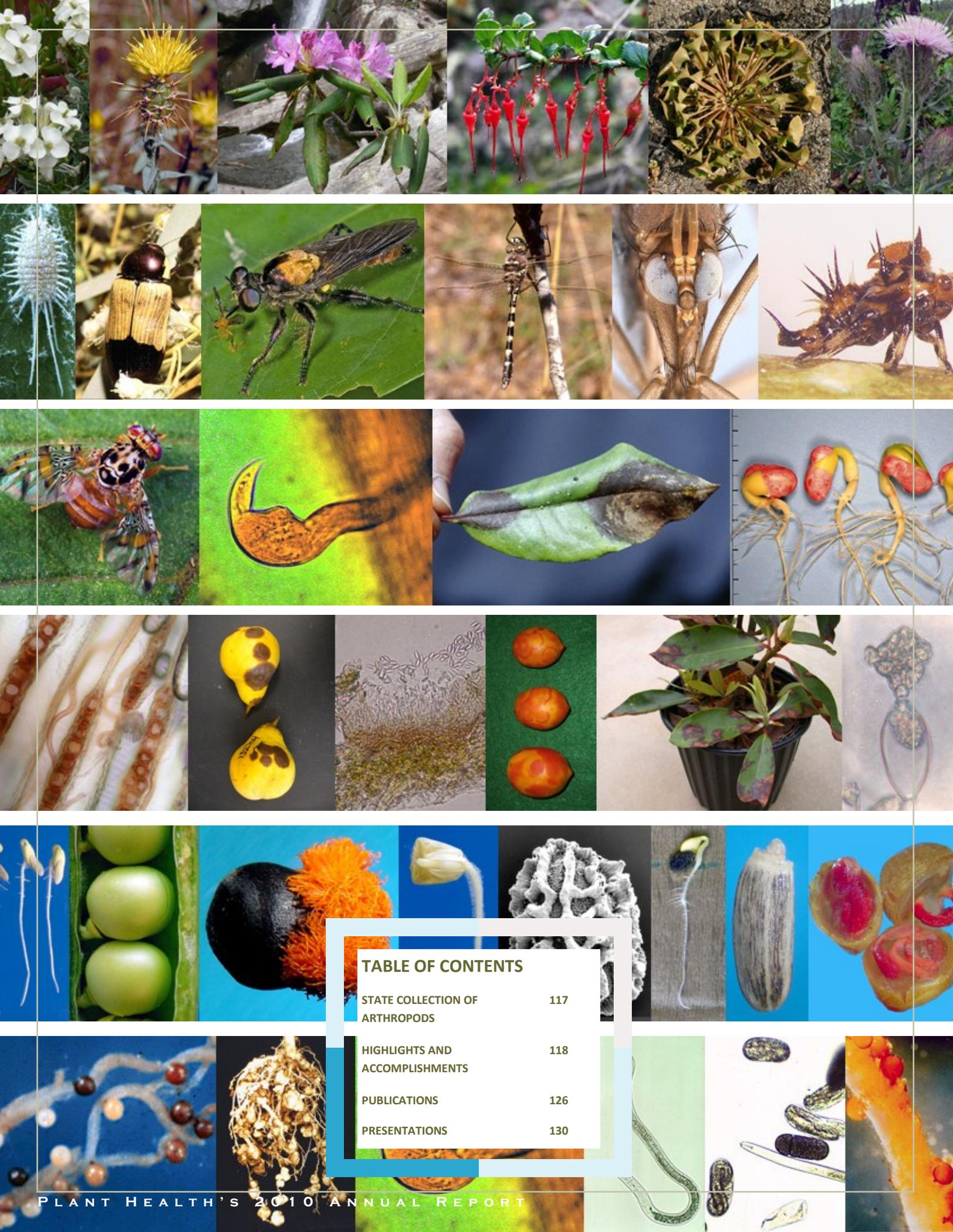


TABLE OF CONTENTS

STATE COLLECTION OF ARTHROPODS	117
HIGHLIGHTS AND ACCOMPLISHMENTS	118
PUBLICATIONS	126
PRESENTATIONS	130



PLANT HEALTH ANNUAL REPORT

PLANT PEST DIAGNOSTICS CENTER

Objective: *To serve as a scientific and professional resource, providing timely and accurate plant pest diagnostics to our clients with the aim of protecting California's agriculture and environment.*

Vision: *To continually enhance our professional expertise as an internationally recognized scientific service and research center committed to meeting future scientific challenges to California's agricultural and environmental needs.*

Values:

- ◆ **Leadership** in the field of plant pest diagnostics.
- ◆ **Excellence and Innovation** in science, technology, research and service.
- ◆ **Professional Integrity** in taking responsibility for the validity of work based on the best available and accepted scientific protocols.
- ◆ **Trust** established by practicing ethical conduct.
- ◆ **Empowerment** through an organizational culture that promotes delegation of authority, creativity and celebration of accomplishments.
- ◆ **Mutual Respect, Cooperation and Communication** through partnerships and teamwork and the constructive exchange of ideas.
- ◆ **Social Responsibility** expressed by a commitment to service of the local community's grade schools and colleges, as well as agricultural, gardening and civic organizations.

BACKGROUND :

Although it has been known by various names over the past eighty years, the Plant Pest Diagnostics Center (PPDC) provides timely and accurate diagnostics of plant pests and diseases in support of the pest prevention programs of the Department. PPDC has five laboratories: Botany, Entomology, Nematology, Plant Pathology and Seed Science with about 50 permanent and 30 seasonal employees. The Branch also serves as a scientific resource and provides professional expertise to a number of clients including the United States Department of Agriculture (USDA), other federal and state agencies, county agricultural commissioners, the University of California Cooperative Extension, the agriculture industry and the public. The PPDC is also a collaborator with the National Plant Diagnostic Network (NPDN), is recognized as the expert lab for the western region, and provides diagnostic service and support to the NPDN. The PPDC scientists, technicians and support staff strive to provide excellence in service and leadership in plant pest diagnostics and biosystematics. More information about PPDC is available at: www.cdfa.ca.gov/plant/PPD/.

[Table 1](#) shows the number of samples and specimens submitted to the laboratory in 2010, compared with previous years. Most programs include special surveys or projects that generate additional



PLANT HEALTH ANNUAL REPORT

samples than cannot be easily tracked by Pest and Damage Report numbers. Note that sample numbers are not comparable among the different disciplines (labs/programs) as an accurate comparison of workload since the time and work required to diagnose or identify different types of samples varies widely from lab to lab and even sample to sample.

TABLE 1. A COMPARISON OF NUMBERS OF SAMPLES RECEIVED BY THE CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE (CDFA) PLANT PEST DIAGNOSTICS CENTER OVER THE LAST SIX YEARS.

Labs/Programs	2005	2006	2007	2008	2009	2010
Botany ¹	1,000	1,474	1,029	1,682	1,167	1,037
Entomology ²	50,000+	50,000+	65,000+	70,000+	80,000+	85,000+
Nematology ³	4,923	7,912	8,648	5,870	7,864	7,293
Plant Pathology ⁴	103,451	87,434	78,872	90,531	92,218	120,262
Seed ⁵	3,166	5,791	2,427	1,843	3835	4,245
Total	162,540	152,611	155,976	169,926	185,084	217,837
Yearly Change	- 2.2 %	- 6.1 %	+ 2.2%	+ 8.2%	+ 8.9%	+17.7%

¹ An additional 2,303 plant specimens were examined & identified for curation and addition to the Plant Pest Diagnostics Botany Herbarium in 2010

² Estimate of actual specimens examined, but not including the 100,000+ specimens of LBAM in 2010.

³ 2010 Figure includes Quarantine samples, Nursery Registration & Certification samples, USDA Survey Project samples, as well as Diagnostic samples.

⁴ 2010 Figure includes 64,487 samples tested for several target viruses as part of the California Deciduous Fruit Tree, Nut Tree, and Grapevine Improvement Advisory Board (IAB) program; 22,039 Sudden Oak Death (SOD) samples; 9,111 plant samples and 3,800 ACP samples tested for the Huanglongbing (HLB) pathogen; 6,461 samples tested for Citrus Tristeza Virus; 23,475 samples tested for the Plum Pox Virus Survey; 178 samples tested for the Sweet Orange Scab Pathogen, *Elsinoe australis*; and 29,670 for general diagnostic plant pathology.

⁵ Quarantine, phytosanitary and noxious weed seed examinations require identification of 25,000 seeds per sample. Purity analyses require identification of 2,500 seeds per sample. Thus in 2010 the total number of seeds or other propagules actually examined for identification exceeded 25,566,600. Germination tests require the evaluation of 400 seedlings per sample; thus the total number of individual seedlings evaluated for germination tests was approximately 168,000.

RESEARCH

The scientists at the PPDC continue to conduct research and publish scientific papers as part of the mission of the branch. In the past year, members of the PPDC published 48 scientific papers, books,



manuals or other publications. In addition, 42 oral presentations and/or posters were given at various professional meetings, seminars and training workshops. A list of scientific publications and presentations for 2010 are included at the end of this report.

SEMINAR SERIES

The Plant Pest Diagnostics Center seminar series began in 2004 to enable scientists to present research data, discuss ongoing basic or applied research and diagnostic and pest issues of general importance. The focus of the seminar series has been to share information on any aspect of basic or applied research or diagnostics and includes invited speakers from other institutions.

The series continued through 2010, and 14 presentations were given during the year. Speakers included scientists from the PPDC and other branches of CDFA, as well as from the USDA-APHIS, the University of California (both Davis and Riverside), the University of California Cooperative Extension, Stoller USA and Corpoica, Colombia.

CALIFORNIA STATE COLLECTION OF ARTHROPODS: 2010 REPORT

The California State Collection of Arthropods (CSCA) is a scientific resource for the local, federal and international community for research and identification of various groups of arthropods, especially insects. The collection is maintained by the Entomology Lab of the Plant Pest Diagnostics Center. Two curators, a collection manager, and the entire scientific staff directly supervise the care, use, growth and development of CSCA by encouraging the use of this collection for research on the taxonomy and systematics of arthropod taxa. The web page for the collection is located at the following website: www.cdfa.ca.gov/plant/ppd/csca.html. As far as specimen usage, the California State Collection of Arthropods issued 18 loans in 2010 representing 3,085 specimens, and hosted 57 visitors from the local, national and international communities to study the collections on site. Visitors came from several North American institutions, including the USDA, Cornell University, Purdue University, The Natural History Museum of Los Angeles, and Ohio, Nevada, and Oregon Departments of Agriculture. International visitors came from around the world including, The Natural History Museum of Denmark, Zoological Institute (St. Petersburg), National Taiwan University, and Australian Quarantine Services.

The total number of prepared specimens now exceeds 2 million, with approximately 100,000 prepared specimens accessioned in 2010. With the CSCA's blanket permit to collect arthropods in California's State Park system, several seasonal survey efforts were undertaken in 2010, including Grover Hot Springs SP, Indian Grinding Rock State Historical Park, Bothe Napa Valley SP, Annadel SP. CSCA's frozen tissue collection continues to grow. At least 18 holotypes and numerous paratypes were deposited in CSCA in 2010, and the collection has been recognized as an important repository for certain groups of arthropods. While personal examination of types may always be necessary, there are plans to add multiple-view close-up digital images to the CSCA Web page for each species held. The inventory of the entire collection is nearly complete with more than 41,000 species so far.

To accommodate interested vocational and avocational entomologists locally, regionally, and worldwide the CSCA has a Research Associate program. Through the associate program, PPDC



PLANT HEALTH ANNUAL REPORT

encourages the use of the collection, the growth of the collection through their respective donations and allows associates to cite their status, if necessary, to provide an institutional address for publications or grants. Several additional scientists have applied to our program in 2010 and have been awarded this courtesy appointment. The Research Associates can be found on the branch website at www.cdfa.ca.gov/plant/ppd/entomology/resassoc.html.

PLANT PEST DIAGNOSTICS CENTER (PPDC) 2010 HIGHLIGHTS AND ACCOMPLISHMENTS



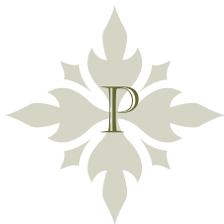
Following is a sampling of some of the accomplishments of the Plant Pest Diagnostics Laboratory from 2010. It is intended to reflect a few of the highlights of the year but is not an exhaustive list.

- ◆ The CDFA PPDB diagnostic laboratory provided timely and accurate identifications and diagnose for over 200,000 pest specimens from numerous sources—municipal, private, and academic.
- ◆ PPDB Botanists expanded the CDFA PPDB Botany Herbarium which is networked with the “Consortium of California Herbaria” that includes several other California Herbaria from Academia. This aids in the identification of many new invasive plant species including those in the nursery trade before they become major agricultural pests in California.
- ◆ The PPDB staff continued to average more than 40 peer-reviewed scientific publications as well as deliver more than 40 oral presentations per year.
- ◆ Numerous new and novel molecular DNA tests were developed by CDFA PPDB Scientists for accurate and early detection and identification of agricultural pests such as the Palm Wilt pathogen, several species of root knot nematodes, the Corn Stunt Phytoplasma and Western X Disease Phytoplasma in their insect vectors, as well as various Stramenopile pathogens such as Downy Mildews and *Phytophthora* spp. This has cut the diagnostic process down from weeks to hours for many serious pathogens.
- ◆ Professional service – many PPDC scientists State scientists continued to be active participants in various professional committees and activities at state, university, federal, and international levels.
- ◆ Numerous “First Reports” were published for various invasive species new to California or the United States. These have often included peer-reviewed journal publications of pathogens, nematodes and insects which are new to California.
- ◆ Various invasive species that occur recurrently in California but are intercepted or detected in time to eradicate them continued to be identified by PPDC scientists. Some good examples of



this in 2010 were identification of the A-rated Cedar Apple Rust pathogen on an apple specimen from a vehicle originating from Shawnee, Oklahoma, and an A-rated perennial weed, *Potentilla recta* (sulfur cinquefoil) which is listed as a noxious weed in several states, from Mad River, California in Trinity County. In addition, PPDC Botanists identified three different “A” rated species of *Centaurea* sp. (star thistles and knapweeds) in one week that had been intercepted at border stations.

- ◆ Plant Pathology scientists again taught graduate level courses in plant disease diagnostics at the University of California, Davis.
- ◆ A number of highly effective seed science training workshops were conducted by CDFA PPDB scientific staff for seed scientists from the private, government, and academic sectors of California and the Western United States.
- ◆ The Seed Science Laboratory provided numerous identifications of seeds, fruits, or associated material from wetland and pasture core samples for the US Geological Survey/ WERC Dixon Field Station in support of an ongoing assessment of wildlife habitat quality in northern California and southeastern Oregon.
- ◆ The Seed Science Laboratory made numerous identifications of Brassicaceae plant specimens for CDFA Biocontrol for a collaborative seed collection project for Biocontrol of Brassicaceae Weeds. These samples were accessioned into the CDFA Herbarium and the CDFA Seed Herbarium.
- ◆ The Seed Science Laboratory provided numerous seed and fruit specimens from the CDFA Seed Herbarium of potential weeds found in table grape growing regions of California for the Identification Technology Program, USDA/APHIS/PPQ, Fort Collins, Colorado. The Seed Laboratory staff scientists are working in collaboration with USDA to construct a new diagnostic LUCID computer-based seed key for weedy plant species that may contaminate California grown table grapes to be exported to Australia and New Zealand. The new key will be a valuable diagnostic tool for agricultural inspectors in California, Australia, and New Zealand that can be used to quickly identify weedy contaminants and determine if they are of quarantine significance.
- ◆ The PPDC lab participated in an educational project in partnership with the Cooperative Work Experience and Internship Program of a local community college in Sacramento. In this program a student was hired as a scientific aide to work on various disease projects in the Plant Pathology Lab. As part of the program the student initially sets goals for himself in conjunction with his instructor and supervisor to learn new skills by working under the supervision of scientists and technicians who are experts in those skills. Late in the semester, the course instructor visits the work site to observe the student in action using his new skills. The student’s performance is ultimately evaluated by the lab scientist, the instructor, as well as the student himself. All parties were very satisfied with the results of this collaboration, so we



PLANT HEALTH ANNUAL REPORT

anticipate additional participants in this educational program in the future.

- ◆ An ongoing survey for Potato Cyst Nematode (PCN) was continued through 2010. The survey is funded by the United States Department of Agriculture (USDA) and is conducted nationwide. The survey was initiated in 2006 in response to the discovery of the potato cyst nematode, *Globodera pallida*, in Idaho. To date, a total of 2031 samples have been collected and processed. All samples have been negative for PCN.
- ◆ The Seed Laboratory participated in several cooperative research studies among public and private seed laboratories throughout the United States and Canada for validation of proposed laboratory testing procedures to be used for regulatory purposes.
- ◆ Seed Laboratory Scientists authored or co-authored numerous standardized seed testing procedures that were adopted by the Association of Official Seed Analysts for use in North America.
- ◆ Seed Laboratory scientists worked in collaboration with ethnoecologist Dr. Kat Anderson, USDA, Natural Resource Conservation Service (NRCS), National Plant Data Center, and the Phoebe A. Hearst Museum of Anthropology, UC Berkeley to identify seed, fruit, and plant fragment samples collected from tribal members of California's indigenous people. The samples were collected in the early part of the twentieth century and have been stored, untouched, at the Phoebe Hearst Museum. The study is to determine what plant species were collected and used for food, fiber, and medicine by the various tribes. Project scientists in the Seed Laboratory examined 137 samples and identified nearly 169,000 seeds, fruits, and vegetative materials representing 174 plant species. CDFA PPDB continued to serve as the diagnostic "hub" laboratory for the Western Region of the USDA/Homeland Security's National Plant Diagnostic Network in partnership with the University of California, Davis. This includes the eleven western states and pacific territories of American Samoa and Guam. Our division's Plant Pest Diagnostic Lab serves the 11 Western States and Pacific Territories by providing expertise and assistance to the Western Region for pest confirmations and particularly difficult diagnoses.
- ◆ Throughout 2010, more than 100,000 light brown apple moth (LBAM) individuals were identified by PPDC Senior Insect Biosystematist Dr. Marc Epstein.
- ◆ Throughout the year, the PPDC laboratory provided diagnostic and pest identification assistance on several samples received from our Western Plant Diagnostic Network (WPDN) diagnostic laboratory partners in the Pacific—including specimens from Hawaii, Guam, and American Samoa. For example, in collaboration with the WPDN Laboratory at the Hawaii Department of Agriculture, PPDC Plant Virologist Dr. Tongyan Tian diagnosed a sample of Maui onion from Hawaii with Iris Yellow Spot Virus.
- ◆ The PPDC tested citrus samples from nursery propagative sources for compliance with the citrus Tristeza virus (CTV) state quarantine. All samples were tested by Enzyme Linked



Immunosorbent assay (ELISA) and positive detections were confirmed by reverse transcriptase polymerase chain reaction (RT-PCR).

- ◆ The PPDC tested more than 20,000 Stone Fruit trees as part of a state-wide Plum Pox Virus survey. This virus has the potential of curtailing exports of several of California's most valuable export crops. Test results demonstrated that California trees continue to be free of this dreaded disease.
- ◆ In January, the PPDC lab hosted entomologist Dr. Soad Abdel-Razak from the Plant Protection Research Institute, Egypt Department of Agriculture who worked with Senior Insect Biosystematist Dr Gillian Watson on species of scale insects found in Egypt and on methods for identifying them. This type of collaboration also benefits CDFA by updating our awareness of pest species known to be present in that part of the Mediterranean Region, an area climatically similar to California.
- ◆ In January, Senior Plant Pathologists Dr. Suzanne Latham and Dr. Cheryl Blomquist confirmed the presence of *Stigmina palmivora* on the fronds of a diseased palm sample that originated in Florida. The sample had been intercepted in Kings County by a dog alert. *S. palmivora* is an important foliage disease of many palm species, causing severe leaf spotting and frond necrosis. The disease has been found in Florida, Kenya, South Africa, Myanmar and Japan. There have been no previous reports of the disease in California.
- ◆ In February, Senior Insect Biosystematist Dr. Marc Epstein presented a workshop on identification of the European Grapevine Moth, *Lobesia botrana*, at the Los Angeles County Agricultural Commissioner's Office for entomologists from the Southern California counties, CDFA, USDA, as well as for CDFA's field trapping supervisors.
- ◆ In February, The Burrowing Nematode, *Radopholus similis* was detected in plant shipments of *Calathea* sp. imported from Florida and destined to San Mateo County. The plants were infested with the high-risk, quarantined nematode *Radopholus similis*, which is not present in California. The nematode lives within plant roots and is readily spread with infested plants. If the plants had been allowed entry, with resulting in establishment and spread of the nematode, it could have resulted in serious economic loss to California's citrus, strawberry, carrot and ornamental industries.
- ◆ In March, the Annual California Nematology Workshop was held in collaboration with the University of California. This workshop is designed for pest control advisors and applicators, growers, farmers, retail and nursery employees, municipal, county and state employees, park and recreation personnel, educators, university educators and students, and consultants. State Nematologists were active in all aspects strategic planning, development, presentations and discussions. In fact, throughout the year Nematology staff presented various seminars and classes at the University of California, Davis and Riverside, State and County offices, International Universities, and even local high schools.



PLANT HEALTH ANNUAL REPORT

- ◆ In March, A turnip sample with severe galling, grown by Master gardeners at the Fair Oaks Horticulture center in Sacramento, was submitted to the PPDC. The causal agent of clubroot, *Plasmodiophora brassicae*, was identified by CDFA Plant Pathologists Dr. Latham and Dr. Blomquist from the resting spores present in the root tissue. Clubroot, caused by a B-rated pathogen that is persistent in the soil, was inadvertently brought in on seedlings of a brassicaceous crop from a coastal county. Most Brassicas such as broccoli, mustard, radish, Brussels sprouts and cabbage are susceptible. Although occasionally detected in coastal regions, this was the first record of clubroot in Sacramento and the Central Valley.
- ◆ In April, the fungal pathogens, *Pseudocercospora pseudoecalyptorum* and *Teratosphaeria molleriana* (synonym: *Mycosphaerella molleriana*) were detected from eucalyptus samples causing leaf spots and defoliation of *Eucalyptus globulus* in Marin county. There are few reports of these pathogens in California but they are common foliar pathogens on Eucalyptus species worldwide. *Pseudocercospora pseudoecalyptorum* and *Mycosphaerella marksii* were also detected from eucalyptus samples causing defoliation of Eucalyptus in San Francisco County. The detection of *M. marksii* was a new report in California. It has been reported primarily from Australia, but also from South Africa, Ethiopia and Indonesia. *P. pseudoecalyptorum* and *T. molleriana* were given “Z” ratings, and *M. marksii* was given a “Q” rating. Senior Plant Pathologist Dr. Suzanne Rooney-Latham made the determinations.
- ◆ In May, Scientists from the PPDC participated in the 22nd Annual State Scientists’ Day at the grounds of the State Capitol. Exhibits of living plants and animals, hands-on microscopic examination of live specimens, as well as preserved specimens from Botany, Seed Botany, Entomology, and Nematology were viewed by approximately 3,000 fourth to sixth graders who attended. Each year, several PPDC scientists staff the booths and give qualified, first-hand instruction on pests, agriculture and beyond.
- ◆ In May, scientists Dr. Ben Normark and two graduate students from the University of Massachusetts, and Mr. John Dooley of the USDA port plant quarantine inspection facility, San Francisco, visited the PPDC Laboratory to collaborate with Senior Insect Biosystematist Dr. Gillian Watson on a USDA-funded project on DNA sequencing of armored scale insects. This information will facilitate the development of DNA bar-coding for identification of quarantine interceptions, and better understanding of generic boundaries and relationships among the armored scale insects.
- ◆ In May, Dr. Ed Biffin, Botanist from the Australian National Herbarium visited the PPDC to work with Senior Plant Taxonomist Dr. Dean Kelch to establish network connections with the Australian botanical institution (Australia shares many weeds with California) and to collaborate on plant identifications.
- ◆ In May, a graduate level diagnostic class from U.C. Davis, including Professor and Extension Specialist, Dr. Mike Davis, visited the PPDC laboratory to see first-hand the workings of a plant



pathology laboratory dedicated primarily to diagnostics. The students also learned about the importance and the role of diagnostics in pest prevention programs like those of CDFA's.

- ◆ In May, Dr. Nathan Havill, USDA Forest Service, visited fly specialist Dr. Steve Gaimari to work on a collaborative project on DNA sequencing of predatory flies attacking hemlock woolly adelgid and other pine-feeding adelgids and aphids. This project facilitates the development of DNA barcoding for identification of biological control agents, to help monitor establishment of released biological control agents, and to better understand generic boundaries and relationships among these flies
- ◆ In June, The PPDC Seed Laboratory was selected by the Association of Official Seed Analysts/ Society of Commercial Seed Technologists (AOSA/SCST) as the lead facility for updating the Seedling Evaluation Handbook. The Seedling Evaluation Handbook is part of the official rules of seed testing and is the authoritative reference for all North American seed analysts and regulatory officials in evaluating seedlings. The main objective of this project, lead by Senior Seed Botanist Dr. Riad Baalbaki with assistance from Dr. Sabry Elias (Oregon State University) and Dr. Miller McDonald (Ohio State University) is to revise and expand the contents of the Seedling Evaluation Handbook. This will be done by digitally documenting and publishing normal and abnormal seedling development patterns of hundreds of important commercial plant species. AOSA/SCST has agreed to provide all the needed documentation equipment, to be housed at the Seed Laboratory at CDFA.
- ◆ In June, Senior Seed Botanist, Dr. Riad Baalbaki, successfully completed the requirements of the Association of Official Seed Analysts (AOSA) to become a Certified Seed Analyst– Germination.
- ◆ In July, in collaboration with the WPDN, a specimen of a pest thrips was submitted for identification by cooperative extension personnel from Alaska. It was identified as *Taeniothrips orionis* by Senior Insect Biosystematist Dr Gillian Watson. This species is native to western North America and has been recorded from several western US states and Canada; however, it had never been reported causing damage before. This thrips species is new to Alaska but has become very common in some US cities this year, being a nuisance in back yards and nurseries.
- ◆ In July, Senior Insect Biosystematist Dr. Marc Epstein identified a new moth pest to California, *Duponchelia foveali*. The moth is a highly destructive pest of a diverse list of vegetables and fruits as well as ornamentals and even aquatic plants.
- ◆ In July, Senior Seed Botanist Dr. Riad Baalbaki was selected by the Association of Official Seed Analysts and the Society of Commercial Seed Technologists to serve as an Editor for the international scientific journal *Seed Technology*. This journal contains scientific papers emphasizing applied and basic research in emphasizing applied and basic research in seed physiology, pathology, and biology related to seed development, maturation, germination,



PLANT HEALTH ANNUAL REPORT

dormancy and deterioration, as well as notes on new laboratory techniques and laboratory test standardization.

- ◆ In August, Systematic Entomologist, Dr. Marc Epstein traveled to Europe to visit the Natural History Museum (London) to study, photograph and borrow specimens of the invasive leaf rollers and other agriculturally destructive moth species. This was followed by a trip to collect all the life stages of the new-to-California European Grapevine Moth (EGVM) at the USDA-ARS Lab in Montpellier, France and Italy in collaboration with the international EGVM working group members.
- ◆ In September, Master Gardeners from Amador County visited the PPDB for training in the diagnosis of plant pests and proper sample collection for pest diagnosis.
- ◆ In September, Senior Insect Biosystematist Dr. Andrew Cline identified specimens of the Red Palm Weevil (*Rhynchophorus ferrugineus*) that were detected in a Canary Island palm tree in Laguna Beach in Orange County, CA. This was a new state and country record for this weevil. The Red Palm Weevil occurs in Asia, Africa, Australia, the South Pacific, the Middle East, and parts of Europe as well as on the island of Aruba and the Lesser Antilles in the Caribbean. The weevil is a destructive pest of numerous agriculturally important palms, and its hosts include date palm, oil palm, coconut palm, and many genera of palms including *Phoenix*, *Washingtonia*, *Areca*, *Sabal*, and several others.
- ◆ In September, 24 students from a Modesto Junior College Plant Diagnostics Class accompanied by their professor, visited the PPDC to see how CDFA, and specifically the diagnostics lab, is a valuable resource to the agricultural industry. The students in the class have diverse backgrounds and interests -- some are Pest Control Advisors, some are aspiring to become tree, vine, or vegetable farmers, some want to become agriculture teachers, and some are planning to transfer to Cal Poly or UC Davis to complete their undergraduate degrees.
- ◆ In September, the PPDC hosted several visiting scholars from the National Taiwan University's Research Center for Plant Medicine, Taipei, Taiwan, giving them a tour of the facility and interacting with them on diagnostic techniques and issues.
- ◆ In October, 2010 Field surveys and laboratory diagnosis for Potato Cyst Nematodes (PCN) had produced nearly 2,600 samples. Although a common grass cyst nematode, *Heterodera mani* was one cyst-forming nematode species that was detected in potato field soils in 2010 from the survey, the survey data demonstrated that California appears to still be free of the federally quarantined golden cyst nematode, *Globodera rostochiensis* and the potato pale cyst nematode, *G. pallida*.
- ◆ In October, the PPDC Laboratory received a new diagnostic tool, the Tescan Vega III variable pressure scanning electron microscope (VP-SEM). This instrument will make a significant contribution to the diagnostic programs of all five laboratories at the PPDC Laboratory.



- ◆ In October, a rust pathogen, *Melampsoridium hiratsukanum*, was identified on a specimen of White Alder from a nursery in Santa Cruz by Dr. Cheryl Blomquist of the Plant Pathology Lab. This was officially a new North American Record, previous finds of the pathogen having only been reported in Japan. Interestingly, the pathogen actually had been detected previously in California in the 1930s and the specimen was submitted to the Federal herbarium in Beltsville, MD, but it had been misidentified at that time and the identification was never published. After this recent detection and a correct identification, it was subsequently found in two additional locations in the Central Valley. Speculation is that the pathogen is probably widespread in California.
- ◆ In October, and then again in December, the PPDC hosted the the 6th grade class of the Mark Hopkins Elementary School, a local grammar school, on October 28. For several years running now, the PPDC staff has given the students in this local inner-city school a hands-on learning experience in science. The staff enjoys doing this each year in part because it is viewed as part of our social responsibility as a high-profile resident of the Meadowview Community and as state employees to reach out and serve the human, social, and educational needs of the economically challenged Meadowview Community.
- ◆ In October, PPDC Nematologists identified the citrus nematode, *Tylenchulus semipenetrans* which was found in samples of California grown mature olive tree shipments destined to Mexico and Florida. The citrus nematode is an economically important nematode pest of major concern to the citrus industry. The species has three biotypes based on the preference of plant hosts parasitized. California has at least two of the three biotypes and therefore, citrus nematode-infested shipments are of concern to several trading partners
- ◆ In November, Sweet orange scab (SOS) caused by *Elsinoë australis* was intercepted and diagnosed from grapefruit rinds from Texas intercepted at a Southern California Border Station. The fungal pathogen was first confirmed in the United States in July 2010 on citrus in Texas, but is thought to have been in the gulf coast area of Texas much longer. Symptoms include scab-like lesions primarily on the fruit, but occasionally on twigs and leaves. This was the first confirmed interception of sweet orange scab into California.
- ◆ In November, the Plant Pathology Lab received samples of diseased coco pods (under a universal USDA permit to receive samples for diagnosis) from agricultural officials in Ecuador, for assistance with diagnosis of a Cacao disease. After successfully culturing and identifying the pathogen from the diseased pods, the disease was diagnosed by PPDC Plant Pathologists as “Frosty Pod” Disease, caused by the fungal pathogen, *Moniliophthora roreri* [= *Crinipellis roreri*].
- ◆ In late December, the Botany laboratory received a sample of Japanese dodder, a noxious parasitic weed, from Sacramento County with immature fruits. This was the first detection of a population with potentially reproductive branches. Samples received in winter after hard frosts typically show signs of severe cold damage that kill the late-maturing fruits. Despite



PLANT HEALTH ANNUAL REPORT

unseasonably cold weather in 2010, this sample was unique in that it showed no damage at all, thus being capable of producing seed in the Central Valley. Production of fertile seed in CA would significantly reduce our chances of eradicating this noxious pest.

- ◆ The National Karnal Bunt survey was completed in December by PPDC staff. Fifty wheat seed samples representing 24 counties were tested in 2010 but as in previous years of the National Survey, *Tilletia indica* was not detected. In addition, Karnal Bunt was not detected in the Federal quarantine area in Riverside County in 2010, and the ten year old federal quarantine was finally lifted from California.

PUBLICATIONS AND PRESENTATIONS BY THE STAFF OF THE PLANT PEST DIAGNOSTICS CENTER

2010 PUBLICATIONS

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Brown, J.W., **M.E. EPSTEIN**, T.M. Gilligan, S.C. Passoa, & J.A. Powell. 2010. Biology, identification, and history of the light brown apple moth, *Epiphyas postvittana* (Walker) (Lepidoptera: Tortricidae: Archipini) in California. *American Entomologist* 56(1): 34-43.

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BAALBAKI, R., & S. Elias. June 6, 2010. Statistics for seed testing: applications, data analysis and tolerances. Workshop presentation-Association of Official Seed Analysts and the Society of Commercial Seed Technologists, Annual Meeting, St. Louis, MO.

BAALBAKI, R. June 8, 2010. Seedling evaluation: updated handbook content, development of seedling evaluation CDs, and work plan. Presentation-Association of Official Seed Analysts and the Society of Commercial Seed Technologists, Annual Meeting, St. Louis, MO.

CHITAMBAR, J. "Detection of Quarantined Nematode Pests: Actions, Results and Current Status." Presented at the 42nd California Nematology Workshop. March 23, 2010. Kearney Agricultural Research Station, Kearney, California.

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EFFENBERGER, J. Identifying *Sorghum*. The identification of Johnsongrass, alnum, sudangrass and sorghum spikelets. California Seed Analysts and Seed Researchers Workshop, September 24, 2010. Plant Pest Diagnostics Center, Sacramento, CA.

EPSTEIN, M.E. & T.M. Gilligan. How to collect and prepare specimens of moths. Dec. 22, 2010. National Museum of Kenya. Nairobi, Kenya.

EPSTEIN, M.E. Limacodidae and Invasive Moth Species. February 2010. Lorquin Entomology Club, Los Angeles.

EPSTEIN, M.E. Identification of the European Grapevine Moth, *Lobesia botrana*. Workshop for entomologists and trapping supervisors from the Southern California counties. February 2010. Los Angeles.

GAIMARI, S.D. & R.M. Miller. An overview of Afrotropical Lauxanioidae. [7th International Congress of Dipterology (Symposium: Advances in Afrotropical Dipterology), San Jose, Costa Rica]

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HAUSER, M. When vinegar flies go bad – the story of *Drosophila suzukii*.

Invited talk, ESA meeting, Spotted Wing *Drosophila* across Boundaries and Perspectives, 15. December, 2010, San Diego, CA.

HAUSER, M. An overview of Afrotropical endemism in Therevidae.”

Invited talk, 7th International Congress of Dipterology, Coauthored with Kevin Holston and Mike Irwin. August 8, 2010. San Jose, Costa Rica,

HAUSER, M. Stratiomyidae biodiversity of the Ethiopian region – Is the island richer than the continent? Invited talk, 7th International Congress of Dipterology, Coauthored with Norm Woodley. August 8, 2010. San Jose, Costa Rica.

HAUSER, M. Aiming towards more resolution - Challenges of a Stratiomyidae Phylogeny.

Invited talk, 7th International Congress of Dipterology. August 10, 2010. San Jose, Costa Rica.

Holman, Garth, RC Cronn, David S. Gernandt, Sean W. Graham, **DEAN KELCH**, Aaron Liston, Sarah Mathews, Matthew Parks, Hardeep Rai, Linda A. Raubeson, Gar W. Rothwell, Dennis Stevenson Wm., Ruth A. Stockey & Christopher S. Campbell. Rooting Pinaceae. 2010 Annual National Botany Conference. July, 2010. Providence, RI.

KELCH, DEAN. Flora of the Carquinez Strait. Wayne Roderick Memorial Lecture Series. East Bay Parks Botanic Garden. March, 2010. Berkeley, CA.

KELCH, DEAN. 51 plant families in the field. Jepson Herbarium workshop series. April, 2010. San Francisco Bay Area.

KELCH, DEAN. Evolution in the Podocarpaceae. CDFA Plant Pest Diagnostics Center seminar series. May, 2010. Sacramento, CA.

KELCH, DEAN. Mimicking Science Interpretation. Dept of Entomology seminar. May, 2010. University of CA, Davis.

KELCH, DEAN. Using gymnosperms as a teaching model in the classroom. San Francisco Botanic Garden. June, 2010. San Francisco, CA.

KELCH, DEAN. Multigene approaches to resolving deep branches in Podocarpaceae Phylogeny. 2010 Annual National Botany Conference. July, 2010. Providence, RI.

KELCH, DEAN, Linda A Raubeson, Sarah Mathews, Hardeep Rai & Abigail Moore. Multigene approaches to resolving deep branches in Podocarpaceae Phylogeny. 2010 Annual National Botany Conference. July, 2010. Providence, RI.

Mathews, Sarah, Christopher S. Campbell, RC Cronn, David A. Gernandt, Garth Holman, Steffi Ickert-Bond, **DEAN KELCH**, Jianhua Li, Aaron Liston, Damon Little, Gene Mapes, Wenbin Mei,



Julie A. Morris, Nathalie Nagalingum, Matthew Parks, Hardeep Rai, Linda A. Raubeson, Gar W. Rothwell, Patricia E. Ryberg, Andrea E. Schwarzbach & Ruth A. Stockey. A focus on gymnosperm clades: Establishing the context to understand seed plant phylogeny. 2010 Annual National Botany Conference. July, 2010. Providence, RI.

MEYER, D. J. L. The evolution of seed testing. California Seed Industry Conference, Modesto, CA, May 11, 2010.

MEYER, D. J. L. Noxious weed seed identification, CDFA Seed Industry Workshop, Sacramento, CA Sept. 2010.

MEYER, D. J. L. Changes to the California noxious weed list, CDFA Seed Industry Workshop, Sacramento, CA Sept. 2010.

MEYER, D. J. L. Problems with the current Association of Official Seed Analysts pure seed unit definitions, CDFA Seed Industry Workshop, Sacramento, CA Sept. 2010.

PRICE, R.A. "Seeds and Fruits of Weedy Brassicaceae", CDFA Seed Industry Workshop, Sept. 2010. Sacramento, CA

PRICE, R.A. & D. J. LIONAKIS MEYER. "Internet Resources for Seed Identification", CDFA Seed Industry Workshop, Sacramento, CA, Sept. 2010.

PRICE, R.A. "Diversity and Relationships of Temperate Zone Conifers", CDFA-PPD Seminar Series, 2010.

Raubeson, Linda A., Justina Aguilera, Cristy Bunnell, Christopher S. Campbell, Timothy W. Chumley, RC Cronn, Ashley Dutton, David S. Gernandt, Garth Holman, **DEAN KELCH**, Jianhua Li, Aaron Liston, Damon Little, Wenbin Mei, Julie A. Morris, Matthew Parks, Hardeep Rai, Andrea E. Schwarzbach, Daniel Smith, Dennis Wm. Stevenson, Josh Talen & Sarah Mathews. Seed plant phylogeny – 78 plastid genes and 50 taxa – will more data make a difference? 2010 Annual National Botany Conference. July, 2010. Providence, RI.

Rothwell, Gar W., Christopher S. Campbell, David A. Gernandt, Elizabeth J. Hermsen, Garth Holman, **DEAN KELCH**, Steffi Ickert-Bond, Damon Little, Gene Mapes, Sarah Mathews, Patricia E. Ryberg, Dennis Wm. Stevenson, Ruth A. Stockey & Yong Yang. The role of morphology in contemporary analyses of seed plant phylogeny. 2010 Annual National Botany Conference. July, 2010. Providence, RI.

TIDWELL, T.E. "Diagnosing diseases, animal injury and abiotic disorders of Trees." Sacramento Tree Foundation, January 21, 2010. Sacramento, CA.

TIDWELL, T.E. "Seed Health Testing and the Impact on California Seed Exports" California Seed Industry Conference, May 11, 2010 Stanislaus Agriculture Center, Modesto, CA.



PLANT HEALTH ANNUAL REPORT

Ülgentürk, S., F. Szentkiralyi, **S. GAIMARI**, N. Uygun, A. Saboori, S. Seven, O. Dursun & S.H. Civelek) Predators of *Marchalina hellenica* Genn. (Hemiptera: Marchalinidae) on Turkish pine in Turkey [poster, 12th International Symposium on Scale Insect Studies, Chania, Crete, Greece]

VON ELLENRIEDER, N. "Argentina's Biogeography: Examples from the Insect Realm." CDFA seminar series, June 2010. Sacramento, CA.

YAKABE L.E., S.R. Parker & D.A. Kluepfel. **2010.** Incidence and control of seed-borne sources of *Agrobacterium tumefaciens* in walnut production. Walnut Research Conference, 20-22 January, Bodega Bay, CA.



MAPS



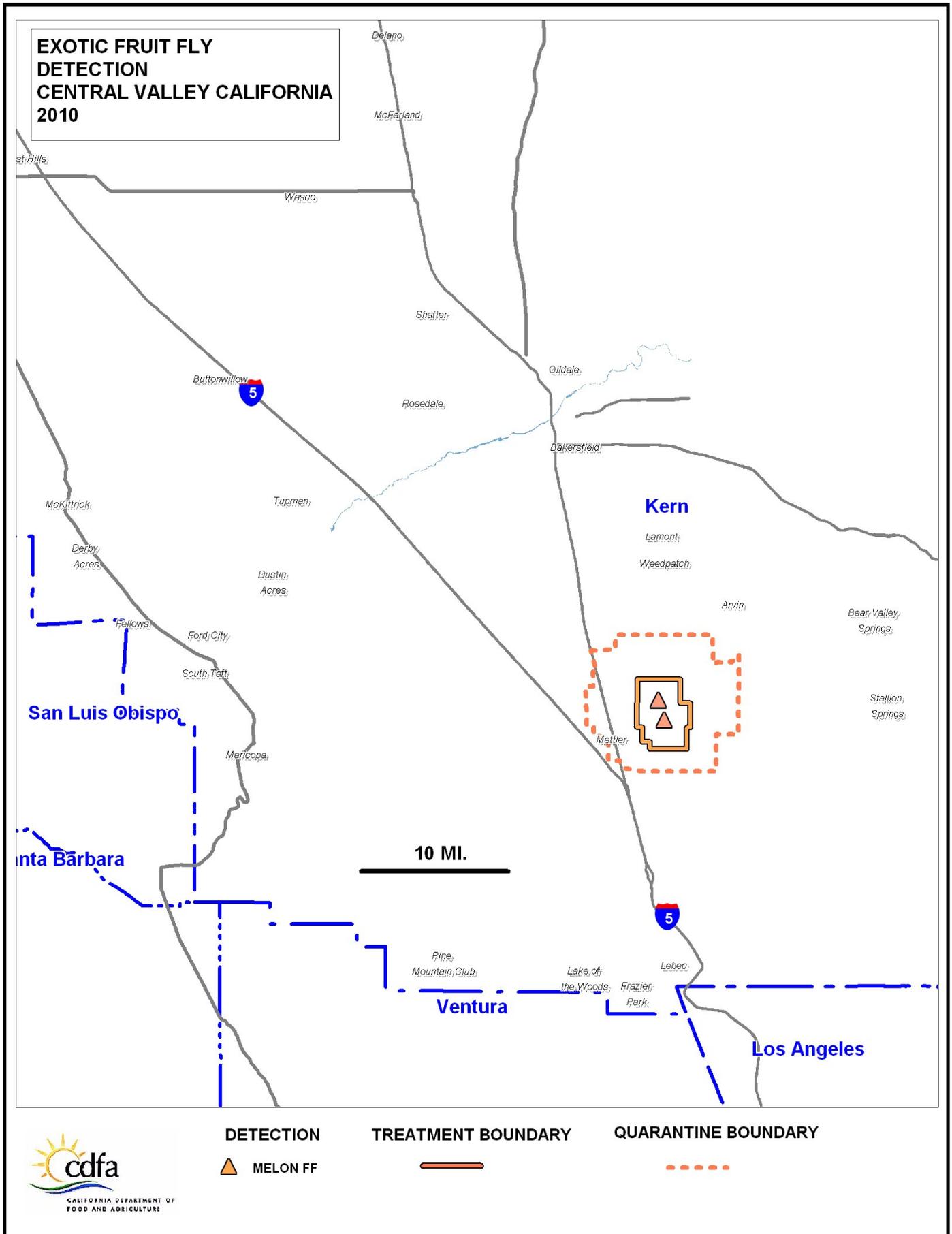
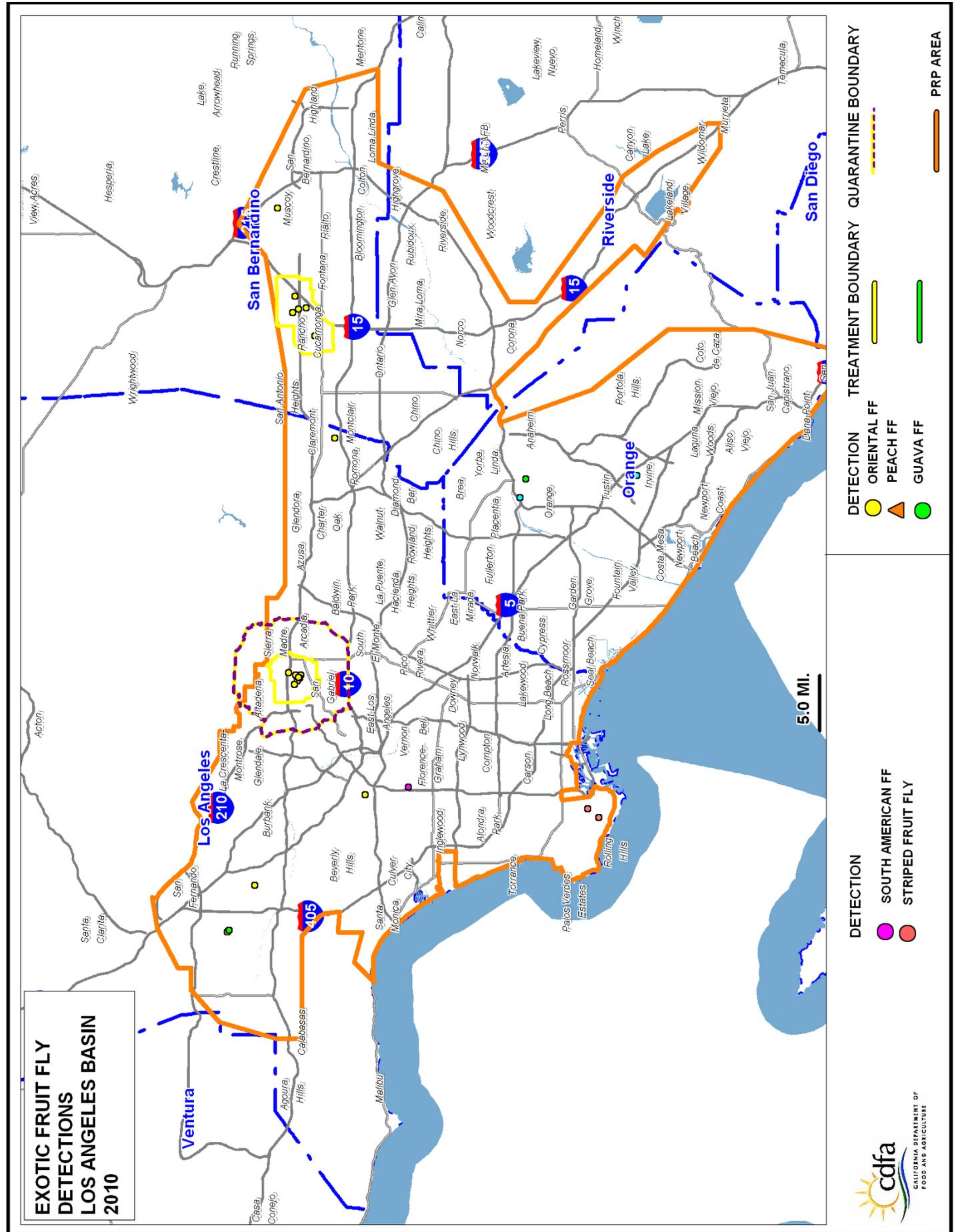
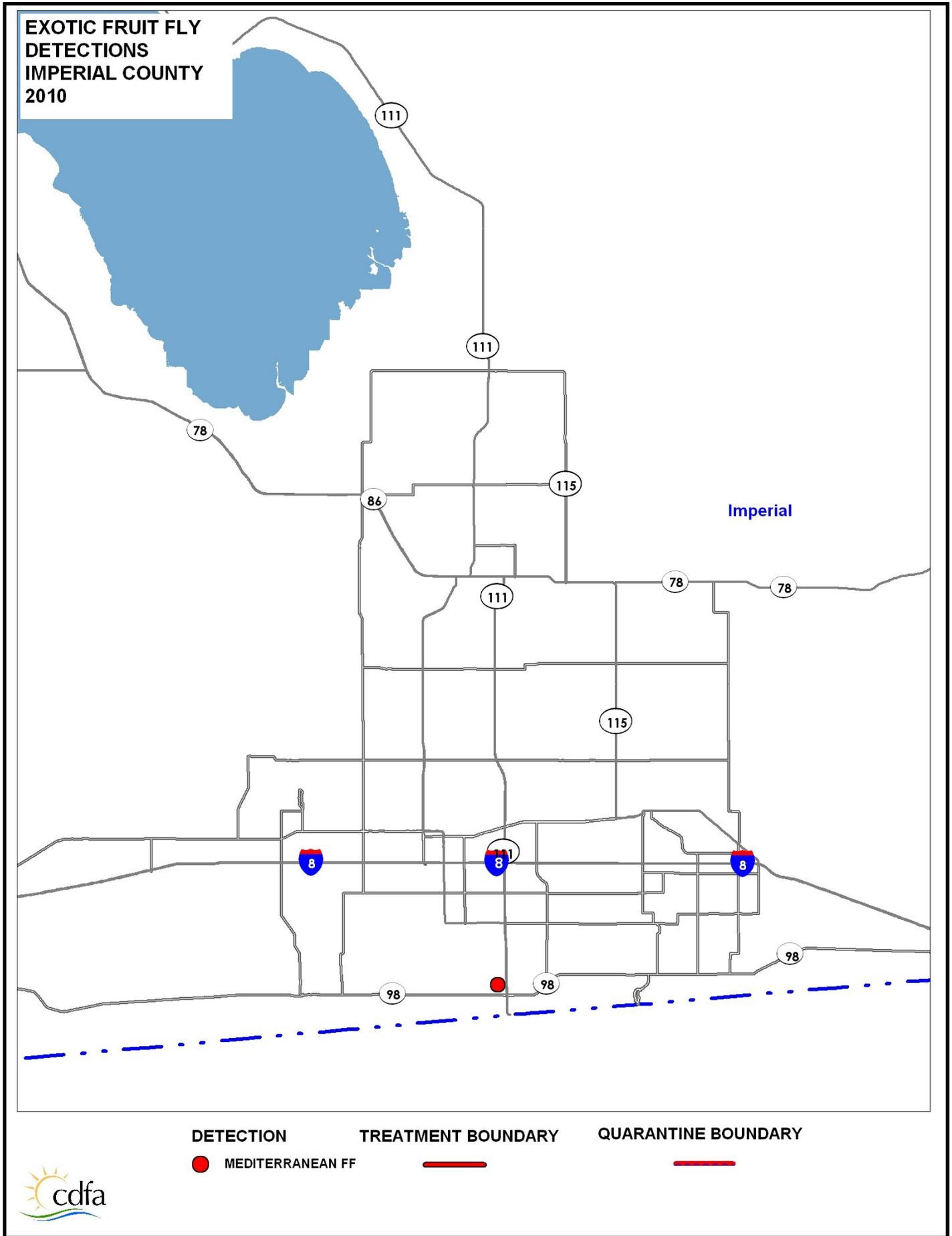
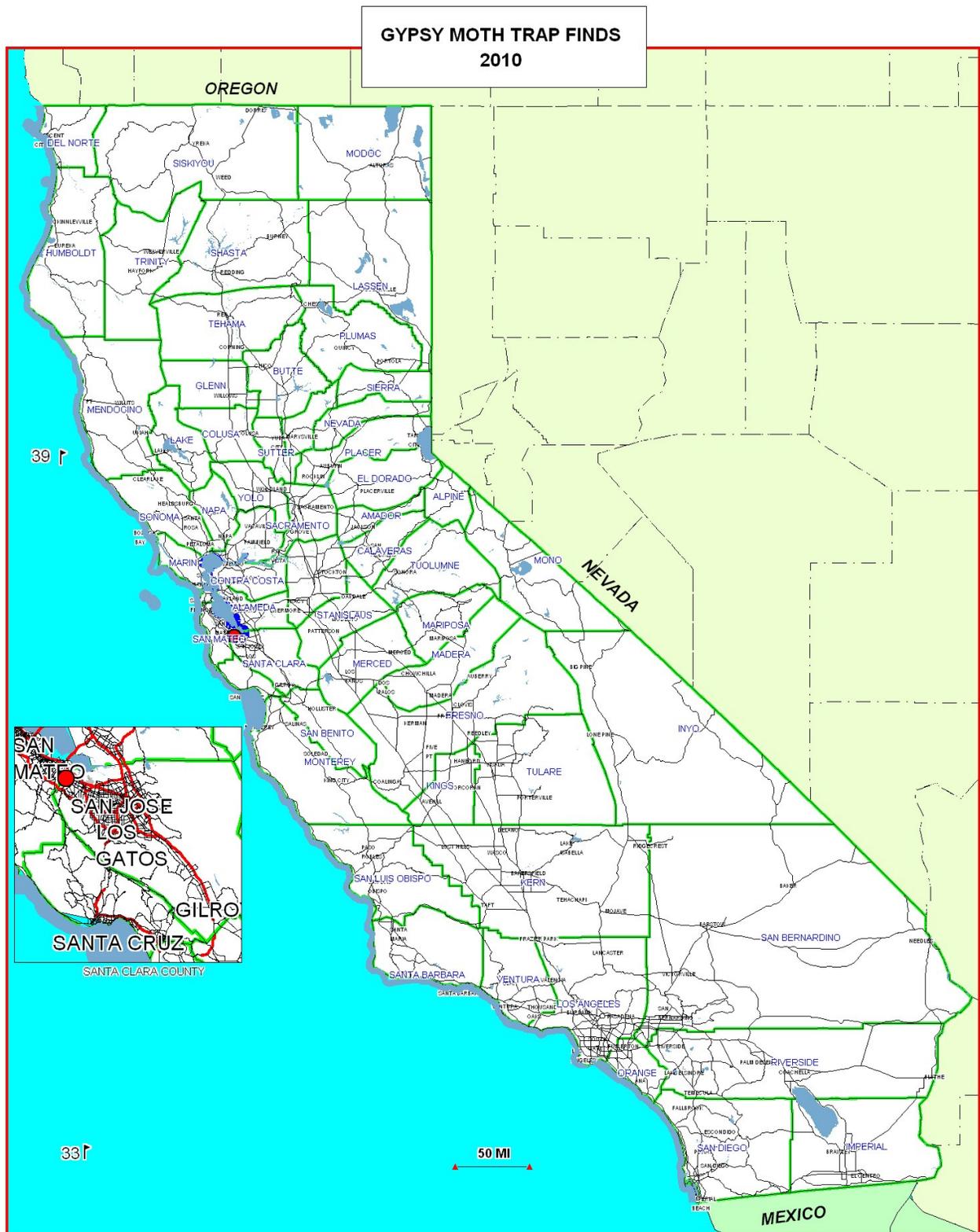


FIGURE 6

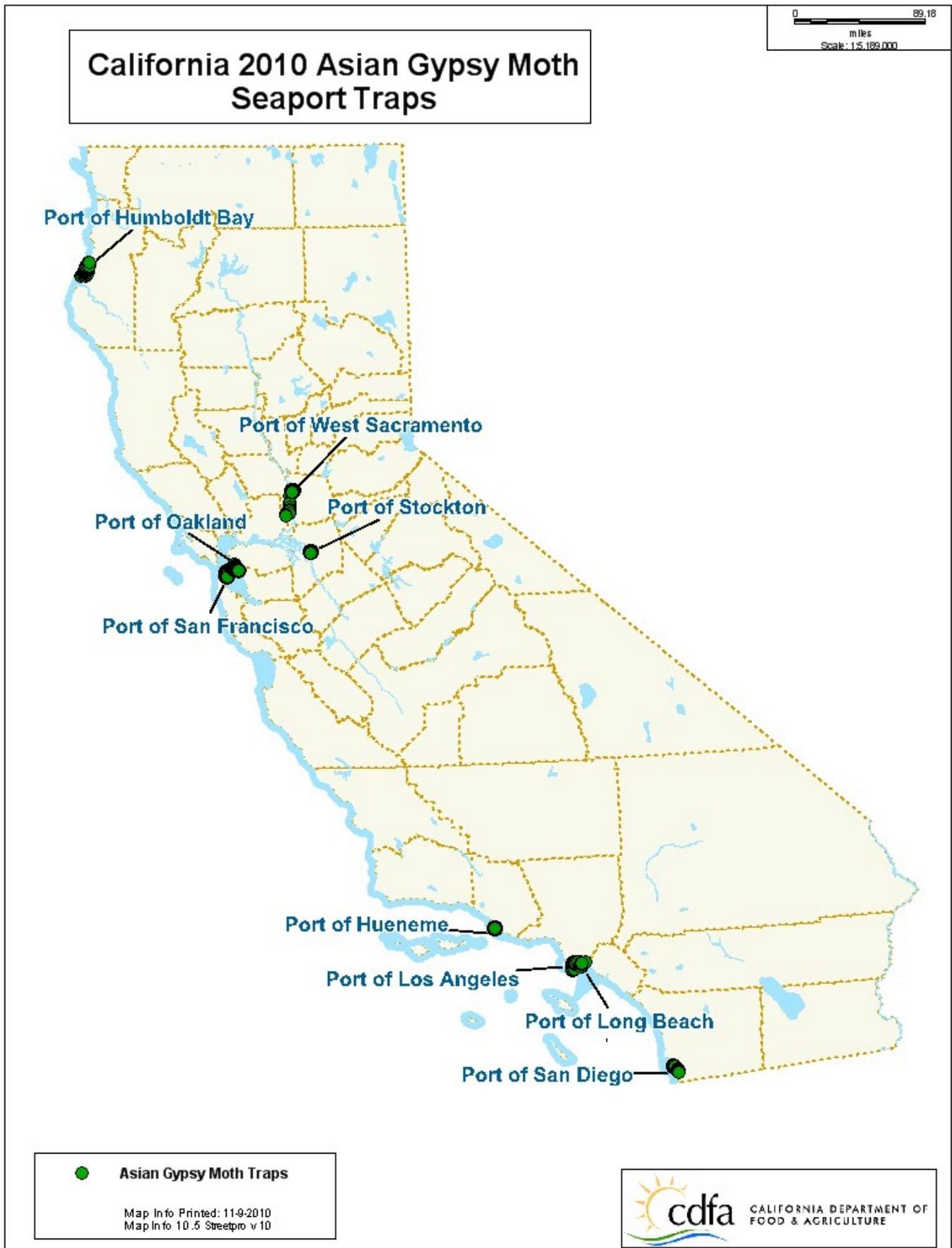


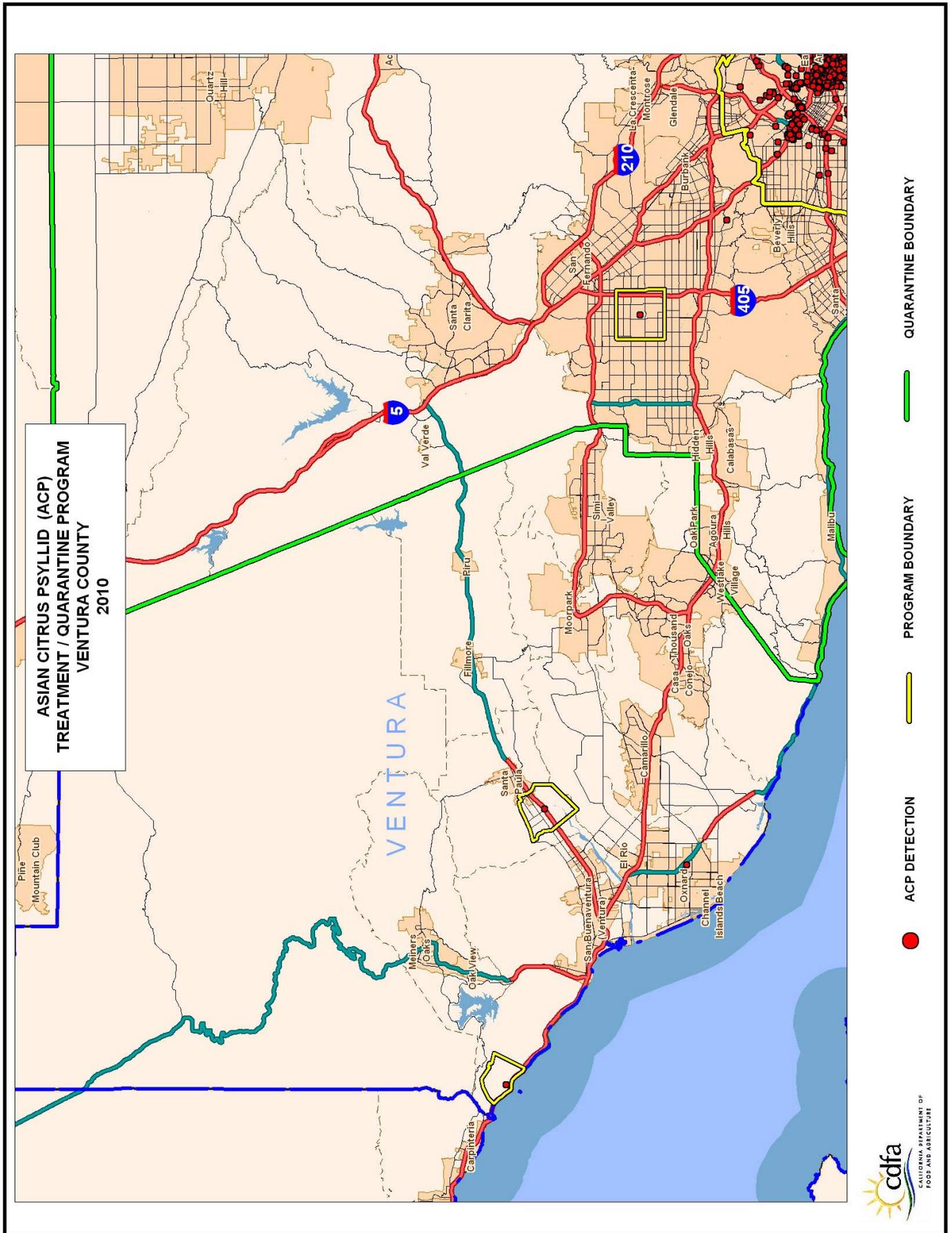


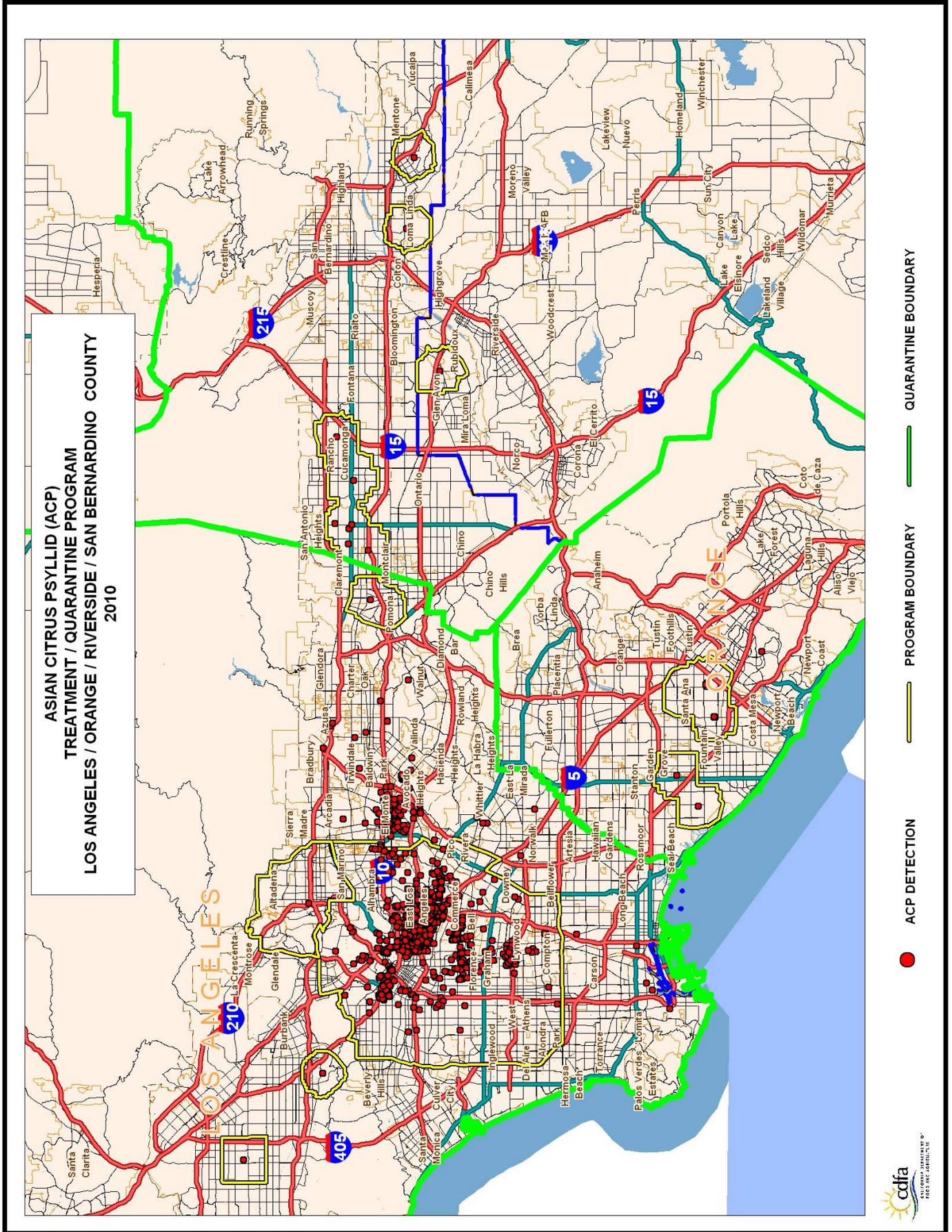


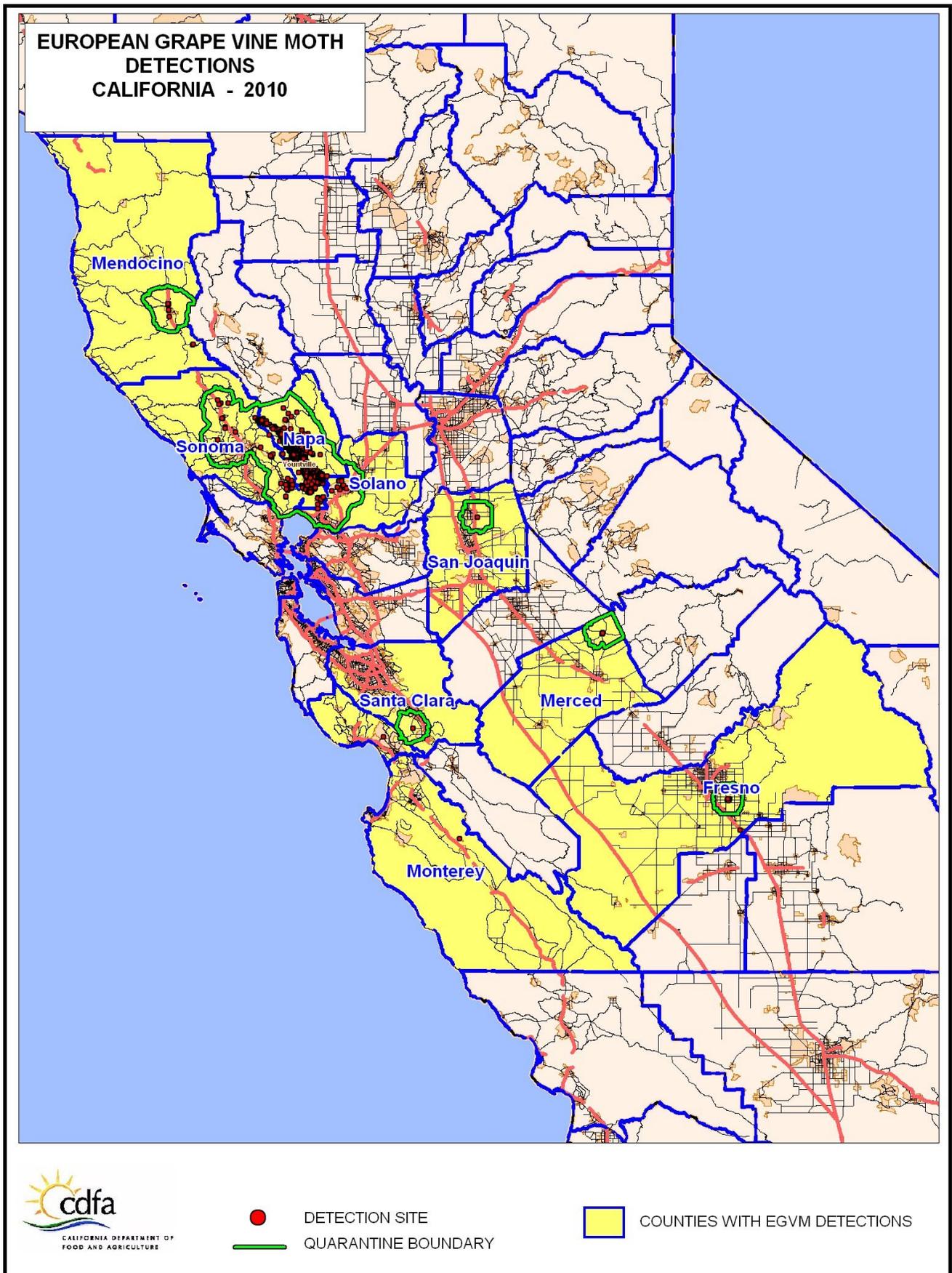
TRAP DETECTION

● GYPSY MOTH

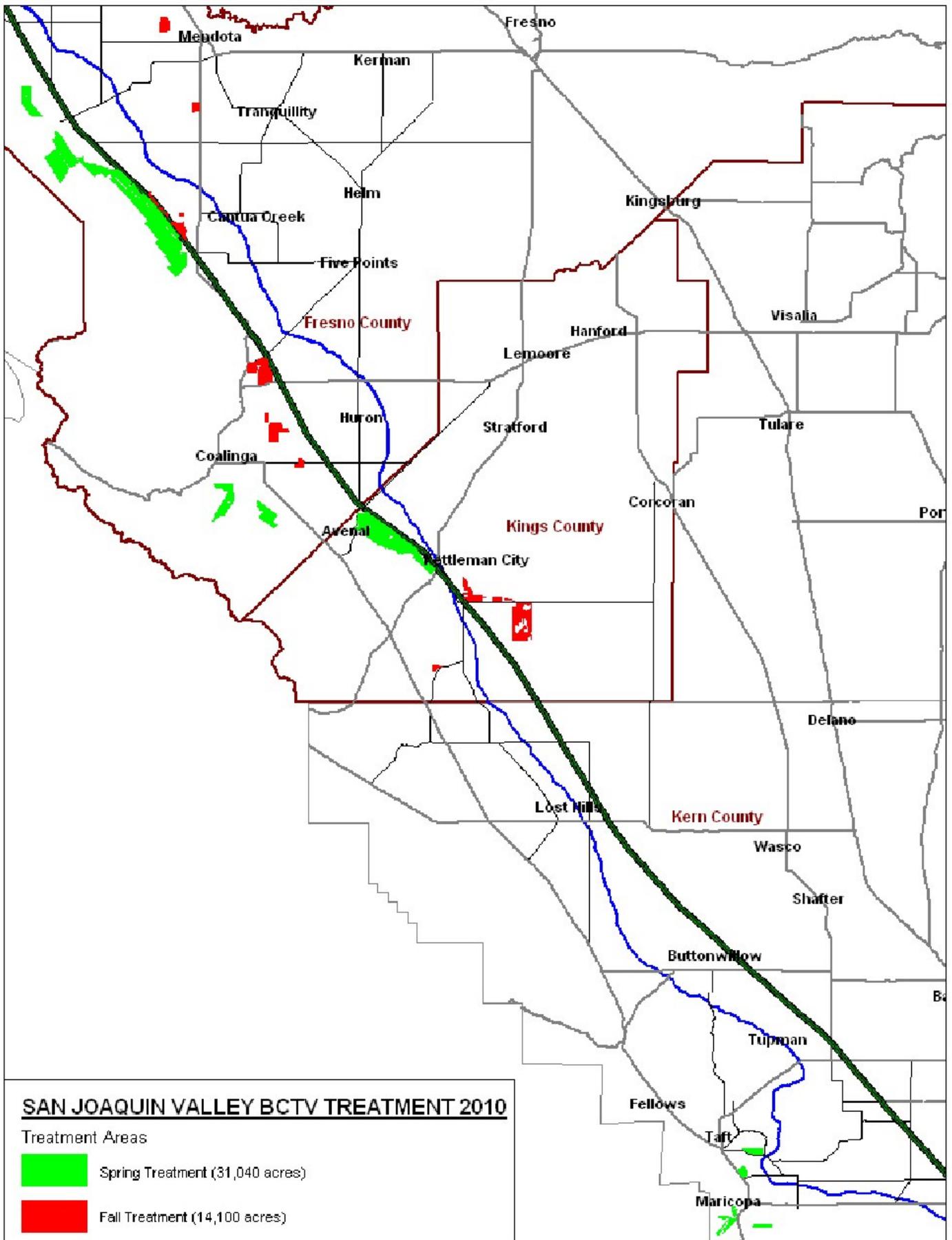








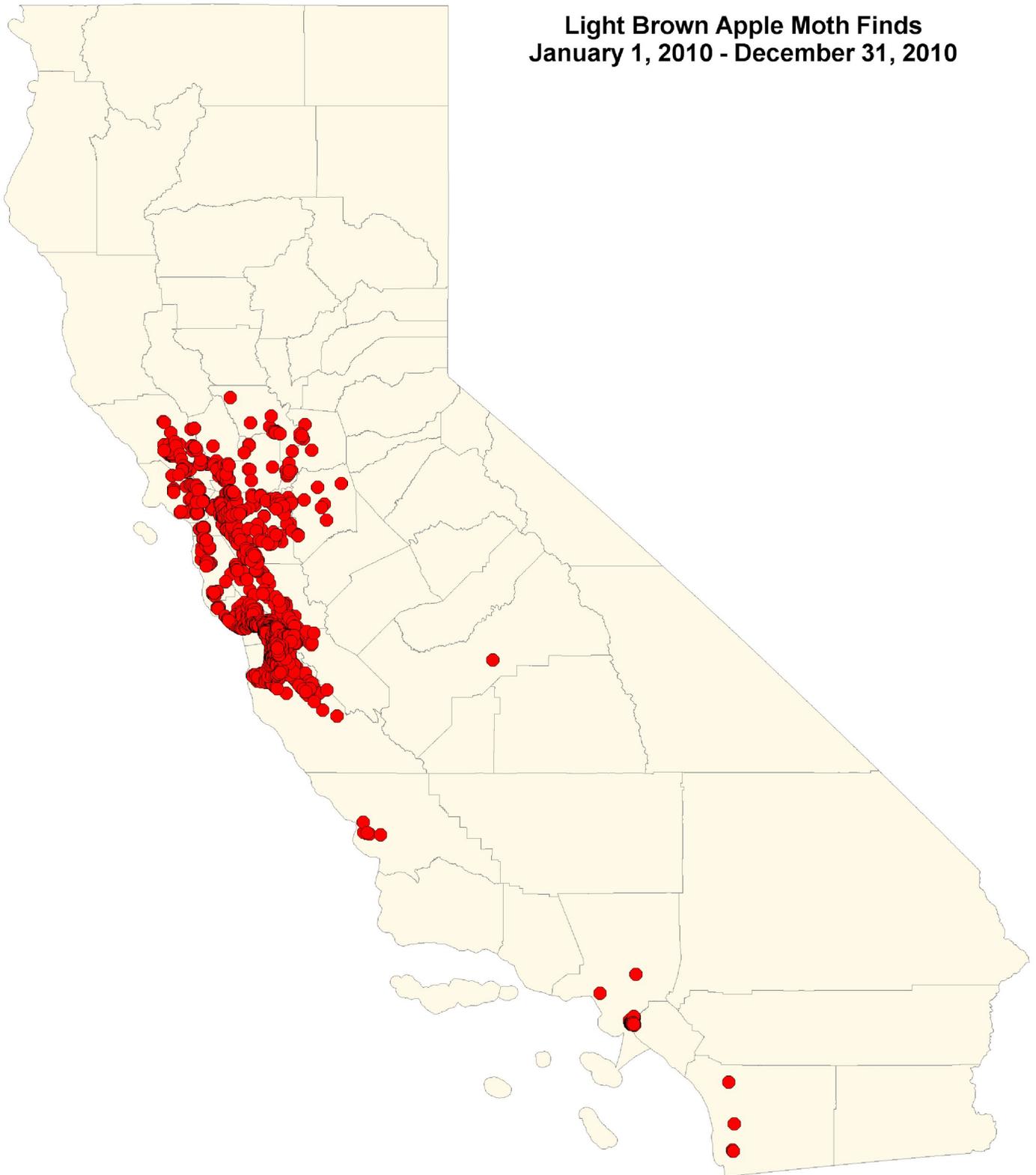
INTEGRATED PEST CONTROL



Central California South District Survey and Control activity 2010



**Light Brown Apple Moth Finds
January 1, 2010 - December 31, 2010**



◆ LBAM Finds January 1, 2010- December 31, 2010



 December 31, 2010



ACP	Asian citrus psyllid
ACIT	Agricultural Commodities Investigative Team
APS	American Phytopathological Society
APS-WPPNL	American Phytopathological Society Widely Prevalent Phytopathogenic Nematodes Sub-Committee
ARA	Artichoke Research Association
ARRA	American Reinvestment and Recovery Act
AGM	Asian gypsy moth
BCTV	beet curly top virus
BCTVCP	Beet Curly Top Virus Control Program
BOE	Board of Equalization
BLH	sugar beet leafhopper
BLM	Bureau of Land Management
BPS	Border Protection Stations
CAC	County Agricultural Commissioner
CBP	U.S. Customs and Border Protection
CDFA	California Department of Food and Agriculture
CEQA	California Environmental Quality Act
CHRPEP	County High Risk Pest Exclusion Program
CLB	cereal leaf beetle
CMS	Call Management System
CSCA	California State Collection of Arthropods
CTV	citrus tristeza virus
CWR	chrysanthemum white rust
DFG	California Department of Fish and Game
DHS	California Department of Health Services
DPH	California Department of Public Health

DPR	California Department of Pesticide Regulation
DRW	Diaprepes root weevil
EATF	Environmental Advisory Task Force
ECB	European corn borer
EGVM	European grapevine moth
ELISA	enzyme-linked immunosorbent assay
FCM	false codling moth
FPS	University of California, Foundation Plant Services
GFLV	grapevine fan leaf virus
GFF	guava fruit fly
GLRaV	grapevine leafroll associated viruses
GM	gypsy moth
GWSS	glassy-winged sharpshooter
HFFRF	Hawaii Fruit Fly Rearing Facility
IAB	Fruit Tree, Nut Tree and Grapevine Improvement Advisory Board
IPC	Integrated Pest Control Branch
JB	Japanese beetle
JFTB	Joint Forces Training Base
KB	Khapra beetle
LAX	Los Angeles International Airport
LBAM	light brown apple moth
LBAM TWG	Light Brown Apple Moth Technical Working Group
MBNMS	Monterey Bay National Marine Sanctuary
MDFF	Mediterranean fruit fly
MXFF	Mexican fruit fly
NAPPO	North American Plant Protection Organization
NDDTC	National Detector Dog Training Center

NOAA	National Oceanic and Atmospheric Administration
NOR	Notice of Rejection
NPDN	National Plant Diagnostic Network
OEHHA	Office of Environmental Health Hazards Assessment
OFF	oriental fruit fly
OIP	Origin Inspection Program
PCN	potato cyst nematode
PD/EP	Pest Detection/Emergency Projects Branch
PDV	prune dwarf virus
PDR	Pest Detection Record
PE	Pest Exclusion Branch
PPDC	Plant Pest Diagnostics Center
PRM	panicle rice mite
PRP	Preventive Release Program (Mediterranean Fruit Fly)
PRT	Pest Response Team
PUP	Pesticide Use Permit
PVPA	Plant Variety Protection Act
R & C	Registration and certification
RIFA	red imported fire ant
RT-PCR	reverse transcriptase polymerase chain reaction
SCBG	Specialty Crop Block Grant
SHIRO	Shirofugen (Japanese cherry tree, scientific name: <i>Prunus serrulata</i>)
SIT	Sterile Insect Technique
SITC	Smuggling Interdiction and Trade Compliance
SJV	San Joaquin Valley
SOD	Sudden Oak Death

SSU	Strategic Services Unit
State	state of California
SWD	spotted wing drosophila
TSWV	tomato spotted wilt virus
TYLCV	tomato yellow leaf curl virus
UC	University of California
UCD	University of California, Davis
UPS	United Parcel Service
USDA	United States Department of Agriculture
USDA/APHIS	United States Department of Agriculture-Animal and Plant Health Inspection Service
USDA/ARS	United States Department of Agriculture-Agricultural Research Service
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
VMB	vine mealybug
VPCRAC	Vertebrate Pest Control Research Advisory Committee
WMA	Weed Management Area
WPDN	Western Plant Diagnostic Network
WSFF	white striped fruit fly

