PLANT HEALTH & PEST PREVENTION SERVICES DIVISION

ANNUAL REPORT 2007

Sutter Buttes, California

Photo: Kris Blaser

cdfa

CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

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TABLE OF CONTENTS

PLANT HEALTH & PEST PREVENTION SERVICES ADMINISTRATION

Sacramento County, California

PHOTO: Ed Williams, CDFA

PLANT HEALTH AND PEST PREVENTION SERVICES

ADMINISTRATION

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

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.*

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.*

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 California Department of Food and Agriculture's (Department) Plant Health and Pest Prevention Services (PHPPS) mission is legislatively mandated and clearly articulated within the California Food and Agricultural Code. 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.

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. 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.

Along with the United States Department of Agriculture (USDA), PHPPS actively participates in the development of standards for pest prevention under the International Plant Protection Convention. The PHPPS 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.

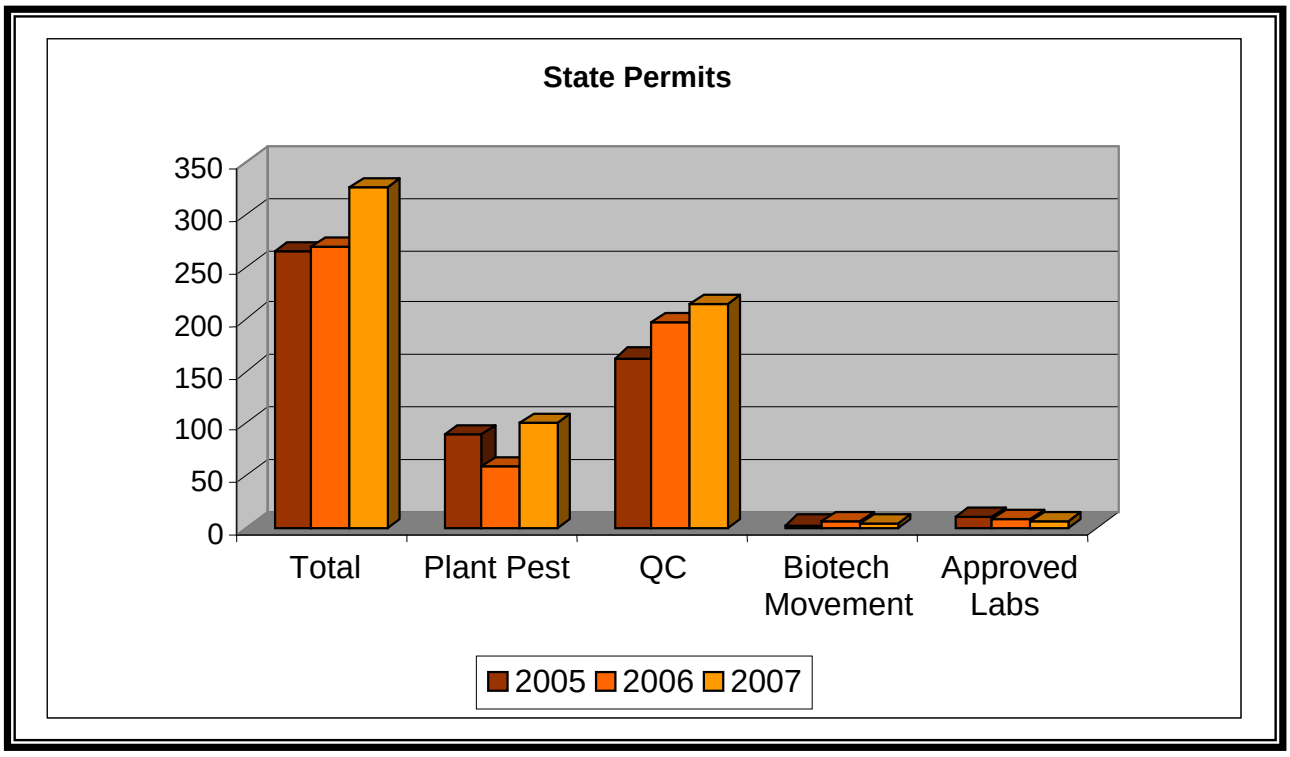
PERMITS AND REGULATIONS

The permits and regulations program develops all regulations administered by the Division of PHPPS 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 post-entry quarantine plant material, genetically engineered organisms (biotechnology permits) and foreign plants and plant products normally prohibited (departmental permits) entry into the United States. The USDA has launched its new web-based electronic permitting system (ePermits). The state concurrence process is now handled via the Internet for plant pest, biotechnology, soil and departmental permits. The addition of postentry quarantine permits is under review and will be added to ePermits in the future.

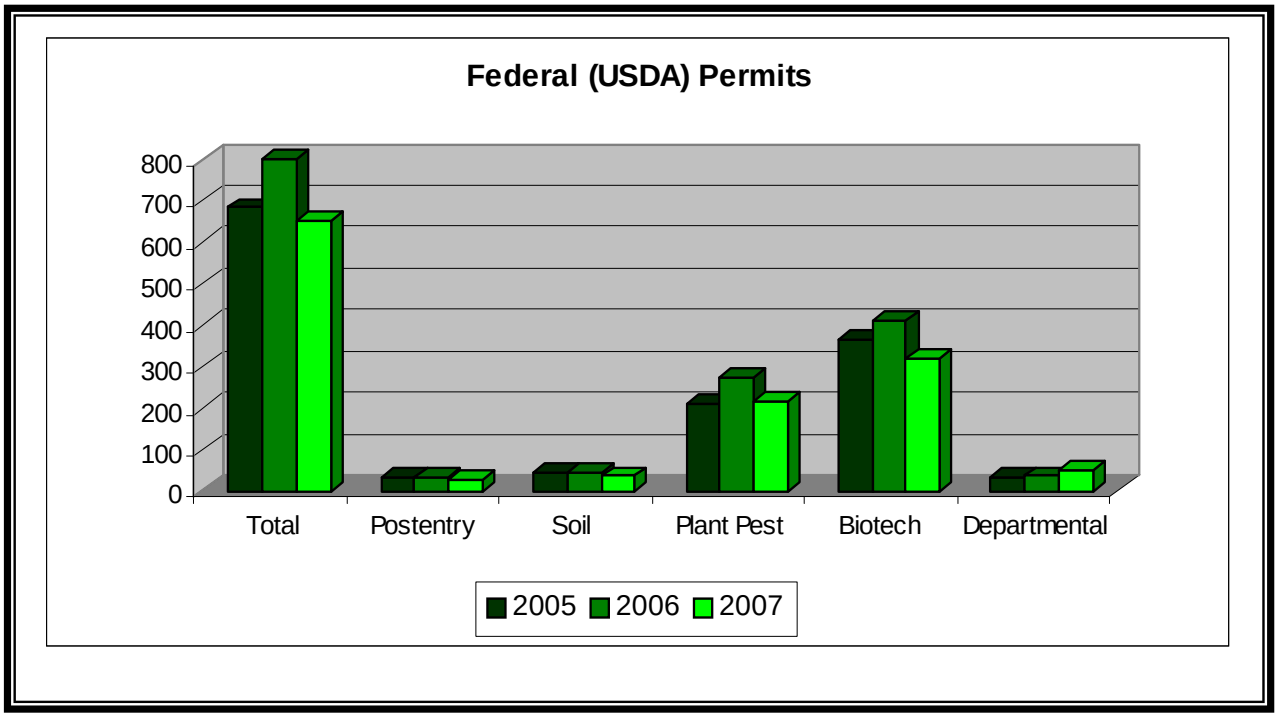
The primary activities of the permits and regulations program significantly increased during the 2006 calendar year over 2005, and these activities have slightly increased during the 2007 calendar year (for comparison, 2006 activities are in parentheses). For comparison of the last three years, see the charts below:

State Permits
There were 327 (269) state permits issued including 100 (58) plant pest permits; 55 for pathogens and 45 for arthropods, 215 (197) quarantine commodities permits, five (six) biotechnology movement authorizations and seven (eight) approved laboratory permits.



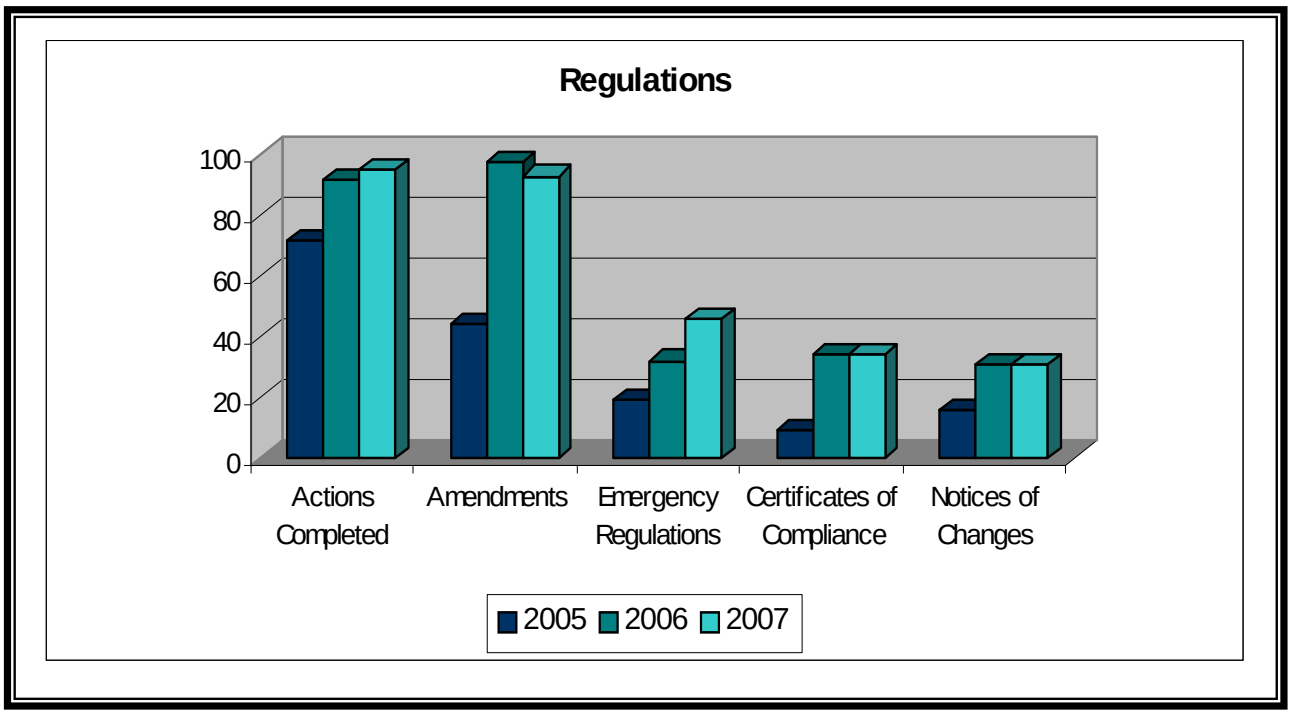
Federal (USDA) Permits

A total of 651 (800) applications for federal permits were reviewed and processed including 28 (32) postentry quarantine agreements, 36 (44) soil permits, 217 (276) plant pest permits (126 for pathogens, 91 for arthropods), 322 (412) biotechnology permits and 48 (36) permits for federally prohibited plant material.



Regulations

There were 95 (92) regulatory actions completed that included the adoption, repeal or amendment of 93 (98) regulations; including 46 (32) emergency regulations, 34 (34) certificates of compliance; and 31 (31) notices of changes in the regulations.



Branches in Plant Health and Pest Prevention Services

The PHPPS Division is comprised of four branches and is responsible for protecting California's agriculture and natural resources against damage caused by exotic and recently introduced plant pests. It provides protection through a comprehensive pest prevention system. Three organizational branches administer the system: Pest Exclusion, Pest Detection/Emergency Project and Integrated Pest Control. These branches receive professional support by the scientists in the Plant Pest Diagnostics Branch.

The Pest Exclusion Branch is considered the first line of defense. The mission of the Pest Exclusion Branch 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, the Branch has two roles: 1) quarantine regulatory compliance and enforcement and 2) service to the agriculture industry and the public. The Branch is divided into three program components: Interior Pest Exclusion (enforcement of quarantines, phytosanitary certification of exports), Exterior Pest Exclusion (border stations) and Nursery, Seed and Cotton (licensing, pest cleanliness, registration and certification, truth in labeling for .seeds and quality cotton).

The Pest Detection/Emergency Projects Branch is responsible for the early detection and prompt eradication of serious exotic agricultural pests. The Branch 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.

This Branch 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. Maximum production can reach up to 136 million pupae per week.

The Integrated Pest Control Branch conducts a wide range of pest management and weed eradication projects in cooperation with growers, agricultural commissioners and federal agencies. The Branch manages biological control and vertebrate pest management functions. Assessments and fees are collected for some program activities and services. The Branch 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.

The Plant Pest Diagnostics Branch 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. The branch consists of five laboratories including: botany, entomology, nematology, plant pathology and seed taxonomy and germination.

PEST EXCLUSION

Bartlett pears

PHOTO: Ed Williams, cdfa

PEST EXCLUSION BRANCH

Mission: *To serve the citizens of California by preventing the entry and spread of harmful pests and ensuring the availability of high-quality commodities for consumers worldwide.*

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 integrity*
- *Partnership and teamwork*
- *Dependability*
- *Decision-making using the best available information*
- *Empowerment and accountability*

INTERIOR PEST EXCLUSION

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

- Preventing the introduction and spread of harmful and invasive plant pests
- Promoting market access for California agricultural products

Pest Prevention

Harmful and invasive exotic pests threaten California's agricultural industry. Pests can directly damage crops by stunting growth, diminishing quality or invading croplands and irrigation systems. Pests can indirectly affect crops by causing unsightly damages that reduce 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 non-native plant pests, the Interior Pest Exclusion Program works within the pest prevention system to reduce the risk of pests entering the state on infested commodities and to prevent pests that have entered the state from becoming established.

The pest prevention system relies on a combination of strategies to protect agricultural commodities from damaging or invasive species. Two strategies employed by the Interior Pest Exclusion Program, pest prevention and pest containment, are the cornerstones of the pest prevention system. First, the Program prevents the entry of pests on commercial or private shipments of goods by conducting inspections on incoming shipments, enforcing state and federal regulations that pertain to incoming shipments and working with agricultural agencies to enhance origin inspections to achieve pest-free shipments. Secondly, the Program takes immediate action to contain the spread of newly-introduced pests by enforcing regulations that restrict shipments from areas that are newly infested with pests.

Functions of the Interior Pest Exclusion Program are carried out in cooperation with the county agricultural commissioners, the United States Department of Agriculture (USDA) and other state

agricultural agencies. The Program works with other state agencies such as the California Departments of Fish and Game, Forestry and Fire Protection and Public Health and Pesticide Regulation to share knowledge and help enforce regulations.

Promoting Exports

To promote California agricultural commodities in foreign and domestic markets, Interior Pest Exclusion maintains a close working relationship with the USDA to facilitate the export of California's products worldwide. Examples of the Interior Pest Exclusion activities that promote California exports include providing up-to-date pest lists and pest risk assessments requested by interested trade partners and enforcing regulations that limit the spread of newly-infested pests within the state. By restricting shipments from areas of the state known to be infested with pests, non-infested areas are protected from the effects of quarantines imposed by trade partners, thus ensuring continued access to California-produced commodities in the world-wide marketplace.

Interior Pest Exclusion activities include:

- Quarantine Response
  - Emergency response to a pest infestation
  - Quarantine response to a pest incident
- Quarantine Training, Direction, Oversight, and Consultation
- Quarantine Enforcement
- Trade Facilitation
- Commodity Treatment Coordination and Consultation
- Data Collection and Information Management

Following are highlights for 2007:

QUARANTINE RESPONSE

Emergency Response to a Pest Infestation

When a reproductive population of a pest is discovered in California, an infestation is declared. Interior Pest Exclusion responds by enacting emergency pest abatement and control measures to contain the infestation and determine effective commodity host treatments that facilitate movement to market. If the pest is a federal action pest, emergency regulatory responses are coordinated with the USDA. In 2007, emergency responses were conducted for infestations of Mediterranean fruit fly, Mexican fruit fly, light brown apple moth, Oriental fruit fly, sudden oak death and Diaprepes root weevil.

Oriental Fruit Fly, Santa Ana, Orange County

In November 2006, an Oriental fruit fly quarantine was established in the Santa Ana, Tustin, Garden Grove and Westminster areas of Orange County. The total quarantined area was approximately 93 square miles, in primarily urban areas. Over 639 businesses/properties were operating under compliance agreements. Affected businesses included produce markets, fruit packing facilities, flea markets, swap meets, farmers' markets, landscaping companies and community gardens. Interior Pest Exclusion periodically visited regulated establishments to ensure compliance, conducted public outreach efforts and monitored quarantine treatments. Crops grown and treated in the quarantined area were predominantly avocados, lemons, oranges and row crops. Hold Notices were issued to 53 businesses/properties within the quarantined area. The quarantine was lifted at the end of July 2007 after three fruit fly generations occurred with negative trapping.

Mediterranean Fruit Fly, Dixon, Solano County

In September 2007, a Mediterranean fruit fly quarantine was established in the Dixon area of Solano County. The 135 square-mile quarantine area includes a small urban area where the wild flies and larvae were found, surrounded by a larger rural area with many row and tree crops. Compliance agreements and hold notices were issued to 177 entities, including growers, harvesters, fruit haulers, fruit processors, fruit packers, produce markets, nurseries and yard maintenance gardeners. Residents of the area also received hold notices and were asked not to move fruit, vegetables or other host material from their properties. Permits were issued to allow the movement of untreated tomatoes, peppers and walnuts to processors outside the quarantine area. Program staff supervised seven treatments to allow the safe movement of apples out of the quarantined area. A total of 3,014 pounds of potentially infested host material was seized and destroyed.

Mediterranean Fruit Fly, San Jose, Santa Clara County

In October 2007, a Mediterranean fruit fly quarantine was established in the San Jose area of Santa Clara County. The quarantine covers approximately 75 square miles in a primarily urban area. Affected businesses include produce markets, produce packer, food banks, swap meets, certified farmers' markets, nurseries, small growers, landscaping companies and community gardens. Over 240 businesses operate under program compliance agreements. Nine establishments received Notices of Violation for non-compliance with the quarantine regulations. The Project issued permits to one olive grower to allow movement to a processor outside the quarantine area. A total of 2,713 pounds of potentially infested host material have been seized and destroyed.

Mediterranean Fruit Fly, Rolling Hills/Rancho Palos Verdes, Los Angeles County

A Mediterranean fruit fly quarantine was established in the Hills/Rancho Palos Verdes Peninsula area of Los Angeles County, following the detection of wild flies and its larvae in October 2007. The 103 square-mile quarantine area included the cities of Rolling Hills, Rancho Palos Verdes, Torrance, San Pedro, Lomita and Wilmington. The quarantined area is primarily residential and includes the entire port of Los Angeles and a portion of the Long Beach port. There is no commercial production of host plants. Over 440 businesses were affected and include wholesale produce distributors, fruit packing facilities, swap meets, certified farmers' markets, importers/exporters, cruise ship terminal, steam ship lines, port terminals, transient load operators, growers produce markets, fruit sellers, nurseries, landscaping companies, recyclers and yard maintenance gardeners. Residents of the area were asked not to move fruits, vegetables or other host material from the area. Hold Notices and Compliance Agreements were issued to the businesses/properties within the quarantined area to prevent movement of infested fruit fly host material.

Interior Pest Exclusion Program staff coordinates quarantine enforcement at the ports of Los Angeles and Long Beach with the Department of Homeland Security, Customs and Border Protection and USDA/APHIS - Plant Protection and Quarantine. Approximately 2,600 pounds of Mediterranean fruit fly host material from high-risk nurseries, mobile vendors and departing passengers from the cruise ship terminal have been collected and disposed of in approved landfills.

Mexican Fruit Fly, Escondido, San Diego County

Mexican fruit fly quarantine was established in the Escondido area of San Diego County in November 2007. The quarantine covers approximately 78 square miles in a primarily urban area. Affected businesses include avocado growers, produce markets, fruit packinghouses, harvesters, swap meets, farmers' markets, nurseries, landscaping companies and community gardens. Over 364 businesses are affected and operate under program compliance agreements. "Hass" avocado growers have been allowed to remove fruits from the quarantined area without pre-harvest bait treatments if they comply with sanitation standards outlined in a new USDA protocol. All other avocado varieties and host commodities undergo pre-harvest bait treatment before being allowed to move out of the quarantined area.

Diaprepes Root Weevil, San Diego County

By the end of 2006, six Diaprepes root weevil (DRW) quarantines were established in San Diego County. During 2007, San Diego County saw three new quarantine areas - two quarantined areas that merged and three that have expanded as noted: La Jolla South (southern boundary expanded), Encinitas (eastern boundary expanded twice), La Jolla/Del Mar/Rancho Santa Fe (this is a merger of the La Jolla/Del Mar quarantine area with Fairbanks Ranch/Rancho Santa Fe quarantine area), Carlsbad (western boundary expanded), Solana Beach (new 2007 quarantine area), Scripps Ranch (new 2007 quarantine area) and Rancho Santa Fe North (new 2007 quarantine area). The quarantined areas total more than 50 square miles, in primarily suburban areas. A total of 570 businesses/entities are affected and operate under program compliance agreements. Affected businesses include landscape companies, yard maintenance operators, green waste haulers and/or processors, golf courses, homeowners, homeowners' associations, recycler landfills and city parks. Program staff ensures that all green waste leaving the quarantined area is run through a chipper/shredder or double-bagged and delivered to an approved landfill, compost or biomass generation facility.

Diaprepes Root Weevil, Orange County

In 2006, three DRW quarantines were established in Orange County. During 2007, the number grew to a total of four DRW quarantine areas, totaling 9.6 square miles primarily in urban areas. Current quarantined areas of Orange County include: two Newport Beach locations (one east and one west of Newport Bay), Huntington Beach and Yorba Linda. Over 659 businesses/entities are affected and operate under program compliance agreements. Affected businesses include landscape companies, yard maintenance operators, green waste haulers and/or processors, golf courses, homeowners, homeowners' associations, recycler landfills and city parks. Program staff ensures that all green waste leaving the quarantined area is run through a chipper/shredder or double-bagged and delivered to an approved landfill, compost or biomass generation facility.

Diaprepes Root Weevil, Los Angeles County

In 2007, Los Angeles County added one additional DRW quarantine area (La Mirada) and saw one expansion of the existing quarantine area (Long Beach). The quarantined areas are approximately 3.5 square miles, in primarily urban areas. Over 97 businesses/entities are affected and operate under program compliance agreements. Affected businesses include landscape companies, yard maintenance operators, green waste haulers and/or processors, golf courses, homeowners, homeowners' associations and city parks. Program staff ensures that all green waste leaving the quarantined area is run through a chipper/shredder or double-bagged and delivered to an approved landfill, compost or biomass generation facility.

Sudden Oak Death

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 the control of *P. ramorum*, the causal agent of sudden oak death (SOD). Interior Pest Exclusion developed project compliance agreements and individual exhibits for nine types of regulated establishments including nurseries, green waste facilities, compost facilities and firewood dealers. A total of 1,495 businesses are under program compliance (see Table 1 below) to ensure that regulated materials shipped within and from California are free of *P. ramorum*.

Number of Businesses Regulated for *P. ramorum* in 2007

Counties	Regulated Business	Count
Quarantined	Nursery Stock/Soil of Nursery Stock	175
	Non-host, Bare-root Nursery Stock	69
	Wood and Wood Products	30
	Greenery, Garland and Wreathes	13
	Green Waste Facility/Transporter	143
	Compost Facility	15
	Tree Farm	14
Regulated	Nurseries that ship host material	401
	Nurseries that only ship non-host material	635
Total		**1,495**

A total of 1,280 nurseries were surveyed/inspected for *P. ramorum* in 2007. *P. ramorum* was detected at seven of the surveyed/inspected nurseries. Interior Pest Exclusion activities associated with the detections are listed in the table below.

Interior Pest Exclusion Activities at Nurseries Where *P. ramorum* was Detected

Survey/Inspection	Quarantined Counties	Regulated Counties	Total
Compliance Agreement	1	2	3
Nursery Stock Cleanliness	3	0	3
Trace Forward	0	0	0
Other/Trace Back	1	0	1
Total	**5**	**2**	**7**

Following detection of *P. ramorum* in a nursery, eradication is initiated by quarantine hold, delimitation, and destruction of infected plant(s). The Federal (USDA, APHIS) Confirmed Nursery Protocol (CNP) for *P. ramorum* is implemented at production/wholesale nurseries in which infection was detected. Trace forward and trace back investigations are also completed to determine the source of infection and potential spread. In 2007, Interior Pest Exclusion staff oversaw that appropriate eradication efforts were carried out at all seven *P. ramorum*-positive nursery sites.

In 2007, county agricultural commissioners' staffs submitted 22,225 samples from nurseries for *P. ramorum* testing at the California Department of Food and Agriculture's (CDFA) Plant Pest

Diagnostics Laboratory. *P. ramorum* was detected in > one percent (or 23) of the samples. Approximately 87 percent of the detections in nursery samples were taken from three plant types; *Camellia spp.*, *Rhododendron spp. and Pieris spp*. Other *P. ramorum*-positive nursery stock included *Loropetalum chinense, Magnolia grandiflora and Osmanthus fragrans.*

In February 2007, the USDA-APHIS released the Interim Rule for *P. ramorum*. This release combined the existing Emergency Federal Order of December 2004 (previously regulating the interstate movement of nursery stock from 44 California counties not considered infested with the disease) with Federal Domestic Quarantine for *P. ramorum* (7CFR 301.92- which previously only regulated nursery stock and other commodities from infested counties). Program staff assisted in communicating program changes and implementation of the Interim Rule for *P. ramorum.*

In fulfillment of the Emergency Federal Order on *P. ramorum*, Interior Pest Exclusion regularly posts updated lists of "California Nurseries Approved for Shipping" on the CDFA public Web site. Other states receiving California nursery stock often use these lists to verify that a nursery has met federal *P. ramorum* regulations.

QUARANTINE TRAINING, DIRECTION, OVERSIGHT, AND CONSULTATION

Each county agricultural department provides the necessary staff to perform pest exclusion inspections at many locations within California. Interior Pest Exclusion provides training, direction, oversight and consultation to each county agricultural commissioner's office in order to ensure uniform inspection procedures throughout the state.

The Program conducted 27 regional training sessions for 1,320 county staff from 37 different counties during 2007. Topics included light brown apple moth, *Phytophthora ramorum*, Diaprepes root weevil, nematology, quarantine certification examinations, Interior Pest Exclusion extranet resources, completing Pest Damage Records, sample submission, exotic fruit identification, exotic fruit fly information, market inspection procedures, exotic fruit fly rapid response and new quarantine regulations established for new pests in other states such as Asian citrus psyllid (see table below).

Regional Training Sessions in 2007

Training Category	Sessions	Counties Served	Participants
Quarantine	26	24	1,317
Phytosanitary	5	17	3
Total	**27**	**46**	**1,320**

TRADE FACILITATION

Interior Pest Exclusion works cooperatively with the United States Department of Agriculture (USDA), agricultural officials from other states and the county agricultural departments to facilitate both domestic and foreign trade of agricultural products. This is accomplished by:

- Collaborating with other states
- Administrating the Federal Phytosanitary Program

Collaboration with Other States

The Program works with agricultural officials in other states to coordinate certification and inspection procedures that will meet California entry requirements.

Origin Inspection Program

Interior Pest Exclusion administers CDFA's Origin Inspection Program (OIP). This Program facilitates the entry of pre-qualified and pre-cleared agricultural commodities from participating shippers in other states. Encouraging origin inspection activities with regulatory officials in other states is an integral part of California's pest prevention system. The OIP mitigates pest risk at origin by requiring commodities to be inspected by regulatory officials in the other states before being shipped and consequently reducing the inspection workload in California. Ongoing negotiations with other regulatory agencies are required, as shippers request new commodities be included in the program.

In 2007, 148 shippers in 11 states participated in the OIP. The commodities covered under the OIP include fruits and vegetables, cut flowers and cut greens, canola pellets, bulbs, seeds and nursery stock.

Origin Inspection Program

State/Country	OIP Participants
Arizona	1
Colorado	1
Florida	2
Hawaii	28
Mississippi	1
Nevada	3
New Mexico	1
Ohio	1
Oregon	65
Utah	1
Washington	44
Total	**148**

Master Permits and Compliance Agreements

Interior Pest Exclusion worked with agricultural officials in Nevada, Texas, Ohio, Michigan and North Carolina to develop compliance agreements that allowed shippers in those states to ship commodities to California. Compliance agreements were approved for the shipment of nursery stock, bulk produce and fresh fruit gift packages.

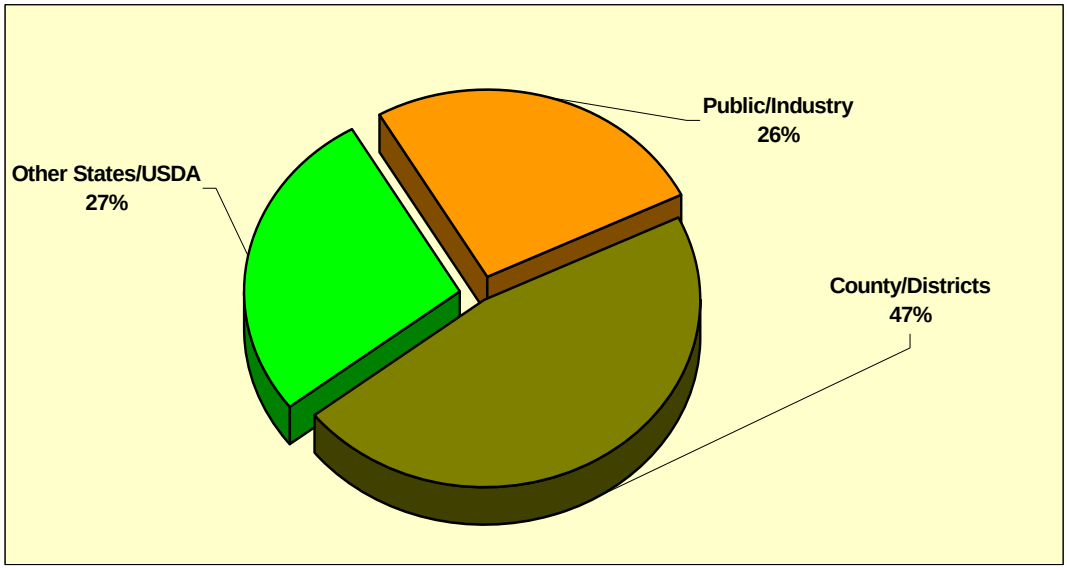


Figure 1. Quarantine consultations conducted by Interior biologists in 2007

QUARANTINE ENFORCEMENT

Interior Pest Exclusion is responsible for the enforcement of California's plant pest quarantines by conducting routine inspections of all incoming shipments of agricultural commodities and all plant material. Commodity shipments arrive in our state via cargo ship, airplane, railcar and truck. Routine port and terminal point inspections help keep California pest-free. These inspections are done cooperatively with the USDA and with help from the local county agricultural commissioner's staff.

Pest Surveillance Canine Inspection Teams for Northern and Southern California

In its second year, the Pest Surveillance Canine Inspection Teams (PSCIT) Program continues to intercept prohibited or regulated plant material entering into California via unmarked parcels. The PSCIT deploys trained dogs in parcel-handling facilities to sniff out unmarked parcels containing plant materials and soil. Currently, PSCIT canine teams conduct inspections at UPS, FedEx, DHL and other private parcel carriers in Contra Costa, Napa, San Mateo, Santa Clara, San Benito, Santa Cruz, Monterey, Marin, Alameda, San Francisco, Solano and San Bernardino counties.

The Pest Surveillance Canine Inspection Teams have demonstrated that unmarked parcels are a high-risk pathway for harmful pests to enter California. During 2007, the PSCIT canine teams intercepted 673 unmarked packages containing plant material, from which 95 pest interceptions were made with 36 pests as actionable A- and Q-rated.

PSCIT Uncovered Smuggled Fruit Fly Host (Mangoes) from India

In April and June 2007, PSCIT southern California team intercepted a foreign parcel that contained uncertified mangoes from India. The parcel was manifested as ladies wear, clothing and jewelry. Since it was a foreign misrepresented parcel, USDA/APHIS/SITC Los Angeles was notified, who further notified USDA/APHIS/SITC in New York. USDA's Smuggling Interdiction and Trade Compliance (SITC) and Customs and Border Protection (CBP), worked together at JFK in New York, LAX in Los Angeles and Ontario International airports. A total of 34 individual air waybills in California and 26 air waybills in New York were discovered to contain smuggled mangoes from India, totaling between 20 and 50 mangoes per shipment. The combined estimated weight of all prohibited untreated mangoes seized was 500 kilograms. This major interception helped avoid the possible introduction of melon fly and other exotic pests into California.

Uncertified mangoes from India intercepted at DHL Ontario, CA

COUNTY HIGH RISK PROGRAM

Background

The County High Risk Pest Exclusion Program (CHRPEP) was 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. The CHRPEP is a cooperative program that provides funds to county agricultural commissioners to conduct high-risk pest exclusion activities under state oversight by the California Department of Food and Agriculture (CDFA).

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 (CACs) with $5 million to conduct an optimal level program for the latter portion (December-June) of fiscal year 1998/99. CDFA allocated funding by way of a negotiated work plan process with the CACs.

In 1999, Section 2282.5 was amended, providing for continuation of the program in fiscal year 1999/00 by extending the June 29, 1999 sunset date to June 30, 2000. In fiscal year 2002/03, the High Risk Program's funding had been reduced to $5.5 million with Scientific Evaluation Trapping paid out of CDFA's funds. For fiscal year 2005/06, the county contracts for high-risk were $977,000 and $3,977,000 for 2006/07.

High Risk Inspections

The primary responsibility of the County High Risk Pest Exclusion Program (CHRPEP) is to provide guidance and funding to county agricultural commissioners to conduct high-risk pest exclusion activities at first point of entry terminals within California. The CHRPEP is a vital component in the state's overall pest prevention efforts and is a crucial part of CDFA's mission to protect agriculture and the environment from the threat of newly-introduced exotic pests.

In FY 2006/07, $3,977,000 was disbursed to 24 counties for high-risk pest exclusion activities at airports, nurseries, United States postal and private parcel facilities, as well as high-risk destination points, including specialty markets, swap meets, flea markets, locations where household goods from gypsy moth infested areas were delivered and locations where material in post-entry quarantine is held.

A- and/or Q-Rated Pests Intercepted in 2007

DESCRIPTION	TOTAL	TRUCK	AIRCRAFT	UPS	FEDEX	USPS	NURSERY SHIPMENT INCOMING	OTHER
Alameda	143		1		113	6	4	19
Contra Costa	143			9	134			
El Dorado	1						1	
Fresno	8	2	7					5
Humboldt	1				1			
Kern	3				1			2
Los Angeles	725	12	665	1	12			35
Marin	4		1		1		1	1
Mendocino	17				17			
Mono	1	1		1	1			
Orange	109	7	39		40			23
Placer	1	1						
Plumas	1							1
Riverside	89	6			14			69
Sacramento	21	7	4		7			3
San Bernardino	74		9	12	50		1	2
San Diego	69	52	4		1			12
San Francisco	2		2					
San Joaquin	10	2	2		1	1	3	1
San Luis Obispo	27	2	17		7		1	
San Mateo	1,259	10	1,237		3			9
Santa Barbara	23				22		1	
Santa Clara	22			4	15			3
Shasta	11				8	2	1	
Sonoma	7			1	3	1		2
Santa Cruz	4			1	3			
Ventura	1	1						
Total	**2,780**	**103**	**1,988**	**29**	**457**	**10**	**13**	**187**

Note: PDR data source. (Program equals Int, HR, or Null; Activity equals 01 through 08; and Situation equals 01 through 08, 10, 11, 12, 13, 20, or 69. Rating equals "A" or "Q").

In FY 2007/08, $5,500,000 was disbursed to 42 counties based upon the pest risk of specific pathways and the volume of work associated with those pathways. The top priority pathways were airfreight, truck shipments of nursery stock, truck shipments of beehives from Red Imported Fire Ants (RIFA) infested areas and special entry pathways including specialty markets, swap meets and flea markets.

A total of 2,284 shipments were rejected from January through December 2006 due to the presence of A- and Q-rated pests, or lack of origin or treatment certification. Figures 2 and 3 (below) detail the pests most commonly intercepted. The table below shows counties with two or more A- and/or Q-rated pest interceptions. There were 214 seizures of foreign-origin plant pest and quarantine material brought into California illegally in 2007.

As part of this important program, county agricultural inspectors/biologists assist with the retrieval of any infested lots (i.e., nursery stock that contains high-risk pests). Seizure of illegal fruit that may have already entered the state is also a vital part of this program.

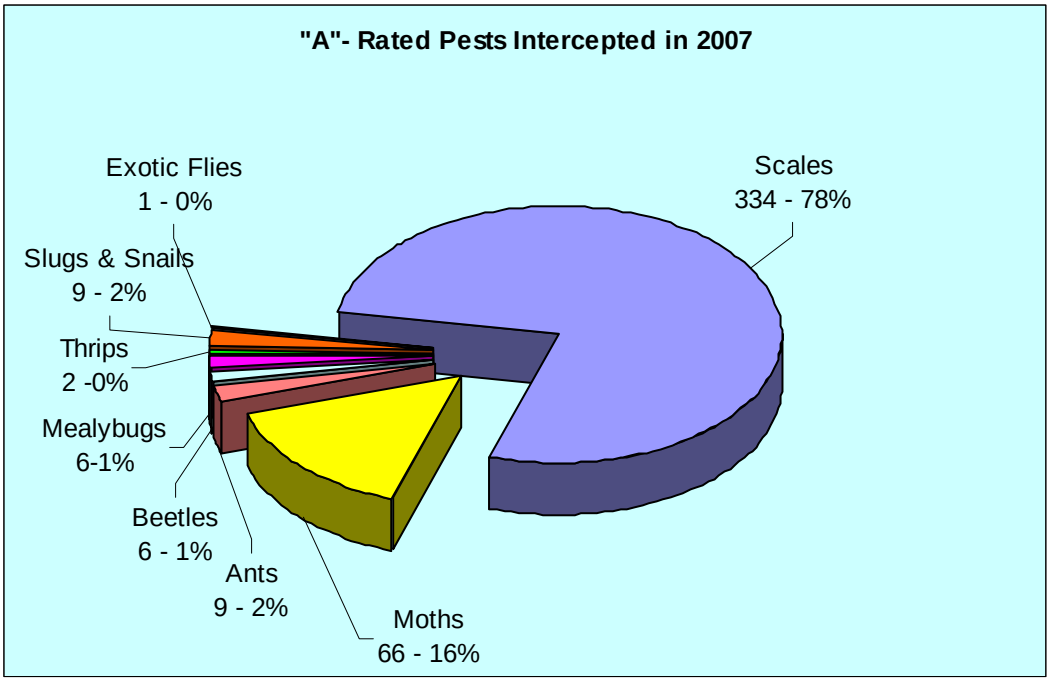


Figure 2. Frequently intercepted A-rated pests (number, percentage of total) in 2007

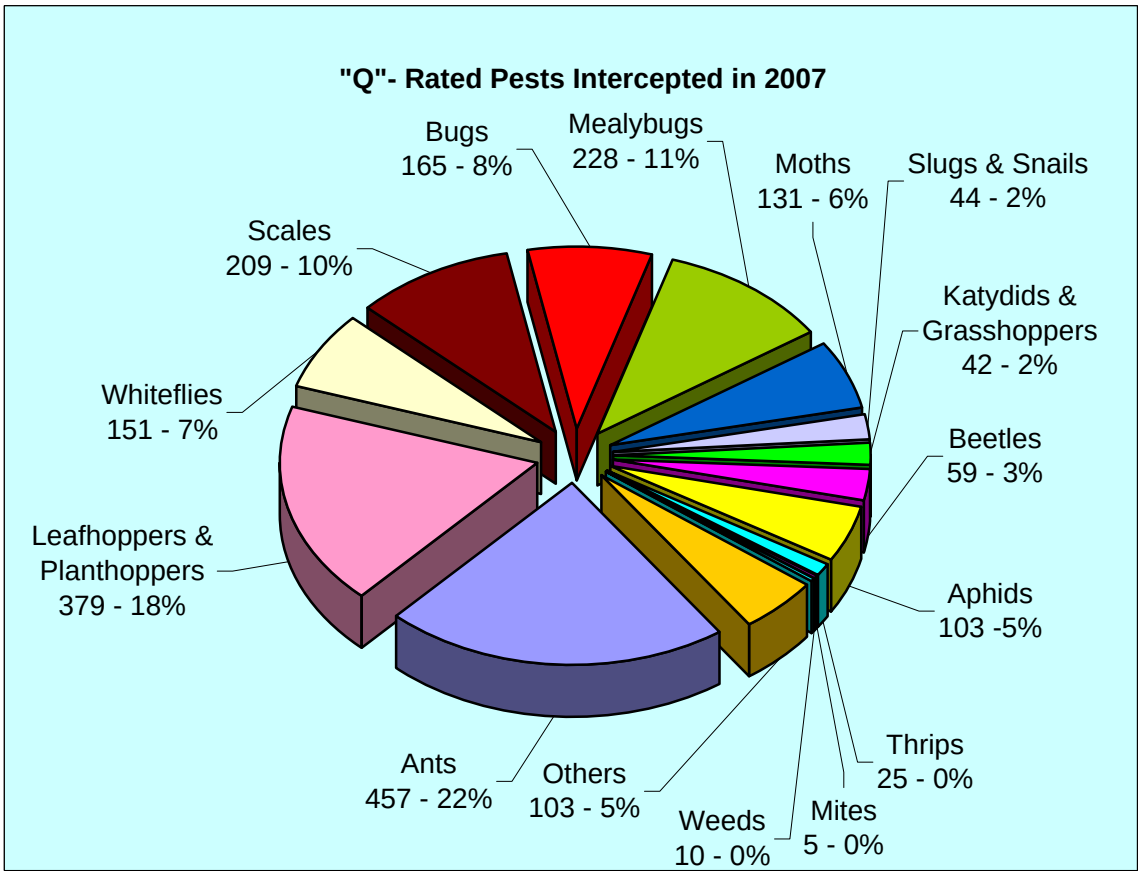


Figure 3. Frequently intercepted Q-rated pests (number, percentage of total) in 2007

Counties with Two or More A- and/or Q-Rated Pest Finds in 2007

COUNTY	PEST FINDS	COUNTY	PEST FINDS	COUNTY	PEST FINDS
San Mateo	1,258	Santa Clara	22	Kern	3
Los Angeles	725	Sacramento	21	San Francisco	2
Contra Costa	143	Mendocino	17		
Alameda	142	Shasta	11		
Orange	109	San Joaquin	10		
San Bernardino	74	Fresno	8		
San Diego	69	Sonoma	7		
San Luis Obispo	27	Marin	4		
Santa Barbara	23	Santa Cruz	4		

Note: PDR data source. (Program equals Int, HR, or Null; Activity equals 01 through 08; and Situation equals 01 through 08, 10, 11, 12, 13, 20, or 69. Rating equals "A" or "Q").

Foreign-Origin Materials Rejected in 2007

MATERIAL	ORIGIN	SHIPMENTS REJECTED
Cuttings	Colombia, Costa Rica, Ecuador, Guatemala, Israel, Laos, Mexico, Netherlands, Thailand	47
Leaves	Costa Rica	13
Bulbs	Canada, Netherlands	4
Cut Flowers	Colombia, Costa Rica, Ecuador, Israel	18
Fruits	Canada, Chile, China, Dominican Republic, Ecuador, India, Italy, Jamaica, Mexico	54
Seeds	India, Netherlands, Vietnam	3
Miscellaneous Materials	Brazil, China, Costa Rica, Dominican Republic, Fiji, Honduras, India, Israel, Kenya, Mexico, Netherlands, Pakistan, Panama, Thailand	27
Miscellaneous Plants	Canada, Costa Rica, Dominican Republic, Japan, Mexico, Netherlands, Thailand	48

Note: NOR data source. Not all counties are reporting.

Examples of High Risk Inspections in 2007

Giant African Snail Found on Taro

In January, San Mateo County inspectors, working at the San Francisco International Airport, intercepted A-rated giant African snail (*Achatina fulica)* in a shipment of taro stalks (*Colocasia sp*.) from Hawaii. Giant African snail is a highly damaging pest that eats over 500 different plant types. This interception has been reported to the United States Department of Agriculture (regulatory organization for all shipments of fruits, vegetables and herbs from Hawaii) for regulatory action.

Caribbean Fruit Fly Host Intercepted

In February, San Mateo County inspectors intercepted live Q-rated scales and mealybugs in a 20-pound private parcel containing guavas (*Psidium guajava*), tindora/ivy gourds (*Coccinia grandis*) and beans. The package was shipped by airfreight from Florida. Guavas are host for Caribbean fruit fly. The shipment had no treatment certification for this pest in violation of California State Exterior Quarantine (CCR 3252). The guavas were cut to inspect for fruit fly larvae and disposed under county supervision.

Florida Shipment
Photos by: San Mateo County

Mealybugs in Unmarked Package of Sugar Apples from Florida

Sugar apple shipment, Photo by: K. Haile

In August, San Joaquin County was notified by the local post office of a suspect package without proper markings identifying plant contents. The package contained 20 sugar apples (*Annona squamose*) infested with Q-rated mealybugs (*Pseudococcus odermatti*), C-rated ants and D-rated spiders. A private party located in Florida sent the package. Sugar apples from Florida are a Caribbean fruit fly host and are regulated by State Exterior Quarantine (CCR 3252). San Joaquin County destroyed the infested material.

Puerto Rico Origin Genips

In August, at the Los Angeles International Airport, Los Angeles County inspectors intercepted Q-rated mealybug (*Pseudococcus odermatti*), scale (Coccidae family) and ants (*Solenopsis* sp) on a 270-carton genip shipment from Puerto Rico. The shipment was destroyed.

Florida Longans Intercepted in Alameda County

In August, Alameda County inspectors intercepted an 18-pound box of longans from Florida at the post office. The shipment was sent from a private party in a box labeled “tomatoes.” The longans were infested with multiple surface pests, including: A- and Q-rated mealybugs (*Maconellicoccus hirsutus*, Pseudococcidae family), and B-rated green shield scale (*Pulvinaria psidii*). The shipment was also in violation of California state exterior quarantine for Caribbean

fruit fly (CCR 3252), which requires treatment for longans, except those from approved commercial shippers. The shipment was destroyed.


Longan branch
Photos by: Ken Peek


Shipment contents

USPS package labeled "tomatoes"

Banded wood snail in Canadian Nursery Shipment

In September, Fresno County inspectors found Q-rated banded wood snail (*Cepaea nemoralis)* on 7-gallon Japanese boxwood plants from DeVru Greenhouses of Canada. Fresno County cooperated with the shipper to facilitate the return of the shipment to Canada. Also, to safeguard for snails, the area where the shipment was sent was treated with snail bait.

Colorado Potato Beetle


Picture by: D. Van Epp

In October, Ventura County intercepted a live, A-rated Colorado potato beetle (*Leptinotarsa decemlineata*) in Seminis Vegetable seeds from Nampa, Idaho. The beetle was found in a bin of carrot seed and carrot plant debris. The shipment was fumigated and released.

Lesser Snow Scale on Puerto Rican Avocados

In October, Alameda County intercepted live, A-rated lesser snow scale (*Pinnaspis strachani*) on an unmarked package of avocados. The box was found with the help of the canine inspection team: Bart (the dog inspecting the package) and the Contra Costa biologist who is his handler.

The State Caribbean Fruit Fly Exterior Quarantine (CCR 3252) prohibits non-commercial shipments of avocados from Puerto Rico into California, unless treated at origin. In addition to being infested with an A-rated scale pest, the shipment lacked the proper certification for Caribbean fruit fly and was therefore rejected and destroyed.

Dell Computer Boxes Containing Uncertified Plants

In November, Santa Cruz County intercepted a shipment containing a live bonsai plant (*Juniperus procumbens*) in a Dell computer box, shipped via United States Postal Service. The box had the Dell logo, but was from Blue Ink, a promotional company and broker in Texas. Santa Cruz County contacted the shipper and learned that the plant originated from a nursery in Florida.


Dell box top view


J. procumbens bonsai inside box
Photos by: Santa Cruz County

The plant, *Juniperus procumbens*, was in violation of several state and federal quarantine regulations, including:

- CFR 301.81 - Imported Fire Ant
- CCR 3271 - Burrowing and Reniform Nematode
- CCR 3274 - Cedar Apple Rust

Aquatic Plant Shipment

In November, a local nursery received a shipment containing aquatic plants with soil from Florida. The package did not have proper markings on the outside of the package required by California Food and Agriculture Code 6421 and no certification for any A-rated Red Imported Fire Ant (*Solenopsis invicta*), A-rated/federal noxious weed Kariba (*Salvinia molesta*), and Q-rated Leafhopper (*Gyponana* sp.). The shipment was destroyed.


Steve Brooks aquatic

Louisiana Citrus Interception

In December, Sonoma County intercepted a package containing 12 pounds of citrus fruit with the leaves from Louisiana. The fruit appeared to be backyard grown. Louisiana citrus is prohibited under CCR 3250 for Citrus Pests and the package was destroyed. The leaves and fruit were heavily infested with the following Q- and B-rated scales and insect eggs.

Shipment contents

Tomato Yellow Leaf Curl Virus (TYLCV)

Tomato Yellow Leaf Curl Virus (TYLCV) was first identified in California on March 26, 2007, where it was found on tomato plants growing in a school greenhouse located in Brawley, Imperial County. During subsequent surveys conducted between March - July, eight residential sites were also found positive in Brawley and El Centro. All positive plants were destroyed.

In November 2007, surveys of nurseries and retail outlets found a tomato plant at a Lowe's in El Centro, Imperial County positive for TYLCV. A trace back survey lead to the discovery of infected tomato plants at a nursery in Thermal, Riverside County. The tomato plants at the Thermal nursery were destroyed. A trace forward survey was conducted in conjunction with affected county agricultural commissioners' offices.

Delimitation surveys conducted in November and December 2007 found field tomato plants positive for TYLCV near the area of Niland, Imperial County. The TYLCV infested plants have been destroyed and the area treated for whiteflies. In addition to tomato plants and whiteflies, TYLCV was also identified on common malva weed (*Malva sp.*) and desert straw apple (*Datura discolor*).

TYLCV is transmitted by adult whiteflies (*Bemesia sp.*) and has a broad host range from several plant families including Solanaceae, Malvaceae and Fabaceae. Several asymptomatic hosts are also known, including horticultural plants (i.e. pepper and common bean) as well as Solanaceous weeds (i.e. nightshade).

A TYLCV Working Group, consisting of industry, state and county entities, is currently developing a course of action to protect the state from this disease.

Asian Citrus Psyllid (ACP)

In August 2007, San Mateo County intercepted two adult Q-rated Asian citrus psyllids, *Diaphorina citri*, (ACP) in a box of curry leaves (*Bergera koenigii=Murraya koenigii*) from Hawaii. This was the first interception of ACP in California. Subsequently, three additional shipments of curry leaves from Hawaii were found infested with ACP. All boxes were destroyed.

ACP is the insect vector of the pathogen that causes citrus greening, a devastating disease of citrus. Citrus greening is not known to occur in Hawaii; however, these interceptions confirmed the vector for this disease could enter California from Hawaii on curry leaves. In order to address this pest risk, Animal Plant and Health Inspection Services (APHIS) issued a Federal Order for citrus greening and Asian citrus psyllid (effective November 2, 2007). The Federal Order requires that all curry leaf shipments from Hawaii undergo a methyl bromide treatment to mitigate the risk of live Asian citrus psyllid entering California. In addition to requiring that all curry leaf shipments be treated, the Federal Order also prohibited the movement of all hosts of ACP (in areas where ACP is known to occur) from entering California.

Other Terminal Point Inspections

The county agricultural commissioner conducts routine terminal inspections of mail carriers, air freight, sea freight, and private shipments of outdoor household articles (OHA's) for Gypsy Moth etc., with oversight by the Interior Pest Exclusion Program. Over 257,000 shipments were inspected in 2007 with more than 1,400 pest interceptions.

Terminal Point Inspections

Terminal	Shipments	Notices of Rejection	Pest Rejections
Post Office	18,288	194	16
UPS	75,988	600	33
Federal Express	96,926	791	314
Other Express Carriers	25,309	184	20
Air Freight	8,545	570	746
Sea Freight	710	32	28
Railroad	153	1	1
OHA's	1,009	5	5
Truck	26,339	238	233
Other	4,125	45	22
Total	**257,392**	**2,660**	**1,418**

NOTE: Report 4 data source. Not all report 4s have been submitted for 2007.

Facility and Property Inspections

The county agricultural commissioner conducts routine facility and property inspections with oversight by Program staff. These inspections include feed grain/screening facilities, research facilities and destination properties of post-entry shipments. Over 1,800 facilities and properties were inspected in 2007.

Facility and Property Inspections

Facility/Property	Number of Inspections
Feed Grain/Screening	22
Post-Entry Property	34
Testing/Research	24
High-Risk Markets	1,174
Quarantine Enforcement/Monitoring, etc.	643
Total	**1,897**

NOTE: Report 4 data source. Not all report 4s have been submitted for 2007.

Phytosanitary Export Certification Administration

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 USDA is charged with nationwide implementation of the international phytosanitary certification program. Interior Pest Exclusion administers both this federal program in California for the USDA and the domestic phytosanitary certification program. Interior Pest Exclusion provides training to county agricultural commissioners' staffs to issue phytosanitary certificates.

Phytosanitary inspections may include post-harvest inspections of agricultural commodities at packing sheds or terminal inspection points, and/or growing season inspections of seed fields, nursery stock and fruit and vegetable stock. Staff performed over 177,000 inspections and issued more than 189,000 phytosanitary certificates in 2007.

Inspections and Certificates Issued in 2007

County Certification Activities		
Type of Certificate	***Inspections***	***Certificates Issued***
Federal Phytosanitary	122,239	130,425
State Phytosanitary Certification	4,463	7,384
Compliance Certificates	35,396	46,704
Quick Decline Permits	2,599	2,726
Compliance Agreements	726	606
Others	12,013	2,027
Total	**177,436**	**189,872**

NOTE: Report 4 data source. Not all report 4s have been submitted for 2007.

EXTERIOR PEST EXCLUSION

PROGRAM BACKGROUND

California established its first “agricultural inspection stations” in the early 1920s. Today, these stations, now known as Border Protection Stations (BPS), form the Exterior Pest Exclusion Program. There are currently 16 stations located on major highways entering California. At these stations, vehicles are inspected for commodities infested with invasive pests that pose serious threats to California’s agriculture or environment. BPS personnel 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.
- Collection, analysis, and dissemination of data pertaining to commodity movement, pest interceptions and traffic flow.
- Increase public and industry awareness about the importance preventing the movement and spread of exotic invasive species.

Old Fort Yuma Station, (near the site of the current Winterhaven Station) c. 1926

The program has cooperative working relationships with many programs within CDFA and several other state, federal and county agencies with like goals including the:

- United States Department of Agriculture.
- County Agricultural Commissioners.
- California Department of Fish and Game.

Additionally, personnel assist the Board of Equalization, the California Highway Patrol and many other law enforcement agencies with various issues of concern to them.

REGULATORY VEHICLE INSPECTIONS

Vehicles are roughly divided into two types: commercial and private. Commercial vehicles include trucks hauling any type of commercial shipment for sale or distribution. Private vehicles include automobiles, recreational vehicles and self-moving vehicles. Because of resource limitations, the focus of the BPS program has been on commercial vehicles since July 2003; however, efforts are currently underway to assess the risk presented by private vehicles to determine if they should also be inspected.

Commercial Vehicle Inspections

In 2007, 7.42 million commercial trucks (up 7.5 percent from 2006) entered California through the BPS. Of these, 404,444 were high-risk or carrying agricultural products and were physically inspected; 2,862 were rejected because of pest finds or quarantine violations; and 29,825 were forwarded to destination for more detailed inspection by county agricultural commissioners' staff.

Commercial Regulatory Sampling

To ensure fruit is free from exotic fruit flies and other pests, BPS personnel take samples from each commercial shipment of many commodities including citrus, mangoes and cherries. Each piece of fruit in the sample is closely inspected for internal and surface feeding pests such as fruit flies and mealybugs.

Inspectors at the Blythe BPS sampling Texas grapefruit for fruit fly larvae.

Citrus: In 2007, 8,146 commercial shipments of citrus entered California from the Bahamas, Mexico, Spain, South Africa, Florida and Texas. BPS inspectors sampled 6,883 containers from these shipments. Due to pest infestations or lack of proper certification, 323 shipments were rejected. All pest finds were mealybugs and scales—no internal feeding larvae were found.

Mangos: To mitigate the risk of fruit fly introductions, all foreign mangoes are treated in a hot-water bath prior to entry into the United States. To ensure the treatment is working properly, all shipments are sampled at the BPS. In 2007, 11,970 containers were sampled from 5,465 commercial shipments. Mango shipments originated from Haiti, Mexico and various Central and South American countries. Sixty-two shipments were rejected because of surface feeding pests. No internal feeding insects were found.

Cherries: Under special permit, shippers are allowed to ship un-fumigated cherries to California. Fruit entering under this program is certified as being pest-free based on field treatments and fruit sampling, both at origin and upon arrival at the California border, eliminating the need for fumigation. Eighty-seven shippers participated in the 2007 permit program, including shippers from Washington, Oregon, Utah and British Columbia, Canada.

In the 2007 season, 3,876 commercial cherry shipments entered the state. Of these, 2,408 shipments came in under special permit and 1,468 were fumigated. BPS personnel sampled all shipments that came in under special permit. One shipment was found to be infested with cherry fruit fly, resulting in rejection of the load and suspension of shipping privileges for the packing shed. One-hundred thirty-eight shipments failed to meet the special permit requirements (e.g., lacking either proper container markings or certification). Those shipments were either shipped out-of-state or released after the requirements were met.

Commercial Gypsy Moth Regulatory Activities

In accordance with the federal gypsy moth quarantine, shipments of used household goods with articles that are used outdoors from infested areas must be accompanied by a certificate of inspection upon entering California. Additionally, all shipments of this nature are forwarded to destination for inspection by county agricultural commissioner's staff.

Gypsy Moth Larva

In 2007, BPS personnel issued 785 citations for lack of proper certification and 3,017 shipments were quarantined for destination inspection. This resulted in nine infested shipments being found at destination by county personnel. Gypsy moth was also detected twice on commercial shipments of construction materials at the Truckee BPS—both of these shipments were cleaned and released.

Other Commercial Quarantine Activities

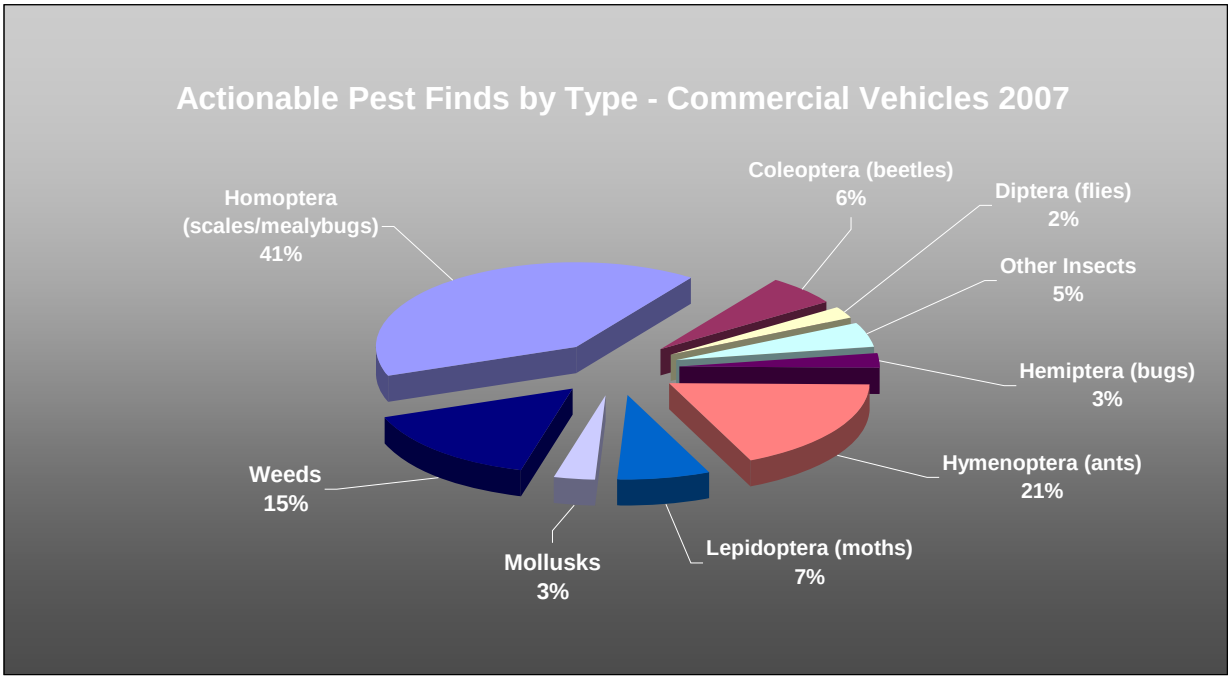
Numerous other types of agricultural commodities are inspected or otherwise regulated at the BPS. The table below details miscellaneous plant quarantine work performed at the BPS during 2007.

Commodity	Inspected and Released	Sent to Destination Under Hold Notice	Rejected Because of Pests or Lack of Certification
Feed Grain	4,411	7	32
Hay	49,643	462	16
Bee Colonies and Related Equipment	114	2,698	87
Misc. Fruits, Vegetables, Nursery Stock and Seed	341,214	26,658	2,862
Total	**395,383**	**28,825**	**2,997**

Significant Pest Interceptions from Commercial Shipments

During the course of inspecting commercial shipments, BPS personnel intercepted actionable pests on 1,145 occasions during 2007. Each of these finds resulted in the shipment being returned out - of - state or other steps being taken to ensure the risk of infestation is eliminated (i.e., fumigation, cleaning, etc.). The table and graph below illustrate the interceptions by type of pest.

Type	Occurrences in 2007
Homoptera (scales/mealybugs), including: Lesser snow scale, magnolia white scale, Vanda orchid scale, fig wax scale, etc.	461
Hymenoptera (ants), including: Imported fire ant, white-footed ant, Florida carpenter ant, etc.	209
Weeds, including: Musk thistle, Scotch thistle, diffuse knapweed, spotted knapweed, etc.	176
Lepidoptera (moths), including: Gypsy moth, false codling moth, hickory shuckworm, pecan nut casebearer, American tent caterpillar, etc.	84
Coleoptera (beetles), including: Japanese beetle, May beetle, cereal leaf beetle, diaprepes root weevil, etc.	68
Mollusks (snails and mussels), including: Quagga mussel, zebra mussel, false dark mussel, brandybaena snail, etc.	38
Hemiptera (bugs), including: Brown marmorated stink bug, chinch bug, black stink bug, etc.	29
Diptera (flies), including: Mexican fruit fly, cherry fruit fly, apple leaf gall midge, apple maggot, etc.	23
Other Insects and mites	57
Total	**1,145**

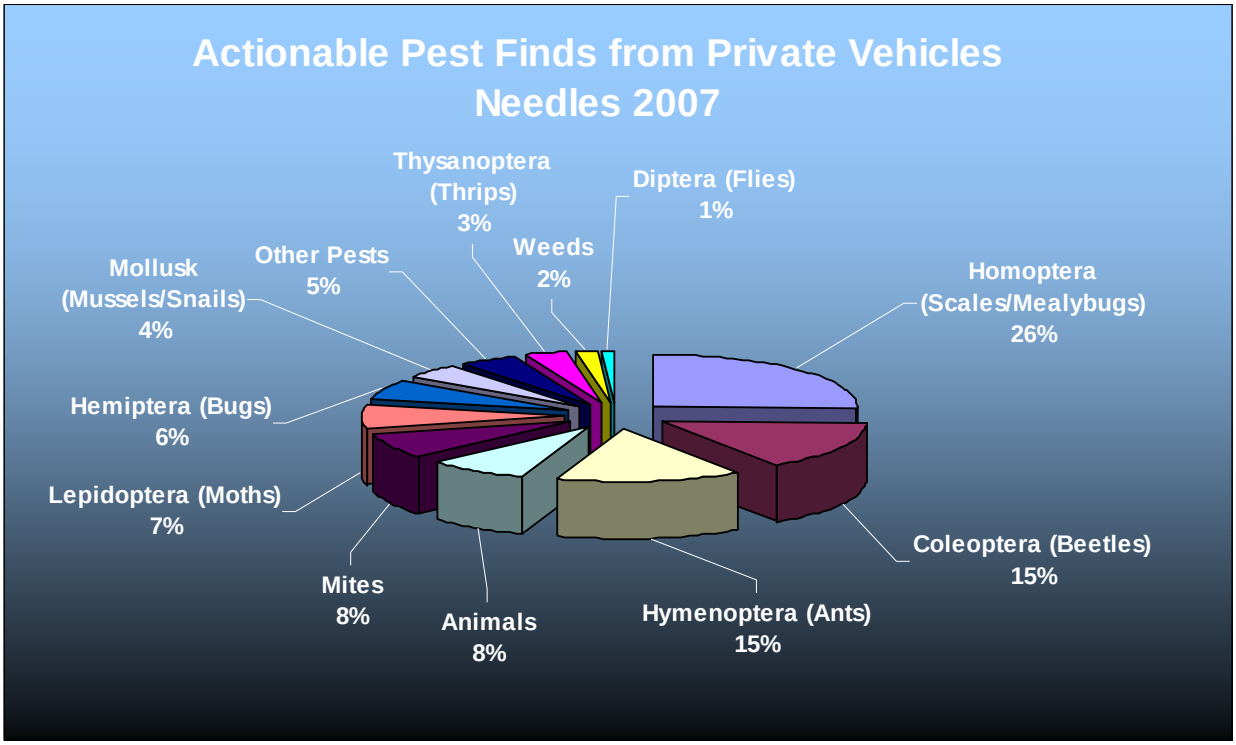


Breakdown of significant pest finds in commercial shipments at BPS by type

PRIVATE VEHICLE INSPECTION PILOT PROGRAM – NEEDLES

Private vehicle inspections were discontinued at all BPS in July 2003. In response to increased pest detections within California, funding was granted to conduct a study to assess the current pest entry risk presented by private vehicles entering the state. The study, which is being conducted at the Needles Station on Interstate 40, began on July 5, 2006 and will run through July 1, 2007. The first eighteen months of the study have produced dramatic results. So far, the results show that not only are more prohibited commodities being transported, but also more pests (both in number and different species) are being brought with them.

Type	Occurrences in 2007
Homoptera (scales/mealybugs), including: Glassy-winged sharpshooter, bamboo pit scale, lesser snow scale, magnolia white scale, etc.	216
Coleoptera (beetles), including: Japanese beetle, May beetle, pecan weevil, longhorned beetles, etc.	128
Hymenoptera (ants), including: Imported fire ant, white-footed ant, Florida carpenter ant, etc.	127
Animals, including: Ferrets, gerbils, etc.	69
Lepidoptera (moths), including: Gypsy moth, false codling moth, hickory shuckworm, etc.	61
Hemiptera (bugs), including: Brown marmorated stink bug, cotton stainer, etc.	52
Mollusks (snails and mussels), including: Quagga mussel, zebra mussel, false dark mussel, brandybaena snail, etc.	38
Thysanoptera (Thrips), including: Chili thrip, cotton bud thrip, etc.	29
Weeds, including: Russian knapweed, diffuse knapweed, Canada thistle, Carolina horse nettle, etc.	14
Diptera (flies), including: Walnut husk maggot, apple maggot, etc.	9
Other pests	108
Total	**851**



INTRA- AND INTER-AGENCY COOPERATIVE ACTIVITIES

Quagga/Zebra Mussel Response

Quagga and zebra mussels are harmful mollusks that disrupt aquatic ecosystems and have severely affected water infrastructure in the eastern United States. Between 1990 and 2000, an estimated $5 billion was spent nationally to control these pests. Watercraft used in infested waters pose a risk of transporting these mussels to new waters. Mussels may be moved as adults attached to boat hulls (they may live out of water for several days) or as free-swimming larvae transported with trapped water moved in boat bilges, live wells and other places capable of harboring water while boats are in transit.


Zebra mussel

Quagga mussel was discovered in Lake Mead along the Arizona-Nevada border on January 6, 2007. In response to the find, a multi-agency task force was assembled to limit the spread of the mussels into California.

The BPS are a significant component of this effort. In 2007, funding was granted to provide staffing to conduct watercraft inspections on all vehicles on a full-time basis at six stations.

Between February and November 2007, 81,690 watercraft were inspected at the BPS. Of these, 8,720 (nearly 11 percent) either had adult mussels clinging to the hull or were carrying enough standing water to harbor the free-swimming larval form of quagga or zebra mussel—all were either cleaned/drained at the BPS or forwarded to destination for further risk mitigation.

Board of Equalization Use Tax Collection Pilot Program

In conjunction with the Board of Equalization (BOE), a pilot program began at the Needles BPS in July 2006 to determine the level of use tax compliance. This program continued throughout 2007. Needles personnel have been trained to identify interstate commercial shipments of commodities that are subject to use tax. Information on these shipments is passed on to BOE analysts who determine whether or not appropriate taxes are being paid. In 2007, this program resulted in the collection of $4.3 million use tax that otherwise might not have been paid.

Game Importation Declarations

Under provisions of the California Fish and Game Code, all sportspersons returning with fish or game from other states are required to complete a Game Declaration upon entering California. These forms aid the California Department of Fish and Game (CDFG) in identifying and prosecuting hunting and fishing regulation violations, including recent laws enacted to present 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.

In cooperation with the CDFG, BPS inspectors provided and collected 6,247 game declarations from returning sportspersons in 2007.

Livestock Tracking

To assist CDFA's Animal Health Branch in tracking animal ownership and disease outbreaks, BPS inspectors recorded all shipments of livestock entering California. In 2007, 37,041 shipments (including 15,210 cattle, 5,027 horses, 13,127 swine, 974 sheep, 480 goats and 2,099 poultry) were recorded.

Market Egg Shipments
To assist the Egg Quality Control Program in ensuring quality standards are met and appropriate mill fees are paid, BPS personnel record all shipments of market eggs entering from other states. In 2007, 12,186 shipments were recorded.

NEW TRUCKEE BORDER PROTECTION STATION

After over two years of construction, the new Truckee Border Protection facility opened in July 2007. This state-of-the-art facility provides ample space for private and commercial vehicle inspection, as well as many technological advances that were not available in the old facility.

The new Truckee Border Protection Station opened in July 2007.

Secretary Kawamura looks on as the first truck through the station breaks the ribbon on opening day.

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 2007, the total value of nursery and floral products produced was $3.9 billion, an increase of 5.4 percent from the previous year. The nursery program budget for 2007 was $ 2,578,341. 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 2007 totaling $1,320,000 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 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 2007, there were 10,743 licensed sales locations with 950 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 $51,034, resulting in a total of $651,034 to be divided among the counties for the 2007/08 fiscal year contracts.

REGISTRATION AND CERTIFICATION SERVICES FOR PLANT MATERIALS

CDFA Code authorizes the Department to establish plant registration and certification (R & C) programs (see Table 1). These programs are implemented by the California Code of Regulations and enforced by the Secretary. In 2007, CDFA staff performed over 750 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, USDA and the Department, 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 nine "clean stock" (registration and certification) programs available for use by the various segments of the agricultural industry.

Table 1. Registration and Certification Programs

PROGRAM	PLANTING TYPE (BLOCKS)	TARGET PEST	TESTING OR TREATMENT REQUIRED
Avocado Certification	Certified	*Phytophthora cinnamomi*	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)
Citrus Registration and Certification	Foundation, Scion, & Seed (tree) Increase Certified (nursery row)	Citrange stunt, concave gum, exocortis, psorosis, tatterleaf, seedling yellow tristeza, tristeza vein enation and yellow vein viruses.	Index testing (UC) + individual tree identification index-testing (CDFA)
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 (*Ditylenchus dipsaci*) 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)

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

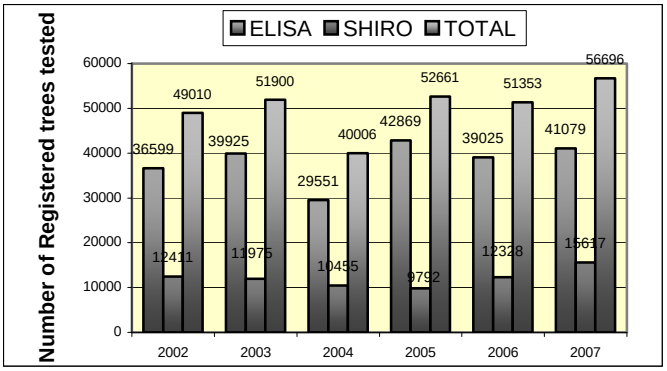
Grapevine Improvement Advisory Board (IAB) provides partial to full funding for annual testing and inspections required by the Deciduous Fruit and Nut Tree R & C, Pome R & C and Grapevine R & C programs.

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.

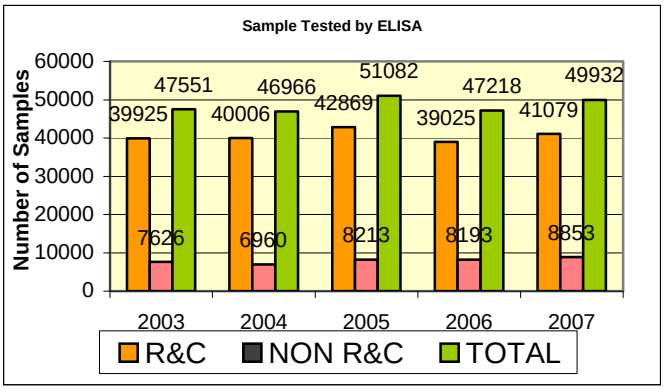
Deciduous Fruit Tree and Nut Tree Registration and Certification Program

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 biological indexing 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.



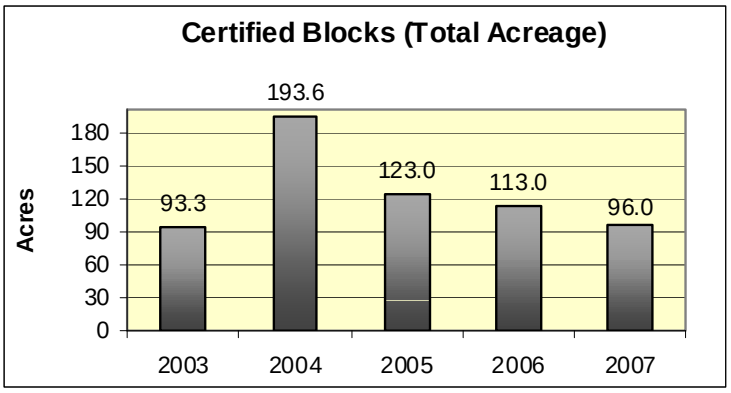
In 2007, 19 nurseries participated in the program. The total number of registered trees tested was 56,696 (41,079 by ELISA and 15,617 by Shirofugen indexing), compared to an average of 51,854 per year for the 2003-2006 growing seasons.

The total number of trees tested using the ELISA technique was 49,932 (41,079 registered trees and 8,853 service samples). The service samples are obtained from non-registered trees and tested as a service to the industry.



Of the 49,932 trees tested by ELISA, 319 (0.64%) were found positive for viruses. Only 121 (0.29%) of the registered samples tested positive for viruses, while 198 (2.24%) of the service samples tested positive for viruses. Of the samples taken from registered trees, 35 (0.22%) tested positive for viruses using the Shirofugen cherry biological indexing technique.

Certified nursery planting acreage totaled 96 acres in 2007, compared to an average of 111 acres over the previous four years.

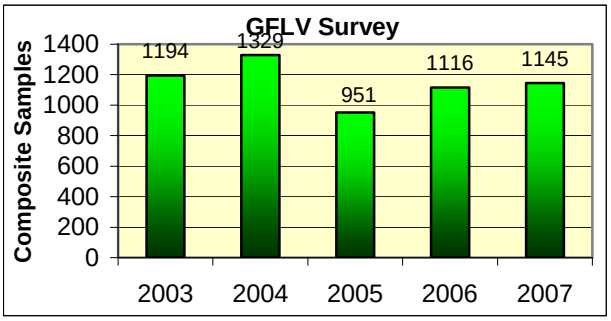


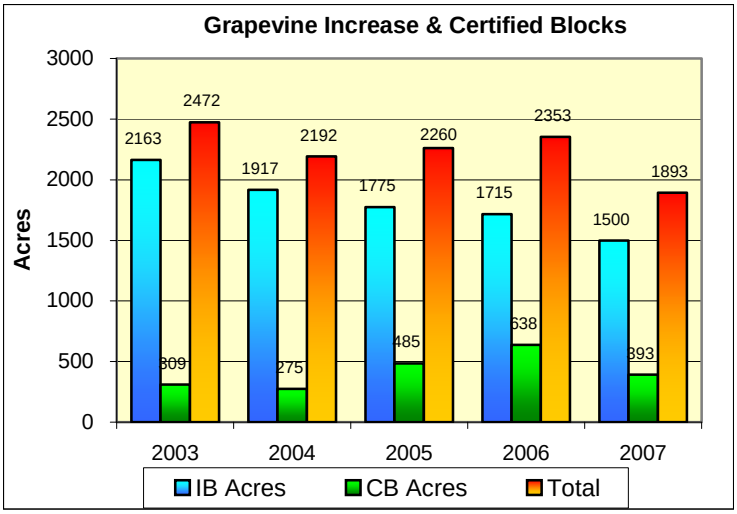
Grapevine Registration and Certification Program

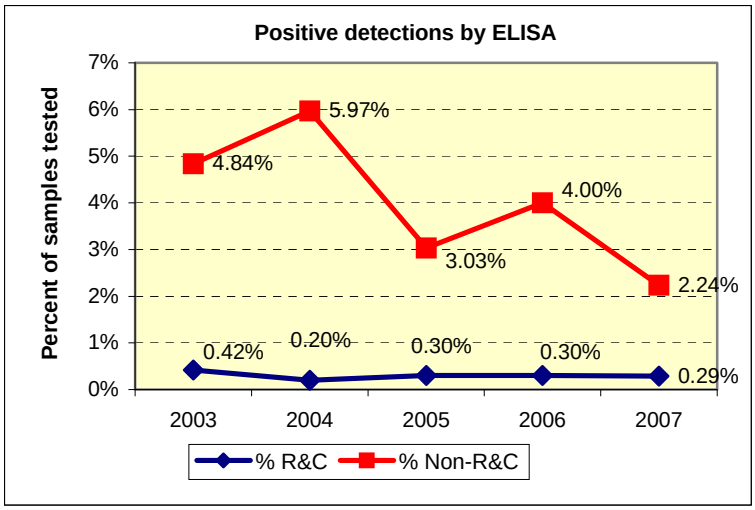
Thirty-three nurseries participated in the program in 2007. Grapevine Increase Block plantings totaled over 1,500 acres, a decrease of 215 acres (12.5%) from the previous year. Grapevine certified blocks (nursery plantings) totaled 393 acres and six greenhouse blocks, a 245 acres (38.4%) decrease from the previous year's 638-acres.

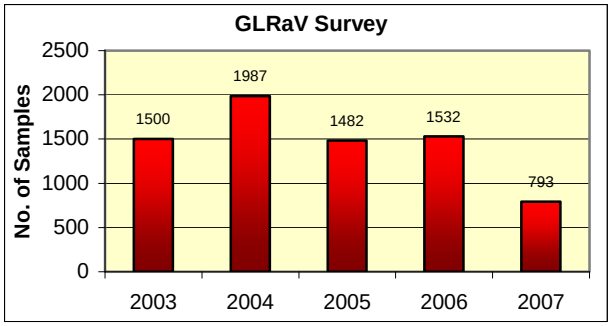
CDFA collected and tested 1,145 composite samples for grapevine fan leaf virus (GFLV). Plants were selected randomly for testing. However, if plants exhibiting typical GFLV symptoms were seen, those plants were also included in the survey. Of the total samples tested, none were positive for GFLV.

In 2007, 793 vines were sampled and tested for grapevine leafroll associated viruses (GLRaV). In total, 48 samples tested positive (6.0%) for leafroll virus-3 in compared with 74 out of 1,523 samples (4.86%) that tested positive in 2006.









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. Eight counties assisted CDFA in trapping by doing non-certified plantings and in some cases, plantings in CDFA's Grapevine R & C Program. There were 1,570 acres and three greenhouses of non-certified plantings. This represented 81 traps deployed in late May and checked over the following six months. There were 1,500 acres and six greenhouses of plantings entered in the R & C programs for 150 traps deployed. Male VMBs were found at twelve locations due to association with nearby vineyards. There was no positive find for female VMB following intense inspections.

Citrus Registration and Certification Program

The Citrus R & C program provides for the testing of propagative source trees for tristeza to meet the requirements of the Citrus Tristeza Quarantine. Other diseases of importance being tested as part of the registration and certification program include exocortis and psorosis. In 2007, 39 citrus nurseries participated in the program. A total of 3,697 citrus seed and scion source trees were sampled and tested for tristeza and other viroids, an increase of 1,088 trees from 2006.

Strawberry Nursery Stock Registration and Certification Program

Eight nurseries participated in the Strawberry Nursery Stock R & C Program in 2007. The strawberry program differs from other registration programs in that foundation stock is maintained by nurserymen in their isolated plantings rather than by the Foundation Plant Service of the University. Strawberry plants in foundation plantings are index-tested annually using *Fragaria vesca* and *Fragaria 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 index-tested 5,630 foundation plants at the Department's greenhouse facility in Sacramento; a 23 percent increase was seen over the previous year. Forty-six plants that were indexed tested positive for viruses and were rejected from the program. CDFA staff visually inspected over 755 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 2007, CDFA staff inspected and registered over 1,980 trees as propagative source trees. Over 24 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 2007. A total of 297 acres were inspected and registered, a decrease of 21 acres (6.6%) from 2006.

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. The FPS carries out activities related to the development of planting materials for pome and stone fruit trees, nut trees and grapevines; and subvent the costs to carry out Department programs concerning the registration and certification of pome and stone fruit trees, nut trees and grapevines. The assessment is collected with the nursery license renewal. In 2007, the total assessment collected on gross sales of fruit trees, nut trees and grapevines was $1,150,000, a 14 percent increase over the collection of $1,335,000 in 2006.

In 2007, the IAB approved funding for 11 research proposals totaling $223,389, funding of Foundation Plant Services in the amount of $471,278 and payment to the Nursery Program to subvent R & C activities in the amount of $324,308. The total budget approved was $1,053,975. As revenues still remain low relative to the past five years, the Board recommended a lower level of funding for research, the Foundation Plant Service (University of California, Davis) and the CDFA R & C program.

SEED SERVICES

The Seed Services Program administers the seed law enforcement throughout California and is funded entirely through an annual assessment on the value of agricultural, vegetable, and grass seed sold in California. The county agricultural commissioners conduct the program, while the Seed Services staff evaluate enforcement activities, collect seed samples for compliance monitoring and assist county inspectors with enforcement activities. The staff of the Seed Services Program also interacts with industry representatives, agricultural departments in other states, the United States Department of Agriculture, and the California Crop Improvement Association (the authorized state seed certification entity). An advisory board of nine seed industry members and two public members provides oversight of the Seed Services Program for the Department.

The value of seed sold for planting in California exceeded $433 million in 2006/07, an all-time high. The total number of firms registered to sell seed in California decreased from 438 in 2005-06 to 416 firms in 2006-07.

The expenditures by the Seed Services Program for 2006/07 were $1,194,444. Significant program expenditures were the funding of the Department's Seed Laboratory ($362,352), the Seed Biotechnology Center at UC Davis ($200,000) and the Seed Subvention contracts paid to agricultural commissioners ($120,000). In order to cover these expenses, the Seed Advisory Board recommended an assessment rate of $0.32 per hundred dollars of gross sales in California during the reporting period. The funds generated by the current assessment rate are adequate to cover expenditures in 2007. Recent emphasis on the production of crops for biofuel is expected to result in more seed sales and increased collections from the assessment on seed sales.

The subvention to county agricultural commissioners for the enforcement of the California Seed Law remains at the maximum of $120,000, provided annually by law. The voluntary program uses annual performance measures to establish the funding for each county. The commissioners are required to maintain an 85 percent compliance level of all seed offered for sale or labeled in their respective counties. In 2006-07, county personnel evaluated 4,681 labels of seed offered for sale. In addition, 2,662 unique labels of seed lots from out-of-state were also inspected by county staff for compliance to the California Seed Law.

The Seed Services Program also administers an alternative dispute resolution process for farmers and labelers disputing over seed performance. Participation in conciliation and mediation are a mandatory prerequisite before pursuing legal remedy in court. In 2006-07, the Seed Services Program received five inquiries about possible seed complaints. No formal seed complaints were actually filed.

CDFA agricultural biologists stationed throughout the state continue to conduct a compliance monitoring program and collected over 600 seed samples. The samples were analyzed by the CDFA Seed Laboratory in Sacramento. An analysis of the laboratory results revealed that greater than 92 percent of the samples were in compliance with the California Seed Law, while only 8 percent were found to be out of compliance. Of the non-compliant samples, only 14 percent were misrepresenting germination by a slight amount, while the remaining 86 percent had slight misrepresentations of the percent purity.

The Seed Services Program has increased its efforts to prevent violations of the Plant Variety Protection Act (PVPA). New inspection forms were developed to assist inspectors in the identification of PVPA violations. The Seed Services Program will work with the Federal Seed Regulatory and Testing Branch to implement additional measures that insure seed sold in California does not violate the Plant Variety Protection Act.

QUALITY COTTON PROGRAM

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 40-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 an extensive multi-location cotton variety-testing program. The Board meets at least five times a year to review 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.

In 2007, the San Joaquin Valley experienced above normal temperatures in March, and most of the cotton acreage was planted before April. This helped get the cotton crop off to an excellent start. Acala and Pima cotton grown within the San Joaquin Valley Quality Cotton District again had exceptional quality, including the highest fiber strength of any cotton grown in the nation.

The USDA estimated that Upland cotton yields (including Acala) in the San Joaquin Valley averaged 1,559 pounds of lint per acre, up more than 32 percent from last year. Pima yields were also high at 1,419 pounds of lint per acre, up 19 percent from 2006. In 2007, CDFA's Pink Bollworm Program reported a huge drop in total cotton acreage in the San Joaquin Valley. Pima acreage was 260,005, down almost 5 percent and Upland acreage (including Acala) was 168,720, down 34 percent from 2006. The total cotton acreage was 428,725, a drop of 99,840 acres. Most experts predict that the acreage will drop more than 100,000 in 2008.

Due to this continued pattern of declining acreage in the San Joaquin Valley, the Board has taken steps to sharply reduce costs in the Program. These steps include:

- Putting forward legislation to reduce the size of the Board
- Eliminating the requirement for tagging all non-approved cotton bales and modules
- Reducing staff in the Program
- Reducing the costs in the Board's Cotton Testing Program.

There is still considerable interest on the part of researchers to develop new cotton varieties in the District. In 2007, nine cotton breeders were approved to conduct research on non-approved cotton in the District. The most promising cotton varieties from private and public breeding programs are submitted to the Board for inclusion in its testing program. Genetically enhanced varieties were widely grown in researchers' test plots and for seed increases. Program staff monitored the planting, harvesting,

ginning, de-linting and marketing of all experimental cotton.

In 2007, one Pima variety and three Acala varieties were approved by the Board to be marketed as SJV Pima and SJV Acala varieties. This increased the total number of approved varieties in the District to 69.

In 2006, the assessment rates for the San Joaquin Valley Cotton District were set by the Secretary, upon recommendation from the Board, at $5.25 per hundredweight of undelinted cotton seed sold or planted within the District. 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.

PEST DETECTION AND EMERGENCY PROJECTS

California Peaches

PHOTO: Ed Williams, CDFA

PEST DETECTION AND EMERGENCY PROJECTS BRANCH

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

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

Values:

- *Leadership in detection and response actions both nationally and internationally.*
- *Timeliness of decisions and actions.*
- *Reliance on scientific soundness in decision making.*
- *Integrity and transparency of policy-making process.*
- *Development and implementation of new technology.*
- *Teamwork, cooperation and communication with other governmental agencies, industry and the public.*
- *Enhancement of quality of life by preventing and eliminating new pest problems.*
- *Environmental stewardship in protecting California's natural resources from the ravages of invasive species.*

The Pest Detection and Emergency Projects (PDEP) Branch's role in the California Department of Food and Agriculture (Department) 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. 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.

Through the early detection of exotic plant pests, the PDEP increases the potential for eradication by limiting the area that needs to be treated. This approach also minimizes the impact on the public and the environment by avoiding large area treatment programs. Consistent with this goal, staff develop 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.

Various pathways into California continue to exist or develop as evidenced by repeated detections of specific pests. A core component of PDEP is to prevent the establishment of exotic pests in California. Due to years of repeated Mediterranean fruit fly (Medfly) infestations in the Los Angeles basin, PDEP implemented a proactive program which uses the continual release of sterilized Medflies in this area. This Medfly Preventative Release Program (PRP) is the largest of its kind in the United States. The success of the PRP in preventing new infestations is evidenced by the longevity of the program, which celebrated its 10 year anniversary in 2006.

ORGANIZATION AND GOALS

The Division of Plant Health and Pest Prevention Service's pest detection and emergency response functions were reorganized into a single branch, the Pest Detection/Emergency Projects (PD/EP) Branch, in March of 1982. The primary responsibilities of the branch are the early detection and prompt eradication of serious agricultural pests from California.

Functionally, branch activities are divided into five components: Administrative/Managerial, Pest Detection, Emergency Projects and Multi-Year Eradication Projects and Ongoing Pest Prevention Programs.

ADMINISTRATIVE/MANAGERIAL

This component provides leadership and supervision and is responsible for decision-making in the formulation of policies and budgets that provide the necessary guidelines, funds, equipment, services and human resources required to implement and operate branch programs.

PEST DETECTION

This proactive component provides the second line of defense against exotic pests through the early detection of new introductions before they become widely established. Despite regulations and best practices to keep exotic pest out of the state, non-native pests invade California. Exotic insect pests have an enormous host range and are difficult and costly to manage once established.

Through early detection, this program is protecting more than agriculture. Limiting the need for pesticide applications protects the environment as the cost and environmental impact of eradication is minimized.

The primary objectives of the statewide detection system are to find:

- Insect pests before they infest one square mile;
- Plant diseases before they exceed one-half of a square mile.

EMERGENCY PROJECTS

Pest eradication programs are conducted following the discovery of an introduced pest species. The primary objective of the emergency project component is to quickly and efficiently eradicate incipient infestations of serious agricultural pests, thereby preventing permanent establishment and subsequent spread in California. Other activities include:

- Preparing specific action plans for unwanted exotic pests;
- Maintaining properly trained and equipped pest response teams situated at strategic locations around the state.

MULTI-YEAR ERADICATION PROGRAMS

Recent detections of some exotic insect pests require eradicative actions over several years due to the biology of the insect. Because there are not effective traps and lures for all exotic pests, when they are detected, there are overlapping generations found (all life stages are present) requiring multi-year eradication projects. These include the red imported fire ant, Diaprepes root weevil and light brown apple moth eradication programs.

ONGOING PEST PREVENTION PROGRAMS

Mediterranean Fruit Fly Preventative Release Program

The Mediterranean fruit fly (Medfly) Preventative Release Program (PRP) is part of California's pest prevention program. Medfly infestations have been periodically detected in California since 1975. After successive years of Medfly infestations (beginning in 1987), trapping activities in 1993 captured 400 adult Medflies in the Los Angeles basin. Ninety-five percent of the Medfly detections were outside the boundaries of the eradication programs conducted in previous years. Clearly, the reactive approach to dealing with Medfly infestations was not working, as new introductions of Medfly continued. The purpose of the Medfly PRP is to prevent the establishment of Medfly colonization by the continuous release of sterile Medflies into the environment. This is a proactive approach to the control and eradication of Medflies in California.

Hawaii Fruit Fly Rearing Facility

The continued success of the PRP is reliant upon an uninterrupted supply of high-quality sterile male Medflies. CDFA's Hawaii Fruit Fly Rearing Facility (HFFRF) is the primary source of sterilized pupae for the PRP and any infestations detected outside of the established release area within the Los Angeles basin.

PEST DETECTION

Statewide Trapping

Early detection of insect pests is accomplished through the operation of a statewide detection trapping program. The Branch administers the statewide detection trapping program through trapping contracts with 48 county departments of agriculture. State personnel conduct trapping in Inyo/Mono, Orange, San Francisco, Santa Barbara, Ventura, Riverside, Santa Clara, Marin, Mendocino, Yolo and Yuba counties.

A variety of trapping and survey programs are used to reach the goal of detecting invasive pests early enough to allow for eradication. PD/EP maintains a trapping network that employs over 122,000 traps statewide, targeting exotic fruit flies, Japanese beetle, light brown apple moth and various target pests, especially exotic fruit flies, gypsy moth and Japanese beetle (Table 1 and Figures 1, 2 and 3).

Table 1. Numbers of Exotic Insect Traps by Trap Type and Lure

Trap Type	Jackson	Jackson	Jackson	McPhail	ChamP	Gypsy Moth	Japanese Beetle
Lure	Trimedlure	Methyl Eugenol	Cuelure	Yeast	Ammonium Bicarbonate	Disparlure	Japonilure, Eugenol, Geraniol
Number of Traps	**27,601**	**21,227**	**19,584**	**20,339**	**4,446**	**20,043**	**9,204**

EXOTIC FRUIT FLY PROGRAM

The California exotic fruit fly detection program is a cooperative effort conducted by PD/EP, the United States Department of Agriculture (USDA) and the California County Agricultural Commissioners. The detection program is designed to detect new introductions of target flies as they occur before they become established breeding populations. The detection program also

supports California's extensive trade markets, both international and domestic, by providing assurance that California's production areas are free from these economically important pests.

The program uses a variety of trap types in combination with several different attractants to target the different species of concern. Statewide, there were over 88,750 exotic fruit fly traps in place for detection monitoring during the peak warm weather period of April – October of 2007 (Table 1).

PD/EP biologists conduct quality control inspections on all trapping programs to ensure that the trapping programs are performing at the desired level. Trap placement, host selection, timeliness of servicings, record keeping and ability to identify target insects are all monitored.

Detection

California is constantly at risk to the introduction and establishment of exotic pest fruit flies because of its unique factors such as a favorable Mediterranean climate, availability of host plants due to agricultural and residential plantings, international trade patterns and culturally diverse population demographics. The magnitude of the risks is shown by the detection results of 2007. There were 79 exotic fruit fly adults representing five species captured in nine California counties in 2007 (Table 2 and Figures 4 through 7). These finds triggered 26 delimitation trapping programs.

Table 2. Exotic Fruit Flies Detected in California During 2007

Pest	County	Number Detected	Total by Species
Anastrepha ludens Mexican fruit fly	Los Angeles	1	6
	San Diego	5	
Bactrocera correcta Guava fruit fly	Los Angeles	2	2
Bactrocera zonata Peach fruit fly	Alameda	1	2
	Santa Clara	1	
Bactrocera dorsalis complex Oriental fruit fly comples	Los Angeles	16	28
	Orange	1	
	Sacramento	2	
	San Bernardino	1	
	San Diego	2	
	San Mateo	1	
	Santa Clara	5	
Ceratitis capitata	Los Angeles	20	41
	Santa Clara	7	
	Solano	14	
		Total	79

Figure 1. Statewide Distribution of Medfly and General Purpose Fruit Fly Traps

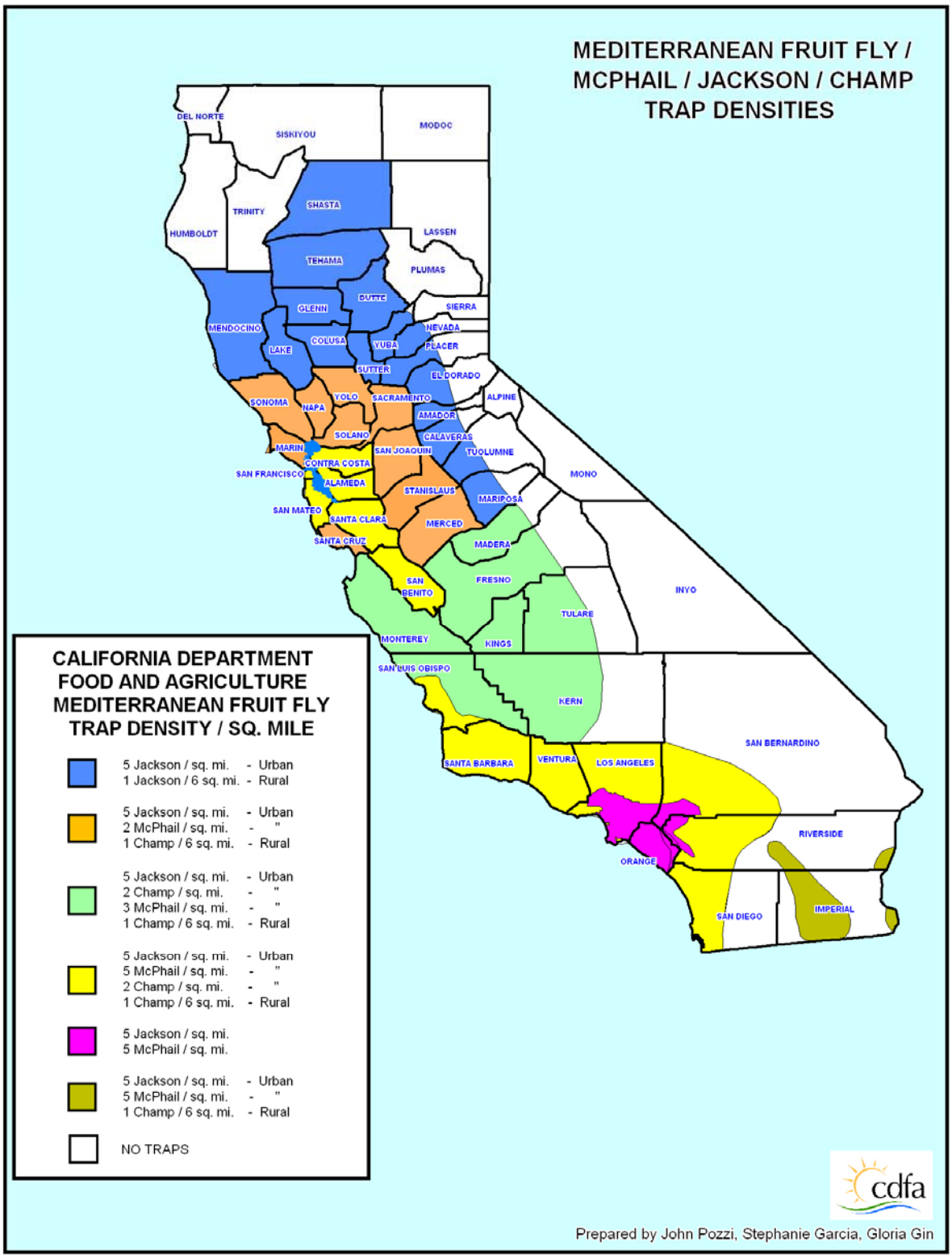


Figure 2. Statewide Distribution of Cuelure and Methyl Eugenol Fruit Fly Traps

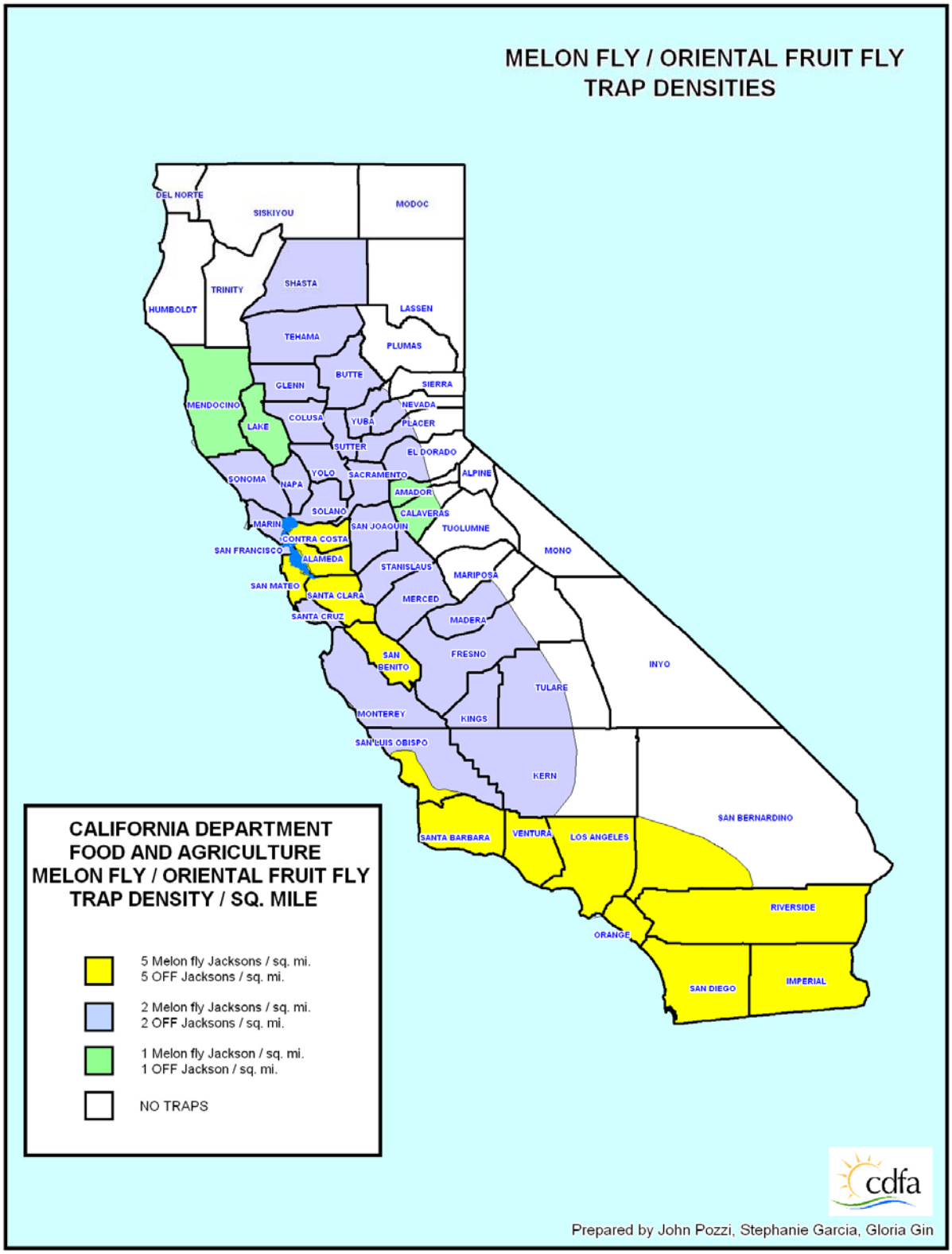


Figure 3. Statewide Distribution of Gypsy Moth and Japanese Beetle Traps.

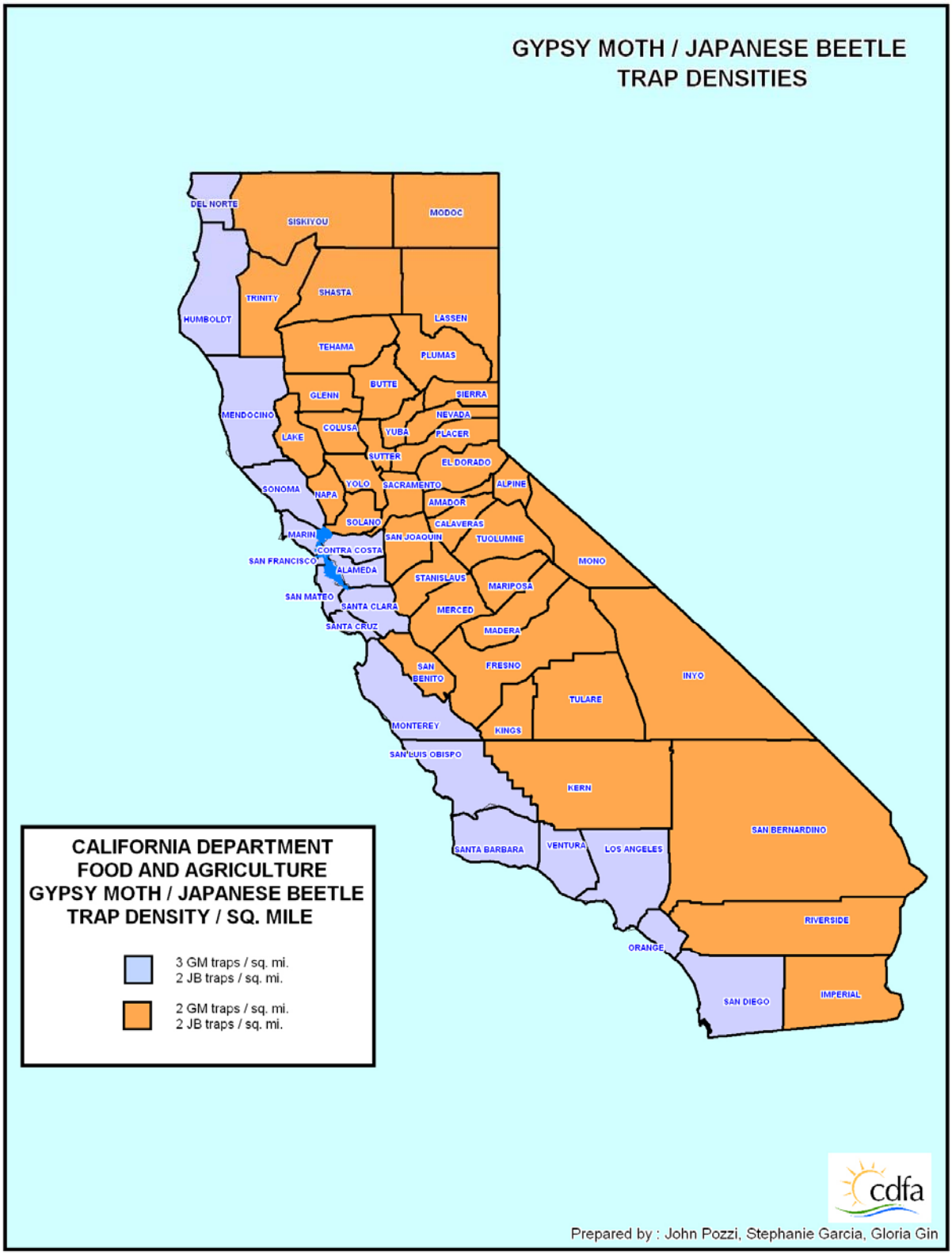


Figure 4. Exotic Fruit Flies Detected in the Bay Area During 2007

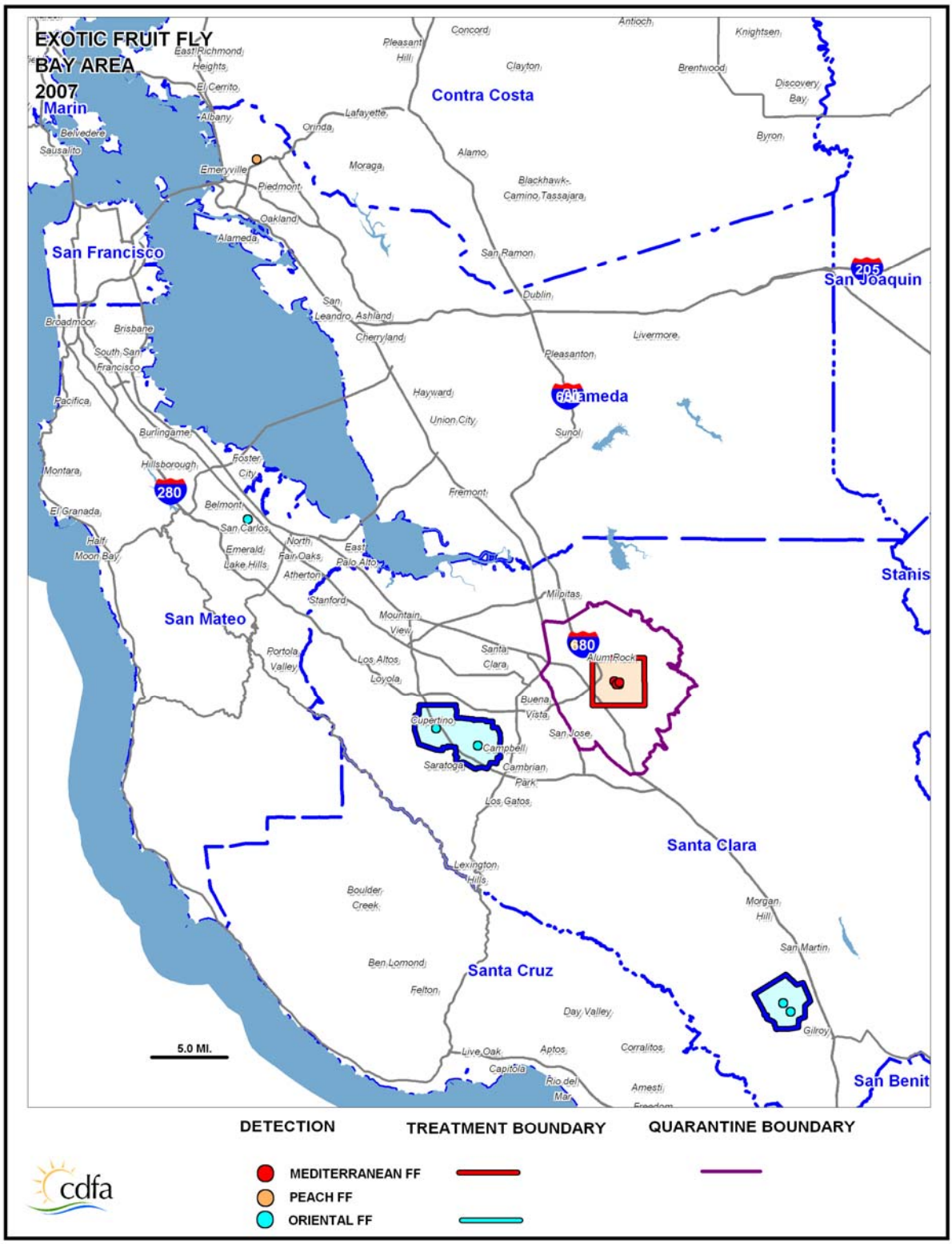


Figure 5. Exotic Fruit Flies Detected in Northern California During 2007

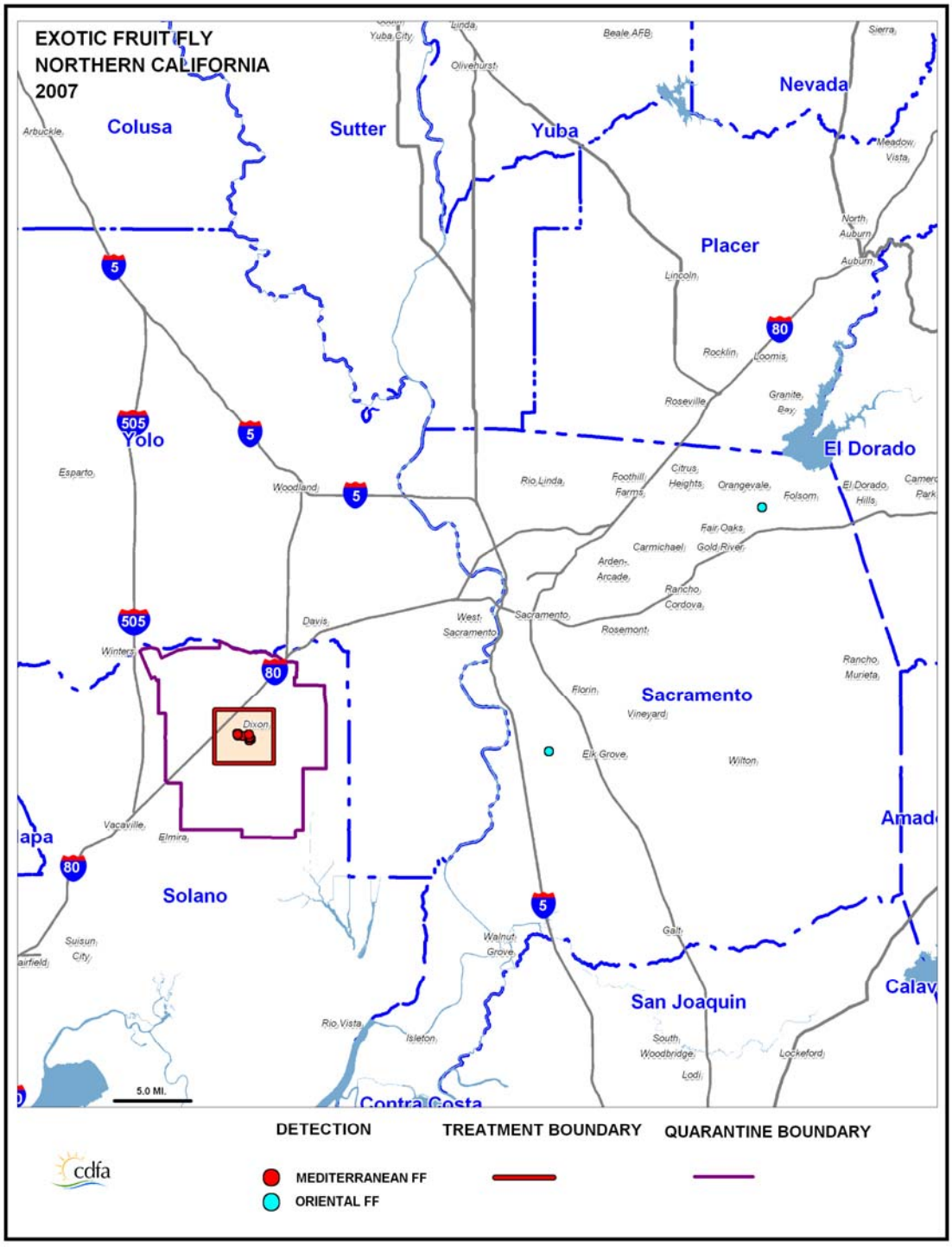


Figure 6. Exotic Fruit Flies Detected in the Los Angeles Basin During 2007

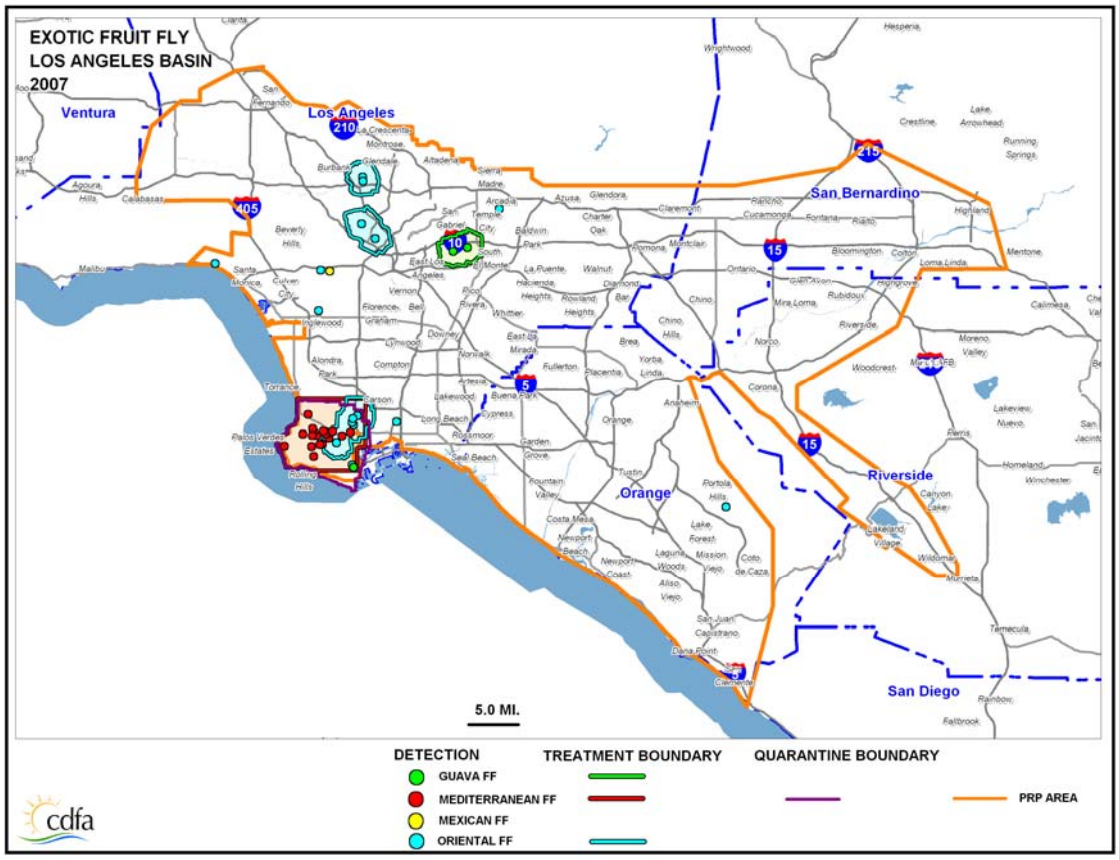
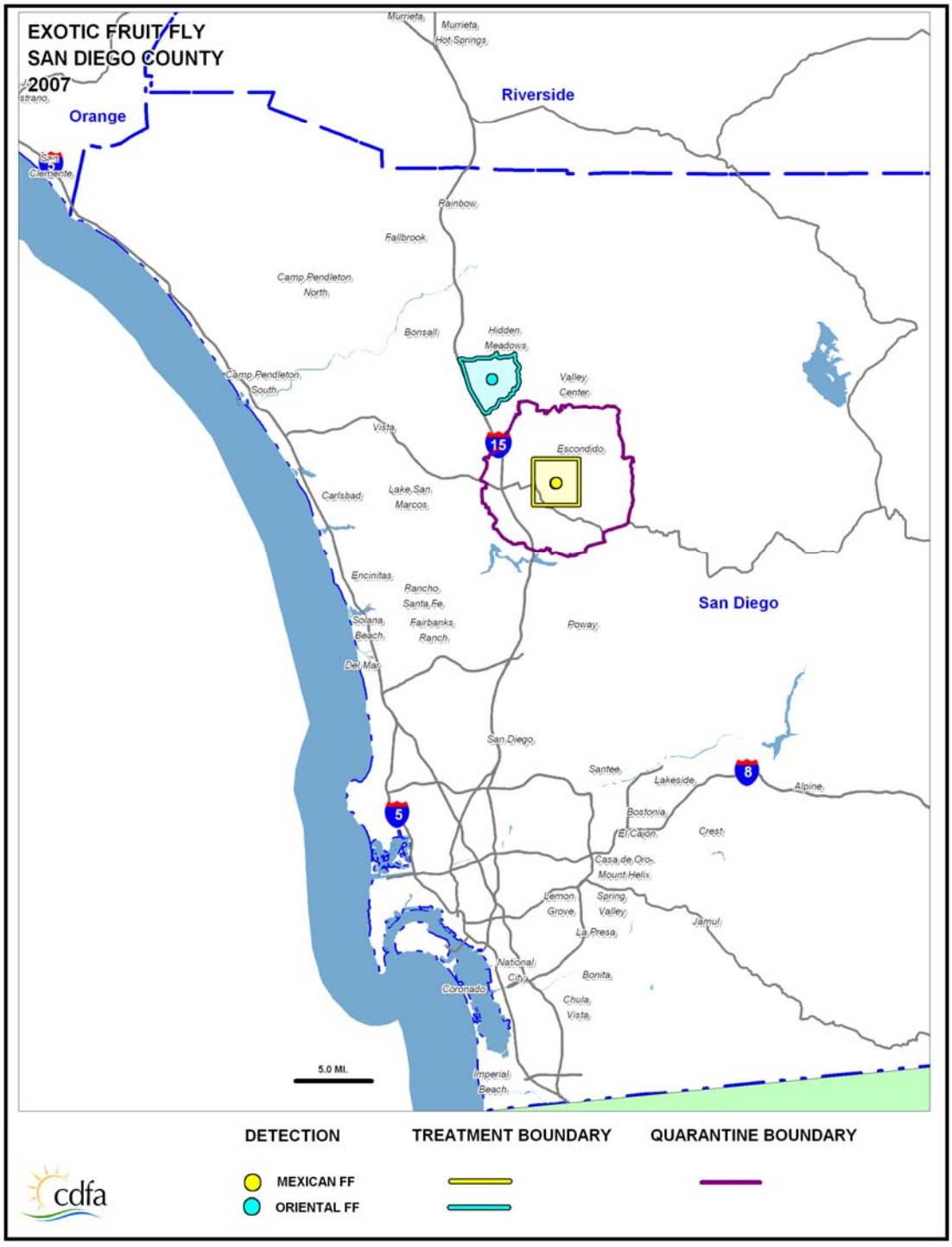


Figure 7. Exotic Fruit Flies Detected in San Diego County During 2007



GYPSY MOTH PROGRAMS

The gypsy moth (GM), *Lymantria dispar* (Lepidoptera: Lymantriidae), is a serious forest and urban pest in Europe and eastern North America. The gypsy moth is currently the most destructive insect attacking hardwood forest and shade trees in the United States. The Asian gypsy moth (AGM) is a race of this species that occurs in eastern Europe and Asia. The AGM is of special concern because unlike the European GM, the female AGM can fly long distances. AGM is not known to be established in North America. CDFA exclusion efforts and PD/EP detection and treatment programs have prevented the establishment of these pests in California.

Detection
During the 2007 season, 20,043 traps were deployed and monitored as part of California's program to detect and delimit new gypsy moth (GM) and/or asian gypsy moth (AGM) infestations. Traps are placed in urban and in rural residential areas of the state where there are 300 or more homes per square mile. Trap density in the 19 coastal California counties is three traps per square mile and two traps per square mile in the remaining 39 counties. California ports receiving shipments from Russia, the Far East and Japan have traps deployed at the rate of 25 traps per square mile for AGM.

This season, nine gypsy moths were trapped (Tables 3 and 4, Figure 8) at seven sites in four counties. All specimens were analyzed for possible AGM identification using the mitochondrial DNA test as well as the FS1 Nuclear DNA test. Two of the finds were identified as AGM. Both AGM were detected in Los Angeles County, in the cities of Los Angeles and Rolling Hills Estates.

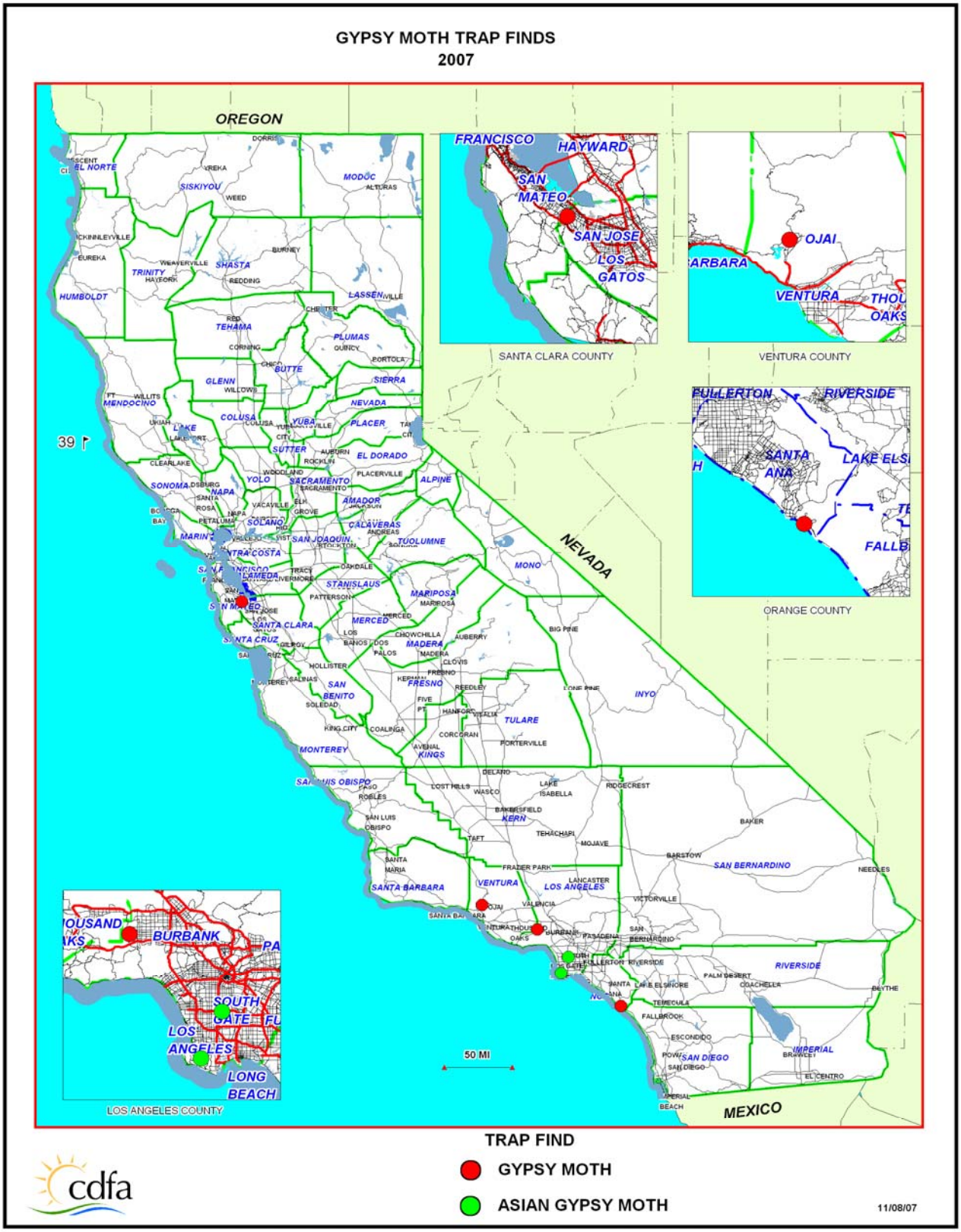
Table 3. Gypsy Moths Detected in California During 2007

County	City	Number Trapped	Egg Masses Detected
Los Angeles	West Hills	1	NA
Orange	San Clemente	1	NA
Santa Clara	Palo Alto	1	NA
Ventura	Ojai	4	0
	Total	**7**	**0**

Table 4. Asian Gypsy Moths Detected in California During 2007

County	City	Number Trapped	Egg Masses Detected
Los Angeles	Los Angeles	1	0
	Rolling Hills Estates	1	0
	Total	**2**	**0**

Figure 8. Gypsy Moth Trap Finds in 2007



For European GM detections, additional traps were placed at the rate of 25 per square mile in a four square mile area surrounding the find sites. For the AGM detections, additional traps were placed at the rate of 25 traps per square mile in a five mile radius around the find sites.

2007 Delimitation Trapping

Due to the life cycle of the GM, two years of negative trapping for the adult GM is required to declare an area free from GM. Therefore, GM detections from the 2006 season were delimited again in 2007. All areas were negative for GM (Table 5).

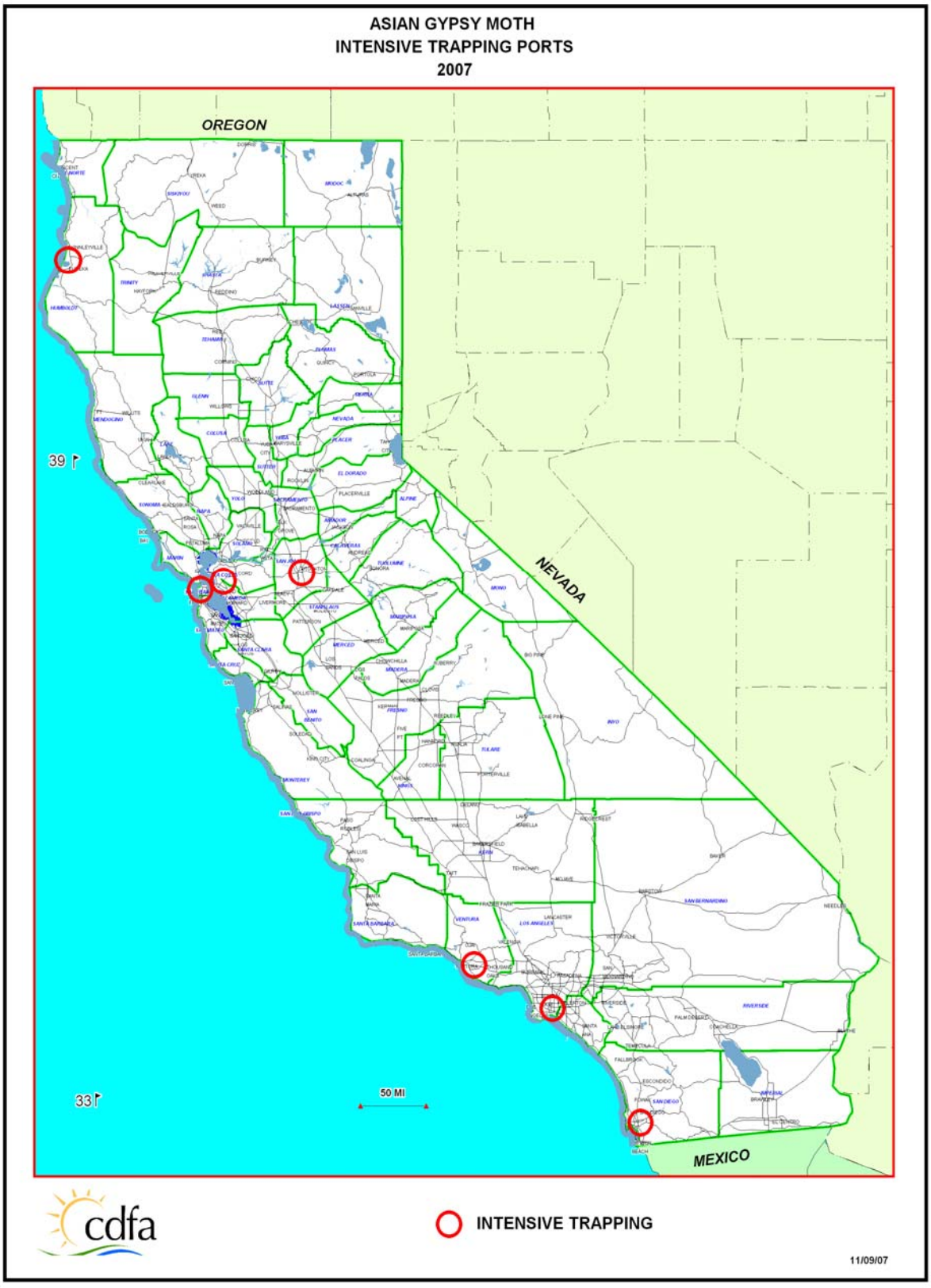
Table 5. Gypsy Moth Delimitation Trapping Results from Detections in 2006

County	City	Number Detected in 2006	Number Detected in 2007
Los Angeles	Highland Park	1	0
	Pasadena	3	0
Marin	Mill Valley	1	0
Orange	Silverado	1	0
Riverside	Corona	3	0
Sacramento	Ida Island	1	0
San Mateo	Portola Valley	3	0
	Half Moon Bay	1	0
Santa Barbara	Montecito	1	0
Santa Cruz	Boulder Creek	1	0
Total		**16**	**0**

High Risk Port Trapping

The ports in Alameda, San Francisco, San Joaquin, Los Angeles, Ventura, San Diego and Humboldt counties were trapped at the density of 25 traps per square mile in a one mile radius surrounding the port. These ports are possible introduction points for AGM because ships arriving from Russia and Asia are often infested with GM egg masses. Scientists believe that while docked, larvae hatch from the eggs and can be blown ashore.

Figure 9. High Risk Port Trapping for AGM



Asian Gypsy Moth (AGM) Delimitation Activities

In response to AGM detections in 2005 and 2006, delimitation trapping for AGM occurred in San Pedro, Santa Ana and Long Beach. Traps were deployed at a rate of 49 traps in the core square mile surrounding the find site, and 25 traps per square mile in a 4.5 mile radius around the find site square mile. Trap results were negative for Santa Ana and Long Beach. In the delimitation array for San Pedro, one AGM was detected in Rolling Hills Estates.

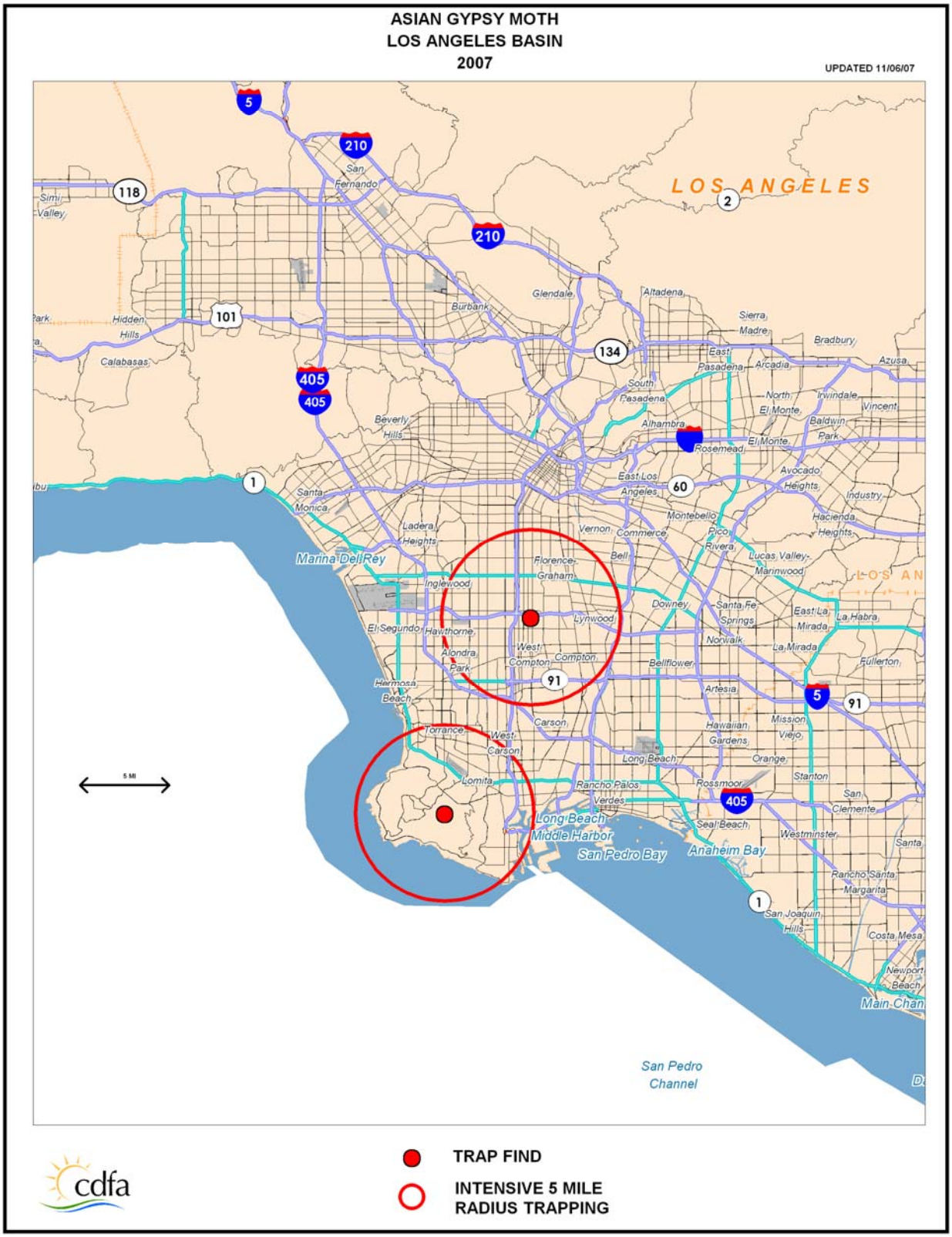
Rolling Hills Estates

A single AGM was trapped in the city of Rolling Hills Estates on July 17, 2007 (Figure 10). This AGM find is three miles west of the 2005 San Pedro find site. Trap density was increased to 49 traps in the square mile surrounding the find site, and 25 traps per square mile in a 4.5 mile radius around the find site. Because the San Pedro intensive trapping array was in place for two seasons before the 2007 find in Rolling Hills Estates, the AGM Science Advisory Panel members believe that this is a separate introduction. No additional moths were trapped in the 2007 season.

Los Angeles

A single male AGM was trapped in the city of Los Angeles on July 19, 2007 (Figure 10). The trap density was increased to 49 traps in the square mile surround the detection site, and 25 traps per square mile in a five mile radius surrounding the find site. Because this find is not near a port, the AGM Science Advisory Panel recommended eradication activities in the spring of 2008.

Figure 10. Asian Gypsy Moth Detections in 2007



JAPANESE BEETLE PROGRAM

The Japanese beetle (JB), *Popillia japonica* (Coleoptera: Scarabaeidae), is a serious pest of turf, crops and ornamental plants. This pest is established in the eastern United States. Every year, adult JB enter California as hitchhikers in airplanes originating from infested areas east of the Mississippi River. The branch prevents the establishment of JB through its aircraft inspection program and the statewide deployment of traps.

Detection

The Japanese beetle detection program has three components: statewide trapping, high hazard trapping and aircraft inspections. In 2007, 9,204 JB traps were deployed throughout the urban and high-risk areas. The trap density for JB detection is two traps per square mile (Figure 3). A high-density trapping array is deployed in a one-mile buffer area around each airport and at transfer/sorting facilities used by air cargo and express mail carriers. There were 22 JBs trapped in proximity to either airports or express mail carrier transfer/sorting facilities (Table 6). One JB was trapped in a residential area.

Table 6. Japanese Beetles Trapped in California in 2007

County	City	Beetles Trapped	Location
Los Angeles	Los Angeles	6	Los Angeles International Airport and sorting facilities
	Long Beach	1	Long Beach Airport
Orange	Costa Mesa	1	Sorting Facility
	Santa Ana	1	Sorting Facility
	Irvine	1	Sorting Facility
	Fullerton	1	Sorting Facility
	Santa Ana	2	John Wayne Airport
Riverside	Riverside	1	March Field Air Base
San Bernardino	Ontario	5	Ontario International Airport
San Diego	San Diego	2	San Diego International Airport
	Vista	1	Residential area
	Total	**22**	

Aircraft Inspections

An intensive aircraft inspection program designed to find and remove hitchhiking JBs before they escape from the aircraft and enter the surrounding environment occurs in the summer, when JB are active. Visual inspections of the cargo and passenger compartments of aircraft originating from states east of the Mississippi River resulted in the collection of 542 JB, of which 33 were alive.

An Inspector looking for hitch hiking JB

Table 7. Number of Aircraft Inspected and Beetles Collected by Airport

County	Airport	Aircraft Inspected	Beetles Collected	
			Alive	Total
Alameda	Oakland International	616	2	148
Los Angeles	Burbank	161	0	7
	Long Beach	120	6	26
	Los Angeles International	1,951	9	129
Orange	John Wayne	328	1	26
Sacramento	Mather	254	0	8
	Sacramento International	127	0	0
San Bernardino	Ontario International	948	9	44
San Diego	Lindbergh Field	1,376	4	139
San Francisco	San Francisco International	748	0	0
Santa Clara	San Jose International	281	2	15
	Total	**6,910**	**33**	**542**

OTHER INSECT SURVEYS

- **European Corn Borer**

European corn borer (ECB), *Ostrinia nubilalis* (Lepidoptera: Pyralidae), 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 are reduced plant vigor leading to subsequent ear drop and stalk lodging.

The branch deployed 186 traps in 12 counties to prevent an introduction of ECB. The 2007 survey was negative for the presence of ECB in California.

- **European Pine Shoot Moth**

European pine shoot moth, *Rhyacionia buoliana* (Lepidoptera: Tortricidae), is a destructive pest of ornamental, Christmas tree and timber pines. In the United States, this insect pest currently infests Wisconsin, Michigan, Illinois, Indiana, Ohio, Pennsylvania, Maryland, Delaware, West Virginia, New Jersey, Connecticut, Massachusetts, New Hampshire Rhode Island, New York, Minnesota, Oregon, Washington and Maine. As a result of the feeding damage, trees will have dead and stunted shoots. Infested trees are bushy and distorted.

The branch inspected 105 traps in 14 counties to protect the state from an introduction of this pest. The 2007 survey was negative for the presence of European pine shoot moth in California.

- **Khapra Beetle**

Khapra beetle, *Trogoderma granarium* (Coleoptera: Dermestidae), is the world's most destructive pest of many stored grains and grain products. The Khapra beetle is not known to occur in the United States. If left uncontrolled, the insect can make the surface of grain storage appear alive with crawling larvae. They not only consume the grain, but may also contaminate it with body parts, which are known to cause adult and especially infant gastrointestinal irritation. Branch entomologists, in conjunction with county staff, deployed and inspected 2,840 traps in 24 counties to guard against an introduction of this pest. The 2007 survey was negative for the presence of Khapra beetle in California.

- **Chrysolina bankii**

Two surveys occurred in San Mateo County for *Crysolina bankii*, a Crysomelid beetle, during the 2007 season. There were no new detections of this beetle.

Visual Surveys

To supplement and expand our detection capacity, the branch also participates in the USDA's Cooperative Agricultural Pest Survey (CAPS). This is a national pest detection program with the goal of providing an early warning system for pest detection and response that is critical for safeguarding our agricultural and natural resources. Typical surveys target exotic and invasive pests and pests of export significance. In 2007, through the CAPS program, PD/EP surveyed for the following exotic pests: Asian gypsy moth, nematodes, citrus canker, citrus greening, cereal leaf beetle and exotic woodboring beetles.

PD/EP staff also participates in the inspection of plant shipments coming into California for diseases as part of the post-entry quarantine program.

COOPERATIVE AGRICULTURAL PEST SURVEYS

Cereal Leaf Beetle Survey

Cereal leaf beetle (CLB), *Oulema melanopus* (Coleoptera: Chrysomelidae), 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 all states east of and including Minnesota, Iowa, Missouri, Arkansas and Louisiana. Branch entomologist conducted sweep net surveys at 134 sites in 10 counties to monitor for this pest. The 2007 survey was negative for the presence of CLB in California.

Woodboring Beetle Survey

This survey is designed to search for potentially harmful woodboring beetles. The Asian longhorn beetle, *Anaplophora glabripennis* (Coleoptera: Cerambycidae), is of particular concern because it attacks a wide variety of hardwoods and it is currently found in two urban areas in the eastern United States. Both traps and visual surveys were employed. The following three lures are used at each trap site, with each one in a separate Lindgren funnel trap: UHR ethanol, UHR ethanol + UHR alpha-pinene and cis-verbenol + Ipsdienol + methyl butenol.

Since the inception of this survey, nine species new to California have been discovered. One species represents a new North American record, the Mediterranean pine engraver, *Orthotomicus erosus* (Coleoptera: Scolytidae), which was found in Fresno, Kern, Madera, Merced and Tulare counties. In 2007, no new species were detected during this survey.

ANNUAL DISEASE SURVEYS

During 2007, no significant plant diseases were discovered through annual detection activities. PD/EP staff participated in three ongoing surveys for citrus commodities, Karnal bunt and potato cyst nematode.

- **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 citrus greening, 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 infested with live Asian citrus psyllid. Of 407 samples submitted to the Division's Plant Pest Diagnostic Laboratory, all were negative for citrus canker and greening.

Table 8. Statewide Citrus Commodities Survey Summary

District	Commercial	Residential	Nurseries	Samples	Results
Northern	456	204	112	75	Negative
Central	47,954	866	67	162	Negative
Southern	17,380	3,087	106	170	Negative
Total	**65,790**	**4,157**	**285**	**407**	**Negative**

- **Potato Cyst Nematode**

The survey aims at the early detection of introductions of the potato cyst nematode (PCN), *Globodera pallida*, into California. This allows the branch and cooperators to respond quickly and effectively, and eradicate the pest before it spreads to large areas of the state. Pest-free samples validates that California is free of PCN, and boosts the confidence of trading partners in California agriculture.

The potato cyst nematode survey was conducted between October 2006 and October 2007. The survey was in response to a request by the potato industry to the USDA for a nationwide survey following the detection of PCN in a potato field in Idaho. The Idaho find marked the first occurrence of PCN in the United States. The USDA holds a federal quarantine against the pest, thus requiring potato producing states to confirm their pest free status.

Survey of California's potato fields was based on the 2006 seed and commercial potato production acreage. In 2006, a total of 39,618 acres in 642 fields were cultivated to production potatoes, while seed potatoes were grown on 661 acres in 24 fields. The current survey plan, developed by USDA, was designed to sample targeted potato fields (100 percent of seed potato and 10 percent of commercial production) one time over a two-year period.

A total of 855 soil samples were processed with no PCN or cysts nematodes of any other species found (Table 9).

Table 9. Potato Cyst Nematode sampling in California during 2007

County	PCN Samples			Results
	Seed Potato	Production Potato	Total	
Imperial	0	52	52	No PCN
Kern	0	104	104	No PCN
Los Angeles	0	24	24	No PCN
Madera	0	8	8	No PCN
Modoc	0	261	261	No PCN
Monterey	0	6	6	No PCN
Riverside	0	48	48	No PCN
San Benito	0	7	7	No PCN
Santa Barbara	39	0	39	No PCN
Siskiyou	0	306	306	No PCN
Total	**39**	**816**	**855**	**No PCN**

- **Karnal Bunt**

Tilletia indica, the causal agent of Karnal bunt of wheat, is a fungal pathogen that infects the wheat seed at the time of flowering. Plant pathologists in conjunction with the USDA and the affected counties performed the survey in eastern Riverside County and in a small portion of Imperial County. During the 2007 wheat harvest, 48 samples were collected from 13 wheat fields. All fields were negative for Karnal bunt in 2007.

Statewide Post-entry Quarantine Program

The Post-entry Quarantine program is a cooperative Federal-State undertaking. By agreement, State plant pathologists and entomologists who have specialized training, perform field inspections of post entry quarantine material. 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 2007, PD/EP staff visited 58 sites in 19 counties, and inspected 488,073 plants from 123 shipments. Following the inspections, 80 lots were released from quarantine.

EMERGENCY PROJECTS

CDFA maintains Action Plans detailing the appropriate emergency responses for the major groups of exotic pests. In conjunction with the Pest Exclusion (PE) branch, the USDA and County Agricultural Commissioners, all cooperating agencies have emergency response roles. PD/EP staff initiates and conducts delimiting trapping, larval survey and treatment activities, while PE, the USDA and the county initiate and enforce interior quarantines. PD/EP staff are trained to oversee and perform required pesticide applications. The rapid response of this combined effort is instrumental to eradication projects. This action minimizes regulatory action to California agriculture and prevents the economic loss to businesses and the public from quarantines. As an example of the effectiveness of these responses, 13 of the 27 delimitations in 2007 resulted in eradication programs, but only four of these became severe enough to require interior quarantines.

ERADICATION PROGRAMS

Oriental Fruit Fly Complex

The oriental fruit fly complex contains several species that are destructive fruit pests. This complex infests over 230 different kinds of fruit. These flies are Asian in origin and two species have become established in Hawaii (*Bactrocera dorsalis*) and northeastern South America (*Bactrocera carambolae*), thereby increasing the likelihood of introductions to California.

There were six eradication programs in 2007 for the oriental fruit fly complex of flies (Table10). No quarantine areas were required for any of these infestations. The primary treatment method for this group of flies is male annihilation, which consists of applying a minimum of 600 methyl eugenol (lure) mixed with an insecticide per square mile every two weeks for two generations of the fly. Eradication has been declared in one of the seven infested areas. The other six eradication projects are still in progress.

Table 10. Oriental Fruit Fly Complex Eradication Projects in 2007

County	City	Number Trapped	Treatment Area Square Miles	Eradication Status
Los Angeles	Monterey Park	2	12.5	Eradicated
	Glendale	2	8.6	In Progress
	Harbor City/ Rolling Hills	6	19.1	In Progress
	Los Angeles/ Echo Park	2	14	In Progress
San Diego	Hidden Meadows	2	10	In Progress
Santa Clara	Cupertino/ San Jose	2	16	In Progress
	Gilroy	3	10	In Progress
	Total	**19**	**90.2**	

MEDITERRANEAN FRUIT FLY ERADICATION PROJECTS

The Mediterranean fruit fly (Medfly), Ceratitis capitata (Wiedemann), is widespread throughout Australia, Central and South America, Europe and Africa. Its distribution in the United States is restricted to the Hawaiian Islands where it was discovered in 1910. With an abundant supply of host fruit in which to lay its eggs, the fly multiplied rapidly in Hawaii, seriously reducing the yield and quality of many crops such as mango, guava, avocado, papaya, coffee, peach and persimmon. Worldwide, the Medfly has been recorded infesting over 250 different types of fruits and vegetables. A great number of crops in California would be threatened by the introduction of this pest including apricot, avocado, grapefruit, nectarine, orange, peach and cherry. Fruit that has been attacked may be unfit to eat; larvae tunnel through the flesh as they feed. Decay organisms enter, leaving the interior of the fruit a rotten mass. It has been estimated that the permanent presence of this pest in California would result in yearly losses of over $1.3 to $1.8 billion in crop damages, additional pesticide use and quarantine requirements.

In 2007, three Medfly infestations were detected in the state (Table 11). All three infestations resulted in eradication projects involving delimitation trapping, larval survey, eradication operations and the establishment of quarantine areas. The infestations were detected in Dixon (Solano County), San Jose (Santa Clara County) and Rolling Hills (Los Angeles County).

In all three infestations, 200 meters around each Medfly detection site was treated with Spinosad for one life cycle, sterile Medflies are released weekly and staff cut fruit to look for Medfly larvae. In Rolling Hills and Dixon, fruit infested with Medfly larvae was removed from 100 meters around each larval detection site.

Dixon Medfly Infestation
A Medfly infestation was detected in Dixon on September 10, 2007. To date, 14 adult Medflies and one larval property have been detected in this area. In addition to the Spinosad treatments, sterile Medfly release began on September 22, 2007, over 13.5 square miles. Sterile Medflies are released at the rate of 250,000 flies per square mile each week. The sterile release will continue through two life cycles followed by one life cycle of high density trapping. Eradication will be declared following one life cycle of trapping with results that are negative for Medfly, currently projected to be August 18, 2008.

San Jose Medfly Infestation
Another Medfly infestation was detected on September 18, 2007, in San Jose. A total of seven adult flies were trapped in this area. In addition to the Spinosad treatments, sterile Medfly release began on October 12, 2007, over 10.8 square miles. Sterile Medflies are released at the rate of 250,000 flies per square mile each week. The sterile release will continue through two life cycles followed by one life cycle of high density trapping. Eradication will be declared following one life cycle of trapping with results that are negative for Medfly, currently projected to be August 12, 2008.

Los Angeles Medfly Infestation
On October 24, 2007, a single Medfly was trapped in Rolling Hills. By December 31, a total of 20 wild Medflies and one larval site were detected in the Rolling Hills/Rancho Palos Verdes area of Los Angeles County. Foliar ground treatment was initiated for 200 meters around each find site. Additionally, sterile Medfly release began on October 27, 2007, at a rate of 250,000 Medflies per square mile per week. As more Medflies were detected, the release rate was increased to 500,000 per square mile per week. The release area started at 15.12 square miles and was expanded several times as new Medflies were detected. Currently, the release area is 54 square miles. The sterile release will continue through two life cycles followed by one life cycle of high density trapping. Eradication will be declared following one life cycle of trapping with results that are negative for Medfly, currently projected to be August 19, 2008.

Table 11. 2007 Mediterranean Fruit Fly Eradication Projects

County	City	Number Trapped	SIT Area *Square Miles*	Properties Under Treatment	Fruit Cut *Pounds*	Fruit Removed *Pounds*
Los Angeles	Rolling Hills Palos Verdes	20	54	1,011	1,327	2,005
Santa Clara	San Jose	7	10.8	532	895	0
Solano	Dixon	14	13.5	457	933	3,955
	Total	**41**	**78.3**	**2,000**	**3,155**	**5,960**

- **Mexican Fruit Fly**

The Mexican fruit fly (Mexfly), *Anastrepha ludens,* is a pest of citrus, mango, avocado and a variety of other fruits in many parts of Mexico and Central America. A large number of commercially produced crops in California would be threatened by the introduction of this pest, such as peach, pear, avocado, grapefruit and orange.

In 2007, the Mexfly was declared eradicated from Jefferson Park, Los Angeles County. This concluded the program that was initiated on October 20, 2006.

A second Mexfly eradication program began in Escondido, San Diego County (Table 12), when five Mexflies were detected on November 6, 2007. Foliar ground treatment with Spinosad was initiated for 200 meters around each find site. The release of sterile Mexflies began on January 3, 2008, at a rate of 750,000 Mexflies per square mile per week. The sterile release will continue through two life cycles followed by one life cycle of high density trapping. Eradication will be declared following one life cycle of trapping with results that are negative for Mexfly, currently projected to be July 19, 2008.

Table 12. 2007 Mexican Fruit Fly Eradication Projects

County	City	Number Trapped	SIT Area *Square Miles*	Properties Under Treatment	Fruit Cut *Pounds*	Fruit Removed *Pounds*
Los Angeles	Jefferson Park	4	18	391	NA	NA
San Diego	Escondido	5	14	87	317	NA
	Total	**9**	**32**	**478**	**317**	**NA**

- **Japanese Beetle**

In 2006, two male Japanese beetles were trapped in the same trap in the city of Vista. Due to the biology of the JB, in 2007, delimitation traps were placed in the same area. On June 18, 2007, a single mated female JB was trapped on the same property as the 2006 detection. This was a strong indication that a breeding population of JB existed in the area, initiating an eradication project. Five foliar ground treatments with carbaryl were applied in a 200-meter radius around the find site. To eradicate the larval stage of the JB, a soil drench was applied with imidacloprid in a 50-meter radius around the find site. Eradication will be declared following two years of negative trap results.

MULTI-YEAR ERADICATION PROJECTS

Red Imported Fire Ant

The red imported fire ant (RIFA), *Solenopsis invicta* (Hymenoptera: Formicidae), is a venomous pest in both urban and rural environments in the southeastern United States. RIFA forms large colonies in soil that are composed of thousands of biting and stinging workers. This species displaces native ants and through its venom, can inflict severe toxic symptoms on both animals and people. The branch maintains eradication and regulatory programs against infestations in the Central Valley and parts of southern California.

Northern California – Fresno and Bay Area/Delta Districts

Survey Activities

The most prevalent pathway for entry of RIFA into the Central Valley has been via infested bee hives which are brought into the state for almond pollination. Survey plans for the Central Valley concentrate on sampling almond orchards using Spam® bait stations along paths through and around the orchards where bee colonies are placed.

Three new and very small infestations were detected in Merced County. In October, a large infestation was found near a preexisting site in Chowchilla. A follow-up visual survey was initiated and to date over 2,800 acres are now considered infested.

Fresno District
The focus of the 2007 survey was to finish the delimitation survey in Madera County, conduct perimeter survey around almond orchards in Fresno County that had received RIFA infested beehives during the preceding winter, perform general survey of almond orchards in Madera and Kern counties and complete the post-treatment surveys (PTS) in Fresno County. Most of the goals for this season were achieved. The delimitation of infested fields in Madera and Chowchilla were both completed and some general survey was conducted in Kern and Madera counties. There were no PTS surveys in Fresno County in 2007.

Bay Area/Delta District
Two of the ongoing infestations in the district, Ballico and Turlock, continued to grow in 2007. A total of 1,520 acres of almonds were surveyed in Merced, San Joaquin and Stanislaus counties. Two new infestation sites were found in Manteca and Snelling.

Treatment Activities

Acreage requiring treatment for RIFA increased from 7,247 at the end of 2006, to 10,145 in 2007. At the Chowchill site in Madera County, crews detected 19 new fields positive for RIFA and during PTS, one field was positive for RIFA. The Turlock site in Stanislaus/Merced counties and the Ballico site in Merced County continued to grow in treatment acreage. Two new locations in 2007 included the Manteca site in San Joaquin County and the Snelling five sites in Merced County (Table 13). All orchards or residential properties were treated with Clinch®, Esteem®, or Extinguish®.

Table 13. Status of RIFA Infestations in Northern California at the end of the 2007

County	Location	Number	Original acres Infested	Acres Under Treatment	Status
Fresno	Kerman # 3 (2002)	33	120	120	Treated
	Clovis (2000)	18	75	1	Monitored
	Wasco (2006) Plastic Recycler	43	5	5	Treated
Madera	Chowchilla (1-5)		6,009	5,767	Treated
	Madera 1 (2002)	29	139	139	Treated
	Madera 2 (2005)	41	200	200	Treated
	Ballico (1-3)		2,842	2,732	Treated
Merced	Hopeton # 3 (2002)	27	160	160	Monitored
	Snelling # 1 (2001)	22	2,673	40	Treated
	Snelling # 2 (2002)	24	721	416	Treated
	Snelling # 3 (2002)	30	8	0	Monitored
	Snelling # 4 (2005)	40	3	0	Monitored
	Snelling # 5 (2007)	45	121	121	Treated
	Gustine (2002)	31	240	0	Monitored
	Turlock #1 (2006)	42	276	276	Treated
San Joaquin	Manteca	44	190	190	Treated
	Hickman # 1 (2000)	14	999	0	Monitored
	Hickman # 5 (2002)	28	262	0	Monitored
	Turlock #2 (2006)	42	139	139	Treated
	Totals	**389**	**15,182**	**10,306**	

Southern California – Orange, Riverside, San Bernardino and Los Angeles Counties
The RIFA quarantine area remained unchanged in 2007 from its inception in 1999. The established quarantine is 865.5 miles. This encompasses all of Orange County (790 square miles), parts of Riverside (67 square miles) and Los Angeles (8.5 square miles). The quarantines are designed to contain the spread of RIFA, by requiring inspection and treatment of articles (nursery stock, soil, landscaping and beehives) through which the ant can be spread.

Treatments in Orange County and Coachella Valley (Riverside County) were conducted by the County Vector Control Districts, and in Los Angeles County, by the county agricultural commissioner's office.

Regulatory Activities

Regulatory enforcement of the RIFA quarantine was accomplished by issuing compliance agreements with businesses and individuals within the quarantine areas that commercially grow, produce, propagate, handle, store, maintain, ship, transport or process regulated articles and commodities. Establishments that are in the compliance program followed specified treatment procedures necessary to ensure that the commodities intended for movement are free from RIFA.

Program staff issued 545 new compliance agreements in 2007, bringing total establishments monitored to 5,902. Staff inspected the soil at 1,779 sites for construction and swimming pool installation.

In 2007, 56 nurseries completed treatment protocols and were taken out of the positive nursery classification after four consecutive negative surveys. Thirty nurseries were treated (broadcast bait) for RIFA. Currently they are monitored and SPAM® bait-surveyed along with all other nurseries within the quarantine areas.

Grid Survey

Grid surveys of southern California counties continued in 2007. In Orange County, 27 square miles were surveyed and in San Bernardino County, 84 square miles were surveyed. Orange County was negative for RIFA. In San Bernardino County, there was one find site.

Asian Longhorn Beetle Program
Three live adults of Asian longhorned beetle (ALHB), *Anoplophora glabripennis,* were discovered June 16, 2005, inside and outside of a warehouse in Sacramento. As a result, a delimitation visual survey and treatment program were initiated, and continued in 2007. The source of the captured beetles was wooden packing crates from China containing slate tiles.

Visual Survey

Ground crews visually surveyed a nine square mile area and tree climbers, from the United States Forest Service, surveyed host trees within the quarter mile. Two surveys were conducted for the 2007 season from February through November at traceforward warehouses. A total of 12,017 properties were surveyed in the nine square mile zone around the find site. All results were negative.

Diaprepes Root Weevil

The Diaprepes Root Weevil (DRW) is native to the Caribbean region and is a very destructive agricultural and ornamental pest. DRW feeds on more than 270 species of plants from 59 plant families. Because of its broad host range, DRW poses a great threat to citrus and ornamental plant industries in California. Infestations of this pest have been detected in the residential and rural residential environs in Los Angeles, Orange and San Diego counties. To prevent the permanent establishment of DRW in California, the branch initiated an eradication campaign against the DRW in 2006.

Detection Activities

An effective detection tool for the DRW is enlisting the public to help find this pest in their yards. To inform the public about this pest, between January and June 2007, postcards with a picture of a DRW were mailed to residences and businesses in Los Angeles and San Diego counties. Other public outreach efforts included PD/EP staff giving presentations at professional meetings, training sessions and fairs. Public outreach activities resulted in one new infestation detected in La Mirada, Los Angeles County (Table 14).

Table 14. Diaprepes Root Weevil Public Outreach for 2007

County	Resident Call-ins	Properties Surveyed	Number of DRW detected
Los Angeles	1,177	460	1
San Diego	1,529	521	0
Total	**2,706**	**981**	**1**

New Detections in 2007

In 2007, new find sites were detected either through the trapping program, homeowner calls from mass mailers sent by CDFA, landscaper calls or by treatment/trapping crews. These new sites either created new treatment boundaries or expanded existing treatment boundaries.

Table 15. Diaprepes Survey Results in 2007

County	Weevils Collected In traps	Weevils Collected By Visual Survey	New Find Sites
Los Angeles	411	1940	5
Orange	117	111	29
San Diego	1479	1321	207
Total	**2,007**	**3,372**	**241**

Treatment Activities

Treatment occurs when a DRW sample is collected by a regulatory official and identified by a CDFA insect biosystematist. In 2007, 13 new treatment areas were identified and treated.

Table 16. Diaprepes Treatment Report ending November 30, 2007

County	Properties Under Treatment	Properties Treated
Los Angeles	135	791
Orange	382	1,876
San Diego	1,009	3,660
Total	**1,526**	**6,327**

LIGHT BROWN APPLE MOTH

The first recorded detection of the light brown apple moth (LBAM) in North America occurred in February 2007 in Berkeley (Alameda County). The implementation of an increased and extensive trapping array throughout California revealed LBAM infesting residential areas, nurseries, croplands and forests in Alameda, Contra Costa, Los Angeles, Marin, Monterey, Napa, San Francisco, San Mateo, Santa Clara, Santa Cruz and Solano counties (Attachment 1).

To develop an eradication strategy, the United States Department of Agriculture (USDA) assembled a technical working group of subject matter experts from the United States, Australia and New Zealand. Their charge is to provide recommendations on survey methods, mitigation tools and eradication strategies. The TWG provided recommendations for the development of a multi-faceted eradication program involving detection protocols, regulatory actions, treatment strategies and research priorities.

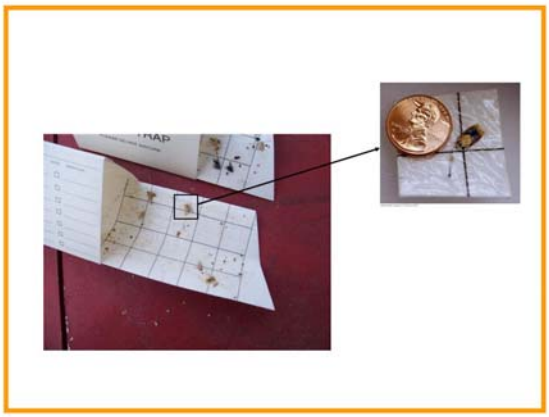
By the spring of 2007, the detection and quarantine measures were firmly established. In the summer, the Department initiated eradication measures. Isolated outlier infestations were treated by ground using an organic insecticide and with twist tie ropes infused with a mating disruption pheromone. Out of 15 areas that were treated by ground, LBAM has been declared eradicated in five areas. The other 10 areas are still under treatment.

To comply with the Federal Domestic Quarantine Order, DA-2007-42, the LBAM Project continues to monitor over 41,000 LBAM traps throughout the state. These traps are strategically and systematically placed targeting commercial, residential, nurseries, croplands and forested areas of the state. Because LBAM has never been detected in California, at the recommendation of the LBAM Technical Working Group, traps were placed within the infested counties to determine the phenology of LBAM in California (Table 17). Finds that are three miles from any other detection site are intensively trapped (delimitation trapping) to determine if an infestation is present. Within 72 hours of the detection, 300 additional traps are placed in a nine square mile area to monitor the LBAM activity in the area.

An inspector servicing a trap.

Table 17. Statewide LBAM Trap Deployment

Trap Type							Total Traps	Total LBAM Trapped
Forest	Phenology	Ports	Delimitation	Nursery	Cropland	Detection		
663	45	37	9,449	4,538	2,548	23,804	41,084	16,280



Light Brown Apple Moth

The results of this trapping effort revealed LBAM infestations in Alameda, Contra Costa, Marin, Monterey, Napa, San Francisco, San Mateo, Santa Clara, Santa Cruz and Solano counties. Single moths detected in Napa and Los Angeles counties were treated and eradicated. An additional single moth was detected in San Luis Obispo County, and is now monitored under a high density trapping array. The rest of the state remains LBAM-free.

Ground Treatment Responses

Because LBAM was not known to occur in California, initially the only pesticide registered for use in the state was an organic formulation of *Bacillus thuringiensis (Bt).* This material is a naturally occurring biological insecticide that attacks the larvae and is commonly used on organic fruits and vegetables. Therefore, in June, the Department began ground treatments with *Bt.* Treatments were applied 200 meters around each of the small outlier infestations every two weeks (Table

By July, a twist tie formulation of the LBAM pheromone was registered in California. This new technology was quickly implemented to replace the *Bt* ground treatments. The twist tie treatment lasts a minimum of three months, thereby requiring fewer visits to each residency. The application of the twist tie treatment is very labor intensive, therefore, this application was reserved for small outlier infestations. Any new outlier infestations are treated with the pheromone-infused twist ties.

To date, five of the outlier infestations have been eradicated and taken out of intensive regulatory restrictions (Table 20).

An inspector deploying twist ties

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A twist tie placed within a host tree.

Table 18. Ground Treatment Results

Area	# of Bt Treatments	# of Properties Treated	# of Twist Ties Deployed	Result
Oakley	3	146	16,977	Eradicated
Napa	3	90	7,134	Eradicated
Danville	NA	NA	11,542	Eradicated
San Jose	NA	NA	7,225	Eradicated
Sherman Oaks	NA	NA	6,155	Eradicated
Dublin	NA	NA	Treatment #1 11,076 Treatment #2 11,126	Ongoing
Dublin	NA	NA	8,033	Ongoing
Pleasanton	NA	NA	9,043	Ongoing
Vallejo	NA	NA	7,900	Ongoing
Vallejo	NA	NA	5,274	Ongoing
Mare Island	NA	NA	6,827	Ongoing
Mare Island	NA	NA	2,851	Ongoing
Vallejo	NA	NA	6,412	Ongoing
Vallejo	NA	NA	8,933	Ongoing
Mare Island	NA	NA	3,132	Ongoing

Trapping data indicates that there are over 500,000 LBAM infested acres that require treatment. The size of the LBAM infestation is too large to treat by ground within a biologically meaningful timeframe. This required the Department to aerially apply mating disruption pheromone in portions of Monterey and Santa Cruz counties.

In September, mating disruption pheromone treatments began in Monterey County, the southernmost infested area. In October, the mating disruption pheromone specific to the LBAM became available. This formulation was applied in Monterey and Santa Cruz counties (Table 3 and Attachment 1) in October and November.

Twin engine King Air-Turbo prop fixed winged aircraft were used to apply the mating disruption pheromone. Aircraft flew at an attitude of 500 to 800 feet above ground level at speeds of 161 to 172 miles per hour. The aircraft are equipped with an Ag-Nav II guidance system. This system uses electronic signals from fixed sources or navigational satellites. Pilots are also equipped with night vision goggles, optimizing their vision during night time operations.

Loading treatment aircraft with pheromone

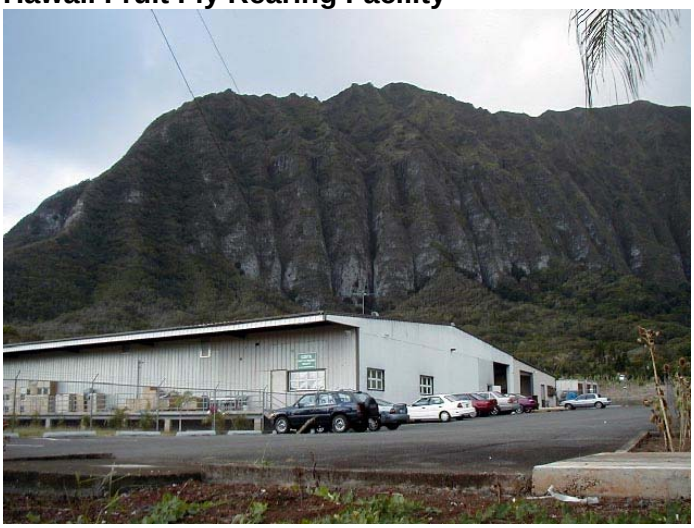
Table 19. Aerial Treatment

Area	Pheromone Treatment #	Treatment Dates	Acres Treated
Monterey	1	9/9/07-9/13/07	38,540
Monterey	2	10/24/07-10/26/07	38,540
Santa Cruz	1	11/8/07-11/9/07	27,350
Prunedale	1	11/9/07, 11/11/07, 11/12/07	13,120
Salinas	1	11/9/07, 11/11/07	9,603
		Total	**127,153**

Trapping and treatment activities will continue in 2008.

ONGOING PEST PREVENTION PROGRAMS

Hawaii Fruit Fly Rearing Facility



The Hawaii Fruit Fly Rearing Facility (HFFRF) provides the Preventative Release Program (PRP) with high-quality sterile Medflies for use in the Sterile Insect Technique (SIT) Program. The facility is located on the island of Oahu approximately 30 miles from Honolulu International Airport. The facility operates seven days a week, 365 days a year. The facility was designed to produce 100 million pupae per week. In 2007, the facility shipped 106 million pupae per week.

During the year, the HFFRF consistently maintained the highest quality control ratings as measured against the other supplier of PRP pupae, the Guatemala/USDA El Pino facility. The three major tests to determine the fly's quality are: emergence (the percent of fully-formed, normal adults emerging from pupae), flight ability (the percent of emerged adult flies capable of flying out of a standardized container), and longevity (the percent of flies that survive a 48-hour period without food and water). Results for 2007 are as follows:

Test	CDFA	Guatemala
Emergence	85.2%	80.7%
Flight Ability	80.8%	71.8%
Longevity	72.5%	62.6%

The tests were performed and measured at the PRP in Los Alamitos and reflect post-irradiated and post-handling quality.

Preventative Sterile Insect Release

The preventative release of sterile Medflies over a 2,489 square mile area of the greater Los Angeles basin is a program crucial to the efforts to prevent the establishment of this pest in California. With a primary mission to prevent the Medfly from infesting the Los Angeles basin, the Medfly Preventative Release Program (PRP), is the largest fruit fly program using the sterile

insect technique (SIT) in the United States. The PRP is a cooperatively funded and administered venture between USDA and CDFA.

The PRP began in July 1996 following a successful two-year area wide release of sterile Medflies to eradicate existing populations of Medflies in the Los Angeles basin. The PRP uses continuous releases of sterile Medflies to prevent Medfly 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, 310 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 air freighted seven days a week, year-round from production facilities operated by CDFA and USDA in Hawaii and Guatemala, respectively. Four days after the sterile Medflies are received as pupae, they are released as adult flies from fixed wing aircraft over the Los Angeles basin.

The basic release rate is 62,500 sterile male flies per square mile per week, with a higher rate of 100,000 being used in a historically high-risk area encompassing a 250 square mile region of central Los Angeles. The typical week features 56 missions flying over 15,000 linear miles to release 200 million sterile Medflies.

To date, the PRP has been highly successful, resulting in a 97 percent reduction in the number of Medfly infestations in the Los Angeles basin since the beginning of the preventive releases. After completing eleven years of the program, a total of 146 billion sterile Medflies have been released during 26,850 flight missions traveling over 6,562,000 linear miles.

CURRENT SIT PROGRAMS

In 2006, the PRP began converting the rearing boxes to the Tower Eclosion System. One tower is equivalent to eight stacks of PARC boxes and only requires 25 percent of the floor space. Due to the space efficiency, the new system has the ability to rear approximately 50 percent more flies than the PARC box system. This allows the branch the flexibility to expand and increase production in the event of Medfly or Mexfly eradication projects. Due to three Medfly eradication projects and one Mexfly eradication project, the PRP increased their production to accommodate these programs.

Tower System

All SIT eradication programs in California are based out of the Los Alamitos facility. In addition to regular releases over the Los Angeles basin, the PRP made eradicative releases over Dixon, San Jose, Rancho Palos Verdes and Escondido.

Table 20. Additional SIT Flights Due to Eradication Projects in 2007

Location	Linear Miles	Flights per week
Rancho Palos Verdes	349	4
Dixon	82	2
San Jose	67	
Escondido	58	3
Total	**556**	**9**

CDFA Exotic Pest Call Management System

The CDFA has an Exotic Pest Call Management System (CMS) in place. This toll-free telephone number is accessible statewide. The goal of the CMS is to provide information regarding current programs to the public with maximum efficiency. A caller may follow a menu driven format to receive information, or the caller has the option to speak to an attendant. This information is recorded by an operator and entered into an Internet database. In 2007, the CMS received 14,900 calls from the public (Table 21).

Table 21. Calls to the Exotic Pest Call Management System in 2007

Pest	Total Calls Received
Asian Gypsy Moth	21
African Honey Bee	16
Avian Health Program	11
Asian Longhorned Beetle	21
Citrus Greening	2
Diaprepes Root Weevil	4,852
Gypsy Moth	73
Guava Fruit Fly	1
Glassy-winged sharpshooter	2
Japanese Beetle	98
Japanese Dodder	214
Light Brown Apple Moth	8,219
Medfly	438
Melon Fly	4
Mexfly	48
Oriental Fruit Fly	54
Other (Non-related)	195
Other (Related)	91
Red Imported Fire Ant	507
West Nile Virus	33
Total	**14,900**

INTEGRATED PEST CONTROL

Point Reyes, California

PHOTO: David Kratville, cdfa

INTEGRATED PEST CONTROL BRANCH

Mission: *To serve the citizens of the State by promoting California agriculture and fostering public confidence in the marketplace through development, implementation and communication of sound public policies on prevention of the damage exotic and harmful plant pests and disease can cause.*

Vision: To be recognized as leaders in the field of integrated pest control.

Values:

- Teamwork of all in achieving the Branch mission.
- Cooperative relationships among agricultural, public, federal, state, county and research groups or institutions.
- Support of research initiatives designed to develop pest control materials and methods.
- Constructive communications and exchange of ideas and information.
- Decision-making based on the best science, technology and common sense.
- Appropriate and timely response to pest problems.
- Effective leadership.

The Integrated Pest Control Branch conducts a wide range of pest management and weed eradication projects in cooperation with growers, agricultural commissioners and federal agencies. This branch manages the biological control and vertebrate pest management functions. Assessments and fees are collected for some program activities and services. The branch 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 their boards: Pink Bollworm, Beet Curly Top Virus, Tristeza; and two committees: Noxious Weed Management Oversight and Vertebrate Pest Control Advisory Committee.

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, potential for migration of BLH's to susceptible crops in the area and 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:

1. 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.

2. Further reduce surviving gravid over-wintering BLH females, prior to egg deposition, once they have concentrated on winter host plants.

3. Selectively treat areas of habitat where a spring population of BLH's has developed preventing migration to crops during late spring and early summer.

During the 2007 season the BCTVCP accomplished the following:

1. Monitored and selectively suppressed over-wintering female BLH populations on winter host plants prior to egg deposition.

2. Located, monitored and selectively suppressed the spring hatch of BLH's prior to maturation and migration into susceptible crops.

3. Assessed the program's success by surveying susceptible crops for BCTV.

4. Mapped all Russian thistle acreage and suppressed high BLH populations prior to dispersal to over-wintering areas.

5. Continued to support and solicit research relative to BLH control, and BCTVCP objectives.

During 2007, using aircraft and ground spray equipment, a total of 26,740 acres was treated with malathion to control BLH populations (Figure 1). The acreage totals for 2007 were below the 10-year treatment average of roughly 70,000 acres (Table 1).

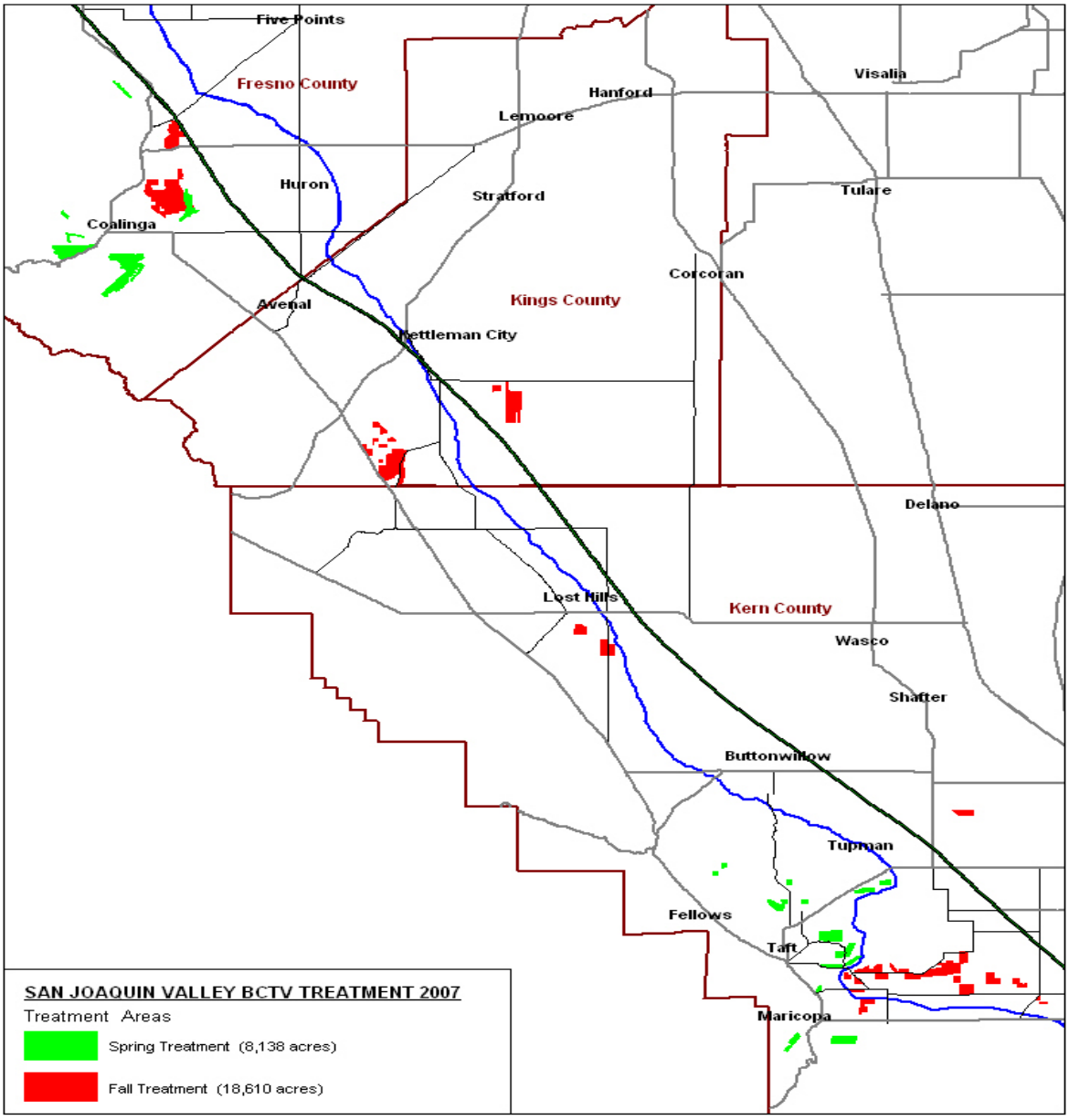


Figure 1. San Joaquin Valley Beet Curtly Top Virus Treatments in 2007, by season.

	SAN JOAQUIN & COASTAL VALLEYS						IMPERIAL & PALO VERDE VALLEYS (Riverside/Imperial Co.)				
Calendar Year	WINTER		SPRING		FALL		All Seasons		YEARLY TOTALS		TOTAL ACRES SPRAYED
	Air	*Ground*	*Air*	*Ground*	*Air*	*Ground*	*Air*	*Ground*	*Air*	*Ground*	
2007	0	0	8,130	800	18,610	240	0	0	26,740	1,040	**27,780**
2006	3,600	0	32,315	160	18,050	480	0	1,840	53,965	2,480	**56,445**
2005	0	0	6,921	800	16,100	0	0	4,510	23,021	5,310	**28,331**
2004	6,600	0	29,820	3,270	10,455	0	0	1,240	46,875	4,510	**51,385**
2003	6,100	0	68,250	2,270	35,500	0	0	1,220	109,850	3,490	**113,340**
2002	20,825	0	92,300	4,540	39,950	240	0	0	153,075	4,780	**157,855**
2001	0	0	57,723	3,764	39,750	1,720	0	1,495	97,473	6,979	**104,452**
2000	0	0	21,375	3,040	42,753	1,330	0	0	64,128	4,370	**68,498**
1999	0	0	12,450	2,872	11,995	1,280	0	0	24,445	4,152	**28,597**
1998	0	0	19,216	640	34,025	1,180	5,900	2,400	59,141	4,220	**63,361**
Totals	**37,125**	**0**	**348,500**	**22,156**	**267,188**	**6,470**	**5,900**	**12,705**	**658,713**	**41,331**	**700,044**
AVERAGE	**3,713**	**0**	**34,850**	**2,216**	**26,719**	**647**	**590**	**1,271**	**65,871**	**4,133**	**70,004**

Table 1. Sugar beet leafhopper/beet curly top virus control program: acres sprayed with malathion in 2007 and proceeding years.

Winter Treatment

Several small storm systems moved through the San Joaquin Valley in December without dropping much rain on the west side of the San Joaquin Valley. The first week of January brought about ¼ inch of precipitation to western Kern County. Most historical over-wintering sites until then were dry and fairly void of host vegetation. Survey during the second week of January on the west side of Fresno County found dry rangeland habitat in the vicinity of Coalinga and north to Big Panoche. Very short grass and newly emerging filaree could be found only in areas where rain had created puddles. Very dry conditions reminiscent of summer were found in the west side of the foothills.

Sugar beet leafhopper (BLH) survey continued through February in the winter treatment area. Below normal precipitation limited development of host plant vegetation and the over-wintering BLH population. Due to small over-wintering BLH populations, there were no winter treatments.

Spring Survey

A winter of below normal rains was responsible for very dry and sparse rangeland conditions on the west side of Fresno, Kings and Kern Counties. Treatment activities in the spring were greatly reduced in some areas. Minimal host plant germination and development was directly impacted by the lack of rainfall under drought conditions. Many west side historical breeding grounds in February and March looked dry and brown as the rangeland normally appears in June (Figures 2 & 3 and 4 & 5).

Figure 2. Kettleman Hills-February 23, 2005
(above normal precipitation)

Figure 3. Kettleman Hills- March 15, 2007
(drought conditions)

Well below normal rainfall on the west side of Kern, Kings, Fresno and Merced counties greatly reduced the development of rangeland and BLH host plants through the winter and early spring. Initial germination of host plants in some areas did not take place until late January. BLH populations were forced from summer host plants in the fall to perennial shrubs such as Atriplex. The BLH population also had to endure a period of very cold temperatures.

In early March, during a brief period of above normal temperatures, BLH nymphs were found emerging in the bottom of Jacalitos Canyon and in the burn area north of Warthan Canyon. BLH populations were small and could only be found where peppergrass and filaree had developed in the bottoms of the ravines. Filaree was found under stress ¼ of the way up the south facing slopes. Plantago could be found but very limited in development. The top ¾ of the south facing slopes were bare. Nymphs of *Aceratagallia* and sharpshooters were also found emerging from the same limited vegetation in the bottoms of the ravines.

In Kern County, low BLH populations were found in historical over-wintering habitat on limited host vegetation through the spring. The spring BLH population was found to be smaller than past years and limited to areas where rains were sufficient to sustain host plants. Large areas of the historical BLH breeding grounds had little to no host plant germination and very few BLH's.

Figure 4. Cantua Creek, April 6, 2005
(above normal precipitation)

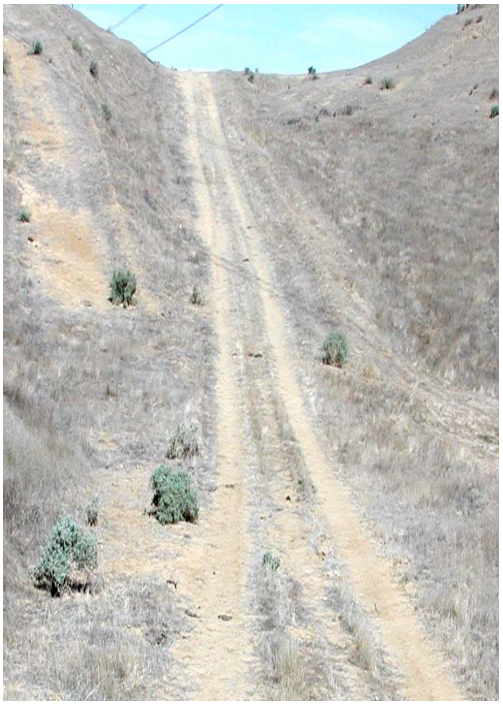


Figure 5. Cantua Creek, March 14, 2007
(drought conditions)

Spring Treatment

During a short spring treatment campaign, approximately 8,130 acres were treated to control BLH populations on the west side of the San Joaquin Valley. BLH development was found to be oriented initially to peppergrass and then fillaree, where host plants could be found. Very little *Plantago* was found developing in the over-wintering rangeland habitat.

Spring treatment activities began in Kern County on April 6 and were completed in one day. A total of 2,340 acres were treated, all at 50 percent coverage due to a blunt-nosed leopard lizard (BNLL) habitat. Included in the treatment acreage was University of California at Riverside test plots. This was the third and final treatment year of testing to determine the potential impacts of Program's pesticide applications to invertebrate prey species of the BNLL.

Treatment activities continued in Fresno County on April 10 and 11. Approximately 5,700 acres were treated in Jacalitos & Warthan Canyons and in a burn area near Phelps and El Dorado Avenues.

Fall Survey

The main objective of summer and fall survey is to locate, monitor and treat high BLH populations developing on summer host plants. Treatment commences prior to the migration of adults to historical winter breeding grounds in the westside foothills. BCTVCP staff surveyed and mapped approximately 60,000 acres as potential for BLH development during the summer on the west side of the San Joaquin Valley. A total of 150 waivers were sent to property owners to obtain permission to perform BLH population checks and to treat if necessary.

Summer BLH populations remained relatively low on the westside of the San Joaquin Valley in Russian thistle, averaging from one to two BLH per single sweep. However, several parcels of rangeland, which burned during the summer of 2006, developed breeding BLH populations early in the season. Both adults and nymphs were found in these burn areas consistently through the summer. Averages were 15 to 20 BLH per sweep. High populations in the Kern

Water Bank developed late in the summer on *Bassia* and Russian thistle. BLH were found developing on the bottoms of the dry recharge basins.

Fall Treatment

A total of 18,610 acres of oilfields, rangeland and cultivated fallow ground were treated in Kern, Kings and Fresno counties in the fall of 2007.

Final contacts and preparations were made in Kern County and the fall treatment campaign started on October 12, 2007. Permission to use an alternative airstrip along Highway 166 was obtained. This strip was located considerably closer to potential treatment areas than the Taft airport.

Aircraft Mixing/Loading Site

The fall treatment campaign began with the treatment of 3,600 acres in the vicinity of Maricopa and Taft. Due to morning fog in southwest Kern County on October 13, 2,850 acres were treated in northwest Kern County and southwest Kings County under more favorable working conditions. BCTV personnel completed fall treatments in Kern County on Sunday, October 14, 2007 with the treatment of 2,270 acres near Taft, close to the Kern County Water Agency. A total of 7,370 acres were treated in Kern County during the first three days.

From October 15 through October 18, program staff treated an additional 11,240 acres in Fresno and Kings counties. Treatment activities were shortened on two separate days due to winds from a low-pressure system and mechanical problems with the aircraft.

Kern Water Bank

Approximately 6,900 acres containing high BLH populations were left untreated within the Kern Water Bank (KWB). The KWB refused permission for treatment based on a request by the United States Fish and Wildlife Service (USFWS). The California Department of Fish and Game recommended denial of access to Conservation Bank lands. USFWS subsequently recommended that CDFA be excluded from the entire 19,000 acre Kern Water Bank. The decision by USFWS could pose a potential risk for higher incidence of beet curly top virus in nearby croplands during future growing seasons.

Reauthorization of Federal Pesticide Use Permit

The Program's five-year Pesticide Use Permit (PUP) was schedule to expire on April 10, 2007. In anticipation of the expiration of the PUP, formal consultation with USFWS was initiated through BLM on August 4, 2006. USFWS's lack of response prompted a BLM follow-up memo dated December 7, 2006 requesting written acknowledgment of the consultation request and specific USFWS contact persons. A USFWS response to the request for consultation was received on February 7, 2007. On February 28, 2007 a meeting was held with USFWS, BLM, California Department of Fish and Game and CDFA personnel to share information requested and discuss the development of a Biological Opinion. The meeting made it apparent there was insufficient time left for the development of a Biological Opinion, nor the reauthorization processes to obtain a reauthorized PUP by April 10, 2007. Due to extreme delays in USFWS's response to the request for consultation, the Federal PUP expired, as scheduled on April 10, 2007. By the first of October, a draft biological opinion had yet to be delivered to BLM. Because there was no PUP, fall treatment activities were not performed on Public Lands. This left approximately 600 acres of Russian thistle untreated in the vicinity of Coalinga.

Research

Dr. Redak from the University of California Riverside completed the final sampling year, of a three-year study to determine the non-target effects of the Beet Curly Top Virus Control Program (BCTVCP) treatments on potential blunt-nosed leopard lizard invertebrate food sources. Final sampling was completed during the spring of 2007. Samples continue to be sorted and animals identified to morpho-species. This is a lengthy process. The identification work was not expected to be complete until October or November 2007. A complete analysis and final report is not expected until the early part of 2008.

Blunt-Nosed Leopard Lizard

Summary

Some individual tomato plants could be found exhibiting Beet Curly Top Virus (BCTV) symptoms following the spring migration. However, the BCTV infection rate was low in the San Joaquin Valley. There were no reports of BCTV infection in the Imperial or Salinas Valleys.

An isolated tomato field east of Kettleman City experienced infection rates from five to eight percent. This field was located 15 east of the Kettleman Hills. Based on the distance, migration of sugar beet leafhoppers (BLH) from spring breeding grounds was not considered to be the source of infection. Rather, it is more likely that a localized BLH population was forced to migrate from host plants due to the cultivation of nearby fields during the early transplant stage.

BIOCONTROL PROGRAM

Key Highlights for the Biological Control Program for 2007 are:

- Foreign exploration for olive fruit fly natural enemies nears completion. To date, two parasites have been approved for release against the olive fly in California. In 2007, Department scientists and cooperators released over 6,300 adults of *Psytallia lounsburyi* and 1,275 *Psytallia* nr. *concolor* (Namibia), the latter species being released for the first time this year.

- Department scientists teamed with United States Department of Agriculture-Animal and Plant Health Inspection Services-Center for Plant Health Science Technology (USDA-APHIS-CPHST), University of California, Berkeley and the University of Adelaide, Australia to begin efforts to develop biological controls for the light brown apple moth.

- Department scientists and cooperators recovered the lygus bug parasitoid, *Peristenus relictus*, from wild vegetation and commercial strawberries on the central coast, which is strong evidence that it is established and spreading.

- Department scientists and cooperators reared, released, and monitored one strain of exotic parasitoids for the vine mealybug in vineyards in the Central Valley. The parasitoids were beginning to establish throughout the vineyards, moving out of the release areas.

- Department scientists and cooperators completed a statewide survey on 147 of the 183 release sites of the rust pathogen of yellow starthistle to determine geographic distribution of its establishment and spread.

- Department scientists and cooperators continued host range studies that expanded the plant host list for the Diaprepes root weevil in southern California. They also organized efforts to explore for better-adapted egg parasitoids in the Caribbean, and began late season releases of one of the egg parasitoids at four release sites in San Diego County.

- Outreach efforts continue. Department scientists and cooperators produced informational brochures on the citrus leafminer and citrus peelminer, and continued to conduct outreach efforts on Gill's mealybug, Asian citrus psyllid, and the Diaprepes root weevil.

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 Fruit Fly

Olive fruit fly is the worst pest of olives to invade California. A single fly maggot feeding in the fruit renders it unmarketable. Through funding provided by the United States Department of Agriculture, Animal and Plant Health Inspection Service, Western Region, the Biological Control Program formed a research team consisting of scientists from the United States Department of Agriculture-Agricultural Research Service (USDA-ARS), the University of California, and Texas A&M University to develop a biological control program against the olive fruit fly.

Figure 1. Woodland of wild olive in Namibia.

CDFA and USDA-ARS scientists have pursued foreign exploration for effective natural enemies of the olive fruit fly in its area of origin and in areas of traditional production, including South Africa, Kenya, Namibia, China, and India. In 2006, scientists returned to Namibia and explored areas not covered in the past. A woodland dominated by wild olive trees was discovered and proved rich in a diversity of olive fly parasitoids (Figure 1). In the neighboring county of South Africa, a cooperating scientist at the University of Stellenbosch shipped several collections of insect-infested olives from several locations in South Africa to the USDA-ARS laboratory in southern France. These exploration efforts resulted in several promising candidates for use as biological control agents against the olive fruit fly in California.

Figure 2. Cage for releasing parasitoids

Cooperators at the University of California, Berkeley and University of California, Riverside (located at the University of California Kearney Field Station), and CDFA made releases of *Psytallia lounsburyi* beginning in October. A second parasite, a new strain of *Psytallia* near *concolor* collected from Namibia, was also released. A total of 6,311 *P. lounsburyi* adult females were released in Butte, Napa, Solano, Sonoma and Yolo counties in fall 2007, over four times the number released last year. In addition, 1,275 *P.* nr. *concolor* (Namibia) were released in California for the first time. Adult parasitoids were released directly into the tree

and some were initially released into field cages (Fig. 2). Recoveries of small numbers of adult *P. lounsburyi* were made from olives in the field cages indicating that the parasitoid survived and developed under California field conditions. Results for *P*. nr. *concolor* are pending.

County, site name	***P. lounsburyi***	***P. nr. concolor***
Butte	264	318
Fresno	1,100	0
Napa	1,383	371
Solano	936	0
Sonoma	1,097	50
Tulare	300	0
Yolo	1,231	536
Grand total	**6,311**	**1,275**

Table 1. Numbers of adult, female *Psyttalia* spp. released in 2007.

Light Brown Apple Moth (LBAM)

Native to southeastern Australia, the light brown apple moth (Figure 3) was found in California in February of 2007. Presently its population distribution is predominantly coastal, extending from Marin County to Santa Cruz County. Efforts were initiated to develop the use of biological control to complement eradication efforts. For this, a team of scientists from CDFA, USDA-APHIS, the University of California, Berkeley, and the University of Adelaide, Australia, was formed. Foreign exploration for light brown apple moth parasitoids in its native range of Australia is underway in cooperation with Australian scientists. Candidate natural enemies will be shipped to the quarantine at UC Berkeley for host specificity studies. In addition to this classical biological control approach, laboratory studies were initiated to examine the use *Trichogramma* egg parasitoids against egg masses of the light brown apple moth. This includes the use of native species of *Trichogramma*, commercially reared and sold in California, to parasitize LBAM eggs in roadsides and residential areas. The objective is to reduce the moth populations that are also being acted upon by the pheromone-based mating disruption measures currently in use.

In August 2007, a light brown apple moth culture was initiated by USDA-APHIS-CPHST at the United States Department of Agriculture, Agricultural Research Service research facility in Albany, CA. By November, the colony had produced three generations and was well established. This colony is being used to determine the potential effectiveness of *Trichogramma* egg parasites, and later will be used to support parasite colonies in quarantine.

Figure 3. Adult light brown apple moth; left: male, right: female

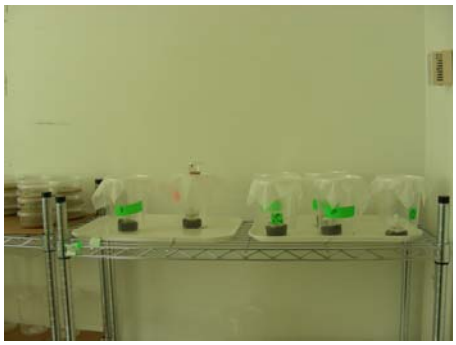


Figure 4(a)

Figure 4(b)

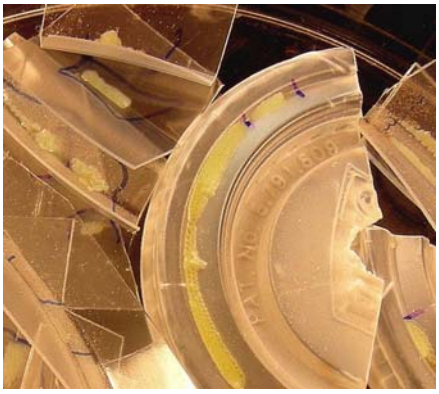


Figure 4(c)

Figure 4(d)

Figure 4. Light brown apple moth colony: a) rearing room, b) food cups for larvae, c) egg masses on sections of plastic oviposition cups, d) oviposition cup for egg production

Lygus Bug (Western Tarnished Plant Bug)

Lygus bug is a serious pest of cotton, strawberries and most other seed crops grown in California. It has developed resistance to traditional insecticides and use of newer, more effective products can cause outbreaks of other pests. Field surveys showed that there are no nymphal parasitoids of the lygus bug in central California. The exotic nymphal parasitoids, *Peristenus relictus* and *P. digoneutis*, were produced in cultures at the Department facilities in Sacramento and released at several locations throughout the strawberry production areas along the central California coast from 2002 – 2006 through a cooperative effort with UC Santa Cruz. *Peristenus relictus* is now permanently established at the first release site (three years of post-release recoveries), and most likely established at the other three release sites. The other parasitoid, *P. digoneutis*, has not been recovered. Numbers of lygus bug in organically-produced strawberries has decreased each of four years since *P. relictus* was first released, providing strong evidence that widespread establishment of this beneficial insect is having a regional impact (Table 1).

Year	#Lygus / 50 Vacs
2003	6.00
2004	2.00
2005	2.56
2006	0.97
2007	0.50

Table 1. Decline in the lygus bug population at an organic strawberry farm in the Monterey Bay Region. Shown are seasonal annual peak values in lygus density.

This is the first time a parasitoid has been reported attacking the nymphal stage of lygus bugs infesting strawberries in California. Strips of alfalfa in commercial strawberries are aiding in the colonization of *P. relictus* on the central coast (Figure 5).

Figure 5. Strips of alfalfa growing between strawberry rows, which serve as an alternate host to the lygus bug parasite *Peristenus relictus.*

Vine Mealybug

The vine mealybug, *Planococcus ficus*, is a serious pest of grape vineyards throughout the grape-growing regions of California. It causes direct damage to the berries, decline in grapevine vigor and vectors leaf-roll viruses. In 2006, CDFA received funding from USDA-APHIS, Western Region, to develop a biological control program against this serious pest. For this, CDFA formed a team of scientists with USDA-ARS, European Biological Control Laboratory, and UC Berkeley. A comprehensive field study using different combinations of exotic parasites was initiated by University of California, Berkeley and CDFA scientists. Work in 2007 by CDFA was directed at field studies on the dynamics of the vine mealybug and the Sicilian strain of *Anagyrus pseudococci*, at two vineyards in San Joaquin County. Field activities included monitoring the density of the vine mealybug throughout the grape growing season (Figure 6), mass rearing and release of the parasitoid and monitoring of the parasitoid's establishment. The density of vine mealybug increased through the season and the mealybugs could be found on all parts of the vine. Approximately 2,200 adult parasitoids were released in the two vineyards from April through October. *A. pseudococci* (Sicilian) parasitoids were recovered from areas of the vineyard outside of the immediate release areas, suggesting that it was beginning to establish. These studies will continue in 2008.

Figure 6. Sampling for vine mealybug and one of its parasitoids in a vineyard.

Diaprepes root weevil

The Diaprepes root weevil, *Diaprepes abbreviatus*, was first found in Southern California in 2005. Research on its biology, phenology and control was initiated in July 2006 near Encinitas in San Diego County and continued in 2007. Adult and egg stages were monitored weekly with traps and visual surveys. Peak densities of adults were found in March and April, and again in August and September with a smaller peak occurring in November. The peak in egg masses coincided with peak adult densities, as expected. Adults could be found feeding from about two feet to as high as 15 feet above the ground. Egg masses were found from two to six feet above the ground. The following plants have been discovered as hosts for Diaprepes in field surveys in California: for adults – India hawthorn, camphor tree, coral tree, hibiscus, macadamia, carrotwood, golden shower tree, golden wattle and powder puff; for eggs – pygmy date palm, India hawthorn, powder puff, olive and privet; for larvae and pupae – loquat, India hawthorn, coral tree and golden shower tree.

Host testing was also conducted in laboratory studies for poinsettia, avocado and grape. Poinsettia was found to be appropriate for oviposition due to the softness of the leaves. The adults did not appear to feed on poinsettia, but did congregate and hide in the flowers (Figure 7). Avocado and grape were found to be suitable for oviposition, adult feeding and larval feeding and development. Diaprepes larvae feeding on avocado and grape developed slower and were smaller than larvae feeding on lemon, but the larvae could complete development on avocado and grape.

Figure 7. Diaprepes root weevil hiding in the flowers of a poinsettia.

Studies on the use of egg parasitoids to control Diaprepes root weevil were conducted in both Florida and California. Two species of parasitoids, *Aprostocetus vaquitarum* and *Haeckeliana sperata*, are currently in culture in a laboratory in Florida and have been made available for release in California. In addition, arrangements have been made with researchers in the Caribbean to ship a third species of egg parasitoid, *Fidiobia dominica*, to cooperators in Florida to establish a laboratory colony. The Caribbean researchers have also agreed to conduct foreign exploration in the hotter and drier parts of their islands for additional species of parasitoids that may attack Diaprepes.

Releases of *Aprostocetus vaquitarum* were made in San Diego County in 2007. Approximately 1,200 adult parasitoids were released at four sites in October and November (Figure 8).

Figure 8. Adults of the egg parasitoid, *A. vaquitarum*.

The wildfires that occurred in San Diego County terminated the release of an additional 500 parasitoids. In the University of California, Riverside, Quarantine Facility, a study was done to verify that *A. vaquitarum* adults would attack Diaprepes eggs from California. The Florida parasitoids did accept Diaprepes eggs from weevils grown in California.

Red Imported Fire Ant

Studies on the ability of the red imported fire ant biocontrol agent, the phorid fly (*Pseudacteon tricuspis*); to reduce densities of red imported fire ant were continued in Lake Elsinore in Riverside County. This beneficial fly attacks the foraging worker ants and reduces the ability of the colony to sustain itself. In May 2007, the Department conducted a visual survey for the flies at fire ant mounds in Lake Elsinore. In November, traps for the phorid flies were made available from cooperators at USDA-APHIS. Trapping was conducted over two weeks at four release sites in Lake Elsinore. No flies were recovered in the visual or trap sampling. The monitoring will continue in 2008 using the visual surveys and traps.

Citrus Leafminer

The citrus leafminer, *Phyllocnistis citrella*, is moving northward from Southern California and can now be found from the southern coastal counties through the San Joaquin Valley. As a part of a cooperative project with researchers at the University of California, Riverside, and the San Diego County Agricultural Commissioner's Office, the Department monitored citrus leafminer populations in three groves in Tulare County and three groves in Kern County with pheromone traps and visual surveys to determine citrus leafminer flight phenology in the San Joaquin Valley and to identify the parasitoids attacking the larvae. In addition, the Department coordinated pheromone trapping at ten sites in San Diego County to determine the flight phenology of the citrus leafminer in the southern coastal areas. The phenology of citrus leafminer varied with location in the state. In San Diego County, adult moths were captured beginning in early March with a peak in trap catches in October. In Kern and Tulare counties, there was a small flight of moths in late February through early March and a peak density in moths occurring from August through October. Citrus leafminer larvae were found in Kern and Tulare counties, with most being found in September through December. No evidence of parasitism was found in Kern and Tulare counties. This study is ongoing.

Avocado Lace Bug

The avocado lace bug was found in San Diego County in the summer of 2004. It has been found solely in urban landscapes and has not been detected in commercial orchards. This pest can occur in devastating numbers in commercial orchards in the Caribbean and has reached pest status in its native region of Florida in the 1990s. However, the Florida outbreak may have been a secondary pest outbreak resulting from mortality of its natural enemies from pesticides applied against other avocado pests. In San Diego, high population densities on residential trees were observed to cause significant leaf damage and leaf drop. A cooperative project between CDFA, the University of California, Riverside, and San Diego counties continued in 2007.

A survey for the avocado lace bug was not conducted in 2007. However, lace bug populations were monitored through detailed monthly sampling at six locations in San Diego County by CDFA and UC Riverside scientists (Figure 9).

Figure 9(b)

Figure 9(a)

Figure 9(c)

Figure 9. a) Nymph and adult avocado lace bugs associated with leaf feeding site, b) close-up of adults, c) population sampling in individual trees.

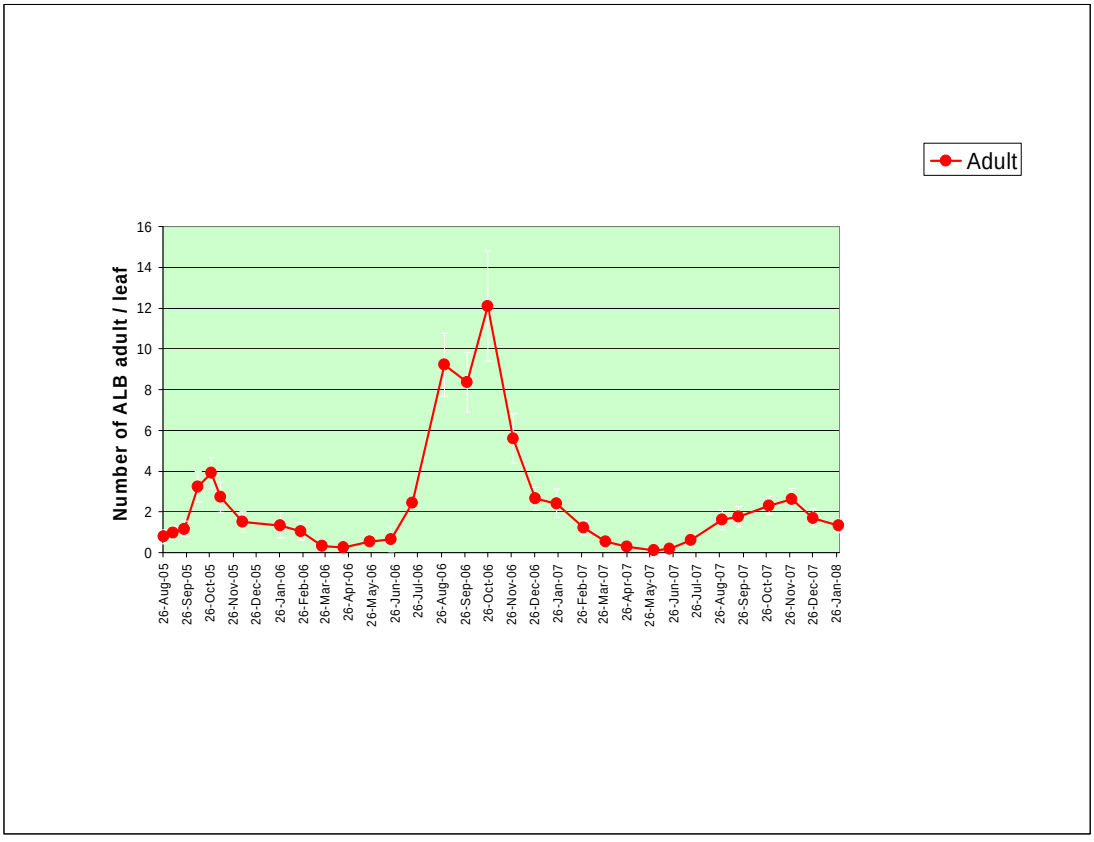


Figure 10. Average number of avocado lace bugs (adults/leaf) from six sites in San Diego County during 2005-07.

Pink Hibiscus Mealybug

In August 1999, the pink hibiscus mealybug was found for the first time in North America in the communities of Calexico and El Centro in Imperial County, California, and in the northern portion of the city of Mexicali, Mexico. Shortly thereafter, CDFA scientists, in cooperation with USDA-APHIS and the Imperial County Agricultural Commissioner's office, established an insectary in El Centro, CA. From this insectary, three species of parasitoids (from Egypt, Pakistan and southeast Asia) were reared (Figure 11) and released throughout the infested area of Imperial County during the next five years (1999-2005).

Figure 11. Left to right: 1) Production of pink hibiscus mealybugs on squash. 2) Mealybug life stages. 3) Parasite rearing cages. 4 & 5) Adult parasites prepared for release

Following these releases, the pink hibiscus mealybug population in Imperial Valley was reduced to less than one percent of its former abundance. Past parasite recovery studies have shown that two parasites, *Anagyrus kamali* and *Gyranusoidea indica*, provided a permanent means of biological control of pink hibiscus mealybug populations without a need for any chemical control applications. Successful control of this mealybug saved many species of ornamental trees and shrubs in the infested communities and prevented the spread of the pink hibiscus mealybug to outlying agricultural areas and other regions of the state. Recently, the pink hibiscus mealybug was found in Florida and Louisiana. As a result, USDA-APHIS again contracted with CDFA to continue production of the parasites for shipment to Louisiana (Table 1). In 2007, the Department produced over 148,000 parasites: 105,400 parasites were shipped to Louisiana for field release and 43,425 parasites were released in Imperial Valley.

Date Sent	Recipient	A. kamali	G. indica
January	Louisiana	3,600	4,400
February	Louisiana		9,400
June	Imperial Valley		3,000
July	Imperial Valley		4,000
August	Imperial Valley		21,925
September	Louisiana	48,000	40,000
September	Imperial Valley	4,000	2,000
October	Imperial Valley	6,000	2,500
Total		**61,600**	**87,225**

Table 1. Production of pink hibiscus mealybug parasites by CDFA in 2007

WEED PESTS

Yellow Starthistle

Department scientists completed a statewide follow-up on previous release sites for the newly approved rust disease, *Puccinia jaceae* var. *solstitialis*, an exotic rust disease introduced to control yellow starthistle. Between 2004-2006, the rust was propagated in greenhouses in Sacramento and released in 183 locations around the state. During this release program, most sites were revisited several times to determine infection rate and establishment. In 2007, 147 of the 183 sites were surveyed to determine the status of the rust. The results show a decline in the persistence of the rust following initial release. Three months following inoculation, the rust was detected at 73 percent of the locations, one year later, the rust was detected at 21 percent of the locations, two years later, the rust was recovered at only 9 percent of the locations and three years following inoculation, 3 percent of the locations showed infection by the rust. The sites where the rust persisted for three years are primarily in coastal counties. These results suggest that the rust may be limited by environmental factors and may not establish in all regions of the state infested with yellow starthistle.

Squarrose Knapweed

Squarrose knapweed is a serious noxious weed of grasslands and pastures in northeastern California. Introduction of three biological control insects has resulted in significant declines in weed abundance in the Big Valley area and adjacent areas of Modoc, Lassen and Shasta counties in northeastern California. In 2007 a remote infestation was discovered on US Forest Service land that was not previously surveyed for this invasive weed. At the request of the US Forest Service, the three biological control agents were released on May 22 and June 17, 2007. This infestation was located in Shasta County near Cassel, CA. Approximately 2,200 of the seedhead weevils, *Larinus minutus* and *Larinus obtusus* were released. Also, approximately 100 *Sphenoptera jugoslavica*, a root-boring beetle, were released on the June release date. The biological control agents were collected from an established nursery site near Pittville, CA.

Salt Cedar

The two species of salt cedar, *Tamarix parviflora* and *Tamarix ramossissima*, have been the target of biological control by the United States Department of Agriculture, Agricultural Research Service (USDA-ARS) in California for the past few years. In 2007, the Crête biotype of salt cedar leaf beetle, *Diorhabda elongata*, became available for distribution throughout California and the first implementation workshop was held on September 5, 2007. Approximately 16,000 were collected at the from the field nursery site in Yolo County and released on salt cedar infestations in Glenn and Tehama counties. Approximately 12,000 were released at two sites in the Stony Creek area of Glenn County and about 4,000 beetles were released at two sites in Tehama County. Additional collections and releases are planned for spring 2008 for other areas of California.

Figure 12. 1) *Diorhabda elongate* salt cedar beetle; 2) *Diorhabda elongate* larvae devouring salt cedar foliage and flowers; 3) *Diorhabda elongate* beetles collected with a sweep net; 4) Cooperator and rancher making a release of the salt cedar beetles

Puncturevine

Puncturevine (*Tribulus terrestris*) has become a major weed pest in mountainous areas of northeastern California because the unusually cold winters in this area kills the biological control agents. In 2005, at the request of the Lassen County Agricultural Commissioner and the Lassen County Agriculture Board, the Biological Control Program began efforts to re-establish *Microlarinus lareynii* (the seed-infesting weevil) and *Microlarinus lypriformis* (the stem-infesting weevil) in this area. The weevils were collected in Tulare County and released at seven sites in Lassen and Shasta counties. The sites were carefully selected in order to assure that the weevils could survive the cold winter temperatures common in those areas. The release sites were surveyed for weevil establishment in 2006 and 2007 and good survivorship was observed in those sites with good overwintering habitat that provided protection to the adult weevils. The results suggested that, if sites are properly selected, the weevils can survive in this part of California and hopefully may able to impact the expanding puncturevine infestations in these areas. Toward this objective, an educational workshop comprising of all aspects of puncturevine control was performed on July 26, 2007, in Susanville, CA. During the workshop, approximately 2,700 puncturevine weevils were distributed to the attendees interested in the biological control of puncturevine and the participants asked to release them at puncturevine infestations in Modoc, Shasta and Lassen Counties. The weevils were divided in lots ranging from 200-300 weevils each. Surveys will be done in 2008 to determine the success of this new implementation effort.

Leafy Spurge

A new biological control program was started in 2007 in a large infestation of leafy spurge located along the Scott and the Klamath rivers in Siskiyou County near Fort Jones, CA. The first set of releases started on June 13, 2007 with approximately 7,000 *Aphthona lacertosa* flea

beetles (Fig. 13) released at five sites along the two river systems. One site, just north of Fort Jones, was selected as a potential nursery site and it received approximately 3,000 flea beetles while the others received about 1,000 beetles each. The flea beetles were mass collected from the Prineville area of central Oregon. A second release of 25,000 flea beetles at the Fort Jones site occurred on June 14, 2004 (Fig. 14) and third release of another 25,000 flea beetles was made in July 18, 2007. The objective is to establish a field nursery site for this beneficial flea beetle in California. Release sites will be monitored for establishment in 2008.

Figure 13. *Aphthona lacertosa* flea beetles feeding on leafy spurge plant.

Figure 14. Mass collection of *Aphthona* flea beetles from a site in southern Oregon.

Geraldton Carnation Spurge

Three experimental releases of the leafy spurge flea beetle were made within a large infestation of Geraldton carnation spurge (*Euphorbia terracina*) at Solstice Canyon in the Santa Monica Mountains near Malibu, CA. Approximately 3,000 *Apththona lacertosa* flea beetles were released at three sites in June 2007. The flea beetles were collected from a population of leafy spurge in central Oregon. Geraldton carnation spurge is quickly becoming widespread in the Malibu area of coastal southern California. This species of spurge has not been a focus of the biological control research but, because it is closely related to leafy spurge, we are testing whether the leafy spurge flea beetle will feed on this invasive weed.

Oblong Spurge

Two experimental releases of about 1,000 leafy spurge flea beetles were made in a population of oblong spurge, *Euphorbia oblongata*, near Sonora in Tuolumne County. The flea beetles were collected from a population of leafy spurge in central Oregon. Oblong spurge is becoming widespread in many areas of the central California foothills and the greater San Francisco Bay area. This species of spurge has not been a focus of the biological control research but because it is closely related to leafy spurge, we are testing whether the leafy spurge flea beetle will feed on this invasive weed.

Public Outreach

The transfer of knowledge of regarding the biological control organisms and the pests they are to control is a critical function of the Biological Control Program. Many talks, lectures, field presentations, training sessions and workshops are performed each year. Most of those attending these workshops are biologists with the county agricultural commissioner's offices but other federal, state and private growers also attend. For example, the statewide distribution of weed biological control agents occurs through oral presentations at field nursery sites (Fig. 15) and through active participation of county biologists in the collection, counting, and packaging of biological control organisms. Afterwards, workshop attendees return to their counties and release the organisms at new field sites. This network of trained county biologists has been very effective in the distribution of biological control organisms throughout California. Educating growers and the general public on what to expect from newly emerging pests and the use of biological controls as part of the management program contributes a great deal to the success of the Department's biological control efforts.

Figure 15: (left) Baldo Villegas demonstrating collection techniques used for mass collecting weed biological control agents during the Modoc County Weed Management Area Weed Tour; (right): Baldo Villegas showing the impact of the various biological control agents that have been released on squarrose knapweed in the Big Valley area of northern California.

During 2007, presentations by Program scientists occurred for the following projects: Diaprepes root weevil, vine mealybug, Asian citrus psyllid, Gill's mealybug, olive fly, lygus bug, citrus leafminer, purple loosestrife, yellow starthistle, salt cedar and puncturevine. In addition, presentations were made to the University of California Master Gardeners, county weed management area meetings, guest lectures at classes held at the University of California, the California State University and several community colleges.

Also in 2007 and at the request of the county agricultural commissioners, the Biological Control Program and the Shasta County Agricultural Commissioner held the Biological Control Field Conference. This was a one and a half day conference held in Redding, CA and consisted of presentations from several scientists from the Biological Control Program, the University of California, and the USDA-ARS, Exotic and Invasive Weed Research Program. This conference received rave reviews and planning for the next conference in 2009 is underway.

Research

Most of the pest organisms worked on by the Biological Control Program are new to California so little information is usually available. As a result, Program scientists perform applied research to obtain the information necessary to develop a successful control project. For many projects, the Program forms research teams with scientists from the University of California and the USDA. As part of these activities, it is critical that the results of this work are published in peer-reviewed books and journals. The following peer-reviewed publications were published in 2007:

Balciunas, J. K. and **B. Villegas**. 2007. Laboratory and realized host ranges of *Chaetorellia succinea* (Diptera: Tephritidae), an unintentionally introduced natural enemy of yellow starthistle. Environmental Entomology 36(4): 849-857.

DiTomaso, J. F., S. F. Enloe, and **M. J. Pitcairn**. 2007. Exotic plant management in California annual grasslands. *In:* M. R. Stromberg, J. Corbin, and C. M. D'Antonio (eds.). *California Grasslands: Ecology and Management.* University of California Press, Berkeley, CA. pp. 281-296.

Fisher, A. J., **D. M. Woods**, L. Smith, and W. L. Bruckart. 2007. Developing an optimal strategy for the rust fungus *Puccinia jaceae* var. *solstitialis* for biological control of *Centaurea solstitialis* (yellow starthistle). Biological Control 42(2): 161-171.

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HYDRILLA ERADICATION PROGRAM

Key developments for 2007 include:

- No hydrilla was found in the Chowchilla River/Eastman Lake system in 2007, and none has been found since 2002. This is the second year of the monitoring phase in the eradication protocol, so no treatments were made for hydrilla this season.

- Hydrilla returned to Clear Lake after being absent since June 23, 2003. Because treatments ended beginning in the 2006 season, its reappearance was expected, but it was still sobering. The crews found 72 “spots” with hydrilla. Most were single plants, but clumps ranged up to a few feet across. The finds fell into 33 treatment areas ranging from 3.5 to 56 acres in size, for a total of 245 acres. Protocol requires treating five acres around an isolated find.

- Surveyors could find no plants for the third year in a row in the Hesseltine Pond/Bear Creek area of Calaveras County.

- No new infestations of hydrilla were found in California this year, while visiting some 364 lakes, ponds and access points along streams, and surveying over 2,100 points in the Sacramento – San Joaquin River Delta.

The Program made good progress in the eradication effort against an infestation of a new invader in California known as the South American spongeplant. That infestation is in Shasta County. However, another infestation was found in July along 23 miles of the San Joaquin

River in Fresno, and a large patch was found in December along the Sacramento River about six miles upstream from Antioch. These new finds challenge whether the Department will be able to contain this new pest.

This report begins with a brief review of the threat that hydrilla poses to the state's waterways, then gives a summary of the Department's authority and mandate to eradicate hydrilla, proceeds with a brief history and overview of the Hydrilla Eradication Program and concludes with program highlights for 2006.

Hydrilla, A Threat to the Water Resources of the State

Hydrilla is an invasive, submersed, non-native aquatic plant that is a threat to water resources of the state. Hydrilla has been called the world's worst submersed aquatic weed. It can reduce water storage capacity of lakes, ponds and reservoirs; impede movement in streams, canals and drains; jam water control structures and choke hydroelectric generators; impede navigation; degrade fish and wildlife habitats; and endanger public health by reducing water flow and producing mosquito breeding habitats. Experience from the infestation in the Imperial Irrigation District indicated that hydrilla could reduce water flow in canals as much as 85 percent (Figure 1). Control costs in highly infested states, such as Florida and Texas, are in the tens of millions of dollars per year.

Figure 1: Hydrilla in an Imperial County canal during the 1980s

The California Department of Food and Agriculture (CDFA) is the lead agency for the eradication of Hydrilla.

In 1977, after the first hydrilla find in California, the California Legislature mandated that the CDFA Secretary initiate a survey and detection program for hydrilla and eradicate hydrilla wherever feasible (California Food and Agricultural Code Sections 4068 and 7271). In 1985, after hydrilla was found in Redding near the Sacramento River, the Governor of the State of California declared a "State of Emergency" to eradicate hydrilla. In 1994, the CDFA Secretary declared an "emergency situation" in regards to the infestation discovered that year in Clear Lake. Similar declarations have been issued for most of the current infestations. In 2005,

CDFA Secretary A.G. Kawamura declared the latest emergency after hydrilla was detected in Nevada County. In addition, hydrilla is listed as an A-rated aquatic noxious weed by CDFA.

Though the CDFA is the lead agency, the CDFA administers the Hydrilla Eradication Program with the support of local county agricultural commissioners and federal, state, county and city agencies, Native American tribes and private individuals and entities. In addition, the CDFA Hydrilla Eradication Program received financial and in-kind support in 2007 from the California Department of Boating and Waterways, California Department of Water Resources, United States Department of the Interior-Bureau of Reclamation, United States Army Corps of Engineers-Eastman Lake, Yolo County Flood Control and Water Conservation District, Lake County Department of Agriculture and Lake County Department of Public Works.

History and Overview of the Hydrilla Eradication Program

Hydrilla heavily infests many places in the United States outside of California. Hydrilla was first identified in Florida in the 1960's where it is believed to been introduced in the 1950's. The infestation spread rapidly throughout the southeastern United States and Texas. Hydrilla was first found in California in 1976 in a 31-acre man-made lake in Marysville, Yuba County, from which it has since been eradicated.

Since 1976, hydrilla has been introduced into California waterways 31 separate times in 18 counties (not counting detections in plant nurseries). Of these introductions, the Hydrilla Eradication Program has eradicated hydrilla from 20 sites in 12 counties: Los Angeles, Monterey, Riverside, San Bernardino, San Diego, San Francisco, Santa Barbara, Shasta, Sonoma, Sutter, Tulare and Yuba. The Hydrilla Eradication Program is currently eradicating hydrilla from nine counties: Calaveras, Imperial, Lake, Madera, Mariposa, Nevada, Shasta, Tulare and Yuba.

Every year, program crews repeatedly survey all known infested waterways. They also survey numerous other high-risk water bodies in the state, including the Sacramento-San Joaquin Delta, to detect new infestations of hydrilla. The Hydrilla Eradication Program also investigates all reports from the public on potential new infestations. In 2007, all the various detection efforts encountered no new hydrilla-infested sites.

The Hydrilla Eradication Program uses an integrated pest management approach to eradicate hydrilla. In 2007, program biologists used manual removal, biological control, small scale dredging and fluridone and copper aquatic herbicides.

In addition to surveying and treating for hydrilla, the Hydrilla Eradication Program samples the water after herbicide applications to determine herbicide concentrations and to confirm that the beneficial uses of the state’s waters are protected. This monitoring is done as a CDFA policy, and also to comply with the National Pollution Discharge Elimination System (NPDES) General Permit issued by the State Water Resources Control Board.

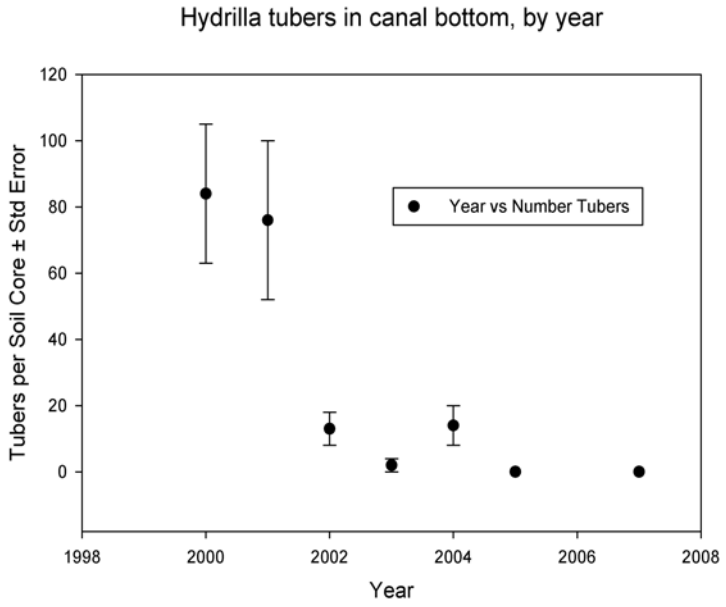
2007 Highlights

In Lake County, hydrilla reappeared in Clear Lake (Table 1). The Clear Lake crews found about 72 spots with hydrilla. Most were single plants but many were clumps up to a few feet across. The last previous find, in 2003, was in June before treatments began for the season. The 2005 season represented the third full treatment season with no finds. Following the eradication protocol, the Program did no treatments for hydrilla in the 2006 season. No plants appeared in 2006. However, Program staff suspected that plants still existed in Clear Lake and increased the number of crews from two in 2006 to three in 2007. The crews not only searched the entire 100+ miles of shoreline nine times during June through November, but treated nearly every plant within one or two days of finding it.

	2000	2001	2002	2003	2004	2005	2006	2007
Number of hydrilla "finds"	67	41	12	1	0	0	0	72
Number of management units with finds	31	21	6	1	0	0	0	24
Fluridone treated acres	1148	1335	1440	1256	520	137	0	245
Copper treated acres	117	62	28	5	0	0	0	245

Table 1. Hydrilla and treatments in Clear Lake, Lake County, from 2000 to 2007

In Yuba County at the Oregon House infestation, hydrilla continued to appear in several infested ponds in 2007. Eight of the 14 infested ponds had hydrilla in 2006, but only three ponds produced hydrilla this year. However, one of those ponds represented a large resurgence after having been free of hydrilla for several years.



The Program tried several new options this year. In one small pond where there was a resurgence of hydrilla in 2006, the crew stocked sterile triploid grass carp. This is the first time the Program has tried grass carp outside Imperial County. In the pond where there was the resurgence this year, staff worked with Lars Anderson of USDA-ARS to test the new herbicide, Imazamox. Results so far are not promising. In a third instance, we tried a new copper formulation in a newly constructed, newly infested pond in the area, again with minimal results. More promising, the Program has a contract out to bid to line about 5,000 feet of the most heavily infested parts of the three-mile infestation in the irrigation ditch. With the concreting, we should be able to prevent the ditch from re-infesting the ponds. With regards to the ditch, populations continue to slowly decline. CDFA biologists found 1,175 plants and tubers in 2006, compared to 2,700 in 2005 and over 4,000 in 2004. The crew was only able to find about 400 plants this year. The density of hydrilla tubers in the canal also continues to decrease.

In Nevada County, CDFA and Nevada County biologists, following leads from the public, confirmed hydrilla in two new ponds in 2005. One pond was in the County Fairgrounds and the other was an isolated 0.1-acre irrigation pond. The other infestation was found at the County Waste Transfer Station in 2004. In 2007, CDFA biologists continued treating all the ponds with fluridone herbicide with excellent results. No plants were found in any of the ponds this year. Both the 0.1-acre and the County Fairgrounds ponds had hydrilla last year.

In Calaveras County, there has been no hydrilla for nine years in all but one of the infested ponds and creek areas in the Bear Creek area. In the remaining infested pond area, no plants were detected from 2005 through 2007, down from two plants in 2004, and 18 plants and five mats in 2002. In addition, no plants were detected in the two isolated stock ponds near Mokelumne Hill.

In Madera and Mariposa counties, there have been no hydrilla detections in the infested portion of the Chowchilla River for five years (Table 2). No hydrilla has been detected in Eastman Lake since 1993. Treatments ceased in the river in 2006 as the effort shifted to the monitoring phase. The 2005 and 2006 seasons had high water, enough to germinate any plants in locations that were previously left dry by the extended dry spell in the area, and yet no plants emerged. If another year passes without any finds, the formal criterion for eradication will have been met.

Year	2000	2001	2002	2003	2004	2005	2006	2007
Plants	19	5	2	0	0	0	0	0
Tubers	1,789	23	3	0	0	0	0	0

Table 2. Number of Hydrilla Plants and Tubers Found and Removed from the Chowchilla River, Madera and Mariposa counties 2000 – 2007

In Tulare County, CDFA biologists continue to survey and treat infested ponds at a private fishing resort near Springville. In the largest pond on the site, which was heavily infested, hydrilla has not been detected in four years and no plants were found in any of the ponds in 2005, 2006 or 2007. In addition, the hydrilla infestation has been contained to the original infested properties and has not spread into adjacent rivers or ponds.

In Imperial County, the only hydrilla detected was in approximately two miles of the Wildcat and Wisteria Drains.

In Shasta County, CDFA and Shasta County staff initiated an eradication program in 2005 on a new invasive aquatic plant, the South American spongeplant, which was found for the first time in California in a seven-acre pond in Redding. Spongeplant shares many characteristics with water hyacinth, and California would benefit from keeping it out. CDFA staff treated the entire infested area of five acres in 2005. In 2006, populations of large plants were much lower, requiring only one general and a few spot treatments with herbicides. Most of the plants could be removed by hand. In October, however, we discovered large quantities of very small seedlings, indicating that the spongeplant comes back vigorously from seeds. In 2007, manual and chemical treatments continued to keep the population low.

There are two separate infestations of hydrilla currently in Shasta County; one in a series of four ponds at a golf course in Redding and another in two ponds at the city park in Anderson. The infestation in the golf course continued to be very small this year, with no plants found, down from three plants last year. Hydrilla rebounded at the Anderson River Park in 2006, producing over 100 plants. However, no plants appeared in 2007.

In conclusion, the CDFA Hydrilla Eradication Program continues to protect California's waterways from this noxious weed. Though new infestations are being discovered, the overall population of hydrilla in the state continues to decline. Several previously infested areas were removed from quarantine zones in 2004, and project biologists project continued success in the future in eradicating hydrilla from remaining infested areas.

WEED MANAGEMENT AREA PROGRAM

Weed Management Areas (WMAs) are dynamic groups of local land managers and public agencies, which have joined together to be more cooperative, strategic and active in battling invasive weeds. WMAs are a unique and crucial infrastructure because:

- They are organized at the local level and can 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 funded.
- They are partners in all statewide weed eradication programs.
- They are partnerships for a better environment.
- They are meant to complement, not supplant, the California Department of Food and Agriculture's (CDFA) core weed management programs.

The CDFA created the WMA program in 1999 to implement Assembly Bill 1168, Frusetta (Chapter 961, Statutes of 1999) and Senate Bill 1740, Leslie (Chapter 315 Statutes of 2000). Both of these bills authorized the Noxious Weed Management Fund within the California Department of Food and Agriculture and the WMA Support Program to administer the allocation of the funding. The bills provided funding to support local public and private partnerships, called WMAs, to aggressively control high priority local weed infestations. WMAs partners include landowners, land managers (private, city, county, special districts, state, Native American and federal), non-governmental organizations and the public interested and committed to controlling local noxious weed problems.

This WMA program is action-oriented, focusing on on-the-ground control. The program was set up to achieve permanent and lasting results, therefore, projects are carried out with clear objectives and are monitored. The CDFA works to ensure that the WMAs are linked networks of highly effective groups, working in cooperation to solve a rapidly spreading statewide problem, which does not recognize borders, fences or political boundaries.

Although mapping, planning and education are critical to the long-term success of the WMAs, these activities are secondary with respect to attacking high-priority, on-the-ground weed infestations. The CDFA implements a comprehensive program to coordinate, train and evaluate WMAs throughout the state. The CDFA Statewide WMA Coordinator works with CDFA district personnel to provide training in control methodology, monitoring, strategic planning, mapping and weed education. The CDFA WMA Support Program has provided individualized trainings and in 2007 hosted the ninth statewide annual workshop.

The CDFA's core weed eradication programs are complementary to the activities of the WMA programs and are involved at all levels of WMA activities. These noxious weed programs are conducted in cooperation with county agricultural commissioners, federal and state agencies, as well as with various entities such as private agricultural organizations and resource conservation groups.

2007/08 Fiscal Year Weed Management Area State Funding Project

The WMA funding program received $1.5 million for fiscal year 2007/08 to implement weed eradication projects carried out by Weed Management Areas. After consulting with various stakeholder groups, including CALIWAC (California Invasive Weed Awareness Coalition) and the Weed and Vertebrate committee of CACASA (California Agricultural Commissioners and Sealers Association), the CDFA WMA program issued a request for proposals in September 2007. 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. The WMA program managers then funded the

proposals in close adherence to the Advisory Committee's recommendations, as detailed below. The balance of the $1.5 million was allocated to research ($124,394.99), indirect charges and administrative overhead.

Weed Management Area (WMA) Program Funding Allocation 2007/08 FY

Weed Management Area*	*Description*	**Amount**
Alameda/Contra Costa	Eradication of four A-Rated weeds: Iberian thistle, Punagrass, Dalmatian Toadflax, and Golden Thistle	$88,034.10
Alpine	Eradication of A and B-Rated weeds	27,500.00
Butte	Eradication of Broom from Little/Big Chico Creek. Eradication of Skeletonweed	29,349.50
C. Sierra Partnership Against Weeds	YST Cost Share program; Eradication of Smooth Distaff Thistle; Eradication of Rush Skeletonweed	83,653.37
Humboldt/Del Norte	Purple Loosestrife eradication; Meadow Knapweed containment; Harding Grass control	94,548.26
Imperial	Management of Puncturevine and Johnsongrass	16,500.00
Kern	Spotted Knapweed cost share eradication project; YST regional collaboration cost share eradication project	38,500.00
Lake	Tamarisk Eradication Strike Team; Eradication of Water Primrose from selected sites on Clear Lake	25,372.60
Lassen	Lassen SWAT – prevention, detection, and management	41,250.00
Marin/Sonoma	Stinkwort eradication from Sonoma County	24,200.00
Mendocino	Red Sesbania eradication from CALTrans property; Gorse containment; Giant Knotweed eradication; Gorse management at the Caspar transfer station	52,185.32
Mojave	Halogeton eradication; Eradication of Perennial Pepperweed	25,317.89
Monterey	Arundo eradication on Upper Salinas River Watershed	55,000.00
Napa	Rush Skeleton Weed Eradication; Arundo donax eradication within the Napa Creek Watershed; Weed Pest Mapping	46,974.40
Nevada/Placer	A and B-Rated eradication; Red Sesbania eradication in the Dry Creek watershed; A and B-Rated eradication in the Truckee River Basin	72,526.78
N. San Joaquin Valley	Invasive species control on State, Federal, and Private lands; Riparian habitat restoration (Himalayan blackberry and Edible fig)	67,504.36
Plumas/Sierra	Perennial Pepperweed containment in Sierra Valley	33,000.00
Sacramento	Strategic plan and regional WMA collaboration; Red sesbania eradication from Steelhead Creek and its tributaries	46,868.00
San Benito	Eradication of Purple Starthistle in the Tres Pinos Creek watershed; Artichoke Thistle eradication in Flint Hills; Scotch Thistle eradication in Stone Canyon; YST Leading Edge Containment project	19,992.68
San Francisco	Endangered species habitat restoration on Twin Peaks; Initial priority weed assessment and strategic plan update	47,773.00

Santa Ana/Orange	Eradication of Dalmation Toadflax; Spotted Knapweed; Diffuse Knapweed; and YST	7,381.92
Santa Barbara	Arundo eradication in Carpinteria Creek	35,200.00
Sierra/San Joaquin	Rush Skeletonweed containment – survey, treatment and mapping; YST leading edge and outlier population eradication	35,109.06
Solano	Artichoke Thistle eradication on high-value sites	27,500.00
Trinity	Diffuse Knapweed eradication on South Fork Mountain	22,000.00
Tulare	Arundo donax leading edge eradication; YST containment, monitoring, and mapping; Alligatorweed eradication; Scotch Thistle eradication	60,969.04
Yolo	Eradication of Wooly distaff thistle from Capay Valley; Eradication of Purple Loosestrife, Ravenna grass, Distaff Thistle, and Yellow Flag Iris from Lower Cache Creek; Early detection and eradication of A and B-Rated weeds	58,594.47
Yuba/Sutter	Arundo eradication from critical irrigation canal	16,500.00
Subtotal		$1,199,304.74

YST Grants	**Description**	**Amount**
Alpine	Control/eradication of YST at Eastern Leading Edge	5,005.00
Amador	Control/eradication of YST at Eastern Leading Edge	4,833.50
Calaveras	Control/eradication of YST at Eastern Leading Edge	5,007.84
Fresno	Control/eradication of YST at Eastern Leading Edge	5,055.00
El Dorado	Control/eradication of YST at Eastern Leading Edge	5,005.00
Kern	Control/eradication of YST at Eastern Leading Edge	4,963.24
Madera	Control/eradication of YST at Eastern Leading Edge	5,000.00
Mariposa	Control/eradication of YST at Eastern Leading Edge	4,950.00
Nevada	Control/eradication of YST at Eastern Leading Edge	4,971.04
Placer	Control/eradication of YST at Eastern Leading Edge	4,697.50
Tulare	Control/eradication of YST at Eastern Leading Edge	4,726.00
Tuolumne	Control/eradication of YST at Eastern Leading Edge	4,974.05
Subtotal		**59,188.17**

Research Projects	**Description**	**Amount**
Dr. Joe Ditomaso – UC Davis	Control of 3 priority noxious weeds	112,770.30
Regents of UC Berkeley	*The Jepson Manual* update.	4,928.00
Regents of UC Davis	Research of Invasive Weed Species	6,696.69
Subtotal		**$124,394.99**

TOTAL		**$1,382,887.90**

Grazing Lands Coalition Initiative Grant Project

In July 2006, the CDFA received a grant for $306,000 from the Natural Resource Conservation Service (USDA) to hire a team of seasonal employees for three years to carry out noxious weed control on private grazing lands. CDFA partnered with the California Conservation Corps to send a nine-person Strike Team out to work collaboratively with 11 WMAs on noxious weed projects across the state (Table 1, Map 1).

USDA NRCS Western Grazing Lands Grant Results in CDFA: California Conservation Corps Weed Strike Team

Such a large collaborative Strike Team Approach allowed for:

(1) survey of vast and rugged terrain, a task that previously was not nearly as effective or efficient with fewer individuals
(2) assistance with large high priority weed infestations, leaving more time for local WMA partners to attack smaller outlier populations
(3) hand-pulling on properties that would not grant permission for herbicide treatments and thus jeopardizing a comprehensive eradication program

WMA being Assisted	Target Weed Species	Gross Area Surveyed	Net Acres Treated
Calaveras	Plumeless thistle, diffuse and spotted knapweeds	171.5 acres	1.25 acres
Shasta	Scotch thistle, oblong spurge, diffuse and squarrose knapweeds, dyer's woad, perennial pepperweed, Mediterranean sage	1,055 acres, total for all species	6.73 acres, total for all species treated
Kern	Spotted knapweed, Scotch thistle	Thistle: 60 acres Knapweed: 9 acres	Thistle: 0.5 acres Knapweed: 4 acres
Kings	Alligatorweed, perennial pepperweed	Pepperweed: 10 acres Alligatorweed: 10 miles waterway	Pepperweed: 5 acres Alligatorweed: 2 plants
Lassen	Musk and Scotch thistles	Musk: 150 acres Scotch: 75 acres	Musk: 5.5 acres Scotch: 4.3 acres
Mariposa	Iberian starthistle	35 acres	4 acres
Monterey	Purple starthistle, French broom	Starthistle: 70 acres Broom: 3 acres	Starthistle: 5 acres Broom: 0.05 acres
Yuba	Skeletonweed, perennial pepperweed, yellow starthistle, Russian knapweed, whitehorse nettle	19 acres, total for all species	3 acres, total for all species treated
Colusa	Purple starthistle	12 acres	4 acres
San Luis Obispo	Barbed goatgrass	3.5 acres	0.2 acres
El Dorado	Spotted knapweed, Canada thistle, perennial pepperweed	92 acres, total for all species	4.25 acres, total for all species

Table 1

Map 1

USDA U.S. Forest Service and CDFA Joint Noxious Weed WMA Grant Program Project
For the past five years, the US Department of Agriculture Forest Service has funded the CDFA to manage a grant program to prevent, detect and eradicate noxious and invasive weed populations on non-federal public and private lands near forested lands throughout California in order to prevent the movement of noxious and invasive weeds onto federal forested lands. The CDFA has managed the program via a competitive grant program to the WMAs. 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 United States Forest Service's (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), and nearby fire "burned" areas, roadsides and utility rights-of-way, pastures and rangelands, agricultural lands and abandoned and wild lands.

Twenty WMA groups have been funded over the last five years addressing the following noxious weeds: meadow knapweed, spotted knapweed, purple loosestrife, slender false-brome, leafy spurge, dalmatian toadflax, rush skeletonweed, perennial pepperweed, musk

thistle, Scotch thistle, Iberian starthistle, yellow starthistle, arundo, amongst others. Details on projects funded in 2007 are in the table below (Table 2).

In summary, this partnership between the US Forest Service 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.

Group Conducting Project	Target Weed Species	Gross Area Surveyed	Net Acres Treated	Method of Treatment
Siskiyou WMA	Scotch and musk thistles, dalmatian toadflax, meadow knapweed	2,536	52 acres	Mechanical, Herbicide
El Dorado WMA	Perennial pepperweed, yellow starthistle, spotted, diffuse and Russian knapweeds, dalmatian and yellow toadflaxes, Canada thistle	6	< 100 plants	Mechanical, Herbicide
Placer/Nevada WMA	Musk and Scotch thistles, spotted and diffuse knapweeds, dalmatian toadflax	2,500	11,000 plants	Mechanical, Herbicide
Monterey WMA	Yellow starthistle, Jubata grass, Cape ivy	3,009	1 acre	Mechanical, Herbicide
San Benito WMA	Purple starthistle	275	15 acres	Herbicide
Tuolumne/ Calaveras WMA (CSPAW)	Spotted knapweed, skeletonweed, tree of heaven, yellow starthistle	20 acres + 300 miles roadway	9 acres	Herbicide
Calaveras/ Tuolumne WMA (CSPAW)	Plumeless thistle, spotted and diffuse knapweeds	110	½ acre	Mechanical, Herbicide
Mariposa/Fresno/ Madera WMA	Arundo donax	2 miles waterway	36 plants	Mechanical, Herbicide, and mulching
Fresno/Mariposa/ Madera WMA	Spotted knapweed	24,000	1 plant	Mechanical
Fall River RCD	Scotch thistle	50	18 acres	Mechanical, Herbicide
Kern WMA	Spotted knapweed	10,050	23 acres	Mechanical, Herbicide

Table 2

2006 BEFORE TREATMENT

2007 AFTER TREATMENT

Figures 1 (before treatment) and 2 (after treatment). Mariposa WMA Arundo Eradication Project, post-treatment effects on one of only 36 clumps of Arundo in the entire waterway

NOXIOUS WEEDS PROGRAM

Noxious Weed Eradication project's accomplishments in 2006 were:

- 160 A-rated weed infestations were treated and evaluated by program staff.
- Approximately 5,000 miles of state, county and forest roads were surveyed for A-rated weeds.
- Program staff gave 25 educational training and outreach presentations on Noxious Weed biology, identification and eradication. Over 1,015 people were in attendance at these presentations.
- An Internet map server was purchased and programmed to provide on-line access to weed maps and information to county departments of agriculture. This server was tested at Sacramento headquarters in 2007 and should be fully operational in 2008.
- Japanese dodder infestations were detected and evaluated in 13 counties across the state.

The objective of the Noxious Weeds Program is the early detection, containment and eradication of A-rated noxious weeds. A-rated noxious weeds are; those of potential great economic or environmental importance, of current limited distribution in the state, and for which eradication efforts will likely be successful. Noxious Weed Eradication projects are a cooperative effort between the California Department of Food and Agriculture (CDFA), the county agricultural commissioners and Weed Management Areas (WMA's).

To date, the Noxious Weeds Program has eradicated 13 weeds from the state. These are whitestem distaff thistle, dudaim melon, giant dodder, serrate spurge, Russian salt tree, blueweed, tanglehead, creeping mesquite, meadow sage, heartleaf nightshade, Austrian peaweed, wild marigold and Syrian beancaper. Weeds approaching eradication at the statewide level include camelthorn, golden thistle, Illyrian thistle, perennial sowthistle, Taurian thistle and smooth groundcherry.

The California Food and Agricultural Code, Section 403, which states, “The Department shall prevent the introduction and spread of noxious weeds”, authorizes the Noxious Weeds Program. The term “noxious weed” is defined in the Code, Section 5004 as “any species of plant which is, or is liable to be, detrimental or destructive and difficult to control or eradicate.”

Currently there are 25 A-rated weeds under eradication, control or containment within California. These are:

1) Punagrass, *Achnatherum brachychaetum*
2) Camelthorn, *Alhagi maurorum*
3) Alligatorweed, *Alternanthera philoxeroides*
4) Capeweed, *Arctotheca calendula*
5) Slender False Brome, *Brachypodium sylvaticum*
6) Plumeless Thistle, *Carduus acanthoides*
7) Musk Thistle, *Carduus nutans*
8) Diffuse Knapweed, *Centaurea diffusa*
9) Iberian Starthistle, *Centaurea iberica*
10) Meadow Knapweed, *Centaurea X monktonii*
11) Spotted Knapweed, *Centaurea maculosa*
12) Squarrose Knapweed, *Centaurea squarrosa*
13) Skeletonweed, *Chondrilla juncea*
14) Yellowspine Thistle, *Cirsium ochrocentrum*
15) Crupina, *Crupina vulgaris*
16) Leafy Spurge, *Euphorbia esula*
17) Halogeton, *Halogeton glomeratus*
18) Dalmatian Toadflax, *Linaria genistifolia* spp*. dalmatica*
19) Scotch Thistle, *Onopordum acanthium*
20) Illyrian Thistle, *Onorpordum illyricum*
21) Taurian Thistle, *Onopordum tauricum*
22) Harmel, *Peganum harmala*
23) Wormleaf Saltwort, *Salsola vermiculata*
24) Golden Thistle, *Scolymus hispanicus*
25) Perennial Sowthistle, *Sonchus arvensis*

In addition, the State of California incorporates the federal noxious weeds as state noxious weeds by regulation (CCR, Section 3161).

The statewide distribution of current A-rated noxious weed infestations can be seen on the following map. Note that a disproportionate number of the A-rated noxious weed infestations in California are found in the four most northeastern counties (Lassen, Modoc, Shasta and Siskiyou). This distribution results partially from the large amount of open rangeland in these counties and the movement of cattle and sheep from out-of-state. It also results from the movement of weed seeds and parts on vehicles and equipment from other states into these counties.

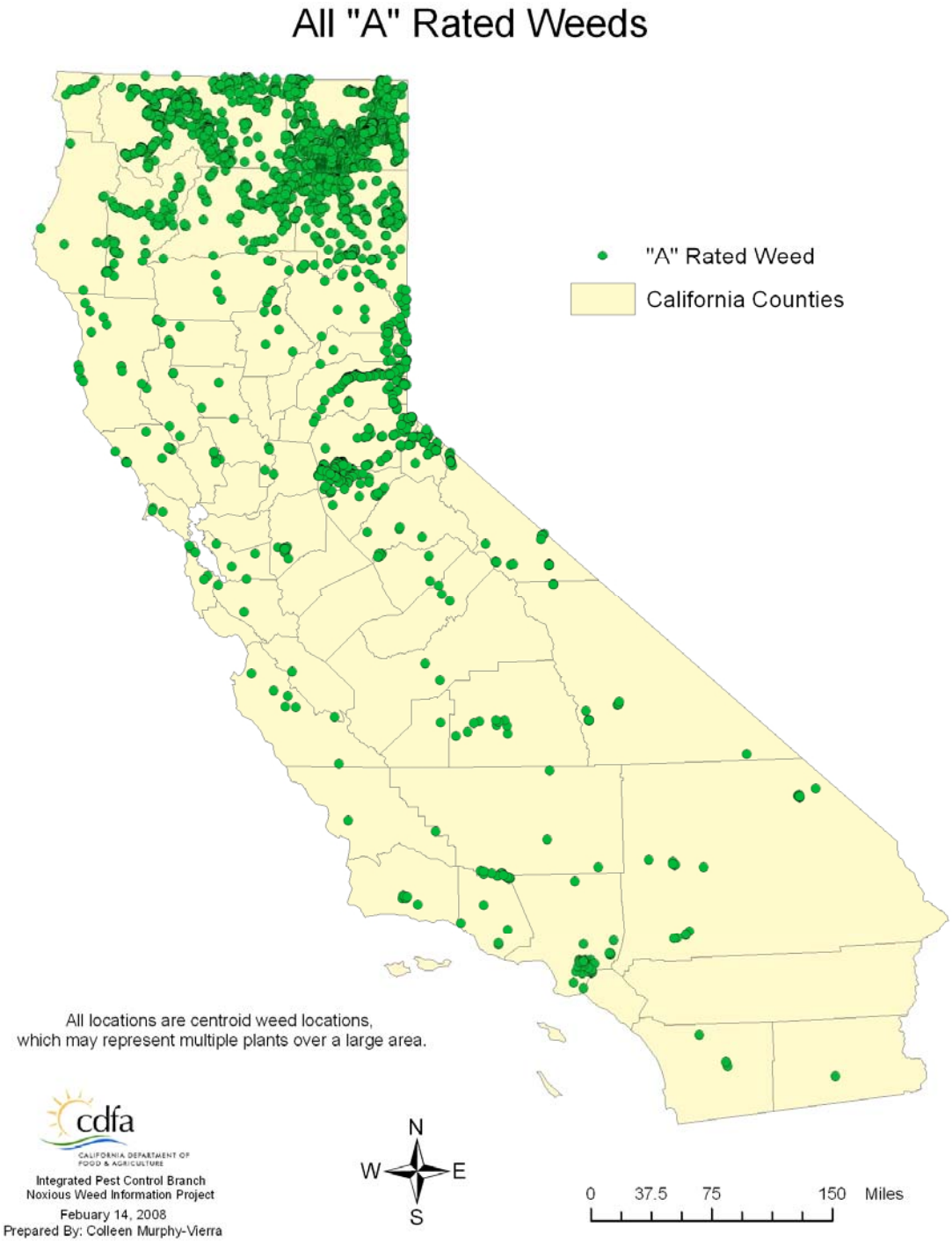


Figure 1. Distribution of all A-rated noxious weeds in California. Note the concentration of A-rated weeds in the northeastern counties and along “entryway” highway corridors.

In addition to the goal of eradication in 2007, the Noxious Weed Program adopted the use of “containment zones” for highly infested areas of certain noxious weeds. This was done to make best use of available, limited resources. The program will aggressively control and eradicate “pioneering” populations of these noxious weeds outside of their “containment zone” in order to prevent spread to un-infested or lightly infested areas. Containment zones were established for Scotch thistle in Modoc and Siskiyou counties, Dalmation toadflax in Trinity, Del Norte and Humboldt counties, and for leafy spurge and musk thistle in Siskiyou County.

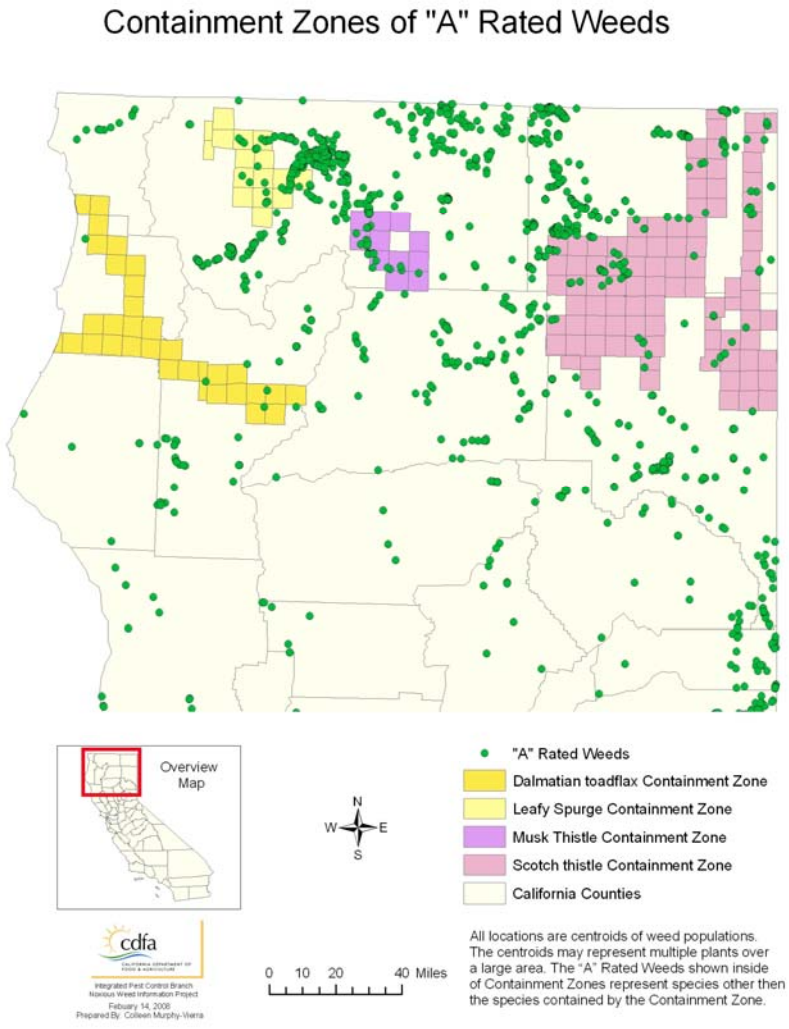


Figure 2. Noxious Weed Containment Zones in the northern California Counties.

JAPANESE DODDER PROGRAM

In 2007, The Department procured Emergency Funds to begin a Japanese dodder, *Cuscuta japonica* (C. japonica), eradication program. The program goals are to detect and eradicate all outdoor infestations of Japanese dodder in California. The program is a cooperative effort among the Department, county agricultural commissioners and the United States Department of Agriculture. Currently, Japanese dodder occurs at 206 sites in 14 counties (Figure 4). The CDFA Botany Laboratory received 313 samples of plants resembling Japanese dodder. Of those 206 (66%) were confirmed as C. japonica. In 2007, a prioritization strategy was implemented to survey those counties likely to have Japanese dodder infestations. Each of the 58 counties in the state was divided into tiers to provide focus for survey purposes. The infested counties are not included as part of the survey tier system because county departments of agriculture have responsibility for all aspects of the eradication program under their jurisdiction. Using data from the United States Census Bureau, and in some instances, Zip Code data from the United States Postal Service, neighborhoods known to have the demographic associated with Japanese dodder infestations were identified within one of two tiers for survey purposes. The Tier III counties are environmentally unsuitable for colonization by Japanese dodder. For the 2007 survey season, over four million properties in Tiers I and II were surveyed for Japanese dodder. From this survey, one infested property was detected in Butte County. Other infestations were found through other survey methods or through the Outreach and Education component of the Japanese dodder Eradication Protocol.

History of Japanese dodder

Japanese dodder is a noxious, annual parasitic plant native to the eastern Asian seaboard and is within a group of dodders frequently referred to as “Giant dodder,” (*C. 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. Recently, a small infestation was detected and eradicated in Houston Texas in 2001. In Los Angeles in 1969, a small infestation of *Cuscuta reflexa* was identified on the campus of the University of California infesting ivy and was eradicated. In 2004, seed resembling Japanese dodder was found in a small retail store in Redding, Shasta County and identified as *Cuscuta japonica* or Japanese dodder. Again in 2004 vegetative parts from Shasta County were submitted to the CDFA Botany Laboratory. The determination was incomplete as mature flowers are required for conclusive identification. Consequently the submitted specimen was rated “Q”, (this is a temporary designation given by the CDFA, and requires ‘action’ when detected outside of a nursery). Based on morphological characteristics the sample from Redding in 2004 was established as possibly *Cuscuta reflexa*, another noxious parasitic weed that is part of the “Giant dodder” complex, and is a federal and state “actionable”, noxious weed that requires eradication when found. Japanese dodder is a leafless parasitic plant that uses specialized temporary root structures called haustoria to obtain water and nutrients from a host plant. Once *C japonica* seedlings locate a suitable host they die and the haustoria colonize the host stem and begin to draw water and nutrients from the host.

The Japanese dodder Eradication Program developed a protocol to provide guidance and establish standards for dealing with infestations. The six components of the protocol are:

1. Detection
2. Delimitation
3. Eradication
4. Post-treatment Monitoring
5. Outreach and Education
6. Regulatory

The detection component of the protocol has several focal points to detect Japanese dodder as follows: the use of citrus greening and tristeza survey personnel to locate incipient infestations;

a systematic visual survey of all square mile grids known to contain Japanese dodder; and, the use of exotic pest trappers during normal trap servicing. When an infestation is located 200-meter delimitation and one-mile surveys are conducted to determine infested boundaries. Treatment, post-treatment monitoring, and eradication occur according to timeframes set forth in the protocol. The Outreach and Education activities for 2007 included meetings with utility companies, tree and landscape companies, arborists, public and non-governmental groups, and attendance at various cultural events and state/county fairs.

State Survey

In 2007, CDFA survey crews logged over 20,000 miles and surveyed nearly five million urban and rural residential blocks in each of the sixteen Tier I counties for the presence of Japanese dodder. This survey resulted in the detection of a single site in Thermalito, Butte County. Delimitation and one-mile surveys around this site failed to produce other Japanese dodder infested sites. In addition, each of the counties in Tier II has no identifiable population normally associated with infestations of Japanese dodder. However, outreach and education activities were undertaken in some of the Tier II counties.

PINK BOLLWORM AND OTHER COTTON PESTS

Pink Bollworm Activities

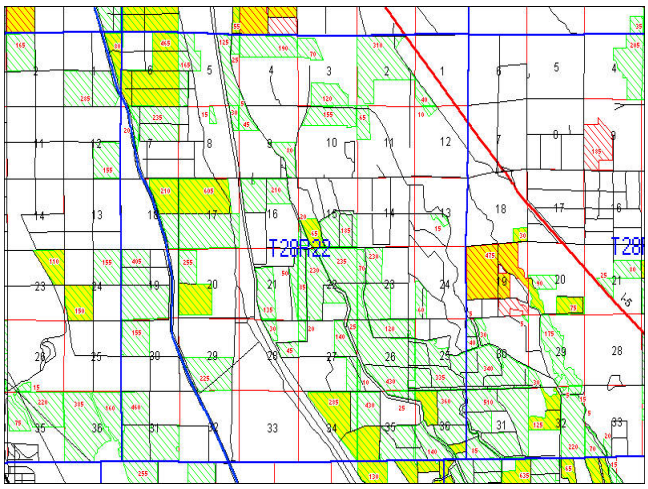
Program personnel continue to utilize a risk-based management approach to maximize cost efficiencies without significantly sacrificing program detection and control objectives. The San Joaquin Valley was divided into bio-potential zones, based on climate data and native moth capture history. The program activities of sterile release, mapping, and trapping were then coordinated within each zone using the pink bollworm (PBW) heat unit model.

The assessment fee remains at $2.00 per bale.

Trapping

All cotton field mapping throughout the State was digitized into computers using MapInfo® software. These digitally, computer generated maps, depicting individual cotton fields, were utilized in trapping, boll survey, sterile release, and plowdown monitoring.

A grand total of 452,005 acres of cotton was mapped in California during 2007. Southern California cotton acreage totaled 18,840 acres. The four cotton-growing counties of Northern California's Sacramento Valley had a total of 4,440 acres.



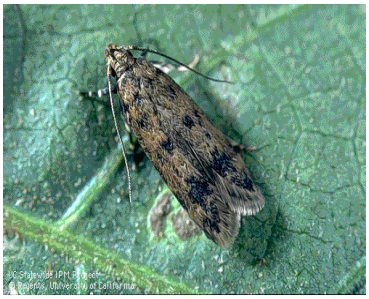
Cotton map with *Pima* varieties in yellow, upland in green

PBW Program personnel mapped 428,725 acres of cotton in six counties of the San Joaquin Valley. The statewide acreage was down (~23%) from the 556,355 acres mapped in 2006. Pima cotton plantings in the San Joaquin Valley for 2007 amounted to 260,005 acres. This is the second consecutive year in which Pima acreage has eclipsed Upland acreage.

Early detection trapping was done at selected San Joaquin Valley sites having native PBW moth catches in the year 2006 to detect possible over-wintering populations and monitor sterile release. The early detection trapping was conducted from April 17 through July 04. General detection trapping activities were matched to the bio-potential zones. The program also utilized different trapping ratios: 1) one trap per 60 acres, 2) one trap per 80 acres, and 3) one trap per 100 acres.

The starting dates for each bio-potential zone were staggered to align with the PBW heat unit model. The earliest general detection trapping began in the southern San Joaquin Valley on June 16. The total number of traps deployed during the peak of the season was 5,889 traps. Traps were inspected weekly, bi-weekly In Merced, Madera, and a portion of Fresno County), and were removed by October 12.

A special desert trap line ran from Highway 58 into the Mojave Desert. This trap line monitors possible PBW moth migration from the southern desert cotton growing regions of Arizona, Mexico, Riverside and Imperial counties into the SJ Valley. Zero (0) PBW moths were detected in the Mojave Desert

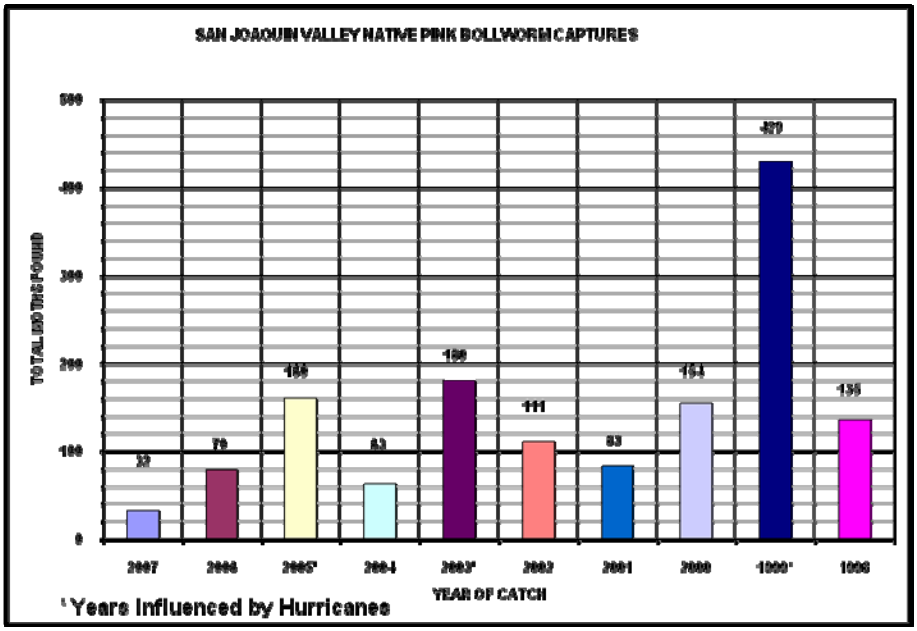


Adult PBW Moth

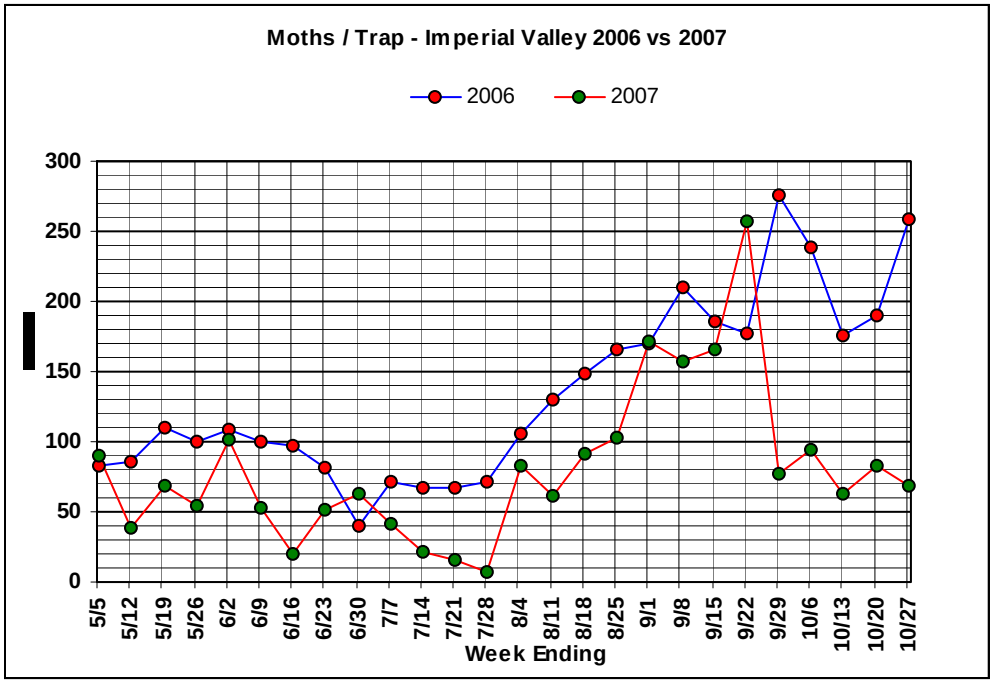
trap line in 2007. There was one (1) PBW moth detected in the Mojave Desert trap line in 2003, most likely a “blow-in moth”, resulting from hurricane “Marty”.

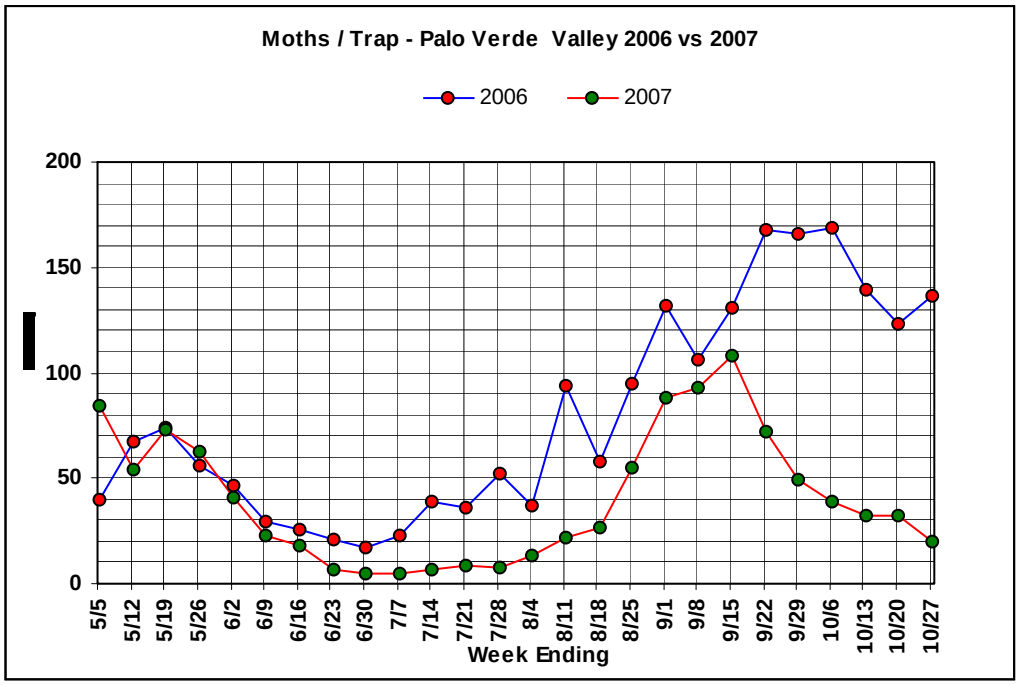
Identification

In year 2007, the lab examined 9,652 traps containing suspect moths submitted by trappers. A total of 238,063 sterile moths and 32 native moths were identified in the San Joaquin Valley traps in 2007. This is the lowest native PBW count since 1973. There were 79 native moths trapped in 2006 and 160 native moths caught in 2005. The breakdown of native moths trapped per county in 2007 was 16 native moths trapped in Kern County, zero in Kings County, zero in Fresno County, nine in Tulare County, one in Merced County, and zero in Madera County.



In Southern California, early summer PBW populations were predictably high due to over-wintering emergence. There was a spike in native captures from mid-August into September due to migration from the adjoining areas of Yuma, AZ and Mexico. After September, there was a significant decline in natives trapped compared to 2006 capture levels.



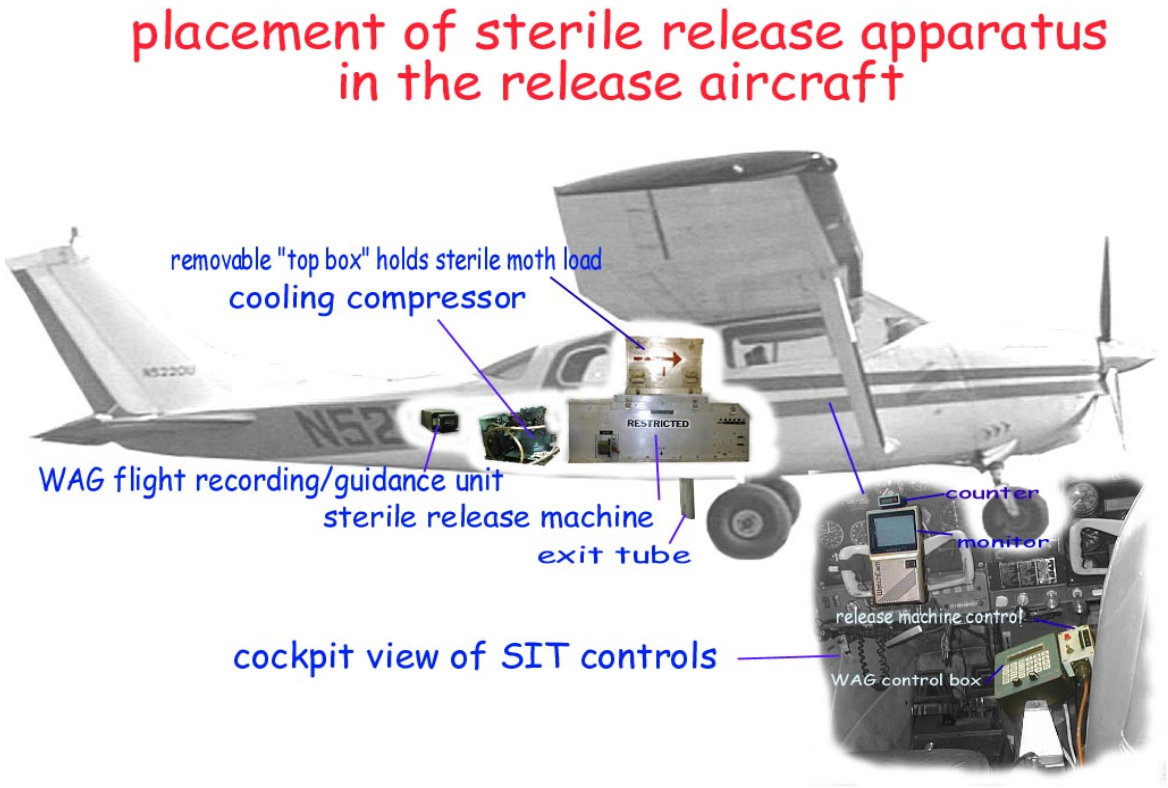


Sterile Insect Release

The sterile moth receipts from the PBW Rearing Facility in Phoenix, AZ were consistent throughout the entire release period. There was an average of two million sterile moths released per day. Sterile release began on May 2 and concluded September 23, 2007. Approximately 254,401,949 sterile moths were released in the San Joaquin Valley.

Southern California cotton growing regions were added to the USDA Pink Bollworm Area-wide Eradication Program. The strategy for this program includes insect monitoring, *Bt* cotton plantings, sterile insect release, and pheromone treatments in non-*Bt* cotton. Growers in the Blythe/Palo Verde and Imperial Valleys chose to plant 100% *Bt* cotton

Mass aerial dispersal of sterile PBW moths was performed on cotton plantings in Imperial, Riverside, and San Bernardino counties. Over 32 million sterile moths were released during the cotton-growing season in southern California as a component of the PBW Area-wide Eradication Program. Nearly 417,000 native moths were trapped in southern California. The Global Positioning System (GPS) MapInfo®-based guidance and flight recording system was again utilized in release aircraft. This GPS guidance/flight recording system greatly improves sterile moth delivery to the target sections and post flight analysis.



Sterile Moth Quality Assurance

Moth quality is confirmed by running a battery of quality assurance tests including: mortality on arrival and again seven days after arrival and mating on arrival and forty-eight hours after arrival. The results of these tests over the last five years demonstrate that the sterile moths received are in excellent condition, will live long enough in the field to be effective, and have the capacity to mate frequently.

STERILE MOTH QUALITY ASSURANCE					
	MORTALITY			MATING	
YEAR	*0 HOUR*	*7 DAY*	*14 DAY*	*0 HOUR*	*48 HOURS*
2003	3.19%	6.35%	42.06%	2.14%	86.79%
2004	2.34%	7.02%	38.59%	2.49%	86.93%
2005	0.20%	6.39%		1.59%	84.88%
2006	5.77%	13.33%		4.15%	82.00%
2007	0.52%	16.03%		2.92%	86.16%
Average	2.40%	9.82%	40.33%	2.66%	85.35%

Methods Development Trials

Phoenix Rearing Facility personnel set up a temperature monitoring system for the sterile moth shippers/release boxes. Temperature probes were placed in the upper and lower regions of each shipper/release box in order to document the conditions the sterile moths are exposed to inside the shipper/release box. Temperatures were recorded at half hour intervals from the time moths were placed in the shipper/release box in Phoenix until removal after the release flight in the San Joaquin Valley the following day. This data is being used to evaluate adjustments to shipping procedures to improve the quality of the sterile moths released.

Shipper/Release Box

Among the adjustments made this year was a change from four individual Polar Pack® units per circulation duct to a hard plastic tube filled with frozen gel. An interim prototype tube was used at the end of last season, but wasn't sturdy enough to hold up to the rigors incurred during shipment and was replaced prior to the start of the 2007 release season.

Polar Pack 1

Interim Tubes

Pheromone Applications

Another control method available for PBW Program use is the pheromone mating confusion technique. This confusion technique can induce mating disruption, interfering with reproduction during that period. Two small research plots in Imperial County received pheromone rope treatments as a part of the PBW Area-wide Eradication Program. No pheromone treatments were required in the San Joaquin Valley.

Bt Resistance Monitoring

PBW Program personnel conducted trapping and boll collection in the cotton-growing areas of Southern California. Cooperating with the USDA, the Arizona Cotton Research and Protection Council, and the University of Arizona, PBW Program staff conducted trapping and boll survey designed to evaluate PBW resistance to *Bt* cotton.

Southern California boll survey in *Bt* cotton was consistent with previous years. During the past six years the maximum level of larvae per boll in *Bt* cotton was 0.01 larvae per boll. This is below expected levels for two percent non-expression of the *Bt* endotoxin. During the same period, adjacent non-*Bt* cotton had a maximum level of 1.74 larvae per boll.

To date, no resistance has been observed.

	No. Sites		No. Bolls		No. PBW		PBW / Boll	
	Imperial Valley	Palo Verde Valley	Imperial Valley	Palo Verde Valley	Imperial Valley	Palo Verde Valley	Imperial Valley	Palo Verde Valley
Total							Average	
Non Bt	21	27	5,400	6,900	1,149	5,053	0.213	0.732
Bt	21	27	19,000	24,050	110	76	0.006	0.003
Maximum								
Non Bt	4	6	1,100	1,800	515	1,569	0.572	1.743
Bt	4	6	4,000	6,000	48	32	0.012	0.005
Minimum								
Non Bt	3	3	800	900	5	311	0.006	0.285
Bt	3	3	2,000	3,000	0	4	0.000	0.001

Boll Survey Data – Six-Year Average

Cotton Plowdown

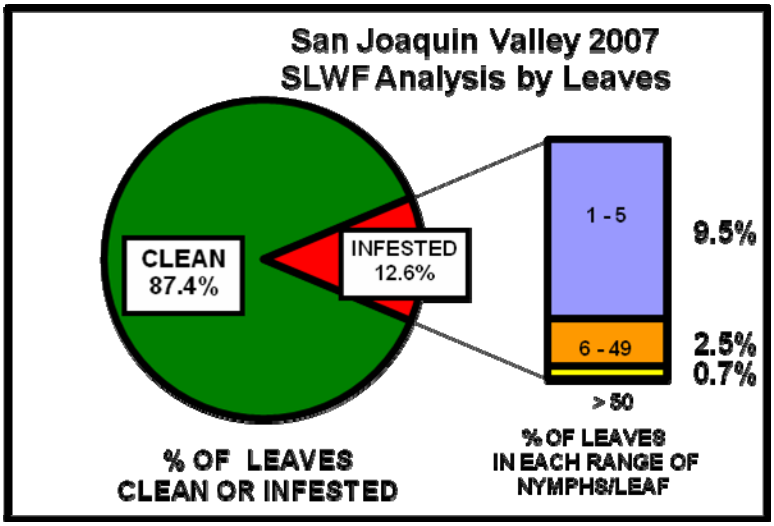
A reduced tillage permit was issued by CDFA to the PBW regulated districts in the San Joaquin Valley (SJV). And a minimum tillage permit was issued to regulated districts in Imperial and Riverside counties. These permits had several key requirements including grower notification to the local county agricultural commissioner, post harvest cotton plant shredding, tillage sufficient to prevent plant re-growth, regulatory inspection of cotton fields; and for the SJV only, substantial prohibited or restricted areas 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. This annual permit expires December 31, 2007 in the SJV regulated areas and January 30, 2008 in southern California.

Silverleaf White Fly

Cotton fields were monitored for the seasonal abundance and distribution of Silverleaf white fly (SLWF) in the San Joaquin Valley. Data was summarized in bi-weekly reports and provided to USDA, Agricultural Commissioners and University of California, Cooperative Extension.

During 2007, 14,230 leaves were sampled from 256 sites in all counties.

Of the total leaves sampled 87 percent (12,443 leaves) had no SLWF nymphs on the leaves, 9.5 percent of the leaves sampled had between one to five nymphs per leaf. Leaves having six to 49 nymphs per leaf accounted for 2.5 percent of the total sampled and less than one percent of the leaves sampled had greater than 50 nymphs per leaf.



This indicates that SLWF infestations are scattered in the San Joaquin Valley and the intensity of infestation at most sites is very low.

Cotton Boll Weevil

Since November 19, 1990, no boll weevils, *Anthonomus grandis*, have been trapped in California. The declaration of eradication of boll weevil was issued December 1993. Program efforts continue to help keep the State free of boll weevil. Traps are deployed in southern California cotton growing areas to monitor any post eradication boll weevil activity.

Photo by: Alton N. Sparks, Jr., University of Georgia, Bugwood.org

Additionally, the Imperial County Agricultural Commissioner, under contract with CDFA, monitors boll weevil traps year round along the borders of Arizona and Mexico. No cotton boll weevils were detected in California. These monitoring activities are coordinated with the Southwestern Boll Weevil Eradication Program.

VERTEBRATE PEST CONTROL

The key accomplishments for 2007 include:

- Vertebrate Pest Control Research Program Web Site
- New Predacide Development
- 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, and water control and conveyance structures and to protect public health and safety.

The Vertebrate Pest Control Research Program funds research studies to investigate experimental application strategies to improve rodenticide efficacy, non-target hazard 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 104 research projects totaling over $7 million.

The Vertebrate Pest Control Research Program has developed a web site (www.vpcrac.org). VPCRAC.org has been completely revised over the past year, providing a much more effective outreach tool. The website includes: general information on the research program and the committee that recommends funding for the program, the legislation that created the research program, background information on vertebrate pests and damage to agriculture in California, and public-friendly reports about the research projects funded by the program. There is also a newsletter and a calendar of events.

New Predacide Development

Livestock losses due to coyote predation have increased significantly in the last several decades. Selective removal of alpha coyotes was the most effective means of controlling these losses. Historically this was accomplished with Sodium Cyanide and Compound 1080 delivered as toxicants. Compound 1080 and Sodium Cyanide are now banned from use in California. The VPCRAC has funded research projects aimed at developing a more socially acceptable, selective, natural predator toxicant. The selective toxicity to canids of concentrated extracts of cocoa, tea and coffee has been the subject of these studies. These extracts are very toxic to coyotes, but are virtually non-toxic to humans, environmentally benign and relatively safe for non-target wildlife. This new toxicant could be delivered via existing methods including the Livestock Protection Collar as well as the Coyote Lure Operative Device.

Vertebrate Pest Control Research Advisory Committee

The Vertebrate Pest Control Research Advisory Committee held two meetings in 2007. The first was held on April 25 in San Luis Obispo County and the second on October 17 in Sacramento County.

The following research proposals were recommended for funding by the Committee, approved by the Secretary of CDFA, and initiated in 2007:

"Efficacy of Oat and Pellet Anticoagulant Baits with Pretreatment of Oat and Pellet Zinc Phosphide Baits and Implications for Secondary Hazards Management," University of California, Cooperative Extension, San Diego County

"Rodent Control Training and Applicator Certification Using an Interactive Computer Kiosk System," University of California, Cooperative Extension, San Diego County

"Economic Impacts of Rodent and Bird Damage to Vulnerable Crop/Commodity-Producing Counties in California," USDA, APHIS, Wildlife Services, National Wildlife Research Center

"Development of Gopher Control Demonstration Videos for Online and Kiosk-based Training," University of California, Cooperative Extension, San Diego County

"Vertebrate Pest Control Continuing Education and Outreach for Licensed Trappers and Others Dealing with California Wildlife," University of California, Cooperative Extension, San Diego County

"Using Liver Microsomes to Assess Resistance of Chlorophacinone and Diphacinone in Meadow Voles," USDA, APHIS, Wildlife Services, National Wildlife Research Center

"Determining the Source of Primary and Secondary Rodenticide Exposure – Agriculture vs. Commensal Application," USDA, APHIS, Wildlife Services, National Wildlife Research Center

"Pharmacokinetic Studies with Kestrels and Owls for Validating Risk Assessment Models," USDA, APHIS, Wildlife Services, National Wildlife Research Center

PLANT PEST DIAGNOSTICS CENTER

Walnut Grove, California

PHOTO: David Kratville, cdfa

PLANT PEST DIAGNOSTICS CENTER

Mission: *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.*

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 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: http://www.cdfa.ca.gov/phpps/PPD/.

The staff of the PPDC continue to provide leadership in plant pest diagnostics and excellence in scientific service and research.

Following is a table representing the number of samples and specimens submitted to the laboratory in 2007, compared with previous years. Programs that include special surveys and projects are denoted by an asterisk. Note that numbers cannot be compared among the different disciplines (labs/programs) as an accurate indication of workload.

Labs/Programs	**2003**	**2004**	**2005**	**2006**	**2007**
Botany	3,284	1,008	1,000	1,474	1,029
Entomology*	36,146	45,000+	50,000+	50,000+	65,000+
Nematology*	4,782	3,874	4,923	7,912	8,648
Plant Pathology*	88,233	109,398	103,451	87,434	78,872
Seed	3,067	6,923	3,166	5,791	2,427
Total	**135,512**	**166,203**	**162,540**	**152,611**	**155,976**

RESEARCH

The scientists at the PPDC continue to do research and publish scientific papers as part of the mission of the branch. In the past year, members of the PPDC published 57 scientific papers, books, manuals or other publications. In addition, 51 oral presentations and/or posters were given at various professional meetings, seminars and training workshops. A list of scientific publications and presentations for 2007 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 and discuss ongoing research and pest issues of general importance and has continued throughout 2007 with enthusiasm and participation by many from within and outside of our branch. The speakers have included scientists from the PPDC, USDA, University of California, Davis and visiting scientists from other universities and agencies. 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.

CALIFORNIA STATE COLLECTION OF ARTHROPODS: 2007 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 Branch of the California Department of Food and Agriculture. Three curators directly supervise the care, use, growth and development of CSCA, 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: http://www.cdfa.ca.gov/phpps/ppd/csca.html As far as specimen usage, the California State Collection of Arthropods issued 18 loans in 2007, representing more than 2000 specimens and more than 25 visitors from the local, national and international communities have come in to study the collections.

The total number of prepared specimens is about 1.7 million, with more than 50,000 prepared specimens accessioned in 2007, including the start of exchange programs with the Deutsche Entomologische Institut in Eberswalde, Germany and the Queensland Department of Primary Industries in Brisbane, Australia. With the CSCA's blanket permit to collect arthropods in California's State Park system, several seasonal survey efforts were undertaken in 2007, including Annadel, Calaveras Big Trees, Indian Grinding Rock, Palomar Mountain and Providence Mountains State Parks. CSCA's frozen tissue collection has grown by over 1000 determined samples. Of these, 398 samples were determined to the species level with the remainder determined to genus. Several holotypes and numerous paratypes were deposited in CSCA in 2007, 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 over 40,000 species.

Through the Research Associates program, PPDC encourages the use of the collection, the growth of the collection through their respective donations and allow them to cite their associate status, if necessary, to provide an institutional address for their publications or grants. Several additional scientists have applied to our program in 2007, and are being considered for this courtesy appointment. The Research Associates can be found on the internet at: http://www.cdfa.ca.gov/phpps/ppd/csca.html#associates

STAFFING CHANGES

Tiffany Jones joined the PPDC as an Office Technician for the PPDC. She came to the PPDC after three years of service in the Inspection Services Division. Voted by her peers in the Inspection Services Division to be an employee "who makes CDFA a great place to work," Tiffany has definitely confirmed their vote of confidence in her new home at the PPDC.

Dr. Alessandra Rung is our newest Associate Insect Biosystematist, with a primary responsibility in the Entomology Lab for identification of Auchenorrhyncha (leafhoppers, planthoppers), which includes the Glassy Wing Sharpshooter (GWSS). Dr. Rung came to us from a position as a Postdoctoral Research Associate with the University of Maryland and USDA's Systematic Entomology Laboratory, where she worked with Dr. Dug Miller developing expert systems for the identification of scale insects. She received her Ph.D. in Entomology from the University of Maryland in 2003.

Gail Coleman came out of retirement from CDFA, bringing her expertise from years of experience in CDFA's Departmental Services with her to take a position as a Staff Services Analyst.

Tiffany Jones

Alessandra Rung

Gail Coleman

Eric Fisher

DEPARTURES

One long-time scientist retired and a number of other permanent employees left the Plant Pest Diagnostics Center (PPDC) to pursue other positions or other careers.

Senior Insect Biosystematist, **Dr. Eric Fisher**, retired after 30 years of state service. Dr. Fisher is a specialist on flies (Diptera), playing the critical role of diagnostics of tephritid fruit flies, which are among the most devastating invasive pests to California agriculture. Besides his diagnostic work on flies, Dr. Fisher is one of the foremost experts on the fly family Asilidae, or robber flies.

Shaun Winterton

Martin Hauser

Senior Insect Biosystematist, **Dr. Shaun Winterton**, left his position as our primary Auchenorrhyncha diagnostician to take up a position as Primary Entomologist for the Queensland Department of Primary Industries in his hometown of Brisbane, Australia.

Postdoctoral Scientist, **Dr. Martin Hauser**, left for a position as a Research Associate Professor in the Department of Biology at the University of South Carolina in Columbus.

Management Services Technician, **Margie Barela**, retired after more than 25 years of state service—the last six years with the PPDC.

Mary-Jean Sawyer

Carol Griggs and Margie Barela

After 18 years with the PPDC as an Agricultural Biological Technician, **Mary-Jean Sawyer** took a position as an Agricultural Biologist with the Japanese Dodder Eradication Project team in the Integrated Pest Control Branch. Among many other duties such as specimen triage, her work has included many critical aspects of the tephritid fruit fly diagnostics program, including screening for sterile Med flies, handling QC specimens, managing the PPDC database of invasive fruit fly interceptions and detections, and incorporation of invasive fruit flies into the Frozen Tissue Collection.

After four years with the PPDC as an Agricultural Biological Technician and a Scientific Aid, **Monica Negrete** left to pursue a career as a Registered Nurse. She will be in an accelerated training program for 18 months designed for persons already possessing a bachelor's degree, after which she will take her state board exams to become an RN.

After 10 years with the PPDC as a Staff Services Analyst, **Carol Griggs** left the PPDC to take a position with the Division of Plant Health & Plant Pest Prevention Services as an Associate Governmental Program Analyst. Carol now helps all the branches prepare duty statements and various other personnel documents. She also keeps track of all the vacant positions for the Division. Carol still lends her budget expertise to the branches as needed.

2007 PPDC PUBLICATIONS & PRESENTATIONS

2007 PPDC PUBLICATION LIST

Backus, E.A., **A.R. Cline**, M.S. Serrano and M.R. Ellerseick. 2007. *Lygus hesperus* (Hemiptera: Miridae) feeding on cotton: New methods and parameters for analysis of non-sequential electrical penetration graph data. Annals of the Entomological Society of America 100: 296–310.

Baalbaki, R. Seed Moisture Determination (Training Manual). CDFA Plant Pest Diagnostics Center. Sacramento. 2007.

Baalbaki, R. Germination of Grasses (Training Manual). CDFA Plant Pest Diagnostics Center. Sacramento. 2007.

Bellamy, C. L. 2007. Taxonomic comments and corrections in Buprestidae (Coleoptera). The Pan-Pacific Entomologist 83 (1): 80–84.

Bellamy, C. L. 2007. The genera *Aphanisticus* Latreille and *Endelus* Deyrolle in Fiji (Coleoptera: Buprestidae: Aphanisticini). In: N. L. Evenhuis and D. J. Bickle (Eds.): Fiji Arthropods VIII, Bishop Museum Occasional Papers 93:13–25.

Bellamy, C. L. 2007. Comments on the proposed conservation of usage of the name *Dactylozodes* Chevrolat, 1838 (Insecta, Coleoptera). Bulletin of Zoological Nomenclature 64(2): 124.

Bellamy, C. L. 2007. A new genus and species of Trigonogeniini Cobos, 1956 from Ecuador (Coleoptera: Buprestidae). The Coleopterists Bulletin 61(2): 159–163.

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Bellamy, C. L. 2007. Review of: A. V. Evans & J. N. Hogue. Introduction to California Beetles and Field Guide to California Beetles. American Entomologist (Fall 2007) 53(3): 184–185.

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Blomquist, C.L., Thomas, S.L., McKemy, J.M., Nolan, P. and M. Luque-Williams. 2007. First report of *Uromyces transversalis*, causal agent of Gladiolus Rust, in San Diego County, California. Plant Disease 91:1202.

Bonsignore, C. P. and **C. Bellamy**. 2007. Daily activity and flight behavior of adults of *Capnodis tenebrionis* (Coleoptera: Buprestidae). European Journal of Entomology 104:425–431.

Chitambar, J. J., Dong, K., Subbotin, S.A. and R. Luna. 2007. Do exotic and invasive plant-parasitic nematodes exist in California's agricultural production sites? Journal of Nematology, 39:91 (Abstract).

Chitambar, J. J., Dong, K., Subbotin, S.A. and R. Luna. 2007. "Annual Report of the Nematology Laboratory." California Plant Pest and Disease Report.

Cline, A.R. 2007. A New Species of *Thalycra* Erichson, 1843 (Coleoptera: Nitidulidae) from Baja California, Mexico with commentary on the genus. The Pan-Pacific Entomologist 83: 161–170.

Cline, A.R. 2007. "Field Guide to Beetles of California." By A.V. Evans and J.N. Hogue. The Coleopterists Bulletin 61:476–477 (Book Review).

Dong, K., Chitambar, J.J., Subbotin, **S.A**., Alzubaidy, M., Luque-Williams, M., Romero, J., Kosta, K.L., and **R. Luna**. 2007. "California Statewide Nematode Survey Project." California Plant Pest and Disease Report.

Elias, S., **Baalbaki, R.**, and M. McDonald. 2007. Seed Moisture Determination Principles and Procedures: Contribution No. 40 to the Handbook on Seed Testing. Association of Official Seed Analysts, Stillwater, OK.

Eskalen, A., **Rooney-Latham, S**. and W.D. Gubler. 2007. Protection of grapevine pruning wounds against esca and young esca pathogens. Phytopathology 97: S33.

Eskalen A., **Rooney-Latham, S.** and W.D. Gubler. 2007. Identifying effective management strategies for esca and Petri disease. Phytopathologia Mediterranea 46:125–126.

Eskalen A., **Rooney-Latham, S.** and W.D. Gubler. 2007. Occurrence of two new species of *Togninia* in California. Phytopathologia Mediterranea 46:102.

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Gallegos L., **Rooney-Latham, S.** and W.D. Gubler. 2007. Apple as a possible alternative host for grapevine pathogens in California. Phytopathologia Mediterranea 46:117.

Garrison, R. W. 2007. *Kalocora* Kennedy, 1940, a junior synonym of *Cora* Selys, 1853 (Odonata: Polythoridae). International Journal of Odonatology 10 (2): 185–188.

Garrison, R. W. and N. von Ellenrieder. 2007. The true *Argia difficilis* Selys, 1865, with the description of *Argia yungensis* sp. nov. (Odonata: Coenagrionidae). Transactions of the American Entomological Society 133 (1+2): 189–204.

Gubler, W. D., **Rooney-Latham, S**. and A. Eskalen. 2007. *Togninia*: Newly discovered pathogen causes centuries-old disease. Phytopathology 97: S168.

Hauser, M. and D. W. Webb. 2007. A Revision of the new world fly genus *Ataenogera* Kröber (Diptera: Therevidae: Phycinae) with the description of two new species. Zootaxa 1530: 41–67.

Hauser, M. and **E. M. Fisher**. 2007. The identity of the fossil Diptera *Psilocephala tarsalis* (Statz, 1940) (Diptera: Asiloidea). Zootaxa 1465:65–68.

Hauser, M. and **S. L. Winterton.** 2007. A new fossil genus of small-headed flies (Diptera: Acroceridae: Philopotinae) from Baltic Amber. Annals of the Entomological Society of America 100 (2): 152–156.

Hodgson, C., Gamper, H., Bogo, A. & **Watson, G.W.** (2007) A taxonomic review of the Margarodoid genus *Stigmacoccus* Hempel (Hemiptera: Sternorrhyncha: Coccoidea: Stigmacoccidae), with some details on their biology. *Zootaxa* **1507**: 1-55.

Hrusa, G. F. and **D. G. Kelch.** 2007. "Profile: CDFA Botany Lab." Noxious Times, Winter 2007, pp. 12–15.

Kaiser, M.E., Noma, T., Brewer, M.J., Pike, K.S., Vockeroth, J.R. and **S.D. Gaimari**. 2007. Hymenopteran parasitoids and dipteran predators found using soybean aphid after its Midwestern United States invasion. Annals of the Entomological Society of America 100: 196–205.

Kerr, P.H. 2007. Revision of the Holarctic genus *Novakia* Strobl (Diptera: Mycetophilidae). Zootaxa 2554: 27–40.

Madani, M., Kyndt, T., Colpaert, N., **Subbotin, S.A**., Gheysen, G. and M. Moens. 2007. Polymorphism among sugar beet cyst nematode *Heterodera schachtii* populations as inferred from AFLP and ITS-rRNA gene analyses. Russian Journal of Nematology 15: 117–128.

Medianero, E., G. Castaño-Meneses, A. Tishechkin, Y. Basset, H. Barrios, F. Ødegaard, **A.R. Cline**, J. Bail, & L. Cizek. 2007. Influence of local illumination and plant composition on the spatial and seasonal distribution of litter-dwelling arthropods in a tropical rainforest. Pedobiologia 51:131–145.

Miller, D.R**., Rung, A**., Venable, G. and **R.J Gill.** 2007. Scale Insects: Identification tools, images, and diagnostic information for species of quarantine significance. CD-room. USDA, SEL, APHIS.

Meyer, D. J. L. Pure seed versus inert matter: How do you know? (Training Manual). CDFA Plant Pest Diagnostics Center. Sacramento. 2007.

Meyer, D. J. L. and **J. Effenberger**. Identification of California noxious weed pest propagules Grasses (Training Manual). CDFA Plant Pest Diagnostics Center. Sacramento. 2007.

Meyer, D. J. L., Wiersema, J. H. and Richie (Eds.). 2007. Uniform classification of weed and crop seeds: Contribution no. 25 to the handbook on seed testing. 6th ed. Association of Official Seed Analysts, Stillwater, OK.

Nagamine, W.T. and **M.E. Epstein**. 2007. Chronicles of *Darna pallivitta* (Moore 1877) (Lepidoptera: Limacodidae): biology and larval morphology of a new pest in Hawaii. Pan-Pacific Entomologist, 83 (2):120–135.

Perry, R.N., **Subbotin, S.A**. and M. Moens. 2007. Book Chapter: Molecular Diagnostics of Plant-Parasitic Nematodes. In the Book: *Biotechnology and Plant Disease* Management. CABI, UK. 624 pages. Edited by Z. K. Punja.

Peterson, P. and **E. Harris.** 2007. Vegetable Seed Germination and Seedling Evaluation (Training Manual). CDFA Plant Pest Diagnostics Center. Sacramento. 2007.

Rooney-Latham, S., Blomquist, C.L., Pastalka, T. and L. Costello. 2007. First Report of *Phytophthora siskiyouensis* causing disease on Italian alder in Foster City, CA. Phytopathology 97: S101.

Rooney-Latham S., Eskalen, A. and W.D. Gubler. 2007. Identification of a portion of the mating type (MAT-2) gene in *Togninia minima*. Phytopathologia Mediterranea 46:102.

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Schubert, T.S., Rizvi, A., Brown, L.G., **Blomquist, C**., and E. Killgore. 2007. First occurrence of gladiolus rust caused by *Uromyces transversalis* in the United States Phytopathology 97:S105.

Sturhan, D., Wouts, W.M.& **S.A. Subbotin**. 2007. An unusual cyst nematode from New Zealand*, Paradolichodera tenuissima* gen. n., sp. n. (Tylenchida, Heteroderidae). Nematology 9: 561–571.

Subbotin, S.A., Sturhan, D., Vovlas, N., Castillo, P., Tanyi Tambe, J., Moens M. and J.G. Baldwin. 2007. Application of secondary structure model of rRNA for phylogeny: D2-D3 expansion segments of the LSU gene of plant-parasitic nematodes from the family Hoplolaimidae Filipjev, 1934. Molecular Phylogenetics and Evolution 43:881–890.

Tanha Maafi, Z., Sturhan, D., Handoo, Z., Mordehai, M., Moens, M. and **S.A. Subbotin**. 2007. Morphological and molecular studies of *Heterodera sacchari*, *H. goldeni* and *H. leuceilyma* (Nematoda: Heteroderidae). Nematology 9: 483–497.

von Ellenrieder, N. & **R. W. Garrison**. 2007. Libélulas de las Yungas (Odonata). Una Guía de Campo para las especies de Argentina — Dragonflies of the Yungas (Odonata). A Field guide to the species from Argentina. Pensoft Series Faunistica 67, Pensoft Publishers, Sofia-Moscow, iv + 116 pp.

Watson, G.W. (2007) Sternorrhyncha. *California Plant Pest and Disease Report* **23**(1): 10-12.

Watson, G.W. (2007) Thysanoptera. *California Plant Pest and Disease Report* **23**(1): 14-15.

Winterton, S.L. 2007. New species of *Laxotela* Winterton & Irwin from Australia (Diptera: Therevidae: Agapophytinae). Zootaxa, 43–55.

Winterton, S.L. 2007. Revision of *Acatopygia* Kröber from Australia (Diptera: Therevidae: Agapophytinae). Zootaxa, 51–62.

Yakabe L.E., **Blomquist C.L**., **Thomas S.L.** and J.D. MacDonald. 2007. Identification and frequency of *Phytophthora* species causing foliar diseases in California ornamental nurseries. Phytopathology 97:S126.

Zhang, Yun-Ping and Jerry Uyemoto. "Cherry Green Ring Mottle Virus." Book Chapter in: Rao G., Myrta A., and Ling K.S. (eds.). Characterization, Diagnosis & Management of Plant Viruses, Vol. 2: Horticultural Crops. pp. 259–266. Studium Press LLC, USA. 2007.

2007 PRESENTATIONS BY CDFA PPDC STAFF

Baalbalki, R. "Statistics Workshop" (Co-organizer and instructor). Association of Official Seed Analysts and Society of Commercial Seed Technologists Annual Meeting, Cody Wyoming, June 5, 2007.

Baalbaki, R. . "Introduction of the Seed Moisture Determination handbook." (Joint presentation with Drs. McDonald and Elias). International Conference; Association of Official Seed Analysts and Society of Commercial Seed Technologists; Cody, Wyoming June 2007.

Baalbaki, R. "Germination/Dormancy Rule Changes." International Conference; Association of Official Seed Analysts and Society of Commercial Seed Technologists; Cody, Wyoming June 2007.

Baalbaki, R. International Conference; Association of Official Seed Analysts and Society of Commercial Seed Technologists; Cody, Wyoming June 2007.
"Progress Report on Modifications to Table 3, Methods of Testing for Laboratory Germination."

Bellamy, C. L. "Odd Bugs in the Outback: Collecting in Australia." California Department of Food & Agriculture, Plant Pest Diagnostics Branch Seminar Series, 23 August 2007.

Blomquist, C.L. "Symptoms of *Phytophthora ramorum* and look-alikes on nursery plants and *Phytophthora ramorum*: research efforts and findings." The California Oak Mortality Task Force training on *Phytophthora ramorum*, Sacramento CA, Nov. 15, 2007.

Chitambar J. J. "Is California agriculture free of exotic and invasive plant parasitic nematodes? – A look at current and past nematode surveys." California Department of Food and Agriculture, Plant Pest Diagnostics Branch Seminar Series. January 22, 2007.

Chitambar J. J. "The Potato cyst nematode in Idaho and impact on California." 39th California Nematology Workshop organized by the University of California and California Department of Food and Agriculture, at Kearney Agricultural Center, Parlier, California. March 27, 2007.

Chitambar, J. (presenter), K. Dong, S. Subbotin, and R. Luna. "Do exotic and invasive plant parasitic nematodes exist in California's agricultural production sites?" Presented at the joint

meeting of The American Phytopathological Society and Society of Nematologists in San Diego, California. July 31, 2007.

Cline, A. R., Bellamy, C. L., Ivie, M. A., Evans, A. and **J**. **Scher**. "Staying lucid while attempting to identify intercepted wood-boring beetles. An introduction to the wood-boring beetles of the world." Poster Presentation. The 55th Annual Meeting of the Entomological Society of America, December 9–12, 2007, San Diego, California.

Cline, A. R. "Exploring Arthropod Diversity in a Lowland Tropical Forest: A Study from the San Lorenzo Protected Area in Panama." Pacific Coast Entomological Society, Davis, CA: 2007.

Cline, A. R. "The Wonderful World of Sap Beetles. (Coleoptera: Nitidulidae)." California Department of Food and Agriculture, Plant Pest Diagnostics Branch Seminar Series March 22, 2007.

Effenberger, J. "Proposed By-law changes. " International Conference; Association of Official Seed Analysts and Society of Commercial Seed Technologists; Cody, Wyoming June 2007.

Effenberger, J. "Ethical Problems within AOSA." International Conference; Association of Official Seed Analysts and Society of Commercial Seed Technologists; Cody, Wyoming June 2007.

Effenberger, J. "Activities of the AOSA Ethics Committee." International Conference; Association of Official Seed Analysts and Society of Commercial Seed Technologists; Cody, Wyoming June 2007.

Elias, S. and D.J.L. Meyer "More Efficient and Uniform Laboratory Methods to Test Lawn Grass and Native Species." International Conference; Association of Official Seed Analysts and Society of Commercial Seed Technologists; Cody, Wyoming June 2007

Epstein, M.E. "Moving along the branches: Evolution of larval locomotion (Section A Symposium: Integrating Larval Ecology and Behavior to Illuminate the Evolution of Lepidoptera)." Entomological Society of America, Annual Meeting, San Diego Dec. 9–12.

Epstein, M.E. Light Brown Apple Moth Workshop. San Diego (and surrounding counties) (July 16, 2007).

Epstein, M.E. Light Brown Apple Moth Workshop. San Jose (August 28, 2007).

Epstein, M.E. Light Brown Apple Moth Workshop. Sacramento/Meadowview (Coast Quarantine Group) (October 31, 2997).

Gaimari, S.D. "*Minettia flaveola* and its kin." ESA Annual Meeting, San Diego, Dec. 11, 2007.

Gaimari, S.D. "One Less Acalyptrate Family? The status of Eurychoromyiidae." Department of Entomology Seminar Series, University of California, Davis, Feb. 14, 2007.

Gaimari, S.D. "The PEET program, or How did I get here?" 6th National Science Foundation PEET meeting (Symposium: Where are they now?), Athens, GA, Mar. 29, 2007.

Gaimari, S.D. "The Wonderful World of Lauxanioidea (Insecta: Diptera), or *Minettia flaveola* and its kin." CDFA-PPD Seminar Series, Sacramento, Nov. 15, 2007.

Gaimari, S.D. "The Wonderful World of Lauxanioidea (Insecta: Diptera), or *Minettia flaveola* and its kin." Presidential Address, Pacific Coast Entomological Society, San Francisco, Dec. 14, 2007.

Garrison, R. W. 5th WDA International Congress of Odonatology. 16–20 April 2007, Swakopmund, Namibia. Organized by Worldwide Dragonfly Association and National Museum of Namibia, Windhoek.

Garrison, R. W. "Research on the Neotropical Odonata: Current results and challenges ahead." 5th Worldwide Dragonfly Association International Congress of Odonatology, National Museum of Namibia, Windhoek, Namibia, April 16–20, 2007.

Garrison, R. W. & N. von Ellenrieder. 2007. "Will the real *Argia difficilis* please stand up?" 5th Worldwide Dragonfly Association International Congress of Odonatology, National Museum of Namibia, Windhoek, Namibia, April 16–20, 2007.

Hodges, A.C., and **S.D. Gaimari.** "The value of connecting with the National Plant Diagnostic Network (NPDN) to taxonomic collections and specialists." Entomological Collections Network Annual Meeting, San Diego, Dec. 8, 2007.

Kelch, D.G. "Flora of The West Cape, South Africa." Sacramento Cactus and Succulent Society. March 2007.

Kelch, D.G. "Succulent flora of the Canary Islands." Stockton Cactus and Succulent Society. April 2007.

Kelch, D.G. "The Robinson Crusoe Island and Hawaii: A Comparison of Vegetation of Two Pacific Volcanic Islands." California Department of Food and Agriculture, Plant Pest Diagnostics Branch Seminar Series. May 24, 2007.

Kerr, P.H., Bellamy, C.L. and **S.D. Gaimari**. "California State Collection of Arthropods (CSCA)." Entomology Collections Network Annual Meeting, San Diego, CA, December 8–9, 2007.

Larsen, P., **Epstein, M**. and S. Weller. "Preliminary phylogeny of the slug moths (Limacodidae) and evolution of larval body types." Entomological Society of America, Annual Meeting, San Diego Dec. 9–12.

Meyer, D.J.L "Annual Report of AOSA Purity Committee." International Conference; Association of Official Seed Analysts and Society of Commercial Seed Technologists; Cody, Wyoming June 2007.

Meyer, D.J.L. "CDFA Seed Laboratory Status Report." California Seed Advisory Board Meeting. Sacramento, CA. May 9, 2007.

Meyer, D.J.L. "CDFA Seed Laboratory Status Report." California Seed Advisory Board Meeting. Sacramento, CA. November 15, 2007.

Meyer, D. J. L. "Pure seed versus inert matter: How do you know when testing native species?" The 7th Annual Native Seed Quality Symposium, Seed Testing Research Foundation, Cody, Wyoming, June 5, 2007.

Meyer D. J. L. and L. Prentice. "Laboratory sampling, purity and viability test relationships." The 7th Annual Native Seed Quality Symposium, Seed Testing Research Foundation, Cody, Wyoming, June 5, 2007.

Rooney-Latham, S. "The use of various pre-harvest practices for the management of 'Sour Rot' and 'Non-Botrytis Slip Skin' of Red Globe table grapes" American Phytopathogical Society Meeting in San Diego, CA. July 28–Aug 1, 2007. (Phytopathology 97: S101).

Rooney-Latham, S. "*Phytophthora siskiyouensi*s on Italian Alder in Foster City, California." California Forest Pest Council Annual Meeting. Nov 13–14, 2007.

Rooney-Latham, S. Sudden Oak Death Training Session in Ventura County, CA. Nov 6, 2007.

Rung, A., Scheffer, S., Evans, G. and D. Miller. "Molecular identification of two closely related species of mealybugs (Pseudococcidae: Planococcus)." Poster presentation at XI international symposium on scale insect studies - ISSIS, 2007, Oieras, Portugal, 2007.

Subbotin, S.A., Rasdale, E.J., Mullens, R.P., and J.G. Baldwin. "Molecular diagnostics and phylogenetic relationships of some species of root-lesion nematodes of the genus *Pratylenchus*." The APS and SON Joint Meeting, San Diego, CA, July 28–August 1, 2007.

Subbotin, S.A. "Application of structural information on ribosomal RNA for phylogeny: examples with nematodes." Nematology Department, UC Davis, 12 March, 2007.

Thomas, C.S., Cresswell, T., Luke, E., Nutter, F.W., Lanier, W., Durgy, R., Byrne, J., **Tidwell, T.**, and M.A. Draper. "Expansion of data collection capabilities for the National NPDN Database." Poster presentation at National Plant Diagnostics Network Meeting, Orlando, FL. January 28–31, 2007.

Tidwell, T., Blomquist, C., Umesh, K.C., Osterbauer N., Putnam, M., and J. Fallacy. 2007. "*Phytophthora ramorum* in the USA: A Time Line of Knowledge and Events." Poster presentation at National Plant Diagnostics Network Meeting, Orlando, FL. January 28–31, 2007.

von Ellenrieder, N & **R.W. Garrison**. 2007. "Dragonfly guardians of the southern wing of the Yungas mountain rain forest." 5th Worldwide Dragonfly Association International Congress of Odonatology, National Museum of Namibia, Windhoek, Namibia, April 16–20, 2007.

Watson, G.W. & El-Serwy, S.A. "Aspects of the biology, ecology and parasitism of *Acanthomytilus sacchari* (Hall) (Hemiptera: Diaspididae) on sugarcane in Egypt." Branco, M. (ed.) Proceedings of the Eleventh International Symposium of Scale Insect Studies, 24-27 September 2007, Oeiras, Portugal.

Watson, G.W. "Field Identification of Mealybugs on Grapevines" Grape Day Meeting, Amador County Fairground, Plymouth, Amador County. 14 June 2007.

Watson, G.W. "Surveillance and Diagnosis of Whiteflies and Mealybugs in Developing APEC Economies for Improved Market Access." Biosystematic training, APEC Re-entry Workshop. Faculty of Biology, Universiti Malaya, Kuala Lumpur, Malaysia, 16-27 April 2007.

AWARDS

Garrison, R. L. Award for Excellence 2007 from the Worldwide Dragonfly Association, for outstanding achievements and contributions in the field of Odonatological research. 5th Worldwide Dragonfly Association International Congress of Odonatology, National Museum of Namibia, Windhoek, Namibia, April 16–20, 2007.



WORKING TO PROTECT CALIFORNIA'S URBAN, RURAL, NATURAL AND AGRICULTURAL ENVIRONMENT