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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 protects 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

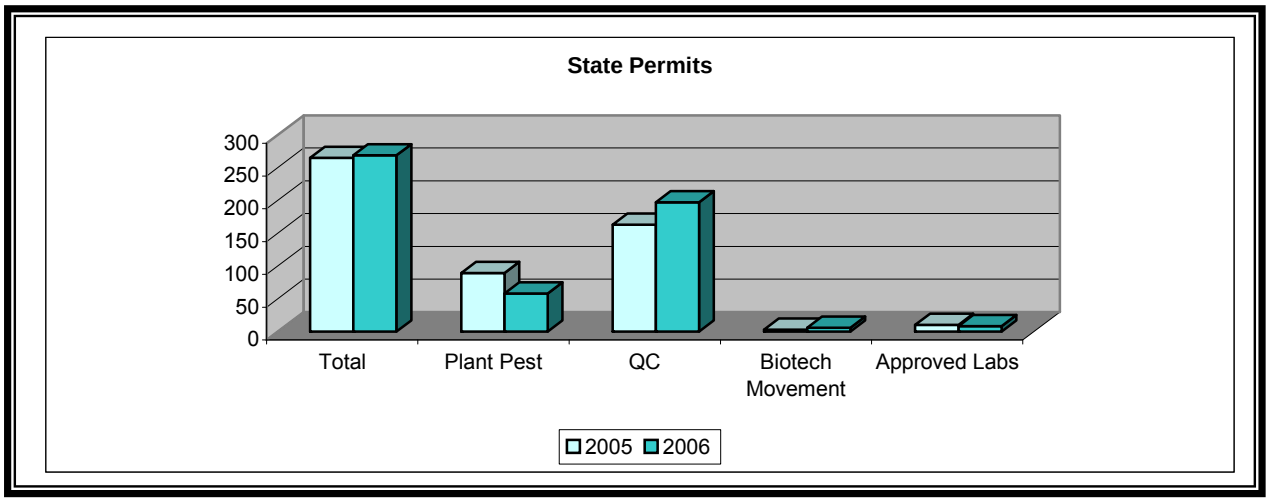
The permits and regulations program develops all regulations administered by the Division of PHPPS and develops associated legally required documents such as notices, statements of reason, orders and certificates of compliance. The Special Assistant serves as regulatory coordinator for the Division and 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 entry into the United States. The USDA has launched its new Web-based electronic permitting system (e-Permits). The state concurrence process is now handled via the Internet for plant pest, biotechnology and departmental permits. The other federal permits will be added to e-Permits in the future.

The primary activities of the permits and regulations program significantly increased during the 2006 calendar year over 2005 (for comparison, 2005 activities are in parentheses):

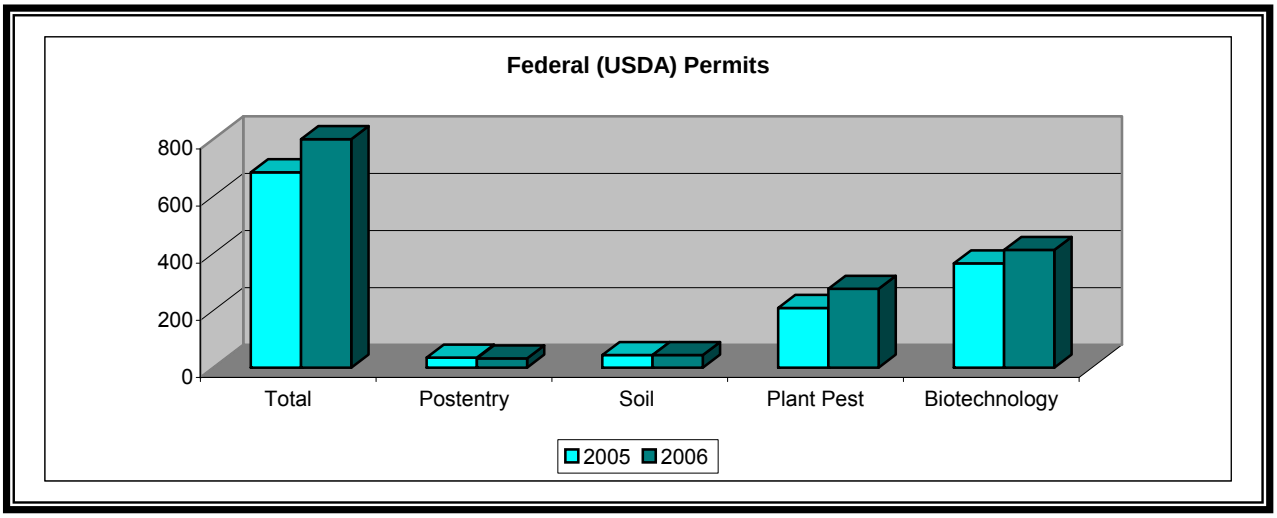
State Permits

There were 269 (265) state permits issued including 58 (89) plant pest permits; 31 for pathogens and 27 for arthropods, 197 (163) quarantine commodities permits, six (three) biotechnology movement authorizations and eight (10) approved laboratory permits.



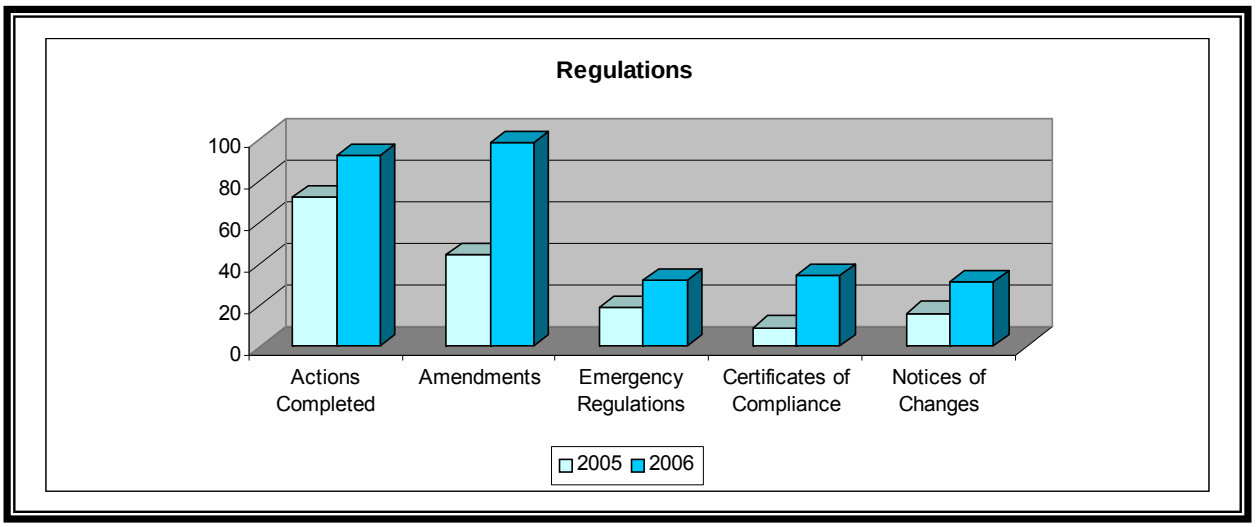
Federal (USDA) Permits

A total of 800 (684) applications for federal permits were reviewed and processed including 32 (35) postentry quarantine agreements, 44 (44) soil permits, 276 (209) plant pest permits (166 for pathogens, 110 for arthropods), 412 (365) biotechnology permits and 36 (31) permits for federally prohibited plant material.



Regulations

There were 92 (72) regulatory actions completed that included the adoption, repeal or amendment of 98 (44) regulations; including 32 (19) emergency regulations, 34 (nine) certificates of compliance; and 31 (16) 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 Projects, 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 (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 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 of 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 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, 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 worldwide 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

Below are highlights for 2006.

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 2006, emergency responses were conducted for infestations of Mediterranean fruit fly, Oriental fruit fly, Peach fruit fly, sudden oak death and Diaprepes root weevil.

- **Mediterranean Fruit Fly, Rancho Cucamonga, San Bernardino County and Pomona, Los Angeles County**

From October 2005 to September 2006, a Mediterranean fruit fly quarantine was established in the Rancho Cucamonga area of San Bernardino County. The 204 square-mile quarantine area included the cities of Rancho Cucamonga, San Antonio Heights, San Bernardino, Upland, Montclair, La Verne, Pomona, San Dimas and San Gabriel. The quarantined area was primarily urban and included the Ontario International Airport. Over 968 businesses were affected and included growers, produce markets, wholesale produce distributors, fruit packing facilities, swap meets, certified farmers' markets, nurseries, landscaping companies 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 Program staff supervised 170 treatments to allow the safe movement of avocados, citrus, chiles, figs, guavas, kumquats, lemons, loquats, oranges, quince, stone fruit, tangerines and tomatoes out of the quarantined area.

Quarantine enforcement was conducted with the cooperation of the Department of Homeland Security, Customs and Border Protection and USDA/Animal and Plant Health Inspection Services (APHIS) - Plant Protection and Quarantine at the Ontario International Airport. The Department of Homeland Security, Transportation Security Administration and Customs and Border Protection supports the program by asking passengers outbound from Ontario International Airport to dispose of homegrown Mediterranean fruit fly host material that originated within the quarantined area before boarding a flight.

Approximately 51,107 pounds of Mediterranean fruit fly host material from high-risk nurseries, mobile vendors and departing passengers were disposed of in approved landfills.

- **Mediterranean Fruit Fly, San Jose, Santa Clara County**

From October 2005 through September 2006, a Mediterranean fruit fly quarantine was established in the San Jose area of Santa Clara County. The quarantine was approximately 77 square miles in a primarily urban area. Affected businesses included produce markets, swap meets, farmers' markets, nurseries, landscaping companies and community gardens. Over 520 businesses were affected and operated under program compliance agreements. Hold Notices were issued to 13 growers and seven nurseries within the quarantined area to prevent the movement of untreated fruit fly host material. Notices of Violation were given to 20 establishments for non-compliance with the quarantine regulations.

- **Oriental Fruit Fly, Rialto, San Bernardino County**

An Oriental fruit fly quarantine was established in September 2006, consisting of a 65 square-mile area in the city of Rialto, San Bernardino County. The quarantine was primarily in an urban area. Program staff issued compliance agreements that defined the handling, safeguarding and deposition of fruit fly host material associated with high-risk nurseries, mobile vendors, yard maintenance companies, street vendors and other identified establishments. Program staff issued 227 compliance agreements, 21 Hold Notices to prevent movement of fruit fly host material and disposed of approximately 743 pounds of fruit fly host material at a local landfill within the quarantined area. The quarantine was lifted in December 2006 after three life cycles of the Oriental fruit fly were completed with no new fly detections.

- **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 quarantined area is approximately 93 square miles, in primarily an urban area. Over 323 businesses/properties in the quarantined area were operating under compliance agreements by the end of 2006. Affected businesses include produce markets, fruit packing facilities, flea markets, swap meets, farmers' markets, landscaping companies and community gardens. Interior Pest Exclusion staff activities include monitoring grower's treatments, site visits, public outreach and regulatory enforcement. Crops treated in the quarantined area are predominantly avocado, lemons, oranges and row crops. Hold Notices were issued to 28 businesses/properties within the quarantined area to prevent movement of fruit fly host materials.

- **Peach Fruit Fly, Fresno and Madera Counties**

In May 2006, a Peach fruit fly quarantine was established in portions of Fresno and Madera Counties. The quarantined area was approximately 106 square-miles. Over 600 businesses and/or properties in the quarantined area were operating under compliance agreements. Affected businesses included produce markets, fruit packing facilities, swap meets, farmer's markets, landscaping companies and fruit/vegetable growers. Program staff activities included monitoring grower treatments, site visits, public outreach and regulatory enforcement. Over 900

acres of citrus, figs, vegetables, stone fruit and other host crops were treated. Hold Notices were issued to 350 businesses/properties within the quarantined area to prevent movement of fruit fly host material. The quarantine was lifted at the end of July 2006 after three generations of negative trapping.

- **Diaprepes Root Weevil, Newport Beach, Huntington Beach and Yorba Linda, Orange County**

In September 2005, a Diaprepes root weevil (Diaprepes) quarantine was established in the Newport Beach area of Orange County. Two new Diaprepes quarantines were established in 2006 in part of the cities of Huntington Beach and Yorba Linda. Cumulatively, about 8.6 square-miles are under Diaprepes quarantine in Orange County, primarily in urban areas. Over 335 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, homeowner's 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, Long Beach, Los Angeles County**

In October 2005, a Diaprepes quarantine was established in the Long Beach area of Los Angeles County. The quarantined area is approximately two square-miles, in primarily an urban area. Over 51 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, homeowner's 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.

- **Diaprepes Root Weevil, San Diego County**

Between May and November 2006, six Diaprepes quarantines were established in the La Jolla, Encinitas, Carlsbad, La Jolla South, Fairbanks/Rancho Santa Fe and Oceanside areas of San Diego County. The quarantined areas are cumulatively approximately 17.1 square-miles, in primarily suburban areas. Over 300 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, homeowner's 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.

- **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 1,411 businesses are under program compliance (see Table 1 below) to ensure that regulated materials shipped within and from California are free of *P. ramorum*.

Table 1. Number of Businesses Regulated for *P. ramorum* in 2006

Counties	Regulated Business	Count
Quarantined	Nursery Stock/Soil of Nursery Stock	169
	Non-host, Bare-root Nursery Stock	40
	Wood and Wood Products	29
	Greenery, Garland and Wreathes	13
	Green Waste Facility/Transporter	140
	Compost Facility	15
	Tree Farm	14
Regulated	Nurseries that ship host material	393
	Nurseries that only ship non-host material	598
Total		**1.411**

A total of 1,200 nurseries were surveyed/inspected for *P. ramorum* in 2006. *P. ramorum* was detected at 28 of the surveyed/inspected nurseries. Interior Pest Exclusion activities associated with the detections are listed in Table 2 below.

Table 2. Interior Pest Exclusion Activities at Nurseries where *P. ramorum* was Detected

Survey/Inspection	Quarantined Counties	Regulated Counties	Total
Compliance Agreement	7	7	14
Nursery Stock Cleanliness	7	1	8
Trace Forward	2	0	2
Other/Trace Back	2	2	4
Total	**18**	**10**	**28**

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 2006, Interior Pest Exclusion staff oversaw that appropriate eradication efforts were carried out at all 28 *P. ramorum*-positive nursery sites.

In 2006, county agricultural commissioner's staff submitted 21,252 samples from nurseries for *P. ramorum* testing at the California Department of Food and Agriculture's (Department) Plant Pest Diagnostics Laboratory. *P. ramorum* was detected in less than one percent (or 145) of the samples. Approximately 92 percent of the detections in nursery samples were taken from two plant types, *Camellia spp.* and *Rhododendron spp*. Other *P. ramorum*-positive nursery stock included *Laurus nobilis, Magnolia grandiflora, Nerium Oleander, Osmanthus spp., Pieris spp., Vancouveria planipetala* and *Viburnum spp.*

The Emergency Federal Order of December 2004 regulates the interstate movement of nursery stock hosts and associated hosts of *P. ramorum* from 44 California counties not considered infested with the disease. The remaining 14 counties are not included in the federal order, because the movement of nursery stock and other commodities from these counties is regulated in the Federal Domestic Quarantine for *P. ramorum* (7CFR 301.92). There were no changes in the regulation in 2006. Program staff implemented both the Federal Domestic Quarantine and Emergency Federal Order for the control of *P. ramorum.*

In fulfillment of the Emergency Federal Order on *P. ramorum*, Interior Pest Exclusion regularly updated lists of "California Nurseries Approved for Shipping" on the Department 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 Response to a Pest Incident

When pests are discovered in arriving commodities, Interior Pest Exclusion responds by taking immediate action to contain the pest and eliminate the risk of the pest escaping and becoming established in the state. The immediate action, conducted in cooperation with the local county agricultural commissioner's office, is to locate and dispose of the entire infested commodity. Additionally, investigations are conducted to determine the extent of distribution in the state of the infested commodity, to determine how the commodity became infested, and to determine if certification or other pest cleanliness procedures must be implemented or corrected at origin to prevent similar incidents in the future.

The following are some of the pest incidents in 2006:

- **Mexican Fruit Fly Larvae in Grapefruit from Texas**

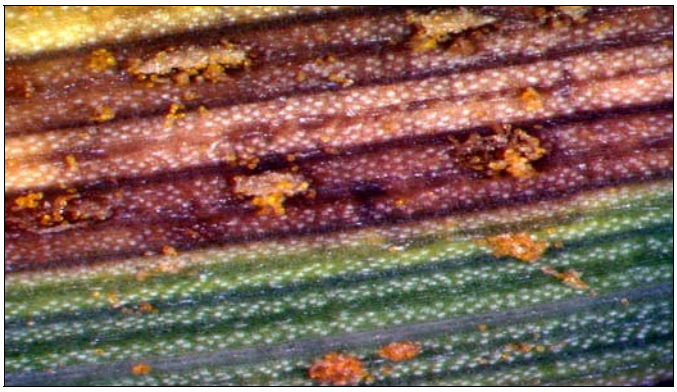
In March 2006, the Arizona Department of Agriculture (ADA) notified the Deaprtment that live Mexican fruit fly (*Anastrepha ludens*) larvae were found in Texas-origin citrus. The fruits originated from the citrus producing region of Texas known as the Rio Grande Valley. Paperwork indicated the infested fruit was destined for California. The ADA also notified the Department that six previous shipments originating in the same production zone had already been delivered or was en route to California. Program staff conducted "trace forward" of the shipments to two locations, a processing plant and a national retailer's distribution warehouse. A total of 25 "bins" were shipped to the processing plant in Corona. Program staff inspected and released the bins after no pests were found in the shipment. The retailer's distribution center received 56 bins that were delivered to 44 locations. The retailer opted to release the bins for disposal after they had been frozen solid.

- **Chrysanthemum White Rust, Santa Barbara County**

In February 2006, a localized incidence of *Puccinia horiana,* the casual agent of Chrysanthemum White Rust (CWR), was confirmed in a greenhouse, cut flower production facility in Santa Barbara County. In accordance with the CWR National Management Plan for Exclusion and Eradication, infected plants were destroyed and treatment was carried out in the contaminated greenhouses. Remaining plants were released after treatments and inspections were completed with no further symptoms of CWR. Investigations indicated that the infected plants originated in California, Utah and Florida; however, no symptoms of CWR were found during inspections of the origins of the infected plants. A 400-meter door-to-door survey around the infected nursery was conducted and no symptoms of CWR were observed.

- **Bamboo Rust (*Dasturella divina),* Los Angeles County**

In November 2006, the Los Angeles County Agricultural Commissioner's Office notified Interior Pest Exclusion that a shipment of Bamboo plants (*Bambusa vulgaris*) from Hawaii was found infected with Bamboo rust (*Dasturella Divina*). The fungus, which causes leaf rust, is not known to occur in North America, and can destroy tissues of bamboo leaves; thus seriously decreasing the rate of photosynthesis. The shipment was recovered, confirmed infested and destroyed under county supervision.



Bamboo rust, *Dasturella Divina*

- **Aquatic Weed, *Cabomba caroliniana*, from Thailand in Los Angeles County**

Interior Pest Exclusion staff received information from USDA/APHIS/PPQ regarding a shipment from Thailand with several aquatic weeds destined to a business in Los Angeles County. The business was visited, inspected and samples were collected that were confirmed as *Cabomba caroliniana* by the Department's Pant Pest Diagnostic Laboratory. This "Q"-rated weed, commonly known as Carolina fanwort or green cabomba, is an invasive weed not known to occur in the western states. The weeds were collected and destroyed.

Cabomba Caroliniana

QUARANTINE TRAINING, DIRECTION, OVERSIGHT AND CONSULTATION

Each county agriculture 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 57 regional training sessions for 968 county staff from 46 different counties during 2006. Topics included chrysanthemum white rust, sudden oak death, glassy-winged sharpshooter, nematology, quarantine certification examinations, County Procedural Training Manual update, Pest Damage Record training, 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 sapote fruit fly and emerald ash borer. Within the year, program staff partnered with the University of California in conducting "First Detector Training" and certified over 350 county agricultural and Department staff (see Table 3 below).

Table 3. Regional Training Sessions in 2006

Training Category	Sessions	Counties Served	Participants
Quarantine	33	24	577
Phytosanitary	24	22	391
Total	**57**	**46**	**968**

Interior Pest Exclusion provides direction and information to county agricultural departments by issuing documents such as Pest Alerts, Pest Exclusion Advisories and Phytosanitary Advisories. There were 43 of these documents issued in 2006 (see Table 4 below).

Table 4. Documents Issued by Interior Pest Exclusion in 2006

Document	Number Issued	Purpose
Pest Exclusion Advisories	21	To advise of specific handling, inspection, or treatment protocols for specific situations
Phytosanitary Advisories	22	To relay import information regarding the certification requirements of other states

Interior Pest Exclusion also provides consultation to agricultural officials in other states, the United States Department of Agriculture (USDA), the agricultural industry and the general public. The program advises on issues relating to quarantine enforcement, interpretation of regulations and methods of certification and inspection.

Most of the consultations performed by program biologists were through inquiries received via telephone or electronic mail. The majority of the inquiries are from county agricultural commissioner's staff and Department district offices. Figure 1 (below) illustrates the percentages of each type of consultation handled by program staff.

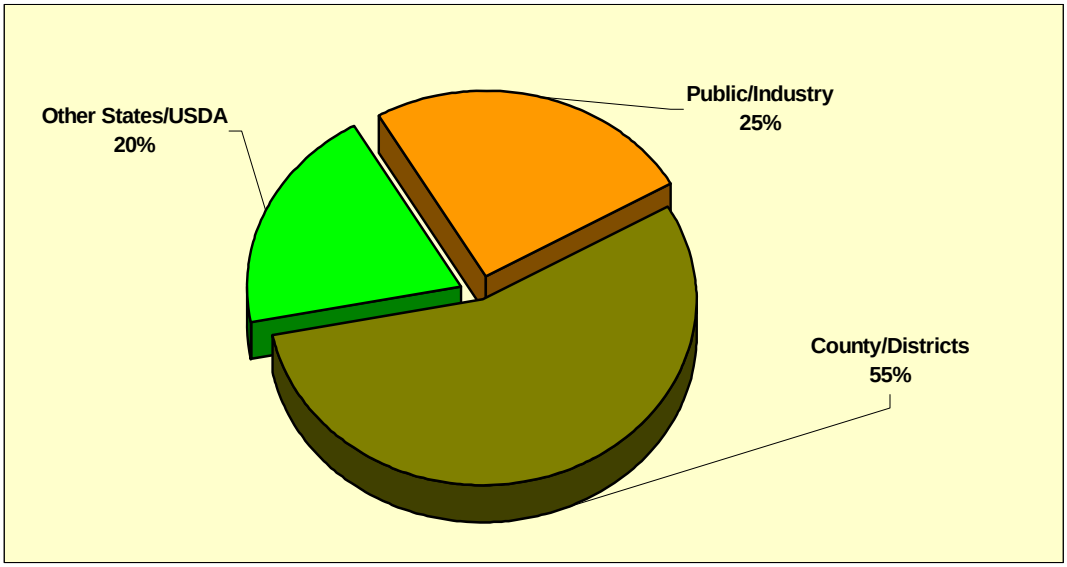


Figure 1. Quarantine consultations conducted by Interior biologists in 2006

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

Parcels are ideal pest pathways for many serious plant pests. Although state law restricts what plant materials may be shipped to California and requires that parcels containing plant material be clearly marked as to the contents and where the contents were grown, not everyone complies with the requirements. Consequently, plant materials and soil is being shipped to California in unmarked, undeclared packages that are difficult to identify and are generally delivered without being inspected for pests.

Quarantine terminal point inspection in California is conducted by the local county department of agriculture under the direction of the Department, primarily at United States Postal Services Processing and Distribution Centers, UPS, FedEx and other express carrier locations. However, this program inspects parcels that are already marked for agricultural inspection. By design, this program cannot detect and stop unmarked/undeclared agricultural parcels before they get delivered.

This "hole" in the state's pest exclusion net weakens the overall pest exclusion system and compromises the effectiveness of all other programs. In 2006, the USDA allocated funds to the California Agricultural Commissioners and Sealers Association to use detector dogs to screen unmarked/undeclared parcels for prohibited plant materials and soil. Initially funded as a one year program, the Pest Surveillance Canine Inspection Teams (PSCIT) has two dog teams trained at the USDA's National Detector Dog Training Center in Orlando, Florida. One dog team is covering Northern California and is based in Contra Costa County, while the second

team covers Southern California from San Bernardino County. The team deploys trained dog teams at parcel terminals to sniff out unmarked parcels containing plant material, which are then inspected.

The program is structured to sample a higher number of terminals. To minimize the impact on carrier operations, inspections are conducted while the parcels are being processed for distribution. Depending upon the facility, this can take place during day, swing or graveyard shifts; and the dogs work under various conditions, such as on conveyer belts, in delivery vans, etc.

The objective of this program is to enhance the state's ability to protect California against exotic plant pests and diseases by targeting a pest introductory pathway not covered by other interior or border exclusion programs.

Port and Terminal Inspections

The Interior Pest Exclusion Program is responsible for inspecting domestic aircraft, second port-of-call foreign and domestic vessels, crew quarters and passenger baggage and cargo shipments for potential pests at the ports of San Pedro, San Francisco and San Diego. Additional responsibilities are to enforce aircraft and vessel garbage regulations; issue permits to remove food stores from vessels and seal vessel stores where high-risk pest food items are contained on board to prevent crew members from taking these food items ashore while on leave; to monitor shipments of commodities while transiting from California to foreign destinations; issue compliance agreements for aircraft owners/operators, catering facilities, vessel dry docks and vessel/aircraft garbage handling facilities and monitor them as needed; and supervise quarantine treatments of commodities that are infested with exotic agricultural pests. All of this work is done in cooperation with Department of Homeland Security Customs and Border Protection, Department of Homeland Security/Transportation Security Administration, United States Department of Agriculture (USDA), United States Food and Drug Administration, the Department's Animal Health Branch, county agriculture departments, agricultural officials in other states, plus representatives from the trucking, airline and shipping industries.

Vessel Inspections

In 2006, a total of 25 shipments were inspected on seven vessels arriving at major California seaports (see Table 5 below). No shipments were rejected.

Table 5. Exclusion Activities/Inspections

Port Area	Vessels	Shipments	Rejections	Total Pest Interceptions	Treatments Supervised
Northern California	7	25	0	0	0
Southern California	0	0	0	0	0
Total	**7**	**25**	**0**	**0**	**0**

Notable Inspections
In 2006, program staff worked with USDA/Animal and Plant Health Inspection Services/Plant Pest Quarantine at the Port of Long Beach to gain compliance in the "Texas and Florida Citrus to Japan and Taiwan Program." This involved the renewal of the compliance agreement with two different trans-loading companies for the 2006 citrus season. A total of 1,272,700 pounds of Texas-origin grapefruit trucked to the Port of Long Beach was inspected, loaded into containers and exported to Japan and Taiwan. Florida trucked 42,840 pounds of grapefruit to the Port of Long Beach that was loaded into containers and exported to Japan and Taiwan.

Table 6. District Inspection Activities

Activities	Northern California	Southern California	Total
Warning/Hold Notices Issued by Port Inspectors	140	428	**568**
Storage Facility	0	0	**0**
Export Transit Shipments	25	659	**684**
Port Operations Coordination Contacts	860	124	**984**
Steamship Line Manifests Read	150	104	**254**
Biotechnology/Soil Lab Inspection	5	0	**5**
Ethnic Market Inspection (Cooperation with Counties)	9	50	**59**
Hawaiian Vehicle Inspection	50	0	**50**
Dunnage Inspection	3	0	**3**

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 Department.

A study found that conducting a statewide County High Risk Pest Exclusion Program at optimal levels would cost approximately $14 million per year. In 1998, Section 2282.5 of the Food and Agricultural Code and a state budget augmentation provided the county agricultural commissioners with $5 million to conduct an optimal level program for the latter portion (December-June) of fiscal year 1998/99. The Department allocated funding by way of a negotiated work plan process with the county agriculture commissioners.

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 the Department 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 the Department's mission to protect agriculture and the environment from the threat of newly introduced exotic pests.

In FY 2005/06, $977,000 was disbursed to 13 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.

In FY 2006/07, $3,977,000 was disbursed to 24 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 ant infested areas and special entry pathways including specialty markets, swap meets and flea markets. Funds were directed to Alameda, Fresno, Los Angeles, Orange, Sacramento, San Bernardino, San Mateo and Santa Clara Counties for inspections of high-risk plant material shipped via airfreight; Alameda, Los Angeles, Monterey, Orange, Riverside, San Bernardino, San Diego, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara and Ventura Counties for inspection of nursery stock from the Southeast and Hawaii; Butte, Colusa, Fresno, Glenn, Kern, Kings, Madera, Merced and Stanislaus Counties for inspections of incoming beehives from areas of the United States that are infested with red imported fire ant; Alameda, Fresno, Los Angeles, Orange, Riverside, San Bernardino, San Diego and Santa Clara Counties for inspections of special pathways; and Alameda and Kern Counties for inspections of parcel terminal facilities.

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. Table 7 (below) shows counties with two or more "A" and/or "Q"-rated pest interceptions. There were 198 seizures of foreign-origin plant pest and quarantine material brought illegally into California in 2006 (see Table 8 below).

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.

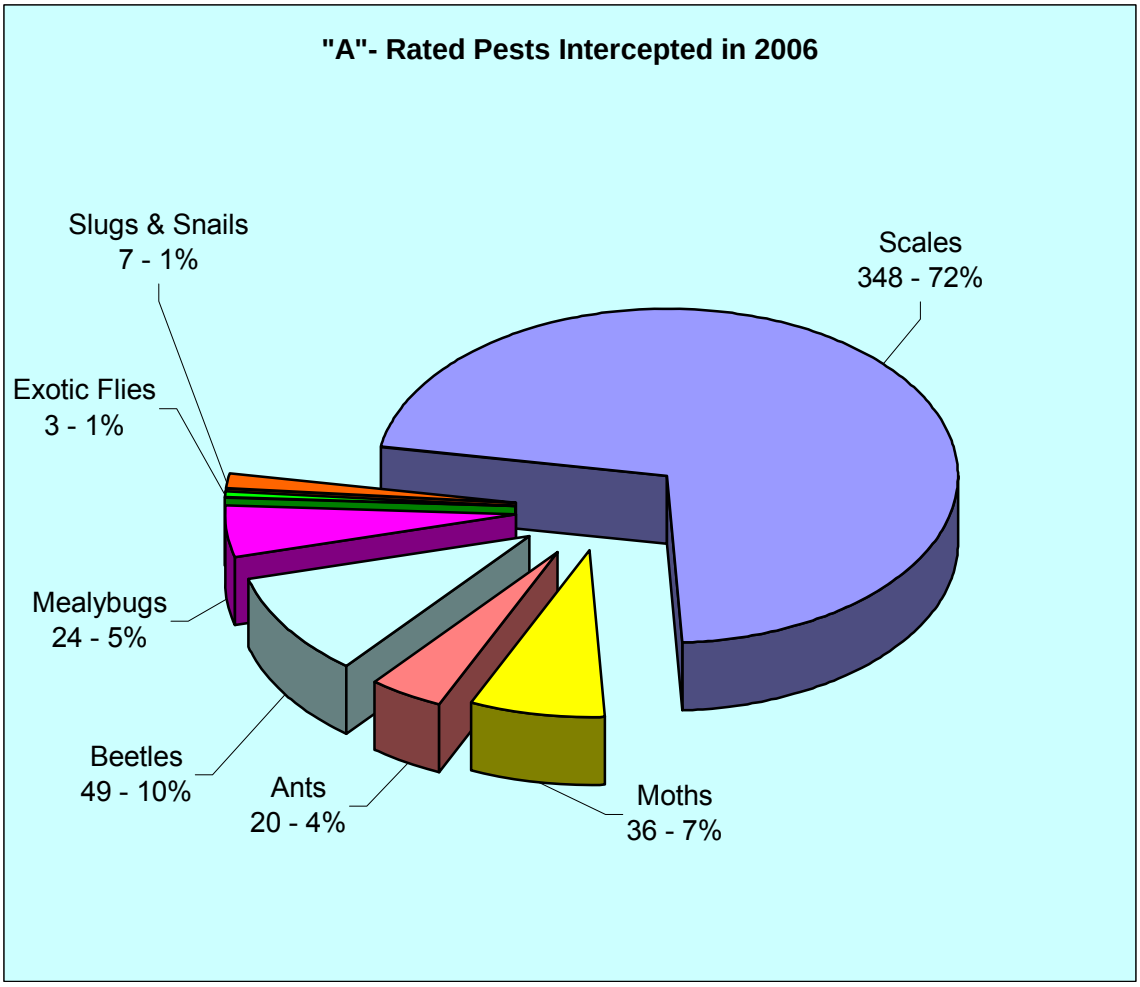


Figure 2. Frequently intercepted "A"-rated pests (number found, percentage of total) in 2006

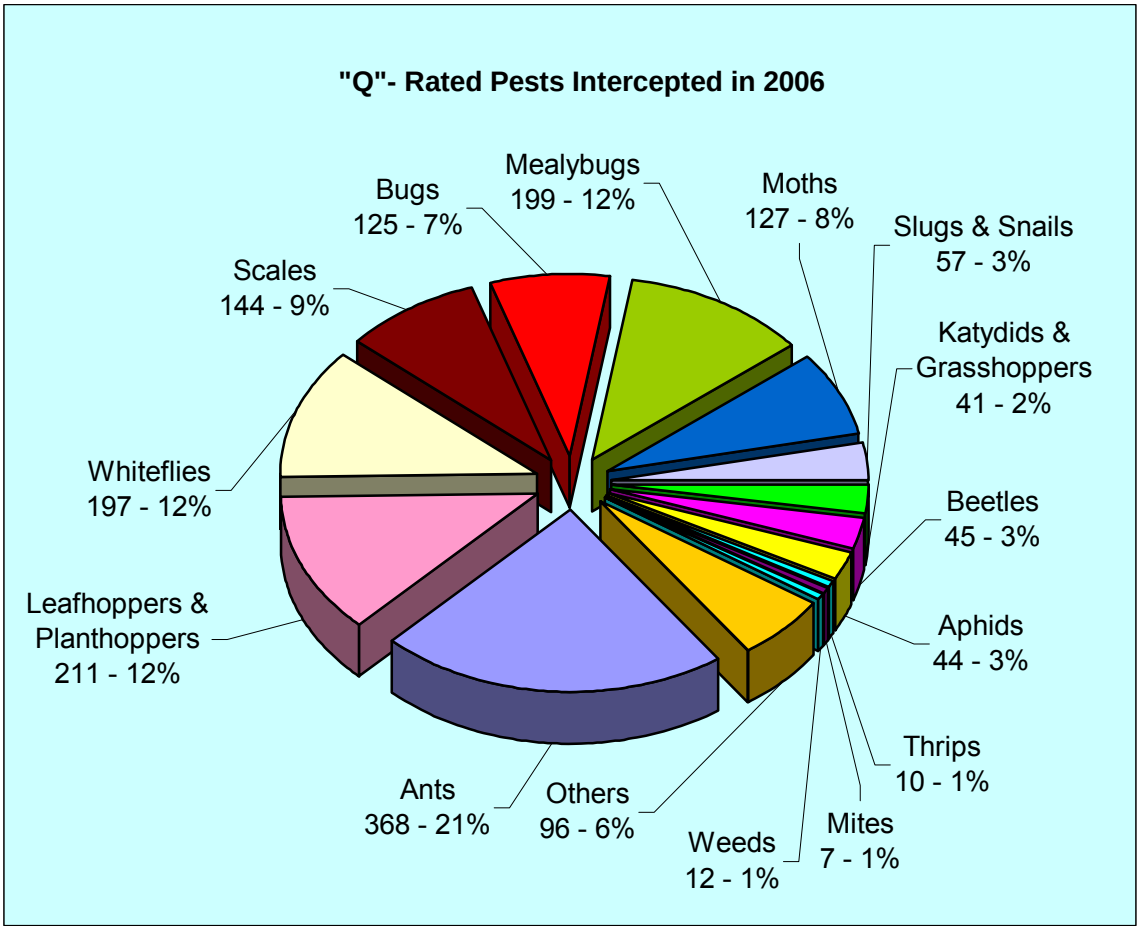


Figure 3. Frequently intercepted "Q"-rated pests (number found, percentage of total) in 2006

Table 7. Counties with Two or More "A"- and/or "Q"-Rated Pest Finds in 2006

COUNTY	PEST FINDS	COUNTY	PEST FINDS	COUNTY	PEST FINDS
San Mateo	973	Riverside	28	Ventura	5
Los Angeles	428	Sonoma	24	Kern	4
Orange	150	Sacramento	19	Monterey	4
Contra Costa	146	Mendocino	15	Glenn	3
Alameda	84	Shasta	11	Marin	2
San Bernardino	84	Santa Barbara	8	San Francisco	2
San Luis Obispo	57	Placer	6		
San Joaquin	53	Santa Clara	6		
San Diego	47	Humboldt	5		

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").

Table 8. Foreign-Origin Materials Rejected in 2006

MATERIAL	ORIGIN	SHIPMENTS REJECTED
Cuttings	Canada, Chile, China, Costa Rica, Guatemala, Israel, Mexico, Netherlands, New Zealand, Philippines	86
Leaves	Colombia, Costa Rica, Ecuador, Israel, New Zealand	20
Bulbs	Netherlands, Israel	16
Cut Flowers	Colombia, Costa Rica, Dominican Republic, Ecuador, Netherlands, Thailand	14
Fruits	Bangladesh, Canada, Dominican Republic, Mexico, New Zealand, South Africa	10
Palm	Costa Rica	8
Dracaena Plants	Costa Rica	7
Seeds	Canada, Mexico	3
Schefflera Plants	Costa Rica	2
Orchids	Japan	2
Chrysanthemum	Canada	1
Daylily	Guatemala	1
Rice	Thailand	1
Miscellaneous Materials	Costa Rica, Dominican Republic, France, Israel, Lao, Netherlands, New Zealand, Panama	15
Miscellaneous Plants	Canada, Costa Rica, Guatemala, Thailand	12

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

Table 9. "A"- and/or "Q"-Rated Pests Intercepted in 2006

DESCRIPTION	TOTAL	TRUCK	AIRCRAFT	UPS	FEDEX	USPS	NURSERY SHIPMENT INCOMING	OTHER
Alameda	84		13	1	39		9	22
Contra Costa	146	1		5	140			
Fresno	1							1
Glenn	3	3						
Humboldt	5			1	1	3		
Kern	4				2			2
Los Angeles	428	19	396		6		4	3
Madera	1				1			
Marin	2				2			
Mendocino	15				15			
Monterey	4	2		1	1			
Nevada	1			1				
Orange	150	21	34	1	60			34
Placer	6	2		3	1			
Plumas	1	1						
Riverside	28	12	1		5		5	5
Sacramento	19	5	1		8		1	4
San Bernardino	84		24	4	55			1
San Diego	47	31					11	5
San Francisco	2	1	1					
San Joaquin	53	5	17		3	3	20	5
San Luis Obispo	57	3	41	1	11		1	
San Mateo	973	21	946		1			5
Santa Barbara	8		1	1	3		2	1
Santa Clara	6							6
Shasta	11				11			
Sonoma	24				20		1	3
Tulare	1					1		
Ventura	5	5						
Yolo	1							1
Total	**2,170**	**132**	**1,475**	**19**	**385**	**7**	**54**	**98**

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").

Other Terminal Point Inspections

The county agricultural commissioner conducts routine terminal inspections of mail carriers, air freight, sea freight, etc., with oversight by the Interior Pest Exclusion Program. Over 300,000 shipments were inspected in 2006. Table 10 (below) shows the results of these terminal inspections.

Table 10. Terminal Point Inspections

Terminal	Shipments	Notices of Rejection	Pest Rejections
Post Office	20,811	268	20
UPS	70,204	464	15
Federal Express	154,985	716	304
Express Carrier	17,968	34	7
Air Freight	17,546	809	1,058
Sea Freight	684	39	54
Railroad	180	1	2
Gypsy Moth	1,015	3	7
Truck	24,110	230	209
Other	4,868	16	59
Total	**312,371**	**2,580**	**1,735**

NOTE: Report 4 data source. Not all report 4's have been submitted for 2006.

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 2,800 facilities and properties were inspected in 2006. Table 11 shows the distribution of these inspections.

Table 11. Facility and Property Inspections

Facility/Property	Number of Inspections
Feed Grain/Screening	49
Post-Entry Property	38
Testing/Research	22
High-Risk Markets	2,366
Quarantine Enforcement/Monitoring, etc.	398
Total	**2,873**

NOTE: Report 4 data source. Not all report 4's have been submitted for 2006.

Smuggling Interdiction

The California Department of Food and Agriculture's (Department) Agricultural Commodity Investigation Team (ACIT) works cooperatively with the Department's Interior and Exterior Pest Exclusion staff, industry groups and other agencies and programs that have vested interests in agricultural smuggling interdiction. These include: Interior agricultural biologists, border protection station inspectors, United States Department of Agriculture's (USDA) Smuggling Interdiction and Trade Compliance (SITC) Program, county agricultural commissioner's offices, USDA's Office of the Inspector General and USDA's Investigative Enforcement Services. ACIT investigators, along with Interior/Exterior staff and USDA counterparts, locate and seize agricultural commodities that have entered California illegally. ACIT investigators examine violations of the California Food and Agricultural Code and prosecute violators administratively, criminally and/or civilly. ACIT Investigators work cases in conjunction with Federal agricultural agencies whenever possible.

Working closely with USDA SITC and other government agencies in California enables ACIT investigators to network within the state and with other states. This networking provides information sharing proven useful in interdicting smuggled agricultural commodities. Much of

California's produce makes its way to other states and information sharing becomes invaluable for all agricultural cooperators nationwide. Another important component of smuggling interdiction is public outreach and education. This includes identifying and inspecting local commercial and non-commercial sources of exotic produce and providing those sources to industry. The cooperative effort and information sharing between industry, agricultural agencies, inspection activities and the subsequent investigations and prosecutions of agricultural violators help to ensure that agricultural commodities enter California legally and free from exotic pests and diseases. All of this, in turn, protects California's agricultural industry.

In 2006, ACIT investigators conducted eight investigations of alleged Food and Agricultural Code violations. These investigations resulted in two criminal prosecutions. The investigations involved prohibited produce, nursery stock, infected citrus budwood and trucks routing around the border protection stations.

Cases Settled in 2005/2006

- The owner of a Ventura County orchard imported citrus canker-infected citrus cuttings from Japan into California. ACIT worked the case in conjunction with United States Department of Homeland Security and after the federal felony conviction the State Attorney General's office settled a civil case in March 2006. The owner of the orchard was ordered to pay a fine of $85,000 with a $3.6 million injunction for any future violations. The California Department of Food and Agriculture (CDFA) recovered $60,000 for eradication and investigative costs and Ventura County Agriculture Commissioner and the State Attorney General's office each recovered $12,500.

Prohibited Citrus Cuttings

- The owner of a Los Angeles wholesale produce establishment possessed for sale approximately 106 pounds of prohibited manzano peppers. The Los Angeles County District Attorney's Office of Consumer Protection Division took civil action against the owner. The case was settled in August 2006 and the owner of the establishment paid a fine of $9,355 that included $1,495 in investigative costs recovered by CDFA.

- The owner of a Los Angeles wholesale produce establishment, possessed for sale approximately 225 pounds of prohibited manzano peppers. The Los Angeles County District Attorney's Office of Consumer Protection Division took civil action against the owner. The case was settled in October 2006 and the owner paid a fine of $11,085 that included $2,585 in investigative and disposal costs recovered by CDFA.

Prohibited Manzano Peppers

- The owner of a retail establishment in Los Angeles County imported approximately 32 pounds of prohibited satkara infected with citrus canker. The owner of the market pleaded no contest in a criminal case brought by the Los Angeles City Attorney's office and was ordered to pay a fine of $1,000.

Prohibited Satkara

- A Florida truck driver attempted to enter California with uncertified nursery stock from Florida manifested as resin. CDFA border protection station inspectors located approximately 800 plants that were infested with snails, scale and ants. All of the plants were destroyed and criminal prosecution of the truck driver is pending. Information obtained from this investigation lead to the seizure of approximately 100 Pigmy Date Palms infested with scale at a nursery in Ventura County.

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:

- Collaboration with other states
- Administrating a 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 the Departments Origin Inspection Program. 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 Origin Inspection Program 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 2006, 138 shippers in 10 states and Canada participated in the Origin Inspection Program (see Table 12). The commodities covered under the Origin Inspection Program include: fruits and vegetables, cut flowers and cut greens, canola pellets, bulbs, seeds and nursery stock.

Table12. Origin Inspection Program

State/Country	OIP Participants
Arizona	1
Canada	2
Colorado	1
Hawaii	29
Mississippi	1
Nevada	2
New Mexico	1
Ohio	1
Oregon	60
Utah	1
Washington	39
Total	**138**

Master Permits and Compliance Agreements
Interior Pest Exclusion worked with agricultural officials in Texas, Ohio, Mississippi and Arizona 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.

ADMINISTERING FEDERAL PHYTOSANITARY PROGRAM

Interior Pest Exclusion works cooperatively with the USDA, regulatory officials in other states and countries, private industry and the county agricultural commissioner's to provide quarantine consultations to facilitate trade to both foreign and domestic markets.

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 commissioner's staff 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.
Table 13 lists the number of inspections and certificates issued for various areas of responsibility.

Table 13. Inspections and Certificates Issued in 2006

County Certification Activities		
Type of Certificate	**Inspections**	**Certificates Issued**
Federal Phytosanitary	138,315	141,235
State Phytosanitary Certification	5,866	7,028
Compliance Certificates	23,092	36,984
Quick Decline Permits	1,925	1,985
Compliance Agreements	585	880
Others	16,189	2,071
Total	**185,972**	**190,183**

NOTE: Report 4 data source. Not all report 4's have been submitted for 2006.

Phytosanitary Issues Management

Phytosanitary Issues Management (PIM) encompasses a range of activities that support export market access and maintenance of open export markets. The main PIM activities include assisting the USDA in developing and implementing commodity export work plans; providing requested information to foreign plant protection officials regarding pests of their concern and providing technical support to the USDA during in-state meetings with foreign plant protection officials. Table 14 summarizes Interior Pest Exclusion PIM activities for 2006.

Table 14. Phytosanitary Issues Management

Commodity	Country/State	Action
Citrus	Australia	Pre-clearance (Bean thrips)
Grapes	Australia	Pre-clearance
Prunes	Japan	Codling Moth Work Plan
In-shell Walnuts	Korea	Initial Trade Agreement (Codling Moth Fumigations)
Apples	Taiwan	Codling Moth
Plums	China	Peach Fruit Fly Quarantine

Phytosanitary Certificate Issuance and Tracking

The Phytosanitary Certificate Issuance and Tracking system went into production this year. The two pilot sites, San Diego and San Joaquin Counties, continue to use the Web-based application and were joined this year by 10 additional counties. The 12 counties combined issued 4,731 Federal Phytosanitary Certificates to 68 different countries in 2006.

Within the 12 counties, there are 21 duty stations. San Joaquin County issued 1,823 certificates; Santa Barbara County issued 1,824 certificates; the Santa Maria duty station in Santa Barbara County issued 1,642 certificates; and the Stockton duty station in San Joaquin County issued certificates to 46 different countries.

California Pest Lists for USDA Phytosanitary Negotiations with Foreign Countries

Pest lists were created and warehoused in the USDA/CDFA "Pest List Database and Web Site Project". Pest list information in this database was made available to the Department and the United States Department of Agriculture (USDA) staffs at the Plant Health and Pest Prevention Services extranet site: http://phpps.cdfa.ca.gov/PestLists/pestlists.asp.

California Department of Food and Agriculture

Pest Lists for California Specialty Crops

Commodity (click for pest list)		
Almond	*Prunus dulcis*	(Rosaceae)
Apple	*Malus sylvestris*	(Rosaceae)
Apricot	*Prunus armeniaca*	(Rosaceae)
Asparagus	*Asparagus officinalis*	(Liliaceae)
Avocado	*Persea americana*	(Lauraceae)
Blackberry	*Rubus spp*	(Rosaceae)
Broccoli	*Brassica oleracea var italica*	(Brassicaceae)
Brussels Sprout	*Brassica oleracea var. gemmifera*	(Brassicaceae)
Cabbage	*Brassica oleracea var capitata*	(Brassicaceae)
Calla	*Zantedschia spp*	(Araceae)
Carnation	*Dianthus caryophyllus*	(Caryophyllaceae)
Carrot	*Daucus carota subsp sativus*	(Apiaceae)
Cauliflower	*Brassica oleracea var botrytis*	(Brassicaceae)
Celery	*Apium graveolens var dulce*	(Apiaceae)
Cherry	*Prunus avium var cerasus*	(Rosaceae)
Chrysanthemum	*Chrysanthemum grandiflora*	(Asteraceae)
Citrus	*Citrus spp*	(Rutaceae)
Cucumber	*Cucumis sativus*	(Cucurbitaceae)
Date	*Phoenix dactylifera*	(Arecaceae)

California Department of Food and Agriculture

Pests Associated with California DATE (*Phoenix dactylifera*)
Pest Exclusion Branch

Reviewed by:
- Peggy Mauk, Riverside Farm Advisor
- Tom Shea, Riverside Farm Advisor
- CDFA Plant Pest Diagnostics Clinic , Plant Pathology

Class/Order	Scientific Name	Common Name	Distribution USA	Distribution CA	Plant Part Affected	Citation
Fungus						
Hyphomycetes	*Alternaria spp*	leaf spot	yes	yes	LF	French
Pyrenomycetes	*Ceratocystis radicicola*	root rot	yes	yes	RT	French
Coelomycetes	*Diplodia phoenicum*	leafstalk rot	yes	yes	LF ST	French
Hyphomycetes	*Fusarium spp*	inflorescence decay	yes	yes	FL FR	French
Basidiomycetes	*Graphiola phoenicis*	Graphiola leaf spot	yes	yes	LF	French
Basidiomycetes	*Marasmiellus pigmentatus*	decline disease	yes	yes	RT	French
Basidiomycetes	*Omphalia tralucida*	decline disease	yes	yes	RT	French
Oomycetes	*Phytophthora parasitica*		yes	yes	RT	USDA Crop Profiles Date
Insect						
Coleoptera	*Carpophilus mutilatus*	nutidulid beetles	yes	yes	FR V	USDA Crop Profiles Date
Lepidoptera	*Ectomyelois ceratoniae*	carob moth	yes	yes	FR	USDA Crop Profiles Date
Coleoptera	*Heptoncus luteolus*	nutidulid beetles	yes	yes	FR V	USDA Crop Profiles Date
Mite						
Acari	*Oligonychus pratensis*	Banks grass mite	yes	yes	FR	USDA Crop Profiles Date

For Further Information:	
Laurel Moody	LMoody@cdfa.ca.gov
Last Updated:12/12/2005	(916)654-0312

Plant Part Abbreviations:
FR=Fruit LF=Leaf ST=Stem FL=Flower BR=Branch
GR=Graft BD=Bud BK=Bark RT=Root TG=Twig TR=Trunk
T=Whole Tree SD=Seed SDL=Seedling CR=Crown BLB=Bulb
PT=Petiole V=Vector SYS=Systemic SH=Shoot

Reference: USDA Crop Profiles Date

Mauk, P, Farrar, K, Davies, J, 2000. USDA Crop Profile for Dates in California. National Information System for the Regional Integrated Pest Management Centers, United States Department of Agriculture. USDA Crop Profiles Date. http://www.ipmcenters.org/CropProfiles/docs/cadates.html.

In 2006, Interior Pest Exclusion staff updated information at the Web site with public access for tracking the status of pest lists used in trade negotiations by USDA/APHIS (http://www.cdfa.ca.gov/phpps/pe/exportstatus/index.asp). Information at the Web site allows commodity boards to review progress of export requests.

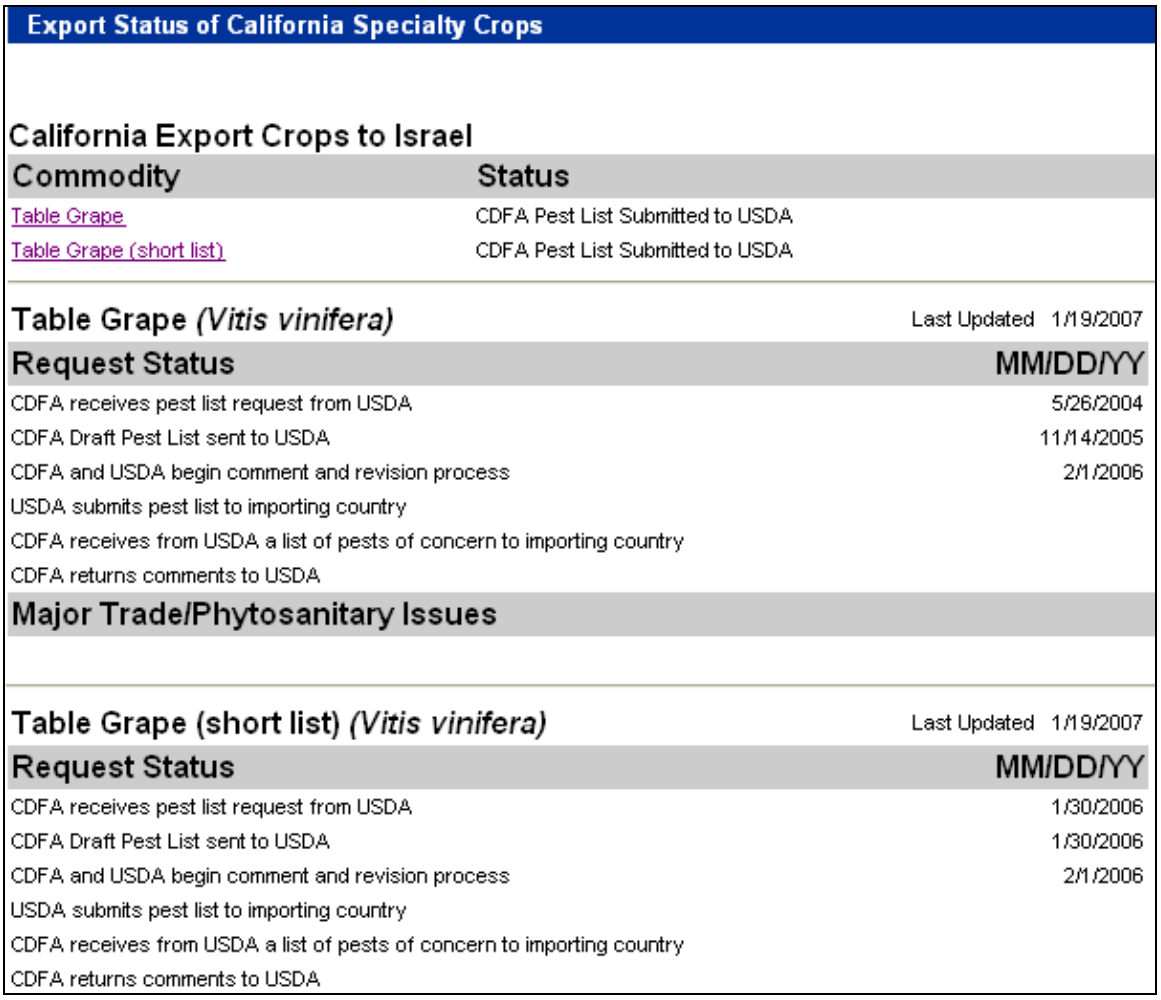
Most Recent Activity

Commodity	Market	Status
Quackgrass	South Korea	CDFA Pest List Submitted to USDA
Barleys	South Korea	CDFA Pest List Submitted to USDA
Ryes	South Korea	CDFA Pest List Submitted to USDA
Wheats	South Korea	CDFA Pest List Submitted to USDA
Triticale	South Korea	CDFA Pest List Submitted to USDA
Cherry	Thailand	CDFA Pest List Submitted to USDA
Table Grape (short list)	Thailand	CDFA Pest List Submitted to USDA
Apricot	Australia	CDFA Pest List Submitted to USDA
Potato	South Korea	CDFA Pest List Submitted to USDA
Pomegranate	Colombia	CDFA Pest List Submitted to USDA

Commodity List
(Search Export Status by Commodity)

Market List
(Search Export Status by Market)

The information provided on this website is considered current and accurate, however it is not legally authoritative. CDFA is solely responsible for the content of this site.



Export Status of California Specialty Crops

California Export Crops to Israel

Commodity	Status
Table Grape	CDFA Pest List Submitted to USDA
Table Grape (short list)	CDFA Pest List Submitted to USDA

Table Grape *(Vitis vinifera)* Last Updated 1/19/2007

Request Status	MM/DD/YY
CDFA receives pest list request from USDA	5/26/2004
CDFA Draft Pest List sent to USDA	11/14/2005
CDFA and USDA begin comment and revision process	2/1/2006
USDA submits pest list to importing country	
CDFA receives from USDA a list of pests of concern to importing country	
CDFA returns comments to USDA	

Major Trade/Phytosanitary Issues

Table Grape (short list) *(Vitis vinifera)* Last Updated 1/19/2007

Request Status	MM/DD/YY
CDFA receives pest list request from USDA	1/30/2006
CDFA Draft Pest List sent to USDA	1/30/2006
CDFA and USDA begin comment and revision process	2/1/2006
USDA submits pest list to importing country	
CDFA receives from USDA a list of pests of concern to importing country	
CDFA returns comments to USDA	

Pest lists for the following California crops were completed or updated in 2006:

Apricot	Gerber Daisy	Quackgrass
Artichoke	Gladiolus	Rose
Avocado	Iris	Ryes
Barleys	Kingfisher Daisy	Snap Bean
Calla	Olive	Snapdragon
Carnation	Pear	Table Grape
Cherry	Pomegranate	Table Grape (fruit only)
Chrysanthemum	Potato	Triticale
Easter Lily	Prune	Wheat

Pest lists submitted to APHIS in 2006 (Table 15):

Table 15. Commodity and Market

Commodity	Market
Apricot	Australia
Avocado	Mexico
Barleys	South Korea
Cherry	Australia, China, Thailand
Kingfisher Daisy	Chile
Pomegranate	Colombia
Potato	South Korea
Quackgrass	South Korea
Ryes	South Korea
Table Grape (fruit only)	Isreal, Thailand
Triticale	South Korea
Wheats	South Korea

Phytosanitary Field Inspection of Seed Program Highlights

The Phytosanitary Field Inspection of Seed Program inspects crops during the growing season for diseases of concern to importing countries. The seed from the inspected crops may be certified for export depending on the results of the inspection and the importing country's phytosanitary concerns. Growers submitted 3,555 applications for crop inspections to the Department in 2006. Tables 16 and 17 indicate the top three crops entered into the program, and the top three counties where crops entered into the program were grown.

Table 16. Crops Inspected

Top Three Crops Inspected in 2006	
Sunflower	686
Watermelon	287
Squash	283

Table 17. Counties of Origin

Top Three Counties of Origin in 2006	
Yolo	779 applications
Colusa	518 applications
Solano	374 applications

COMMODITY TREATMENT MANUAL

Interior Pest Exclusion maintains the CDFA Commodity Treatment Manual (CTM) at the Plant Health and Pest Prevention Services extranet site. The CTM document addresses pests of quarantine concern that are unique to California. Accordingly, the CTM is a companion document to the federal treatment manual. The current revision of the CTM includes a major effort to create an Intranet document as well as adding new treatment schedules. The intranet document is constructed to facilitate rapid information retrieval by presenting the user with a topical index from which content is accessed. The new e-version includes Internet links to the California Department of Pesticide Regulation for verification of current pesticide registrations. Other Web tools are provided for referencing product labels.

Electronic Registration of Staff Accredited as Authorized Certification Officials

The USDA/APHIS/PPQ maintains a Phytosanitary Issues Management office to address the export of domestic crops to foreign markets. California is responsible for approximately one half of all federal phytosanitary certificates completed in the United States. Interior Pest Exclusion coordinates the training and accreditation of the Commodity Treatment Manual by the United States Department of Agriculture (USDA) of California and the county agricultural commissioner's staff as Authorized Certification Officials (ACO). Program staff maintained the electronic registration database to record active ACOs by California counties.

Pesticide Registration

Interior Pest Exclusion facilitated the registration, amendment and renewal of the following pesticides in 2006 (Table 18):

Table 18. Pesticide Registrations, Amendments and Renewals in 2006

Pesticide	Registration	Target Pest	Status
Spinosad GF-120 Fruit Fly Bait	Section 3	Tephritidid Fruit Flies	Section 3 All Crops Tolerance Naturalyte (Organic)
Spinosad GF-120 Fruit Fly Bait	SLN (organic) rare crops	Tephritidid Fruit Flies	Terminated
Spinosad GF-120 Fruit Fly Bait	SLN (conventional) rare crops	Tephritidid Fruit Flies	Terminated
Spinosad GF-120 Fruit Fly Bait	Federal section 18 request	Tephritidid Fruit Flies	Terminated due to procedural errors
Spinosad GF-120 Fruit Fly Bait	SLN urban aerial	Tephritidid Fruit Flies	Under Departmental review
Dimilin 2L	Section 18	Diaprepes Root Weevil	Submitted to CDPR November
Malathion ULV	SLN	Citrus Pests	Amend SLN to terminate inactive products and list new Malathion products
Naled	SLN	Tephritidid Fruit Flies	Initiate amendment regarding dose

EXTERIOR PEST EXCLUSION

Mission: *Protect California from the introduction of invasive pests via overland highways.*

Vision: *We are California's first line of defense in an integrated pest prevention system. California's border protection stations enforce quarantine laws and regulations by using the best available technology and biologically sound methods.*

Values:

- *Consistency: Enforcement of laws and regulations is standardized throughout the Program*
- *Communication: Open, constructive exchange of ideas and information*
- *Decision: Decision-making based on the best available science, technology and common sense*
- *Team Work: Accomplishing program goals through the cooperative efforts of each of our employees*
- *Integrity/Dependability: Our employees are committed to excellence in job performance*
- *Credibility: We have a responsive, accountable, and trusted program*
- *Employee Development: Provide an environment that develops employee skills, potential and capabilities*

Goals: *To accomplish our mission by:*

- *Inspecting all commercial vehicles based on pest risk profiling*
- *Educating and soliciting the cooperation of the affected industry and traveling public*
- *Maintaining an informed and well-trained workforce*
- *Continuously striving to expand and improve our service to the citizens of California*

BORDER PROTECTION STATIONS

California established the first "agricultural inspection station" in the early 1920s to monitor vehicles entering the state for prohibited or infested commodities. Currently known as the Border Protection Stations (BPS), the California Department of Food and Agriculture (Department) currently operates 16 BPS located on major highways throughout the state. The goal of the program is to minimize the chance that vehicles entering California from other states are carrying commodities infested with invasive pests that pose a serious threat to California's agriculture or environment. BPS personnel perform the following functions:

- Enforcement of the California Food and Agricultural Code, federal and state quarantines and county enforcement policies
- Inspection of vehicles and commodities to ensure quarantine compliance and interception of exotic pests transported in these shipments
- Provide quarantine consultations to the agricultural industry and the public
- Collect, analyze and disseminate data pertaining to commodity movement, pest interceptions and traffic flow

Additionally, the BPS Program has cooperative working relationships with many programs within CDFA and other federal and state departments. At the local level, the program personnel assist

county agricultural commissioners, county sheriffs, city police and fire departments with various issues, and/or provide public assistance with emergencies that arise at or near the stations.

COMMERCIAL SHIPMENT INSPECTION

In 2006, 6.86 million commercial trucks entered California through the BPS. Of these, 336,118 were high-risk or carrying agricultural products and were opened and physically inspected. Of the physically inspected shipments, 2,872 were rejected because of pest finds or quarantine violations and 31,280 were forwarded to destination for more detailed inspection by county agricultural commissioner's staff.

Regulatory Sampling

- **Citrus**

During the year, 6,423 commercial shipments of citrus entered California from the Bahamas, Mexico, Spain, South Africa, Florida and Texas. BPS inspectors sampled 4,577 containers from these shipments. Inspectors rejected 323 shipments due to pest infestations or lack of proper certification. All pest finds were mealybugs and scales – no internal feeding larvae were found.

- **Mangos**

To ensure that mangos were free from exotic fruit flies and other pests, BPS personnel sampled 12,600 containers from 5,430 commercial shipments in 2006. Mango shipments originated from Haiti, Mexico and other Central and South American countries. Inspectors found one shipment from Mexico to be infested with live exotic fruit fly larvae, resulting in destruction of the shipment and a temporary suspension of the work unit of origin until the problem could be investigated. In addition, 211 shipments were fumigated or returned due to scale insect infestations.

Secretary A.G. Kawamura looks on as mangos are sampled at Blythe

- **Cherries**

Under special permit, shippers are allowed to ship unfumigated 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.

Ninety-four shippers participated in the 2006 permit program, including 59 from Washington, nine from Oregon, two from Utah and 10 from British Columbia, Canada.

This season 3,653 commercial cherry shipments entered the state. Of these, 2,510 shipments came in under special permit and 1,143 were fumigated. Border Protection Station (BPS) personnel sampled all shipments that came in under special permit. No pests of significance were found. One hundred twenty-five 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.

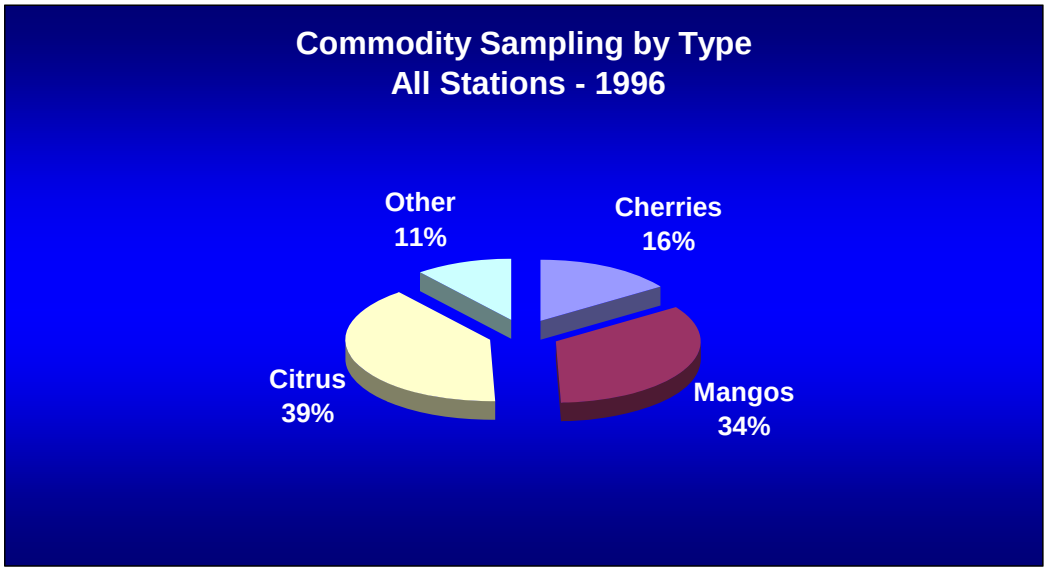


Figure 4: Border protection station personnel sampled 16,290 shipments in 2006

Gypsy Moth Regulatory Activities

There were 778 recreational vehicles and 4,309 self-moved shipments of household goods inspected for the presence of gypsy moth life stages by BPS personnel in 2006. All originated from gypsy moth quarantine areas. Of these, five were found to be infested with gypsy moth and were cleaned at the stations.

All commercial shipments of outdoor household articles from gypsy moth quarantine areas are forwarded to destination for inspection by county agricultural commissioner's staff. In 2006, 3,041 shipments (up 8.5 percent from 2004) of used household goods were quarantined for destination inspection. Additionally, shipments with outdoor household articles are required to be accompanied by a certificate of inspection upon entering California. BPS personnel issued 65 citations to drivers for lack of proper certification.

Other Quarantine Activities

Table 19 (below) details miscellaneous plant quarantine work performed at the border stations during 2006.

Table 19. Summary of Regulated Commodities

Summary of Commercial Shipments of Regulated Commodities - All Stations 2006			
Commodity	**Inspected and Released**	**Sent to Destination Under Hold Notice**	**Rejected Due to Lack of Certification or the Presence of a Pest**
Feed Grain	5,885	21	55
Hay	41,315	2,790	22
Bee Colonies and Related Equipment	115	2,515	69
Misc. Fruits, Vegetables, Nursery Stock and Seed	346,804	22,913	2,872
Total	**394,119**	**28,239**	**3,018**

Significant Pest Interceptions from Commercial Shipments

BPS personnel intercepted significant ("A" or "Q"-rated) pests on 1,474 occasions during 2006 (see Figure 5 below). This represents a 17 percent increase over 2005. The interceptions were highlighted by finds of zebra mussel, false coddling moth, Mexican fruit fly, red imported fire ant, various weeds and many actionable surface feeding insects.

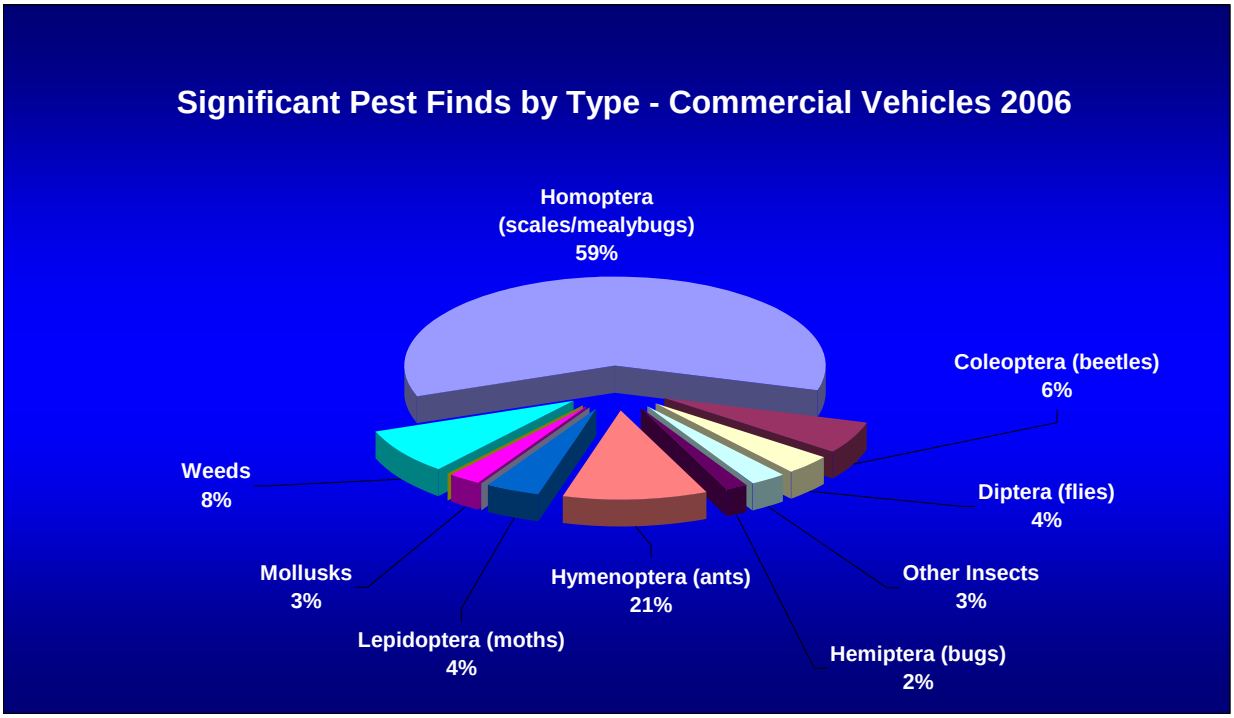


Figure 5. Break down of significant pest finds in commercial shipments at BPS by type

PRIVATE VEHICLE INSPECTION PILOT PROGRAM – NEEDLES

Private vehicle inspections were discontinued at all Border Protection Stations (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 six months of the study have produced dramatic results. Early 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.

Table 20. Private Vehicle Inspection Comparison

	July	Aug	Sept	Oct	Nov	Dec	Jan	Total
Significant Pest Finds 2002	15	26	23	14	11	7	6	**102**
Significant Pest Finds 2006	62	50	54	50	52	49	46	**363**
Increase	47	24	31	36	41	42	40	**261**
% Increase	313.33%	92.31%	134.78%	257.14%	372.73%	600.00%	666.67%	**255.88%**
Different Pest Species 2002	15	20	20	8	11	3	5	**82**
Different Pest Species 2006	38	26	25	36	31	30	28	**214**
Increase	23	6	5	28	20	27	23	**132**
% Increase	153.33%	30.00%	25.00%	350.00%	181.82%	900.00%	460.00%	**160.98%**

Table 20 (above) details data collected thus far from the Needles pilot and compares it to the same period in 2002 (when private vehicles were last inspected at all stations). Quite simply, more prohibited materials are being transported, these materials are more apt to be infested with species known to damage agriculture or the environment, and more types of invasive species are in the pathway.

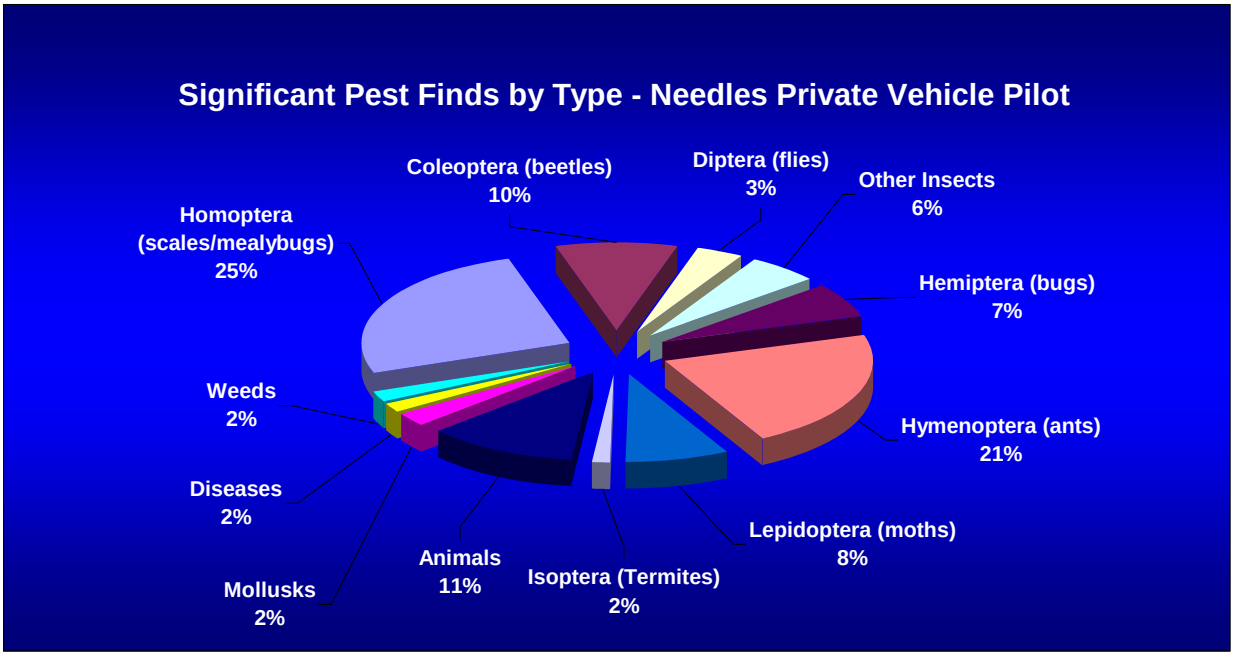


Figure 6: Preliminary breakdown of significant pest finds at Needles during pilot study

INTRA- AND INTER-AGENCY COOPERATIVE ACTIVITIES

Pilot Program With The Board Of Equalization

In conjunction with the Board of Equalization (BOE), a pilot program began at the Needles station in July 2006 to determine the level of use tax compliance. Station personnel were trained to identify interstate commercial shipments that were likely to be subject to use tax. Information on these shipments is given to BOE analysts in Sacramento who follow up to determine whether the tax is being paid.

Game Importation Declarations

In cooperation with the California Department of Fish and Game, Border Protection Station (BPS) inspectors collected 370 game declarations from hunters returning to California. Fish and Game uses these forms to aid in identifying and prosecuting hunting and fishing regulation violations.

Livestock Tracking

During 2006, BPS inspectors recorded 38,449 shipments of livestock entering California. This information was forwarded to the Animal Health Branch for ownership and disease tracking.

Market Egg Shipments

BPS personnel recorded 12,698 shipments of market eggs entering through the border stations from other states. The Egg Quality Control Program uses this information to ensure that all shipments meet quality standards and appropriate mill fees are paid.

SURVEILLANCE CAMERAS ON UNPROTECTED HIGHWAYS

Budget cuts in 1991 made it necessary to restrict the hours of operation of seven stations on some of the less-traveled highways. Now, surveillance cameras and digital video recorders have been installed to assess the nature and amount of traffic using these highways when the stations are closed. In addition, surveillance units have been installed on two minor roadways unprotected by stations. The goal is to determine whether a significant amount of commercial traffic is bypassing the BPS system via these roads, whether as a natural route or as purposeful avoidance of inspection.

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 2006, the value of nursery and floral products produced was $3.7 billion, an increase of one percent from the previous year. The nursery program budget for 2006 was $ 2,275,772 with 22 personnel years. 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 2006 totaling $2,105,351 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 staffs 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 2006, there were 11,729 licensed sales locations with 870 production (growing grounds) locations. Since 2003, the budget for nursery inspection contracts has been set at $500,000. 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 $51,000, resulting in a total of $551,000 to be divided among the counties for the 2006/07 fiscal year contracts.

REGISTRATION AND CERTIFICATION SERVICES FOR PLANT MATERIALS

The Food and Agricultural Code authorizes the California Department of Food and Agriculture (Department) to establish plant Registration and Certification (R & C) programs. These programs are implemented by the California Code of Regulations and enforced by the Secretary of the Department. California presently has nine "clean stock" (registration and certification) programs available for use by the various segments of the agricultural industry (see Table 21).

Table 21. 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)

R & C programs are voluntary programs developed at the request of various segments of the agricultural industry for the exclusion of specific plant pests that are not readily detected by ordinary inspections. These programs are the result of close working relationships between the University of California, United States Department of Agriculture (USDA) and 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 R & C programs.

The criteria for establishing these programs are:

- There is an established need
- Sufficient technical information is available
- A source of “clean” propagating stock has been established

- Methods have been developed to assure the continued pest cleanliness of the stock

In 2006, CDFA staff performed over 530 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.

The primary tools developed for maintaining pest cleanliness of the stock in these programs are:

- Biological indexing (use of indicator plants which exhibit symptoms of virus or virus-like diseases) and enzyme-linked immunosorbent assay (ELISA)
- Laboratory techniques for the detection of nematodes
- Eradication treatments (thermotherapy, fumigation and hot water treatments)
- Visual field inspections targeted to specific life cycles of the pests and plants

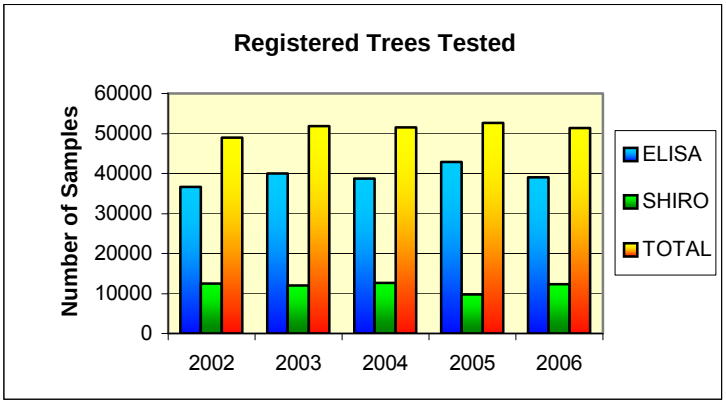
The costs of services to carry out these programs are borne by the participants. Fees are charged for inspections, testing and treatments. In addition, the Fruit Tree, Nut Tree and Grapevine Improvement Advisory Board provides from partial to full funding for annual testing and inspections required by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

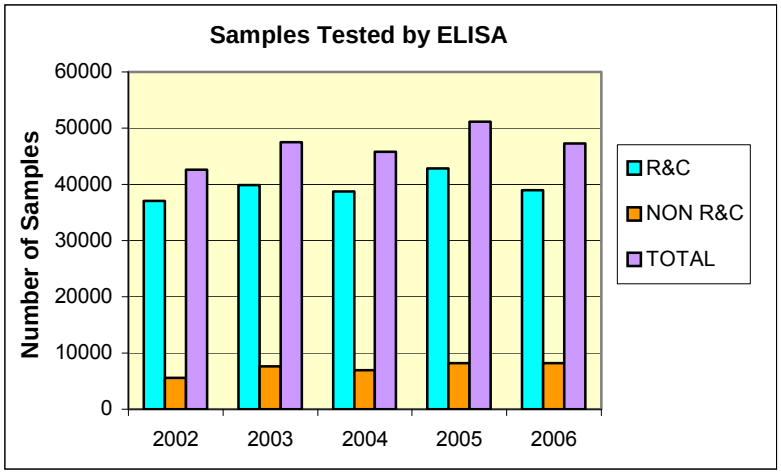
Deciduous Fruit Tree and Nut Tree Registration and Certification Program

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.



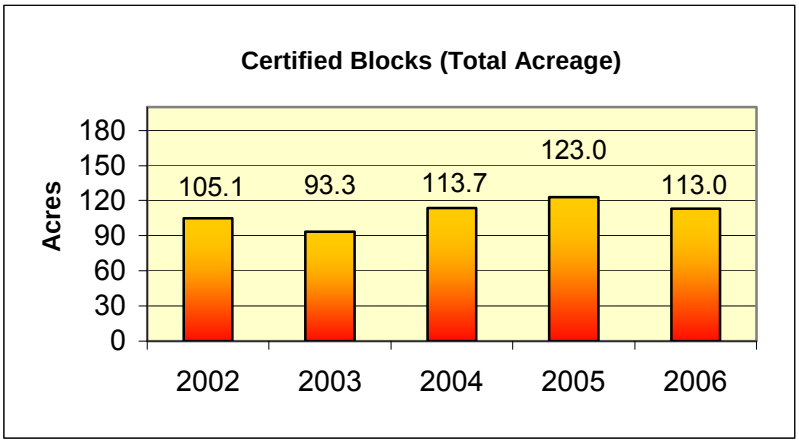
In 2006, 17 nurseries participated in the program. The total number of registered trees tested was 51,353 (39,025 by ELISA and 12,328 by Shirofugen indexing), compared to an average of 51,268 per year for the 2002-2005 growing seasons.

The total number of trees tested using the ELISA technique was 47,218 (39,025 registered trees and 8,193 service samples). The service samples are obtained from non-registered trees and tested as a service to the industry.



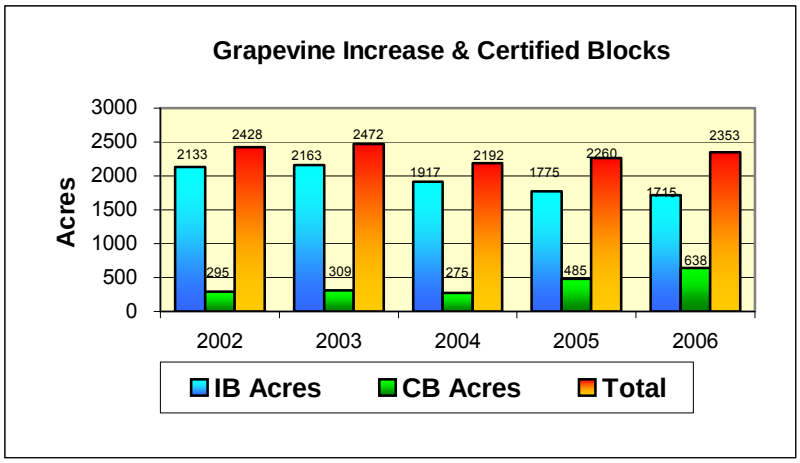
Of the 47,218 trees tested by ELISA, 453 (0.96 percent) were found positive for viruses. Only 119 (0.30 percent) of the registered samples tested positive for viruses, while 334 (four percent) of the service samples tested positive for viruses. Of the samples taken from registered trees, 26 (0.21 percent) tested positive for viruses using the Shirofugen cherry biological indexing technique.

Certified nursery planting acreage totaled 113 acres in 2006, compared to an average of 109 acres over the previous four years.

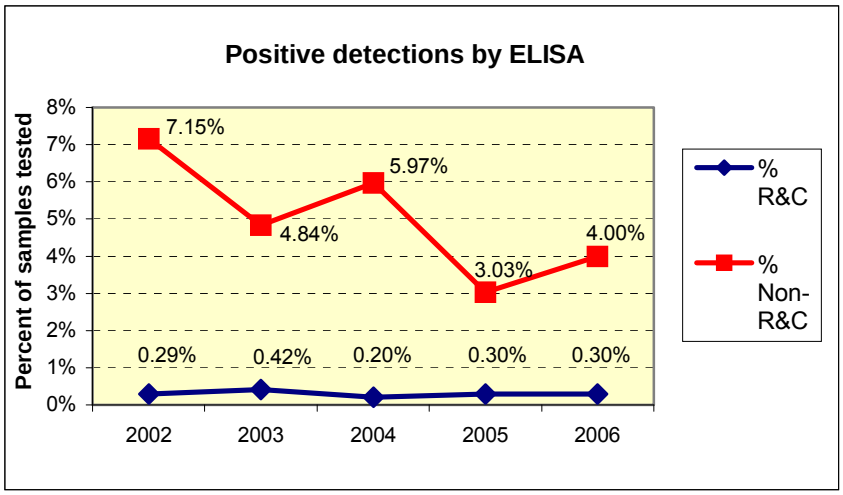


Grapevine Registration and Certification Program

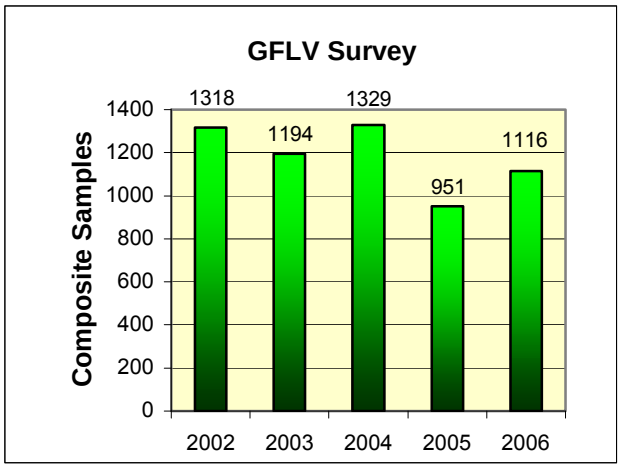
There were 36 nurseries participating in the program in 2006. Grapevine Increase Block plantings totaled 1,715 acres, a slight decrease of 60 acres (3.4 percent) from the previous year. Grapevine certified blocks (nursery plantings) totaled 638 acres and six greenhouse blocks, an increase of 153 acres (31.5 percent) over the previous year's 485 acres.

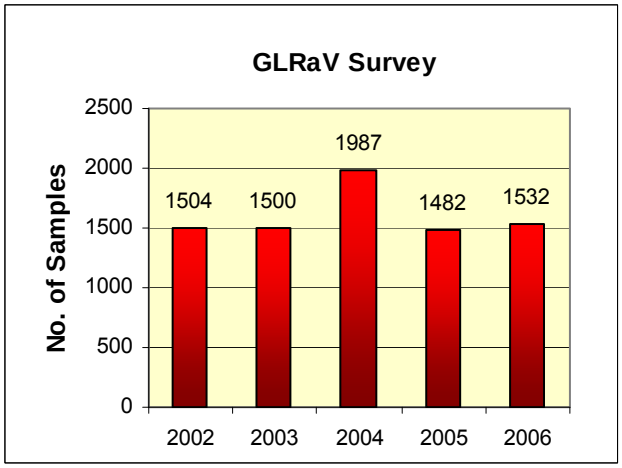


The Department collected and tested 1,116 composite samples for grapevine fan leaf virus (GFLV), a 17 percent increase over the previous year. Plants were selected randomly for testing. However, if plants exhibiting typical GFLV symptoms were seen, those plants were also included in the survey. Of the total samples tested, none were positive for GFLV.



In 2006, Department staff sampled and tested 1,532 vines for grapevine leaf-roll associated viruses (GLRaV). In total, 74 samples tested positive.





Since 2004, the Improvement Advisory Board began supporting trapping for vine mealybug (VMB). 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 the Departments Grapevine R & C Program. There were 1,076 acres and three greenhouses of non-certified plantings. This represented 97 traps deployed in late May and checked over the following six months. There were 2,212 acres and seven greenhouses of plantings entered in the R & C programs for 317 traps deployed. Male VMB's were found at 12 locations due to association with nearby vineyards. There were no positive finds 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 Citrus R & C Program include exocortis and psorosis. Thirty-seven citrus nurseries participated in the program in 2006. During the year 2,609 citrus seed and scion source trees were sampled and tested for tristeza and other viroids, an increase of 68 trees from 2005.

Strawberry Nursery Stock Registration and Certification Program

Eleven nurseries participated in the Strawberry Nursery Stock R & C Program in 2006. The strawberry program differs from other registration programs in that foundation stock. It is maintained by nurserymen in their isolated plantings rather than by the Foundation Plant Service of the University of California. 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, leaf-roll and featherleaf. CDFA nursery staff index-tested 4,585 foundation plants at the Department's greenhouse facility in Sacramento; a 23 percent increase was seen over the previous year. Twenty-three plants that were indexed tested positive for viruses and were rejected from the program. The Department staff visually inspected over 731 acres of registered and certified strawberry nursery stock for the presence of viral diseases and other pests, an acreage increase of 18 percent over the previous year, 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 viral diseases and other important pests. Three nurseries are currently participating in the program. In 2006, Department staff inspected and registered a total of 982 trees as propagative source trees. Over five 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 white rot fungus, *Sclerotium cepivorum.* Two nurseries participated in 2006. A total of 318 acres were inspected and registered, a decrease of 155 acres (32 percent) from 2005.

FRUIT TREE, NUT TREE AND GRAPEVINE IMPROVEMENT ADVISORY BOARD

The Fruit Tree, Nut Tree and Grapevine Improvement Advisory Board 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 Improvement Advisory Board is to improve the quality and pest freedom 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; support of the University of California Foundation Plant Services, which serves as a source of clean planting stock and 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 2006, the total assessment collected on gross sales of fruit trees, nut trees and grapevines was $1,334,264, a 35.5 percent increase over the collection of $984,268 in 2005.

In 2006, the Improvement Advisory Board approved funding for 11 research proposals totaling $266,421. Funding of Foundation Plant Services in the amount of $503,932 and payment to the Nursery Program to subvent R & C activities in the amount of $322,000 was allocated. The total budget approved was $1,439,123. 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 Department's R & C Program.

SEED SERVICES PROGRAM

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 Seed Services staff also interacts with industry representatives, agricultural departments in other states, the United States Department of Agriculture (USDA) and the California Crop Improvement Association (the 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 $388 million in 2005, an all time high. The total number of firms registered to sell seed in California increased from 398 in 2004/05 to 438 in 2005/06.

The expenditures for 2005/06 were $1,099,264. Significant program expenditures were the funding of the Department's Seed Laboratory ($347,003), the Seed Biotechnology Center at the University of California, Davis ($150,000) and the Seed Subvention contracts paid to county agricultural commissioners ($120,000). To cover these expenses, the Seed Advisory Board recommended that the assessment rate be set at $0.32 per hundred dollars of gross sales in California during the reporting period. The funds generated by the current assessment plus program reserves are adequate to cover expenditures in 2006/07. The assessment rate may need a slight adjustment to cover an increase in funding for the Seed Biotechnology Center

approved by the Board in 2006 (from $150,000 to $200,000 annually). 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 agricultural commissioners are required by contract to maintain an 85 percent compliance level of all seed offered for sale or labeled in their respective counties. In 2005/06, county personnel evaluated 4,400 labels of seed offered for sale. In addition, 1,100 labels on seed lots from out-of-state suppliers were inspected by county staff for compliance to the California Seed Law.

Another activity provided by the Seed Services Program is the administration of an alternative dispute resolution process when farmers and labelers dispute over seed performance. Participation in conciliation and mediation is a mandatory prerequisite before pursuing legal remedy in court. In 2005/06, two complaints were filed with the Department. After completion of the Investigative Committee meeting, one seed complainant withdrew his complaint while the second complainant was released from further participation and allowed to pursue other legal remedy. Except for an initial filing fee, the cost of the alternative dispute resolution process is borne entirely by the Seed Services Program.

Department agricultural biologists stationed throughout the state collected over 600 seed samples as part of a compliance monitoring program. The Department Seed Laboratory in Sacramento analyzed the samples. A summary of the results revealed that greater than 85 percent of the samples were in compliance. Approximately 7.5 percent were not in compliance due to misrepresentation of the germination percentage and about seven percent were out of compliance due to misrepresentation of the percent pure seed stated on the label. It is worth noting however, that most of the samples found to be out of compliance were only out of compliance by slight amounts. In other words, the values determined by the laboratory were usually only slightly different than the values stated on the label.

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. It is administered by the San Joaquin Valley Cotton Board, which has 40 members and is composed of cotton growers, cotton industry representatives and public members. 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 cotton 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 meets or exceeds 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 2006, 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. However, due to an unusually wet spring, cotton planting did not begin until mid-April and continued well into May. Yields in 2006 were higher than 2005 and lower than the record setting crop in 2004.

The USDA estimated that Upland cotton yields (including Acala) in the San Joaquin Valley averaged 1,178 pounds of lint per acre, up almost 11 percent from last year. Pima yields dropped approximately two percent with an average of 1,191 pounds of lint per acre. The Department's Pink Bollworm Program reported that in 2006 there were 272,670 acres of Pima and 255,895 acres of Upland (including Acala) for a total of 528,565 acres of cotton planted in the district. This year was the first year that the total Pima acreage was higher than the Acala/Upland acreage; however, the overall cotton acreage in the district dropped 108,550 acres.

2006 is the sixth full season in which cotton growers were allowed to plant any commercially available variety of cotton in the San Joaquin Valley. This was the result of the 1998 legislation allowing the planting of varieties not previously allowed under the Quality Cotton Law. Section 52981 was added to the Food and Agricultural Code to allow varieties not tested and approved by the San Joaquin Valley Cotton Board to be planted as "non-approved" varieties beginning in 1999. The new law also charged the Department with adopting regulations to ensure that the growing of non-approved varieties does not adversely affect the quality of Acala and Pima cotton varieties approved by the board. Regulations to implement this law were developed by the Department in conjunction with the board and cotton industry representatives in the San Joaquin Valley. Program personnel are responsible for enforcing these regulations. Also added to the law was the authority allowing the Secretary of the Department to increase the district assessment to meet additional regulatory costs of enforcing the law.

In 2006, approximately 102,000 acres of non-approved varieties were harvested in the district, which is just slightly less than last year's 105,000 acres. A large number of growers continue planting varieties that are in the board's testing program before they are released by the board to see how they perform. All non-approved cotton lint was identified at harvest and ginning with tags supplied by the Department; these tags designated them as "California Pima", "California Upland", or "SJV (San Joaquin Valley) Experimental" cotton.

There is still considerable interest on the part of researchers to develop new cotton varieties in the district. In 2006, 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, delinting and marketing of all experimental cotton.

In 2006, three Acala varieties and two Pima varieties were approved by the Board to be marketed as San Joaquin Valley Acala and San Joaquin Valley Pima varieties. This increased the total number of approved varieties in the district to 66.

In 2006, the assessment rates for the San Joaquin Valley Cotton District were set by the Secretary of the Department, upon recommendation from the board, at $5.25 per hundredweight of undelinted approved seed and $9.25 per hundredweight of undelinted, non-approved 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 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 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.

PEST DETECTION

The Pest Detection component of the pest prevention system is the second line of defense in protecting the state's agricultural commodities and ultimately the environment. To achieve eradication of an exotic plant pest, the Pest Detection and Emergency Projects branch (PDEP) deploys and services a variety of insect traps and performs visual surveys of plants so that early

detection is achieved.

Pest Detection Trapping
PDEP maintains a statewide trapping network with over 130,000 traps in operation for various target pests, such as exotic fruit flies, gypsy moth and Japanese beetle. This statewide trapping program is detailed in the Insect Trapping Guide maintained by PDEP. The program is administered either via contracts with the county departments of agriculture or direct participation by PDEP staff in those counties that do not enter into a contract. PDEP biologists conduct quality control inspections overseeing all of the Departments trapping programs. Both county and state run programs are evaluated by this program to ensure that they are performing at the desired level. Trap placement, host selection, maintenance of scheduled trap inspections, record keeping and ability to identify target insects are all monitored.

Annual Surveys
The Branch conducts a number of different visual survey programs. Aircraft originating from east of the Mississippi River are subject to intensive aircraft inspections to find and remove hitchhiking Japanese beetles preventing them from escaping from the aircraft and enter the surrounding environment. PDEP staff participates in ongoing red imported fire ant survey in parts of central and southern California. Other targeted insect surveys are conducted to detect a variety of potentially harmful exotic insects, such as Asian longhorned beetle, cereal leaf beetle, khapra beetle and Africanized honey bee. PDEP also performs annual surveys for plant diseases such as citrus canker, citrus greening and Karnal bunt. Branch staff conduct inspections on plant shipments into California for diseases as part of the post-entry quarantine program.

EMERGENCY PROJECTS

The Branch maintains action plans detailing the appropriate emergency responses for the major groups of exotic pest fruit flies. Accordingly, the Department's PDEP and Pest Exclusion Branches, USDA Emergency Projects and the Medfly Exclusion Program (MEP) all have emergency response roles. Branch staff initiates and conducts delimiting trapping and larval survey activities, the exclusion programs and USDA Emergency Projects initiate and enforce interior quarantines when needed, the MEP initiates and conducts sterile insect techniques activities if appropriate to the particular fly species. Department staff from both the eradication program and the MEP are trained to perform any required pesticide applications. The rapid response of this pest response team is instrumental to eradicate these flies. This action minimizes regulatory action to California agriculture and prevents economic loss to businesses and the public from quarantines. As an example of the effectiveness of these responses, 15 of the 44 delimitations, in 2006, resulted in eradication programs, but only three of these (two Oriental fruit fly programs and one Peach fruit fly program) became severe enough to require the initiation of interior quarantines.

STERILE INSECT RELEASE

PDEP employs a strategy termed the sterile insect technique (SIT) to prevent and eradicate populations of exotic fruit flies. The preventive release of sterile Medflies, over a 2,500 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. The PRP is a cooperatively funded and administered venture between USDA and PDEP.

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 MEP 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.

PDEP maintains a contract with the Mexican government that guarantees California shipments of up to 50 million sterile Mexican fruit fly pupae per week for use in SIT programs. These pupae are reared at the Planta Moscafrut located in Tapachula, Mexico.

Loading "drop boxes" filled with sterile Medflies into the airplane.

Hawaii Fruit Fly Rearing Facility

The Hawaii Fruit Fly Rearing Facility (HFFRF) provides the PRP with high-quality sterile Medflies for use in the SIT program. The facility, located on the windward side of the island of Oahu approximately 30 miles from Honolulu International Airport, operates seven days a week, 365 days a year.

The fly currently produced at the HFFRF is a male-only, *temperature sensitive lethal* strain known as "Vienna 7". Pupae produced at the facility are gamma-irradiated at the nearby USDA facility with Cobalt 60 at a dose of 14.5 KRads. Irradiated pupae are double-inspected prior to shipment in a refrigerated van to the airport, where they are loaded onto a commercial jet in the evening and delivered to Los Angeles International Airport, ready for pickup by PRP staff early the following morning.

The facility was designed to produce 100 million pupae per week. In 2006, the facility shipped 3,768 boxes of pupae to the PRP for an average of approximately 149 million pupae per week.

During the year, the HFFRF has consistently maintained the highest quality control ratings relative to other fruit fly producing facilities in the world. 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 compared to the Guatemala facility (which also supplies the PRP with pupae) for 2006 are as follows:

Test	CDFA	Guatemala
Emergence	82.74%	82.58%
Flight Ability	78.03%	75.13%
Longevity	74.68%	70.56%

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

David R. Rumsey Emergence and Release Facility

Each week, on average over the course of 2006, 416 million sterile Medfly pupae were delivered to the David R. Rumsey Emergence and Release Facility located on the Joint Forces Training Base in Los Alamitos. This resulted in 3,059 flight missions and 780,836 linear miles flown during 2006. The sterilized pupae are air freighted seven days a week, year-round from production facilities operated by the PDEP and USDA in Hawaii and Guatemala, respectively. Four days after the sterile Medflies were received as pupae, they are released as adult flies from a 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 rate of 110,000 sterile male flies per square-mile per week, 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 eight years of the program, a total of 132 billion sterile Medflies have been released during 24,059 flight missions traveling over 5 million linear miles.

In addition to the normal preventive releases, the program is tasked with conducting sterile release eradication programs for Medfly and for another pest species, the Mexican fruit fly, whenever infestations are found. In 2006, PRP has been conducting eradication SIT over the infested areas of Rancho Cucamonga and San Jose (see below for more details). In addition, PRP continued participating in the technological innovation of incubation using the Worley Eclosion Tower to eventually replace the current incubation method using PARCs. As this operation demonstrates, the strategic location of the PRP's operation at the Joint Forces

Training Base allows the program to respond swiftly and economically with sterile fruit flies to any infestation in California, southern Arizona and northwestern Mexico.

EXOTIC FRUIT FLY PROGRAMS

The California Fruit Fly Program is a multifaceted program designed to maintain California's fruit fly-free status through pest exclusion, detection, eradication, identification and public information efforts. The three primary PDEP components include the fruit fly detection programs, treatment programs and a preventive sterile insect technique program. The main target pests include various species belonging to five economically important genera: *Anastrepha* (Mexican fruit fly, West Indian fruit fly, etc.), *Bactrocera* (Oriental fruit fly complex, melon fly, guava fruit fly, etc.), *Ceratitis* (primarily Mediterranean fruit fly), *Dacus* (pumpkin fly, etc.) and *Rhagoletis* (Western cherry fruit fly, etc.).

The trapping detection program is a cooperative effort conducted by PDEP, the USDA and the California County Agricultural Commissioners. The detection program is designed to detect new introductions of target flies as they occur, before they have the opportunity to become established breeding populations. The detection program also supports California's extensive trade markets, both international and domestic, by providing verifiable assurance that California's production areas are free from these economically damaging pests.

The program uses a variety of trap types in combination with several different attractants to target the different species of concern. Statewide, over 91,000 fruit fly traps (Figure 1) were deployed for detection monitoring during the peak warm weather months of April through October (Table 1).

Table 1. Numbers of Fruit Fly Traps by Trap Type and Lure

Trap Type	Jackson	McPhail	Champ	Jackson	Jackson
Lure	**Trimedlure**	**Yeast**	**Ammonium Bicarbonate**	**Methyl Eugenol**	**Cuelure**
Number of Traps Deployed	24,701	20,127	3,997	20,227	19,921

Figure 1. Inspector placing a trap in a tree.

California is constantly at risk to the introduction and establishment of exotic pest fruit flies because of its unique factors: a favorable Mediterranean climate; extensive availability of host-plants due to agricultural and residential plantings; international trade patterns; and culturally diverse population demographics. The magnitude of the risks is well illustrated by the detection results of 2006. Eighty-two exotic pest fruit fly adults representing five species were captured in 10 California counties in 2006 (Table 2). These finds triggered 37 delimitation-trapping programs.

Table 2. Exotic Fruit Flies Detected in California During 2006

PEST (Fruit Fly)	**COUNTY**	**NUMBER DETECTED**	**TOTAL BY SPECIES**
Anastrepha ludens Mexican Fruit Fly	Los Angeles	7	7
Bactrocera correcta Guava Fruit Fly	Alameda Fresno Los Angeles Orange Sacramento San Diego Santa Clara	1 1 1 1 1 2 1	8
Bactrocera zonata Peach Fruit Fly	Fresno Los Angeles Sacramento San Mateo	6 1 1 1	9
Bactrocera curcubitae Melon Fly	Los Angeles	2	2
Bactrocera dorsalis complex Oriental Fruit Fly complex	Los Angeles Orange Riverside San Bernardino San Diego Santa Barbara Santa Clara	18 16 2 6 9 3 1	55
Total			**81**

ERADICATION PROGRAMS

- **Guava Fruit Fly**

Guava fruit fly, *Bactrocera correcta*, is a serious fruit pest of citrus, peach and several kinds of tropical and subtropical fruit hosts. It occurs in India, Pakistan, Nepal, Sri Lanka, Thailand, Myanmar and southern China.

In 2006, one eradication program for guava fruit fly occurred in San Diego County when two male guava fruit flies were detected within one mile of each other. The primary treatment method for guava, Oriental and peach fruit fly is the male annihilation treatment (MAT), which combines a lure with an insecticide to attract and eradicate sexually mature males. This mixture

is applied via specially modified trucks to inanimate objects such as telephone poles, light poles and street trees situated along the roadside (Figure 4).

Figure 4. Male Annihilation Treatment

Foliar bait application used to eradicate the Oriental fruit fly.

- **Oriental Fruit Fly**

Oriental fruit fly, *Bactrocera dorsalis,* is a serious pest of a great number of crops in California, including pears, plums, cherries, peaches, apricots, figs, citrus, tomatoes and avocados. It is widespread through much of the mainland of Southern Asia and neighboring islands, including Sri Lanka, Indonesia, Taiwan, the Philippines and the Ryukyu Islands.

In 2006, there were 11 Oriental fruit fly eradication programs in California. The male annihilation technique was used as the primary eradication tool. The Rialto and Santa Ana programs required Spinosad foliar bait treatments by ground, in addition to male annihilation, as a breeding populations were detected. All of the eradication programs and their outcomes are listed in Table 3.

Table 3. 2006 Oriental Fruit Fly Eradication Information

County	City	Number Trapped	Last Find Date	Treatment Sq. Miles	Quarantine Sq. Miles*	Eradicated
Los Angeles	Rowland Heights/ Walnut	2	6/19/06	11	NA	8/27/06
	Northridge	2	9/15/06	9	NA	2/7/07
	West Hollywood	4	11/13/06	8	NA	12/17/06
Orange	Huntington Beach/ Fountain Valley	2	7/04/06	12	NA	9/16/06
	Santa Ana	14	12/05/06	13	93	In Progress
Riverside	Riverside	2	11/06/06	8	NA	In Progress
San Bernardino	Bloomington	2	8/30/06	6	NA	12/7/06
	Fontana	2	8/08/06	10	NA	10/29/06
	Rialto	1	8/29/06	10	65	2/14/07
San Diego	La Mesa	4	7/11/06	15.5	NA	10/16/06
Santa Barbara	Santa Barbara	3	7/27/06	8	NA	11/5/06

- **Peach Fruit Fly**

Peach fruit fly, *Bactrocera zonata,* attacks tropical and subtropical fruits. It occurs in Egypt, Saudi Arabia, Oman, Pakistan, India and several South Asian countries.

In 2006, one eradication program for peach fruit fly occurred in Fresno (Table 4). This was the first eradication program for peach fruit fly in Fresno County. The detection of six adult peach fruit flies mandated the implementation of a 105.5 square-mile quarantine to regulate the movement of host materials within the area.

Table 4. 2006 Peach Fruit Fly Eradication Information

County	City	Number Trapped	Last Find Date	Treatment Sq. Miles	Quarantine Sq. Miles	Eradicated
Fresno	Fresno	6	5/20/06	25.5	105.5	7/28/06

- **Mexican Fruit Fly**

Mexican fruit fly A*nastrepha ludens,* is a serious pest of citrus, mango, avocado and a wide variety of other fruits in many parts of Mexico and Central America. A large number of commercially produced crops in California are threatened by the introduction of this pest, such as peach, pear, avocado, grapefruit and orange. In 2006, two Mexican fruit fly (Mexfly) eradication programs occurred in Los Angeles County (Table 5). The Mexfly eradication programs required foliar bait treatments by ground with Spinosad/protein bait in a 200 meter radius around each Mexfly find site, followed by the release of 750,000 sterile Mexflies over a minimum of nine square-miles surrounding each find site.

Table 5: Mexican Fruit Fly Eradication Information

County	City	Number Trapped	Last Find Date	Treatment Sq. Miles	Quarantine Sq. Miles	Eradicated
Los Angeles	Huntington Park Southgate	3	2/14/06	16.1	N/A	7/21/06
	Jefferson Park	4	1/03/07	13	N/A	In Progress

- **Mediterranean fruit fly**

Worldwide, the Medfly has been found infesting more than 260 different types of fruits and vegetables. The Medfly is widespread throughout Australia, Central and South America, Europe and Africa. A great number of crops in California are threatened by the establishment of the pest, including apricot, avocado, grapefruit, nectarine, orange, peach and cherry.

In 2005, Medfly infestations were detected in San Bernardino, Los Angeles and Santa Clara counties. Eradication projects were initiated in each of these counties. These activities continued into September 2006, when all three infestations were declared eradicated.

Table 6: Mediterranean Fruit Fly Eradication Information

County	City	Number Trapped	Last Find Date	Treatment Sq. Miles	Quarantine Sq. Miles	Eradicated
San Bernardino/ Los Angeles	Rancho Cucamonga Upland Ontario Pomona Glendora	31	12/13/05	258	143	9/1/06
Santa Clara	San Jose	2	10/9/05	10	77	9/7/06

GYPSY MOTH PROGRAMS

The gypsy moth (GM), *Lymantria dispar* (Lepidoptera: Lymantriidae), is a serious pest of most trees and shrubs in Europe and eastern North America. GM is currently the most destructive insect attacking hardwood forest and shade trees in the United States. The Asian gypsy moth (AGM) and the Siberian Gypsy Moth (SGM), are strains of this species occurring in eastern Europe and Asia. The AGM differs from the GM in its preference for coniferous trees, tolerance for cold and the female moth's ability to fly. Neither AGM nor SGM is known to be established in North America. Pest Detection and Emergency Projects (PDEP) inspection efforts, pest detection and treatment programs have prevented the establishment of these pests in California.

Detection

During the 2006 season, 17,373 traps were deployed and monitored as part of California's program to detect and delimit GM and/or AGM/SGM infestations. Trap density in the coastal California counties is three traps per square-mile, while two traps per square-mile are placed in the remaining counties. California ports receiving shipments from Russia, the Far East, Japan and other ports at risk for AGM and SGM are trapped at 10 traps per square-mile.

This season, 17 moths were trapped (Table 6) at 11 sites in eight counties. Eight of the find sites were single-moth catches while three of the find sites had multiple moth detections. The specimens were analyzed for possible AGM or SGM identification using the mitochondrial DNA test as well as the FS1 Nuclear DNA test. Through this test, one trapped sample was confirmed as AGM from Long Beach in Los Angeles County.

The sites where multiple moth captures occurred were inspected for GM egg masses in the Fall of 2006. The presence of egg masses is an indication of a breeding population. No egg masses were detected during this survey.

Table 6. 2006 Gypsy Moth Finds

County	City	Number Trapped	Last Find Date	Egg Masses Detected
Los Angeles	Pasadena	3	7/12/06	0
	Highland Park	1	8/10/06	0
Marin	Mill Valley	1	7/28/06	0
Orange	Silverado	1	7/31/06	0
Riverside	Corona	3	7/5/06	
Sacramento	Ida Island	1	7/3/06	0
San Mateo	Portola Valley	3	7/25/06	
	Half Moon Bay	1	8/22/06	0
Santa Barbara	Montecito	1	7/25/06	0
Santa Cruz	Boulder Creek	1	9/12/06	0

Table 7. 2006 Asian Gypsy Moth Finds

County	City	Number Trapped	Last Find Date	Egg Masses Detected
Los Angeles	Long Beach	1	7/31/06	0

ERADICATION TREATMENT

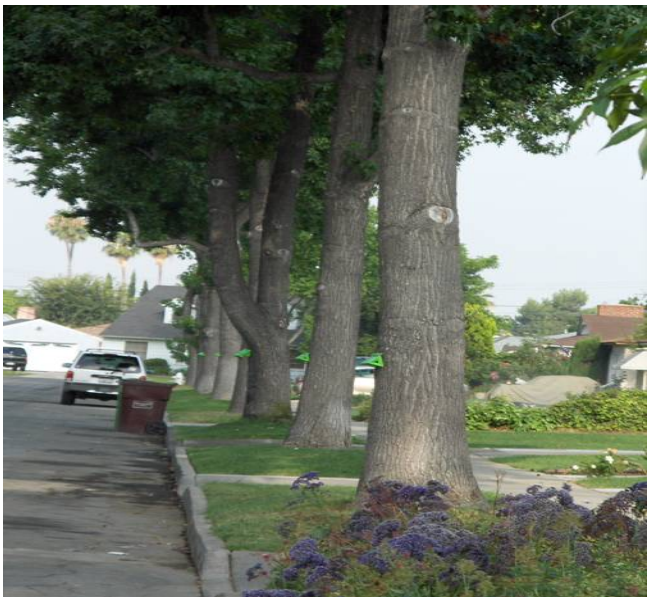
Two eradication programs for AGM were required in 2006 due to AGM detections in Santa Ana, Orange County and San Pedro, Los Angeles County.

Bacillus thurengiensis (Bt) treatment, Santa Ana, Orange County

In response to a single AGM detection in Santa Ana, the Branch's scientific staff consulted with experts from the United States Department of Agriculture (USDA), to determine the appropriate eradication measures. The Branch treated a 200 meter area around the find site three times with *Bacillus thurengiensis var.* kurstaki (Bt). Following this the last treatment, the square mile surrounding the find site was intensively trapped with 5,000 delta traps, which were inspected biweekly. No additional AGM were detected.

Mass Trapping, San Pedro, Los Angeles County

The San Pedro site was compromised by the designation of the area as being a habitat for the Palos Verdes blue butterfly. The Palos Verdes blue butterfly is an endangered species. The application of a pesticide in this habitat is prohibited. Following discussions with the Branch's environmental staff and USDA scientific staff, the next best eradication option was to place traps at a density of 5,000 traps per square-mile within the core square-mile. The final inspection of these traps occurred in November, with no additional AGM detected.



Mass trapping for the Asian gypsy moth.

ASIAN GYPSY MOTH

High-Risk Port Trapping

The pathway that is most likely to introduce the AGM into California is via deep water shipping ports. To monitor that pathway, the PDEP conducted high-risk trapping in seven locations statewide. Twenty-five delta traps, baited with disparlure, were placed per square-mile over a one mile buffer around the ports of entry in Oakland, Port Hueneme, Sacramento, San Diego, San Francisco, Stockton and Wilmington. A total of 1,750 traps (including those for 2005 AGM delimitation in San Pedro) were placed and inspected biweekly from June through September.

Asian Gypsy Moth – Long Beach

One AGM was trapped at the Port of Long Beach on July 31, 2006 (Map 3). This find was at the proximal end of the pier, at the water's edge, and is considered to be an isolated find. The site is adjacent to the outer edge of the five-mile intensive trapping radius for the 2005/2006 AGM delimitation response in San Pedro. Because the AGM was detected in a trap that was located at the end of a pier, the area was surrounded by the ocean. Therefore traps were placed only in 10 square miles surrounding the find site. These traps were inspected biweekly through October. No additional AGM were detected.

JAPANESE BEETLE PROGRAMS

The Japanese beetle (JB), *Popillia japonica* (Coleoptera: Scarabaeidae), is a serious pest of turf, crops and ornamental plants in the eastern United States. The JB enters the state each year mostly as an adult hitchhiker in airplanes originating from infested areas east of the

Mississippi River. Exclusion of the JB from aircraft combined with a high hazard trapping array and treatment programs have prevented the establishment of this pest in California.

Detection

The JB detection program has two major components: statewide trapping and aircraft inspection. During 2006, 12,172 JB traps were deployed in urban and high-risk (airports and air cargo sorting facilities) areas throughout the state. The trap density for JB detection is two traps per square-mile. A high-density trapping array is deployed in a one mile buffer area around each airport and transfer/sorting facility used by express mail carriers. A total of 25 JBs were trapped in proximity to airports used by express mail carriers or their transfer/sorting facilities located in urban areas (Table 7). Three JBs were trapped in residential areas.

Table 7. Japanese Beetles Trapped in California in 2006

County	City	Beetles Trapped	Comments
Alameda	Oakland	1	DHL facility - Oakland International Airport
Los Angeles	City of Industry	1	DHL freight forwarding facility
	Hollywood Hills	1	Residential neighborhood
	Los Angeles	7	Los Angeles International Airport
	Long Beach	2	Near Long Beach Airport
	Long Beach	1	1.5 miles north of Long Beach Airport
	Van Nuys	1	Freight forwarding facility
Sacramento	Rancho Cordova	2	Mather Airport
	Sacramento	1	Sacramento International Airport
San Bernardino	Ontario	2	Ontario International Airport
	Ontario	2	Near Ontario International Airport
San Diego	Vista	2	Residential neighborhood
	San Diego	2	Near San Diego International Airport
Santa Clara	San Jose	1	Near San Jose International Airport
San Mateo	Brisbane	1	DHL freight forwarding site
	Burlingame	1	FedEx freight forwarding facility near San Francisco International Airport

Airport/Aircraft Inspections

On-board inspections of aircraft from high-risk areas of the eastern United States resulted in the collection of 999 total specimens (124 were alive or moribund) (Table 8).

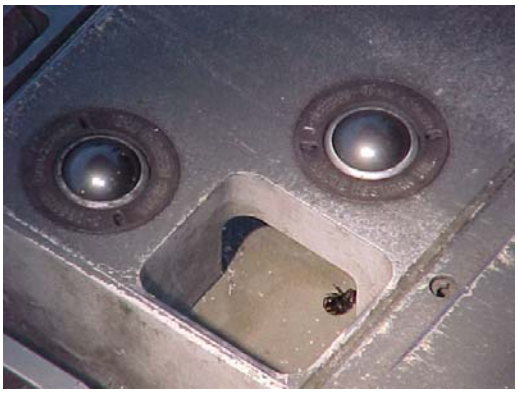


Table 8. Number of Aircraft Inspected and Beetles Collected - by Airport

County	Airport	Aircraft Inspected	Beetles Collected
Alameda	Oakland International	895	138:4 alive
Fresno	Fresno/Yosemite International	33	9:8 alive
Los Angeles	Burbank	96	11:0 alive
	Long Beach	144	124:46 alive
	Los Angeles International	2185	392:47 alive
Orange	John Wayne	587	26:2 alive
Sacramento	Mather	143	36:2 alive
	Sacramento International	74	2:0 alive
San Bernardino	Ontario International*	961	31:2 alive
San Diego	San Diego International	1571	194:10 alive
San Mateo	San Francisco International	380	1:0 alive
Santa Clara	San Jose International	290	35:3 alive
TOTALS		**7,359**	**999:124 alive**

RED IMPORTED FIRE ANT PROGRAM

The red imported fire ant (RIFA), *Solenopsis invicta* (Hymenoptera: Formicidae), is native to South America and has a history of being a serious 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. PDEP maintains eradication and regulatory programs against infestations in both the Central Valley and parts of southern California.

Northern California – Fresno, Sacramento and Bay Area/Delta Districts

Survey Activities

A prevalent pathway for entry of RIFA into the Central Valley is via beehives infested with RIFA which are brought into California for almond pollination. Survey plans for the Central Valley concentrate on sampling orchards using Spam® bait stations along paths through and around

the orchards where beehives are normally placed in the early spring. Thirty-eight infested sites in the Central Valley have been found since 1997. All have been eradicated or were under the three year post-treatment survey in 2006.

Five counties in the San Joaquin Valley have surveyed for RIFA at a variety of possible introduction points, such as nurseries, bee drop points, new commercial and urban developments, trucking facilities and general grid survey of urban areas. Fresno, Kern, Kings, Madera and Tulare counties collected 655 ant samples from several of these sites. This data, along with PDEP RIFA activities, continues to indicate that RIFA is not established in areas other than agricultural crops.

TREATMENT

Treatment Activities – San Joaquin Valley

Once an infestation has been detected treatment begins at the earliest possibility. Usually three to four treatments per year are applied. All orchards or residential properties were treated with Amdro®, Clinch®, Esteem® or Extinguish®. Approximately 7,247 acres were under treatment in 2006. This is an increase from 5,176 acres under treatment in 2005. Considering multiple applications, a total of 16,159 acres were treated in 2006. By crop, pesticide baits were applied to 2,125 acres of almonds, 1,578 acres of pistachios, 880 acres of grapes, 259 acres of prunes, 225 acres of peaches, 60 acres of apricots and 49 miscellaneous acres. All infested properties found prior to 2000 have been eradicated or are under post-treatment survey monitoring. In 2006, only four sites will be under general treatment. See Table 9 and Figure 8.

Table 9. Status of All RIFA Infestations in Northern California in 2006

County	Location	Number	Original Acres Infested	Acres Currently Under Treatment	Status
Fresno	Kerman # 1 (1998)	2	1,160	0	Eradicated
	Kerman # 2 (1998)	5	106	0	Eradicated
	Kerman # 3 (2002)	33	120	120	Treated
	Mendota # 1 (1999)	7	160	0	Eradicated
	Mendota # 2 (1999)	8	80	0	Eradicated
	San Joaquin (1999)	11	276	0	Eradicated
	Fresno (1999)	9	Nursery	0	Eradicated
	Clovis (2000)	18	75	0	Monitored
	Fresno # 2 (2001)	20	260	0	Eradicated
	Clovis # 2 (2002)	23	24	0	Eradicated
Kern	Lost Hills (1997)	1	464	0	Eradicated
	Wasco (1998)	4	40	0	Eradicated
	Wasco (2006)	43	Plastic Recycler 26	26	Treated
	Bakersfield (1999)	6	Residence	0	Eradicated
	Bakersfield # 2 (1999)	10	Nursery	0	Eradicated
Madera	Chowchilla (1-5)		4,484	4,484	Treated

	Chowchilla # 1 (2000)	12	See information above.	See information above.	See information above.
	Chowchilla # 2 (2000)	13			
	Chowchilla # 3 (2003)	32			
	Chowchilla # 4 (2004)	38			
	Chowchilla # 5 (2004)	39			
	Madera # 1 (2002)	29	139	139	Treated
	Madera # 2 (2005)	40	160	160	Treated
Merced	Ballico # 1 (2004)	35	625	625	Treated
	Ballico # 2,3 (2004)		1,077	1,077	Treated
	Ballico # 2 (2004)	36	See information above.	See information above.	
	Ballico # 3 (2004)	37			
	Hopeton # 1 (2001)	19	6	0	Eradicated
	Hopeton # 2 (2002)	25	320	0	Monitored
	Hopeton # 3 (2002)	27	160	0	Monitored
	Snelling # 1 (2001)	22	2,673	0	Monitored
	Snelling # 2 (2002)	24	617	412	Treated
	Snelling # 3 (2002)	30	8	0	Monitored
	Snelling # 4 (2005)	40	3	0	Monitored
	Gustine (2002)	31	240	0	Monitored
	Gustine # 2 (2003)	34	40	0	Monitored
	Turlock # 1	42	53	53	Treated
Sacramento	Cal Expo (2001)	21	24	0	Eradicated
Stanislaus	Newman (1998)	3	256	0	Eradicated
	Hickman # 1 (2000)	14	999	0	Monitored
	Hickman # 2 (2000)	15	311	0	Eradicated
	Hickman # 3 (2000)	16	145	0	Eradicated
	Hickman # 4 (2000)	17	15	0	Eradicated
	Hickman # 5 (2002)	28	262	0	Monitored
	Turlock # 1	42	151	151	Treated
Totals*	**43***		**15,559**	**7,2475,173**	
Percentage of Original Infested Acres Remaining Under Treatment					**46%**
Percentage of Original Infested Acres Eradicated or Being Monitored of RIFA					**54%**

*Smith River was number 26, but is doubtful that this was an infestation.

Southern California – Orange, Riverside and Los Angeles Counties
The RIFA quarantine area remains unchanged in 2006 from its inception by the PDEP in 1999. The established quarantine is 865.5 miles. This encompasses all of Orange County (790 sq. mi.) and parts of Riverside (67 sq. mi.) and Los Angeles (8.5 sq. mi.). The quarantines were designed to contain the spread of RIFA, by requiring inspection and treatment of articles through which the ant can be spread such as nursery stock, soil, landscaping and beehives. Treatment activities are conducted in Orange County and Coachella Valley (Riverside County) by the County Vector Control Districts and in Los Angeles County by the County Agricultural Commissioner.

Regulatory Approach
Regulatory enforcement of the RIFA quarantine was accomplished using compliance agreements with businesses and/or individuals within the quarantine areas that commercially grow, produce, propagate, handle, store, maintain, ship, transport or process regulated articles or commodities. Establishments that are in program-compliance followed specified treatment procedures necessary to ensure RIFA-free status for the articles or commodities intended for movement. Inspection surveys, treatment records and activities of these establishments were monitored in 2006 to ascertain that all applicable protocols of inspection surveys, treatment procedures and information records are done in accordance with the compliance agreement. The categories of compliance agreements include: production nurseries, non-production or retail nurseries, landscapers, yard maintenance, golf courses, sod farms, bee-keepers, soil movers, homeowners, hay dealers/handlers, green waste recyclers and landfills. Program staff signed 278 new compliance agreements in 2006, bringing total establishments monitored to 5,357. The number of compliance agreements for nurseries, sod farms and golf courses has leveled off, but there continues to be an increase in the numbers of new compliance agreements in other high-risk categories such as landscapers, yard maintenance, soil movers, etc. The number of businesses under compliance agreements varies due to new or failing businesses.

To ensure movement of RIFA-free nursery stock, the highest priority for quarantine enforcement is compliance of production nurseries. In 2006, 1,160 or 77.3 percent of SPAM-bait/visual inspection surveys by the program were conducted in production nurseries (Figure 9). An additional 2,194 soil site inspections for construction/swimming pool installation were also conducted. To ensure compliance to program procedures, the goal of program staff is inspection of 100 percent of quarantined production nurseries in each quarter of the year (Table 10).

Table 10. Inspections of Production Nurseries for RIFA in 2006

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Goal	100.0%	100.0%	100.0%	100.0%
Actual	100.0%	99.41%	99.87%	99.13%

RIFA has been found in 81nurseries since the beginning of inspections in October 1998 and the end of 2006. Fifty-nine or 73 percent of these nurseries completed treatment protocols and were taken out of positive nursery classification after four consecutive negative quarterly surveys (Figure 10). Twenty-two nurseries were treated (broadcast bait) for RIFA. They are monitored and SPAM® bait-surveyed along with all other nurseries within the quarantine areas. All nurseries within the quarantine areas also continued soil drenching or incorporating pesticides in soil mixture in 2006 as a regulatory requirement.

In 2006, regulatory inspections of establishments found RIFA in 16 production nurseries and 21 soil-movement related sites. Each site was treated (broadcast bait) and put under monitoring according to program protocol.

Grid Survey
Grid surveys of southern California counties continued in 2006. Three SPAM® bait stations are set at each of four locations per square-mile (one per quarter mile grid). This baiting survey has been repeated by the PDEP branch in southern California counties at the same locations since 2000. In 2006, 24 square-miles were surveyed in Orange and Los Angeles counties. In Los Angeles county there were not any RIFA finds.

The Arizona Department of Agriculture (ADA) and California Department of Food and Agriculture (Department) continued using a Master Permit Agreement for shipment of nursery stock from California to Arizona. This agreement allows RIFA-free nurseries, within the California quarantine, to ship nursery stock into Arizona without being held in a special ADA approved quarantine holding area. Sixteen nurseries of about 1,558 acres, participating under the terms of this master permit.

OTHER INVASIVE SPECIES SURVEYS

PDEP performs a variety of other surveys for invasive pest species statewide each year. Some of these are on an ongoing annual basis, while others are temporary and are in response to new invasive pest threats. Branch staff may also conduct geographically limited surveys in response to specific questions concerning the presence and/or distribution of potentially invasive species.

SPECIAL EXOTIC PEST SURVEYS

- **Potato Cyst Nematode**

The detection of PCN in Idaho, the first in the United States, elevated the necessity for a nationwide survey. A special survey for potato cyst nematode was conducted in 2006 to obtain information on the occurrence and distribution of this economically harmful pest. The goal was to survey 100 percent of the seed potato fields and 10 percent of the commercial potato production fields. A total of 674 potato cyst nematode samples were collected from 49 fields covering 2,329 acres. The survey results were negative for all samples.

- **Pea Leafminer**

The purpose of the pea leafminer survey was to determine whether the pest is present in California. Until recently, *Liriomyza langei and Liriomyza huidobrensis* were thought to be the same species. In 2001, molecular methods were used to demonstrate that these two are separate species. Because California does have *Litiomyza langei,* PDEP must survey to verify the sole presence of *Liriomyza langei.* In 2006, 12 counties and 91 properties were surveyed for the presence of *Liriomyza huidobrensis.* There were 84 samples submitted, all 84 samples were negative *Liriomyza huidobrensis.*

ANNUAL INSECT SURVEYS

- **Africanized Honey Bee Monitoring**

Africanized honeybee (AHB), *Apis mellifera* (Hymenoptera: Apidae), is a hybrid between one or more of the European honeybee sub-species (*Apis mellifera mellifera*, *Apis mellifera linguica*, etc.) and the African honeybee (*Apis mellifera scutellata*). Because of its aggressive nature, AHB can cause serious envenomation symptoms in animals and people from multiple sting

incidents. It first migrated into California from Arizona during late 1994, arriving in Blythe, Riverside County. The total number of California square miles colonized with AHB is 63,303. The 2006 survey in Fresno, Merced, Monterey, San Benito and San Luis Obispo counties resulted in 82 samples that were negative for AHB. A single positive sample was taken from Salinas, Monterey County. This sample was taken from an aggressive bee colony brought in from San Benito County. Until additional foragers are taken that are confirmed Africanized, Monterey County will not be considered colonized. Additional survey in both counties turned in no positive samples. Currently, AHB colonizes the entire counties of Imperial, Kern, Kings, Los Angeles, Madera, Orange, Riverside, San Bernardino, San Diego, Tulare, Ventura; and portions of Inyo, San Luis Obispo and Santa Barbara counties.

- **Cereal Leaf Beetle Survey**

Cereal leaf beetle (CLB), *Oulema melanopus* (Coleoptera: Chrysomelidae), is a serious pest of grains and grasses and occurs in the northeastern and northwestern United States, but has not yet become established in California. CLB feeds primarily on cultivated and escaped grains and grasses, such as oats, barley and wheat. PDEP conducted sweep net surveys at 2,607 sites in 58 counties to monitor for this pest. The 2006 survey was negative for the presence of CLB in California.

- **European Corn Borer Trapping**

European corn borer (ECB), *Ostrinia nubilalis* (Lepidoptera: Pyralidae), is a serious pest of corn and can infest a wide variety of herbaceous plants. In the U.S., it currently occurs in the eastern and midwestern states. PDEP operated 150 traps in 11 counties to guard against an introduction of this pest. The 2006 survey was negative for the presence of ECB in California.

- **European Pine Shoot Moth Trapping**

European pine shoot moth, *Rhyacionia buoliana* (Lepidoptera: Tortricidae), is a serious pest of various species of pines. In the U.S., it currently occurs across the northern states. PDEP operated 88 traps in 11 counties to guard against an introduction of this pest. The 2006 survey was negative for the presence of European pine shoot moth in California.

- **False Codling Moth Trapping**

False Codling Moth, *Thaumatotibia leucotreta* (Lepidoptera : Tortricidae), is a very important pest of citrus and cotton in sub-Saharan Africa. The larvae of this moth infest a wide variety of fruits, vegetables and forest trees, but cause the most damage to citrus and cotton. PDEP operated 1,289 traps in 18 counties to determine if a resident population exists in California. The 2006 survey was negative for the presence of false codling moth in the state.

- **Khapra Beetle Trapping**

Khapra beetle, *Trogoderma granarium* (Coleoptera: Dermestidae), is a serious pest of many stored grains and grain products. It is not known to occur in the United States. PDEP operated 2,928 traps in 25 counties to guard against an introduction of this pest. The 2006 survey was negative for the presence of Khapra beetle in California.

- **Nematode Survey**

Fifteen nematode species were the targets of an area-wide nematode survey. Ten crops were surveyed for these nematodes: alfalfa, almond, cotton, grape, pecan, potato, rice, tomato, walnut and zucchini. A total of 2,159 survey samples taken from 1,288 fields were processed and examined by the Plant Pest Diagnostics Branch.

- **Woodboring Beetle Survey**

This survey is designed to search for potentially harmful woodboring beetles. The Asian longhorn beetle, *Anoplophora 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 with UHR alpha-pinene and cis-verbenol with Ipsdienol and methyl butenol (aka Exotic Ips Lure).

Five exotic woodborers that are new but of no agricultural significance to California were detected during the 2006 survey.

SPECIAL INSECT PROJECTS

Asian Longhorned 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 2006. ALHB occurs in China and Korea. The source of the captured beetles was wooden packing crates from China containing slate tiles. Larvae of this beetle bore into the trunks of maples, poplars, elms, willows and other hardwood trees and can cause rapid tree death.

Visual Survey

Ground crews surveyed a nine square-mile of the area visually and tree climbers, from the United States Forest Service, surveyed host trees within the quarter-mile. Two full surveys were conducted from mid-February to mid-November 2006. A total of 8,019 properties were surveyed in the nine square-mile zone around the find site.

Trace Forward Surveys

Visual surveys were undertaken at and around sites where shipments of at-risk materials were sent from the find site warehouse in Sacramento.

Sacramento

The trace forward survey in Sacramento had 13 target sites, with 488 properties and 2,103 trees inspected. For the rest of the Northern District, there were 27 target sites, with 1,260 properties and 2,323 trees surveyed.

San Marcos

The San Marcos site was surveyed visually during 2006. A single survey was performed in a quarter mile radius around the receiver site. A total of 12 properties with three host trees were surveyed with negative results for ALHB.

Lancaster

The square-mile surrounding the Lancaster site was surveyed twice in 2006, with 18 properties and 2,057 trees visually surveyed. Results were negative for ALHB.

Eradication Program

Tree trunk and soil injection using Imidacloprid was performed within a one quarter-mile radius around the find site in Sacramento. Of the two methods, trunk injection was determined to be superior in efficacy to soil injection. This method will be used exclusively for future treatments.

Diaprepes Root Weevil Program

The Diaprepes Root Weevil (Diaprepes) is native to the Caribbean region and is a pest agricultural and ornamental pest. Diaprepes feeds on more than 270 species of plants from 59 plant families. Because of its broad host range, Diaprepes 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. In the rural residential areas, Diaprepes is encroaching upon commercial citrus and nursery operations. To prevent the permanent establishment of Diaprepes in California, Pest Detection and Emergency Projects (PDEP) initiated an eradication campaign against Diaprepes. The Branch also launched a statewide survey program to determine if Diaprepes is infesting other parts of the state.

At the onset of the eradication project, there were three areas scheduled to be treated. As additional Diaprepes were detected in new locations, the new sites were incorporated into the existing treatment programs. The statewide survey revealed 13 additional DRW infestations in California, bringing the total number of infested areas to 16.

Background

The first DRW infestation in California was first discovered in Newport Beach in September 2005. Following the establishment of a Diaprepes quarantine in Orange County, PDEP issued a press release to inform the public of the quarantine boundaries and regulations. Through this press release, a resident in Long Beach called PDEP to report Diaprepes on her property. A follow-up survey by PDEP biologists confirmed that Diaprepes was also infesting Long Beach. The third infestation in the state was reported in April 2006 in La Jolla. Subsequent surveys in La Jolla confirmed its presence in San Diego County.

Detection Activities

The Department Public Affairs Office, in cooperation with local agencies in the affected areas, conducted a variety of activities to increase public awareness of Diaprepes and to enlist public's help in reporting Diaprepes detections. The public outreach program is a multi-tiered effort that includes mailings, advertisements, informational flyers, surveys, and the Exotic Pest Call Management System (CMS). Between July and August 2006, over 1.8 million postcards were mailed to residences and businesses in the 225 area code throughout California. In October 2006, an advertisement was placed in the garden section of 14 newspapers statewide, reaching over of 4 million people. Informational flyers were sent to each county with a detection trapping program. The flyers were hand delivered to residents in conjunction with the rotation of exotic insect traps. Other public outreach efforts included Department staff giving presentations at professional meetings, training sessions and fairs.

Public outreach activities resulted in three new treatment areas in Orange County and 10 new treatment areas in San Diego County.

Visual Survey Activities
The most reliable Diaprepes detection method is visual survey. Surveyors look for feeding damage and adult Diaprepes. There are three levels of survey: statewide detection survey, delimitation survey and post-treatment survey.

Statewide detection survey
Visual survey for the Diaprepes occurred in 34 counties. This survey will continue in the spring of 2007. The properties targeted for survey are those where the resident called the CMS to report suspect Diaprepes detections, those that are maintained by a landscape contractor or properties that were landscaped within the last 10 years. No Diaprepes were detected in this survey.

Delimitation Survey
In Orange County, through public outreach activities, three new cities were found to be infested with Diaprepes (Yorba Linda, Newport Beach (west) and Huntington Beach).

In San Diego County, 10 new infestations were detected in the cities/communities in San Diego County (Carlsbad, Carmel Valley, Del Mar, Encinitas, Encinitas (west), Fairbanks Ranch, La Jolla (south), Oceanside, Rancho Santa Fe and Sorrento Valley).

Treatment Activities
Treatment occurs when a sample of Diaprepes is collected by a regulatory official and identified by a Department insect biosystematist. However, due to the addition of 13 new treatment areas and limited resources, in some areas, pesticides were applied only at the find sites and adjacent properties.

Pesticides were selected to attack all life stages of Diaprepes. Initial detections were in residential neighborhoods with ornamental plantings. But subsequent find sites contained a mixture of fruit trees and ornamental plantings, requiring the selection and application of a variety of pesticides to suit each plant type, the Diaprepes life stage and human health and environmental effects.

Table 11 - Cumulative DRW Treatment Report ending November 30, 2006

County	City	# of Treatments	Total Number of Properties Treated
Los Angeles	Long Beach	6	1,627
Orange	Newport Beach	3	857
	Newport Beach (West)	2	580
	Yorba Linda	1	90
	Huntington Beach	1	8
San Diego	Carlsbad	2	250
	Carmel Valley	2	330
	Del Mar	2	15
	Encinitas	2	137
	Fairbanks Ranch	2	28
	La Jolla	2	2,034
	La Jolla (South)	1	4
	Oceanside	1	3
	Rancho Santa Fe	2	6
	Sorrento Valley	2	2
Total			**5,971**

Environmental Monitoring

The Department of Pesticide Regulation (DPR), through an interagency agreement initiated by PDEP, developed site specific environmental monitoring plans for Los Angeles, Orange and San Diego counties. The objective of this monitoring is to measure the residual amount of insecticides used in the Diaprepes eradication program in surface and storm runoff water, soil, foliage, produce and air.

ANNUAL PLANT PATHOGEN SURVEYS

During 2006, no significant plant diseases were discovered through annual detection activities. Pest Detection and Emergency Projects (PDEP) participated in four plant disease surveys for citrus canker, citrus greening and karnal bunt.

- **Citrus Canker**

Citrus canker is a bacterial disease caused by *Xanthomonas axonopodis pv. citri*. It affects the leaves, twigs and the fruit of citrus trees and is a major threat to the citrus industry worldwide. In the United States it occurs in Florida where it is under active eradication. PDEP annually performs visual surveys in citrus producing regions with a goal to survey 25 percent of the total citrus acreage each year on a rotational basis. This year, 17,140 acres were surveyed in 24 counties. The 2006 survey was negative for the presence of citrus canker in California.

- **Citrus Greening**

Citrus greening is one of the most devastating diseases of citrus. Caused by a fastidious phloem-limited bacterium, the Asian strain, the African strain, and the Brazilian strain. The bacterium is transmitted by the Asian citrus pysllid, *Diaphorina citri* Kuwayama. This pysllid is not known to occur in California.

The purpose of the survey is to detect the presence of Citrus greening or the Asian citrus psyllid before citrus greening disease or the Asian citrus pysllid is established. The survey targeted areas that are a risk for citrus greening disease or the vector. Areas surveyed included areas

that receive plant material from eastern or southern Asia or in areas with ethnicity originating from Asian ancestry

- **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. In 1996, Karnal bunt was found in Riverside and Imperial counties of California shortly after having been discovered in Arizona, which resulted in Federal quarantines of the affected areas. Thirty of the wheat fields harvested within the regulated area of the Palo Verde Valley in Riverside County were tested for the presence of Karnal bunt. All samples were negative for Karnal bunt.

The National Karnal Bunt Survey was completed in California with the cooperation of various branches and county agricultural commissioner offices. The California portion of the Karnal Bunt National Survey was performed according to the USDA protocol for calendar year 2006. Thirty-eight samples from 17 counties were collected with all samples negative for Karnal bunt.

- **Rice Pathogen Survey**

The objective of the rice pathogen survey was to obtain information on the distribution of domestic and exotic pests of rice in rice fields and in rice germplasm thoughout California. The targeted diseases could cause devastation losses to rice production. In California, the annual production value from rice exceeds $370 million.

A series of causal pathogens were targets of the 2006 rice pathogen survey. A combination of commercial rice fields and research locations throughout California were surveyed. A total of 111 fields in six counties were surveyed for exotic rice diseases; all results were negative.

STATEWIDE POST-ENTRY QUARANTINE PROGRAM

The statewide post-entry quarantine program is responsible for inspecting plant shipments that have already arrived in California for the presence of diseases. In 2006, PDEP staff visited sites throughout the state and inspected over 500,000 plants.

INTEGRATED PEST CONTROL

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

The Integrated Pest Control Branch operates a beet curly top virus (BCTV) control program under the agencies of the Curly Top Virus Control Board. BCTV is an extremely serious plant virus affecting several hundred varieties of ornamental and commercial crops in California. The program consists of surveys and treatment of the sugar beet leafhopper (BLH), *Circulifer tenellus* (Baker) on rangeland in the San Joaquin Valley. The only known vector of this virus is the sugar beet leafhopper.

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 Curly Top Virus Control Program (CTVCP) 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 BLHs 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 CTVCP is to:

1. Reduce the potential number of over-wintering female BLHs through the application of insecticide on Russian thistle and other weed hosts in 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 BLHs has developed preventing migration to crops during late spring and early summer.

4. Not treat areas that are restricted due to the presence of threatened or endangered species (after consultation with the U.S. Fish and Wildlife Service, the U.S. Bureau of Land Management and the California Department of Fish and Game).

During the 2006 season, the CTVCP staff 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 BLHs 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 CTVCP objectives.

During 2006, using aircraft and ground spray equipment, a total of 56,445 acres were treated with malathion to control BLH populations (Figure 1 and Table 1). The acreage totals for 2006 were below the 10-year treatment average of roughly 74,127 acres.

A second year of above normal rains was responsible for lush rangeland conditions in BLH breeding grounds on the west side of Fresno and Kings counties. Prolonged cool and rainy spring weather extended the spring treatment activities over a month. BCTV infection was generally light except in the Buena Vista lakebed where as much as 50 percent infection was observed in several fields.

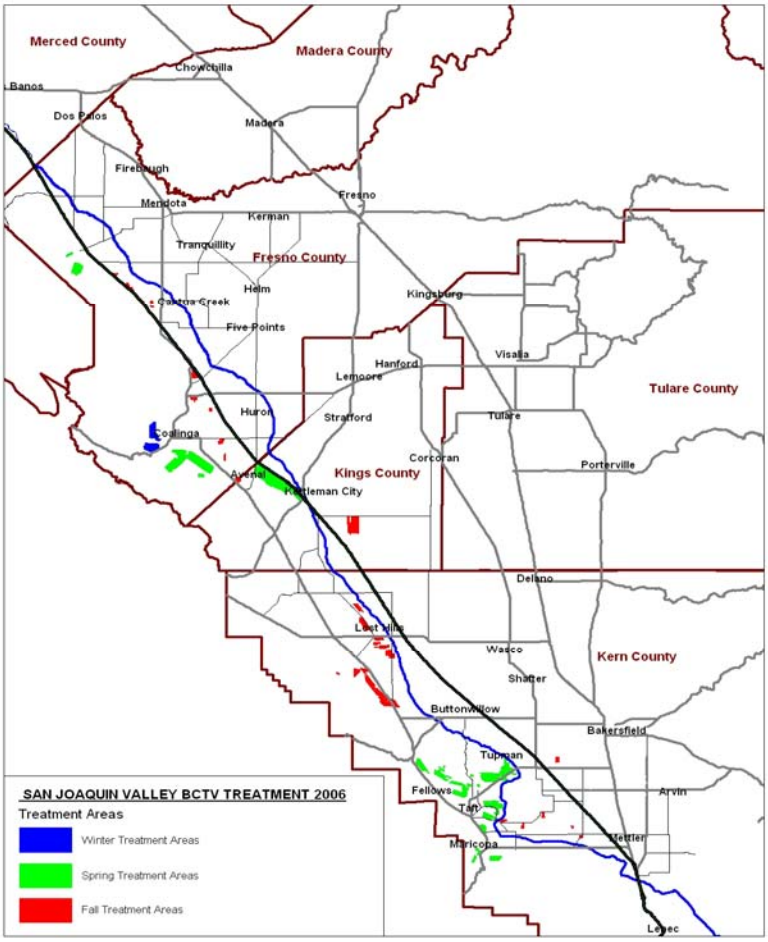


Figure 1. San Joaquin Valley beet curly top virus treatments in 2006, by season

Table 1. Sugar beet leafhopper/curly top virus control program: acres sprayed with malathion in 2006 and proceeding years

CURLY TOP VIRUS CONTROL PROGRAM

10 Year Average Acres Sprayed

	SAN JOAQUIN & COASTAL VALLEYS						IMPERIAL /PALO VERDE VALLEYS (Riverside/Imperial Co.)		
Calendar Year	WINTER		SPRING		FALL		All Seasons		TOTAL ACRES SPRAYED
	Air	*Ground*	*Air*	*Ground*	*Air*	*Ground*	*Air*	*Ground*	
2006	***3600***	***0***	***32315***	***160***	***18050***	***480***	***0***	***1840***	***56,445***
2005	0	0	6,921	800	16,100	*0*	*0*	4,510	**28,331**
2004	6,600	0	29,820	3,270	10,455	0	0	1,240	**51,385**
2003	6,100	0	68,250	2,270	35,500	0	0	1,220	**113,340**
2002	20,825	0	92,300	4,540	39,950	240	0	0	**157,855**
2001	0	0	57,723	3,764	39,750	1,720	0	1,495	**104,452**
2000	0	0	21,375	3,040	42,753	1,330	0	0	**68,498**
1999	0	0	12,450	2,872	11,995	1,280	0	0	**28,597**
1998	0	0	19,216	640	34,025	1,180	5,900	2,400	**63,361**
1997	2,310	0	49,415	4,656	10,900	1,720	0	0	**69,001**
1996	7,872	0	47,203	7,080	14,425	480	0	0	**77,060**
TOTALS	**43,707**	**0**	**404,673**	**32,932**	**255,853**	**7,950**	**5,900**	**6,355**	**757,370**
Average	**4,371**	**0**	**40,467**	**3,293**	**25,585**	**795**	**590**	**1,087**	**76,188**

Winter Treatment

Rangeland host vegetation in the winter treatment area was developing normally in January. There were breaks in the storms to allow sun penetration and beet leaf hopper (BLH) host plants to develop. Early survey on Burma Ridge and Zapatos Canyon found good vegetation developing on the flats under a significant remnant of dried turkey mullin from the previous year. Rainfall in Jacalitos Canyon appeared to have been less than surrounding areas. Significant BLH counts averaging four to 12 per 10 net sweeps were found in Jacalitos, Warthan Canyons and on the Coalinga Rifle Range.

A total of 3,600 acres of rangeland was aerially treated in western Fresno County to control BLH populations on February 2. Approximately 2,500 acres in Jacalitos Canyon remained untreated due to the refusal of a property owner. .

Spring Treatment

A total of 32,315 acres were aerially treated to control BLH populations between March 30 and May 6 on the west side of the San Joaquin Valley. The above normal rains in Kings and Fresno counties and a generally cool spring prolonged treatment activities in Kings and Fresno counties.

In December and January, over-wintering female BLHs were found concentrating on host plants in good numbers on the west side of Kern County. By late February, host plants were beginning to dry and stress while wetter conditions to the north allowed rangeland in Kings and Fresno counties to continue growing. During the last week of March, BLH nymphs were found in high

numbers averaging 50-75/10 sweeps at most locations where stressed *Plantago* could be located. A total of 11,100 acres were treated in Kern County between March 30 and April 1.

Weather systems continued to bring rain consistently through March and the first part of April to rangelands on the west side of Kings and Fresno counties. By the last weekend of the month, the rainy weather experienced in the first part of the month had been replaced by 80-90 degree temperatures. Survey work continued into the first week of May. BLH populations in the Kettleman Hills continued to be found averaging 30-40/10 sweeps on very green *Plantago*. The higher temperatures began drying the rangeland host plants at a much faster rate. From May 3 through May 5, 9,450 acres were treated in the Kettleman Hills. An additional 9,600 acres were treated from April 26-28 in Zapatos, Plaugher and Jacalitos canyons. On May 6, 1,800 acres of rangeland were treated in the Tumey Hills where BLH populations were found in bands of Plantago on the tops of the ridges and in the bottom third of the draws.

Fall Treatment
Approximately 18,050 acres of oilfields, rangeland and cultivated fallow ground were aerially treated to control BLH populations from October 13 through October 20.

Program staff monitored and mapped approximately 50,000 acres of Russian thistle, *Bassia,* goosefoot and lambs quarter developing in rangeland and cultivated fallow ground. A total of 210 waivers were sent to property owners to obtain permission for survey and treatment, if necessary. In response to this notification, some landowners removed Russian thistle and other weed hosts. A continual reduction in potential treatment acreage was observed through the summer due to disking, drying and grazing.

The BLH populations remained low and static through the summer averaging only one to three leafhoppers per single sweep. During the last week of September the nighttime temperatures began to lower and the BLH populations were observed increasing in a few locations. By the second week in October, BLH counts were increasing in southwestern Kern County along Hwy 166 near Maricopa. Increasing populations were also found in the Belridge and Lost Hills oilfields. A majority of the higher averages were found on small drying *Bassia* plants.

Treatments began in Kern County on October 13. Approximately 10,750 acres were treated in southwestern Kern County and the Belridge and Lost Hills oilfields. Treatments resumed on October 18 in Kings County where approximately 3,500 acres were treated east of Utica Avenue and Interstate 5. On October 19 and 20, a total of 3,550 acres were treated in Pleasant Valley and west of Three Rocks.

Research
Beet Curly Top Virus Assessment Project; a contract with Karen Jetter, University of California at Davis, for the purpose of constructing a statistical model to determine grower assessment rates and calculate net benefits of the CTVCP to susceptible industries.

Dermal Study; Bob Hosea (Department of Fish and Game) completed the dermal toxicity study for blunt-nosed leopard lizard, during 2005, and released a final report in March 2006. The study concluded; “malathion as used by the CTVCP is not acutely toxic to the blunt-nosed leopard lizard and does not pose a toxic risk through dermal exposure”.

Insect Ecology Study; *Non-Target Effects of Sugar Beet Leafhopper Control*: *Implications for the Blunt-Nosed Leopard Lizard*, Dr. Richard A. Redak, University of California, Riverside. A progress report from the University of California at Riverside was received outlining the initial

year's sampling procedures. The identification of insects collected from the control and treated blocks is continuing. No analysis of the data collected during the initial year of sampling was provided.

Summary
While some individual tomato plants could be found exhibiting BCTV symptoms, following the spring migration, the BCTV infection rate was low in the San Joaquin Valley. There were no reports of BCTV infection in the Imperial or Salinas valleys.

Several isolated tomato fields in the Buena Vista lakebed experienced infection rates from 20 to 60 percent. These fields are in proximity to blunt-nosed leopard lizard habitat, restricted by U.S. Fish and Wildlife Service biological opinion, to a maximum of 50 percent treatment. The fields are also in proximity to other lands and preserves administered by the California Department of Fish and Game where permission to treatment is continually denied.

The program's ability to control BLH migration from the Elk Hills and Buena Vista Valley are severely hampered due to the afore mentioned treatment restrictions.

BIOLOGICAL CONTROL PROGRAM
Key Highlights for the Biological Control Program for 2006 are:

- Foreign exploration for olive fruit fly natural enemies nears completion. Department scientists and cooperators released over 1,800 adults of *Psytallia lounsburyi*, the first parasite approved for release in California in 2006.

- Department scientists and cooperators received a shipment of the Diaprepes root weevil (Diaprepes) egg parasitoid and a culture was initiated in quarantine at the University of California, Riverside.

- Department scientists and cooperators released a rust pathogen of yellow starthistle at 99 new sites in 38 counties in 2006.

- 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 recovered weevils on Mediterranean sage at several northeastern California sites, which is strong evidence that the weevil has been established there.

- Outreach efforts continue. Department scientists and cooperators produced informational brochures on several key pests, including Gill's mealybug, citrus greening and canker diseases, Asian citrus psyllid and the Diaprepes.

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, Plant Pest Quarantine (USDA-APHIS-PPQ) Western Region, the Biological Control Program formed a research team consisting of scientists from the USDA Agricultural Research Service (ARS), University of California, and Texas A&M University to develop a biological control program against the olive fruit fly.

Department and USDA-ARS scientists have pursued foreign exploration for effective natural enemies of the olive fruit fly in its area of origin and areas of traditional production. In 2005, exploration occurred in South Africa, Namibia and China. In 2006, scientists searched southern and northern India, developing valuable local contacts that will collect for them in the future. A cooperator at the University of Stellenbosch, South Africa, shipped several collections from South Africa. These exploration efforts have resulted in several promising candidates for use as biological control agents against the olive fruit fly in California

Cooperators at the University of California, Berkeley continued their host range testing of several olive fruit fly parasitoids in quarantine. In 2005, the first biological control agent (the parasitoid, *Psytallia lounsburyi* was approved for field release by USDA-Animal and Plant Health Inspection Services and the Department. A total of 1,850 *P. lounsburyi* adults were released in Butte, Napa, Sonoma and Yolo counties in fall 2006. Adult parasitoids were released directly into the tree and some were released in field cages (Figure 1). Recoveries of small numbers of adult parasitoids have been made from olives in the field cages indicating that the parasitoid can survive and develop under California field conditions.

Figure 1. Field cage for olive fruit fly release

- **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 newer, effective products cause outbreaks of other pests. Field surveys showed that there are no nymphal parasitoids of the lygus bug in California. The exotic nymphal parasitoids, *Peristenus relictus* (=*stygicus*) and *P. digoneutis*, were produced in cultures at the Department facilities in Sacramento and in a nearby field insectary and released at several locations throughout the strawberry production area along the central California coast in 2006. *Peristenus relictus* has now been recovered at the first release site, two years after the last releases were made, suggesting that this biological control agent has established. The other parasitoid, *P. digoneutis*, has not been recovered. Numbers of lygus bug in organically-produced strawberries has decreased each of three years since *P. relictus* was first released, providing strong evidence that widespread establishment of this beneficial insect is having a regional impact. 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 is aiding in the colonization of *P. relictus* on the central coast (Figure 2).

Figure 2. Strips of alfalfa growing between strawberry rows, which serve as an alternate host to the lygus bug parasite *Peristenus relictus*

- **Diaprepes root weevil**

The Diaprepes root weevil (Diaprepes), *Diaprepes abbreviatus* L., was first found in Southern California in 2005. Research on its biology, phenology and control was initiated in July 2006 in an area near Encinitas in San Diego County. Adult and egg stages were monitored weekly with traps and visual surveys. Peak densities of adults were found from July through September with a smaller peak occurring in November. The cold weather in December greatly reduced densities of weevils. Egg masses were found during peak adult densities. The egg masses are difficult to detect because the adult female sandwiches the eggs between two leaves (Figure 3). Several species of host plants were examined and new host plants have been discovered for Diaprepes in California.

Figure 3. A Diaprepes egg mass between two avocado leaves

The spatial arrangement of Diaprepes larvae around the roots of a plant was investigated in a lemon grove in Encinitas where several infested trees had blown down in early January after a windstorm. The grower granted permission to excavate the trees and look for larvae (Figure 4). To date, approximately 92 larvae have been recovered from the roots of the lemon trees. The larvae varied in age from about third instar through the pre-pupal stage (instars 10 or 11). On average, the larvae were found on roots approximately 1.4 feet from the crown and at an average depth of 4.6 inches. This work is continuing.

Figure 4. Dr. Tracy Ellis of the University of California Cooperative Extension excavating Diaprepes root weevil larvae from the roots of a lemon tree in Encinitas.

Department and university scientists and county cooperators initiated studies on the ability of the egg parasitoid *Aprostocetus vaquitarum* (Wolcott) to develop on Diaprepes in California in early December. They received high-quality parasitoid pupae at the University of California, Riverside Quarantine Facility from a laboratory colony maintained at the University of Florida. However, cold winter temperatures prevented the planned field studies because the low

temperatures prevented egg production by Diaprepes females and resulted in high mortality of Diaprepes adults. Additional shipments of parasitoids are scheduled for late spring and early summer 2007. Field studies will be performed this summer.

- **Vine Mealybug**

The vine mealybug, *Planococcus ficus* (Signoret), 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. County cooperators continued to monitor the spread of vine mealybug using pheromone traps in 2006. During 2006, 17 counties had at least one vineyard with vine mealybug females and four counties had a vineyard where only vine mealybug males were found. Eradication efforts also continued with one county showing great progress in eradicating vine mealybug, and one county appears to have eradicated it completely. In 2006, a Department scientist initiated a colony of the vine mealybug parasite, *Anagyrus pseudococci* (Girault), Sicilian strain, at the Department facilities in Sacramento and secured two vineyards in San Joaquin County as release sites for 2007.

- **Red Imported Fire Ant**

Studies on the ability of the red imported fire ant biocontrol agent, the phorid fly (*Pseudacteon tricuspis* Borgmeier); 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 April, a Department scientist released a total of 3,109 adult flies on several mounds at two sites in Lake Elsinore. Though a few flies were observed one month after this 2006 release, no flies were recovered at 2005 release sites. However, studies in the southeastern United States have shown that it can take up to three years to recover the fly after release in new areas. Follow-up monitoring will continue for at least two more years.

- **Citrus Leafminer**

The citrus leafminer, *Phyllocnistis citrella* Stainton, is moving northward from Southern California and can now be found in the southern coastal counties and the southern half of the San Joaquin Valley. As a part of a cooperative project with researchers at the University of California, Riverside, Department scientists monitored citrus leafminer populations in five groves in Tulare County with pheromone traps and visual surveys to determine the citrus leafminers flight phenology in the San Joaquin Valley and to identify the parasitoids attacking the larvae. Adult moths were captured beginning in mid May with a peak in trap catches in mid September. The density of citrus leafminer at these sites in Tulare County is still very low. This study is ongoing.

- **Avocado Lace Bug**

Found in San Diego County in late summer 2004, the avocado lace bug 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 by 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 has been initiated between Department, the University of California, Riverside and San Diego County. Department scientists and university cooperators are using facilities in Chula Vista as an insectary where a colony of the lace bug is being grown for research and as a source of lace bug hosts for the production of potential biological control agents.

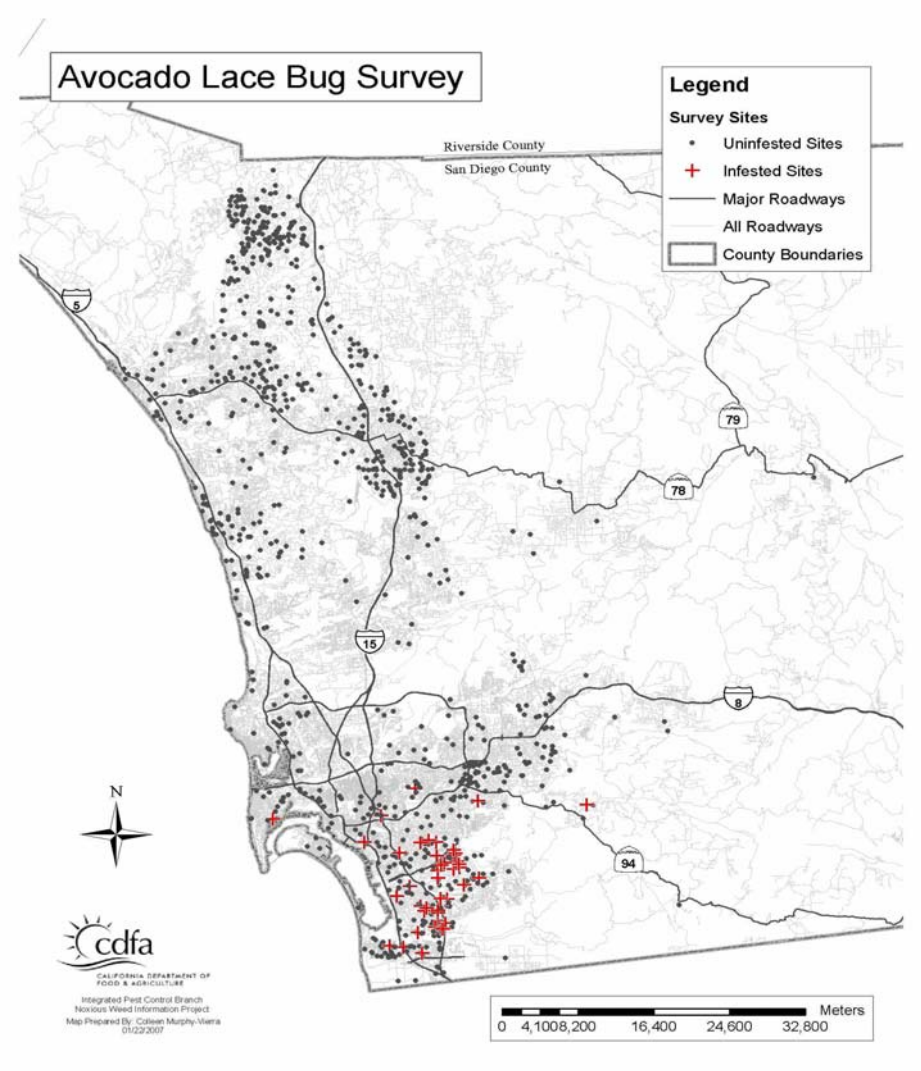
Two surveys of the avocado lace bug infestation were performed in 2006. The late spring survey indicated that the avocado lace bug continued to be limited to areas south of Interstate 8 in San Diego County (Figure 6). However, the second, survey in fall 2006 recovered the lace bug at a site near Lake Murray and at two new sites near La Jolla.

Detailed monthly sampling of populations at six locations in 2006 indicated that population levels were similar to densities observed in 2005.

Foreign exploration was initiated in March 2006 in the Caribbean and southeastern Mexico. To date, no potential natural enemies have been found. Additional trips at other times of the growing season and inclusion of the avocado production area of southwestern Mexico are planned.

Figure 5. Adult avocado lace bugs, eggs and nymphs and leaf feeding damage

Figure 6. Map of spring 2006 infestation of the avocado lace bug in San Diego County



- **Pink Hibiscus Mealybug**

In August 1999, the pink hibiscus mealybug was found in North America for the first time 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, Department 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 areas of southeastern Asia were reared and released throughout the infested area of Imperial County during the next five years (1999-2005).

Figure 7. 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

Program scientists and cooperators have recovered two parasite species (*Anagyrus kamali* and *Gyranusoidea indica*) from ornamental trees and shrubs at the release areas. In addition, surveys of the pink hibiscus mealybug in the release area demonstrated that the parasites have reduced mealybug populations to less than one percent of their former abundance. The parasite recoveries and their impact on the pink hibiscus mealybug provide strong evidence that the two parasites have permanently established in the region and will continue to suppress mealybug populations without need for any chemical control applications. Without this protection, many species of ornamental trees and shrubs would have been destroyed in these communities and the spread of the pink hibiscus mealybug to other regions of the state would have rapidly occurred, likely affecting several commercial crops. In more recent years, the pink hibiscus mealybug has been found in Florida and Louisiana. As a result, USDA-APHIS has contracted with the Department Biological Control Program to continue production of the parasites for shipment to these states (Table 1). In 2006, the Department produced and shipped 159,750 individual parasites to Florida and Louisiana.

Table 1. Shipments of pink hibiscus mealybug parasites from California to other states in 2006

Date Sent	Recipient	*A. kamali*– strain: Hawaii/China	*A. kamali*- strain: Taiwan	*G. indica*- strain Egypt/Australia
January	Florida		3,000	46,400
February	Florida	4,800	7,000	8,000
August	Florida	5,000	3,500	
September	Florida	4,400	16,800	12,500
October	Florida	2,000	2,800	1,800
October	Louisiana	6,750	8,800	11,800
November	Louisiana		4,500	2,000
December	Louisiana	1,800	3,300	7,300
Total		**20,250**	**49,700**	**89,800**

WEED PESTS

- **Yellow Starthistle**

California Department of Food and Agriculture (Department) scientists made large-scale releases of the newly-approved rust disease, *Puccinia jaceae* var. *solstitialis*, to control yellow starthistle for the third year in 2006. Each release, made in cooperation with the county agricultural commissioner's offices, occurred at field sites heavily infested with yellow starthistle. In total, it was released at 99 locations in 38 counties using spores propagated by the Biological Control Program in a greenhouse in Sacramento during 2005. Follow-up surveys approximately one month following treatment showed evidence of infection at almost all the sites. In total, the rust has been released at 204 locations in 38 counties since 2003.

- **Purple Loosestrife**

Program personnel have used an established population of purple loosestrife leaf beetles at Big Lake, Shasta County as a collection source for the last several years. The leaf beetles are effective biocontrol agents for purple loosestrife as they devastate the leaves and flower stalks (Figure 8). However, rising water levels in and upstream of the Fall River in 2005 caused by severe infestations of Eurasian water milfoil in the river appear to have reduced over-wintering populations of the two leaf beetles. It appears that raising waters in areas bordering Big Lake and Horr Pond drowned the beetles, which crawl under vegetation in search for a dry place to wait out the winter. Consequently, spring collections were canceled so that the beetle populations would have a chance to recover.

By late summer, the beetle populations had built up to levels observed in previous years and markedly impacted the loosestrife at monitoring sites. Surveys during 2006 showed that the beetles have become established at Ahjumawi Lava Springs State Park along the southern boundaries of Big Lake and Horr Pond and along the Little Tule River to Eastman Lake. Severe defoliation early in the season occurred along the Little Tule River which escaped the flooding caused by the Eurasian water milfoil.

Department biologists collected approximately 8,000 adults of the two leaf beetles in August 2006 and released 3,000 of them at a purple loosestrife infestation in Fresno County and released another 5,000 in Butte County.

Figure 8. Purple loosestrife leaf feeding damage by *Galerucella* leaf beetles

- **Mediterranean Sage**

The exotic noxious weed, Mediterranean sage, infests rangeland in Modoc and Lassen counties in northeastern California. A Department scientist and county cooperators released the beneficial root weevil, *Phrydiuchus tau*, from 2001-2005. In 2006, surveys demonstrated that the weevil has been established at most sites where it was released. The weevil was also recorded at locations where they were never released showing that it has spread to nearby infestations of the weed. Early releases of *P. tau* in 1978-1979 had occurred on heavy populations of Mediterranean sage along Hwy 395 from Alturas north to the Oregon State line and along Hwy 139 south of Tule Lake. Surveys of this area in 2006 recovered very few plants, suggesting that the weevil has been very successful in keeping the Mediterranean sage under control. Efforts are now underway to monitor the more recent release sites to demonstrate impact by the weevil on the Mediterranean sage in these areas.

Figure 9. Mediterranean sage weevil feeding on a Mediterranean sage leaf

- **Puncturevine**

A Department scientist and county cooperators released two beneficial weevils, *Microlarinus lareynii* (a seed weevil) and *M. lypriformis* (a stem weevil), at selected sites in Lassen County in July 2005. The sites were pre-selected as the most protected to improve chances that the weevils survive the cold winter temperatures common in the area. Surveys in 2006 recovered the weevils at three release sites. It is hoped that the weevils have survived the unusually cold winter of 2006-07 and, if recovered in 2007, additional releases of the weevils will be made at similar sites.

HYDRILLA ERADICATION PROGRAM

Key accomplishments for 2006 include:

- For the third consecutive year, Department biologists and surveyors did not detect hydrilla in Clear Lake. 2005 was the last year for treatments under the eradication protocol, and this year was the first since the eradication effort began in 1994 where treatment for hydrilla did not occur. It is very encouraging that no hydrilla appeared despite the absence of herbicide.

- Department surveyors also detected no hydrilla in the Chowchilla River/Eastman Lake system this year, and none has been found since 2002. For the first time since eradication began in 1989, no treatments were made there for hydrilla.

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

- No new infestations of hydrilla were detected in California this year, while visiting some 371 lakes, ponds and access points along streams, and surveying over 3,000 points in the Sacramento – San Joaquin River Delta, and responding to reports from the public.

- Department biologists and surveyors also made good progress in the eradication effort against an infestation of a new invader in California, South American spongeplant, which is in Shasta County.

The Hydrilla (*Hydrilla verticillata*) Eradication Program reached some milestones in 2006. Two infestations, in Clear Lake and the Chowchilla River, moved from the treatment phase to the follow-up monitoring phase. While program staff expect that hydrilla will likely reappear, to some degree in Clear Lake at least, it is very satisfying to be reaching the end of treatments after many years of effort in these two infestation sites.

Hydrilla, A Threat to the Water Resources of the State

Hydrilla is an invasive, submersed, non-native aquatic plant that is a threat to the 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 it can impede movement in streams, canals and drains; jam water control structures and choke hydroelectric generators; impede navigation; degrade fish and wildlife habitat; and endanger public health by reducing water flow and producing mosquito breeding habitat. Results from the Imperial Irrigation District infestation indicate that hydrilla can reduce water flow in canals as much as 85 percent. Annual control costs in highly infested states, such as Florida and Texas, are in the tens of millions of dollars.

History and Overview of the Hydrilla Eradication Program

Hydrilla heavily infests many places in the United States outside California. Hydrilla has two biotypes, dioecious and monoecious, that differ slightly in their ecological and biological characteristics. The dioecious form 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). The monoecious form was first detected in California in 1993 at an aquatic nursery in Visalia, Tulare County (from which it has since been eradicated).

In 1977, after the first California hydrilla find, the California Legislature authorized the Department Secretary to initiate a survey and detection program for hydrilla and to eradicate hydrilla wherever feasible (California Food and Agriculture Code Section 4068). 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 Department 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 2004, Department Secretary Kawamura declared the latest emergency after hydrilla was detected in Nevada County.

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. The Hydrilla Eradication Program is currently eradicating hydrilla from the following nine counties: Calaveras, Imperial, Lake, Madera, Mariposa, Nevada, Shasta, Tulare and Yuba.

Though the Department is the lead agency for hydrilla eradication, the Department administers the Hydrilla Eradication Program with the cooperation and support of the local county agricultural commissioners and other federal, state, county and city agencies, Native American tribes, and private individuals and entities. In addition, the Department Hydrilla Eradication Program received financial and in-kind support in 2006 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.

2006 Highlights

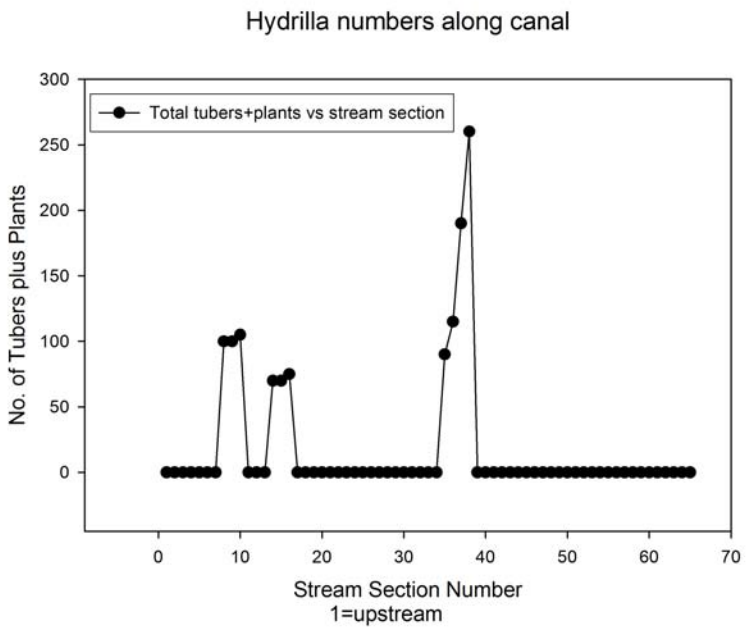
In Lake County, for the third year in a row, crews detected no hydrilla in Clear Lake (Table 1), after surveying the lake once a month during the six-month growing season. As the last find in 2003 was in June before treatments began for the season, 2005 represented the third full treatment season with no finds. Following the eradication protocol, the program did not treat for hydrilla in the 2006 season. Although it is too early to tell if all plants and tubers have been eliminated from Clear Lake, this step represents an important milestone in the eradication effort. Because of the long-lasting effectiveness of the herbicide used in the program, and because it kills the plants when they are small and just emerging from the sediments, a break from treatment is necessary to give any remaining plants an opportunity to grow to the point where the surveys will have a nearly 100 percent chance of finding them. Should plants be found, treatments will resume.

Table 1. Level of Hydrilla Infestation in Clear Lake, Lake County by Number of Infested Management Units and Number of Finds - 2000 to 2006

Year	2000	2001	2002	2003	2004	2005	2006
# of Management Units with “Finds”	31	21	6	1	0	0	0
# of Hydrilla “Finds”	67	41	12	1	0	0	0

In Yuba County, the Oregon House infestation consists of 14 infested ponds and the lowest three miles of an irrigation canal, which supplies the ponds. While seven of the infested ponds had hydrilla in 2005, eight ponds produced hydrilla this year, and the amounts in several of the ponds were higher than last year. Treatments will be intensified in the next year, and the Department is exploring the potential use of grass carp in several of the ponds where the plants have been especially persistent. In the canal, populations continue to slowly decline. Department biologists removed 1,175 plants and tubers in 2006, compared to 2,700 in 2005 and over 4,000 in 2004. As in previous years, the hydrilla in the canal has been reduced to several "hotspots" (Figure 1).

Figure 1. Number of tubers removed from the infested portion of the Yuba County Water District Canal in 2006 (by 50-meter sections, beginning at the upstream end).



In Nevada County, Department and Nevada County biologists, following leads from the public, confirmed hydrilla in two ponds in the county in 2005 but none in 2006. One pond is in the county fairgrounds and the other is an isolated 0.1-acre irrigation pond. This brings the number of infestations in Nevada County to three, including the find at the County Waste Transfer Station in 2004. In 2006, Department biologists continued treating all the ponds with fluridone herbicide, with excellent results. No plants were found in the transfer station pond and three plants in the fairgrounds pond. At the 0.1-acre irrigation pond, biologists estimated that the treatments reduced the cover of hydrilla on the pond's bottom from approximately 90 percent at the start of the season to 15 percent by season's end.

In Calaveras County, there have been no hydrilla detections for eight years, in all but one of the originally infested ponds and creek areas in the Bear Creek area. In the remaining infested ponded area, no plants were detected in 2005 and 2006, down from two plants in 2004, and 18 plants and five mats in 2002. In addition, no plants were detected in the isolated stock pond near Mokelumne Hill.

In Madera and Mariposa counties, there have been no hydrilla detections in the previously infested portion of the Chowchilla River for four years (Table 2). No hydrilla has been detected in Eastman Lake since 1993. Treatments ceased in the river this season and the effort shifted to a monitoring phase, depending on the continued absence of hydrilla. The last two years have had high water, enough to germinate any plants in locations that were previously left dry by an extended dry spell in the area, and yet no plants were found this year. Department and county biologists are hopeful that they will be able to declare eradication in this lake/river system within a few years.

Table 2. Number of Hydrilla Plants and Tubers Found and Removed from the Chowchilla River, Madera and Mariposa Counties - 2000 to 2006

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

In Tulare County, Department 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 three years, and no plants were found in any of the ponds in 2005 or 2006. 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 two stretches of the Wildcat and Wisteria Drains, totaling approximately two miles between them. The Department, Imperial County and Imperial Irrigation District biologists had surveyed this drain in November 2004 and found higher populations of hydrilla than previously thought. The decision was made to finally eradicate the plant from this troublesome area. Beginning in November 2005 and through the winter of 2006, when the flows in the drains were low enough to make working in them safe, Department and Imperial Irrigation District personnel worked on clearing the drains. They manually removed all the plants, along with many tubers, throughout the areas of these two drains, leaving them completely free of visible plants. Tubers remained in the sediments and surveys in fall 2006 showed considerable re-growth, as expected. Department personnel again are removing the plants in the drains during the winter of 2006-07. In addition to the work in the drains, the Imperial Irrigation District continues to produce and release the sterile grass carp in its canals for control of hydrilla and other aquatic vegetation.

In Shasta County, Department and Shasta County staff initiated an eradication program in 2005 on a new invasive aquatic plant, 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 would become a threat to the economy and environment of the state if not eradicated. Department 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, the Department discovered large quantities of very small seedlings camouflaged among other small floating plants of different species, indicating that the spongeplant comes back vigorously from seeds. The treatment strategy will be adjusted to more specifically target these small plants.

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 only three plants found. The hydrilla rebounded at the Anderson River Park, however. No plants were found at the park from 1999 through 2004, when Department crews made extensive surveys in preparation for declaring eradication, including surveys by divers. In addition to surveying, the crews also treated heavy infestations of water primrose in the pond, which was growing from the banks out into the water, impeding access and visibility. A few plants returned in 2005, and in 2006 the crews found over 100 plants in the pond.

In conclusion, the Department 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, and project biologists expect continued success in the future in eradicating hydrilla from the remaining infested areas.

WEED MANAGEMENT AREA PROGRAM

Weed Management Areas (WMAs) are dynamic groups of local land managers and public agencies, which have banded together to be more cooperative, strategic and active in battling the weed invasion spreading across our landscape. 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 (often federal) 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 (Department) core weed management programs.

The Department 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 Department and the WMA Support Program to administer the allocation of the funding. The bills provided a total of $5.4 million over a period of six years to local public and private partnerships to form local WMAs and aggressively control high priority weed infestations. WMAs have created a mechanism for landowners, land managers (private, city, county, state and federal), special districts and the public to combine their actions to control noxious weed problems, which they hold in common.

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 Department has ensured that WMAs are not a set of individual county programs, but instead 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 weeds infestations now. The Department implements an intensive program to coordinate, train and evaluate WMAs throughout the state. The Department statewide WMA coordinator works with Department district personnel to provide training in control methodology, monitoring, strategic planning, mapping and weed education. The Department WMA Support Program has provided individualized trainings, hosted seven statewide annual workshops and established 107 financial contracts. To ensure accountability, the Department conducted thorough WMA field project reviews for each WMA in the state.

The Department'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 the county agricultural commissioners, federal and state

agencies as well as with various entities such as private agricultural organizations and resource conservation groups.

2006/2007 Fiscal Year Weed Management Area State Funding Project

The WMA funding program received $1.5 million for the fiscal year 2006/2007 to implement weed eradication projects carried out by Weed Management Areas. After consulting with various stakeholder groups, including the California Invasive Weed Awareness Coalition and the Weed and Vertebrate committee of the California Agricultural Commissioners and Sealers Association, the Department WMA program issued a request for proposals in September 2006. The proposals were reviewed by a WMA Advisory Committee who ranked them according to their 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.

Weed Management Area Program Funding Allocation 2006/2007 FY

Weed Management Area*		**Amount**
Amador	Salt cedar eradication from the county	$56,314.03
Calaveras	Gorse eradication from the county	4,450.25
Colusa, Glenn, Tehama	Eradicate populations of perennial pepperweed, purple starthistle, tamarisk, Arundo, barbed goatgrass	73,590.90
El Dorado	Spotted knapweed eradication, yellow starthistle leading edge containment	99,849.42
Fresno	Yellow starthistle leading edge containment and eradication of outliers	12,585.32
Inyo, Mono	A-rated weeds on Walker River floodplain; pepperweed eradication and control; tamarisk eradiation on the lower Owens River	98,732.72
Lake Tahoe	Noxious weed eradication: spotted and diffuse knapweed, Dalmatian toadflax, perennial pepperweed, musk thistle	49,855.30
Los Angeles	Eradicate priority weeds of Catalina Island, Palos Verde Peninsula, Santa Monica Mountains: yellow starthistle, Arundo, spotted knapweed	73,607.76
Mariposa	Iberian starthistle eradication and yellow starthistle leading edge containment	63,188.38
Mendocino	Eradication of only woolly thistle distaff population in the county	8,980.00
Modoc	Widespread eradication and control of Scotch thistle on rangeland	41,000.00
Orange	Restoration of coastal chaparral through removal of exotics in Caspers Wilderness Park	4,400.00
Riverside	Wildlife habitat enhancement through multiple weed removal; tamarisk removal in rare palm habitat	94,920.03
San Diego	Eradication of all purple loosestrife, yellow starthistle and perennial pepperweed in the county	99,732.71
San Luis Obispo	Arundo removal on the Upper Salinas River; Fiscalini Ranch Preserve restoration through invasive weed control	70,066.74

San Mateo	Eradicate only California population of Slender false brome; exotic grass control in a rare grasslands; Canary Island St. John's wort eradication; pampas grass removal	99,531.52
Santa Clara	Eradicate Illyrian thistle, barbed goatgrass, purple and Iberian starthistle, broom, weeds of Arastadero Preserve	86,599.90
Shasta	Arundo and scarlet wisteria eradication from the county	54,801.00
Siskiyou	Control of invasive weeds near endangered species; Meadow, squarrose, spotted and diffuse knapweed eradication on rangelands	82,080.00
Northern County Support	Eradication of A-rated Weeds	25,714.02
Subtotal		**1,200,000.00**

*listed by county where possible

Research Projects		
Dr. Joe Ditomaso - UC Davis	Control of 3 priority noxious weeds	70,000.00
Dr. Carl Bell - UC Coop Extension	Control of perennial pepperweed in wetlands	20,000.00
Dr. Ray Carruthers – USDA ARS	Biological control of pepperweed and tumbleweed	60,000.00
SUBTOTAL		**150,000.00**

Department Administrative Costs	**150,000.00**

TOTAL	**$1,500,000.00**

Grazing Lands Noxious Weed WMA Grant Project
In July 2006, the WMA Program received a Grazing Lands Coalition Initiative Grant for $306,000 from the Natural Resource Conservation Service (USDA) to hire a team of four seasonal employees for four years to carry out noxious weed control on private grazing lands. Planning has begun to select high-priority control sites for this new weed eradication team.

USDA, U.S. Forest Service and the Department Joint Noxious Weed WMA Grant Project
For the past four years, the U.S. Department of Agriculture Forest Service has funded the Department 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 Department 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 lands throughout California area relatively weed free. However, invasive weeds can move onto United States Forest Service 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 (cards, 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 four 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 2006 are in the table below (Table 1).

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

Table 1. USDA, U.S. Forest Service and the Department Joint Noxious Weed Projects in 2006

Accomplishments from USFS/Department Projects Completed

Group Conducting Project	Target Weed Species	Gross Area Surveyed	Net Acres Treated	Method of Treatment	Project Progress Quantified Further
Eastern Sierra WMA	Scotch thistle, Dalmatian toadflax, spotted knapweed, perennial pepperweed	843 acres	12	Mechanical, Herbicide	Scotch thistle populations were down over 47% to 0.5 acres and with two sites showing no growth during 2005-06. The spotted knapweed population has declined from 0.03 acres in 2004 to less than 0.01 acres. Perennial pepperweed sites that were known in 2004 have decreased by about half and several new sites were discovered in 2005-06. 25 Dalmatian toadflax plants were hand-pulled in the Mammoth Lakes area, which represents a 20% reduction from 2005.
Lassen WMA	Leafy spurge, rush skeletonweed, Dalmatian toadflax, musk	257 acres	10	Mechanical, Herbicide	Data being analyzed.

	thistle				
Mariposa WMA	Iberian starthistle	6 miles of creed	53	Herbicide	Percent reduction from 2005 to 2006: Piney Creek – 100% , Highway 132 - 40% and Granite Springs – 94%
Salmon River Restoration Council	Spotted knapweed, Tree of Heaven, Italian thistle, puncturevine, short white top	225 acres	23	Digging, Cutting, Mulching, Burning, Partial Girdling, Copper	Data being analyzed.
El Dorado WMA	Spotted knapweed	50 acres	0.2	Seed head clipping, hand pulling, weed wrenches and herbicides	In 2001, this plant species was established at 46 sites within the project area with up to an estimated 25,000 plants per site. In 2006, surveys identified 24 active sites with an average of less than 10 plants per site.
	Yellow starthistle	1,818 acres	3.6	Herbicide	Data being analyzed.
Alpine WMA	Canada thistle, yellow starthistle, spotted knapweed	300 miles of roadway	11.5	Herbicide, mechanical	No regrowth in 2006 of Canada thistle plants at two sites that were treated in fall 2005.
Shasta WMA	Musk thistle, Scotch thistle, squarrose and spotted knapweeds, Dalmatian toadflax, rush skeletonweed	2,500 acres	20	Mechanical, Herbicide	Data being analyzed.
Siskiyou WMA	Leafy spurge	257 acres	10	Herbicide	This project saw almost a 30% reduction in the acres of spurge treated over what was treated in the same area last year.
Plumas WMA	Yellow starthistle	5,367 acres	10	Herbicide	Funding allowed us to conduct survey, detect and treat a starthistle in Sierra Valley.
Modoc WMA	Musk thistle, leafy spurge, perennial	1,500 acres	5	Herbicide, Mechanical	Detection and immediate treatment of a brand new

	sowthistle, yellowspine thistle, plumeless thistle				infestation of leafy spurge (Fig. 2)
Fall River RCD	Perennial pepperweed	1,200 acres	9	Herbicide	Data being analyzed.
Kern RCD	Purple loosestrife	500 acres	25	Herbicide	Data being analyzed.
Mid-Klamath Watershed Alliance	Meadow knapweed	25 acres	3	Mowing, weed barrier cloth/mats, digging, Waipuna hot foam, revegetation with grass plugs	After two years of work towards eradication of meadow knapweed in Weitchpec, Humboldt County, the Mid-Klamath Watershed Council has made significant steps toward containing the invasive plant population.

2005 BEFORE TREATMENT **2006 POST TREATMENT**

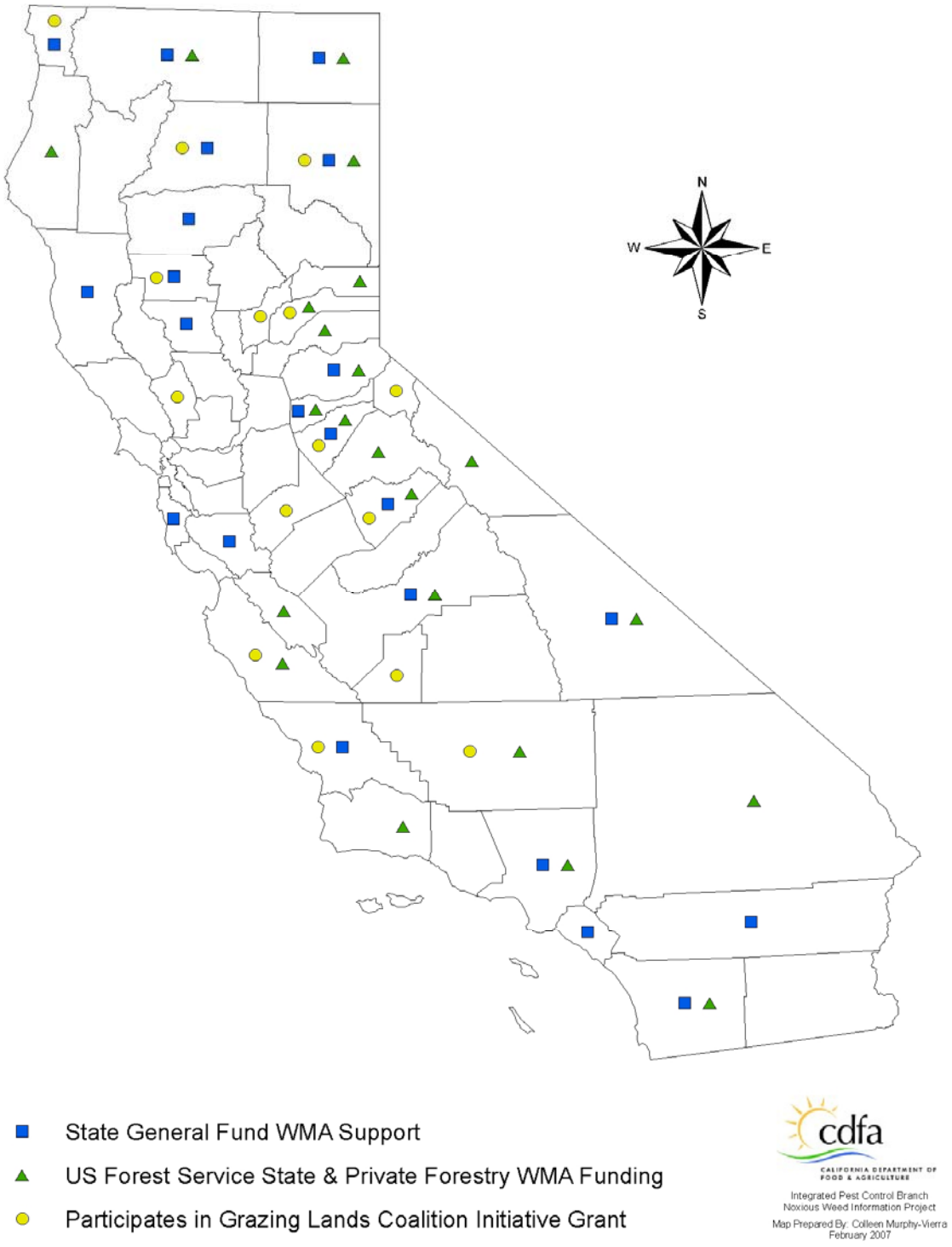
Figure 1. Mariposa WMA Iberian Starthistle Eradication Project

2005 BEFORE TREATMENT **2006 POST TREATMENT**

Figure 2. Modoc WMA Leafy Spurge Project

Figure 3

Figure 3. Location of the Three WMA Program Projects by County



NOXIOUS WEEDS PROGRAM

Noxious Weed Eradication project's accomplishments in 2006 were:

- 150 A-rated weed sites were treated and evaluated by program staff.
- A total of 13,285 miles of state, county and forest roads were surveyed for A-rated weeds.
- Program staff gave 40 educational, training and outreach presentations on Noxious Weed biology, identification and eradication. Over 1,250 people were in attendance at these presentations.
- Japanese dodder infestations were detected and evaluated.

To date, Noxious Weed Eradication projects have eradicated 14 weeds from the state. These are whitestem distaff thistle, dudaim melon, giant dodder, serrate spurge, Russian salttree, blueweed, tanglehead, creeping mesquite, meadowsage, heartleaf nightshade, Austrian peaweed, wild marigold, Syrian beancaper and perennial sowthistle. Weeds approaching eradication at the statewide level include camelthorn, golden thistle, smooth groundcherry and Illyrian thistle.

Noxious Weed Eradication projects are a cooperative effort between the California Department of Food and Agriculture (Department), the county agricultural commissioners and weed management areas. The objective of the projects is the early detection, containment and eradication of A-rated noxious weeds.

The Noxious Weeds Program is authorized by the California Food and Agricultural Code, Section 403 where it states, "The Department shall prevent the introduction and spread of … noxious weeds." 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 22 A-rated weeds under eradication, control or containment within California. These are:

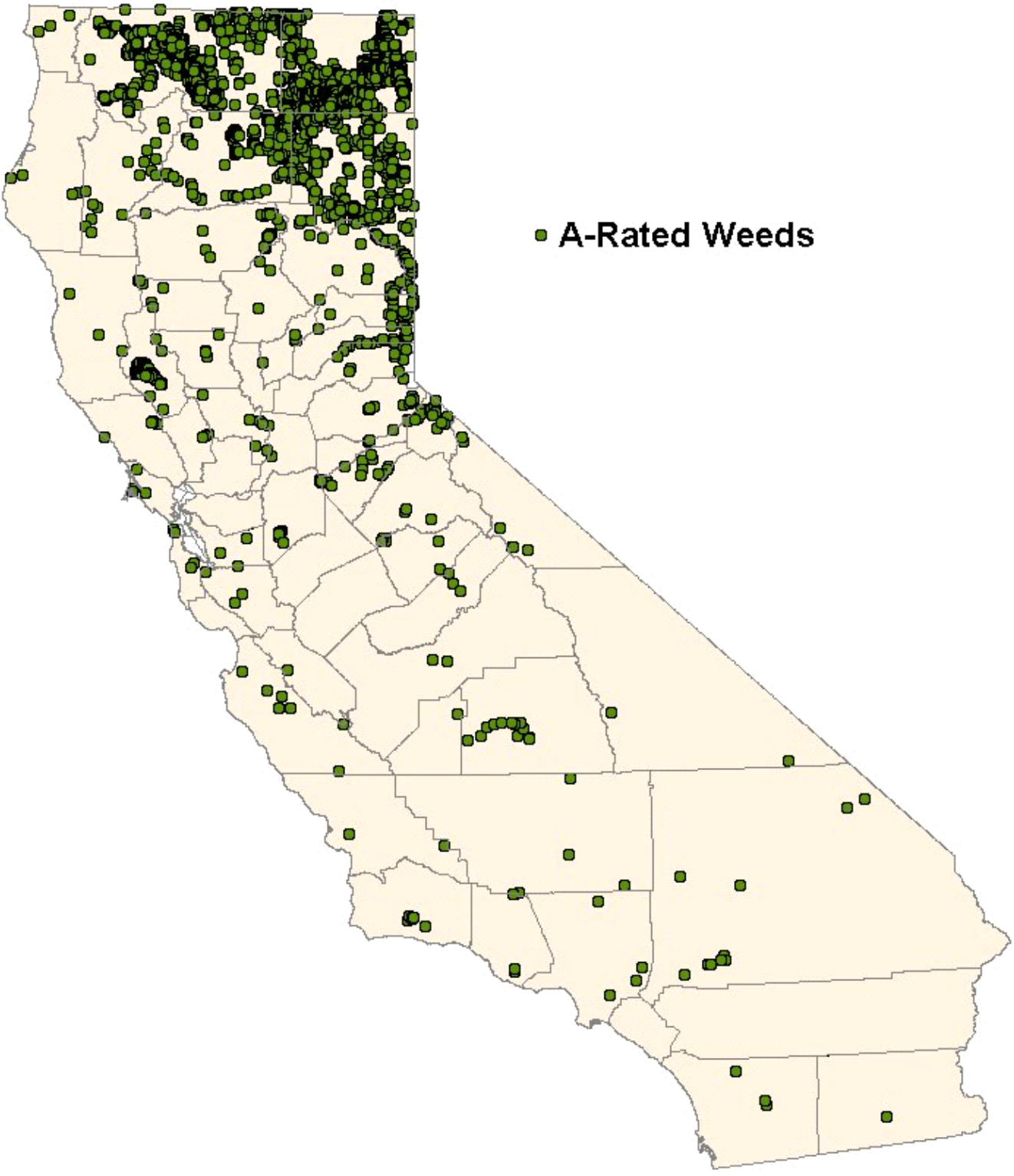
1) Punagrass - *Achnatherum brachychaetum*
2) Camelthorn - *Alhagi maurorum*
3) Alligatorweed - *Alternanthera philoxeroides*
4) Fertile capeweed - *Arctotheca calendula*
5) Plumeless Thistle - *Carduus acanthoides*
6) Musk Thistle - *Carduus nutans*
7) Diffuse knapweed - *Centaurea diffusa*
8) Iberian starthistle - *Centaurea iberica*
9) Spotted knapweed - *Centaurea maculosa*
10) Squarrose knapweed - *Centaurea squarrosa*
11) Skeletonweed - *Chondrilla juncea*
12) Yellowspine Thistle - *Cirsium ochrocentrum*
13) Dudaim melon - *Cucumis melo* var. *dudaim*
14) Leafy spurge - *Euphorbia esula*
15) Halogeton - *Halogeton glomeratus*
16) Dalmatian toadflax - *Linaria genistifolia* spp. *dalmatica*
17) Scotch Thistle - *Monopodium acanthi*
18) Illyrian Thistle - *Monopodium illyricum*

19) Taurian Thistle - *Onopordum tauricum*
20) Harmel - *Peganum harmala*
21) Wormleaf salsola - *Salsola vermiculata*
22) Golden Thistle - *Scolymus hispanicus*

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 from out of state. It also results partially from the movement of weed seed and parts on vehicles from out-of-state into these counties.

Figure 2. Locations of A-Rated noxious weeds in California. Each point on the map is a centroid (center locator) which may represent multiple weed populations over a large area



The Noxious Weed Eradication project's field activities in 2006 were approximately distributed as follows:

- Forty percent consisted of survey and detection of A-rated noxious weeds at known and historical find sites and defined "high-risk" corridors of entry into the state.

- Thirty-five percent consisted of eradication activities, such as physical removal, assistance to the Biological Control group in introducing and evaluating biological weed control agents and chemical control.

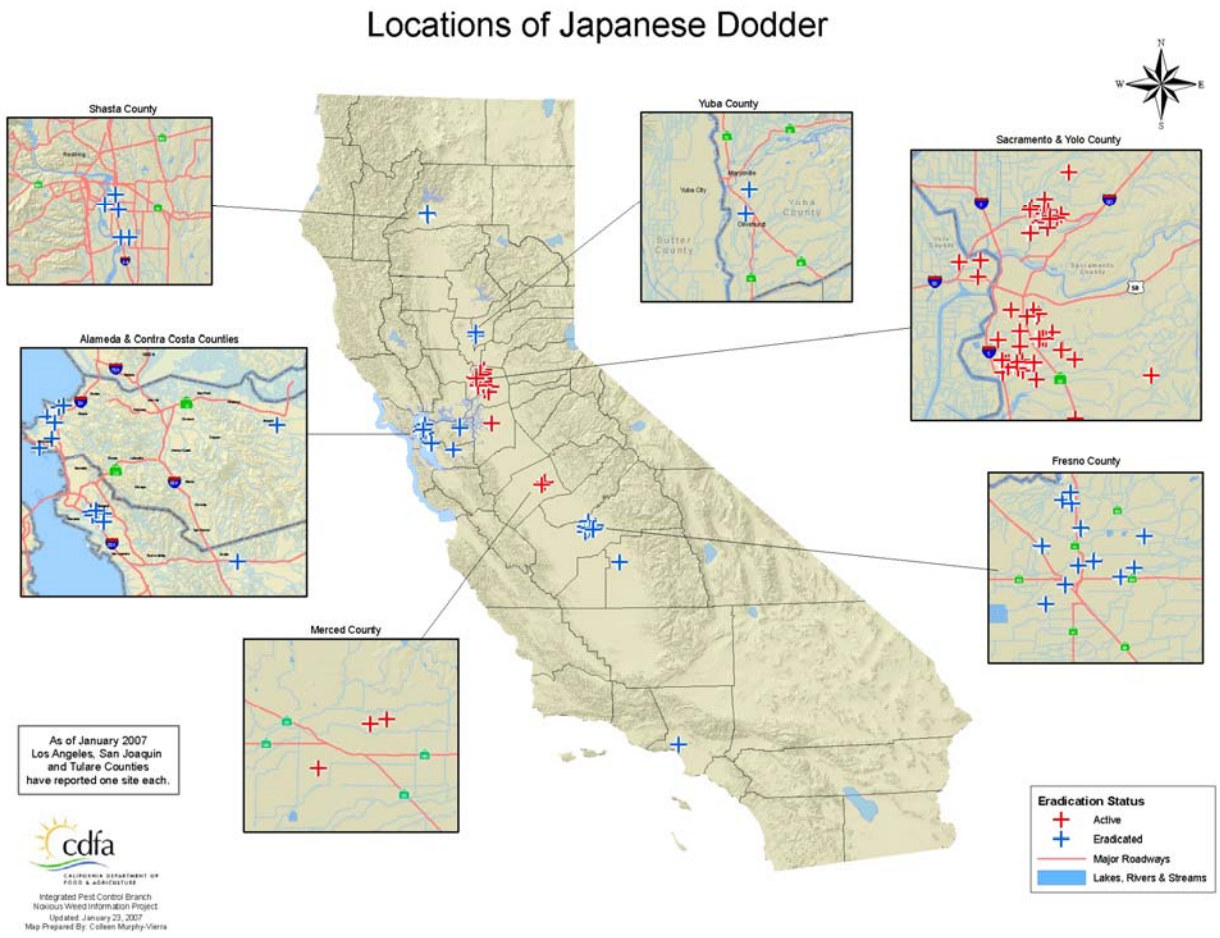
- Twenty-five percent consisted of outreach and education to elicit the help of the county agriculture departments, Weed Management Areas and public partners to report possible A-rated noxious weed finds.

JAPANESE DODDER PROGRAM

The Department has procured Emergency Funds to begin a Japanese dodder eradication program. The program goals are to detect and eradicate all outdoor infestations of Japanese dodder in California (Figure 3). The program will be a cooperative effort among the Department, the county agricultural commissioners and the United States Department of Agriculture. At present, Japanese dodder is known to occur in about 135 sites in 11 counties (Figure 4).

Figure 3. Japanese Dodder Infestation

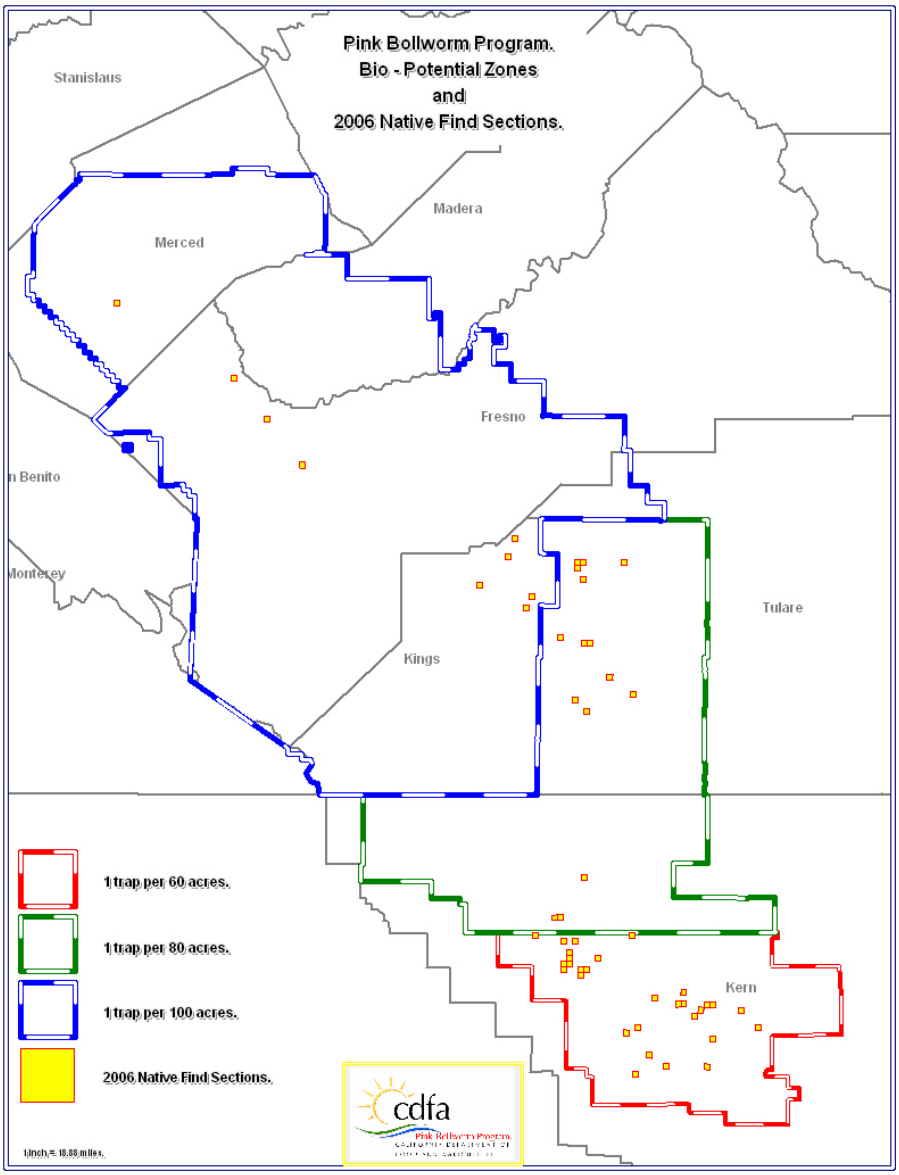
Figure 4. Japanese Dodder Locations



PINK BOLLWORM AND OTHER COTTON PESTS

Program personnel continue to prioritize activities using a risk-based management approach to control costs without significantly sacrificing program detection and control objectives. To match resources with needs, the San Joaquin Valley was divided into bio-potential zones, based on climate data and native moth capture history (Figure 1). The program activities of sterile release, mapping and trapping were then coordinated within each zone using the pink bollworm (PBW) heat unit model.

Figure 1. Map of the Pink Bollworm Bio-Potential Zones and 2006 Native Pink Bollworm Finds



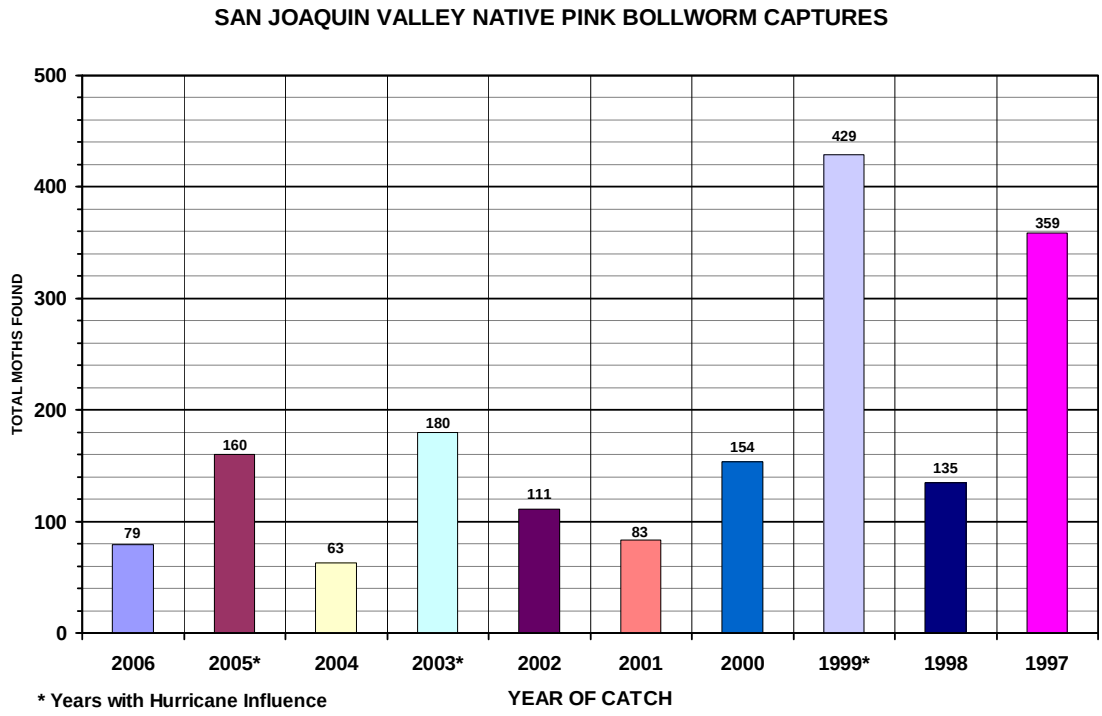
A total of 556,355 acres of cotton was mapped in California during 2006, 528,565 acres of which were in six counties in the San Joaquin Valley. Southern California cotton acreage totaled 20,375 acres. The three cotton-growing counties of northern California's Sacramento Valley had a total of 7,415 acres. In total the statewide acreage was down (~16.5 percent) from the 666,340 acres mapped in 2005. However, pima cotton plantings in the San Joaquin Valley for 2006 amounted to 272,670 acres, an increase of 18 percent from the 231,000 acres in 2005. Early detection trapping was done at selected San Joaquin Valley sites having native PBW moth catches in the year 2005 to detect possible over-wintering populations and monitor sterile release, which typically starts about May 1. The early detection trapping was conducted from April 17 through July 23. No non-sterile moths were caught in the 2006 early detection program.

General detection trapping activities were matched to the bio-potential zones. The program also utilized differential 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 SJV on June 19. The total number of traps deployed during the peak of the season was 6,260 traps. Traps were inspected weekly and were removed by October 13.

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 San Joaquin Valley. Zero PBW moths were detected in the Mojave Desert trap line in 2006. However, an unusual high number and past pattern of late season native moth captures in the San Joaquin Valley suggests that a "blow-in or carry-in" migration did occur.

Due to the closure of the Visalia field office, the PBW Identification Lab was relocated to the Shafter field office. In 2006, the lab examined 6,694 traps containing suspect moths submitted by trappers, which is roughly a 50 percent decline from 2005. This is most likely due to the reduced cotton acreage and increased field insecticide use in 2006. A total of 137,629 sterile moths and 79 native moths were identified in the San Joaquin Valley traps in 2006 (Figure 2). In 2005, 160 native moths were caught and 63 were caught in 2004. The breakdown of native moths trapped per county in 2006 was 49 trapped in Kern County, five in Kings County, seven in Fresno County, 17 in Tulare County, one in Merced County and zero in Madera County.

Figure 2. Native Pink Bollworm Captures in the San Joaquin Valley, 1997 through 2006

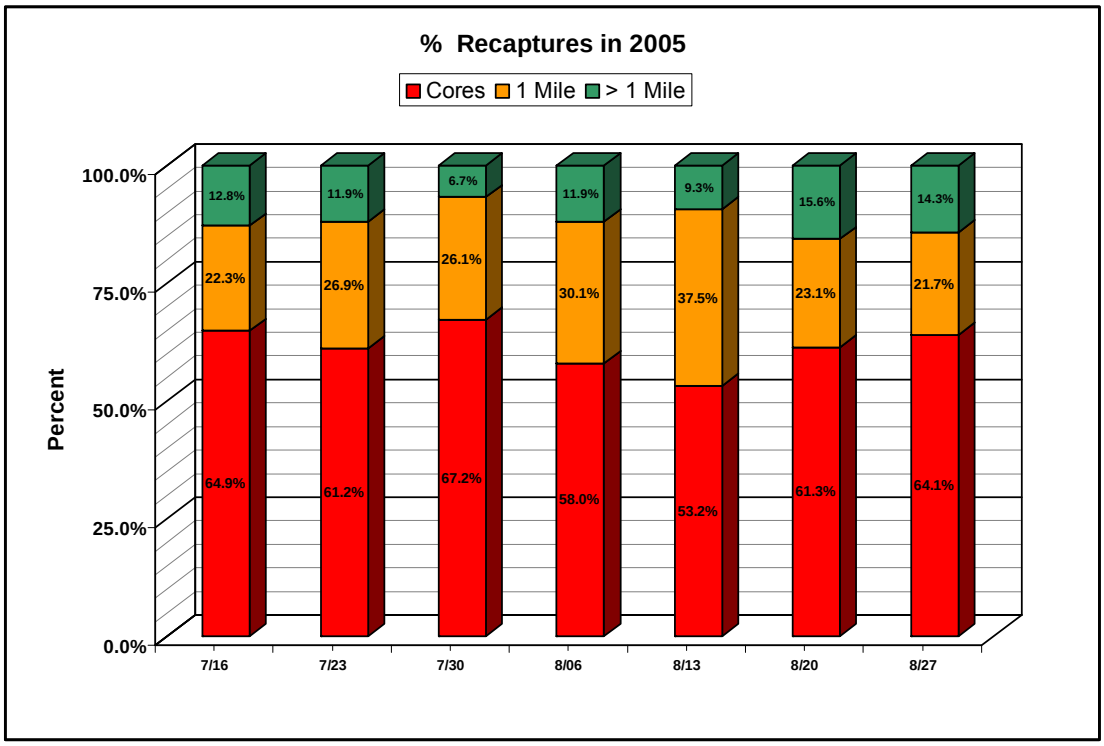


The sterile moth supply shipments from the PBW Rearing Facility in Phoenix, AZ were consistent throughout the entire release period. The program released an average of two million sterile moths per day. In total, 268,142,857 sterile moths were released in the San Joaquin Valley.

A Reduced Tillage Permit was issued by the Department to the PBW regulated districts in the San Joaquin Valley. The permit had several key requirements including grower notification to the local county agricultural commissioner, post harvest cotton plant shredding, tillage sufficient to prevent plant regrowth, regulatory inspection of cotton fields and 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 expired on December 31, 2006.
A Minimum Tillage Permit was issued by Department to the PBW regulated districts in southern California. The conditions and requirements of this permit were somewhat similar to the San Joaquin Valley, except there were no stipulations regarding native moth finds. The Permit was based, in part, on the high percentage of *Bt* cotton being grown in southern California.

Methods Development Trials
Department staff conducted an evaluation of sterile moth recaptures from three areas. Staff reviewed sterile moth recapture data from selected core sections, the immediate adjoining buffer sections, and sections greater than one mile from the core (Figure 3). This trial was conducted to assess the general movement and recapture of sterile moths from the targeted release section (core). Approximately 62.5 percent of the sterile moths recaptured were caught in the core square mile. The adjacent buffer square mile sections captured approximately 26.5 percent of the total moths caught. Roughly 11 percent of the sterile moths caught came from greater than one mile from the core release sections. This illustrates the potential for sterile moth movement from release sites, giving greater coverage of planted cotton acres.

Figure 3. Sterile pink bollworm moth recaptures in 2006 by distance from the targeted release section (core)



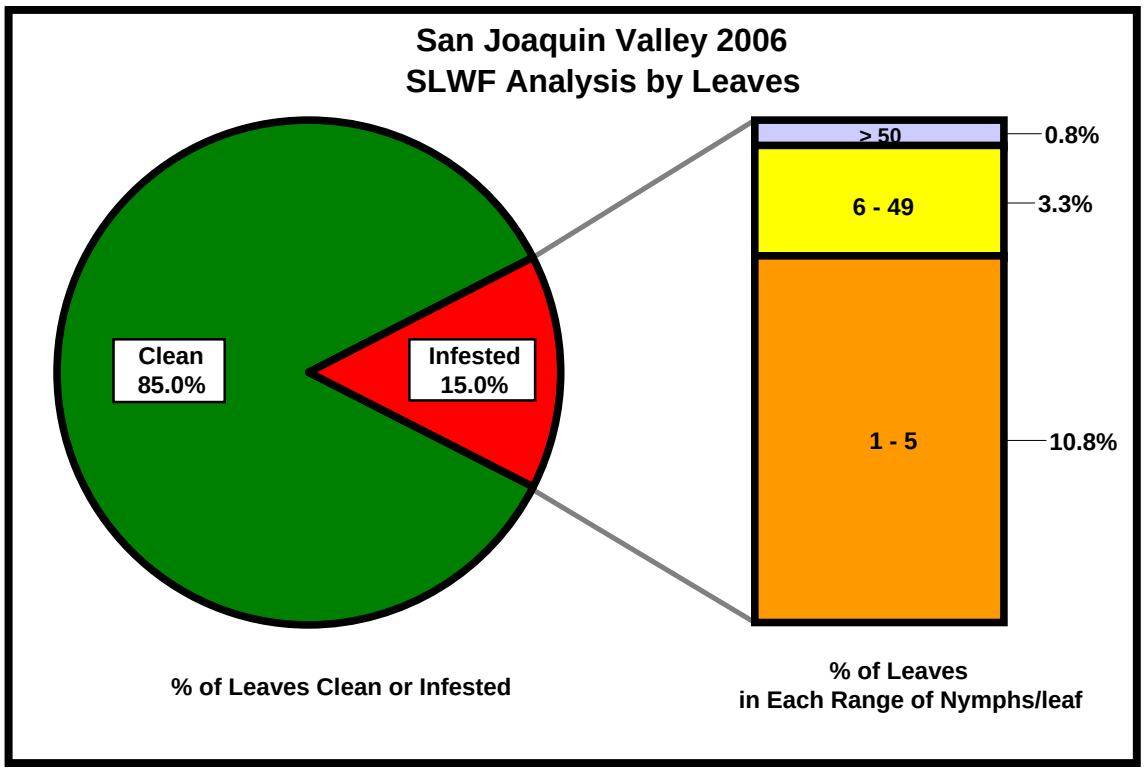
***Bt* Resistance Monitoring**
Pink Boll Worm (PBW) Program personnel conducted trapping and boll collection to evaluate possible PBW resistance to *Bt* cotton in the cotton-growing areas of Southern California. This

was done in cooperation with the USDA, the Arizona Cotton Research and Protection Council and the University of Arizona. Monitoring was done in Riverside and Imperial counties by collecting bolls at 10 sites. One thousand bolls were collected from each Bt cotton field and 200 bolls were collected from each non-Bt cotton field. Seven thousand two hundred bolls were collected from the Palo Verde Valley and another 4,800 bolls from Imperial Valley and were examined for Bt resistance using a U.S. Environmental Protection Agency approved protocol. To date, no resistance has been observed.

Silverleaf White Fly

Cotton fields were monitored for the seasonal density and distribution of Silverleaf white fly (SLWF) in the San Joaquin Valley. Data was summarized in bi-weekly reports and provided to USDA, county agricultural commissioners and University of California Cooperative Extension. During 2006, a total of 20,930 leaves were sampled from 385 sites in all counties (Figure 4). Of the total leaves sampled, 85 percent (17,793 leaves) had no SLWF nymphs on the leaves, 10.8 percent of the leaves sampled had between one to five nymphs per leaf. Leaves having six to 49 nymphs per leaf accounted for 3.3 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 that the intensity of infestation at most sites is very low.

Figure 4. Distribution of silverleaf whitefly in the San Joaquin Valley



Cotton Boll Weevil

Since November 1990, no boll weevils, *Anthonomus grandis*, have been trapped in California. The declaration of eradication of boll weevil was issued in December 1993. However, program efforts continue to help keep the state free of re-infestations of boll weevil. Traps are deployed in southern California cotton-growing areas to monitor any post eradication boll weevil activity. CDFA traps cotton fields in Imperial and Blythe/Palo Verde Valleys. The Imperial County Agricultural Commissioner, under contract with the Department, monitors boll weevil traps year

round along the borders of Arizona and Mexico. In 2006, no cotton boll weevils were detected in California.

CITRUS TRISTEZA VIRUS

The *Citrus tristeza virus* (CTV) or tristeza program continues to operate with funds generated by a tax assessment to citrus growers within participating pest control districts. Three citrus pest control districts comprise the Central California Tristeza Eradication Agency (CCTEA): 1) the Central Valley (Fresno County), 2) southern Tulare, and 3) Kern County. Whereas the West Fresno Red Scale Protective District does not have a mandatory program to remove CTV infected trees in commercial groves, it continues to contract with the Tristeza Agency to survey a limited amount of commercial acreage each year.

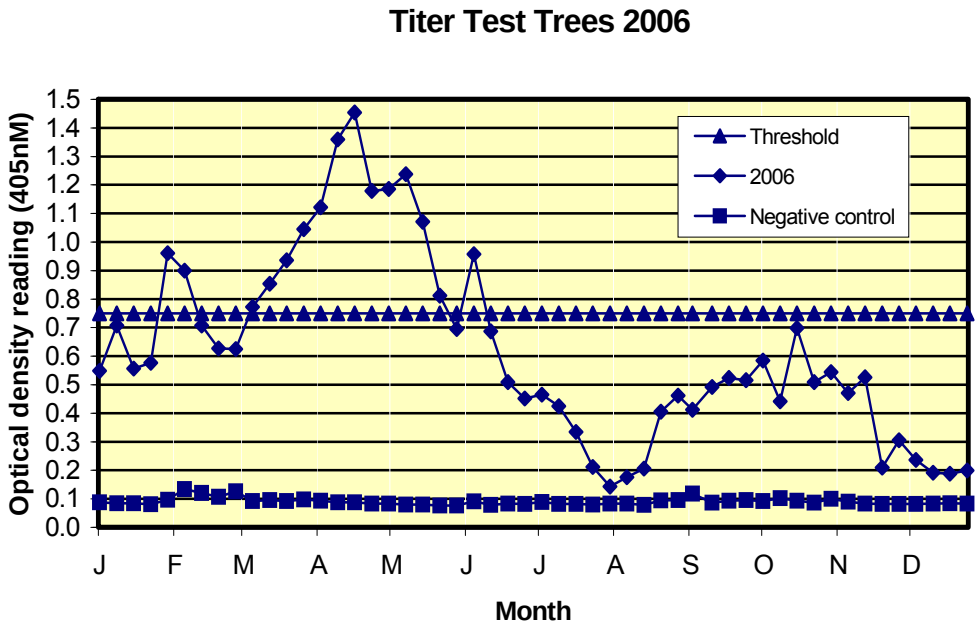
Contract Services

The CCTEA provides survey and laboratory services for a variety of entities. For the West Fresno District 1,905 samples were collected and analyzed. Contracts with citrus nurseries, University of California researchers, and the University of California Lindcove Research and Extension Center were honored representing a total of 6,132 samples. A portion of Riverside County, mainly the Coachella Valley area, is designated as suppressive and according to state CTV quarantine regulations must test and remove CTV-infected trees. This county collected 997 samples and sent them to the CCTEA for analysis. The agricultural commissioners in Fresno and Tulare counties conduct a CTV survey of citrus nurseries in their respective counties each spring. They also collect tissue when a nursery is cutting budwood for propagation. A total of 6,087 samples were tested for these purposes.

Seasonality

Samples from known CTV-positive trees, ("test trees") are collected on a weekly basis to determine virus titer. Titer is the level of virus that can be detected in field trees and determines whether citrus tissue can be collected to give accurate ELISA results. Data from ELISA is measured by the optical density at a wavelength of 405 nm. High levels of virus will absorb more light and therefore result in a higher optical density reading. The results from 25 test trees located in commercial groves in Fresno, Kern and Tulare counties are averaged. As recommended by the CCTEA Technical Advisory Committee (a group of Department, USDA and university scientists) the titer threshold for samples collected as part of the sub-sampling survey is 0.75. The following is a graph reflecting CTV titer during 2006 (Figure 1).

Figure 1. 2006 Citrus Tristeza Virus Titer Test Trees



Survey

The Central California Tristeza Eradication Agency (CCTEA) conducts two levels of survey: first, a grove level sub-sampling that determines whether a grove has infected trees and second, a single tree sampling that determines which individual tree or trees is infected with CTV and must be removed.

Grove Level Sub-sampling

The operational plan during 1998 to 2002 called for the subsampling of all commercial acreage within a four-year span (25 percent of the acreage/year) whereas the current plan accomplishes the same within a five-year span (20 percent acreage/year). 2006 was year four of the five-year cycle. The following is the survey results table. Comparing the percent incidence of 2006 to the overall incidence during the 1998 to 2002 period (Table 1), it is clear that CTV infection has decreased over time. This provides strong evidence that the Tristeza Eradication Program is effective.

Table 1. 2006 Citrus Tristeza Survey Results Summary

Activity in 2006					1998-2002
Pest Control District	**Acres Collected**	**Samples Collected**	**# Suspect**	**% Incidence**	**Average % Incidence**
Central Valley	4,947	30,821	35	0.028	0.046
Southern Tulare	11,536	89,887	139	0.039	0.117
Kern County	18,976	133,077	293	0.055	0.146
Totals	**35,459**	**253,785**	**467**	**0.049**	**0.120**

Single Tree Sampling

All groves that result in one or more suspect positive samples from the subsampling survey are compiled into a Collection Priority List and sorted by the estimated percent infection. Field crews return to these properties as the annual budget allows. Leaf samples are collected from individual trees to identify the CTV-infected trees. Confirmation of infection occurs after two separate tissue collections and ELISA (Enzyme-Linked Immunosorbant Assay) tests. A *Notice of Infection* requiring the removal of CTV-positive trees is sent to the owner. See Table 2 for 2006 results.

Table 2. 2006 Tree Removal Summary

Pest Control District	# Samples	# Owners	# Citrus Blocks	# Infected Trees
Central Valley	6,903	7	11	68
Southern Tulare	16,454	15	21	216
Kern County	41,589	13	32	1,294
Totals	**64,946**	**35**	**64**	**1,578**

CTV Isolate Collection and Virus Bio-characterization Experiments

Currently, there are 362 isolates of *Citrus tristeza virus* (CTV) in the collection maintained in the Central California Tristeza Eradication Agency (CCTEA) greenhouses. In past years, some entries were eliminated to open up space for researchers to add new isolates of interest. We have continued to keep the total number in the collection at a manageable number, as space is limited. The collection represents the San Joaquin Valley with 294 isolates, Ventura County with 30 isolates and southern California with 28 isolates. Approximately 87 isolates are related to specific research projects.

Each year approximately 30 isolates are selected for biological characterization (host symptom evaluation) on standard host indicator plants. These experiments are conducted under environmentally controlled greenhouse conditions. The objective is to determine various strains of CTV and their source. Specifically, looking for those that cause quick decline; stem pitting especially in sweet orange and seedling yellows. Detailed results are available on the CCTEA Web site at: http://www.cctea.org. The following is a summary of CTV types in California citrus groves.

Number of Isolates Causing Symptom Reactions

	Quick Decline		Stem Pitting		Seedling Yellows	
Host Variety	mild	severe	mild	severe	mild	severe
Sweet Orange grafted to Sour Root	47	17				
Lemon			14	1	56	3
Grapefruit			53	14	55	7
Sweet Orange			25	7		
Sour Orange					18	7

A severe reaction is considered one with a rating of three or higher based on a rating scale of zero to five, with zero being no symptoms observed.

Funding for the maintenance of the CTV collection and the biocharacterization of isolates is through two sources: 1) the University of California Genetic Resources Conservation Program – Imperiled Collection and 2) a cooperative program between the Citrus Research Board and the USDA.

Cooperative Research

The CTV collection is available to researchers and there are several ongoing projects. The purpose of one such project was to study quick decline symptom expression and identify genes expressed at the bud union during early stages of infection of sweet orange on sour orange rootstock. Plants were inoculated with several quick decline isolates that ranged in the severity of the decline symptom. RNA (ribonucleic acid) was extracted from plant tissue at 30, 60, 90 and 180 days post-inoculation. From this work, Expressed Sequence Tags were submitted for public access and genetic data is being analyzed using an Affymetrix Gene Chip.

The CCTEA is also working collaboratively with an USDA, Agriculture Research Services Parlier group on two projects. The first is characterizing an isolate collected from an illegal importation of the Dekopan variety of mandarin from Japan. Results from this project will improve the efficiency and accuracy of determining exotic isolates from those naturally occurring in California. The second is determining why certain mandarin varieties give elevated optical density readings when tested for CTV using ELISA which is a serological or protein-based assay. The Parlier group provides verification of CTV infection by using real time RT-PCR (reverse-transcriptase polymerase chain reaction) which is a DNA assay. The hypothesis is that a plant protein is reacting with the ELISA antibodies. Results from this work will determine whether the Agency will need to alter the current antibodies used in our ELISA protocol to accommodate the increased acreage of mandarin varieties in California. In addition, CTV isolates are provided to this researcher to determine the efficiency of transmission of California tristeza isolates by the California vector, *Aphis gossypii*. Isolates collected in certain areas in Kern County, primarily where growers had refused to remove trees in 1996, the cotton/melon aphid is able to transmit CTV at 60 percent efficiency. Historically the transmission efficiency of this vector was reported at three percent.

VERTEBRATE PEST CONTROL



The key accomplishments for 2006 include:

- *Vertebrate Pest Control Handbook* development and publication
- Public outreach and education seminars: Wildlife Damage Management
- Vertebrate Pest Control Research Advisory Committee

The primary objectives of the Vertebrate Pest Control Research Program are to maintain the California Department of Food and Agriculture's (Department) 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 Department'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 97 research projects totaling $6.7 million.

Vertebrate Pest Control Handbook Development and Publication

The *Vertebrate Pest Control Handbook Fourth Edition* (J.P. Clark 1994) has been used as a resource on vertebrate pest control throughout the state and nation and is considered the standard for vertebrate pest control information in California. The handbook, as originally written, was the guidebook for the California agricultural commissioners in their efforts to deal with important vertebrate pests in agriculture and public health. Although the handbook has been an important resource in the past, several portions of the handbook were out of date, such as the laws and regulations, vertebrate pest control products, information on diseases related to wildlife and humans and recent research on wildlife damage management. In 2006, the Vertebrate Pest Control Research Advisory Committee funded the development of a revised handbook to provide a relevant, updated resource for California's pest problems. Revisions are being made by the Department, the University of California and the California Department of Health Services. Accurate and up-to-date information will be available to agricultural producers and others by June 2007. The handbook will be published on the Internet and other electronic formats.

Public Outreach and Education Seminars: Wildlife Damage Management

In 2006, the Vertebrate Pest Control Research Program staff provided public outreach and education seminars to the California Cattleman's Association, the Vertebrate Pest Conference, the University of California Cooperative Extension, the Pesticide Applicators Professional Association, the U.S. Fish and Wildlife Services, the Western Extension and Research Association, the U.S. Department of Agriculture (USDA) and the California Agricultural Commissioners and Sealers Association.

- Seventeen education seminars were presented to the public
- Approximately 1,500 people attended the education seminars
- Education seminars were presented on laws and regulations, bird control, predator management, small mammal control, endangered species conservation, invasive species management and current research projects

Vertebrate Pest Control Research Advisory Committee

The Vertebrate Pest Control Research Advisory Committee held two meetings in 2006. The first was held on April 19 in Sonoma County and the second on October 25 in El Dorado County.

The following research proposals were recommended for funding by the committee, approved by the Secretary of the Department, and initiated in 2006:

1. “Evaluation of Hydrolyzed Casein as a Repellent for Rabbits, Voles, Pocket Gophers and Mountain Beaver”, Dr. Bruce Kimball, USDA/Animal and Plant Health Inspection Services (APHIS), Wildlife Services, National Wildlife Research Center.

2. “A Field Test of Jackrabbit Bait Station Strategies Year 2”, Dr. Terrell Salmon, University of California, Davis.

3. “Research Web site Development for the Vertebrate Pest Control Research Advisory Committee”, Dr. Terrell Salmon, University of California, Cooperative Extension, San Diego County.

4. “Establishing Baselines and Monitoring Anticoagulant Resistance in California Ground Squirrels”, Dr. Terrell Salmon, University of California, Cooperative Extension, San Diego County.

5. “Evaluation and Control of Wild Turkey Damage in California Vineyards”, Dr. Mike Delwiche, University of California, Davis.

6. “Development of a Pharmacokinetic Computer Model to Assure the Continued/Expanded use of Anticolagulant Rodenticides”, Dr. John Johnston, USDA/APHIS, Wildlife Services, National Wildlife Research Center.

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) also serves as a scientific resource and provides professional expertise to a number of clients including California Department of Food and Agriculture (Department), 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. PPDC scientists, technicians and support staff strive to provide excellence in service and leadership in plant pest diagnostics and biosystematics.

The staff of the PPDC continues 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 2006.

SAMPLES PROCESSED (4 YEARS)				
Labs / Programs	**2003**	**2004**	**2005**	**2006**
Botany	3,284	1,008	1,000	1,474
Entomology*	36,146	45,000+	50,000+	50,000+
Nematology*	4,782	3,874	4,923	7,912
Plant Pathology*	88,233	109,398	103,451	87,434
Seed Science	3,067	6,923	3,166	5,791
Total	**135,512**	**166,203**	**162,540**	**152,611**
* Includes special projects				
Please note that the numbers cannot be compared among the different disciplines (labs/programs) as an accurate indication of workload.				

RESEARCH

The scientists at the PPDC continue to do research and publish scientific papers as part of the mission of this branch. In the past year members of the PPDC published 58 scientific papers. In addition, 34 posters and/or oral presentations were given at various professional meetings, seminars, and training workshops. A list of scientific publications and presentations for 2006 are included at the end of this report.

THE CALIFORNIA STATE COLLECTION OF ARTHROPODS

The California State Collection of Arthropods, a significant resource of more than 1.5 million specimens, is utilized for comparative specimens in diagnostics by staff and as a resource for scientists worldwide. The collection is maintained by the Entomology Lab, as an integral feature of the identification services provided to the citizens and business interests of the state, and to peers and colleagues both nationally and internationally. PPDC staff has added more than 25,000 specimens to the collection this year, and an inventory of the species held is nearly compete, with over 40,000 species represented so far. As far as specimen usage, the California State Collection of Arthropods issued 10 loans in 2006, representing nearly 5,000 specimens, and more than 25 visitors from the local, national and international communities have come in to study the collections.

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 2006 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: 2006 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 (Department). Two 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 Web site: www.cdfa.ca.gov/phpps/ppd/CSCA.htm.

The total number of prepared specimens exceeds 1.5 million, with more than 25,000 prepared specimens accessioned in 2006, including the start of an exchange program with the Museo de Ciencias Naturales in Salta, Argentina. With the CSCAs blanket permit to collect arthropods in California's State Park system, several seasonal survey efforts were undertaken, including Grover Hot Springs State Park and Big Sur State Park. CSCA's Frozen Tissue Collection has grown by over 500 determined samples from over 200 collecting events. Several holotypes and numerous paratypes were deposited in CSCA in 2006, and the collection has been recognized as an important repository for certain groups of arthropods. While personal examination of types may always be necessary, 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, so far with over 40,000 species.

Collection management has been streamlined with the appointment of the Collection Manager. Duties include processing loan requests, reaccessioning loan returns, accessioning new materials, sorting incoming accessions, assuring that supplies are adequate for collection work and keeping the inventory database up to date.

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 2006, and are being considered for this courtesy appointment. The Research Associates can be found on the Internet at: www.cdfa.ca.gov/phpps/ppd/Entomology/CSCA/ResAssoc.htm

ANNUAL STATE SCIENTISTS DAY EXHIBITION

Dr. John Chitambar of the PPDC Nematology Laboratory ponders a question posed by a student at State Scientists Day, while others examine laboratory displays and demonstrations. Since the late 1980s the Plant Pest Diagnostics Center (PPDC) has participated in the State Scientists Day in Sacramento. Here PPDC scientists set-up educational displays and demonstrations that include real specimens to educate thousands of young science students who travel from all over the state to attend this event. Hands-on displays of mounted insects, live exotic plants and microscopes set up for viewing specimens of seeds, nematodes and fungi always stimulate interesting discussions, questions and great interest among both students as well as with their science teachers. The hope is that students exposed to the exciting world of real, everyday applied science will have a greater appreciation of the sciences, and perhaps even develop the same love of and enthusiasm for science that they see modeled by all the science professionals at State Scientists Day.

PPDC Training at Border Protection Stations

Several Diagnostic Scientists from the PPDC traveled to the various California Department of Food and Agriculture (Department) Pest Exclusion Border Protection Stations during summer 2006 to provide training to their inspection partners working at the borders. A supervisor of Pest Exclusion's border station program led the tour. The training consisted of PowerPoint presentations on the recognition of invertebrate and weed seed pests, and plant diseases. Specialized training was provided in photography of invertebrates and seeds for the digital identification program, in which high-quality digital images taken by border station staff are emailed to laboratory scientists, sometimes enabling them to make identifications in minutes as opposed to days.

Gillian Watson, Insect Biosystematist, instructs inspectors from Blythe and Vidal Inspection Stations on the recognition of thrips injury to various plant parts.

A seed botanist discussed the identification of seeds, particularly those of noxious weeds not known to occur in California. It was explained how to use a new seed identification guide prepared for border station use by the seed laboratory staff. A seed identification folder was provided for each border station.

Seed Botanist Jim Effenberger explains how to use a new seed identification guide book prepared by CDFA PPDC Seed Laboratory staff specifically for the border stations.

Two plant pathologists visited the northern and southern California stations respectively. They provided basic training in the recognition of plant diseases, including some high-profile diseases of citrus and stone fruits. They also covered proper sampling and appropriate packaging of disease specimens for sending to the diagnostic laboratory.

An important benefit of the training tours was that the training went both ways. The laboratory scientists also received an education in the often high-pressure job of the inspectors, by spending the afternoons after the morning training sessions “out on the line” with the inspectors at several border stations. They quickly developed a healthy respect for the inspectors, and an

appreciation of the often-adverse conditions under which they perform their jobs with skill and professionalism.

Plant Pathologist Tim Tidwell and Pest Exclusion Supervisor Mark Stirling assist Inspector Patricia Duarte at Vidal Station, examining limes from Mexico for pests.

John Sorensen, Insect Biosystematist, confirms a RIFA identification on site at Vidal Inspection Station.

While the lab scientists were visiting Vidal station, a truck from Texas rolled up carrying a seemingly innocuous load of rolled plastic. The young inspector at the Vidal station had the driver open the truck for inspection and found exactly what she suspected she might find – red imported fire ants. Since John Sorensen was among the visiting group, he quickly examined the ants microscopically and confirmed the identification on site. This set a new record for the fastest turn-around for border station identification. The trucker elected to go to Blythe for fumigation of his load.

The 2006 border protection station training tour was a major success on all fronts. Station inspectors received valuable training, and lab scientists got an accurate picture of this vital part of the Plant Health and Pest Prevention Services. As a result, both groups have a much clearer vision of the "team" that together they comprise, and a better appreciation for the difficulties and nuances of one another's jobs. It also opened wide the door of creativity and promoted an

exchange of ideas so that both groups will be better able to better assist one another in the common goal of excluding unwanted pests from California.

STAFFING CHANGES

Sergei Subbotin

Dean Kelch

Dr. Sergei Subbotin currently serves as an Associate Plant Nematologist in the PPDC Nematology laboratory. Dr. Subbotin is an expert in the molecular methodology for nematode identification, as well as for studies in the genetic diversity and phylogeny of nematodes. His particular research interest is in the systematics of cyst nematodes. In addition, Dr. Subbotin is accomplished in both scanning and transmission electron microscopy. He has been a Senior Researcher at the Institute of Parasitology of the Russian Academy of Sciences in Moscow, Russia, a Guest Professor at the Gent University in Gent, Belgium, and most recently an assistant nematologist at the Nematology Department of the University of California, Riverside. In addition, Dr. Subbotin serves as Chief Editor of the Russian Journal of Nematology.

Dr. Dean Kelch joined the PPDC in March 2006, and currently serves as an Associate Botanist in the Botany Laboratory. An expert in California's native flora, Dr. Kelch's research interests include the systematics of thistles and conifers, as well as the evolution and biogeography of seed plants using molecular methodology and computer-assisted phylogenetic analysis. Dr. Kelch's diverse and varied areas of expertise include seed plant evolution, native plant restoration, habitat delineation, as well as native and rare plant propagation. Most recently Dr. Kelch served as a visiting scholar, researcher and lecturer at the University of California, Berkeley. Dr. Kelch has won numerous awards, grants and scholarships to study various aspects of botany and systematics both in the United States and internationally.

Dr. Riad Baalbaki joined the PPDC in April of this year, and serves as an Associate Seed Botanist in the Seed Science Laboratory. A Seed Physiologist by training, Dr. Baalbaki received his education in seed science at Michigan State University. Prior to joining the PPDC seed science laboratory, he was an associate professor of plant science at the American University of Beirut, Lebanon, where he designed, set up and managed the seed science laboratory. Dr. Baalbaki is a specialist in seed physiology including seed responses to stress factors, germplasm characterization, phytoremediation and sustainable cropping systems. In

his professional travels he has also served as a visiting scholar/scientist at Stanford University, Cornell University, the University of California, Davis as well as with the USDA Agriculture Research Services in Riverside, California.

Riad Baalbaki

Suzanne Rooney Latham

Dr. Suzanne Rooney Latham joined the PPDC in December 2006. Dr. Latham is an Associate Plant Pathologist, whose special expertise and experience in grape diseases is a welcome addition to the Plant Pathology Laboratory. A specialist in mycology, Dr. Latham's primary responsibilities include the diagnostics of plant diseases caused by fungal plant pathogens, and will likely spend a fair amount of time working on the *Phytophthora ramorum* project. Most recently Dr. Latham has been working as a Post-doctoral scholar at the University of California, Davis, conducting research on fruit diseases. This includes serving as the project leader of a research team on studies involving grape pathogens. During this same period, Dr. Latham has also been serving as Professor of Biology at Solano Community College, in Fairfield, California. She also currently serves as a reviewer for the scientific journals *Plant Disease*, *Phytopathologia Mediterranea* and the *European Journal of Plant Patholo*gy.

Tom Manos, joined the PPDC Entomology Laboratory staff in March as an Senior Laboratory Assistant. Tom assists in the processing of samples for Glassy Wing Sharpshooter identification, including scanning electron microscopy. Most recently he had been part of the Microbial Data Program, assisting microbiologists in various lab functions such as media preparation and sample processing. Tom has a diverse background that includes working in a medical laboratory, doing medical transcription, information technology, and includes a four year term as an English language editor at the Central Translation Bureau of the Chinese government in Beijing.

Tom Manos

Marinell Soriano and Jun-Jun Estoque

Marinell Soriano and Jun-Jun Estoque joined the PPDC Plant Pathology laboratory as Laboratory Assistants working on the Sudden Oak Death Project. Marinell heads up the sample processing team, and is involved in the training of part time scientific aides who process Sudden Oak Death samples and prepare culture media. Jun-Jun works primarily in the ELISA (Enzyme-Linked Immunosorbant Assay) laboratory conducting serological tests for *Phytopthora ramorum*, and occasionally assists with ELISA testing for other pathogens such as the Pierce's Disease pathogen, *Xylella fastidiosa*. Both Jun-Jun and Marinell have Bachelor's degrees in nursing.

Deapartures

Dr. Samantha Thomas, left the Plant Pathology Laboratory in July to take a position with Seminis Vegetable Seeds as the Director of their Seed Health Testing Program in Woodland, California. She had served as an Associate Plant Pathologist for 1 ½ years with the PPDC Lab.

Dr. Matthew Buffington left the Entomology Laboratory to take a position a Research Entomologist with USDA-ARS-Systematic Entomology Laboratory at the Smithsonian Institution, Washington, D.C. He was a Post-doctoral Researcher for about a year with the PPDC Lab.

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2006 PRESENTATIONS BY PPDC STAFF

Baalbaki, R. Setting up a seed lab in Lebanon. The CDFA Annual Seed Workshop and the California Seed Industry Conference, Woodland, CA, May 17 – 19, 2006.

Bellamy, C. L. "Is prettiness a valid character state?". CDFA PPDC Seminar series, Sacramento, CA, May 18, 2006.

Cline, Andrew R. Invited seminar: "Exploring Arthropod Diversity in a Lowland Tropical Forest: A Study from the San Lorenzo Protected Area in Panama." Montana State University, Bozeman, MT.

Effenberger, J. Identification of onions, leeks and chives. The CDFA Annual Seed Workshop and the California Seed Industry Conference, Sacramento, CA, May 17 – 19, 2006.

Effenberger, J. California noxious weed pest propagules. Border Station Training Sessions: Truckee, August 15 – 16; Hornbrook, September 19 – 21; Blythe, October 2 – 3; and Needles, October 5 – 6, 2006.

Epstein, M.E. Limacodidae along the Barva transect. Symposium: Tropical Arthropod Diversity from Sea-level to Cloud Forest: Project ALAS results from the Barva Transect. National Meeting of the Entomological Society of America, Indianapolis, Dec. 10, 2006.

Shen-Horn, Yen and **M.E. Epstein**. Homology of copulatory structures of the Zygaenoidea, with special reference to genitalia reduction and functional morphology in Zygaenidae. Symposium: Genitalic Homology Challenges in the Lepidopteran Tree of Life. National Meeting of the Entomological Society of America, Indianapolis, Dec. 13, 2006.

Gaimari, S.D., & M.S. Anderson. Raman-atomic force microscopy revealing nanometer-scale morphology and spectro-chemistry of the ommatidial surfaces of Dipteran compound eyes. VIth International Congress of Dipterology, Fukuoka, Japan.

Gaimari, S.D. Dipterology in an island paradise: Trekking through Fiji looking for lauxaniid flies. CDFA-PPD Seminar Series, Sacramento, CA.

Gaimari, S.D. One less acalyptrate family? The status of Eurychoromyiidae. VIth International Congress of Dipterology, Fukuoka, Japan

Garrison, Rosser; "*Insects from around the world-a photographic journey*" CDFA PPDC Seminar series, Sacramento, CA, September 22, 2006.

Hauser, M. "Scientific illustrations with Adobe Illustrator" Workshop, Department of Entomology, Iowa State University, Ames, IA. April 2006

Hauser, M. *"The basal radiation of Stiletto Flies - Evidence from time and space"* Oral presentation, Entomology seminar series, Iowa State University, Ames, IA. April 2006

Hauser, M.. "Dipterological research in Madagascar" Oral presentation, Museum for Natural History Stuttgart, Germany. July 2006.

Hauser, M. "Mysterious Madagascar" Seinar series, CDFA, Sacramento, California. January 2006

Hrusa, G.F. Systematics and Evolution of Rhododendron occidentale (western azalea). 10-18-2006, McKinley Center, Sacramento. For the California Native Plant Society.

Rooney-Latham, S. Demystifying Esca: Recent findings on an ancient and elusive disease of grapevines CDFA PPDC Seminar series, Sacramento, CA, Novermber 14, 2006.

Elias, S. and **D. J. L. Meyer**. Tolerances in seed purity analysis. Research Session, Association of Official Seed Certifying Agencies/Association of Official Seed Analysts/Society of Commercial Seed Technologists Annual Meeting, Indianapolis, IN, June 2 – 8, 2006.

Meyer, D. J. L. General Blower calibration based on air velocity measurement. The CDFA Annual Seed Workshop and the California Seed Industry

Conference, Woodland, CA, May 17 – 19, 2006.

Meyer, D. J. L. Seeds and fruits of small seeded legumes. The CDFA Annual Seed Workshop and the California Seed Industry Conference, Sacramento, CA, May 17 – 19, 2006.

Meyer, D. J. L. Identification of California noxious weed pest propagules. Oregon State University Seed Workshop, November 29, 2006.

Meyer, D. J. L. 2006. Cover illustration: 'Georgia Green' peanut, *Arachis hypogaea* L., seedlings showing normal development at day 6 of germination test. *Seed Technology*, Vol. 28(1).

Meyer, D. J. L. and J. Effenberger. Poster: Seed morphology of *Cuscuta* spp. (dodders), *Physalis* (ground cherry) and *Solanum* (nightshades). Seed Issues Forum, Association of Official Seed Certifying Agencies/Association of Official Seed Analysts/Society of Commercial Seed Technologists Annual Meeting, Indianapolis, IN, June 2 – 8, 2006.

Peterson, P. Normal and abnormal seedling structures in large seeded legumes: bean, chickpea, cowpea, horsebean, lima bean, pea, soybean and vetch. The CDFA Annual Seed Workshop and the California Seed Industry Conference, Sacramento, CA, May 17 – 19, 2006.

Scher, J. "Introduction to Lucid Keys." WPDN, UC Davis Regional Center, Insect Identification Workshop: Homoptera, March 22, 2006, Davis, CA.

Subbotin S.A. *Molecular systematics of cyst-forming nematodes*. CDFA PPDC Seminar series, Sacramento, CA, July 12, 2006

Tidwell, T.E. The role that seed laboratories play in issuing a phytosanitary certificate. California Seed Industry Annual Conference, Woodland, CA, May 24, 2006.

Tidwell, T.E. 2006 California Tree Disease Summary. California Forest Pest Council Annual Meeting, Woodland, CA. November 14, 2006.

Watson, G. Integrated Pest Management of Cotton in Asia. CDFA PPDC Seminar series, Sacramento, CA, January 8, 2006.

Winterton, S.L. Integrated, multinational study on stiletto flies (Diptera: Therevidae): an example from the NSF (PEET) program. Pacific Coast Entomological Society. February, 2006.

Winterton, S.L. The ancestral lacewing had an aquatic larval stage: molecular Phylogeny and historical divergence time estimates for Neuropterida (Insecta: Neuroptera, Megaloptera, Raphidioptera). University of California, Davis, Department of Entomology seminar series. March, 2006.

Winterton, S.L. The position of Diptera in the Holometabola: Evidence from multiple nuclear genes. 6th International Congress of Dipterology, Fukuoka, Japan. September, 2006.

Winterton, S.L. Evolution of the therevoid clade (Diptera: Asiloidea) with special emphasis on window flies (Scenopinidae): a total evidence approach. 6th International

Congress of Dipterology, Fukuoka, Japan. September, 2006.

Winterton, S.L. The future of multimedia: electronic and internet resources for Asiloidea research. 6th International Congress of Dipterology, Fukuoka, Japan. September, 2006.